BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

In the Matter of:	)	
STANDARD FOR THE DISPOSAL OF COAL COMBUSTION RESIDUALS IN SURFACE IMPOUNDMENTS: PROPOSED NEW 35 ILL. ADMIN. CODE 845	)	PCB 2020-019(A) (Rulemaking - Land)

NOTICE OF ELECTRONIC FILING

To: Attached Service List

PLEASE TAKE NOTICE that on August 6, 2021, I electronically filed with the Clerk of the Illinois Pollution Control Board ("Board") the **ENVIRONMENTAL LAW & POLICY CENTER, LITTLE VILLAGE ENVIRONMENTAL JUSTICE ORGANIZATION, PRAIRIE RIVER NETWORK, AND SIERRA CLUB'S INITIAL COMMENTS AND RECOMMENDED RULES**, copies of which are served on you along with this notice. Attachments to the Comments will be submitted in a separate filing.

Dated: August 6, 2021

Respectfully Submitted,

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	)	R 2020-019(A)
STANDARDS FOR THE DISPOSAL	)	
OF COAL COMBUSTION RESIDUALS	)	(Rulemaking – Land)
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CODE 845	)	

INITIAL COMMENTS AND RECOMMENDED RULES

The Environmental Law & Policy Center ("ELPC"), Little Village Environmental Justice Organization ("LVEJO"), Prairie Rivers Network ("PRN"), and Sierra Club (collectively, "Environmental Groups" or "Commenters"), hereby submit these initial comments and recommended rules in the above-referenced docket. Our recommended rules are included as appendices to these comments. We appreciate the Board's prompt consideration of these important matters.

I. The Board Should Regulate Historic Coal Ash Fill Because, Similar to Coal Ash Impoundments, It Contaminates Groundwater.

The Board opened this sub-docket to explore historic, unconsolidated coal ash fill in the State of Illinois, among other topics. R20-19, Order at 2 (February 4, 2021). Historic coal ash fill has been buried at coal-fired power plants across Illinois, and ample evidence exists showing that this historic coal ash fill has been a source of groundwater pollution. Further, historic coal ash fill is only regulated in Illinois after the fact – it is possible to bring an enforcement action for surface water pollution, groundwater pollution or open dumping.[1] Enforcement under those provisions can only happen, however, if the contamination is monitored or discovered in some manner and if citizens or the Attorney General have the resources and will to bring a suit. Because historic coal ash fill pollutes groundwater in a manner similar to unlined coal ash impoundments, regulation of historic coal ash fill can be modeled on how Illinois regulates impoundments.

This section is comprised of four parts: Part A highlights existing evidence of pollution from historic coal ash in Illinois, in response to the Hearing Officer's request for "information on historic, unconsolidated fills, including the number of fills in the State, the location of the fills, [and] potential groundwater issues,"[2] Part B explains why existing Illinois law is inadequate to address the historic ash problem; Part C provides an explanation of the Environmental Groups' proposed rules governing historic coal ash fill in Illinois; and Part D recommends a process by which the Board can identify CCR fill areas that should be subject to CCR fill area regulations.

[1] *See, e.g.*, 415 ILCS 5/12(a), 12(d), 21(a).
[2] R20-19(A), Hearing Officer Order at 1 (May 6, 2021).

In response to the Hearing Officer's request for "regulatory approaches to manage or close the fills along with specific rule language to that effect,"[3] the accompanying proposed rule language is attached to these Comments in Appendix 1.

A. Historic Coal Ash Fill Contaminates Soil and Groundwater in Illinois.

There is extensive evidence showing that historic coal ash fill from coal-fired power plants is present across Illinois, and that this historic coal ash fill has been a source of groundwater pollution. Further, while we know about some CCR fill areas, there are likely many more CCR fill sites that have not yet been identified, given the historic industry practice of dumping coal ash in unlined landfills.[4]

1. Midwest Generation, LLC Coal Plants.

In *Sierra Club, et al., v. Midwest Generation, LLC*, the Board found historic coal ash fill caused years' worth of groundwater pollution at four coal plants across Illinois.[5] Those coal plants are (1) Joliet 29 Generating Station, (2) Powerton Generating Station, (3) Will County Generating Station, and (4) Waukegan Generating Station.

i. Joliet 29

At the Joliet 29 coal plant in Joliet, Illinois, the Board found that there existed large swathes of historic coal ash fill areas, including the Northeast Area, the Southwest Area, and the Northwest Area.[6] These historic coal ash fill areas are unlined, and no groundwater monitoring wells were ever installed around these areas.[7] The Board also found that MWG had done little to investigate the coal ash fill or prevent these areas from causing groundwater pollution.[8] Lastly, at the Northwest Area, the Board found it was an area about 13.2 acres in size that contains "interlayered fly ash and bottom ash and slag from the bottom of the coal combustion process," including coal ash fill as deep as seventeen feet below ground.[9] In addition to delineated historic coal ash fill areas, the Board also found that coal ash fill exists near the perimeter of existing coal ash impoundments.[10]

The groundwater has been contaminated at the Joliet 29 coal plant since monitoring first began in 2010. The Board found that the above unlined historic coal ash areas "are contributing

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[3] R20-19(A), Hearing Officer Order at 1 (May 6, 2021).
[4] *Sierra Club, et al., v. Midwest Generation, LLC,* PCB No. 13-15, Interim Order (June 20, 2019).
[5] *Id.*
[6] *Id*. at 26.
[7] *Id*.
[8] *Id*. at 26-27.
[9] *Id*. at 28.
[10] *Id*.

to the groundwater contamination."[11] The lack of monitoring wells closer to the historic coal ash fill areas means that no one has a clear picture of the nature and extent of groundwater contamination being caused by these historic coal ash areas.

ii. Powerton

At the Powerton coal plant in Pekin, Illinois, the Board found historic coal ash fill exists throughout the site.[12] These historic coal ash fill areas are unlined and are located "in areas around Secondary Basin, Ash Surge Basin and Ash Bypass Basin. The deepest coal ash fill [is] coming from the area between the Ash Surge Basin and Ash Bypass Basin."[13] Historic coal ash fill was recorded as deep as fourteen feet below the surface.[14] Like Joliet 29, the groundwater has been contaminated at Powerton since monitoring first began in 2010. The Board concluded that "it is more likely than not that the coal ash is spread out across the Stations in the fill and is contributing to the exceedances in the Stations' monitoring wells."[15]

iii. Will County

At the Will County coal plant in Romeoville, Illinois, the Board found that there are historic coal ash areas throughout the site, including the former slag and bottom ash placement area in the southeast corner of the coal plant's property and coal ash fill around the coal ash impoundments.[16] These historic coal ash fill areas are unlined, and the former slag and bottom ash placement area has no monitoring wells.[17] The historic coal ash fill runs along the eastern perimeters of the four surface impoundments and contains ash as deep as twelve feet below the surface.[18] Like Joliet 29 and Powerton, the groundwater has been contaminated at Powerton since monitoring first began in 2010. The Board concluded that, similar to Powerton, "it is more likely than not that the historic areas and coal ash in the fill areas at the Station are causing or contributing to GQS exceedances at the Station."[19]

iv. Waukegan

At the Waukegan coal plant in Waukegan, Illinois, the Board also found that historic coal ash areas are present, including the Former Slag/Fly Ash Storage Area and coal ash fill around

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[11] *Id*.
[12] *Id*. at 41.
[13] *Id*.
[14] *Id*.
[15] *Id*.
[16] *Id*. at 56-57.
[17] *Id*. at 57.
[18] *Id*. at 56.
[19] *Id*. at 57.

the coal ash impoundments.[20] These historic coal ash fill areas are unlined, and the coal ash around the impoundments is as deep as twenty-two feet below the surface.[21] Like Joliet 29, Powerton, and Will County, the groundwater has been contaminated at Waukegan since monitoring first began in 2010. The Board concluded that, similar to Powerton and Will County, "it is more likely than not that the historic areas and coal ash in the fill areas at the Station are causing or contributing to GQS exceedances at the Station."[22]

2. Crawford Generating Station

Little Village residents have been subjected to years of environmental wrongs originating from the Crawford site throughout its operation, closure, and remediation. Crawford operated less than 0.25 miles from Little Village from 1924 until 2012. The site was closed in 2011 and decommissioned in 2012. Hilco Redevelopment Partners ("Hilco"), the current owners, enrolled the site in the Illinois Site Remediation Program ("SRP") in 2018. Remediation at the Crawford site is complete under the SRP program and construction of a one-million square foot warehouse and distribution center is nearly finalized.[23]

Even after Crawford's closure, the risks to human health and the environment were not eliminated. The Crawford site contains accumulations of coal ash fill that are unconsolidated; that is, the coal ash is scattered about the site, not located within a discrete impoundment or pile. Coal ash is found in fill deposited across the site with little to no pollution controls in place, leaving the surrounding groundwater, air, and soil susceptible to contamination and a risk of coal ash migration into the residential areas nearby. Violations of groundwater quality standards for numerous coal ash constituents – including chloride, iron, antimony, sulfate, and manganese – have been found at Crawford.[24] However, due to the unconsolidated nature of the coal ash on site and the fact that there are no active landfills, the new Federal and Illinois rules regarding coal ash do not apply to the coal ash fill at the site.

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[20] *Id*. at 66-67. The Illinois EPA claims that this area is a surface impoundment covered by Illinois' new surface impoundment rules (Part 845); Commenters agree that the historic ash fill area should be addressed as expeditiously as possible since it is causing groundwater contamination. If the Board disagrees that this area is a surface impoundment, then it should be regulated as a historic coal ash fill area.

[21] *Id*. at 67.

[22] *Id*. at 68.

[23] Illinois Environmental Protection Agency (IEPA), *Site Fact Sheet: Hilco Dev. Partners* (last visited Aug. 5, 2021), https://www2.illinois.gov/epa/topics/community-relations/sites/hilco/Pages/default.aspx.

[24] *See* PCB No. R2020-19, Comments of Little Village Environmental Justice Organization (June 15, 2020) ("LVEJO Initial Comments"), Ex. Two, Michael Crumly, IEPA, Violation Notice to Midwest Generation, LLC., re Crawford Generating Station (June 11, 2012) at pp. 142-43. A repository of information about environmental conditions at the Crawford site is available to any person. IEPA, *Site Remediation – Technical,* Illinois DOCUMENT EXPLORER, https://external.epa.illinois.gov/DocumentExplorer/Documents/Index/170000041238.

In 1998, then-owner ComEd performed Phase I and Phase II Environmental Site Assessments, which included collecting samples and boring logs to establish environmental conditions of the property. Of the 30 soil borings logged, 23 included references to either "slag," "coal," or "ash" in the description section.[25] Again, in 2018, after Crawford was decommissioned, current owners, Hilco, hired a separate consulting agency to perform similar sampling resulting in 69 soil borings.[26] 53 of the 69 soil borings included a reference to either "slag," "coal," or "cinders."[27] In December 2018, an additional 40 soil borings were performed and all referenced some combination of the same three indicators.[28] Of the total 139 soil borings taken on site in 1998 and 2018, 102 – roughly 73% – reference coal, slag, or ash.

In 2012, the Illinois EPA issued a violation notice to Midwest Generation for coal-ash related contaminant exceedances in two groundwater monitoring wells at Crawford. Both wells showed levels of coal ash constituents like antimony, pH, manganese, sulfate, chloride, and TDS, exceeding groundwater quality standards.[29] Illinois EPA attributed these levels to "operations at ash impoundments" located on site. As part of the settlement, Midwest Generation was required to remove "ash residuals" from one impacted basin and remove surface ash material. However, they were not required to assess or address subsurface coal ash deposits. Midwest Generation was also not required to continue operating monitoring wells to determine if groundwater conditions improved after the rest of the settlement was fulfilled. Illinois EPA and the community do not know whether those contaminants continue to be present at the site and within groundwater following the settlement. Thus, the historic coal ash fill and its potential to contaminate groundwater was ignored.

3. Other Known Historic Coal Ash Fill Sites in Illinois

As part of the U.S. EPA's promulgation of the federal CCR rule, it compiled a compendium of damage cases where coal ash had negatively impacted the environment. Those compendiums contain other examples of coal ash fill areas risking or causing groundwater contamination in Illinois. Below is a survey of the places U.S. EPA highlighted.

i) Hennepin Power Station (Hennepin, IL)

Pond 2E was built on top of historic ash fill, and there is a historic coal ash fill area directly to the west of Pond 2, which was also built on top of existing historic coal ash fill.[30]

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[25] *See* LVEJO Initial Comments, ENSR Boring Log (1998), attached as Ex. Two, at pp. 28-50 of 186.
[26] *Id.*, V3 Companies Boring Logs (Mar. 2018) at pp. 51-103 of 186.
[27] *Id*.
[28] *Id.* V3 Companies Boring Logs (Dec. 2018) at pp. 104-129.
[29] LVEJO Initial Comments, Ex. Two, Michael Crumly, IEPA, Violation Notice to Midwest Generation, LLC., re Crawford Generating Station (June 11, 2012) at pp. 142-43.
[30] Exhibit 1, U.S. EPA, Damage Case Compendium: Technical Support Document, Volume IIa: Potential Damage Cases at 30, ns.110, 111 (Dec. 18, 2014) (excerpts) (attached).

Pond 4 was a 30-foot-deep gravel quarry where coal ash fill was disposed in the mid-1980s.[31] Groundwater downgradient of the East Ash Pond System, which includes Ponds 2, 2E and 4, showed concentrations of sulfate and boron that exceeded state groundwater standards.[32] The groundwater was (and may still be) contaminated with coal ash constituents.[33] It is not clear whether any fill has been removed.

ii) Ameren Coffeen/White & Brewer Trucking (Coffeen, IL)

A 40-acre unlined historic coal ash land fill area operated from 1977 to 1997, and it was located just west of the East Fork of the Shoal Creek; it was comprised of Cells A-D and Cell E.[34] The groundwater was (and may still be) contaminated with coal ash constituents.[35] This site became the subject of a federal lawsuit.[36] In discussing the factual history of the case, the court discussed an Illinois EPA letter covering violations at the site including leachate flowing out of one of the landfill cells, across the ground surface, and into an adjoining creek.[37] Four years later, a county health inspector observed that leachate was still flowing out of the same landfill cell and into the creek.[38] During repeat inspections, the county health inspector "noted numerous violations" at four different landfill cells.[39] The instances noted by the county health inspector were violations of Illinois statutory and regulatory law.[40]

iii) Southern Illinois Power Cooperative Marion Plant (Marion, IL)[41]

An unlined historic coal ash land fill area, estimated to contain 1.1 million cubic yards of coal ash, located between the two forks of the Saline Creek.[42] Monitoring at the site in the 2004-08 time period found concentrations of cadmium above the Illinois Class I Groundwater Standard (0.005 mg/L) in six of eight monitoring wells, with maximum concentrations up to between 10-18 times the federal Maximum Contaminant Level (MCL).[43] Monitoring from

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[31] *Id*. at 30, n.110.
[32] *Id.* at 33.
[33] *Id*. at 32-33.
[34] *Id*. at 48.
[35] *Id*. at 49.
[36] *White & Brewer Trucking Inc. v. Donley,* 952 F. Supp. 1306 (C.D. Ill. 1997).
[37] *Id.* at 1309.
[38] *Id.*
[39] *Id.*
[40] *Id.*
[41] The Illinois EPA has taken the position that this area is one or more surface impoundments covered by Illinois' new surface impoundment rules (Part 845). Commenters agree that this historic coal ash land fill area should be addressed as expeditiously as possible since it has and may still be causing groundwater contamination. If the Board disagrees that this area is a surface impoundment, then it should be regulated as a historic coal ash fill area.
[42] Exhibit 2, U.S. EPA, Damage Case Compendium: Technical Support Document, Volume IIb, Part One: Potential Damage Cases at 51 (Dec. 18, 2014) (excerpts)(attached).
[43] *Id.* at 53.

2010-11 indicated elevated boron and iron.[44] The groundwater may still be contaminated with coal ash constituents.[45]

B. Existing Illinois Law Is Insufficient to Address the Historic Ash Problem

Despite recent enforcement before the Illinois Pollution Control Board involving groundwater contamination from coal ash sources, existing law is not sufficient to address the problems of onsite coal ash fill. Enforcement action over contamination of groundwater from coal ash takes place after the fact, when the harm is already done. Enforcement cases are also resource-intensive and time-consuming. For instance, the Midwest Generation case has been going on for nine years and the remedy phase hearing has not even been scheduled.[46] Because of the time and resources required, and the fact that enforcement cases cannot prevent coal ash contamination from occurring, enforcement cases are an inefficient means of addressing groundwater contamination from coal ash landfills.

Illinois' Site Remediation Program ("SRP") is similarly inadequate: it only arises once contamination has already been found, and it lacks the robust public participation necessary to ensure that affected communities have meaningful opportunities to provide input into the protections used to limit pollution from coal ash fill.[47] As discussed above, the SRP in place at the former Crawford coal plant failed to address – or even require monitoring sufficient to detect – groundwater pollution from coal ash fill at that site.

Existing solid waste law does not preclude Illinois EPA from permitting coal ash landfills under that existing law.[48] The unique circumstances of these sites, however, strongly suggest that they would be more appropriately addressed under a new set of regulations tailored to the circumstances. First, as discussed above, many, if not all, of these sites are causing groundwater contamination. Most, if not all, of these sites are likely unlined, and some of them likely have coal ash waste sitting in direct contact with groundwater. The regime used to regulate these sites needs to address existing violations of state groundwater regulations and the need for corrective action.

Second, some of these sites are known, but there are very likely many that are unknown. Unlike existing landfills, measures need to be put in place to locate unidentified coal ash fills, under the same ownership, on power plant sites or offsite, and the regulations need to place the investigatory burden on owners, not IEPA.

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[44] *Id.*
[45] *Id*. at 52-53.
[46] *See, e.g., Sierra Club v. Midwest Generation,* PCB 13-15, Hearing Officer Order (May 18, 2021) (Order scheduling expert depositions).
[47] *See*, *e.g.*, PCB Case No. R2020-19, Comments of Little Village Environmental Justice Organization (June 15, 2020).
[48] *See* Commenters' Final Post-Hearing Comments, 57-61 (Oct. 30, 2020).

Third, these same sites are inactive and may contain just historic ash. Regulations need to address the inactive nature of these sites. Unlike landfill regulations where there is a need to focus on ongoing operations, coal ash fill regulations need to focus on corrective action and closure. Fourth, unlike current solid waste regulations, there is no need for complex regulations that address multiple unique wastes streams such as landscape waste, construction waste, medical waste, household waste, etc. The waste at coal ash fill sites should be fairly uniform in comparison. For all these reasons, it makes sense to write coal ash fill regulations (which can even replicate many of the regulations for coal ash impoundments), instead of relying on existing solid waste regulations.

C. Proposed Rules to Regulate Historic Coal Ash Fill in Illinois.

This section provides an overview of the Environmental Groups' proposed rules governing historic coal ash fill in Illinois. Those proposed rules are attached in the Appendix to these Comments. First, Environmental Groups' proposed rules apply to ash fill areas or CCR fill areas defined as any area of land that holds an accumulation of CCR and stores or disposes of that CCR located at an active facility or inactive facility.[49] This definition includes scattered ash, any ash that was placed on the surface of the land, and any area holding an accumulation of CCR that does not meet the definition of "coal combustion by-product."[50] The definition explicitly excludes any area that meets the definition of "CCR surface impoundment."[51] It also excludes regulated landfills. [52]

The rule we propose includes three separate pathways for compliance. First, the rule includes provisions calling for removal of coal ash fill. Removal is optional in certain circumstances and required in others. Owners or operators of ash fill areas may opt to remove the ash instead of conducting monitoring where there are no potable water wells within 2,500 feet of the ash fill. This condition is necessary in order to assure that the ash fill or scattered ash does not pose a risk to drinking water or public health. We expect this compliance pathway to be attractive to owners and operators with small areas of ash fill or scattered ash where removal in the first instance would be less costly than installing a monitoring system.

Removal is required when the ash fill does not meet location restrictions. Where an ash fill area is within five feet of the upper limit of the uppermost aquifer or the uppermost saturated zone, the owner or operator must demonstrate that there will not be an intermittent, recurring, or sustained hydraulic connection or else must remove the ash. One important factor to note is that where an owner or operator is required to remove an ash fill area or scattered ash fill due to the location restrictions, that owner/operator is still required to conduct three years of monitoring but is not required to implement any of the other care measures that apply to fill areas where a cover

[49] *See* Appendix 1, Proposed 35 Ill. Adm. Code Section 846.110.
[50] *Id.* citing 415 ILCS 5/3.135.
[51] *Id.*
[52] *Id.*

system is installed. Whenever removal is either required or opted for, the proposed rules require a removal plan, and have requirements that apply to the initiation and completion of removal.

Second, we propose a pathway for corrective action. For any location where an owner or operator does not elect to remove all ash, the owner/operator must install monitoring instead. The requirements that apply to monitoring are, in large part, parallel to those in the Part 845 rules. These requirements include the Groundwater Protection Standards from Section 845.600, the requirement for a hydrogeologic site characterization, a groundwater monitoring system, groundwater sampling and analysis, and a groundwater monitoring program. Where the monitoring detects exceedances attributable to coal ash, the owner/operator must conduct a corrective action alternatives assessment, a corrective action plan, implementation of corrective action, and completion of correction action.

The third and final pathway involves installation of a cover system. First, where there are exceedances of groundwater protection standards, the owner will be required to conduct corrective action. This may require removal or a cover system. Corrective action may include additional measures above and beyond installation of a cover system, such as a slurry wall or pump and treat. Second, wherever coal ash area is not removed, regardless of whether there are exceedances, the owner/operator must install a cover system. As part of the suite of provisions that apply to all cover system installations, the proposed rules require a cover system plan, initiation of cover system, completion of cover system, and post-cover system care. Post-cover system care at a CCR fill area is akin to post-closure care of surface impoundments as provided in Part 845. Finally, the Environmental Groups' proposed rule contains requirements for record-keeping that are akin to the record-keeping requirements in Part 845.

D. Process for Identifying Ash Fill Areas

Given the limited information currently available about the location and extent of coal ash fill in the state, the Environmental Groups recommend that the Board, during this rulemaking process, require that parties file with the Board in the docket for this proceeding, all documents and other information that identify or indicate the presence of historic coal ash fill. These documents should include not only documents that identify onsite historic coal ash fill, but also any documents that indicate offsite areas where coal-fired generators may have disposed of, deposited, or stored CCR. The Environmental Groups also recommend that the Board ask EGUs to obtain and file with the Board publicly-available aerial photographs in five-year increments showing the EGUs' complete facility and property beginning five years before the facility was built or whenever first available, whichever is earlier. Aerial photos are one of the best mechanisms for identifying the presence of historic ash and will be especially useful for identifying coal ash fill areas where there is the absence of other documents.

In addition, wherever an owner or operator has used an Alternate Source Demonstration to argue that units regulated under the Federal CCR rule are not the source of constituents exceeding the Groundwater Protection Standards, but the owner or operator has not attempted to

or been able to rule out other onsite sources, the owner or operator should be required to investigate the site for CCR fill.

By way of example, the 2018 CCR Compliance Annual Groundwater Monitoring and Corrective Action Report for Waukegan summarized the Alternate Source Demonstration and indicated that leach testing was conducted to "determine whether the noted SSIs may be associated with an actual release from the regulated unit(s) or if *another potential source in the vicinity of the ash ponds* may be affecting the local groundwater quality."[53] The ASD went on to conclude that the SSIs resulted "from other potential source(s)".[54] Consequently, MWG should be required to fully investigate all other onsite potential sources beyond the regulated units (surface impoundments), including but not limited to, sources in the "vicinity of the ash ponds."

Similarly, for Powerton Station, Midwest Generation's consultant KPRG also conducted leach testing to determine "whether the noted detections above GWPSs may be associated with an actual release from the regulated unit(s) or if another *potential historical source in the vicinity of the ash ponds* may be affecting the local groundwater quality."[55] Again, the consultant concluded that the regulated units are not the source and "there is an alternate source(s) of impacts."[56] In addition, KPRG points out that "Wells MW-15 and MW-17 are also both completed within areas of historical fill material placement which includes ash."[57] This is clear evidence that points to the presence of onsite ash fill and requires a full investigation to characterize the scope of that onsite ash.

All these conclusions suggest a potential onsite ash fill source is contributing to the elevated groundwater constituents, which must be investigated to fully address the coal ash

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[53] Exhibit 3, CCR Compliance Annual Groundwater Monitoring and Corrective Action Report—2018, Waukegan Station at 4 (Jan. 31, 2019) (emphasis added) (attached).
[54] *Id.*
[55] Exhibit 4, CCR Compliance Annual Groundwater Monitoring and Corrective Action Report – 2019, Powerton Station at 5 (Jan. 31, 2020) (emphasis added) (attached).
[56] *Id.*
[57] Exhibit 5, Alternate Source Demonstration, CCR Groundwater Monitoring, Powerton Generating Station at 3 (March 25, 2019) (attached as Appendix B to CCR Compliance Annual Groundwater Monitoring and Corrective Action Report – 2019, Powerton Station)(attached).

An ASD for a third MWG location also pointed to onsite ash fill as the source of the contamination. In the Will County Alternate Source Demonstration, KPRG states that the purpose of the Alternate Source Demonstration is to determine "if another *potential historical source in the vicinity of the ash ponds* may be affecting the local groundwater quality." Exhibit #6, Alternate Source Demonstration, CCR Groundwater Monitoring, Will County Generating Station at 2 (Apr. 12, 2018) (attached as Appendix B to CCR Compliance Annual Groundwater Monitoring and Corrective Action Report – 2018, Will County Station.) (attached) The report concluded that the SSIs were not a result of leakage from the regulated units, but resulted from other potential sources. *Id.* at 5. KPRG pointed out that "upgradient well chemistry for various Appendix III constituents is similar to ash leachate chemistry at natural pH levels." *Id.* This suggests that the upgradient monitoring wells may be completed in ash and the alternate source could be onsite ash fill outside of ponds.

sources that are contributing to groundwater pollution. The Board should require owners and operators to submit all ASDs to the Board so that the Board may determine whether the ASD suggests the potential for onsite ash fill to be a source of groundwater contamination. Where there is such a suggestion, the Board should require the owner or operator to fully investigate the site for coal ash fill areas.

Wherever documents or other information indicate the presence of CCR fill, the rules require that the owner/operator characterize the scope and extent of the CCR fill by conducting Geoprobe borings and characterizing the vertical and horizontal extent of the CCR fill, among other steps. Results of the CCR fill characterizations should be submitted to the Board.

II. Temporary storage piles should have limited volume and duration to protect against contamination of underlying groundwater or nearby surface waters.

A. Temporal limitations are appropriate to ensure CCR does not accumulate to unwieldy quantities that pose greater threats of pollution.

The Board should impose temporal limitations for how long CCR may be stored in a temporary CCR storage pile. Specifically, temporary CCR storage piles used to store CCR removed from any impoundment should be limited, at any time, to no more than the quantity of ash that the owner/operator, based on reasonable estimates and associated permit conditions, estimates it will excavate from the CCR surface impoundment in a three-month period.[58]

Such limitations are important to ensure that CCR does not accumulate in those piles to unwieldy volumes that create water or air pollution hazards. Many of the protections called for in the new Part 845 rules require an estimate of the volume of CCR in the piles in order to size or place those safeguards properly. For example, coal ash piles must be placed on a storage pad or geomembrane liner.[59] If the area for such storage pad or liner is inadequate to hold the volume of CCR in the temporary pile, CCR will end up on the ground, creating a hazard for groundwater or adjacent surface waters. CCR storage piles also must be tarped or constructed with wind barriers to suppress dust,[60] with tarps over the edge of the storage pad where possible.[61] As with storage pads and liners, tarps and wind barriers must be selected or constructed with a size in mind; if

[58] Environmental Groups understood the Board's request for comments in this subdocket to pertain to the piles that temporarily store CCR removed from impoundments during closure by removal, and have focused these comments on such piles. To the extent the Board is willing to entertain further temporal and volume limitations on piles of CCR not utilized to temporarily store removed ash, Environmental Groups are happy to provide further recommendations for such piles. To better understand the extent of CCR piles in the state, we ask that the Board request, as part of this rulemaking process, that any owner/operators of coal ash ponds or landfills in Illinois identify whether there are any onsite CCR piles at its facilities and, if so, whether they are regulated under either Illinois landfill regulations or the federal CCR rule.

[59] 35 I.A.C. § 845.740(c)(4)(B)(iii).

[60] *Id*. § 845.740(c)(4)(B)(i).

[61] *Id*. § 845.740(c)(4)(B)(iv).

not, uncovered CCR dust will become airborne, posing a risk to workers and adjacent communities. Similarly, the berms required to reduce run-on and run-off from CCR storage piles[62] must be constructed with an estimated pile size in mind, lest they fail to extend the full length of the pile and leave stormwater to run off the pile unabated. Finally, water spray or chemical dust suppressant systems must be properly located and sufficiently deployed to limit CCR dust. If a CCR pile contains significantly more CCR than the volume for which those systems were designed, there is a real risk that they will not adequately protect against CCR dust.

In short, the owner or operator of a CCR surface impoundment from which CCR is moved into a temporary storage pile must have a specific maximum pile size in mind in order to properly size the protections required by Part 845. Without a specific volume limit for the temporary CCR pile, there is a risk that protective tarps, wind barriers, storage pads, liners, berms, or other protective measures will be inadequately sized or located and will not provide sufficient protection against pollution.[63]

A maximum volume equal to the amount of CCR that can reasonably be expected to be excavated from a CCR impoundment over three months is an appropriate, reasonable approach for limiting the volume of temporary CCR piles. Once CCR has been placed in the pile, the owner or operator should already have operations ongoing to move the CCR out of the pile, whether that be to an onsite landfill or via loading into the relevant transport method (rail, barge, low-polluting truck, etc.) for transport offsite. Three months' accumulation reasonably balances industry's need for flexibility with the public need for effective pollution risk management. That time period accounts for any unforeseen temporary delays at disposal sites, transportation hiccups, or other short-term logistics challenges. At the same time, a three-month volume maximum ensures that the pile will not reach an unwieldy size and that site personnel operating the pile will be present frequently enough to notice – and promptly repair – tarp damage, water spray malfunctions, or other pollution control malfunctions or inadequacies in a timely manner.

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[62] *Id*. § 845.740(c)(4)(B)(v).

[63] Although failure to ensure that these measures are properly sized and located likely constitutes a violation of the Part 845 rules, properly designing protective measures to prevent pollution is a far better safeguard than waiting until after that pollution occurs and relying on self-reporting or time- and resource-consuming enforcement to halt further violations. Once CCR dust has already blown off the pile, or CCR constituents have already leached into groundwater or surface water, cleanup can be complex and, in some cases, full remediation may not be possible. *See*, *e.g*., *Utility Solid Waste Activities Group et al. v. EPA*, 901 F.3d 414, 422 (D.C. Cir. 2018) (hereafter "USWAG") (noting that "EPA has acknowledged that it 'will not always be possible' to restore groundwater or surface water to background conditions after a contamination event").

A three-month timeframe is also akin to regulatory timelines other states have set for solid waste piles. For example, three months is even longer than Michigan's similar requirement, which limits piles to the amount of waste generated over 60 days.[64]

B. Several additional measures should be required to ensure protection against groundwater and surface water contamination.

Several additional measures should be required to ensure protection against groundwater and surface water contamination from temporary CCR piles. First, the storage pad or liner underlying temporary storage piles should be inspected quarterly. Geomembrane liners can crack, particularly – though not only – if they are not installed properly.[65] The same is true with storage pads. Because those liners or pads serve as the primary barrier to separate CCR from the ground, cracks or holes in them allow precipitation to percolate into groundwater, carrying CCR pollutants along the way, and from there potentially into adjacent surface waters.

As we know from PCB 2013-15, even short-term piles can have adverse impacts on groundwater if inadequately controlled.[66] There, the Board found that coal ash stored on the ground for just two to three months contributed to groundwater contamination, as groundwater monitoring wells down- and side-gradient from the coal ash pile showed exceedances of arsenic, boron, surface, and TDS during the period the pile was in place.[67] As such, it is critical that the integrity of liners and storage pads be maintained.

Quarterly inspections and, if necessary, prompt repairs of liners and storage pads will ensure problems are identified before much damage is done. Such inspections can be conducted by designing a liner or pad larger than needed for a three-month volume of CCR and ensuring

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[64] *See* Mich. Admin. Code R 299.4129(2) ("The storage of the following waste in piles before reuse or disposal does not require a permit or license under the act and these rules if the conditions specified in subrule (3) of this rule are met: . . . (c) Low-hazard industrial waste that is stored for less than 60 days before being transported for disposal.") State guidance documents interpreting this mandate clarify that, "Since new waste may be generated during this 60-day period, R 299.4129(2)(c) effectively allows a pile of low-hazard industrial waste to be maintained continuously, provided the volume of the pile does not exceed the amount of waste generated over 60 days." Mich. Dep't of Envtl. Quality, Office of Waste Mgmt. & Radiological Prot. Policy and Procedure, *Waste Pile Closure*, No. OWMRP-115-20 at 3-4 (2000, revised 2002, reformatted 2012), https://www.michigan.gov/documents/deq/deq-owmrp-policy-115-20_408157_7.pdf (emphasis added). *See also* N.D. Admin. Code 33.1-20-04.1-07.

[65] *See* Exhibit 7, Letter from Kirk Engineering & Natural Resources, Inc. to Flora Champenois, Earthjustice, re Landfill permit by rule proposal, Docket ID No. EPA–HQ–OLEM–2019–0361 (April 22, 2020) (attached), at 4-5 (describing different construction and design defects that can lead to ineffective or damaged liners).

[66] *See* R2020-19 Hearing Ex. 9, *Sierra Club v. Midwest Generation*, LLC, PCB 13-15, Interim Board Order and Opinion at 42 (June 20, 2019) ("PCB 13-15, Interim Order").

[67] *See id*.

that each portion of the pad or liner is uncovered for inspection at least once in a three-month period. As long as the entire liner or pad is inspected over the three-month period, this inspection requirement would be satisfied and would ensure that any necessary repairs are promptly performed. Reports of those quarterly inspections and any repairs performed on holes, tears, or other damage found during such inspections should be included in the monthly removal reports required by 35 Ill. Adm. Code § 845.740(d) for the month following the inspection. If repairs have not yet been completed by the date required for submission of that report, updates on those repairs should be provided in subsequent monthly removal reports under 35 Ill. Adm. Code § 845.740(d).

Second, the Board should impose limitations on drop distance onto temporary CCR piles. The transfer of dry or semi-dry CCR into piles can create significant dust, particularly when wind speeds are above 10 meters per second.[68] A mandate that drop distance be minimized when transferring CCR into piles should be added and is consistent with drop distance mandates specified by Chicago Department of Public Health's bulk materials regulations.[69]

Third, there should be required setbacks of temporary CCR piles from waterways. Given the risk of both water pollution and air pollution that CCR piles pose, temporary CCR piles should be located as far from waterways as is feasible at a facility. Where transport of the ash is by barge, a pile should be located as far from the waterway as possible, taking into account the need to transfer ash from the pile into the barge (which may be conducted via conveyer, for example, making it unnecessary to locate the pile immediately adjacent to the waterway).

Fourth, wherever coal ash is being moved around a site – whether into piles, for dewatering in preparation for removal, or otherwise – silt curtains should be placed around the site in order to prevent the release of wind-blown or displaced coal ash or contaminated soils into nearby waterways. Requirements should be added to Part 845 requiring use of silt curtains during closure or corrective action at all impoundment sites adjacent to water bodies.

Fifth, the Board should consider whether additional protections should be required for ash accumulated within, but not outside of, CCR surface impoundments. Ash that is excavated from one portion of the impoundment and placed in another area of the impoundment to allow water to drain out of it may, as it dries, create greater dust hazards than in other portions of the impoundment where ash remains saturated. The Board should consider requiring that the closure permit application set out any additional measures, such as increased watering frequencies or new locations for water or chemical dust suppressant sprays, that may be required to control dust from such ash piles located within impoundments.

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[68] *See* R2020-19, Attachment 6 to Environmental Groups' Final Comments, Appendix: Pless Report at 15 (Oct. 30, 2020).

[69] *See* Exhibit 8, City of Chicago Rules, *Control of Emissions from Handling and Storing Bulk Materials*, at Part B, 3.0(8)(d) (effective Jan. 25, 2019) (attached).

C. Documentary evidence should be required to ensure that temporary CCR piles contain no more than three months of excavated CCR at given time.

The three-month volume limitation for CCR stored in temporary piles will only protect human health and the environment against coal ash pollution if owners and operators comply with it. To ensure accountability and compliance with this mandate, it is critical that owners and operators be required to submit necessary documentation to demonstrate that piles contain no more than the quantity of ash that the owner/operator, based on reasonable estimates and associated permit conditions, estimates it will excavate from the CCR surface impoundment in a three-month period. Such documentation should include the following:

- In the closure construction permit application for the CCR surface impoundment, the owner or operator should provide an estimate of the volume of ash it reasonably estimates it will excavate in a given three-month period, together with the basis for that estimate. The owner/operator should also submit the estimated dimensions (width, depth, and height) of the temporary CCR pile if the pile were to contain the volume of ash it estimates would be excavated in a given three-month period. The Agency may require the owner/operator to submit revised estimates if the Agency deems either estimate unreasonable.

- The final closure construction permit shall specify the maximum volume of ash that may be accumulated in a temporary CCR pile at any given time.

- In the monthly reports required by 35 Ill. Adm. Code § 845.740(d), the owner/operator should state the amount of CCR moved into and out of any temporary CCR storage piles during the previous month and identify whether the total volume of ash in any such pile has, at any time during the previous month, been less than, equal to, or greater than the volume of ash that may be accumulated in the pile.

- The owner or operator shall also include in the monthly report required by 35 Ill. Adm. Code § 845.740(d) documents demonstrating that CCR from the temporary ash pile has been limited to no more than the maximum accumulation set forth in the final closure permit. Such documentation should include at least two of the following: (a) purchase orders or contracts for transport of CCR from the facility to an offsite location; (b) facility records documenting the placement of CCR into the pile and the removal of ash from the temporary storage pile; or (c) photographs of the pile during the prior month.

Proposed changes to Part 845 consistent with these comments are included in Appendix 2.

III. The Board Should Require Fugitive Dust Monitors to Monitor Coal Ash Dust.

A. Fugitive dust monitoring and mitigation is necessary to protect facility employees and nearby communities from the impacts of fugitive dust.

As detailed in our prior comments, fugitive CCR dust poses a grave threat to workers, passersby, and affected communities if not properly controlled.[70] When coal ash is disposed or placed on the ground, dust is emitted into the air by loading and unloading, transport, and wind. Once in the air, fugitive dust can impact workers on-site and migrate off-site. As a result, workers and nearby residents can be exposed to significant amounts of CCR dust. Breathing in that dust puts people at risk in numerous ways, including:

- Exposure to coarse particulate matter (PM10) and respiration of small particulates (PM2.5) that lodge in the lung;[71]
- Inhalation of radioactive particles;[72]
- Uptake of heavy metals, including mercury;[73]
- Inhalation of silica; and
- Exposure to hydrogen sulfide.[74]

[70] *See* Environmental Groups' Initial Public Comments (June 15, 2020); Final Post-Hearing Comments (Oct. 30, 2020); Final Post-Hearing Response Comments (Nov. 6, 2020). *See also* 75 Fed. Reg. 35,128, 35,171 (June 21, 2010) ("Air emissions from CCR disposal and storage sites can originate from waste unloading operations, spreading and compacting operations, the re- suspension of particulates from vehicular traffic, and from wind erosion. Air inhalation exposures may cause adverse human health effects, either due to inhalation of small-diameter (less than 10 microns) ''respirable'' particulate matter that causes adverse effects (PM10 and smaller particles which penetrate to and potentially deposit in the thoracic regions of the respiratory tract), which particles are associated with a host of cardio and pulmonary mortality and morbidity effects."); U.S. EPA, Inhalation of Fugitive Dust: A Screening Assessment of the Risks Posed by Coal Combustion Waste Landfills (May 2010), attached as Exhibit 9; U.S. EPA, Damage Cases: Fugitive Dust Impact, Technical Support Document (Dec. 18 2014), attached as Exhibit 10.

[71] Alan H. Lockwood & Lisa Evans, *Ash in Lungs: How Breathing Coal Ash Is Hazardous To Your Health*, 5, 13-15 (2014), attached as Exhibit 11.

[72] *Id.* at 5. Burning coal concentrates the radionuclides approximately three to ten times the levels found in the initial coal seams. The radioactive metals stay with the coal ash when the carbon is burned off. *See Figure 1.* Graph from Radioactive Elements in Coal and Fly Ash: Abundance, Forms, and Environmental Significance. U.S. Geological Survey Fact Sheet FS-163-97 (Oct. 1997), https://pubs.usgs.gov/fs/1997/fs163-97/FS-163-97.html.

[73] *Id.* at 6. Implementation of the federal Clean Air Mercury Rule significantly increases the mercury content in fly ash because the mercury capture required by the rule will result in more mercury ending up in the solid waste created by coal burning. According to U.S. EPA testing of fly ash at plants that had mercury controls, the mercury in ash increased by a median factor of 8.5, and in one case, by a factor of 70. *See also*, U.S. EPA, National Emission Standards for Hazardous Air Pollutants from the Portland Cement Manufacturing Industry, 71 Fed. Reg. 76,518 (Dec. 20, 2006).

[74] *Id.*

Both coarse and small particulates have been linked to heart disease, cancer, respiratory diseases, and stroke.[75] CCR contains significant amounts of silica, in both crystalline and amorphous form. Respirable crystalline silica can lodge in the lungs and cause silicosis, or scarring of the lung tissue, which can result in a disabling, sometimes fatal, lung disease.[76] Chronic silicosis can occur after many years of mild overexposure to silica. While the damage may at first go undetected, irreversible damage can occur to the lungs from chronic exposure. Such exposure can result in fever, shortness of breath, loss of appetite and cyanosis (blue skin). In addition, the International Agency for Research on Cancer has determined that silica causes lung cancer in humans. Inhalation of CCR dust also poses significant health threats because of the toxic metals present, such as arsenic, chromium (including the highly toxic and carcinogenic chromium VI), lead, manganese, mercury, radium, and others. When inhaled, these toxic metals can cause a wide array of serious health impacts, including cancer and neurological damage.

Analysis from U.S. EPA has made clear the severe harms fugitive CCR dust can cause. In 2010, U.S. EPA developed a screening assessment acknowledging significant potential harm from fugitive dust. The agency found that when CCR dust blows from dry storage sites, particulate matter can readily exceed the national ambient air quality standards (NAAQS) for levels of particulate matter in the air.[77] U.S. EPA concluded "there is not only a possibility, but a strong likelihood that dry-handling [of coal ash] would lead to the NAAQS being exceeded absent fugitive dust controls."[78] In its 2014 Risk Assessment, U.S. EPA reiterated that conclusion, recognizing that uncontrolled fugitive CCR dust would exceed the 24-hour NAAQS for PM2.5 (fine particulate matter) under the scenario modeled.[79] Moreover, U.S. EPA acknowledged that acute inhalation of fugitive CCR dust, without appropriate controls, could result in dangerously high non-cancer risk due to arsenic exposure.[80] Finally, in 2014, as part of the record for the federal CCR Rule, U.S. EPA completed a damage case report specific to fugitive CCR dust impacts, listing 27 sites, including 3 in Illinois (all of which were associated with "beneficially re-used" coal ash).[81] One of those Illinois cases, involving open piles of CCR at U.S. Minerals near the Coffeen power plant, resulted in "OSHA fin[ing] *U.S. Minerals* nearly $400,000. . . for more than two dozen safety violations endangering workers with dangerously high levels of hazardous ash dust without proper breathing equipment and training."[82]

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[75] *See* Yixing Du et al., *Air particulate matter and cardiovascular disease: the epidemiological, biomedical and clinical evidence*, J Thorac Dis. 2016 Jan; 8(1): E8–E19, attached as Exhibit 12. *See also,* U.S. EPA, Linking Air Pollution and Heart Disease at https://www.epa.gov/sciencematters/linking-air-pollution-and-heart-disease.

[76] *See* Ash in Lungs report.

[77] *See* Fugitive Dust Screening Assessment at 11.

[78] *Id*.

[79] U.S. EPA, *Regulatory Impact Analysis: EPA's 2015 RCRA Final Rule Regulating Coal Combustion Residual (CCR) Landfills and Surface Impoundments at Coal-Fired Electric Utility Power Plants*, Docket ID No. EPA-HQ-RCRA-2009-0640-12034 at 1-15 – 1-16 (Dec. 2014).

[80] *Id.* at 5-32.

[81] *See* U.S. EPA Damage Cases.

[82] *Id.* at 40.

Workers have unfortunately borne the brunt of CCR dust injuries across our hemisphere. In the early 2000s, coal ash generated at AES' coal-burning power plant in Guayama, Puerto Rico, was dumped on a beach in the Dominican Republic, where it was alleged to have been left for years.[83] Reports of rampant, severe harm – including severe illness and death of Dominicans who worked on the CCR operations there – followed soon thereafter.[84] Several years later, the Dominican Republic and local citizens sued AES for the harms caused by the CCR dumped on the beach.[85] AES settled both complaints,[86] but reports of harm from workers who inhaled the CCR dust – or their families, when the workers have passed away – continue.[87]

Injuries to workers related to the Kingston TVA Fossil Plant spill in Harriman, Tennessee, also provide a devastating example of risks to workers from CCR dust. In the decade following the multi-year cleanup of the 5.4 million-ton CCR spill, at least forty cleanup workers died and over 400 have reported being sickened with skin rashes, lung disease, and cancer from the inhalation of CCR dust, all with ailments known to be caused by long-term exposure to arsenic, radium, and toxic metals found in coal ash, according to a lawsuit filed after the spill.[88] Workers at the Arrowhead Landfill in Uniontown, Alabama, which received more than four million tons of CCR from the TVA spill, also reported significant injuries to health.[89] In short,

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[83] *See* Omar Alfonso, *Arroyo Barril: Coal Ash and Death Remain 15 Years Later*, Centro de Periodismo Investigativo (Dec. 20, 2018) ("Arroyo Barril"), http://periodismoinvestigativo.com/2018/12/arroyo-barril-coal-ash-and-death-remain-15-years-later/; *see also Dominican Republic v. AES Corporation*, 466 F.Supp.2d 680 (E.D. Va. 2006) (granting in part and denying in part motion to dismiss).

[84] *See* Arroyo Barril; *see also* F Sue Sturgis, *Lawsuit accuses Virginia power company of poisoning Dominican community with toxic coal ash*, Facing South (Nov. 10, 2009), https://www.facingsouth.org/2009/11/lawsuit-accuses-virginia-power-company-of-poisoning-dominican-community-with-toxic-coal-ash.

[85] *See id*.

[86] *See* Dimitri Lascaris, *Toxic Coal Ash Afflicts Puerto Rico and the Dominican Republic*, The Real News Network (Apr. 1, 2019), https://therealnews.com/stories/toxic-coal-ash-afflicts-puerto-rico-and-the-dominican-republic; Dominican Today, *AES settles Dominican Republic toxic waste dump case: Bloomberg*, (Apr. 5, 2016), https://dominicantoday.com/dr/local/2016/04/05/aes-settles-dominican-republic-toxic-waste-dump-case-bloomberg/.

[87] *See* Arroyo Barril.

[88] *See* Jamie Satterfield, *Judge rejects TVA contractor's ask for a new trial over coal ash contamination lawsuit*, Knox News (Mar. 1, 2019), https://www.knoxnews.com/story/news/crime/2019/03/01/judge-says-evidence-backs-jury-verdict-kingston-coal-ash-contamination/3017696002/; Jamie Satterfield, *Sickened Kingston coal ash workers left with faulty, manipulated test results*, Knox News (Sept. 2, 2018), https://www.knoxnews.com/story/news/crime/2018/09/02/kingston-coal-ash-spill-faulty-manipulated-testing/1126963002/; J.R. Sullivan, *A Lawyer, 40 Dead Americans, and a Billion Gallons of Coal Sludge,* Mens Journal (Aug. 26, 2019), https://www.mensjournal.com/features/coal-disaster-killing-scores-rural-americans. Seventy-three plaintiffs, comprising sick workers and families of deceased workers, won a jury verdict in November 2018 that found that exposure to toxic heavy metals and radiation in coal ash could be responsible for the workers' illnesses, including skin rashes, lung disease and cancer. *Id*.

[89] Holly Haworth, S*omething Inside of Us*, Oxford American, Issue 82 (Nov. 11, 2013), http://www.oxfordamerican.org/articles/2013/nov/11/something- inside-us/.

the workers who clean up CCR are subject to increased risk of harm and accordingly must be assured extensive protections to protect their health and that of their families.

In light of these grave risks to human health from exposure to fugitive CCR dust, monitoring is critical. Thus, in addition to the dust control measures required at all sites subject to Part 845, the rules should require a robust monitoring program to ensure that fugitive dust controls are in fact minimizing CCR dust pollution. Communities near CCR dump sites in northwest Indiana are acting to demand more monitoring oversight of fugitive dust controls,[90] and Illinois should do no less to ensure full protection for communities hosting coal ash dumps in our state, which are all too often overburdened with air and water pollution and disparate health impacts.[91]

B. Additional fugitive dust monitoring and mitigation for closure projects is necessary because emissions are increased during closure of CCR surface impoundments.

Additional fugitive dust monitoring and mitigation is necessary for closure projects because fugitive dust emissions increase during the closure of CCR surface impoundments. Both closure in place and closure by removal involve increased activities at a facility that will increase fugitive dust emissions. Such activities include the dewatering and movement of CCR, onsite construction, and the increased use of trucks on paved and unpaved roads. Additionally, closure by removal will require the excavation of CCR; loading onto trucks, conveyors, railcars, or barges; unloading from trucks or conveyors or unloading of railcars or barges via mobile equipment; use of temporary CCR piles, as noted above; and the potential transportation of CCR off-site. All of these activities are significant sources of fugitive dust emissions. [92] As a result, the additional closure project-specific fugitive dust monitoring and mitigation requirements proposed below are important and necessary to protect facility employees and communities nearby facilities and along transportation routes from the impacts of fugitive dust emissions.

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[90] The Michigan City, Indiana Common Council, for example, recently passed a resolution requiring independent monitoring and robust safety measures for the closure of ash ponds owned by Northern Indiana Public Service Company (NIPSCO) in Michigan City and removal of ash to a landfill at NIPSCO's Schafer Plant. *See* Kelley Smith, *Council wants NIPSCO to assure safety and transparency during coal ash removal*, News Dispatch (June 11, 2020), https://www.thenewsdispatch.com/news/local/article_78f4478d-1cba-5f3e-b250-df49b492898a.html.

[91] *See*, *e.g.*, Earthjustice, et al., Cap and Run: Toxic Coal Ash Left Behind by Big Polluters Threatens Illinois Water at 42-43(Nov. 2018), https://illinoiscoalash.files.wordpress.com/2018/12/ilcoalashreport_capandrun.pdf; Emily K. Coleman & James T. Norman, *Lake County Health Department watching growing number of coronavirus cases among Hispanic, black residents*, Lake County News-Sun (May 10, 2020), https://www.chicagotribune.com/suburbs/lake-county-news-sun/ct-lns-lake-county-essential-workers-st-0509-20200509-ttnbev62ebgwjj4u4bfkbg4f5u-story.html.

[92] *See* 2010 Pless Expert Report, attached as Exhibit 13 (discussing and documenting the substantial amount of fugitive dust emissions associated with many of these activities); 2020 Sahu Expert Report, attached Exhibit 14 (same).

C. The Board should require all owners and operators of a facility subject to Part 845 to prepare, submit for approval, and follow a fugitive dust monitoring and mitigation plan.

The Board should require that all owners and operators of a facility subject to Part 845 prepare, submit for approval, and follow a fugitive dust monitoring and mitigation plan that, among other things, requires (1) the continuous monitoring of PM10 and PM2.5 at multiple locations of a facility; (2) quarterly high-volume, filter-based monitoring to more thoroughly evaluate the composition of fugitive dust emissions; (3) sufficient recordkeeping and submittal of data to IEPA; and (4) a plan describing the actions that will be taken in response to detection of exceedances of Reportable Action Levels, the detection of visible fugitive dust, and the malfunction or failure of monitors.[93] The fugitive dust monitoring and mitigation plan should be included in a facility's fugitive dust control plan,[94] submitted for approval in a facility's operating permit application,[95] and placed in the facility's operating record.[96]

1. Requirements for monitoring equipment

Owners or operators should install, operate, and maintain, according to manufacturer's specifications, permanent, continuous Federal Equivalent Method (FEM) real-time PM10 and PM2.5 monitors around the perimeter of the facility. The rules should require that at least six monitors for PM10 and six monitors for PM2.5 be installed, operated, and maintained at or near the boundaries of the facility to monitor for fugitive dust in the ambient air around the facility, with monitor locations subject to approval of IEPA and consistent with the most recent U.S. EPA protocols and guidance for ambient air quality monitoring siting criteria. At a minimum, one monitor should be located at each cardinal point (north, south, east, west) of the facility and two monitors should be located at downwind locations. Additional monitors should be installed, operated, and maintained as appropriate, depending on the size of the facility and other relevant factors such as variability of wind direction at the site and the proximity of neighborhoods.

In addition to the continuous real-time monitors, the Board should require that quarterly, 24-hour high-volume filter-based air sampling be conducted to obtain more accurate and precise data about the specific types of metals being emitted at a facility and to calibrate the real-time monitoring data. At least one monitor each should be located at an upwind location and a downwind location for each quarterly sampling event. At a minimum, the high-volume samples should test for PM10, PM2.5, total suspended solids, silica, radionuclides, and metals, including hexavalent chromium.

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[93] Local and state regulations including similar fugitive dust monitoring plan requirements have been implemented and effective in protecting facility employees and nearby communities from impacts of fugitive dust. *See* Rules for Control of Emissions from Handling and Storing Bulk Materials, Chicago Dept. of Public Health, (Jan. 25, 2019) attached as Exhibit 8; Excerpt, Rules for Bulk Solid Materials Storage, City of Detroit, Ch. 42 (2019) attached as Exhibit 15.

[94] *See* 35 Ill. Adm. Code § 845.500.

[95] *See* 35 Ill. Adm. Code § 845.230

[96] *See* 35 Ill. Adm. Code § 845.800.

The fugitive dust monitoring and mitigation plan should also require the installation, operation, and maintenance, according to manufacturer's specifications, of a weather station or other permanent device to continuously monitor and log wind speed and wind direction at the facility. The weather station should be located at an unobstructed, unsheltered area, centrally positioned in relation to the facility's surface impoundments, and at a minimum height of ten meters above ground level, unless another height is appropriate pursuant to applicable U.S. EPA protocols and guidance.

The costs related to installing, operating, and maintaining the types of monitors specified above would likely not exceed $50,000 a year. The first year of monitoring would be the highest year for costs, given the initial capital needed to purchase and set up the monitoring equipment and network, but the yearly cost for each subsequent year would likely be lower. Although the FEM real-time monitors vary in cost, each monitoring device would likely not exceed $1,000. Additionally, the cost of the quarterly high volume sampling events would likely not exceed $2,000 per sampling event.

2. Recordkeeping and reporting requirements

All fugitive dust monitoring data collected should be required to be consistent with the units of measurement used in the NAAQS for PM10 and PM2.5. Ambient monitoring practices must comply with current U.S. EPA protocols and guidance for ambient air quality monitoring, including but not limited to those for data completeness, calibration, inspection, maintenance, and site and instrument logs. A data logger should be attached to the monitors to record readings from the monitors, and the owner or operator should be required to notify IEPA, in writing within twenty-four hours, each time the monitors exceed the defined Reportable Action Level and any time monitoring equipment has malfunctioned preventing readings or logging of data.

The rules should require owner and operators to maintain and submit sufficient records, including logs of all routine and non-routine maintenance and calibration activities associated with each fugitive dust monitor. The fugitive dust monitoring and mitigation plan should adequately describe the facility's recordkeeping system, which should include a schedule for routine inspection, testing, and maintenance. On a monthly basis, owners and operators should be required to submit the hourly data for each fugitive dust monitor in a Microsoft Excel-compatible file-type, together with the weather station data for the same period. The monthly monitoring reports shall be submitted to IEPA within fourteen days of the end of the month in which the data was collected, placed in the facility's operating record, and uploaded to a publicly available online database, which would help ensure that the public has access to this information in a readable format.[97]

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[97] Publicly available databases for monitoring data are currently utilized at both the state and federal level. *See* IEPA's PFAs Sampling Network (last visited Aug. 4, 2021), https://illinois-epa.maps.arcgis.com/apps/opsdashboard/index.html#/d304b513b53941c4bc1be2c2730e75cf; U.S. EPA's National Contaminant Occurrence Database (last visited Aug. 4, 2021), https://www.epa.gov/sdwa/national-contaminant-occurrence-database-ncod.

3. Mitigation plan requirements

The Board should require fugitive dust monitoring and mitigation plans to include a mitigation plan. The mitigation plan should describe the owner or operator's response activities when the monitors detect exceedances of the Reportable Action Level, which should be defined by the owner or operator in the overall fugitive dust monitoring and mitigation plan. For example, an exceedance of the Reportable Action Level may be defined as any increase greater than half of the 24-hour NAAQS for PM10 (150 ug/m3) and PM2.5 (35 ug/m3) between the upwind and downwind monitors, assuming that half of the total standard is associated with background. Similar levels should be defined for each additional pollutant tested during the quarterly high-volume filter-based air sampling. The response activities should consist of a range of increasingly aggressive measures appropriate to different levels of exceedance. The mitigation plan should also describe the owner or operator's response activities when any visible fugitive dust is detected at the facility and provide for an alternative method of monitoring in the event of malfunction or failure of the monitors.

4. Air modeling requirements

The Board should require owners or operators to conduct air modeling to predict fugitive dust emissions caused by a facility's operations. In order to do so, an owner or operator should utilize conventional air quality dispersion modeling and local records of weather conditions to develop Emissions Factors in accordance with U.S. EPA's AP-42 Compilation of Air Pollutant Emissions Factors handbook. The development of Emissions Factors for a facility's operations will allow an owner or operator to adequately assess the anticipated impacts to air quality that various activities at a facility may have and help ensure the effectiveness of a facility's fugitive dust monitoring and mitigation plan and fugitive dust control plan. Such modeling will also allow the owner or operator to better prepare its mitigation plan. If done properly, the modeling will provide a reasoned, educated basis for the owner or operator to determine which control measures must be utilized more frequently or more effectively and which activities must be curtailed to avoid excess fugitive dust emissions at the site.

D. <u>The Board should require that all owners and operators closing a CCR surface impoundment prepare, submit for approval, and follow a closure project-specific fugitive dust monitoring and mitigation plan.</u>

1. Monitoring requirements for both closure methods

The Board should require that all owners or operators of a CCR surface impoundment closing in accordance with Part 845 prepare, submit for approval, and follow a closure project-specific fugitive dust monitoring and mitigation plan to help protect facility employees and communities from the impacts of any increase in fugitive dust emissions resulting from closure activities. The closure project-specific fugitive dust monitoring plan should be implemented in addition to the requirements of the facility's existing fugitive dust monitoring and mitigation plan.

All closure project-specific fugitive dust monitoring and mitigation plans should require the installation, operation, and maintenance of additional continuous FEM real-time PM10 and PM2.5 monitors to monitor any increases in fugitive dust emissions caused by the closure activities. At a minimum, the monitors should be located in close vicinity to the surface impoundments at which closure activities are occurring. Monitor locations should be subject to IEPA approval and be consistent with the most recent U.S. EPA protocols and guidance for ambient air quality monitoring siting criteria.

The closure project-specific fugitive dust monitoring and mitigation plan should direct owners and operators to comply with the same requirements for the general fugitive dust monitoring and mitigation plans, as discussed above. This includes all requirements for: (a) quarterly high-volume, filter-based monitoring; (b) collecting and logging data; (c) scheduling and logging all routine and non-routine inspection, testing, and maintenance; (d) monthly submittal of hourly data to IEPA within fourteen days of the end of the month in which the data was collected; (e) a mitigation plan describing the response activities to detected exceedances, visible fugitive dust, and the malfunction or failure of monitors; and (f) modeling to develop emission factors for any activities that are different, or performed at different rates or in different ways, than during normal (non-closure) operations.

The Board should require that all closure project-specific fugitive dust monitoring and mitigation plans be submitted with an owner or operator's application for a closure permit in accordance with 35 Ill. Adm. Code § 845.220 and 35 Ill. Adm. Code § 845.720. This will help ensure that there is adequate public participation and agency oversight of all aspects of a facility's plan for closure of a surface impoundment.

2. Additional requirements for closure-by-removal projects

The Board should implement several additional fugitive dust monitoring requirements for all closure-by-removal projects, some of which were previously discussed in the Environmental Groups' comments in the Part 845 rulemaking docket.[98] For all closure-by-removal projects, additional monitors should be installed, operated, and maintained at any transfer point and if transported off-site, at or near the boundaries of the facility where the removed CCR is being disposed, with monitor locations subject to approval of IEPA and consistent with the most recent U.S. EPA protocols and guidance for ambient air quality monitoring siting criteria.

Additionally, in order to monitor fugitive dust emissions during the transportation of removed CCR, all project-specific fugitive dust monitoring and mitigation plans for closure-by-removal projects should require the use of video cameras and GPS-enabled, continuously operating webcams on all trucks, barges, or railcars transporting CCR, at all times. The cameras should be solely aimed and focused on the cover of the trucks, barges, or railcars to monitor any fugitive dust emissions or failure of fugitive dust controls required by an owner or operator's

[98] *See* Initial Public Comments at Section II; Final Post-Hearing Comments at 61-69; 2020 Sahu Expert Report.

fugitive dust control plan[99] or transportation plan.[100] Although webcams will provide a continuous, live video feed, the video cameras will be necessary to monitor fugitive dust emissions in areas where wireless internet networks may be limited or unavailable.

Owners or operators should be required to maintain sufficient records and logs of all video camera and webcam footage, and on a monthly basis, upload the footage to the facility's state CCR website or at a minimum, submit the footage to IEPA within fourteen days of the end of the month in which the data was collected. The owner or operator should also report to IEPA, within 7 days, any releases of fugitive CCR dust from a truck, barge, or railcar carrying CCR from its facility, place the report in the facility's operating record, and post the report on the facility's CCR website within fourteen days of the release. The report should include an estimate of the volume of CCR released, the location(s) where the release occurred, the date and time of the release, and any mitigation measures taken to limit the release.

In addition, all trucks transporting CCR should be required to display a clearly visible telephone number and/or website, which community members can call or access to place a fugitive dust complaint. All complaints placed via telephone or website should be logged in a publicly available database operated by IEPA within fourteen days of the complaints being received.

These additional requirements for all closure by removal projects will help ensure that all fugitive dust controls required by a facility's fugitive dust control plan or transportation plan are constantly being maintained and implemented and all fugitive dust emissions during the transportation of CCR are detected and promptly mitigated.

The cost estimates provided above in section C.1. account for any additional monitoring required for facilities closing CCR surface impoundments. The same type of monitoring devices required for a facility's general fugitive dust monitoring and mitigation plan should also be required for a facility's closure project-specific plan.

Proposed changes to the Part 845 rules consistent with these comments are included in Appendix 3.

IV. The Board Should Expand the Tools It Uses to Identify Areas of Environmental Justice Concern.

The Coal Ash Pollution Prevention Act (P.A. 101-0171) mandates that the rules "specify a procedure to identify areas of environmental justice concern in relation to CCR surface impoundments" and "specify a method to prioritize CCR surface impoundments . . . so that the CCR surface impoundments with the highest risk to public health and the environment, and areas

[99] *See* 35 Ill. Adm. Code § 845.500.
[100] *See* 35 Ill. Adm. Code § 845.740(c).

of environmental justice concern are given first priority."[101] During the hearing, the public raised concerns about how overburdened communities would be prioritized.[102] In the Board's May 6, 2021 Order, the Board invited comments on the application of environmental justice screening tools that rely on both environmental and demographic indicators to identify areas of environmental justice concern.

The Environmental Groups appreciate the Board's decision to consider additional tools to identify areas of environmental justice concern. The question of how to adequately and appropriately identify environmental justice communities has become a national conversation in Congress, at state environmental agencies, and in communities.

Traditionally, race and income have been used to identify environmental justice communities. These factors demonstrate the vulnerabilities of a community and their exposure to environmental pollution due to structural racism and inequities. However, other equally overburdened areas that fail to meet the prescribed threshold for race and income can be overlooked when exclusively considering race and income. Overburdened communities are still suffering under policy frameworks that fail to address the burdens of living amidst many pollution sources. By looking at the overall disproportionate exposure to health and environmental risks, decisionmakers can better see the total harm and communities, can better advocate for clean-up because the cumulative impacts are being reviewed rather than the harm from just one facility. This is not to say that race and income should not be considered in this process – rather that, due to how demographic data can be collected or skewed, it is important to analyze other factors that indicate whether a community is overburdened. Because action is prioritized for environmental justice communities in this rulemaking, it is critical that the Board not leave any communities that have been disproportionately impacted behind.

State agencies and the federal government are also engaged in the discussion of how to best identify environmental justice communities – including other agencies within Illinois. For

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[101] 415 ILCS 5 §22.59(g)(8)-(9).

[102] *See e.g.*, Oct. 1, 2020 Tr. 41:23-42:3 (Ms. Richardson: "The rule must also improve environmental justice community classification to better identify environmental justice communities. In this way, the rule can begin to account for cumulative impacts of multiple pollution sources."); Oct. 1, 2020 Tr. 45:4-20 (Ms. Janowski: "Specifically, I'm concerned about the rules that put the priority on the communities that are poor, where sensitive or vulnerable populations live. Specifically, I ask that some of these most toxic communities be identified. I read that information from the U.S. EPA Environmental Justice Screen and the Clean Power Plan has identified these communities. The positive result of having a rule identifying these impacted communities is that we can begin to account for the cumulative impacts of multiple pollution sources on these vulnerable populations. We know today that the study of COVID affects the health and well-being is greater in areas where black and brown people live. We should not leave out the most impacted communities. . . ."); Aug. 12, 2020 Tr. 11:22 – 12:6 (Ms. Krost: "The proposed rule uses the IEPA's EJ Start tool to identify environmental justice communities, but that tool leaves out some of the most impacted communities. So, the final rule should use the U.S. EPA's environmental justice screening to identify environmental justice communities. Only then can we begin to account for cumulative impacts on sensitive or vulnerable population. . .").

instance, the proposed Environmental Justice Act for All would establish environmental justice requirements, advisory bodies, and programs to address the disproportionate adverse human health or environmental effects of federal laws or programs on communities of color, low-income communities, or tribal and indigenous communities – one of which includes requiring an assessment of cumulative impacts in permitting decisions.[103] The bill defines cumulative impacts as the "disproportionate exposure of a community to public health or environmental hazards from one or multiple facilities including power plants, recycling facilities, sewage plants, incinerators, landfills, and others."[104] There is also the proposed Environmental Justice Mapping and Data Collection Act of 2021, which would establish an interagency Environmental Justice Mapping Committee to create a tool to identify environmental justice communities.[105] Other states with comprehensive environmental justice mapping tools include, but are not limited to, California,[106] New Jersey,[107] Maryland,[108] Minnesota,[109] North Carolina,[110] Pennsylvania,[111]

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[103] S. 872, 117th Cong. (2021).
[104] *See id.*
[105] *See* H.R. 516, 117th Cong. (2021).
[106] Cal. Off. of Envtl. Health Hazard Assessment, CalEnviroScreen, https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-30 (last visited Aug. 5, 2021).
[107] New Jersey Dept. of Envtl. Prot. Environmental Justice Mapping Tool, https://njdep.maps.arcgis.com/apps/webappviewer/index.html?id=34e507ead25b4aa5a5051dbb85e55055.
[108] Maryland EJ Mapper, https://p1.cgis.umd.edu/ejscreen/ (last visited Aug. 5, 2021).
[109] Minn. Pollution Control Agency, Understanding Environmental Justice in Minnesota, https://mpca.maps.arcgis.com/apps/MapSeries/index.html?appid=f5bf57c8dac24404b7f8ef1717f57d00, (last visited Aug. 5, 2021). (Although Minnesota's metrics are based on race and income, they factor in tribal populations, and the map depicts air pollution scores and facilities.)
[110] N. C. Dept. of Envtl. Quality, NCDEQ Community Mapping System, https://ncdenr.maps.arcgis.com/apps/webappviewer/index.html?id=1eb0fbe2bcfb4cccb3cc212af8a0b8c8 (last visited Aug. 5, 2021).
[111] Pa. Dept. Of Envtl. Prot., Environmental Justice Areas Viewer, https://www.arcgis.com/apps/webappviewer/index.html?id=f31a188de122467691cae93c3339469c (last visited Aug. 5, 2021).

Texas,[112] Virginia,[113] and Washington[114]. Other states have mapping tools but only focus on race, ethnicity, and income. *See e.g.*, Massachusetts[115] and New York.[116]

These comments will provide a brief survey on other mapping tools that identify environmental justice communities in order to illustrate other practical means of identifying areas of environmental justice concern. These comments will also identify potential gaps in this rulemaking's methodology to identify areas of areas of environmental justice concern and suggest an approach for this rulemaking.

A. Existing Mapping Tools

1. U.S. EPA'S EJSCREEN

The U.S. EPA developed EJSCREEN to provide data about overburdened communities. The Geographic Information System ("GIS") tool identifies areas that may have higher environmental burdens and vulnerable populations by providing data about demographic and environmental indicators. Demographic indicators include:

- Low-income: Percentage of block group population at or below twice the federal "poverty level"
- Minority: All people other than non-Hispanic white-alone individuals
- Less than high school education: Percentage of people age 25 or older without a high school diploma
- Linguistic isolation: Percentage of people in household in which all members over age 14 years speak English less than "very well"
- Individuals under age 5

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[112] Climate Cabinet Education, Texas Environmental Justice Explorer, https://ej.txrising.org/Explore (last visited Aug. 5, 2021). (This tool was not developed by or with a state agency, but by Climate Cabinet Education.).

[113] Mapping for Environmental Justice, Virginia, https://mappingforej.berkeley.edu/ (last visited Aug. 5, 2021). (This tool was not developed by or with a state agency, but by Mapping for Environmental Justice housed at University of California Berkley).

[114] Wash. State Dept. of Health, Washington Environmental Health Disparities Map, https://fortress.wa.gov/doh/wtn/WTNIBL/ (last visited Aug. 5, 2021).

[115] Mass. Exec. Off. of Energy and Envtl. Affairs, Environmental Justice Map Viewer, https://mass-eoeea.maps.arcgis.com/apps/webappviewer/index.html?id=1d6f63e7762a48e5930de84ed4849212 (last visited Aug. 5, 2021).

[116] N.Y. Dept of Envtl. Conservation, Maps & Geospatial Info. System (GIS) Tools for Environmental Justice, https://www.arcgis.com/home/webmap/viewer.html?url=https://services6.arcgis.com/DZHaqZm9cxOD4CWM/ArcGIS/rest/services/Potential_Environmental_Justice_Area__PEJA__Communities/FeatureServer&source=sd (last visited Aug. 5, 2021). (New York does create different percentile thresholds for urban "minority" communities versus rural "minority" communities.).

- Individuals over age 64[117]

Environmental indicators are direct measurements, proxy estimates of pollution exposure, and facility location information, which are screening-level proxies for risk. The indicators include (1) particulate matter 2.5, (2) ozone, (3) NATA diesel particulate matter, (3) NATA air toxics cancer risk, (4) NATA respiratory hazard index, (5) lead paint indicator, (6) traffic proximity, (7) proximity to superfund (NPL) sites, (8) proximity to risk management plan facilities, (9) proximity to hazardous waste facilities, and (10) wastewater discharger indicator.[118]

EJSCREEN is also based on national data that is available on the census tract level. The U.S. EPA acknowledges that EJSCREEN's screening level results have significant limitations and do not provide data on every environmental impact and demographic indicator that may be relevant to a particular location, or the data may be several years old.[119] It also acknowledges that even though the "environmental indicators are in common units it does not mean that those risks are equal or comparable."[120] U.S. EPA does not use EJSCREEN to identify or label environmental justice communities, nor does U.S. EPA believe it should be the sole basis to determine the existence or absence of environmental justice concerns.[121] In fact, the U.S. EPA supplements EJSCREEN outputs with additional information and local knowledge before making decisions about potential issues.[122] The Board here has the ability to access that local knowledge and explore other indicators to best determine appropriate tools to identify areas of environmental justice concern.

However, this does not mean the data inputs from EJSCREEN should not be used, but rather that it should be used in conjunction with other tools to fully assess and identify the environmental justice concerns. The Illinois Commission on Environmental Justice ("EJ Commission") recognized that EJSCREEN can help identify communities with greater risk of exposure to pollution based on those environmental indicators.[123] Other state agencies also use both the demographic and environmental indicators to assess the potential for environmental justice concerns in an area. As discussed below, this includes agencies in California, Washington, New Jersey, Michigan,[124] Illinois, and several other states–where several states are

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[117] U.S. EPA, EJSCREEN, https://www.epa.gov/ejscreen (last visited Aug. 5, 2021).
[118] *See* U.S. EPA, EJSCREEN Fact Sheet, attached as Exhibit 16; See PCB R20-19 Hearing Ex. 11, EJ Commission Letter.
[119] *See* Ex. 16 EJSCREEN Fact Sheet.
[120] *See id.*
[121] *See id.*
[122] *See id.*
[123] *See* PCB R20-19, Hearing Ex. 11, EJ Commission Letter.
[124] Univ. of Mich. School for Environment and Sustainability, Environmental Justice Screening Tools, https://seas.umich.edu/news/environmental-justice-screening-tools (last visited Aug. 5, 2021).

exploring the question of defining and identifying environmental justice via legislation in the past year.[125]

2. CalEnviroScreen Mapping Tool

The California Environmental Protection Agency Office of Environmental Health Hazard Assessment (OEHHA) developed the California Communities Environmental Health Screening Tool (CalEnviroScreen) to define "disadvantaged communities." The tool looks at census tracts that are disproportionately burdened by multiple sources of pollution based on indicators of pollution burden and pollution characteristics. Pollution indicators include: (1) air quality for PM 2.5 and ozone, (2) diesel particulate matter, (3) drinking water contaminants, (4) pesticides and toxic releases from Facilities, (5) Traffic Density, (6) cleanup sites, (7) Groundwater Threats, (8) hazardous Waste Generators and Facilities, and (9) Impaired Water Bodies and solid waste sites and (11) facilities. Population Characteristics indicators represent biological traits, health status, or community characteristics that can result in increased vulnerability to pollution and include: (1) Age: Children and Elderly, (2) Asthma, (3) Low Birth Weight Infants, (4) Educational Attainment, (5) Linguistic Isolation, and (6) Poverty and Unemployment.[126]

CalEnviroScreen takes the individual indicator scores within each of the two groups and multiplies the Pollution Burden and Population Characteristics scores to get the final score.[127] Many other states, including Illinois, as discussed below, have also adopted aspects of this tool.

3. Existing Tools to Identify Environmental Justice Communities in Illinois

Pursuant to the Future Energy Jobs Act ("FEJA"), the Illinois Power Agency ("IPA") had to define and provide special consideration of "environmental justice community" in order to implement the Illinois Solar for All Program (a program to bring low-income communities distributed generation and community solar projects).[128] Accordingly, the EJ Commission evaluated existing environmental justice identification tools: Illinois EPA's EJ Policy, U.S. EPA's criteria for overburdened communities, U.S. EPA's EJSCREEN mapping tool, and California's CalEnviroScreen mapping tool. The EJ Commission recommended that the IPA utilize the EJSCREEN as a tool to map the relevant suggested indicators and that IPA work with other agencies to ascertain whether indicators from CalEnviroScreen were available.[129]

Ultimately, IPA identified environmental justice communities, for the purposes of FEJA and the associated Solar For All Program, by looking at the communities' risk of pollution

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[125] *See e.g.*, "An Act Concerning the Disproportionate and Public Health Impacts of Pollution on Overburdened Communities," S. 232/A. 2212, Reg. Sess. (N.J. 2020-21) (requiring evaluation of facilities when applying for permits in overburdened communities.

[126] Cal. Off. of Envtl. Health Hazard Assessment, CalEnviroScreen, https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-30 (last visited Aug. 5, 2021).

[127] *See* CalEnviroScreen; EJ Commission Letter, Ex 11.

[128] *See* 20 ILCS 3855/1-56

[129] *See* PCB R20-19 Hearing Ex. 11, EJ Commission Letter.

exposure.[130] The IPA found CalEnviroScreen to be an attractive way to consider defining environmental justice communities as it appeared to be the most rigorous tool.[131] IPA determined which areas qualified as environmental justice communities by analyzing census block group data for environmental indicators and sociodemographic indicators.[132] Environmental indicators, as described by the EJSCREEN Tool, include (1) National-Scale Air Toxics Assessment (NATA), (2) air toxics cancer risk, (3) NATA respiratory hazard index, (4) NATA diesel PM, (5) particulate matter, (6) ozone (7) traffic proximity and volume, (8) lead paint indicator, (9) proximity to risk management plan sites, (10) proximity to hazardous waste treatment, storage and disposal facilities, and (11) Proximity to National Priorities List sites wastewater dischargers indicator.[133] The following demographic indicators are also used by EJSCREEN and were incorporated into the Agency's methodology: (1) percent low-income (2) percent minority, (3) less than high school education, (4) linguistic isolation, (5) individuals under age 5, and (6) individuals over age 64.[134]

IPA also considered including other factors, such as asthma emergency department visits, low birth weight infants and the following environmental indicators from the Illinois EPA: (1) Drinking Water Watch, (2) site remediation program, (3) Leaking Underground Storage Tank Incident Tracking (5) State Response Action Program, and (6) solid waste facilities, but evaluation of these factors was difficult as they are not available on the census block group level. The environmental indicators as identified by EJSCREEN are multiplied by the demographic indicators. Understanding that there are limitations to this data, communities also have the opportunity to engage in a self-designation process.[135] Then communities with scores in the top 25% of all census block groups statewide are defined as "Environmental Justice Communities" for the purpose of the Illinois Solar for All Program.[136]

Subsequently, community-based organizations in environmental justice areas and other environmental groups have worked to support other potential legislation that adopts this formula to identify areas of environmental justice concern. Both the proposed Clean Energy Jobs Act[137] and the Environmental Justice bill, which would impact permitting,[138] adopted the Solar For All framework to identify environmental justice communities because the Solar For All framework included a significant amount of public input. Although neither bill became law, the push to adopt the Solar For All framework demonstrates communities' interest in utilizing a method that incorporates the cumulative impact on communities.

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[130] *See* Illinois Power Agency, IPA Long-Term Renewable Resources Procurement Plan, 219 (Apr. 20, 2020) attached as Exhibit 17.
[131] *See id.* at 220.
[132] *See id.* at 221.
[133] *See id.* at 221-22.
[134] *See id.* at 222.
[135] *See id.*
[136] *See id.* at 223.
[137] Ill. S.B 1718, H.B. 804, 102d Gen. Assemb. (2021).
[138] Ill. H.B. 4093, 102d Gen. Assemb. (2021).

4. Other States with Tools to Identify Environmental Justice Concerns

Washington also has one of the more comprehensive tools to identify environmental justice communities. Washington's environmental justice tool[139] not only identifies environmental health disparities based on the aforementioned indicators, but it also looks at other issues such as diesel pollution and disproportionate impact, social vulnerability to COVID-19, social vulnerability to hazards, lead exposure risk, health disparities, and even a tool to help plan for heath.[140] The environmental health disparities map is based on the cumulative impacts assessment of CalEnviroScreen, where the product of the threats (pollution burdens) and the vulnerabilities (socioeconomic factors) equal the risk (cumulative impact). Using that formula, it estimates a score for each census tract.[141]

New Jersey's environmental justice tool[142] is used both in identifying communities and in permitting decisions.[143] It focuses on identifying overburdened communities and defines them as any census block group, as determined in accordance with the most recent United States Census, in which: (1) at least 35 percent of the households qualify as low-income households (at or below twice the poverty threshold as determined by the United States Census Bureau); (2) at least 40 percent of the residents identify as minority or as members of a State recognized tribal community; or (3) at least 40 percent of the households have limited English proficiency (without an adult that speaks English "very well" according to the United States Census Bureau). New Jersey uses this threshold to look at the cumulative burden on an area that identifies as an overburdened community.

The Maryland EJScreen mapping tool[144] applies the CalEnviroScreen methodology to create an environmental justice score that indicates impact of social and environmental factors. The tool looks at the aforementioned CalEnviroScreen indicators as well as high rates of asthma, myocardial infraction, and low birth rate infants based on information gathered from communities. The tool averages the environmental exposure and environmental effects to create a pollution burden score and then averages the sensitive populations and socioeconomic factors to create population characteristics score. Last, it multiplies the two averages to create a score measuring cumulative impacts on the community. The mapping tool also depicts park equity, supermarkets, public schools, EPA Superfund sites, railroads, legislative districts, 200% federal poverty line, percent of people who are Hispanic or Black, and public transit stops.

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[139] Wash. State Dept. of Health, Washington Environmental Health Disparities Map, https://fortress.wa.gov/doh/wtn/WTNIBL/ (last visited Aug. 5, 2021).
[140] *See id.*
[141] *See id.*
[142] N.J. Dept. of Envtl. Prot. Environmental Justice Mapping Tool, https://njdep.maps.arcgis.com/apps/webappviewer/index.html?id=34e507ead25b4aa5a5051dbb85e55055.
[143] S. 232/A. 2212, Reg. Sess. (N.J. 2020-21).
[144] Maryland EJ Mapper, https://p1.cgis.umd.edu/ejscreen/ (last visited Aug. 5, 2021).

The North Carolina Community Mapping System[145] uses demographic data at the census block level. Because of the use of census block rather than census tract data, North Carolina Department of Environmental Quality had to alter the display of some of its demographic data switching from using data about race, gender disability, household income, and poverty to race and ethnicity, annual income, median household income, homeowner status, dependent populations (*i.e.* certain age groups), and limited English status. The tool also identifies a variety of environmental exposures including permitted facilities and structural CCR fill, and it identifies important sensitive receptors such as hospitals, schools, churches and elder care facilities.

Other states are in development of their environmental justice tools. Michigan is for instance considering adopting a tool developed by the University of Michigan.[146] The mapping tool plans to use the CalEnviroScreen factors, but also looked to residents to determine what indicators the state should include when assessing the pollution burden on a community. This led the agency to also include race, blood lead levels, and life expectancy factors.

The state-specific mapping tools each rely upon more than just race/ethnicity and income to identify overburdened or environmental justice areas. While each agency or organization may have had different purposes for identifying these communities, each tool creates space to acknowledge that there are sociodemographic vulnerabilities, especially race and income, that have been used to create barriers to equity and justice. This is exacerbated by other factors (including the drawing of the lines on the maps) that cumulatively impact the environmental and health burden on communities. By considering a variety of indicators, one can help ensure that vulnerable communities are captured by screening tools to prevent demographic data from being diluted and overburdened areas from being ignored. The Board should thus explore the inputs from these other mapping tools and indicators to identify areas of environmental justice concern.

B. The Board Should Expand the Existing Tools Used to Identify Areas of Environmental Justice Concern

The existing language in the regulation defines areas of environmental justice concern as any area that meets either of the following:

> A) Any area within one mile of a census block group where the number of low-income persons is twice the statewide average, where low income means the number or percent of a census block group's population in households where the household income is less than or equal to twice the federal poverty level; or

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[145] N. C. Dept. of Envtl. Quality, NCDEQ Community Mapping System, https://ncdenr.maps.arcgis.com/apps/webappviewer/index.html?id=1eb0fbe2bcfb4cccb3cc212af8a0b8c8 (last visited Aug. 5, 2021).

[146] Univ. of Mich. School for Environment and Sustainability, Environmental Justice Screening Tools, https://seas.umich.edu/news/environmental-justice-screening-tools (last visited Aug. 5, 2021).

> (B) Any area within one mile of a census block group where the number of minority persons is twice the statewide average, where minority means the number or percent of individuals in a census block group who list their racial status as a race other than white alone or list their ethnicity as Hispanic or Latino.

During the hearing several members of the public asked that the Board improve this definition to fully account for environmental justice communities.[147]

The Illinois EPA utilizes the data as depicted on EJ Start to identify these areas.[148] In its Pre-filed Answers,[149] Illinois EPA also listed the following CCR surface impoundments as falling under this provision:

- Ameren: Venice North and South Ponds
- City Water Light and Power Lake Side Pond and Dullman Pond
- NRG Joliet 9 Lincoln Stone Quarry
- NRG Joliet 29 Pond 1, Pond 1, Pond 3
- NRG Waukegan Station East Pond, West Pond, and Old Pond
- Vistra Duck Creek Station ash Pond No. 1, Ash Pond No. 2, Bottom Ash Basin, GMF Pond, and GMF Recycle Pond
- Vistra Havana Station East Ash Pond Cell 2, East Ash Pond Cell 3
- Vistra Hennepin Station West Ash Pond 1, West Ash Pond 3, West Secondary Ash Pond, East Ash Pond 2, East New Primary Pond, East Pond 4
- CTI Wood River Station West Ash Pond 1, West Ash Pond 2W, West Ash Pond 2E, and Pond[150]

However, when CTI filed its Surface Impoundment Category Designation and Justification, it indicated Wood River Station would fall under Category 6, despite Illinois EPA's classification above. Without the Part 845.700(g)(7) establishing the one-mile buffer, Waukegan – a well-known environmental justice community – could also not qualify as an area of environmental justice concern. Rather than rely solely on the buffer, the Board should look to additional tools to account for areas of environmental justice concern.

Another issue is the current rules' focus on demographic data. Solely relying upon demographic data may not paint the full picture of an area of environmental justice concern. While race and income are indicators of environmental racism and injustice, those demographics might not be captured in the census block for the industry that burdens a community. For instance, by just looking at the EJ Start census block data for the CCR surface impoundments rather than the facility or the one-mile buffer, the surface impoundments in Waukegan – a known

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[147] *See e.g.*, *supra* n.102.
[148] *See* PCB R20-19 Hearing Ex.1, Testimony of Chris Pressnall at 2.
[149] *Id.*, PCB R20-19, Ex. 2.
[150] *See Id.*, Ex. 2 at 181-182.

environmental justice community – might not be captured as an area of environmental justice concern in this rulemaking.[151] In addition, communities are not just defined by the geographical limitations of census blocks. Rather, they are a mix of other geographic and cultural factors, that create a community. Relying upon census block data, even though it is a smaller unit of analysis than census tract data, can still dilute the make-up of an overburdened community.[152] This illustrates the importance of considering a variety of tools to identify areas of environmental justice concern.

However, during the hearing, the Illinois EPA also explained that using this Illinois Solar For All formula, described above, to identify areas of EJ concern is less inclusive than relying upon EJ Start.

> Illinois Solar for All mapping tool does the scoring system and only the – only sort of 25 percent of the communities that are, quote, unquote, the worst, and this is an oversimplification, but Solar for All takes the, quote, unquote, 25 worst of the different demographic and environmental indicators and scores them on a relative basis and so, for instance, where that becomes problematic is in downstate Illinois. There are no EJ communities in the town of Springfield where I'm sitting right now.[153]

Illinois Solar For All does nevertheless establish a self-designation process, where communities can apply to also be recognized as an environmental justice community.[154] This is important because it is possible for a community to meet the environmental and sociodemographic indicators, but not meet the requisite score to be considered an environmental justice community despite having higher scores for some of the indicators.[155] This is also why it is important to have a one-mile buffer around an identified area because it can "provide a margin for error."[156]

Utilizing other tools in addition to EJ Start can also help capture communities that disproportionately bear the burden of environmental injustice and racism. For instance, there could be residents who are overburdened in their community, but live outside the 1-mile radius from the facility, as described in in Part 845.700(g)(6). Those residents could still rely upon the impacted water resources for activities like subsistence fishing, and thus the facility could raise additional environmental justice concerns. However, because that community is outside the radius, those impacts do not count. By looking at whether there is subsistence fishing and other health impacts in the area, the Agency can better capture the total impact on the community,

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[151] *See* Ill. EPA, Illinois EJ Start, https://www.arcgis.com/apps/webappviewer/index.html?id=f154845da68a4a3f837cd3b880b0233c (last visited Aug. 5, 2021). (The filters do not appear to cover the ponds, but they do cover the facilities).
[152] *See* Ex. 17, Procurement Plan, Sec. 2.6; Ex. 16 EJSCREEN Fact Sheet.
[153] Aug. 13, 2020 Tr. 191:1-12.
[154] *See* Ill. Power Agency, Illinois Solar for All Environmental Justice Community Self-Designation Process (Apr. 22, 2019), attached as Exhibit 18.
[155] *See generally* Aug. 13, 2020 Tr. 192-96.
[156] *See* Aug. 13, 2020 Tr. 195:9.

whereas demographic indicators can be diluted based on how boundaries are drawn.[157] While not every person that uses the waterways near a surface impoundment is from a known environmental justice community, there can still be communities that travel to use polluted waterways for sustenance and that are then overburdened by environmental and health risks when returning home.

In this subdocket, the Board does not have to be restricted to the existing definition of environmental justice communities. Census block data would not capture how residents of an overburdened community that may be over a mile away use waterways affected by CCR. Therefore, the Environmental Groups recommend that the Board incorporate a 3-mile radius around the census block when considering utilizing the Solar For All methodology or other tools. This could better capture environmental justice communities who still may be burdened by coal ash pollution.

Given the EJ Commission's work on the Solar For All Program definition of environmental justice community and its advisory role to the Illinois EPA,[158] we recommend that the Board consult the EJ Commission on the best methodology and mapping tools to utilize for this rulemaking. Furthermore, it would be beneficial to solicit from stakeholders, especially those in communities near CCR surface impoundments and those in recognized environmental justice communities across the state, the input about the best environmental and sociodemographic indicators to apply here. However, the Environmental Groups also understand the logistical hurdles to this analysis with the timeline for closure prioritization and the urgency to clean up this pollution, especially in areas of environmental justice concern. If the Board must skip these steps, Commenters recommend the adoption of the Solar For All Program methodology (including the self-designation process for environmental justice communities) based on CalEnviroScreen as described above, with a radius to account for potential error.

Proposed changes to Part 845 consistent with these comments are in Appendix 4.

V. Conclusion

Environmental Groups appreciate the Board's initiative to develop rules to address historic coal ash fill, temporary coal ash piles, fugitive dust monitoring for coal ash dust, and additional environmental justice screening tools. We strongly urge the Board to adopt rules that include comprehensive protections against these pollution sources, as we propose in these comments and the appendices thereto. We also strongly urge the Board to expand the screening tools for use in determining areas of environmental justice concern. Thank you for your consideration of these comments and recommended rules.

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[157] *See* Testimony of Jo Lakota, PCB R20-19, Ex. 40 ("They often are fishing for supper in these waters. Along Kickapoo Creek by Edwards, I see everyday people fishing – young people, young black men, and families, some even from Pekin. They sometimes throw the fish back, but usually they keep the fish for food. They should not be eating this fish.").

[158] PCB R20-19 Hearing Ex. 11, EJ Commission Letter.

Dated: August 6, 2021

Respectfully Submitted,

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3	2018 Waukegan Annual GW Monitoring Report
4	2019 Powerton Annual GW Monitoring Report
5	2019 Powerton ASD
6	2018 Will County ASD
7	EJ letter CCR landfill
8	Chicago Dept of Public Health - Storage Control of Emissions from Handling and Storing Bulk Materials January 2019
9	EPA Inhalation of Fugitive Dust Report
10	Compendium of Damages Cases, Technical Support Document, Fugitive Dust Impact (Dec. 18, 2014)
11	Ash In Lungs
12	Yixing Du, Journal Thoracic Disease
13	Pless Expert Report
14	Sahu Expert Report 6.16.20
15	Excerpts of Michigan Chapter 42 for Bulk Solid Materials Storage
16	2018 EJSCREEN Fact Sheet 8-14-18
17	Procurement Plan - Revised Long Term Renewable Resources Procurement Plan (Apr. 20, 2020)
18	EJC-Self-Designation-Process

CERTIFICATE OF SERVICE

The undersigned, Jennifer Cassel, an attorney, certifies that I have served by email the Clerk and by email the individuals with email addresses named on the Service List provided on the Board's website, *available at* https://pcb.illinois.gov/Cases/GetCaseDetailsById?caseId=16975, a true and correct copy of the **ENVIRONMENTAL LAW & POLICY CENTER, LITTLE VILLAGE ENVIRONMENTAL LAW ORGANIZATION, PRAIRIE RIVER NETWORK, AND SIERRA CLUB'S INITIAL COMMENTS AND RECOMMENDED RULES**, as well as attachments, before 5 p.m. Central Time on August 6, 2021. The number of pages in the email transmission is 709 pages.

Dated: August 6, 2021

Respectfully Submitted,

/s/ Jennifer Cassel

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APPENDIX 1

Recommended Rules

(Historic Ash Fill)

PROPOSED REGULATIONS: Part 846

SUBPART A: GENERAL PROVISIONS

Section 846.100 Scope and Applicability

a) This Part applies to CCR fill areas containing CCR generated from the combustion of coal at electric utilities and independent power producers.

b) This Part does not apply to CCR fill areas permitted under Part 811 prior to the effective date of these regulations.

c) This Part does not apply to wastes, including fly ash, bottom ash, boiler slag, and flue gas desulfurization materials generated at facilities that are not part of an electric utility or independent power producer, such as manufacturing facilities, universities, and hospitals.

d) This Part does not apply to fly ash, bottom ash, boiler slag, and flue gas desulfurization materials generated primarily from the combustion of fuels (including other fossil fuels) other than coal, for the purpose of generating electricity unless the fuel burned consists of more than 50% coal on a total heat input or mass input basis, whichever results in the greater mass feed rate of coal.

e) This Part does not apply to CCR placement at active or abandoned underground or surface coal mines.

Section 846.110 Definitions

"CCR fill area" means any area of land that holds an accumulation of CCR and stores or disposes of that CCR located at an active facility or inactive facility, including, but not limited to: (1) scattered ash and any ash that was placed on the surface of the land; (2) any area holding an accumulation of CCR; and (3) CCR fill used for construction, if that CCR does not meet the definition of "coal combustion by-product, 415 ILCS 5/3.135. "CCR fill area" does not include: (1) any area that meets the definition of "CCR surface impoundment," 15 ILCS 5/3.143; 35 IAC 845.120; (2) any area holding an accumulation of CCR when that CCR meets the definition of "coal combustion by-product," 415 ILCS 5/3.135; and (3) any area meeting the definition of "existing CCR landfill" under the federal Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments, 40 C.F.R. §257.53.

"Facility" means all contiguous land, and structures, other appurtenances, and improvements on the land, used for treating, storing, disposing of, or otherwise conducting solid waste management of CCR. A facility may consist of several treatment, storage, or disposal units (e.g., one or more fill areas, landfills, surface impoundments, or combinations of them).

"Free liquids" means liquids that readily separate from the solid portion of a waste under ambient temperature and pressure.

"Operator" means the person or persons responsible for the overall operation of a facility where a CCR fill area is located.

"Owner" means the person or persons who own a CCR fill area or facility where a CCR fill area is located.

"Uppermost saturated zone" means the nearest zone below the land surface in which all the pores and rock fractures are filled with water, which is not necessarily an aquifer or hydrologically connected to an aquifer.

Section 846.130 Characterization of a CCR Fill Area

a) CCR Fill Characterization Plan

1) Wherever evidence indicates the presence of a CCR fill area, the owner or operator must immediately submit notification to the Agency that it has knowledge of a CCR fill area within its property or control.

2) After submitting notification to the Agency, the owner or operator must develop a plan to characterize the scope and extent of the CCR fill area, including the vertical and horizontal extent of the CCR fill area.

3) The plan must be submitted to the Agency for approval within 90 days of the owner or operator's notification to the Agency of the presence of CCR fill area. The plan must identify all necessary steps that will be taken to characterize the scope and extent of the CCR fill area. The plan must demonstrate that it will provide adequate information to determine compliance with Sections 846.300 (Placement Above the Uppermost Aquifer or Uppermost Saturated Zone) and 846.310 (Unstable Areas and Floodplains).

4) The plan must include the estimated amount of time it will take the complete the CCR fill characterization.

5) That plan must include a certification from a qualified professional engineer stating that it complies with the requirements of this Section.

b) Public Notice and Agency Approval

1) The owner or operator must place the CCR Fill Characterization Plan on the facility's publicly accessible Internet site (CCR website) under Section 846.700 within 24 hours after the submission to the Agency (see Section 846.700).

2) Within two business days of receiving the CCR Fill Characterization Plan, the Agency must email public notice to its listserv for the facility that the CCR Fill Characterization Plan is available to view on the facility's CCR website. If the facility does not already have a dedicated listserv, the Agency must provide public notice by

posting notice on the Agency's website, posting notice on Agency social media, notifying the listserv of the nearest CCR surface impoundments for which there is a facility listserv, and other means deemed adequate by the Agency. The public notice must note that public comments are welcome within 14 days of the notice's service.

3) Members of the public may submit written public comments on the CCR Fill Characterization Plan to the Agency within 14 days after the Agency provides public notice.

4) Within 30 days of the close of the public comment period, the Agency must provide a written response to the owner or operator, either approving or indicating the modifications that need to be made to the Plan. The Agency's approval must set a date for when the CCR fill characterization must be completed.

5) The Agency must mail or email its response to each person who timely submitted a written public comment and supplied a mailing or email address and email its response to the facility listserv, if one exists.

Section 846.140 Severability

a) If any provision of this Part or its application to any person or under any circumstances is adjudged invalid, that adjudication must not affect the validity of this Part as a whole or of any portion not adjudged invalid.

Section 845.150 Incorporations by Reference

a) For purposes of this Part, the Board incorporates the following material by reference:

1) Non-Regulatory Government Publications and Publications of Recognized Organizations and Associations:

Association for the Advancement of Cost Engineering (AACE), 726 East Park Avenue #180, Fairmont, WV 26544, (304) 296-8444, web.aacei.org.

"Cost Estimate Classification System — As Applied in Engineering, Procurement, and Construction for the Process Industries", TCM Framework: 7.3 – Cost Estimating and Budgeting. March 6, 2009, AACE International Recommended Practice No. 18R-97.

NTIS. National Technical Information Service, 5285 Port Royal Road, Springfield VA 22161, (703) 605-6000, www.ntis.gov.

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", USEPA Publication No. SW-846, as amended by Updates I, II, IIA, IIB, III, IIIA, and IIIB (Doc. No. 955-001-00000-1) (available online at https://www.epa.gov/hw-sw846/sw-846-compendium).

2) Code of Federal Regulations, Available from the Superintendent of Documents, U.S. Government Publishing Office, Washington, DC 20401, (202) 783-3238, https://www.ecfr.gov, https:/www.govinfo.gov/app/collection/cfr, or https://www.federalregister.gov:

40 CFR 257.35 (2019) (Definition of "beneficial use of CCR")

40 CFR 257.103(f)(1)(x) (85 Fed. Reg. 53563-64 (Aug. 28, 2020)) (Preparation of Semi-Annual Progress Reports)

b) This Section incorporates no later editions or amendments.

SUBPART B: PERMITTING

Section 846.200 Permit Requirements and Standards of Issuance

a) Permit Requirements

1) No person may undertake construction at, remove, or modify a CCR fill area or related treatment or mitigation facilities, including under corrective action measures under Subpart D, without a construction permit issued by the Agency under this Part.

2) No person may perform corrective action at a CCR fill area without obtaining a construction permit for corrective action.

3) No person may remove or install a cover system at a CCR fill area without obtaining a construction permit issued by the Agency under this Part.

b) Standards for Issuance

1) The Agency may not issue any construction permit required by this Part unless the applicant submits adequate proof that the CCR fill area will be modified so as not to cause a violation of the Act or Board rules.

2) The existence of a violation of the Act, Board regulation, or Agency regulation will not prevent the issuance of a construction permit under this Part if:

A) The applicant has been granted a variance or an adjusted standard from the regulation by the Board;

B) The permit application is for construction, installation, or operation of equipment to alleviate or correct a violation; or

C) The permit application is for construction, installation, or operation of equipment necessary to restore, protect, or enhance the environment.

3) In granting permits, the Agency may impose reasonable conditions specifically related to the applicant's past compliance history with the Act as necessary to correct, detect, or prevent noncompliance. The Agency may impose such other conditions as may be necessary to accomplish the purpose of the Act and as are not inconsistent with this Part. [415 ILCS 5/39(a)]

4) In making its determinations on permit applications under this Part, the Agency may consider prior adjudications of noncompliance with the Act by the applicant that involved a release of a contaminant into the environment. [415 ILCS 5/39(a)]

Section 846.210 General Provisions

a) All permit applications must be made on the forms prescribed by the Agency and must be mailed or delivered to the address designated by the Agency on the forms. The Agency must provide a dated, signed receipt upon request. The Agency's record of the date of filing must be deemed conclusive unless a contrary date is proved by a dated, signed receipt.

b) Required Signatures of Owners or Operators

1) All permit applications must contain the name, address, email address and telephone number of the operator, or duly authorized agent, and the property owner to whom all inquiries and correspondence must be addressed.

2) All permit applications must be signed by the owner, operator or a duly authorized agent of the operator.

3) An application submitted by a corporation must be signed by a principal executive officer of at least the level of vice president, or his or her duly authorized representative, if that representative is responsible for the overall operation of the facility described in the application form. In the case of a partnership or a sole proprietorship, the application must be signed by a general partner or the proprietor, respectively. In the case of a publicly owned facility, the application must be signed by either the principal executive officer, ranking elected official, or other duly authorized employee.

c) Legal Description. All permit applications must contain a legal description of the facility boundary and a description of the boundaries of all units included in the facility.

d) The Agency must mail all notices of final action by certified mail, postmarked with a date stamp and with return receipt requested. Final action must be deemed to have taken place on the postmarked date that the notice is mailed.

e) Violation of any permit condition or failure to comply with the Act or regulations promulgated under the Act must be grounds for enforcement action as provided in the Act, including revocation of a permit.

f) Issuance of a permit under this Part does not relieve the applicant of the obligation to obtain other permits required by law.

g) The owner or operator must place in the facility's CCR fill area record all permit applications submitted to the Agency and all permits issued under this Part (see Section 846.700(d)(1)).

h) Agency Listserv

1) For each facility subject to this Part, the Agency must create and maintain a listserv. Each listserv must include the email addresses of all interested persons who notify the Agency in writing—either directly under subsection (h)(2) or through the facility owner or operator under Section 846.220(a)(6) or 846.230(f)(4)—of their respective email addresses and that they would like to receive emails of notices concerning the facility.

2) The Agency's webpage must specify how interested persons may notify the Agency in writing of their respective email addresses and that they would like to be added to the Agency's listserv for a facility subject to this Part.

3) When this Part requires that the Agency email a notice to the listserv for a facility, the Agency must do so within the timeframe specified, concurrently with other required means of disseminating the notice, or otherwise in a timely manner. When this Part requires an owner or operator to request that the Agency email a notice to the listserv for the facility, the Agency must do so within two business days after receiving the request from the owner or operator.

Section 846.220 Construction Permits

a) All construction permit applications must contain the following information and documents.

1) Site Location Map. All permit applications must contain a site location map on the most recent United States Geological Survey (USGS) quadrangle of the area from the 7 1⁄2 minute series (topographic), or on another such other map whose scale clearly shows the following information:

A) The facility boundaries and all adjacent property, extending at least 1000 meters (3280 feet) beyond the boundary of the facility;

B) All surface waters;

C) The prevailing wind direction;

D) The limits of all 100-year floodplains;

E) All-natural areas designated as a Dedicated Illinois Nature Preserve under the Illinois Natural Areas Preservation Act [525 ILCS 30];

F) All historic and archaeological sites designated by the National Historic Preservation Act (16 USC 470 et seq.) and the Illinois Historic Sites Advisory Council Act [20 ILCS 3410]; and

G) All areas identified as critical habitat under the Endangered Species Act of 1973 (16 USC 1531 et seq.) and the Illinois Endangered Species Protection Act [520 ILCS 10].

2) Site Plan Map. The application must contain maps, including cross - sectional maps of the site boundaries, showing the location of the facility. The following information must be shown:

A) The entire facility, including all existing CCR fill area locations;

B) The boundaries, both above and below ground level, of the facility and all CCR fill areas included in the facility;

C) All existing and proposed groundwater monitoring wells; and

D) All main service corridors, transportation routes, and access roads to the facility.

3) A narrative description of the proposed modification to the CCR fill area.

4) A new groundwater monitoring program or any modification to an existing groundwater monitoring program that includes, but is not limited to, the following information, unless the construction permit application is for removal pursuant to Section 846.600(a):

A) A hydrogeologic site investigation meeting the requirements of Section 846.420, if applicable;

B) Design and construction plans of a groundwater monitoring system meeting the requirements of Section 846.430; and

C) A proposed groundwater sampling and analysis program that includes selection of the statistical procedures to be used for evaluating groundwater monitoring data (see Sections 846.440 and 846.450).

5) The signature and seal of a qualified professional engineer or geologist.

6) Certification that the owner or operator of the property or facility with a CCR fill area completed the public notification and public meetings required under Section 846.230, a summary of the issues raised by the public, a summary of any revisions, determinations, or other considerations made in response to those issues, and a list of interested persons in attendance who would like to be added to the Agency's listserv for the facility.

b) Corrective Action Construction. In addition to the requirements in subsection (a), all construction permit applications that include any corrective action required to be performed under Subpart D must also contain the following information and documents:

1) Corrective action plan (see Section 846.470).

2) Groundwater modeling, including:

A) The results of groundwater contaminant transport modeling and calculations showing how the corrective action will achieve compliance with the applicable groundwater standards;

B) All modeling inputs and assumptions;

C) Description of the fate and transport of contaminants with the selected corrective action over time; and

D) Capture zone modeling, if applicable.

3) Any necessary licenses and software needed to review and access both the models and the data contained within the models required by subsection (c)(2).

4) Corrective action groundwater monitoring program, including identification of any revisions to the groundwater monitoring system for corrective action.

5) Any interim measures necessary to reduce the contaminants leaching from the CCR fill area, and/or potential exposures to human or ecological receptors, including an analysis of the factors specified in Section 846.480(a)(3).

6) Post-cover system care plan specified in Section 846.530(d), if applicable.

7) A demonstration of whether the CCR fill area meets the location standards in the following Sections:

A) Section 846.300 (Placement Above the Uppermost Aquifer or Uppermost Saturated Zone);

B) Section 846.310 (Unstable Areas and Floodplains);

c) Cover System Construction. In addition to the requirements in subsection (a), all construction permit applications to install a cover system at the CCR fill area under Subpart E must contain the following information and documents:

1) Cover system plan (see Section 846.500);

2) Groundwater modeling, including:

A) The results of groundwater contaminant transport modeling and calculations showing how the cover system will achieve compliance, if applicable, with the groundwater standards;

B) All modeling inputs and assumptions;

C) Description of the fate and transport of contaminants, if monitoring shows groundwater contamination, with the selected cover system over time;

D) Capture zone modeling, if applicable; and

E) Any necessary licenses and software needed to review and access both the model and the data contained within the model.

3) Proposed schedule to complete cover system; and

4) A demonstration that the CCR fill area meets the location standards in the following Sections:

A) Section 846.300 (Placement Above the Uppermost Aquifer or Uppermost Saturated Zone);

B) Section 846.310 (Unstable Areas and Floodplains).

d) Removal Construction. In addition to the requirements in subsection (a), all construction permit applications for removal of the CCR fill area under Subpart F must contain the following information and documents:

1) Removal plan (see Section 846.620); and

2) Proposed schedule to complete removal.

e) Duration of Construction Permits

1) For any construction permit that is not for the removal of the CCR fill area, the construction permit must be issued for fixed terms not to exceed 3 years.

2) For any construction permit for the removal of a CCR fill area, the construction permit must be issued for an initial fixed term expiring within the timeframe approved by the Agency in the construction permit or five years, whichever is less. The Agency may renew a construction permit for removal in two-year increments under Section 846.640(b).

Section 846.230 Pre-Application Public Notification and Public Meeting

a) At least 30 days before the submission of a construction permit application, the owner or operator of the property or facility with a CCR fill area must hold at least two public

meetings to discuss the proposed construction, with at least one meeting to be held after 5:00 p.m. in the evening. Any public meeting held under this Section must be located at a venue that is accessible to persons with disabilities, and the owner or operator must provide reasonable accommodations upon request.

b) The owner or operator must prepare and circulate a notice explaining the proposed construction project and any related activities and the time and place of the public meeting. At least 30 days before the public meeting, the owner or operator of the property or facility with a CCR fill area must:

    1) Mail or hand-deliver the notice to the Agency and all residents within a one-mile radius from the facility boundary;

    2) Post the notice to the owner's or operator's publicly accessible Internet site under Section 846.710;

    3) Post the notice in conspicuous locations throughout villages, towns, or cities within 10 miles of the facility, or use appropriate broadcast media (such as radio or television);

    4) Request that the Agency email the notice to the Agency's listserv for the facility; and

    5) Include in the notice the owner or operator's contact information, the Internet address where the information in Section 846.230(e) will be posted, and the date on which the information will be posted to the site.

c) When a proposed construction project or any related activity is located in an area with a significant proportion of non-English speaking residents, the notification must be circulated, or broadcast, in both English and the appropriate non-English language, and the owner or operator must provide translation services during the public meetings required by Section 846.230(a), if requested by non-English speaking members of the public.

d) The owner or operator of the property or facility with a CCR fill area must prepare documentation required by Section 846.700(d) recording the public meeting and place the documentation in the facility's CCR fill area record.

e) At least 30 days before a public meeting, the owner or operator of the property or facility with a CCR fill area must post on the owner's or operator's publicly accessible Internet site all documentation relied upon in making a tentative construction permit application.

f) At the public meeting, the owner or operator of the property or facility with a CCR fill area must:

    1) Present its decision-making process for the construction permit application, including, when applicable, the corrective action alternatives and the removal alternatives considered. The presentation must include a comparison of projected groundwater impacts for each alternative considered and an objective comparison of the pros and cons of each alternative considered;

2) Include a question/answer portion of the meeting to allow the public to ask questions. There must be representatives from the owner or operator present who are qualified and knowledgeable enough to answer the questions posed by the public;

3) If there are questions posed by the public at the hearing that cannot be answered in person, or if there are subsequent questions posed by the public following the meeting, the owner or operator of the property or facility with a CCR fill area must respond to those questions in writing within a reasonable timeframe and post the response on the facility's CCR website required by Section 846.710; and

4) Explain that the Agency is creating a listserv for the facility, compile a list of interested persons in attendance—and their respective email addresses—who would like to be added to the listserv from those that attend the public meeting, and transmit that list to the Agency with the permit application.

g) Within 14 days after the public meetings required by Section 846.230, the owner or operator must distribute a general summary of the issues raised by the public, as well as a response to those issues or comments raised by the public. If these comments resulted in a revision, change in a decision, or other considerations or determinations, a summary of these revisions, changes, and considerations must be included in the summary. The summary must be distributed to any attendee who requests a copy at the public meeting.

h) This Section does not apply to applications for minor modifications as described in Section 846.270(d).

Section 846.240 Tentative Determination and Draft Permit

a) Following the receipt of a complete application for a construction permit, the Agency must prepare a tentative determination.

1) The tentative determination must include at least the following:

A) A statement regarding whether the permit is to be issued or denied; and

B) If the determination is to issue the permit, a draft permit and a brief description of any conditions contained in the permit.

2) Upon tentative determination to issue or deny the permit:

A) If the determination is to issue the permit, the Agency must notify the applicant in writing of the content of the tentative determination and draft permit and of its intent to circulate public notice of issuance in accordance with Section 846.250;

B) If the determination is to deny the permit, the Agency must notify the applicant in writing of the tentative determination and of its intent to circulate

public notice of denial, in accordance with Section 846.250. In the case of denial, notice to the applicant must include a statement of the reasons for denial, as required by Section 39(a) of the Act.

3) The documents supporting the Agency's tentative decision to issue or deny a permit must be made part of the Agency's record.

Section 846.250 Draft Permit Public Notice and Participation

a) The Agency must post a notification that it has received a permit application on the Agency's webpage and must email the notice to the Agency's listserv for the applicant's facility.

b) Public Notice of Draft Permit

1) Not earlier than 15 days following the Agency's notification to the applicant of its tentative decision under Section 846.240 to issue or deny the permit application, the Agency must circulate public notice of the completed application for the permit in a manner designed to inform interested and potentially interested persons of the construction at the CCR fill area and of the proposed determination to issue or deny the permit.

2) The contents of public notice of completed applications for permits must shall include at least the following:

A) Name, address, and telephone number of the Agency;

B) Name and address of the applicant;

C) Brief description of the applicant's activities that result in the construction at the CCR fill area;

D) A statement of the tentative determination to issue or deny the permit;

E) A brief description of the procedures for the formulation of final determinations, including the procedures for submitting comments and the expiration date of the comment period;

F) Address and telephone number of Agency premises at which interested persons may obtain further information and request a copy of the permit application and related documents;

G) A translation of the public notice into the appropriate language or languages if the Agency determines that a project is located within one mile of a significant population of non-English speaking residents;

H) A brief description of how members of the public can request a public hearing under Section 846.250(d); and

I) A brief description of how members of the public can request being added to the Agency's listserv for the facility.

3) Procedures for the circulation of public notice required under this Section must include at least the following concurrent actions:

A) Posting on the Agency's webpage and all the Agency's social media outlets;

B) Mailing the notice to the clerk of the nearest city, town, or village requesting further posting in conspicuous locations throughout the city, town, or village;

C) Requiring the applicant to post the notice near the entrance to the applicant's premises; and

D) Emailing the notice to the Agency's listserv for the facility.

c) Public Comment Period

1) The Agency must accept written comments from interested persons on the draft permit determination for 45 days following the circulation of the public notice under subsection (b).

2) All comments must be submitted to the Agency and to the applicant.

3) All written comments submitted during the 45-day comment period must be retained by the Agency and considered in the formulation of its final determination with respect to the permit application.

4) The period for comment may be extended at the discretion of the Agency.

5) The Agency must consider all timely submitted comments.

d) Public Hearing

1) The Agency must hold a public hearing on the issuance or denial of a draft permit whenever the Agency determines that there exists a significant degree of public interest in the proposed permit.

2) Within the 45-day public comment period, any person, including the applicant, may submit to the Agency a request for a public hearing, which must include the reasons why a hearing is warranted.

3) Hearings held under this Section must be held in the geographical area in which the CCR fill area is located. When determining the hearing location, consideration must be given to facilitating attendance of interested or affected persons and organizations and to accessibility of hearing sites to public transportation.

e) Notice of Public Hearing

1) The Agency must issue notice of a public hearing not less than 30 days before the date of the hearing, under the procedures for the circulation of public notice in subsection (b)(3).

2) The contents of the public notice for the public hearing must include at least the following:

A) Name, address, and telephone number of the Agency;

B) Name and address of each applicant whose application will be considered at the hearing;

C) Brief description of the applicant's activities that result in the construction at the CCR fill area;

D) Information regarding the time and location of the hearing;

E) The purpose of the hearing;

F) A concise statement of the issues to be considered at the hearing;

G) Address and telephone number of premises at which interested persons may obtain further information and request a copy of the draft permit and related documents;

H) A statement that the hearing will be conducted in accordance with this Section; and

I) A translation of the public notice into the appropriate language or languages will be made if the Agency determines that a project is located within one mile of a significant population of non-English speaking residents.

f) When the Agency receives written comments or holds a public hearing under this Section, the Agency must prepare a responsiveness summary that includes:

1) An identification of the public participation activity conducted;

2) Description of the matter on which the public was consulted;

3) An estimate of the number of persons present at the hearing;

4) A summary of all significant comments, criticisms, and suggestions, whether written or oral, submitted during the public comment period, at the hearing, or during the time that the hearing record was open;

5) The Agency's response to all significant comments, criticisms, and suggestions; and

6) A statement of Agency action, including, when applicable, the issuance or denial of the permit.

Section 846.260 Final Permit Determination and Appeal

a) The Agency must not make a final permit determination until the public participation process in Section 846.250 has concluded.

b) After the consideration of any comments that may have been received, the Agency may either issue or deny the permit.

c) The Agency must provide a notice of the issuance or denial of the permit to the applicant, to any person who provides comments or an email address to the Agency during the public notice period or a public hearing, and to any person on the Agency's listserv for the facility. The Agency must post its final permit determination and, if a public hearing was held, the responsiveness summary, to the Agency's website. The notice must briefly indicate any significant changes that were made from the terms and conditions set forth of the draft permit.

d) In the case of denial, the Agency must inform the applicant of the reasons for denial, as required by Section 39(a) of the Act.

e) Appeal

1) If the Agency refuses to grant, or grants with conditions, a permit under this Part, the applicant or a third party who is or may be adversely affected by the Agency's decision may petition the Board to appeal the Agency's final decision under Section 40 of the Act.

2) All appeals must be filed with the Board within 35 days after the final action is served on the applicant as specified in Section 846.210(d).

Section 846.270 Transfer, Modification and Renewal of Construction Permits

a) No permit is transferable from one person to another except as approved by the Agency.

b) Agency Initiated Modification. The Agency may modify a permit under the following conditions:

1) Discovery of a typographical or calculation error;

2) Discovery that a determination or condition was based upon false or misleading information;

3) An order of the Board; or

4) Promulgation of new statutes or regulations affecting the permit.

c) The owner or operator of a CCR fill area may initiate modification to its permit by application submittal to the Agency at any time after the permit is approved and before the permit expires.

d) The Agency may make minor modifications to a permit without following the public notice procedures of Section 846.250. Minor modifications may only:

1) Correct typographical errors;

2) Require more frequent monitoring or reporting by the permittee, including the installation of additional groundwater monitoring wells;

3) Allow for a change in ownership or operational control of a facility when the Agency determines that no other change in the permit is necessary, provided that a written agreement containing a specific date for transfer of permit responsibility, coverage, and liability between the current and new permittees has been submitted to the Agency;

4) Change the construction schedule, which does not impact the scheduled date of completion; or

5) Require electronic reporting requirements.

e) An application for renewal of a permit must be filed with the Agency at least 180 days before the expiration date of the existing permit unless the Agency grants a waiver of this requirement. The Agency may grant a waiver of the 180-day requirement only if:

1) The permittee submits a written request to the Agency at least 60 days before the expiration of the permit;

2) The permittee's written request includes the reasonably justifiable causes for not meeting the 180-day requirement; and

3) The permittee's written request includes a date by which the permittee will submit the renewal application.

f) Any Agency decision to deny a waiver request must be made within 21 days after receipt of the waiver request (see subsection (e)(1)).

g) The terms and conditions of an expiring permit remain effective and enforceable against the permittee until the Agency takes final action on the pending permit renewal application, only if the permittee has submitted a timely application under subsection (e) and the Agency, through no fault of the permittee, does not issue a new permit by, on, or before the expiration date of the previous permit.

Section 846.280 Construction Quality Assurance Program

a) The following must be constructed according to a Construction Quality Assurance (CQA) program:

    1) Installation of a groundwater collection system and discharge system;

    2) Installation of the groundwater monitoring system; and

    3) Installation of the final cover system.

b) The CQA program must meet the following requirements:

    1) The owner or operator of the CCR fill area must designate a CQA officer who is a qualified professional engineer.

    2) At the end of each week of construction, until construction is complete, a summary report must be prepared either by the CQA officer or under the supervision of the CQA officer. The report must include descriptions of the weather, locations where construction occurred during the previous week, materials used, results of testing, inspection reports, and procedures used to perform the inspections. The CQA officer must review and approve the report. The owner or operator of the CCR fill area must place the weekly reports in the facility's fill area record (see Section 846.700(d)(3)).

    3) The CQA officer must certify the following, when applicable:

        A) The bedding material contains no undesirable objects;

        B) The removal plan, cover system plan, or corrective action plan approved by the construction permit has been followed;

        C) The anchor trench and backfill are constructed to prevent damage to a geosynthetic membrane;

        D) All tears, rips, punctures, and other damage are repaired;

        E) All geosynthetic membrane seams are properly constructed and tested in accordance with the manufacturer's specifications;

        F) Any groundwater collection system is constructed to intersect the water table;

        G) Any groundwater collection system is properly constructed to slope toward extraction points, and the extraction equipment is properly designed and installed;

        H) Appropriate operation and maintenance plans for the groundwater collection system and extraction and discharge equipment are provided;

I) Proper filter material consisting of uniform granular fill, to avoid clogging, is used in construction;

J) The filter material, as placed, possesses structural strength adequate to support the maximum loads imposed by the overlying materials and equipment used at the facility;

K) CCR stabilization; and

L) Site restoration, if any.

4) The CQA officer must supervise and be responsible for all inspections, testing and other activities required to be implemented as part of the CQA program under this Section.

5) The CQA officer must be present to provide supervision and assume responsibility for performing all inspections of the following activities, when applicable:

A) Compaction of the subgrade and foundation to design parameters;

B) Application of final cover, including installation of the geomembrane; and

C) Installation of the groundwater collection system and discharge system.

6) If the CQA officer is unable to be present as required by subsection (b)(5), the CQA officer must provide the following in writing:

A) The reasons for his or her absence;

B) A designation of a person who must exercise professional judgment in carrying out the duties of the CQA officer-in-absentia; and

C) A signed statement that the CQA officer assumes full responsibility for all inspections performed and reports prepared by the designated CQA officer-in-absentia during the absence of the CQA officer.

7) The CQA program must ensure, at a minimum, that construction materials and operations meet design specifications.

SUBPART C: LOCATION RESTRICTIONS

Section 846.300 Placement Above the Uppermost Aquifer or Uppermost Saturated Zone

a) The base or bottom-most portion of a CCR fill areas must not be located within 1.52 meters (five feet) of the upper limit of the uppermost aquifer and above the uppermost saturated zone, or the owner or operator of a property or facility with a CCR fill area must demonstrate that there will not be an intermittent, recurring, or sustained hydraulic connection between

any portion of the base or bottom-most portion of the CCR fill area and the uppermost aquifer and uppermost saturated zone due to normal fluctuations in groundwater elevations (including the seasonal high water table).

b) The owner or operator of the property or facility with a CCR fill area must obtain a certification from a qualified professional engineer stating that the demonstration meets the requirements of subsection (a).

c) The owner or operator of the property or facility with a CCR fill area must complete the demonstration required by subsection (a) and submit the completed demonstration, along with a qualified professional engineer's certification, to the Agency for approval within 30 days of completing the CCR characterization required by Section 846.130 and must place the completed demonstration and certification in the facility's CCR fill area record as required by Section 846.700(d).

Section 846.310 Unstable Areas and Floodplains

a) A CCR fill area must not be located in an unstable area unless the owner or operator demonstrates that recognized and generally accepted engineering practices have been incorporated into the design of the CCR fill area to ensure that the integrity of the structural components of the CCR fill area will not be disrupted.

b) The owner or operator must consider all the following factors, at a minimum, when determining whether an area is unstable:

    1) On-site or local soil conditions, including but not limited to liquefaction, that may result in significant differential settling;

    2) On-site or local geologic or geomorphologic features; and

    3) On-site or local human-made features or events (both surface and subsurface).

c) A CCR fill area must not be located in a floodplain unless the owner or operator demonstrates that recognized and generally accepted engineering practices have been incorporated into the design of the CCR fill area to ensure that the CCR fill area will not restrict the flow of the base flood, reduce the temporary water storage capacity of a floodplain, or result in washout of CCR, so as to pose a hazard to human life, wildlife, or land or water resources. For this subsection (c):

    1) Base flood means a flood that has a 1 percent or greater chance of recurring in any year or a flood of a magnitude equaled or exceeded once in 100 years on average within the time of historical river level records.

    2) Floodplain means the lowland and relatively flat areas adjoining inland and coastal waters, including flood-prone areas of offshore islands, which are inundated by the base flood.

3) Washout means the carrying away of CCR by waters of the base flood.

d) The owner or operator of the property or facility with a CCR fill area must obtain a certification from a qualified professional engineer stating that the demonstration meets the requirements of subsection (a).

e) The owner or operator of the property or facility with a CCR fill area must complete the demonstration required by subsection (a) and submit the completed demonstration, along with a qualified professional engineer's certification required by subsection (b), to the Agency for approval within 30 days of completing the CCR characterization required by Section 846.130 and must place the completed demonstration and certification in the facility's CCR fill area record as required by Section 846.700(d).

Section 846.320 Public Notice and Agency Approval of Location Demonstration

a) The owner or operator must place the completed location demonstration, as submitted to the Agency, on the facility's publicly accessible Internet site (CCR website) under Section 846.700 within 24 hours after the submission to the Agency pursuant to Sections 846.300(c) and 846.310(e).

b) Within two business days after receiving the completed location demonstration, the Agency, must email a notice to its listerv for the facility that the location demonstration is available to view on the facility's CCR website. If the facility does not already have a dedicated listserv, the Agency must provide public notice by posting notice on the Agency's website, posting notice on Agency social media, notifying the listserv of the nearest CCR surface impoundments for which there is a facility listserv, and other means deemed adequate by the Agency. The public notice must note that public comments are welcome within 14 days of the notice's service.

c) Members of the public may submit to the Agency written comments on the completed location demonstration within 14 days after the Agency provides public notice.

d) Within 30 days of the close of the public comment period, the Agency must provide a written response to the owner or operator, either approving or disagreeing with the location demonstrations. The Agency's decision is final regarding Section 846.330.

e) The Agency must mail or email its response to each person who timely submitted a written public comment and supplied a mailing or email address and to the listserv for the facility.

Section 846.330 Failure to Meet Location Standards

a) An owner or operator of a property or facility with a CCR fill area who fails to demonstrate compliance with the requirements of this Subpart is subject to the requirements of Subpart F.

An owner or operator of a property or facility with a CCR fill area who fails to demonstrate compliance with the requirements of this Section must submit a construction permit application pursuant to Subpart B to the Agency within 180 days of establishing the groundwater monitoring system and the groundwater monitoring program at the CCR fill area within the timeframe required by the Agency's approval pursuant to Section 846.410(c)(5).

SUBPART D: GROUNDWATER MONITORING AND CORRECTIVE ACTION

Section 846.400: Groundwater Protection Standards:

a) For CCR fill areas:

1) The groundwater protection standards at the waste boundary must be the standards contained in 35 Ill. Admin. Code 845.600(a).

2) For constituents with a background concentration higher than the levels identified in subsection (a)(1), the background concentration must be the groundwater protection standard.

b) The owner or operator of a property or facility with a CCR fill area may not obtain alternative groundwater quality standards in 35 Ill. Adm. Code 620.450(a)(4) for the constituents in subsections (a) and (b) before the end of post-cover system care under Section 846.530, when installing a cover system, or before the end of groundwater monitoring under Section 846.640(b), when removing.

Section 846.405: General Requirements and Removal Exemption

a) All CCR fill areas are subject to the groundwater monitoring and corrective action requirements of this Subpart.

b) However, in lieu of complying with this Subpart, a CCR fill area may be removed if it meets the following conditions:

1) The CCR fill does not violate the location restrictions in Subpart C.

2) The CCR fill area is not located within 2,500 feet of potable water wells.

c) Owners or operators electing to remove pursuant to subsection (b) must comply with Subpart F. The owner or operator electing to remove pursuant to subsection (b) must submit notification to the Agency within 30 days of the Agency rendering a decision pursuant to Section 846.320.

Section 846.410: Required Submissions and Agency Approvals for Groundwater Monitoring

a) Within 180 days of the Agency rendering a decision pursuant to Section 846.320, the owner or operator of a property or facility with a CCR fill area who does not or may not elect to remove pursuant to Section 846.405(b) must submit the following to the Agency for approval in a hydrogeologic assessment plan:

    1) A hydrogeologic site characterization meeting the requirements of Section 846.420;

    2) Design and construction plans of a groundwater monitoring system meeting the requirements of Section 846.430;

    3) A groundwater sampling and analysis program that includes selection of the statistical procedures to be used for evaluating groundwater monitoring data as required by Section 846.440; and

    4) A monitoring program that includes a minimum of eight independent samples for each background and downgradient well as required by Section 846.450(b).

    5) An estimate of how long it will take to establish the groundwater monitoring system and the groundwater monitoring program.

b) The owner or operator of a property or facility with a CCR fill area who does not or may not elect to remove pursuant to Section 846.405(b) must:

    1) Conduct groundwater monitoring under a monitoring program approved by the Agency under this Subpart;

    2) Evaluate the groundwater monitoring data for statistically significant levels over background levels for the constituents listed in Section 846.400 after each sampling event;

    3) Determine compliance with the groundwater protection standards in Section 846.400 after each sampling event; and

    4) Submit all groundwater monitoring data to the Agency and any analysis performed under subsections (b)(2) and (b)(3) within 60 days after completion of sampling and place the groundwater monitoring data in the facility's CCR fill area record as required by Section 846.700(d)(15).

c) Public Notice and Agency Approval

    1) The owner or operator must place the hydrogeologic assessment plan on the facility’s CCR fill record and publicly accessible Internet site (CCR website) under Section 846.700 within 24 hours after the submission to the Agency (see Section 846.700).

2) Within two business days after receiving the hydrogeologic assessment plan, the Agency must email a notice to its listserv for the facility that the hydrogeologic assessment plan is available to view on the facility's CCR website. If the facility does not already have a dedicated listserv, the Agency must provide public notice by posting notice on the Agency's website, posting notice on Agency social media, notifying the listserv of the nearest CCR surface impoundments for which there is a facility listserv, and other means deemed adequate by the Agency. The public notice must note that public comments are welcome within 14 days of the notice's service.

3) Members of the public may submit to the Agency written public comments on the hydrogeologic assessment plan within 14 days after the Agency provides public notice.

4) Within 30 days of the close of the public comment period, the Agency must provide a written response to the owner or operator, either approving or indicating the modifications that need to be made to the plan. The Agency's approval must set a date for when the groundwater monitoring system and the groundwater monitoring program must be established.

5) The Agency must mail or email its response to each person who timely submitted a written public comment and supplied a mailing or email address and to the listserv for the facility.

d) Once the groundwater monitoring system and the groundwater monitoring program have been established at the CCR fill area within the timeframe required by the Agency's approval pursuant to subpart (c)(5), the owner or operator must conduct groundwater monitoring and, if necessary, corrective action throughout the life and post-cover system care period of the CCR fill area or the time period specified in Section 846.640(b) when ash is removed.

e) If a CCR fill area has a release, the owner or operator must immediately take all necessary measures to control all sources of the release to reduce or eliminate, to the maximum extent feasible, further releases of contaminants into the environment. The owner or operator of the property or facility with a CCR fill area must comply with all applicable requirements of Sections 846.460, 846.470, and 846.480.

f) Annual Groundwater Monitoring and Corrective Action Report

1) The owner or operator of a property or facility with a CCR fill area who does not or may not elect to remove pursuant to Section 846.405(b) must prepare and submit to the Agency an annual groundwater monitoring and corrective action report as a part of the annual consolidated report required by Section 846.450.

2) For the preceding calendar year, the annual report must document the status of the groundwater monitoring and corrective action plan for the CCR fill area, summarize key actions completed, including but not limited to the status of permit applications and Agency approvals, describe any problems encountered, discuss actions to resolve the problems, and project key activities for the upcoming year.

3) At a minimum, the annual groundwater monitoring and corrective action report must contain the following information, to the extent available:

    A) A map, aerial image, or diagram showing the CCR fill area, all background (or upgradient) and downgradient monitoring wells, including the well identification numbers, that are part of the groundwater monitoring program for the CCR fill area, and a visual delineation of any exceedances of the groundwater protection standards;

    B) Identification of any monitoring wells that were installed or decommissioned during the preceding year, along with a narrative description of why those actions were taken;

    C) A potentiometric surface map for each groundwater elevation sampling event required by Section 846.450(b)(2);

    D) In addition to all the monitoring data obtained under this Subpart, a summary including the number of groundwater samples that were collected for analysis for each background and downgradient well, and the dates the samples were collected;

    E) A narrative discussion of any statistically significant increases over background levels for the constituents listed in Section 846.400; and

    F) Other information required to be included in the annual report as specified in this Subpart.

4) A section at the beginning of the annual report must provide an overview of the current status of groundwater monitoring program and corrective action plan for the CCR fill area. At a minimum, the summary must:

    A) Specify whether groundwater monitoring data shows a statistically significant increase over background concentrations for one or more constituents listed in Section 846.400;

    B) Identify those constituents having a statistically significant increase over background concentrations and the names of the monitoring wells associated with the increase;

    C) Specify whether there have been any exceedances of the groundwater protection standards for one or more constituents listed in Section 846.400;

    D) Identify those constituents with exceedances of the groundwater protection standards in Section 846.400 and the names of the monitoring wells associated with the exceedance;

    E) Provide the date when the assessment of corrective measures was initiated for the CCR fill area;

F) Provide the date when the assessment of corrective measures was completed for the CCR fill area;

G) Specify whether a remedy was selected under Section 846.470 during the current annual reporting period, and if so, the date of remedy selection; and

H) Specify whether remedial activities were initiated or are ongoing under Section 846.480 during the current annual reporting period.

Section 846.420: Hydrogeologic Site Characterization:

a) The owner or operator of the property or facility with a CCR fill area not subject to the removal requirements of Section 846.600 must design and implement a hydrogeologic site characterization.

b) The hydrogeologic site characterization must include, but is not limited to, the following:

1) Geologic well logs/boring logs;

2) Vertical and horizontal extent of CCR fill;

3) Climatic aspects of the site, including seasonal and temporal fluctuations in groundwater flow;

4) Identification of nearby surface water bodies and drinking water intakes;

5) Identification of nearby pumping wells and associated uses of the groundwater;

6) Identification of nearby dedicated nature preserves;

7) Geologic setting;

8) Structural characteristics;

9) Geologic cross-sections;

10) Soil characteristics;

11) Identification of confining layers;

12) Identification of potential migration pathways;

13) Groundwater quality data;

14) Vertical and horizontal extent of the geologic layers to a minimum depth of 100 feet below land surface, including lithology and stratigraphy;

15) A map displaying any known underground mines beneath a CCR fill area;

16) Chemical and physical properties of the geologic layers to a minimum depth of 100 feet below land surface;

17) Hydraulic characteristics of the geologic layers identified as migration pathways and geologic layers that limit migration, including:

A) Water table depth;

B) Hydraulic conductivities;

C) Effective and total porosities;

D) Direction and velocity of groundwater flow; and

E) Map of the potentiometric surface;

18) Groundwater classification under 35 Ill. Adm. Code 620; and

19) Any other information requested by the Agency that is relevant to the hydrogeologic site characterization.

Section 846.430: Groundwater Monitoring Systems:

a) Performance Standard. The owner or operator of a property or facility with a CCR fill area who does not or may not elect to remove pursuant to Section 846.405(b) must install a groundwater monitoring system that consists of a sufficient number of wells, installed at appropriate locations and depths, to yield groundwater samples that:

1) Accurately represent the quality of background groundwater that has not been affected by CCR fill, leakage from any CCR fill area, or leakage from a CCR surface impoundment. A determination of background quality may include sampling of wells that are not hydraulically upgradient of the CCR management area where:

A) Hydrogeologic conditions do not allow the owner or operator of the property or facility with a CCR fill area to determine what wells are hydraulically upgradient; or

B) Sampling at other wells will provide an indication of background groundwater quality that is demonstratively as representative or more representative than that provided by the upgradient wells; and

2) Accurately represent the quality of groundwater passing the waste boundary of the CCR fill area. The downgradient monitoring system must be installed at the waste boundary that ensures detection of groundwater contamination. All potential contaminant pathways must be monitored.

b) The number, spacing, and depths of monitoring system wells must be determined based upon site-specific technical information identified in the hydrogeologic site characterization conducted under Section 846.420.

c) The groundwater monitoring system must include a sufficient number of monitoring wells necessary to meet the performance standards specified in subsection (a) based on the site-specific information specified in subsection (b). The groundwater monitoring system must contain:

    1) A minimum of one upgradient, three downgradient monitoring wells, and one monitoring well completed within the fill to monitor groundwater/leachate quality within the central CCR fill area; and

    2) Additional monitoring wells as necessary to accurately represent the quality of background groundwater that has not been affected by CCR fill, leakage from any CCR fill area, or leakage from any CCR surface impoundment and the quality of groundwater passing the waste boundary of the CCR fill area.

d) Multiunit Groundwater Monitoring System

    1) The owner or operator of a property or facility with multiple CCR fill areas may install a multiunit groundwater monitoring system instead of separate groundwater monitoring systems for each CCR fill area.

    2) The multiunit groundwater monitoring system must be equally as capable of detecting monitored constituents at the waste boundary of the CCR fill area as the individual groundwater monitoring system specified in subsections (a) through (c) for each CCR fill area, based on the following factors:

        A) Number, spacing, and orientation of each CCR fill area;

        B) Hydrogeologic setting;

        C) Site history; and

        D) Engineering design of the CCR fill area.

    3) Any multiunit groundwater monitoring system must include one monitoring well completed within the fill to monitor groundwater/leachate quality within the central CCR fill area being monitored.

e) Monitoring wells must be properly constructed in a manner consistent with the standards of 77 Ill. Adm. Code 920.170.

    1) The owner or operator must document and include in the facility's CCR fill area record the design, installation, development, and decommissioning of any monitoring wells, piezometers and other measurement, sampling, and analytical devices. The qualified professional engineer must be given access to this documentation when

completing the groundwater monitoring system certification required by subsection (f).

2) The monitoring wells, piezometers, and other measurement, sampling, and analytical devices must be operated and maintained so that they perform to the design specifications throughout the life of the monitoring program.

f) The owner or operator must obtain a certification from a qualified professional engineer stating that the groundwater monitoring system has been designed and constructed to meet the requirements of this Section. If the groundwater monitoring system includes the minimum number of monitoring wells specified in subsection (c)(1), the certification must document the basis supporting this determination. The certification must be submitted to the Agency with the appropriate permit application.

Section 846.440: Groundwater Sampling and Analysis:

a) The groundwater monitoring program must include consistent sampling and analysis procedures that are designed to ensure monitoring results that provide an accurate representation of groundwater quality at the background and downgradient wells required by Section 846.430. The owner or operator of the property or facility with a CCR fill area must develop a sampling and analysis program that includes procedures and techniques for:

1) Sample collection;

2) Sample preservation and shipment;

3) Analytical procedures;

4) Chain of custody control; and

5) Quality assurance and quality control.

b) The groundwater monitoring program must include sampling and analytical methods that are appropriate for groundwater sampling and that accurately measure constituents and other monitoring parameters in groundwater samples. For this Subpart, the term “constituent” refers to both constituents and other monitoring parameters listed in Section 846.400.

c) The owner or operator must perform the following each time ground water is sampled:

1) Measure groundwater elevations in each well before purging;

2) Determine the rate and direction of groundwater flow; and

3) Measure groundwater elevations in wells that monitor the same CCR management area within a time period short enough to avoid temporal variations in groundwater

flow that could preclude accurate determination of groundwater flow rate and direction.

d) The owner or operator of the property or facility with a CCR fill area must establish background groundwater quality in a hydraulically upgradient or background well for each of the constituents listed in Section 846.400. Background groundwater quality may be established at wells that are not located hydraulically upgradient from the CCR fill area if it meets the requirements of Section 846.430(a)(1).

e) The number of samples collected when conducting monitoring (for both downgradient and background wells) must be consistent with the statistical procedures chosen under subsection (f) and the performance standards under subsection (g). The sampling procedures must be those specified by Section 846.450(a) through (c).

f) Statistical Methods

1) The owner or operator of the property or facility with a CCR fill area must select one of the statistical methods specified in this subsection, (f)(1), to be used in evaluating groundwater monitoring data for each specified constituent. The statistical test chosen must be conducted separately for each constituent in each monitoring well.

A) A parametric analysis of variance followed by multiple comparison procedures to identify statistically significant evidence of contamination. The method must include estimation and testing of the contrasts between each compliance well's mean and the background mean levels for each constituent.

B) An analysis of variance based on ranks followed by multiple comparison procedures to identify statistically significant evidence of contamination. The method must include estimation and testing of the contrasts between each compliance well's median and the background median levels for each constituent.

C) A tolerance or prediction interval procedure, in which an interval for each constituent is established from the distribution of the background data and the level of each constituent in each compliance well is compared to the upper tolerance or prediction limit.

D) A control chart approach that gives control limits for each constituent.

E) Another statistical test method that meets the performance standards of subsection (g).

2) The owner or operator of the property or facility with a CCR fill area must obtain a certification from a qualified professional engineer stating that the selected statistical method is appropriate for evaluating the groundwater monitoring data for the CCR fill area. The certification must include a narrative description of the statistical method selected to evaluate the groundwater monitoring data. The certification must be submitted to the Agency with the appropriate permit application.

3) The owner or operator of the property or facility with a CCR fill area must submit the following to the Agency in a hydrogeologic assessment plan:

A) Documentation of the statistical method chosen; and

B) The qualified professional engineer certification required under subsection (f)(2).

g) Any statistical method chosen under subsection (f) must comply with the following performance standards, as appropriate, based on the statistical test method used:

1) The statistical method used to evaluate groundwater monitoring data must be appropriate for the distribution of constituents. Normal distributions of data values must use parametric methods. Non-normal distributions must use non-parametric methods. If the distribution of the constituents is shown by the owner or operator of the property or facility with a CCR fill area to be inappropriate for a normal theory test, then the data must be transformed or a distribution-free (non-parametric) theory test must be used. If the distributions for the constituents differ, more than one statistical method may be needed.

2) If a control chart approach is used to evaluate groundwater monitoring data, the specific type of control chart and its associated constituent values must be such that this approach is at least as effective as any other approach in this Section for evaluating groundwater data. The constituent values must be determined after considering the number of samples in the background database, the data distribution, and the range of the concentration values for each constituent of concern.

3) If a tolerance interval or a prediction interval is used to evaluate groundwater monitoring data, the levels of confidence and, for tolerance intervals, the percentage of the population that the interval must contain, must be such that this approach is at least as effective as any other approach in this Section for evaluating groundwater data. These constituents must be determined after considering the number of samples in the background database, the data distribution, and the range of the concentration values for each constituent of concern.

4) The statistical method must account for data below the limit of detection with one or more statistical procedures at least as effective as any other approach in this Section for evaluating groundwater data. Any practical quantitation limit that is used in the statistical method must be the lowest concentration level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions that are available to the facility. For the constituents identified in Section 846.400(a)(1), the practical quantitation limit must be less than the groundwater protection standards.

5) If necessary, the statistical method must include procedures to control or correct for seasonal and spatial variability as well as temporal correlation in the data.

h) The owner or operator of the property or facility with a CCR fill area must determine whether there is a statistically significant increase over background values for each constituent in Section 846.400.

    1) In determining whether a statistically significant increase has occurred, the owner or operator must compare the groundwater quality of each constituent at each monitoring well designated under Section 846.430(a)(2) or (d)(1) to the background value of that constituent, according to the statistical procedures and performance standards specified by subsections (f) and (g).

    2) Within 60 days after completing sampling and analysis, the owner or operator must determine whether there has been a statistically significant increase over background for any constituent at each monitoring well.

i) The owner or operator must measure total recoverable metals concentrations in measuring groundwater quality. Measurement of total recoverable metals captures both the particulate fraction and dissolved fraction of metals in natural waters. Groundwater samples must not be field filtered before analysis.

j) All groundwater samples taken under this Subpart must be analyzed by a certified laboratory using Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, incorporated by reference in Section 846.150.

Section 846.450: Groundwater Monitoring Program:

a) The owner or operator of a property or facility with a CCR fill area must conduct groundwater monitoring consistent with this Section. At a minimum, groundwater monitoring must include groundwater monitoring for all constituents with a groundwater protection standard in Section 846.400(a), calcium, and turbidity. The owner or operator of the property or facility with a CCR fill area must submit a groundwater monitoring plan to the Agency with its hydrogeologic assessment plan.

b) Monitoring Frequency

    1) The monitoring frequency for all constituents with a groundwater protection standard in Section 846.400(a), calcium, and turbidity must be at least quarterly during the period when groundwater in the vicinity of the CCR fill area is being characterized before any remediation and the post-cover system care period or period specified in Section 846.640(b) when corrective action is by removal except as allowed in subsection (b)(4).

    2) The groundwater elevation monitoring frequency must be monthly.

    3) The elevation of groundwater/leachate within the CCR fill area must be measured each time the groundwater elevations are measured (see Section 846.450(b)(2)).

4) After completion of five years of monitoring under this Part, the owner or operator of a property or facility with a CCR fill area may ask the Agency for approval of a semiannual monitoring frequency by demonstrating all of the following:

A) The groundwater monitoring effectiveness will not be compromised by the reduced frequency of monitoring;

B) Sufficient data has been collected to characterize groundwater;

C) The groundwater monitoring schedule currently does not show any statistically significant increasing trends; and

D) The concentrations of constituents monitored under Section 846.450(a) at the down-gradient monitoring wells are below the applicable groundwater protection standards of Section 846.400.

5) If, after an Agency approval of a semiannual monitoring frequency under subsection (b)(4), a statistically significant increasing trend is detected or an exceedance above the GWPS is detected, the monitoring must revert to a quarterly frequency.

c) The number of samples collected and analyzed for each background well and downgradient well during subsequent quarterly sampling events must be consistent with Section 846.440 and must account for any unique characteristics of the site; but must include at least one sample from each background and downgradient well.

d) If one or more constituents are detected, and confirmed by an immediate resample, to be in exceedance of the groundwater protection standards in Section 846.400 in any sampling event, the owner or operator must notify the Agency which constituent exceeded the groundwater protection standard and place the notification in the facility's CCR fill area record as required by Section 846.700(d)(16). The owner or operator of the property or facility with a CCR fill area also must:

1) Characterize the nature and extent of the release and any relevant site conditions that may affect the remedy ultimately selected. The characterization must be sufficient to support a complete and accurate assessment of the corrective measures necessary to effectively clean up all releases from the CCR fill area under Section 846.460. The owner or operator of the property or facility with a CCR fill area must submit the characterization to the Agency and place the characterization in the facility's CCR fill area record as required by Section 846.700(d)(16). Characterization of the release includes the following minimum measures:

A) Install additional monitoring wells necessary to define the contaminant plumes;

B) Collect data on the nature and estimated quantity of material released, including specific information on the constituents listed in Section 846.400 and the levels at which they are present in the material released;

C) Install at least one additional monitoring well at the facility boundary in the direction of contaminant migration and sample this well in accordance with subsections (a) and (b); and

D) Sample all wells in accordance with subsections (a) and (b) to characterize the nature and extent of the release.

2) Notify all persons who own the land or reside on the land that directly overlies any part of the plume of contamination if contaminants have migrated off-site as indicated by sampling of wells in accordance with subsection (d)(1). The owner or operator must send notifications made under this subsection (d)(2) to the Agency and place the notifications in the facility's CCR fill area record (see Section 846.700(d)(16)).

Section 846.460: Assessment of Corrective Measures:

a) If one or more constituents are detected, and confirmed by an immediate resample, to be in exceedance of the groundwater protection standards in Section 846.400 in any sampling event, the owner or operator must initiate an assessment of corrective measures to prevent further releases, to remediate any releases, and to restore the affected area.

1) The assessment of corrective measures must be initiated within 90 days after finding that any constituent listed in Section 846.400 has been detected in exceedance of the groundwater protection standards in Section 846.400, at the downgradient waste boundary or immediately upon detection of a release of CCR from a CCR fill area.

2) The assessment of corrective measures must be completed and submitted to the Agency within 90 days after of initiation of assessment of corrective measures, unless the owner or operator demonstrates to the Agency the need for additional time to complete the assessment of corrective measures due to site-specific conditions or circumstances. The owner or operator must submit this demonstration, along with a certification from a qualified professional engineer attesting that the demonstration is accurate, to the Agency within 60 days after initiating an assessment of corrective measures. The Agency must either approve or disapprove the demonstration within 30 days. The 90-day deadline to complete the assessment of corrective measures may be extended for no longer than 60 days. The owner or operator must also include the Agency approved demonstration in the annual groundwater monitoring and corrective action report required by Section 846.410(e), in addition to the certification by a qualified professional engineer.

b) The owner or operator of the property or facility with a CCR fill area must continue to monitor groundwater in accordance with the monitoring program as specified in Section 846.450.

c) The assessment under subsection (a) must include an analysis of the effectiveness of potential corrective measures in meeting all the requirements and objectives of the corrective action plan, as described by Section 846.470, addressing at least the following:

1) The performance, reliability, ease of implementation, and potential impacts of appropriate potential remedies, including safety impacts, cross-media impacts, and control of exposure to any residual contamination;

2) The time required to begin and complete the corrective action plan; and

3) The institutional requirements, such as State or local permit requirements or other environmental or public health requirements that may substantially affect implementation of the corrective action plan.

d) The owner or operator of the property or facility with a CCR fill area must discuss the results of the corrective measures assessment, at least 30 days before prior to the selection of remedy, in a public meeting with interested and affected parties (see Section 846.230).

Section 846.470: Corrective Action Plan

a) The owner or operator must prepare a semi-annual report describing the progress in selecting a remedy and developing a corrective action plan. The semi-annual report must be submitted to the Agency and placed in the CCR fill area record as required by Section 846.700(d)(17).

b) Within 180 days after submitting the completed corrective action assessment required by 846.460(a)(2) to the Agency and after completion of the public meeting in Section 846.460(d), the owner or operator of the CCR fill area must submit, in a construction permit application to the Agency pursuant to Subpart B, a corrective action plan that identifies the selected remedy. This requirement applies in addition to, not in place of, any applicable standards under any other State or federal law.

c) The corrective action plan must meet the following requirements:

1) Be based on the results of the corrective measures assessment conducted under Section 846.460;

2) Identify a selected remedy that at a minimum, meets the standards listed in subsection (d);

3) Contain the corrective action alternatives analysis specified in subsection (e); and

4) Contain proposed schedules for implementation, including an analysis of the factors in subsection (f);

d) The selected remedy in the corrective action plan must:

1) Be protective of human health and the environment;

2) Attain the groundwater protection standards specified in Section 846.400;

3) Control the sources of releases to reduce or eliminate, to the maximum extent feasible, further releases of constituents listed in Section 846.400 into the environment;

4) Remove from the environment as much of the contaminated material that was released from the CCR fill area as is feasible, taking into account factors such as avoiding inappropriate disturbance of sensitive ecosystems; and

5) Comply with standards for management of wastes as specified in Section 846.480(d).

e) Corrective Action Alternatives Analysis. In selecting a remedy that meets the standards of subsection (d), the owner or operator of the CCR fill area must consider the following evaluation factors:

1) The long- and short-term effectiveness and protectiveness of each potential remedy, along with the degree of certainty that the remedy will prove successful based on consideration of the following:

A) Magnitude of reduction of existing risks;

B) Magnitude of residual risks in terms of likelihood of further releases due to CCR remaining following implementation of a remedy;

C) The type and degree of long-term management required, including monitoring, operation, and maintenance;

D) Short-term risks that might be posed to the community or the environment during implementation of such a remedy, including potential threats to human health and the environment associated with excavation, transportation, and re-disposal of contaminants;

E) Time until groundwater protection standards in Section 846.400 are achieved;

F) The potential for exposure of humans and environmental receptors to remaining wastes, considering the potential threat to human health and the environment associated with excavation, transportation, re-disposal, containment, or changes in groundwater flow;

G) The long-term reliability of the engineering and institutional controls, including an analysis of any off-site, nearby destabilizing activities; and

H) Potential need for replacement of the remedy.

2) The effectiveness of the remedy in controlling the source to reduce further releases based on consideration of each of the following potential factors:

A) The extent to which containment practices will reduce further releases; and

B) The extent to which treatment technologies may be used.

3) The ease or difficulty of implementing each a potential remedy based on consideration of the following types of factors:

A) Degree of difficulty associated with constructing the technology;

B) Expected operational reliability of the technologies;

C) Need to coordinate with and obtain necessary approvals and permits from other agencies;

D) Availability of necessary equipment and specialists; and

E) Available capacity and location of needed treatment, storage, and disposal services.

4) The degree to which community concerns are addressed by each a potential remedy.

f) The owner or operator must specify, as part of the corrective action plan, a schedule for implementing and completing remedial activities. The schedule must require the completion of remedial activities within a reasonable time, taking into consideration the factors set forth in this subsection (f). The owner or operator of the CCR fill area must consider the following factors in determining the schedule of remedial activities:

1) Extent and nature of contamination, as determined by the characterization required under Section 846.450(d);

2) Reasonable probabilities of remedial technologies achieving compliance with the groundwater protection standards established by Section 846.400 and other objectives of the remedy;

3) Availability of treatment or disposal capacity for CCR managed during implementation of the remedy;

4) Potential risks to human health and the environment from exposure to contamination before completion of the remedy;

5) Resource value of the aquifer, including:

A) Current and future uses, including but not limited to potential, residential, agricultural, commercial industrial, and ecological uses;

B) Proximity and withdrawal rate of users;

C) Groundwater quantity and quality;

D) The potential impact to the subsurface ecosystem, wildlife, other natural resources, crops, vegetation, and physical structures caused by exposure to CCR constituents;

E) The hydrogeologic characteristic of the facility and surrounding land;

F) The availability of alternative water supplies; and

G) Other relevant factors.

g) The selected remedy in the corrective action plan must:

1) Be protective of human health and the environment;

2) Attain the groundwater protection standards specified in Section 846.400;

3) Control the sources of releases to reduce or eliminate, to the maximum extent feasible, further releases of constituents listed in Section 846.400 into the environment;

4) Remove from the environment as much of the contaminated material that was released from the CCR fill area as is feasible, taking into account factors such as avoiding inappropriate disturbance of sensitive ecosystems; and

5) Comply with standards for management of wastes as specified in Section 846.480(d).

Section 846.480: Implementation of Corrective Action Plan

a) Within 90 days after the Agency's approval of the corrective action plan submitted under Section 846.470, the owner or operator must initiate corrective action. Based on the schedule approved by the Agency for implementation and completion of corrective action, the owner or operator must:

1) Establish and implement a corrective action groundwater monitoring program that:

A) At a minimum, meets the requirements of the monitoring program under Section 846.450;

B) Documents the effectiveness of the corrective action remedy; and

C) Demonstrates compliance with the groundwater protection standard under subsection (c).

2) Implement the corrective action remedy approved by the Agency under Section 846.470; and

3) Take any interim measures necessary to reduce the contaminants leaching from the CCR fill area, and/or potential exposures to human or ecological receptors. Interim measures must, to the greatest extent feasible, be consistent with the objectives of, and contribute to the performance of, any remedy that may be required by Section 846.470. The following factors must be considered by an owner or operator in determining whether interim measures are necessary:

    A) Time required to develop and implement a final remedy;

    B) Actual or potential exposure of nearby populations or environmental receptors to any of the constituents listed in Section 846.400;

    C) Actual or potential contamination of sensitive ecosystems or current or potential drinking water supplies;

    D) Further degradation of the groundwater that may occur if remedial action is not initiated expeditiously;

    E) Weather conditions that may cause any of the constituents listed in Section 846.400 to migrate or be released;

    F) Potential for exposure to any of the constituents listed in Section 846.400 as a result of an accident or failure of a container or handling system; and

    G) Other situations that may pose threats to human health and the environment.

b) If the Agency or an owner or operator of the property or facility with a CCR fill area determines, at any time, that compliance with the requirements of Section 846.470(d) is not being achieved through the remedy selected, the owner or operator must implement other methods or techniques that could feasibly achieve compliance with the requirements. These methods or techniques must receive approval by the Agency before implementation.

c) Corrective action must be considered complete when:

    1) The owner or operator of the property or facility with a CCR fill area demonstrates compliance with the groundwater protection standards established by Section 846.400 has been achieved at all points within the plume of contamination that lies beyond the waste boundary;

    2) Compliance with the groundwater protection standards has been achieved by demonstrating that concentrations of constituents listed in Section 845.600 have not exceeded the groundwater protection standards for a period of three consecutive years, using the statistical procedures and performance standards in Section 846.440(f) and (g); and

    3) All actions required to complete the remedy have been satisfied.

d) All CCR managed under a remedy approved by the Agency under Section 846.470, or an interim measure required under subsection (a)(3), must be managed in a manner that complies with this Part.

e) Upon completion of the corrective action plan, the owner or operator must submit to the Agency a corrective action completion report and certification.

    1) The corrective action completion report must contain supporting documentation, including, but not limited to:

        A) Any engineering and hydrogeology reports, including, but not limited to, monitoring well completion reports and boring logs, all CQA reports, certifications, and designations of CQA officers-in- absentia required by Section 846.280;

        B) A written summary of the implementation of the corrective action plan as set forth in the construction permit and this Part;

        C) Groundwater monitoring data demonstrating compliance with subsection (c);

        D) Any remedial actions completed under subsection(d);

        E) Documentation showing compliance with the selected remedy requirements of Section 846.470(b); and

        F) Any other information relied upon by the qualified professional engineer in making the corrective action certification.

    2) The corrective action completion certification must include a statement from a qualified professional engineer attesting that the corrective action plan has been completed in compliance with the requirements of subsection (c).

    3) The owner or operator must place the corrective action completion report and certification in the facility's CCR fill area record as required by Section 846.700(d)(18).

Section 846.490: Completion of Corrective Action:

a) Except as provided for in subsection (b), the owner or operator must complete corrective action at CCR fill areas within the timeframe approved by the Agency in the corrective action plan, or within five years of obtaining a construction permit for corrective action, whichever is less.

b) Extensions of Corrective Action Timeframes

1) The timeframes for completing corrective action of a CCR fill area specified under subsection (a) may be extended if the owner or operator has demonstrated to the Agency that it was not feasible to complete corrective action at the CCR fill area within the required timeframes due to factors beyond the facility's control.

2) The demonstration must include a narrative explaining the basis for additional time.

3) The owner or operator must submit the demonstration to the Agency with a renewal construction permit application for corrective action.

4) Factors that may support such a demonstration include:

A) Complications stemming from the climate and weather, such as unusual amounts of precipitation or a significantly shortened construction season;

B) Time required to dewater a fill area due to the volume of CCR contained in the CCR fill area or the characteristics of the CCR in the fill area;

C) Statement that the geology and terrain surrounding the CCR fill area will affect the amount of material needed to close the CCR fill area; or

D) Time required or delays caused by the need to coordinate with, and obtain necessary approvals and permits from, the Agency or other agencies.

c) Maximum Time Extensions

1) CCR fill areas of 40 acres or smaller where the selected remedy is not removal may extend the time to complete corrective action by no longer than two years.

2) CCR fill areas larger than 40 acres where the selected remedy is not removal may extend the timeframe to complete corrective action of the CCR fill area multiple times, in two-year increments. For each two-year extension sought, the owner or operator must substantiate the factual circumstances demonstrating the need for the extension. No more than a total of five two-year extensions may be obtained for any CCR fill area.

3) CCR fill areas where the selected remedy is removal may extend the time to complete removal multiple times, in two-year increments. For each two-year extension sought, the owner or operator must substantiate the factual circumstances demonstrating the need for the extension. In no instance may the time allowed for corrective action by removal be extended beyond the completion of a groundwater corrective action as required by pursuant to Section 846.480(c)(1).

d) In order to obtain an additional time extension to complete corrective action of a CCR fill area beyond the times provided by subsection (a), the owner or operator of the property or facility with a CCR fill area must include with the demonstration required by subsection (b) the following statement signed by the owner or operator or an authorized representative: I certify under penalty of law that I have personally examined and am familiar with the

information submitted in this demonstration and all attached documents, and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

e) Upon completion of all corrective action activities required by this Part and approved in the final corrective action plan, the owner or operator of the property or facility with a CCR fill area must submit to the Agency a corrective action report and a corrective action certification.

1) The corrective action report must contain supporting documentation, including, but not limited to:

A) Engineering and hydrogeology reports, including but not limited to monitoring well completion reports and boring logs, all CQA reports, certifications, and designations of CQA officers-in-absentia required by Section 846.280;

B) Photographs, including time, date and location information of the photographs of the final cover system and groundwater collection system, if applicable, and any other photographs relied upon to document construction activities;

C) A written summary of corrective action requirements and completed activities as stated set forth in the corrective action plan and this Part; and

D) Any other information relied upon by the qualified professional engineer in making the corrective action certification.

2) The corrective action certification must include a statement from a qualified professional engineer that corrective action has been completed in accordance with the Agency-approved final corrective action plan and the requirements of this Section.

3) The owner or operator must place the corrective action report and certification in the facility's CCR fill area record as required by Section 846.700(d)(8).

f) Within 30 days after the Agency's approval of the corrective action report and corrective action certification submitted under subsection (e), the owner or operator must prepare a notification of corrective action at the CCR fill area. The notification must include the certification by a qualified professional engineer as required by subsection (e)(2). The owner or operator must place the notification in the facility's CCR fill area record as required by Section 846.700(d).

g) Deed Notations

1) Following corrective action at a CCR fill area, the owner or operator must record a notation on the deed to the property, or some other instrument that is normally examined during title search.

2) The notation on the deed must in perpetuity notify any potential purchaser of the property that:

    A) The land has been used as a CCR fill area; and

    B) Its use is restricted under the post-corrective action care requirements as provided by Section 846.530(d)(1)(C) or groundwater monitoring requirements in Section 846.640(b).

    C) Within 30 days after recording a notation on the deed to the property, the owner or operator must submit to the Agency a notification stating that the notation has been recorded. The owner or operator must place the notification in the facility's CCR fill area record as required by 846.700(d)(15).

SUBPART E: COVER SYSTEMS

Section 846.500: Cover System Plan

a) Where a cover system is approved as a corrective action pursuant to Section 846.470 or required by Section 846.510(a), the owner or operator of the CCR fill area must comply with the following cover system plan requirements:

    1) The owner or operator of a property or facility with a CCR fill area must not initiate installing a cover system of the CCR fill area without a construction permit issued under this Part.

    2) The owner or operator of a property or facility with a CCR fill area must submit to the Agency, as a part of a construction permit application for installing a cover system, a cover system plan. The plan must be submitted before the initiation of installing a cover system of the CCR fill area.

    3) The cover system plan must include the following information:

        A) A narrative description of how the cover system of CCR fill area will be installed in accordance with this Part.

        B) A description of the procedures to install a cover system CCR fill area in accordance with Section 846.520.

        C) A description of the cover system, designed in accordance with Section 846.510, and the methods and procedures to be used to install the cover. The

cover system plan must also discuss how the cover system will achieve the performance standards specified in Section 846.510.

D) An estimate of the maximum inventory of CCR ever on-site in the ash fill area.

E) A schedule for completing all activities necessary to satisfy the cover system criteria in this Section, including an estimate of the year in which all cover system activities for the CCR fill area will be completed. The schedule should provide sufficient information to describe the sequential steps that will be taken to install a cover system at the CCR from the fill area, including identification of major milestones such as coordinating with and obtaining necessary approvals and permits from other agencies, the dewatering and stabilization phases of installing a cover system, and the estimated timeframes to complete each step or phase of installing a cover system. When preparing the cover system plan, if the owner or operator of a property or facility with a CCR fill area estimates that the time required to complete installation of a cover system will exceed the timeframes specified in Section 846.540(a), the preliminary written cover system plan must include the site-specific information, factors, and considerations that would support any time extension sought under Section 846.540(b).

F) An estimate of the largest area of the CCR fill area requiring a cover (see Section 846.650).

Section 846.510: Cover System:

a) If, after three years of monitoring pursuant to Section 846.450, no constituents are detected to be in exceedance of the groundwater protection standards in Section 846.400 in any sampling event, the owner or operator a CCR fill area must initiate installation of a cover system unless the owner or operatory elects to remove the CCR fill area pursuant to Section 846.600(b). The owner or operator of the CCR fill area must submit notification to the Agency of its intent to initiate installation of a cover system pursuant to this subsection within 30 days of the end of the three-year monitoring period.

b) Cover System Performance Standard When Leaving CCR in Place: The owner or operator of a property or facility with a CCR fill area must ensure that, at a minimum, the CCR fill area is covered in a manner that will:

1) Control, minimize, or eliminate, to the maximum extent feasible, post-cover system infiltration of liquids into the waste and releases of CCR, leachate, or contaminated run-off to the ground or surface waters or to the atmosphere;

2) Preclude the probability of future impoundment of water, sediment, or slurry;

3) Include measures that provide for major slope stability to prevent the sloughing or movement of the final cover system during the corrective action and post-cover system care period;

4) Minimize the need for further maintenance of the CCR fill area; and

5) Be completed in the shortest amount of time consistent with recognized and generally accepted engineering practices.

c) Drainage and Stabilization of CCR Fill Areas. The owner or operator of a property or facility with a CCR fill area must meet the requirements of this subsection (b) before installing the final cover system required by subsection (c).

1) Free liquids must be eliminated by removing liquid wastes or solidifying the remaining wastes and waste residues.

2) Remaining wastes must be stabilized sufficiently to support the final cover system.

d) Cover System. If an owner or operator proposes to leave CCR in place and install a cover system, the owner or operator must install a cover system that is designed to minimize infiltration and erosion, and, at a minimum, meets the requirements of this subsection (c). The cover system must consist of a low permeability layer and a final protective layer. The design of the cover system must be included in any cover system plan required by Section 846.500 and the construction permit application for cover system submitted to the Agency.

e) Standards for the Low Permeability Layer. The low permeability layer must have a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present, or a hydraulic conductivity no greater than 1×10^{-7} cm/sec, whichever is less. The low permeability layer must be constructed in accordance with the standards in either subsection (c)(1)(A) or (c)(1)(B), unless the owner or operator demonstrates that another low permeability layer construction technique or material provides equivalent or superior performance to the requirements of either subsection (c)(1)(A) or (c)(1)(B) and is approved by the Agency.

1) A compacted earth layer constructed in accordance with the following standards:

A) The minimum allowable thickness must be 0.91 meter (three feet); and

B) The layer must be compacted to achieve a hydraulic conductivity of 1×10^{-7} cm/sec or less and minimize void spaces.

2) A geomembrane constructed in accordance with the following standards:

A) The geosynthetic membrane must have a minimum thickness of 40 mil (0.04 inches) and, in terms of hydraulic flux, must be equivalent or superior to a three-foot layer of soil with a hydraulic conductivity of 1×10^{-7} cm/sec;

B) The geomembrane must have strength to withstand the normal stresses imposed by the waste stabilization process; and

C) The geomembrane must be placed over a prepared base free from sharp objects and other materials that may cause damage.

f) Standards for the Protective Layer. The protective layer must meet the following requirements, unless the owner or operator demonstrates that another protective layer construction technique or material provides equivalent or superior performance to the requirements of this subsection (c)(2) and is approved by the Agency:

1) Cover the entire low permeability layer;

2) Be at least three feet thick, be sufficient to protect the low permeability layer from freezing, and minimize root penetration of the low permeability layer;

3) Consist of soil material capable of supporting vegetation;

4) Be placed as soon as possible after placement of the low permeability layer; and

5) Be covered with vegetation to minimize wind and water erosion.

g) The disruption of the integrity of the cover system must be minimized through a design that accommodates settling and subsidence.

h) The owner or operator of the property or facility with a CCR fill area must obtain and submit with its construction permit application for corrective action a written certification from a qualified professional engineer that the design of the final cover system meets the requirements of this Section.

Section 846.520: Required Steps to Meet Cover System Requirements:

a) The owner or operator of a property or facility with a CCR fill area installing a cover system must responsibly handle the CCR consistent with this subsection.

b) The owner or operator of a property or facility with a CCR fill area must provide the following public notices:

1) Signage must be posted at the property entrance warning of the hazards of CCR dust inhalation

c) The owner or operator of the property or facility with a CCR fill area must take measures to prevent contamination of surface water, groundwater, soil, and sediments from the installation of a cover system, including but not limited to the following:

1) The owner or operator must minimize the amount of time the CCR is exposed to precipitation and wind.

2) The discharge of stormwater runoff that has contact with CCR must be covered by an individual National Pollutant Discharge Elimination System (NPDES) permit. The owner or operator must develop and implement a Stormwater Pollution Prevention Plan (SWPPP) in addition to any other requirements of the facility's NPDES permit. Any construction permit application for removal must include a copy of the SWPPP.

d) If a cover system is the selected remedy as part of a corrective action plan pursuant to Section 846.460, the owner or operator must continue groundwater monitoring under Subpart D for three years after the completion of the cover system or for three years after groundwater monitoring does not show an exceedance of the groundwater protection standard established under Section 846.400, whichever is longer.

e) If a cover system is required pursuant to Section 846.510(a), the owner or operator must continue groundwater monitoring under Subpart D for three years after the completion of the cover system.

f) At the end of each month during which the CCR cover system is being installed, the owner or operator must prepare a report that:

1) Describes the weather, precipitation amounts, the amount and location of CCR being stored on-site, and the implementation of dust control measures; and

2) Documents implemented worker safety measures. The owner or operator of the property or facility with a CCR fill area must place the monthly report in the facility's CCR fill area record as required by Section 846.700(d)(17).

g) Upon completion of the CCR cover system of the CCR fill area under subsection (a), the owner or operator of the property or facility with a CCR fill area must submit to the Agency a completion of the CCR cover system report and a certification from a qualified professional engineer that the CCR cover system has been completed in accordance with this Section. The owner or operator must place the CCR cover system report and certification in the facility's CCR fill area record as required by Section 846.700(d)(18).

h) Upon completion of groundwater monitoring required under subsection (b) or (c), the owner or operator of the property or facility with a CCR fill area must submit to the Agency a completion of groundwater monitoring report and a certification from a qualified professional engineer that groundwater monitoring has been completed in accordance with this Section. The owner or operator must place the groundwater monitoring report and certification in the facility's CCR fill area record as required by Section 846.700(d)(20).

Section 846.530: Post-Cover System Care

a) Applicability. This Section applies to the owners or operators of properties or facilities with CCR fill areas who have installed an Agency-approved cover system at the CCR fill area.

b) Post-Cover System Care Maintenance Requirements. Following the installation of a cover system at a CCR fill area, the owner or operator must conduct post-cover system care for the CCR fill area, which must consist of at least the following:

1) Maintaining the integrity and effectiveness of the cover system, including making repairs to the cover as necessary to correct the effects of settlement, subsidence, erosion, or other events, and preventing run-on and run-off from eroding, or otherwise damaging the cover; and

2) Maintaining the groundwater monitoring system and monitoring the groundwater in accordance with the requirements of Subpart F.

c) Post-Cover System Care Period

1) The owner or operator of the property or facility with a CCR fill area must conduct post-cover system care until the groundwater monitoring data shows the concentrations are below the groundwater protection standards in Section 846.400.

A) Below the groundwater protection standards in Section 846.400; and

B) Not increasing for those constituents over background, using the statistical procedures and performance standards in Section 846.440(f) and (g), provided that:

i) Concentrations have been reduced to the maximum extent feasible; and

ii) Concentrations are protective of human health and the environment.

d) Written Post-Cover System Care Plan

1) Content of the Plan. The owner or operator of a property or facility with a CCR fill area must prepare a written post-cover system care plan that includes, at a minimum, the information specified in this subsection (d)(1).

A) A description of the monitoring and maintenance activities required in subsection (b) for the CCR fill area and the frequency at which these activities will be performed;

B) The name, address, telephone number, and email address of the person or office to contact about the facility during the post-cover system care period; and

C) A description of the planned uses of the property during the post-cover system care period. Post-cover system use of the property must not disturb the integrity of the final cover, liners, or any other component of the containment system, or the function of the monitoring systems unless necessary to comply with the requirements of this Part. Any other disturbance is allowed if the

owner or operator of the property or facility with a CCR fill area demonstrates that disturbance of the final cover, liner, or other component of the containment system, including any removal of CCR, will not increase the potential threat to human health or the environment. The demonstration must be certified by a qualified professional engineer and must be submitted to the Agency.

2) Deadline to Prepare the Initial Written Post-Cover System Care Plan. The owner or operator of a property or facility with a CCR fill area must submit to the Agency an initial written post-cover system care plan consistent with the requirements specified in subsection (d)(1), with its initial construction permit application.

3) Amendment of a Written Post-Cover System Care Plan.

A) The owner or operator may submit a construction permit modification application to amend the initial or any subsequent written post-cover system care plan developed under subsection (d)(1) at any time.

B) The owner or operator must seek to amend the written corrective action care plan whenever:

i) There is a change in the operation of the CCR fill area that would substantially affect the written post-cover system care plan in effect; or

ii) Unanticipated events necessitate a revision of the written post-cover system care plan, after post-cover system activities have started.

C) The owner or operator must seek to amend the written post-cover system care plan at least 60 days before a planned change in the operation of the facility or CCR fill area, or within 60 days after an unanticipated event requires the need to revise an existing written post-cover system care plan. If a written post-cover system care plan is revised after post-cover system activities have started for a CCR fill area, the owner or operator must submit a request to modify the construction permit within 30 days following the triggering event.

4) The owner or operator of the property or facility with a CCR fill area must obtain a written certification from a qualified professional engineer that the initial, and any amendment of, the written post-cover system care plan meets the requirements of this Section.

e) Upon the completion of the post-cover system care period, the owner or operator of the property or facility with a CCR fill area must submit a request to the Agency to terminate post-cover system care. The request must include a certification by a qualified professional engineer verifying that post-cover system care has been completed in accordance with the post-cover system care plan specified in subsection (d) and the requirements of this Section.

f) Notification of Completion of Post-Cover System Care Period. Within 30 days after the Agency's approval of the owner's or operator's request to terminate post-cover system care,

the owner or operator must prepare a notification of completion of post-cover system care and must place the notification in the facility's CCR fill area record as required by Section 846.700(d).

Section 846.540 Cover System Application Schedule

a) Within 180 days of determining that the CCR fill area must install a cover system as required by Section 846.510, the owner or operator of the CCR fill area must submit, in a construction permit application to the Agency, a cover system plan consistent with the requirements of Section 846.500.

b) If the Agency denies a construction permit application submitted under Section 846.470(b), the owner and operator must submit a revised construction permit application addressing all deficiencies identified by the Agency. The revised construction permit application for installation of a cover system must be submitted to the Agency within 90 days after the Agency's denial if the Agency's denial is not appealed under Section 846.260. If the Agency's denial is appealed and upheld, the owner or operator must submit a revised construction permit application for installation of a cover system within 90 days after a final decision by the Board is rendered. The owner or operator of the property or facility with a CCR fill area must discuss the owner's or operator's proposed response to all deficiencies identified by the Agency in a public meeting with interested and affected parties held under Section 846.230. The Agency may extend the deadline as necessary.

SUBPART F: REMOVAL

Section 846.600 Removal of CCR Fill Areas

a) Required Removal. The owner or operator of a property or facility with any of the following CCR fill areas must initiate removal of the CCR fill area:

1) A CCR fill area that has not demonstrated compliance with either of the following location restrictions:

A) Uppermost aquifer or uppermost saturated zone (see Section 846.300);

B) Unstable areas and floodplains (see Section 846.310).

2) A CCR fill area that has elected removal pursuant to Section 846.405(b).

b) Voluntary Removal. An owner or operator of a CCR fill area that is required to install a cover system pursuant to Section 846.510(a) may elect to remove that CCR fill area as an alternative.

Section 846.610 Removal Schedule

a) For owners or operators removing pursuant to Section 846.600(a)(1), they must submit a construction permit application containing a removal plan consistent with the requirements of Section 846.620 to the Agency pursuant to Subpart B within 180 days of establishing the groundwater monitoring system and the groundwater monitoring program at the CCR fill area within the timeframe required by the Agency's approval pursuant to Section 846.410(c)(5).

b) For owners or operators removing pursuant to Section 846.600(a)(2), they must submit a construction permit application containing a removal plan consistent with the requirements of Section 846.620 to the Agency pursuant to Subpart B within 180 days of notifying the Agency of their intent to remove in lieu of groundwater monitoring pursuant to Section 846.405(c).

c) For owners or operators removing pursuant to Section 846.600(b), they must submit a construction permit application containing a removal plan consistent with the requirements of Section 846.620 to the Agency pursuant to Subpart B within 180 days of providing notification notifying the Agency pursuant to Section 846.510(a).

d) If the Agency denies a construction permit application submitted under Section 846.470(b), the owner and operator must submit a revised construction permit application addressing all deficiencies identified by the Agency. The revised construction permit application must be submitted to the Agency within 90 days after the Agency's denial if the Agency's denial is not appealed under Section 846.260. If the Agency's denial is appealed and upheld, the owner or operator must submit a revised construction permit application within 90 days after a final decision by the Board is rendered. The owner or operator of the property or facility with a CCR fill area must discuss the owner's or operator's proposed response to all deficiencies identified by the Agency in a public meeting with interested and affected parties held under Section 846.230. The Agency may extend the deadline as necessary.

Section 846.620: Removal Plan.

a) When removing a CCR fill area pursuant to Section 846.600,

1) The owner or operator of a property or facility with a CCR fill area must submit to the Agency, as a part of a construction permit application for removal, a removal plan. The plan must be submitted before the removal of CCR from the fill area.

2) The owner or operator of a property or facility with a CCR fill area must not remove CCR from a CCR fill area without a construction permit issued under this Part.

3) The removal plan must include the following information:

A) A narrative description of how the CCR in the CCR fill area will be removed in accordance with this Part;

B) A description of the procedures to remove the CCR and decontaminate the CCR fill area in accordance with Section 846.640;

C) An estimate of the maximum inventory of CCR ever on-site in the ash fill area; and

D) A schedule for completing all activities necessary to satisfy the removal criteria in this Section, including an estimate of the year in which all removal activities for the CCR fill area will be completed. The schedule should provide sufficient information to describe the sequential steps that will be taken to remove the CCR from the fill area, including identification of major milestones such as coordinating with and obtaining necessary approvals and permits from other agencies, the dewatering and stabilization phases of CCR removal, and the estimated timeframes to complete each step or phase of CCR removal. When preparing the removal plan, if the owner or operator of a property or facility with a CCR fill area estimates that the time required to complete removal will exceed the timeframes specified in Section 846.640(a), the preliminary written removal plan must include the site-specific information, factors and considerations that would support any time extension sought under Section 846.640(b).

4) If a final written removal plan revision is necessary after removal activities have started commenced for a CCR fill area, the owner or operator must submit a request to modify the construction permit within no later than 60 days following the triggering event.

5) The owner or operator of the property or facility with a CCR fill area must obtain and submit with its construction permit application for removal a written certification from a qualified professional engineer that the final written removal plan meets the requirements of this Part.

3) The maximum volume of CCR that the owner or operator estimates will be excavated from the impoundment over any given three-month period, and provide the basis, including documentation, for that estimate.

4) The dimensions, including height, width, and length of CCR in a CCR storage pile that contains the maximum volume of CCR that the owner or operator estimates will be excavated from the impoundment over any given three-month period, and provide the basis, including documentation, for that estimate.

Section 846.630: Required Steps to Meet Removal Requirements:

a) Removal of CCR. An owner operator of a property or facility with a CCR fill area required to remove pursuant to subsection 846.600(a), voluntarily removing pursuant to subsection 846.600(b), or where removal is the selected remedy as part of a corrective action plan pursuant to Section 846.470, must remove all CCR in the CCR fill area and decontaminate all areas affected by the CCR fill area. CCR removal and decontamination of the CCR fill

area are complete when all CCR and CCR residues, containment system components such as the fill area liner, if the fill area is lined and contaminated subsoils, and CCR fill area structures and ancillary equipment have been removed. Removal must be completed before the completion of a groundwater corrective action under Subpart D.

b) If removal is the selected remedy as part of a corrective action plan pursuant to Section 846.470, the owner or operator must continue groundwater monitoring under Subpart D for three years after the completion of removal or for three years after groundwater monitoring does not show an exceedance of the groundwater protection standard established under Section 846.400, whichever is longer.

c) If removal is required pursuant to Section 846.600(a)(1), the owner or operator must install and complete groundwater monitoring under Subpart D for three years after the completion of removal or for three years after groundwater monitoring does not show an exceedance of the groundwater protection standard established under Section 846.400, whichever is longer.

d) The owner or operator of the property or facility with a CCR fill area who is removing CCR must responsibly handle and transport the CCR consistent with this subsection.

1) Transportation

A) Manifests

i) When transporting CCR off-site by motor vehicle, manifests must be carried as specified in 35 Ill. Adm. Code 809. For purposes of this Part, coal combustion fly ash that is removed from a CCR fill area is not exempt from the manifest requirement.

ii) When transporting CCR off-site by any other mode or method, including but not limited to trains or barges, manifests must be carried specifying, at a minimum, the following information: the volume of the CCR; the location from which the CCR was loaded onto the mode of transportation and the date the loading took place; and the location where the CCR is being taken and the date it will be delivered.

B) The owner or operator of a property or facility with a CCR fill area from which CCR is removed and transported off-site must develop a CCR transportation plan, which must include:

i) Identification of the transportation method selected, including whether a combination of transportation methods will be used;

ii) The frequency, time of day, and routes of CCR transportation;

iii) Any measures to minimize noise, traffic, and safety concerns caused by the transportation of the CCR;

iv) Measures to limit fugitive dust from any transportation of CCR;

v) Installation and use of a vehicle washing station;

vi) A means of covering the CCR for any mode of CCR transportation, including conveyor belts; and

vii) A requirement that, for transport by motor vehicle, the CCR is transported by a permitted special waste hauler under 35 Ill. Adm. Code 809.201.

2) The owner or operator of a property or facility with a CCR fill area must develop and implement onsite dust controls, which must include:

A) A water spray or other commercial dust suppressant to suppress dust in CCR handling areas and haul roads; and

B) Handling of CCR to minimize airborne particulates and offsite particulate movement during any weather event or condition.

3) The owner or operator of a property or facility with a CCR fill area must provide the following public notices:

A) Signage must be posted at the property entrance warning of the hazards of CCR dust inhalation; and

B) When CCR is transported off-site, a written notice explaining the hazards of CCR dust inhalation, the transportation plan, and the tentative transportation schedule must be provided to units of local government through which the CCR will be transported.

4) The owner or operator of a property or facility with a CCR fill area must take measures to prevent contamination of surface water, groundwater, soil, and sediments from the removal of CCR, including but not limited to the following:

A) CCR removed from the fill area may only be temporarily stored and must be stored in a lined landfill, CCR fill area, enclosed structure, or CCR storage pile. The total volume of CCR placed in the CCR storage pile at any given time may not exceed the volume specified by the Agency in the final closure construction permit for the impoundment, which volume shall be no more than the volume of CCR estimated to be excavated from the CCR surface impoundment in a three-month period.

B) CCR storage piles must:

i) Have a storage pad, or a geomembrane liner, with a hydraulic conductivity no greater than 1×10^{-7} cm/sec, that is properly sloped to allow appropriate drainage and that is inspected quarterly for cracks, holes, tears, or other damage, which must be repaired as soon as practicable if found;

ii) Be constructed with fixed and mobile berms, where appropriate, to reduce run-on and run-off of stormwater to and from the storage pile, and minimize stormwater-CCR contact;

iii) Have a groundwater monitoring system that is consistent with the requirements of Section 845.630 and approved by the Agency; and

iv) Be located as far as feasible from surface waters.

C) The distance that CCR is dropped from any equipment onto the CCR storage pile must be minimized.

D) The owner or operator of the property or facility with a CCR fill area must incorporate general housekeeping procedures such as daily cleanup of CCR, tarping of trucks, maintaining the pad and equipment, and good practices during unloading and loading.

E) The owner or operator of the property or facility with a CCR fill area must minimize the amount of time the CCR is exposed to precipitation and wind.

F) The discharge of stormwater runoff that has contact with CCR must be covered by an individual National Pollutant Discharge Elimination System (NPDES) permit. The owner or operator must develop and implement a Stormwater Pollution Prevention Plan (SWPPP) in addition to any other requirements of the facility's NPDES permit. Any construction permit application for removal must include a copy of the SWPPP.

G) The owner or operator of any CCR surface impoundment located adjacent to any surface water body, including but not limited to a lake, river, or stream, must utilize silt curtains during the removal process to limit the release of CCR.

e) At the end of each month during which CCR is being removed from a CCR fill area, the owner or operator must prepare a report that:

1) Describes the weather, precipitation amounts, the amount of CCR removed from the CCR surface impoundment, the amount and location of CCR being stored on-site, the amount of CCR moved into and out of any CCR storage piles on-site and whether the volume of CCR in the pile was less than the maximum volume of CCR that may be accumulated in the pile, the amount of CCR transported offsite, the implementation of good housekeeping procedures required by subsection (c)(4)(D), the implementation of dust control measures, the results of any inspection required by subsection (c)(4)(B)(iii) during the previous month, and any repairs performed as a result of that inspection; and

2) Documents worker safety measures implemented and demonstrates that the volume of CCR in the CCR storage pile has not exceeded the maximum CCR volume for the pile set out in the final closure permit for the impoundment. To make that

demonstration, the owner or operator shall include at least two of the following: (a) purchase orders or contracts for transport of CCR from the facility to an offsite location; (b) facility records documenting the placement of CCR into the pile and the removal of ash from the pile; or (c) photographs of the pile during the prior month. The owner or operator of the CCR surface impoundment must place the monthly report in the facility's operating record as required by Section 846.700(d)(11).

f) Upon completion of CCR removal and decontamination of the CCR fill area under subsection (a), the owner or operator of the property or facility with a CCR fill area must submit to the Agency a completion of CCR removal and decontamination report and a certification from a qualified professional engineer that CCR removal and decontamination of the CCR fill area has been completed in accordance with this Section. The owner or operator must place the CCR removal and decontamination report and certification in the facility's CCR fill area record as required by Section 846.700(d)(13).

Section 846.640: Completion of Removal:

a) Except as provided for in subsection (b), the owner or operator must complete removal pursuant to Section at CCR fill areas within the timeframe approved by the Agency in the removal plan, or within five years of obtaining a construction permit for removal, whichever is less.

b) Extensions of Removal Timeframes

1) The timeframes for completing removal of a CCR fill area specified under subsection (a) may be extended if the owner or operator has demonstrated to the Agency that it was not feasible to complete removal at the CCR fill area within the required timeframes due to factors beyond the facility's control.

2) The demonstration must include a narrative explaining the basis for additional time.

3) The owner or operator must submit the demonstration to the Agency with a renewal construction permit application for removal.

4) Factors that may support such a demonstration include:

A) Complications stemming from the climate and weather, such as unusual amounts of precipitation or a significantly shortened construction season;

B) Time required to dewater a fill area due to the volume of CCR contained in the CCR fill area or the characteristics of the CCR in the fill area;

C) Statement that the geology and terrain surrounding the CCR fill area will affect the amount of material needed to close the CCR fill area; or

D) Time required or delays caused by the need to coordinate with and obtain necessary approvals and permits from the Agency or other agencies.

c) Maximum Time Extensions

1) CCR fill areas where the selected remedy is removal may extend the time to complete removal multiple times, in two-year increments. For each two-year extension sought, the owner or operator must substantiate the factual circumstances demonstrating the need for the extension. In no instance may the time allowed for removal be extended beyond ten years.

d) In order to obtain an additional time extension to complete removal of a CCR fill area beyond the times provided by subsection (a), the owner or operator of the property or facility with a CCR fill area must include with the demonstration required by subsection (b) the following statement signed by the owner or operator or an authorized representative: I certify under penalty of law that I have personally examined and am familiar with the information submitted in this demonstration and all attached documents, and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

e) Upon completion of all removal activities required by this Part and approved in the final removal plan, the owner or operator of the property or facility with a CCR fill area must submit to the Agency a removal report and a removal certification.

1) The removal report must contain supporting documentation, including, but not limited to:

A) Engineering and hydrogeology reports, including but not limited to monitoring well completion reports and boring logs, all CQA reports, certifications, and designations of CQA officers-in-absentia required by Section 846.280;

B) Photographs, including time, date, and location information of the photographs of the final cover system and groundwater collection system, if applicable, and any other photographs relied upon to document construction activities;

C) A written summary of removal requirements and completed activities as stated set forth in the removal plan and this Part; and

D) Any other information relied upon by the qualified professional engineer in making the removal certification.

2) The removal certification must include a statement from a qualified professional engineer that removal has been completed in accordance with the Agency-approved final removal plan and the requirements of this Section.

3) The owner or operator must place the removal report and certification in the facility's CCR fill area record as required by Section 846.700(d)(13).

f) Within 30 days after the Agency's approval of the removal report and removal certification submitted under subsection (e), the owner or operator must prepare a notification of removal at the CCR fill area. The notification must include the certification by a qualified professional engineer as required by subsection (e)(2). The owner or operator must place the notification in the facility's CCR fill area record as required by Section 846.700(d).

g) If an owner or operator of a property or facility with a CCR fill area has completed removal at the CCR fill area before the effective date of these rules, the owner or operator must notify the Agency of the completed removal within 90 days of the effective date of these rules, if that notification has not previously been submitted.

h) Deed Notations

1) Following removal at a CCR fill area, the owner or operator must record a notation on the deed to the property, or some other instrument that is normally examined during title search.

2) The notation on the deed must in perpetuity notify any potential purchaser of the property that:

A) The land has been used as a CCR fill area; and

B) Its use is restricted under the post-cover system care requirements as provided by Section 845.530(d)(1)(C) or groundwater monitoring requirements in Section 845.520.

SUBPART H: RECORDKEEPING

Section 846.700 CCR Fill Area Record

a) Each owner or operator of a property or facility with a CCR fill area subject to the requirements of this Part must maintain files of all information required by this Section in a written CCR fill area record at the facility.

b) Unless specified otherwise, each file must be retained for at least three years past the date the Agency approved the owner's or operator's request to terminate post-cover system care, when a cover system is installed at a CCR fill area pursuant to a corrective action plan, or the completion of groundwater monitoring under Section 846.640(b), when CCR fill area is removed.

c) An owner or operator of a property or facility with more than one CCR fill area subject to the provisions of this Part Section may comply with the requirements of this Section in one recordkeeping system provided the system identifies each file by name and identification

number for each CCR fill area. The files may be maintained on microfilm, on a computer, on computer disks, on a storage system accessible by a computer, on magnetic tape disks, or on microfiche.

d) Unless otherwise required below, the owner or operator of a property or facility with a CCR fill area must place the following information, as it becomes available, in the CCR fill area record:

1) Copies of all permit applications and permits issued under this Part;

2) The CCR Fill Characterization Plan;

3) The demonstration of whether a CCR fill area meets the location standards;

4) Documentation recording the public meetings held under Section 846.230;

5) Weekly CQA reports under Section 846.280(b);

6) The hydrogeologic site assessment;

7) The annual groundwater monitoring and corrective action report (see Section 846.410(f);

8) All groundwater monitoring data submitted to the Agency and any analysis performed (see Section 846.410(b)(4);

9) Within 30 days after detecting one or more monitored constituents above the groundwater protection standard, the notifications required by Section 846.450(d);

10) Any corrective action plan;

11) The semi-annual report describing the progress in selecting and designing the remedy (see Section 846.470(a));

12) Within 30 days after completing the corrective action plan, the notification required by Section 846.480(e);

13) Any removal plan and any amendment of the plan (see Section 846.620(a)), except that only the most recent removal plan must be maintained in the facility's CCR fill area record, irrespective of the time requirement specified in subsection (b);

14) The written demonstrations, including the certification required by Section 846.630(f) for a time extension for initiating removal (see Section 846.640(b);

15) The monthly reports for removal (see Section 846.640(d));

16) The removal report and certification (see Section 846.640(e)(3)),

17) The completion of CCR removal and decontamination report and certification (see Section 846.640(e));

18) The notification of completion of removal of a CCR fill area (see Section 846.640(f));

19) The notification recording a notation on the deed (see Section 846.640(h));

20) Any cover system plan and any amendment of the plan (see Section 846.620(a)), except that only the most recent cover system plan must be maintained in the facility's CCR fill area record, irrespective of the time requirement specified in subsection (b);

21) The monthly reports for installation of a cover system (see Section 846.530(f));

22) The cover system report and certification (see Section 846.520(g));

23) The completion of groundwater monitoring report and certification, where required (see Section 846.520(h)); and

24) The notification of completion of post-cover system care period (see Section 846.530(f));

Section 846.710 Publicly Accessible Internet Site Requirements

a) Each owner or operator of a property or facility with a CCR fill area subject to the requirements of this Part must maintain a publicly accessible Internet site (CCR website) containing the information specified in this Section. The owner's or operator's website must be titled “Illinois CCR Fill Area Compliance Data and Information.”

b) An owner or operator of a property or facility with more than one CCR fill area subject to the provisions of this Part may comply with the requirements of this Section by using the same Internet site for multiple CCR fill areas, provided the CCR website clearly delineates information by the name of and an identification number for each CCR fill area.

c) Unless otherwise required in this Section, the information required to be posted to the CCR website must be made available to the public on the CCR website until 3 years after post-cover system care (when corrective action includes a cover system); until the completion of groundwater monitoring under Section 846.640(b) (when corrective action is by removal); or until 3 years after removal under per Section 846.600 (when CCR fill area is removed).

d) Unless otherwise required in this Section, the information must be posted to the CCR website within 14 days after placing the pertinent information required by Section 846.700 in the CCR Fill Area record.

e) The owner or operator must place all the information specified under Section 846.700(d) on the owner's or operator's CCR website.

f) The owner or operator must place all the information specified in Section 846.230(e) on the owner's or operator's CCR website at least 30 days before the public meeting.

g) The owner or operator must notify the Agency of the web address of the publicly accessible Internet site, including any change to the web address. The Agency must maintain a list of these web addresses on the Agency's website.

APPENDIX 2

Recommended Rules (Temporary CCR Piles)

Appendix 2:
Proposed changes to Part 845 concerning temporary CCR piles

35 Il. Adm. Code § 845.120

"CCR storage pile" means any temporary accumulation of solid, non-flowing CCR placed on the land that is designed and managed to control releases of CCR to the environment, utilizing the measures specified in Section 740(c)(4)(A)-(G) of this Part. CCR contained in an enclosed structure is not a CCR storage pile. ~~Examples of control measures to control releases from CCR storage piles include: periodic wetting, application of surfactants, tarps, or wind barriers to suppress dust; tarps or berms for preventing contact with precipitation and controlling run-on/run-off; and impervious storage pads or geomembrane liners for soil and groundwater protection~~

"Temporary accumulation" means an accumulation on the land that is neither permanent nor indefinite. To demonstrate that the accumulation on the land is temporary, all CCR must be removed from the pile at the site. The entity engaged in the activity must have a record in place, such as a contract, purchase order, or facility operation and maintenance record ~~or fugitive dust control plan~~, documenting that all the CCR in the pile will be completely removed according to a specific timeline.

35 Il. Adm. Code § 845.680(a)

a) Within 90 days after the Agency's approval of the corrective action plan submitted under Section 845.670, the owner or operator must initiate corrective action. Based on the schedule approved by the Agency for implementation and completion of corrective action, the owner or operator must:

[…]

3) Take any interim measures necessary to reduce the contaminants leaching from the CCR surface impoundment, and/or potential exposures to human or ecological receptors~~.~~, including utilization of silt curtains for corrective actions at CCR surface impoundments that are adjacent to surface waters. Interim measures must, to the greatest extent feasible, be consistent with the objectives of, and contribute to the performance of, any remedy that may be required by Section 845.670. The following factors must be considered by an owner or operator in determining whether interim measures are necessary:

35 Il. Adm. Code § 845.710(c)

c) In the closure alternatives analysis, the owner or operator of the CCR surface impoundment must:

1) Analyze complete removal of the CCR as one closure alternative, along with the modes for transporting the removed CCR, including by rail, barge, low-polluting trucks, or a combination of these transportation modes;

2) Identify whether the facility has an onsite landfill with remaining capacity that can legally accept CCR, and, if not, whether constructing an onsite landfill is possible; ~~and~~

3) Specify the maximum volume of CCR that the owner or operator estimates will be excavated from the impoundment over any given three-month period, and provide the basis, including documentation, for that estimate;

4) Specify the dimensions, including height, width, and length, of CCR in a CCR storage pile that contains the maximum volume of CCR that the owner or operator estimates will be excavated from the impoundment over any given three-month period, and provide the basis, including documentation, for that estimate; and

~~3~~5) Include any other closure method in the alternatives analysis if requested by the Agency.

35 Il. Adm. Code § 845.740(c)(4)

4) The owner or operator of the surface impoundment must take measures to prevent contamination of surface water, groundwater, soil, and sediments from the removal of CCR, including the following:

A) CCR removed from the surface impoundment may only be temporarily stored, and must be stored in a lined landfill, CCR surface impoundment, enclosed structure, or CCR storage pile. The total volume of CCR placed in the CCR storage pile at any given time may not exceed the volume specified by the Agency in the final closure construction permit for the impoundment, which shall be no more than the volume of CCR estimated to be excavated from the CCR surface impoundment in a three-month period.

B) CCR storage piles must:

[…]

iii) Have a storage pad, or a geomembrane liner, with a hydraulic conductivity no greater than 1 x 10−7 cm/sec, that is properly sloped to allow appropriate drainage, and that is inspected quarterly for cracks, holes, tears, or other damage, which must be repaired as soon as practicable if found;

[…]

v) Be constructed with fixed and mobile berms, where appropriate, to reduce run-on and run-off of stormwater to and from the storage pile, and minimize stormwater-CCR contact; ~~and~~

vi) Have a groundwater monitoring system that is consistent with the requirements of Section 845.630 and approved by the Agency~~.~~; and

vii) Be located as far as feasible from surface waters.

C) The distance that CCR is dropped from any equipment onto the CCR storage pile must be minimized.

~~C~~D) The owner or operator of the CCR surface impoundment must incorporate general housekeeping procedures such as daily cleanup of CCR, tarping of trucks, maintaining the pad and equipment, and good practices during unloading and loading.

~~D~~E) The owner or operator of the CCR must minimize the amount of time the CCR is exposed to precipitation and wind.

~~E~~F) The discharge of stormwater runoff that has contact with CCR must be covered by an individual National Pollutant Discharge Elimination System (NPDES) permit. The owner or operator must develop and implement a Stormwater Pollution Prevention Plan (SWPPP) in addition to any other requirements of the facility's NPDES permit. Any construction permit application for closure must include a copy of the SWPPP.

G) The owner or operator of any CCR surface impoundment located adjacent to any surface water body, including but not limited to a lake, river, or stream, must utilize silt curtains during the removal process to limit the release of CCR.

35 Il. Adm. Code § 845.740(d):

d) At the end of each month during which CCR is being removed from a CCR surface impoundment, the owner or operator must prepare a report that:

1) Describes the weather, precipitation amounts, the amount of CCR removed from the CCR surface impoundment, the amount and location of CCR being stored on-site, the amount of CCR moved into and out of each CCR storage pile on-site and whether the volume of CCR in the pile was less than the maximum volume of CCR that may be accumulated in the pile, the amount of CCR transported offsite, the implementation of good housekeeping procedures required by subsection (c)(4)(~~C~~D), ~~and~~ the implementation of dust control measures, the results of any inspection required by subsection (c)(4)(B)(iii) during the previous month and any repairs performed as a result of that inspection; and

2) Documents worker safety measures implemented and demonstrates that the volume of CCR in the CCR storage pile has not exceeded the maximum CCR volume for the pile set out in the final closure permit for the impoundment. To make that demonstration, the owner or operator shall include at least two of the following: (a) purchase orders or contracts for transport of CCR from the facility to an offsite location; (b) facility records documenting the placement of CCR into the pile and the removal of ash from the pile; or (c) photographs of the pile during the prior month. The owner or operator of the CCR surface impoundment must place the monthly report in the facility's operating record as required by Section 845.800(d)(23).

APPENDIX 3

Recommended Rules

(Fugitive Dust Monitoring)

Appendix 3:
Proposed changes to Part 845 concerning CCR fugitive dust monitoring

35 IAC 845.120

"PM10" means particulate matter less than or equal to 10 micrometers in diameter.

"PM2.5" means particulate matter less than or equal to 2.5 micrometers in diameter.

"Reportable Action Level" means the positive difference between the level of PM10 or PM2.5 measured at the upwind monitor(s) at a facility and the level of PM10 or PM2.5 measured at the downwind monitor(s) at a facility that will trigger response activities under a mitigation plan pursuant to 845.500(c)(9), as established in a CCR fugitive dust monitoring and mitigation plan under 845.500(c) or a project-specific CCR fugitive dust monitoring and mitigation plan under 845.740(c)(3) or 845.750(e). The Reportable Action Level may vary based on the value of the difference and based on the concentration of PM10 or PM2.5 detected at the downwind monitor(s) at a facility. For example, an exceedance of the Reportable Action Level may be defined as any increase greater than half of the 24-hour NAAQS for PM10 (150 ug/m3) and PM2.5 (35 ug/m3) between the upwind and downwind monitors, assuming that half of the total standard is associated with background. Similar levels should be defined for each additional pollutant tested pursuant to 845.500(c)(3).

"Transfer point" means any location where CCR being moved, carried, or conveyed is dropped or deposited.

New 35 IAC 845.220(d)(5)

d) Closure Construction. In addition to the requirements in subsection (a), all construction permit applications for closure of the CCR surface impoundment under Subpart G must contain the following information and documents:

5) A closure project-specific fugitive dust monitoring and mitigation plan pursuant to 845.740(c)(3) or 845.750(e).

New 35 IAC 845.230(a)(10)

The operating permit applications must contain the following information and documents:

a) Initial operating permit for a new CCR surface impoundment and any lateral expansion of a CCR surface impoundment.

10) Fugitive dust control plan, including a fugitive dust monitoring and mitigation plan, and accompanying certification (see Section 845.500(b)(7));

New 35 IAC 845.500(c)

c) CCR Fugitive Dust Monitoring and Mitigation Plan. The owner or operator of the CCR surface impoundment must prepare and operate in accordance with a CCR fugitive dust monitoring and mitigation plan as specified in this subsection (c). The CCR fugitive dust

monitoring and mitigation plan is to be included in the owner or operator's CCR fugitive dust control plan and must meet all applicable requirements of subsection (b).

1) The CCR fugitive dust monitoring and mitigation plan shall describe the placement, operation, and maintenance, according to manufacturer's specifications, of permanent, continuous Federal Equivalent Method (FEM) real-time PM10 and PM2.5 monitors around the perimeter of the facility. At least six monitors for PM10 and six monitors for PM2.5 shall be located at or near the boundaries of the facility to monitor for fugitive dust in the ambient air around the facility, with monitor locations subject to approval of IEPA and consistent with the most recent U.S. EPA protocols and guidance for ambient air quality monitoring siting criteria. At a minimum, one monitor shall be located at each cardinal point (north, south, east, west) of the facility, and two monitors shall be located at downwind locations. Additional monitors should be installed, operated, and maintained as appropriate depending on the size of the facility and other relevant factors, such as variability of wind direction at the site and the proximity of communities.

2) The CCR fugitive dust monitoring and mitigation plan shall describe the placement, operation, and maintenance, according to manufacturer's specifications, of a weather station or other permanent device to monitor and log wind speed and wind direction at the facility. The weather station shall be located at an unobstructed, unsheltered area, centrally positioned in relation to the facility's surface impoundments, and at a minimum height of 10 meters above ground level, unless another height is appropriate pursuant to applicable U.S. EPA protocols and guidance.

3) In addition to the required monitoring pursuant to subsection (c)(1) and (2), the owner or operator shall conduct quarterly, 24-hour high volume filter-based air sampling to calibrate the real-time monitoring data. At least one monitor each shall be located at an upwind location and a downwind location for each quarterly sampling event. At a minimum, the high volume samples should test for PM10, PM2.5, total suspended solids, silica, radionuclides, and metals, including hexavalent chromium.

4) All data collected shall be consistent with the units of measurement used in the NAAQS for PM10 and PM2.5, and ambient monitoring practices must comply with current U.S. EPA protocols and guidance for ambient air quality monitoring, including but not limited to those for data completeness, calibration, inspection, maintenance, and site and instrument logs.

5) A data logger shall be attached to the monitors to record readings from the monitors, and the owner or operator shall notify IEPA, in writing within 24 hours, each time the monitors exceed the applicable Reportable Action Level, and any time monitoring equipment has malfunctioned preventing readings or logging of data.

6) The owner and operator shall maintain a log of all routine and non-routine maintenance and calibration activities associated with each fugitive dust monitor.

7) The CCR fugitive dust monitoring and mitigation plan shall adequately describe the facility's recordkeeping system, which should include a schedule for routine inspection, testing, and maintenance.

8) On a monthly basis, the owner or operator shall submit the hourly data for each monitor in a Microsoft Excel-compatible file type, together with the weather station data for the same period. The monthly monitoring reports shall be submitted to IEPA within 14 days of the end of the month in which the data was collected, placed in the facility's operating record, and uploaded to a publicly available online database operated by IEPA.

9) The CCR fugitive dust monitoring and mitigation plan shall include a mitigation plan describing the owner or operator's response activities and explaining how those activities will adequately minimize releases of dust, in the following circumstances:

A) When the monitors detect exceedances of the applicable Reportable Action Level. The response activities should consist of a range of increasingly aggressive measures appropriate to different levels of exceedance.

B) When any visible CCR fugitive dust is detected.

C) In the event of malfunction or failure of the monitors.

10) Prior to the installation of the monitors required by this subsection, the owner or operator shall conduct air modeling to predict fugitive dust emissions caused by a facility's operations. The owner or operator shall utilize conventional air quality dispersion modeling and local records of weather conditions to develop Emissions Factors in accordance with U.S. EPA's AP-42 Compilation of Air Pollutant Emissions Factors handbook.

New 35 IAC 845.740(c)(3)

c) The owner or operator of a CCR surface impoundment removing CCR during closure must responsibly handle and transport the CCR consistent with this subsection.

3) Updated CCR Fugitive Dust Monitoring and Mitigation Plan. If a CCR surface impoundment is closed by removal, the owner or operator must prepare and operate in accordance with a project-specific CCR fugitive dust monitoring and mitigation plan as specified in this subsection (c)(3), in addition to the requirements of 845.500(c).

A) The project-specific CCR fugitive dust monitoring and mitigation plan shall describe the placement, operation, and maintenance of continuous FEM real-time PM10 and PM2.5 monitors located in close vicinity to the surface impoundments at which closure activities are occurring, and at any transfer point, with monitor locations subject to approval of IEPA and consistent with the most recent U.S. EPA protocols and guidance for ambient air quality monitoring siting criteria.

B) If CCR is removed and transported off-site, the project-specific CCR fugitive dust monitoring and mitigation plan shall describe the placement, operation, and

maintenance of continuous FEM real-time PM10 and PM2.5 monitors located at or near the boundaries of the facility where the CCR is being disposed, with monitor locations subject to approval of IEPA and consistent with the most recent U.S. EPA protocols and guidance for ambient air quality monitoring siting criteria.

C) The owner or operator shall install and operate at least one video camera and one GPS-enabled, continuously operating webcam on each truck, barge, or railcar transporting CCR, at all times. The cameras and webcams shall at all times be directed at the cover of the truck, barge, or railcar to monitor any CCR fugitive dust emissions or failure of CCR fugitive dust control measures required by the owner or operator's CCR fugitive dust control plan or CCR transportation plan. The owner or operator shall maintain logs of all video camera and webcam footage and,on a monthly basis, upload the footage to the facility's state CCR website or, at a minimum, submit the footage to IEPA within 14 days of the end of the month in which the data was collected.

D) The owner or operator shall report to IEPA any releases of fugitive CCR dust from a truck, barge, or railcar carrying CCR from its facility within **7** days after any release and place that report in the facility's operating record. The owner or operator shall post that report on the facility's CCR website within 14 days of any release. The report shall include an estimate of the volume of CCR released, the location(s) where the release occurred, the date and time of the release, and any mitigation measures taken to limit the release.

E) The owner or operator shall ensure that all trucks transporting CCR display a clearly visible telephone number and/or website, which community members can call or access to place a fugitive dust complaint. All complaints placed via telephone or website shall be logged in a publicly available database operated by IEPA within 14 days of the complaints being received.

F) The project-specific CCR fugitive dust monitoring and mitigation plan shall comply with the requirements specified in 845.500(c)(3) - (10).

Added 35 IAC 845.750(e)

(e) Updated CCR Fugitive Dust Monitoring and Mitigation Plan. If a CCR surface impoundment is closed by leaving CCR in place, the owner or operator must prepare and operate in accordance with a project-specific CCR fugitive dust monitoring and mitigation plan as specified in this subsection (e), in addition to the requirements of 845.500(c).

1) The project-specific CCR fugitive dust monitoring and mitigation plan shall describe the placement, operation, and maintenance of continuous FEM real-time PM10 and PM2.5 monitors located in close vicinity to the surface impoundments at which closure activities are occurring, with monitor locations subject to approval of IEPA and

consistent with the most recent U.S. EPA protocols and guidance for ambient air quality monitoring siting criteria.

2) The project-specific CCR fugitive dust monitoring and mitigation plan shall comply with the requirements specified in 845.500(c)(3) - (10).

New 35 IAC 845.800(d)(7),(8),(23) - (25)

d) Unless otherwise required below, the owner or operator of a CCR surface impoundment must place the following information, as it becomes available, in the facility's operating record:

[…]

7) The CCR fugitive dust control plan, including the CCR fugitive dust monitoring and mitigation plan, and any subsequent amendment of the plan (see Section 845.500(b)(6)), except that only the most recent fugitive dust control plan must be maintained in the facility's operating record, irrespective of the time requirement specified in subsection (b);

8) The monthly reports for CCR fugitive dust monitoring (see Section 845.500(c)(8));

[…]

23) The reports documenting CCR fugitive dust releases during the transportation of CCR off-site (see Section 845.740(c)(3)(D));

24) The monthly reports for closure by removal-specific CCR fugitive dust monitoring (see Section 845.740(c)(3)(F));

25) The monthly reports for closure in place-specific CCR fugitive dust monitoring (see Section 845.750(e)(2));

APPENDIX 4

Recommended Rules

(Environmental Justice Screening Tools)

Appendix 4:
Proposed changes to Part 845 concerning Environmental Justice Screening Tools

C. Proposed Changes to Part 845:

35 I.A.C § 845.700 Required Closure or Retrofit of CCR Surface Impoundments

6) For the purposes of, and only for, this Part, areas of environmental justice concern are identified as any area that meets either of the following:

A) Any area within one mile of a census block group where the number of low-income persons is twice the statewide average, where low-income means the number or percent of a census block group's population in households where the household income is less than or equal to twice the federal poverty level; or

B) Any area within one mile of a census block group where the number of minority persons is twice the statewide average, where minority means the number or percent of individuals in a census block group who list their racial status as a race other than white alone or list their ethnicity as Hispanic or Latino;

C) Any area that falls within the top 25 percent of scores based on a cumulative impacts assessment which uses the most recent data from existing methodologies and findings, or factors as indicated by the Illinois Commission on Environmental Justice, that take into account, but is not limited to, the following environmental and demographic factors:

(1) Population density;

(2) National-Scale Air Toxics Assessment (NATA) air toxics cancer risk;

(3) NATA respiratory hazard index;

(4) NATA diesel PM;

(5) particulate matter;

(6) ozone;

(7) traffic proximity and volume;

(8) lead paint indicator;

(9) proximity to Risk Management Plan sites;

(10) proximity to Hazardous Waste Treatment, Storage, and Disposal Facilities;

(11) proximity to National Priorities List sites;

(12) Wastewater Dischargers Indicator;

(13) percent low-income;

(14) percent black, indigenous, and people of color;

(15) percent less than a high school education;

(16) linguistic isolation;

(17) age (individuals under age 5 or over 64);

(18) number of asthma-related emergency department visits; and

(19) frequency of low birth weight infants;

Whereby the census block groups must be ranked for each demographic factor listed in (g)(6)(C)(2)-(12) and ranked for each environmental factor listed in (g)(6)(C)(1), (13)-(19), a resulting percentile score must be determined for each census block group, and the percentile scores must be averaged, resulting in an environmental score and a demographic score for each census block group. The two averages must then be multiplied together to determine a single Environmental Justice score for each census block group; or

D) A community that is not in the top 25% of scores and thus is not initially defined as an area of environmental justice concern but which requests consideration from the Agency to be included and the Agency grants that request.

7) For subsection (g)(6)(A) and(B), if any part of a facility falls within one mile of the census block group, the entire facility, including all its CCR surface impoundments, must be considered an area of environmental justice concern.

8) For subsection (g)(6)(C), any area that falls within three miles of the census block group with a threshold score must be considered an area of environmental justice concern.

~~8)~~ 9) The Agency may designate a CCR surface impoundment as another Category when site-specific conditions contradict the designations provided by the owner or operator in subsection (c) and the categories in subsection (g)(1).

Exhibit 1

DAMAGE CASE COMPENDIUM

Technical Support Document, Volume IIa: Potential Damage Cases

Alexander Livnat, Ph.D.

12/18/2014

This is the second out of five volumes describing EPA's current state of knowledge of CCR damage cases. This volume comprises 42 damage case-specific modules. Each module contains background information on the host power plant, type and design of the CCR management unit(s), their hydrogeologic setting and status of groundwater monitoring system, evidence for impact, regulatory actions pursued by the state and remedial measures taken, litigation, and rationale for the site's current designation as a potential damage case in reference to pre-existing screenings. Ample footnotes and a list of references provide links to sources of information.

Havana Power Plant, Dynegy Midwest Generation, Inc., Havana, Illinois, Project # 0-381, Dewberry & Davis LLC, June 2009, Revised Final September 11, 2009. Accessed Online August 2012. http://www.epa.gov/waste/nonhaz/industrial/special/fossil/surveys2/havana-final.pdf and (Appendices): http://www.epa.gov/osw/nonhaz/industrial/special/fossil/surveys2/havana-app.pdf

IEPA (2011a): Dynegy Midwest Generation, Inc. Havana Power Station, National Pollutant Discharge Elimination System (NPDES) Permit, Responsiveness Summary Regarding November 8, 2011 Public Hearing, Illinois Environmental Protection Agency, Office of Community Relations, September 14, 2012. Accessed Online January 2013. http://www.epa.state.il.us/public-notices/2011/dynegy-havana/responsiveness-summary.pdf

Reinertsen (1988): A Guide to the Geology of the Canton Area, Fulton County, Geological Science Field Trip, Field Trip 1988B, David L. Reinertsen, May 21, 1988, Department of Energy and Mineral Resources, Illinois State Geological Survey, Champaign, Illinois. Accessed Online January 2014. https://www.ideals.illinois.edu/bitstream/handle/2142/42848/guidetogeolo1988rein.pdf?sequence=2

Hlinka et al., (1999): Ground-Water/Surface Water Interactions at Sand Lake, Mason County, Illinois, Kenneth J. Hlinka, Andrew G. Buck, and Gary R. Clark, Illinois State Water Survey and Office of Water Resources, Illinois Department of Natural Resources, March 1999. Accessed Online January 2014. http://www.isws.uiuc.edu/pubdoc/MP/ISWSMP-187.pdf

PTa07. Dynegy Midwest (formerly: Illinois Power Co.) Hennepin Power Station,[108] Hennepin, Putnam County, Illinois

Type: Surface Impoundments, Some in a Pre-Existing Gravel Pit.

Background and Description: The Hennepin Power Station (HPS) is located about 4 miles north of Hennepin, on the south bank of the Illinois River.[109] The HPS has two unlined, no longer active coal ash impoundment systems: a 30-acre west impoundment (WAPS) operated from 1952, and a 38-acre east ash

[108] According to *Hennepin Power Station Ash Pond System*: http://www.sourcewatch.org/index.php/Hennepin_Power_Station_Ash_Pond_System, the Station's generating capacity is 306 MW. There are two generating units (75 MW and 231 MW) that came online in 1953 and 1959, respectively. According to Dynegy's website, the generating capacity of this base-load plant is 293 MW (*Hennepin Power Station:* http://www.dynegy.com/about/power-generation-facilities). It used barge-delivered bituminous and sub-bituminous coal from the Illinois Basin coal fields, with an average sulfur content is 2.9 percent (EPRI, 1999, Case Study HN). According to EPRI (1999), the coal source has changed several times; it is currently Power River Basin coal (Dynegy Generation, 2014).
For the March 7, 2005 US District Court for the Southern District of Illinois Consent Order between the US, State of Illinois and a coalition of citizens groups and Dynegy Midwest Generation, requiring upgrades to all Dynegy's plants, in addition to stringent reductions in overall pollution rates; see *Illinois Power Company and Dynegy Midwest Generation Settlement:* http://www2.epa.gov/enforcement/illinois-power-company-and-dynegy-midwest-generation-settlement; and *Consent Decree: United States of America, et al. v. Illinois Power Company, et al., Civil Action No. 99-833-MJR* http://www2.epa.gov/enforcement/consent-decree-united-states-america-et-al-v-illinois-power-company-et-al-civil-action.

[109] State Rte. 71 W, Hennepin, IL 61327.

impoundment (EAPS) operated from 1958, both decommissioned in 1997.[110] There is also, a new, two-cell, 20.5-acres lined ash pond that came into service in 1997.[111]

[110] According to GZA GeoEnvironmental (2012), there are two decommissioned impoundments areas at the HPS: (1) East Ash Pond System Ponds 2 and 4 (EAPS) which are located adjacent to the Active East Ash Pond System (AEAPS) and have been taken out of service in 1995 (but according to EPRI, 1999 – either late in 1996 or in January 1997). Pond 4 was a former, approximately 30 feet deep gravel quarry excavated in the early 1980s (EPRI, 2001), that was used for ash disposal in the mid-1980s. (2) West Ash Pond System Ponds 1 and 3 (WAPS), located west of the HPS, and which according to Dynegy Generation (2014), received sluiced coal ash that was a by-product of high-sulfur Illinois coal (apparently, so did the EAPS ponds). Between 1988 and 1989, Ponds 1 and 3 were consolidated and divided into primary and secondary cells. Pond 1 and 3 have been out of service since 1997. The original WAPS (Ponds 1 and 3) was constructed in the 1950's. The ponds appear to have been constructed as unlined earthen embankments which consist of sand and gravel materials. The HPS CCR disposal system and its groundwater impacts is one of the best studied coal-fired management systems in the U.S. thanks to several EPRI and contractor studies conducted at the site between 1996 and 2014.

[111] According to GZA GeoEnvironmental (ibid), the current HPS operations use the Active East Ash Pond (AEAPS) for disposal of CCR. The AEAPS consists of three pond units. The first two units, known as the Primary and Secondary Cells, were designed as two-chambered wet ash ponds by reshaping an area that was an existing gravel pit to form the current surface impoundment. They were placed in service in 1997. After several years of operation, the Primary Cell's settling efficiency was reduced due to ash deposition and a third pond, Pond 2 East (2E) was added in 2010. The original Composite (clay/HDPE) AEPS liner was raised in 2003 in both the Primary and Secondary Cells by extending the existing liner up the upstream slopes from the original 20 foot level an additional 12 feet to the top of the crest. The extended liner consists of 45-mil HDPE geomembrane over a 12-inch layer of compacted clay.

Pond 2E was constructed within the footprint of the eastern portion of the decommissioned Pond 2 of the EAPS, by excavating and removing a portion of the ash fill. Pond 2E was designed to increase the efficiency of the existing pond system by adding additional storage and settling capacity; it is also designated to provide sediment control, storm flow storage, and leachate detention to the dry ash landfill that was constructed on the western portion of the Pond 2 area of the EAPS. A 60-mil smooth HDPE geomembrane liner was installed on the bottom and upstream slopes of Pond 2E. The liner also caps the underlying ash along the eastern portion of the former ash impoundment. The landfill has been constructed with a liner placed on the existing ash fill that was subsequently covered with several feet of ash during construction of Pond 2E.

The AEAPS Primary and Secondary Cells function as sedimentation basins for CCR, including bottom ash, fly ash, miscellaneous station low volume waste, and coal pile runoff streams which are piped from the plant. CCR flows are discharged directly from the Primary Cell into Pond 2E along with surface water runoff from (the now inactive) EAPS Pond 2. Flow is routed from the Primary Cell through Pond 2E and into the Secondary Pond before discharging to the Illinois River through the system outlet works. For the location of all waste units and associated monitoring wells, see GZA GeoEnvironmental (ibid), Figs. 2, 6, and 10, and Dynegy Generation (ibid), Figures on virtual pages 53-54.

According to Dynegy's Securities report for the nine months period ending September 30, 2013, in July 2013, in response to the final EPA dam safety assessment report concerning Hennepin, Dynegy notified the EPA of its intent to close the Hennepin west ash pond system. See *Note 13—Commitments and Contingencies:* http://www.sec.gov/Archives/edgar/data/1379895/000137989513000023/R20.htm.

According to Hennepin Power Station (2009), discharge to the Illinois River is regulated under NPDES Permit No. IL0001554 (*NPDES Permit No. IL0001554, Public Notice issued July 21, 2010:* http://www.epa.state.il.us/public-notices/2010/dynegy-hennepin/index.pdf). The proposed permit calls for monitoring of up to six parameters (pH, TSS, oil/grease, residual chlorine, iron, and mercury), disregarding most toxic metals. The Illinois River was formerly (2006) listed as impaired for fish consumption and primary contact uses on the Illinois Integrated Water Quality Report and Section 303(d) List. The potential causes of impairment were given as mercury and PCBs for the fish consumption use and fecal coliform bacteria. The draft 2008 List is the same except that the primary contact use impairment and fecal coliform cause has been removed. For the *general* nexus between power plant mercury emissions and fish mercury levels in Illinois (Muller, 2006).

The HPS is located in an area with fluvioglacial deposits,[112] with a high potential for aquifer recharge.[113] The EAPS ponds are located on a sand and gravel terrace above the river.[114] Near the river, alluvial formations - up to 130 ft thick on the upper terrace - occur consisting of silts and clays. The formation is highly permeable, with a hydraulic conductivity of about 0.01 cm/sec to 0.1 cm/sec. Because of the steep gradient from the pond, the groundwater seepage velocities are high, between 100 and 1,000 feet/year.[115] The flow direction at the time of the 1993 monitoring was toward the river, except that a mounded flow system existed beneath the pond (EPRI, 1999, Case Study HN, narrative and Fig. 3-3).

The eastern half of the WAPS is on a terrace about 15 feet higher than normal river stage. The terrace overlies an old river channel, subsequently filled with fine-grained and organic channel deposits, which overlies the aquifer (EPRI, 2001, Fig. 4-2). The western half of the WAPS are on lowlands that are about 5 to 10 feet higher than normal river stage, and is bordered to the southwest and west by a swampy area.[116] Depth to groundwater varies from less than 5 feet in the lowlands south and west of the impoundment to 15 to 20 feet in wells on the impoundment berm and in upland wells.

The Pennsylvanian-age Carbondale Formation defines the base of the unlithified deposits (and uppermost aquifer) underlying the WAPS and is regarded as the first confining unit beneath the uppermost aquifer. Water well logs at the HPS indicate shale bedrock at an elevation of roughly 350 feet ASL. In the vicinity of the HPS the Pennsylvanian rocks have an estimated thickness of about 300 to 400 feet. The Pennsylvanian rocks of this area contain little or no usable water and are seldom considered for even domestic water supply purposes due to generally low effective porosity and hydraulic conductivity

Based on the Illinois Administrative Code (IAC) Title 35, Section 620.210, groundwater within the Upper Groundwater Unit at the WAPS meets the definition of a Class I, Potable Resource Groundwater. EPRI (2010) claims that there are no human receptors between the impoundments and the river.[117]

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[112] According to Hlinka et al., (1999, page 11) and Reinstern (1988), the glaciofluvial materials were deposited by meltwater that discharged along the front of the ice sheets during the Kansan, Illinoisan, and Wisconsinan Stages of the Pleistocene Series. These materials were subsequently reworked by prevailing winds to form the small sand dunes. The Kankakee Flood associated with the meltdown of the Valparaiso ice sheet during the Wisconsin-Stage glaciation generated much of the glaciofluvial sequence. For location of the HPS with respect to the end moraines of the Wisconsin Glacial Episode, see Dynegy Generation (ibid), Fig. 8.

[113] Illinois EPA (2011).

[114] EPRI (2001), Fig. 3-2.

[115] Dynegy Generation (ibid) presents lower hydraulic conductivity values; in conjunction with the hydraulic gradients observed in 2013, the calculated velocities away from the WAPS impoundment range from 0.1 to 1.1 feet/day (37 to 401 feet/year). For the EAPS, EPRI (2001) states that the 'Geometric mean hydraulic conductivity of the aquifer is 1.7×10^{-1} cm/sec. Gradients near the EAPS impoundment range from 0.003 to 0.0008. Assuming an effective porosity of 0.2, groundwater velocities range from 700 to 2,600 feet/year.'

[116] The low-lying Donnelley Wildlife Management Area is administered by the Illinois Department of Natural Resources (IDNR), where ponds are maintained for migratory waterfowl.

[117] A comprehensive water well survey was conducted for a 2,500-foot radius around the entire HPS property boundary, inclusive of the WAPS. Based on State of Illinois records there are only two wells located outside of the HPS property boundary and within 2,500 feet of the WAPS. Neither of the two wells, which according to State of Illinois records were constructed in 1844 and 1922 to depths of 30 and 17 feet BLS, respectively, have been verified and were most likely abandoned decades ago. There are no homes, farms or other potential users present at the two locations. There are also no public water supply (PWS), community water supply (CWS) or non-CWS wells or wellhead protection areas (WHPAs) within 2,500 feet of the WAPS. The closest PWS, CWS, or non-CWS well is a non-CWS well owned by Washington Mills and located approximately 4,350 feet east-southeast of the WAPS. Within the HPS property boundary, and within 2,500 feet of the WAPS, there are four wells owned by Dynegy, all of which are non-potable and non-contact industrial wells. One well is used exclusively for irrigation of the coal pile (Dynegy Generation, ibid).

Groundwater monitoring at AEAPS comprises 15 monitoring wells. The Primary and Secondary AEAPS Cells are monitored by six groundwater monitoring wells.[118] A groundwater mound existed beneath the impoundment while it was in service; however, that mound has mostly dissipated since the impoundment was removed from service, and groundwater flow is primarily toward the Illinois River at a velocity greater than 100 feet/year.[119]

Groundwater monitoring at the WAPS comprises 14 groundwater monitoring wells and two actively sampled leachate monitoring wells (EPRI, 2000, Fig. 2-5, and GZA Geoenvironmental, ibid, Figs. 6 and 10).[120] Groundwater flow while the WAPS impoundment was active was radial from a mound that existed beneath Pond 3. As of 2000, based on evidence at wells PZ-23 and MW-35, that mound still persisted although in a reduced level (EPRI 2001, Fig. 4-3). There appeared to be a pronounced gradient toward the southwest, towards the Donnelley Wildlife Management Area, where surface water elevations are managed. Wells PZ-32 and PZ-33 are in this area and are therefore down-gradient of the impoundment; however, in 2001 ash indicator parameter concentrations in these wells were – and still are - low, probably because it was discharging to the Donnelley Area wetlands between the impoundment and these wells.[121] Therefore, PZ-32 and PZ-33 were referred to in that study as 'background wells.'[122]

Impact: According to EPA (2007), monitoring data (1997–1999) showed levels of sulfate and total dissolved solids in down-gradient wells in excess of their SMCLs. According to Cherry et al., (2000) and Table 2-3 in EPRI (2002), groundwater beneath and down-gradient from the west impoundment has relatively high concentrations of ash indicator parameters such as boron and sulfate, and also has high concentrations of manganese in some locations.[123] Until recently, there were no monitoring data for metals at this site.

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[118] Numbered 12 through 16. For monitoring well locations, see GZA Geoenvironmental (ibid), Figs. 6 and 10.

[119] EPRI (2002). According to Dynegy Generation (ibid), the base-flood (i.e., 100-year flood) elevation value of 462 feet is located through the center of the WAPS's Pond 3. As of 2013, the groundwater table beneath the WAPS was very flat, although slight radial flow may persist (There, Figs. 12 through 15). In addition to flow towards the Illinois River there is a gradient towards the southwest and west. River stage during high precipitation and/or flood events seasonally rises above adjacent groundwater elevations and in low lying areas of the floodplain. During these events, the river temporarily recharges the aquifer and groundwater flow direction close to the river reverses. The groundwater flow reversals are limited in duration and extent, but do affect groundwater quality in some wells at the WAPS and off-site on the Donnelley Wildlife Management Area.

[120] The wells, numbered 21 through 27, 31 through 36, and L1 and L4 (the 'L' wells, designated for leachate collection, are finished in silty materials underlying the ash) are monitored quarterly and as a condition of the 1996 IEPA-approved Closure Work Plan (CWP) for the WAPS.

[121] EPRI (2001) speculated that the low concentrations of ash indicator parameter in wells PZ-32 and PZ-33 might reflect yet another possibility - that the boron and sulfate plume has not yet migrated that far from Pond 3. However, considering the estimated flow rate away from the WAPS, by now the plume should have migrated at least as far as well 33, which is located about 1,000 feet west of the western berm of the Secondary Pond, formerly Pond No. 3.

[122] A similar behavior of these two wells (as well as of well 34) was still observed thirteen years later, in the Dynegy Generation (2014) study. Consequently, the same practice - of addressing the down-gradient wells No. 32, 33, and 34 as 'background wells' was similarly applied by the authors of the recent study.

[123] According to Cherry et al., (2000), exceedances involved the same three constituents in wells situated down-gradient from both the east and west impoundments. The exceedances associated with the east impoundment were sulfate (460 mg/L), TDS (950 mg/L) and boron (14 mg/L); the exceedances associated with the west pond were sulfate (700 mg/L), TDS (1,200 mg/L), and boron (11 mg/L).

According to EPRI (1999, HN Case Study), groundwater monitoring was carried out by the utility at the east pond both before its closure in 1996 and subsequent to the closure in 1997 and 1998. Groundwater samples from sixteen wells were analyzed for alkalinity, total dissolved solids, boron, calcium, chloride, iron, magnesium, manganese, potassium, sodium, and sulfate beginning in November 1994. A comparison of upgradient and downgradient concentrations showed that boron, chloride, sodium, sulfate, and total dissolved solids levels were elevated in the downgradient wells (There, Table 3-5) before the closure of the pond. Monitoring data postdating the

Groundwater down-gradient of EAPS Ponds 2 and 4 prior to 1997, when Pond 2 was still active and before the new lined ponds were in service had higher average concentrations of boron, chloride, potassium, sodium, specific conductivity, sulfate, and TDS than up-gradient groundwater (EPRI, 2001, Table 3-3). Sulfate and boron exceeded state groundwater standards. Sulfate slightly exceeded the standard at least once at eight wells, with concentrations of up to 600 mg/L. Boron consistently exceeded the standard.[124] The high boron concentrations at MW-08 and MW-16 suggested that the mounding beneath Pond 2 reversed groundwater flow as far south as those wells. Boron and sulfate concentrations were highest in monitoring wells toward the eastern end of Pond 2 (EPRI, 2001, Figs. 3-4 and 3-5), where water accumulated and leachate flux was highest.

Several years following the abandonment of WAPS Pond No. 3, boron, iron, manganese, sulfate, and TDS in groundwater down-gradient of the pond exceeded state groundwater standards (EPRI, 2001, Table 4-4).[125] Boron consistently exceeded the standard at all four downgradient wells and three of the five intermediate wells. Boron and sulfate concentrations were highest in down-gradient monitoring wells between the impoundment and the river (EPRI, 2001, Figs. 4-4 and 4-5). In addition, a plume of elevated boron and sulfate concentrations extended southwest from the impoundment toward monitoring well PZ-27.[126] TDS exceeded the standard once at PZ-23. Iron and manganese exceeded the standard in wells finished beneath the organic river channel fill sediments; however, the exceedances did not correlate with proximity to the impoundment, indicating that these exceedances are naturally occurring.

EPRI (2002) reports three wells with elevated manganese attributed to the impoundment at the HPS site. Similar to the case at Havana, EPRI (2002) claims that high manganese concentrations do not always correlate with high ash indicator parameter concentrations. Manganese concentrations are high in several down-gradient monitoring wells, but are also high in two 'background' monitoring wells (wells 32 and 34). All of the monitoring wells with high manganese concentration are screened beneath silty, organic-rich, channel-fill deposits (EPRI 2002, Fig. 2-6). EPRI (2002) claims that it is likely that manganese concentrations in these three wells are due primarily to reductive dissolution of manganese oxides and oxyhydroxides in the overlying soils. Reducing conditions that trigger release of manganese are associated with the close proximity of the facilities to river and wetland sediments containing organic-rich

closure (1997 and 1998) show that only boron and sulfate in some wells exceeded the state standards of 2 mg/l and 400 mg/l, respectively (There, Fig. 3-4). Both iron and sulfate concentrations were low, indicating that leaching was dominated by dissolution of ash and that pyrite oxidation was not occurring.

[124] According to Table 3-3 in EPRI (2001), the median concentration of boron in down-gradient wells was 11 mg/L (maximum: 22 mg/L), as compared to an up-gradient median concentration of 0.16 mg/L.

[125] According to Table 4-4 in EPRI (2001), the median concentration of boron in down-gradient wells was 4.6 mg/L (maximum: 10 mg/L), as compared to an up-gradient median concentration of 0.070 mg/L. Sulfate exceeded the standard at least once in four wells. According to Table 4-4 in EPRI (2001), the median concentration of sulfate in down-gradient wells was 215 mg/L (maximum: 600 mg/L), as compared to an up-gradient median concentration of 50 mg/L.

[126] At the southwestern edge of the property.

PTa11. Ameren Coffeen/White & Brewer Trucking Fly Ash Landfill, Coffeen, Montgomery County, Illinois

Type: Landfill and a Leachate/Storm Water Pond.[191]

Background and Description: The Ameren Coffeen Power Station[192] is located about 70 miles northeast of St. Louis.[193] According to EPRI (2010), this case involved a 40-acre, unlined, state-permitted landfill that operated from 1977 or earlier until 1997. The landfill, located just west of the East Fork of Shoal Creek, was owned and operated by the White and Brewer Trucking Company, who disposed of fly ash in the landfill. There were two separately-permitted areas: Cells A-D and Cell E. Cells A-D were capped from 1980 to 1990, and Cell E was capped in 1997.[194] According to Ameren (2010), currently the site has an unlined Recycle Pond (primarily in receipt of boiler slag)[195] and an HDPE-lined Gypsum Management Facility Recycle Pond (in receipt of FGD gypsum).[196] It is inferred that fly ash is dry-handled in a landfill.[197, 198]

The plant site is situated on the Springfield Plain, a broad, flat, physiographic area. The landscape was shaped largely by Quaternary glaciations. Glaciers left deposits of material on the irregular bedrock surface. The upper soil deposits at the plant site are comprised of glacial till.[199]

According to EPRI (2010), the landfill is located in an isolated, rural area. There is groundwater seepage into the landfill—which was constructed in an area of sloping topography—via sand seams. Groundwater near the site is not used for drinking water. Groundwater flowing through sand seams at the site either discharges to the surface as seeps or to East Fork of Shoal Creek, a small creek immediately down-gradient. There are no dwellings between the site and the creek.

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[191] NPDES IL0000108. A public notice for a renewed/modified NPDES Permit No. IL0064785 was issued on June 8, 2012.

[192] According to http://www.ameren.com/sites/aem/AboutAEM/Documents/AEMGenerationPortfolio.pdf, the Plant's generating capacity is 895 MW. According to http://www.sourcewatch.org/index.php?title=Coffeen_Power_Station, the Plant's nameplate capacity is 1,005 MW, comprising two generation units (389 MW and 617 MW) that came on line in 1965 and 1972, respectively.

[193] According to Ameren's March 10, 2010 Media Release (http://ameren.mediaroom.com/index.php?s=43&item=793), and Kleinfelder (2011), the plant is located on a peninsula between two branches of Coffeen Lake, about two miles south of the Town of Coffeen. The 1,200-acre, man-made cooling lake is managed by the Illinois Department of Natural Resources. Coffeen Lake provides outdoor recreational activities for boaters, anglers, campers and hunters. A 73-acre cooling basin and a series of 24 cooling towers were built and placed in service in July 2000 to keep Coffeen Lake temperatures within allowable limits during times of extreme heat.

[194] EPRI (2010).

[195] In service since 1979: 23 acres in area, 500 acre-feet capacity.

[196] In service since 2009: 17 acres in area, 243 acre-feet capacity. For the location of the disposal and recycling units, see Kleinfelder (ibid), Figures 1 and 2.

[197] According to NPDES Permit No. IL0064785 (2012), the facility operates a landfill for the disposal of coal combustion waste and scrubber sludge. Wastewater is generated from water which percolates through cell D, stormwater which contacts the exposed face of fly ash in Cell E, and storm water which contacts the cover areas of cells A, B, C, D and E. Facility operation results in an intermittent discharge of leachate and storm water from outfall 001. The proposed, reissued NPDES permit adds leachate to the permit as an authorized waste stream, for a total of 26 parameters to be discharged in a controlled manner.

[198] According to Kleinfelder (ibid), a Decommissioned Ash Pond is located between the Gypsum Reclaim Pond and the Recycle Ash Pond. The pond was decommissioned and capped in 1981.

[199] Kleinfelder (ibid), Section 3.3.

Impact: According to EPA (2007), monitoring data at this site[200] showed levels of sulfate, total dissolved solids, and manganese in down-gradient wells in excess of their secondary MCLs. Two of the three wells for which the commenters provided data appear to be located directly underneath the landfill area. A May 18, 1995 memorandum from the Illinois Environmental Protection Agency (IEPA) documents areas of dead or distressed grass on-site, apparently due to ground water seepage. Seepage samples causing vegetation damage are associated with orange-red sediment. The sediment and soils are high in metals (maximum values): manganese (602 ppm), iron (12,000 ppm), barium (44 ppm), zinc (29 ppm), nickel (12 ppm), and chromium (9 ppm).

According to Cherry et al., (2000), ten constituents taken in down-gradient monitoring wells and leachate seeps exceeded federal standards. At 10,954 mg/L, sulfate concentrations were exceptionally high, exceeding the MCL by nearly 22 fold. The TDS at 7,367 mg/L was one of the higher such values in CCR landfills and exceeded the limit by about 15 times. Boron was measured at 167 mg/L but also was recorded at up to 314 mg/L at a down-gradient seep, exceeding the US EPA 10-day health advisory for children by 349 times. Manganese ranged from 1.570 mg/L at a landfill well to 5.580 mg/L at the seep, which exceeded the limit by 31 and 111 times, respectively. Iron (65.7 mg/L) was at least 65 times higher than the US EPA WQC and 219 times higher than the MCL. Sodium was measured up to 910 mg/L, which exceeded the MCL by 18 fold. Aluminum reached 2.020 mg/L, 10-times above the MCL and 23 times greater than the US EPA chronic WQC. Zinc was measured at 184 mg/L, which exceeded the US EPA chronic WQC by about four times.

According to EPRI (2010), based on groundwater monitoring data from 1982 to 1997, pre-mitigation monitoring showed exceedances of sulfate and manganese. Post-mitigation monitoring, based on samples obtained in 2008-2009, detected onsite exceedances of boron, cadmium, chromium, nickel, thallium, iron, manganese, and sulfate.[201]

Resolution: IEPA's May 1995 memo documents areas of dead grass on-site, due to groundwater seepage; and a July 1996 memo discusses IEPA's recognition of contamination to groundwater as a result of ash disposal operations at the site. As of late in 1998, no further administrative action is known to have taken place regarding the implications of the July 1996 memo.

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[200] Presumably, the findings are based on groundwater monitoring data for the period August 1993 to August 1997, from at least 17 groundwater monitoring wells, although groundwater quality data go as far back as 1982.

[201] Regarding the documented pre- and post-mitigation exceedances, EPRI (2010) states:

- Tabulation of exceedances in groundwater before/after remediation (is) based on a database provided by the power company listing groundwater monitoring results from 1982 through May 2009. Pre-mitigation exceedances (are) based on samples obtained prior to 1997; post-mitigation results (are) based on samples obtained in 2008-2009.
- Post-remediation exceedances that were not listed before remediation (boron, cadmium) were observed in monitoring wells added after 1997.
- The highest iron concentrations were observed in an up-gradient well near the footprint of the landfill, and the second-highest concentrations were observed in a down-gradient well where concentrations of one CCR indicator (boron) were low and another (sulfate) were high.
- Arsenic and lead were detected in several unfiltered samples collected in 2007 and 2008; however, concentrations were low (arsenic) or non-detect (lead) in filtered splits of those same samples. Therefore, these concentrations appear to be related to turbidity issues in the samples and these constituents were not tabulated as exceedances.
- Beryllium, nickel, and thallium concentrations exceeded the MCL or state water quality standards in wells with high CCR indicator concentrations, but had equal or higher concentrations in wells with very low CCR indicator concentrations, suggesting a potential alternative cause for the observed concentrations.

Exhibit 2

Damage Case Compendium

Technical Support Document, Volume IIb, Part One: Potential Damage Cases

Alexander Livnat, Ph.D.

12/18/2014

This is the third out of five volumes describing EPA's current state of knowledge of CCR damage cases. This volume comprises 32 damage case-specific modules. Each module contains background information on the host power plant, type and design of the CCR management unit(s), their hydrogeologic setting and status of groundwater monitoring system, evidence for impact, regulatory actions pursued by the state and remedial measures taken, litigation, and rationale for the site's current designation as a potential damage case in reference to pre-existing screenings. Ample footnotes and a list of references provide links to sources of information.

PTb10. Marion Plant, Southern Illinois Power Cooperative, Marion, Williamson County, Illinois

***Type*:** Landfill and Surface Impoundments.

Background and Description: The 293 MW Southern Illinois Power Cooperative (SIPC)[170] has placed coal combustion residual (CCR) from the Marion Power Plant into seven ponds and a landfill on the plant's site since 1963.[171, 172] Only one of the seven ponds is lined. The approximately 1.1 million cubic yard landfill, located between two forks of the Saline Creek, is also unlined. The plant lies about eight miles south of Marion, in a rural area of Illinois.[173] Groundwater monitoring has been required in the vicinity of the landfill and ponds since 1994, and high concentrations of cadmium were first detected in

[170] According to Leonard Hopkins/SIPC (2011), Southern Illinois Power Cooperative is a small Generation & Transmission System, a not-for-profit corporation defined as a "Small Business" by the U.S. Small Business Administration. It serves approximately 250,000 people and businesses located in the southernmost twenty-two counties of Illinois. According to DCEO (2010), in 2009, close to 89% of the plant's fuel was derived from open-pit and underground Knight Hawk Coal Company's coal mines in Jackson and Perry Counties, Illinois. According to http://www.isgs.uiuc.edu/maps-data-pub/coal-maps.shtml and http://www.knighthawkcoal.com/index.html, the bituminous coal contains between 1.3% and 3.2% sulfur and its calorific values range between 11,000 and 11,800 BTU/lb.

[171] Major CCR types are coal fly ash, bottom ash, and (since the late 1970s) flue gas desulfurization (FGD) sludge. According to SIPC (2012) and Sourcewatch (2010), SIPC's Baseload capacity is provided by two coal-fired boilers. In 2003, SIPC replaced three aging small boilers (Units 1-3: 1963 vintage, 33 MW each) with one 120 MW circulating fluidized bed boiler. Capable of burning a variety of fuels, it is currently fueled with locally available mine waste. The second unit (originally, Unit 4) comprises a 173 MW coal-fired unit, which came online in 1978. This unit has been equipped from the outset with a wet scrubber, and since 2003, also with a selective catalytic reduction technology.

[172] According to Marion Plant's Response to EPA's Information Request (2011), there are actually 11 discrete, active surface impoundments, with a total capacity of 411 acre-feet: seven were commissioned in 1976, one – in 1988, one- in 1992, and three – in 1996. They range from the large South Fly Ash Dam and Pond S-1 (103 acre-feet and 71 acre-feet, respectively), to the small Pond S-6 and Pond 1 (16 acre-feet and 9 acre-feet, respectively). Most ponds are designated for the disposal of fly ash and/or flue gas emission control residuals, whereas Ponds 1 and 2 are designated for the storage of bottom ash/boiler slag, ultimately removed for beneficial use.

Kleinfelder (2013) inspected the bottom ash Ponds 1, 2, and 4, claiming that (i) all were commissioned in 1963, (ii) the presence of a liner is 'unknown', (iii) their pool areas are 1.75 acre, 2 acre, and 4.2 acre, respectively, and (iv) their storage capacities are (in acre-feet) 9, 15, and 55, respectively. Bottom ash Ponds 1 and 2 act as a primary settling basin for bottom ash prior to the water being transferred into Pond 4, which acts as a final clarification pond, and then being released into Little Saline Creek. Currently the bottom ash residual produced at the facility is removed from Ponds 1 and 2, and then sold to various organizations for beneficial use such as roof shingle sand.

Kleinfelder (ibid) did not asses the following ponds: South Fly Ash Pond, Fly Ash Disposal Pond B-3, Pond A-1, Pond S-1, Pond 3A, Pond 3, Pond S-6, Pond S-2, and Pond S-3. For locations of all ponds, see Figure 2 in Kleinfelder (2013).

[173] SIPC created the Lake of Egypt in 1962, by damming the South fork of the Saline River, a tributary of the Ohio River, to supply cooling water for the Marion electric power plant. Located six miles south of Marion, Illinois, it covers 2,300 acres with 90 miles of shoreline. The lake is used extensively for recreational purposes (http://www.sipower.org/p/map.pdf). The spillway elevation of the dam for Lake of Egypt located just east of the Marion plant is 500 feet.

1997; however, no offsite monitoring data is available. SIPC also disposes of some CCR offsite.[174] The plant has a National Pollutant Discharge Elimination System (NPDES) permit.[175]

The Marion area is situated near the southern margin of the Illinois Basin, where bedrock strata dip north at less than one-degree.[176, 177] Most of SIPC's ash ponds are located in upland positions a little above or below 500 feet asl. The CCR landfill is located at an elevation of about 460 feet in the floodplain between the confluence of Saline Creek and South Fork Saline Creek. The uplands that confine the floodplain are mantled by rather thin glacial Quaternary deposits, mainly glacial drift and wind-blown silt (loess).[178] These surficial deposits overlie the Pennsylvanian-age Tradewater Formation,[179] comprising primarily sandstone. In the southern two-thirds of Illinois, thin sandstone and limestone beds of Pennsylvanian age and sandstone and limestone formations of Mississippian age yield small quantities of groundwater. Although wells in these rocks commonly yield less than 25 gpm, they are the only source of water for many domestic and small municipal and industrial supplies.[180] According to Gibb (1973), the groundwater yield potential of shallow bedrock formations in Williamson County is estimated to be less than 5 gpm.

Impact and Damage Claims: EIP (2010a) indicates that groundwater monitoring (which only looked for boron cadmium, iron, and sulfate) showed multiple instances of onsite contamination. The 2004 to 2009 average concentrations of cadmium were found above the Illinois Class I Groundwater Standard (0.005 mg/L)[181] in six of eight monitoring wells, with maximum concentrations up to between 10-18 times the federal MCL. The two wells with the highest average concentrations of cadmium (3-4 times the MCL) are adjacent to Saline Creek and discharging into it.

EIP (2010a) also notes that iron exceeded the secondary EPA MCLs (SMCLs) and the Illinois Class I Groundwater Standard in most sampling events. Some relatively higher concentrations of iron were

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[174] According to Barbara L. McKasson's comment to the proposed CCR rule docket: EPA-HQ-RCRA-2009-0640-11555 ((Louisville, KY, Public Hearing), the offsite locations include: (i) an abandoned strip mine north of the Williamson County Regional Airport, which lacks a monitoring well, liner and state regulation or monitoring. (ii) Near Lake of Egypt, SIPC is dumping CCR into a small lake it drained. "A farmer said that when it rains, water drains off of that lake onto his adjacent field where he grazes cattle."

[175] Permit No. IL0004316.

[176] Jacobson et al., (1991); Nelson (2007).

[177] Follmer and Nelson (2010).

[178] According to USDA (2009), the glacial drift, which is about 150,000 years old, is thin, and the topography is generally controlled by the underlying bedrock of Pennsylvanian age. According to Follmer and Nelson (2010), the Glasford Till, comprising two facies: (i) silty clay loam diamicton (sediment that consists of a wide range of non-sorted to poorly sorted terrigenous sediment, i.e. sand or pebbles that are suspended in a mud matrix) that varies from pebbly, silty clay to silt loam diamicton; very few pebbles in places; fabric is compact and uniform. Underlies most of the gently rolling hills of the county; variable thickness ranging from a veneer of a few feet to over 100 feet thick in buried valleys; (ii) ablation (the erosive processes by which a glacier is reduced) deposits; water transported and glacial debris-flow deposits with soft-sediment deformation features; likely contains gravel at the base and overlies dense basal till where glacial deposits are thick; largely restricted to discontinuous terrace levels (localized level areas) across the uplands at elevations from 420 up to 550 feet; formed on the Illinoian glacier after stagnation; temporary ice-walled lakes accumulated sediments that formed terraces now buried by loess. According to USDA (2009), the thickness of the loess on stable summits in Williamson County ranges from 4 to 5 feet to just over 12 feet.

[179] According to Nelson and Weibel (1996), The Tradewater consists of lithic arenite inter-bedded with shale, siltstone, and thin coal. Maximum thickness of the Tradewater is about 300 feet; its top is eroded.

[180] Visocky et al., (1983).

[181] This standard is equivalent to the Federal Maximum Contaminant Level (MCL).

recently found in two of the wells, which the SIPC attributes to rusting well covers. EIP (2010a) also notes that sulfate occasionally exceeded the EPA SMCL and boron occasional exceeded the Illinois Class I Groundwater Standard (2.0 mg/L) since monitoring began. There are three wells within a one-mile radius of the CCR disposal areas, but their exact locations – including how many wells are down-gradient of the site, are unknown.

According to the Illinois Environmental Protection Agency (IEPA),[182] The Agency has groundwater monitoring well sampling data from eight sampling events ranging from January 2007 to November 2008 that indicate elevated cadmium and iron concentrations. SIPC renovated (repaired and cleaned out) their monitoring wells in 2010 and replaced two monitoring wells. Groundwater sampling reports at their monitoring wells from five sampling events ranging from June 2010 through June 2011 confirmed elevated levels of boron and iron with one detection of cadmium that has not been confirmed since well renovation. Elevated iron may also be due to a nearby coal mined area.

EIP (2010a) notes that the wells with the most significant contamination are those which lie between the CCR sites and Saline Creek, to which the shallow groundwater discharges.[183] It also notes that effluent samples from one ash pond which has an NPDES permitted discharge into the creek indicated aluminum over the EPA Ambient Water Quality Criteria (AWQC), as well as boron over the EPA's criteria for sensitive crop irrigation.[184] According to IEPA,[185] aluminum has no water quality standard or derived water quality criterion in Illinois. Many states do not have an aluminum standard because only dissolved aluminum is a concern for aquatic life and dissolved aluminum does not occur at levels of concern unless a very low pH is present.

According to IEPA,[186] a query run for the last five years of discharge data does not indicate any discharge limit exceedances of aluminum or boron in the surface water. During the same time period, there were five exceedances of TDS, one exceedance of iron, one exceedance of copper, and two exceedances of oil and grease.

Evaluation against Proven Damage Criteria[187]

Criteria	Evaluation
Criterion 1: *Documented exceedances of primary maximum contaminant levels (MCLs) or other health-based standards measured in groundwater at sufficient distance from the waste management unit to indicate that hazardous constituents have*	• Onsite groundwater data exceeded the primary EPA MCL for cadmium. • Onsite groundwater data exceeded the EPA SMCLs for iron and sulfate, and the Illinois Class I Groundwater Standard for iron and boron. • No offsite groundwater data are available.

[182] Feedback from Richard P. Cobb, Deputy Manager, Division of Public Water Supplies, IEPA, on September 1, 2011, in response to EPA's Region 5 follow up on citizen concerns raised in the 2010 Louisville and Charlotte CCR proposed rule Public Hearings (forwarded on September 27, 2011 by J. Gevrenov, EPA R5, to A. Livnat, EPA/OSWER)
[183] EIP (2010a) concedes that there does not appear to be any sampling to determine actual impacts of the discharges on Saline Creek.
[184] According to EIP (2010a), USEPA's boron surface-water criteria for the protection of sensitive crops by long-term irrigation is 0.75 mg/L.
[185] Feedback from Richard P. Cobb, ibid.
[186] Feedback from Richard P. Cobb, ibid.
[187] ICF (2010a).

Exhibit 3

K P R G

ENVIRONMENTAL CONSULTATION & REMEDIATION

KPRG and Associates, Inc.

CCR COMPLIANCE
ANNUAL GROUNDWATER MONITORING and CORRECTIVE ACTION REPORT - 2018

Midwest Generation, LLC
Waukegan Station
401 E. Greenwood Avenue
Waukegan, Illinois

Prepared By: KPRG and Associates, Inc.
14665 West Lisbon Road, Suite 1A
Brookfield, WI 53005

January 31, 2019

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1.0 INTRODUCTION

The Detection Monitoring requirements in accordance with the Federal Register, Environmental Protection Agency, 40 CFR Parts 257.94, Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule dated April 17, 2015 (CCR Rule) have been completed for the ash pond monitoring wells located at the Midwest Generation, LLC (Midwest Generation) Waukegan Generating Station. The wells sampled were selected to meet the monitoring requirements of the CCR Rule for both the West and East Ash Ponds. The CCR monitoring well network around these ponds consists of eight monitoring wells (MW-01 though MW-04, MW-09, MW-11, MW-14 and MW-16). Wells MW-09, MW-11 and MW-14 are upgradient wells.

The 2017 CCR Compliance Annual Groundwater Monitoring and Corrective Action Report was submitted on January 24, 2018. This annual report covers the work performed relative to CCR groundwater monitoring from January 1, 2018 through the end of 2018. It does not duplicate information or activities previously reported for 2017. It is prepared in accordance with Section 257.90(e)(1-5) and summarizes the sampling procedures used, provides an evaluation of groundwater flow conditions, summarizes the analytical data generated, provides a discussion of the statistical evaluations completed and alternate source demonstration testing completed as a basis for determining the appropriate next phase of compliance activities.

2.0 FIELD PROCEDURES AND GROUNDWATER FLOW EVALUATION

2.1 Field Procedures

As previously noted, the CCR groundwater monitoring network around the ash ponds at this facility consists of eight wells (MW-01, MW-02, MW-03, MW-04, MW-09, MW-11, MW-14 and MW-16) as shown on Figure 1. As part of sampling procedures, the integrity of all monitoring wells was inspected and water levels obtained using an electronic water level meter (see summary of water level discussion below). All wells were found in good condition.

All groundwater samples were collected using the low-flow sampling technique from dedicated pumps. The samples were not filtered prior to analysis to provide for total metals concentrations as opposed to dissolved metals concentrations. One duplicate sample was collected from a randomly selected monitoring well per sampling event for quality assurance purposes.

2.2 Groundwater Flow Evaluation

Water level data measurements were obtained from monitoring wells during each round of groundwater sampling. A complete round of water levels was collected prior to initiating sampling, and the water level data are summarized in Table 1. It is noted that water levels were also concurrently measured at other monitoring well locations in the area that are not part of the CCR monitoring network. The full set of water levels were used to generate a groundwater flow map for each sampling event. These maps are provided as Figures 2 and 3. A review of the maps indicates a consistent southeasterly groundwater flow direction beneath the ash ponds. In accordance with general groundwater sampling requirements under Section 257.93(c), Table 2 provides a summary of the flow direction and an estimated rate of groundwater flow for each sampling event. The flow rate was calculated using the following equation:

$$V_s = \frac{K\,dh}{n_e\,dl}$$, where

V_s is seepage velocity (distance/time)
K is hydraulic conductivity (distance/time)
dh/dl is hydraulic gradient (unitless)
n_e is effective porosity (unitless)

The average hydraulic conductivity of 4.04×10^{-3} ft/sec used in Table 2 was obtained from the Hydrogeologic Assessment Report dated February 2011 and prepared by Patrick Engineering. The estimated effective porosity of the aquifer materials (0.35) was obtained from literature (Applied Hydrogeology, Fetter, 1980).

3.0 ANALYTICAL DATA AND STATUS OF EVALUATIONS

3.1 Sampling Summary

The groundwater sampling summary from 2018 is provided in Table 3, in accordance with 257.90 (e)(3).

3.2 Data Summary

The analytical data from the detection monitoring groundwater sampling for Appendix III parameters are provided in Table 4 which includes calculated Prediction Limits (PLs) established in the initial CCR Groundwater Monitoring Statistical Evaluation Summary dated January 2018 for data comparison purposes. The downgradient intrawell prediction limits were established for the parameters which were part of the Alternate Source Demonstration (ASD; see discussion in Section 4.2 below). For those parameters in downgradient wells, a concentration above both interwell and intrawell prediction limits would be considered a potential statistically significant increase (SSI).

Confirmatory resampling events were limited to any potential statistically significant increases (SSI) for specific parameters at specific wells for parameters that were either not covered in the ASD or sufficiently addressed in the ASD. The first 2018 semi-annual sampling data indicated calcium and total dissolved solids (TDS) above the calculated statistical Prediction Limits (PLs) at well MW-16 (see discussion on initial statistical evaluation summary in Section 4.1 below). Confirmatory resampling was completed for those parameters at well MW-16 and the results were below the PLs. The second semi-annual sampling data also indicated calcium and TDS above the calculated PLs for well MW-16, however, confirmatory resampling was completed and the results were still above the calculated PLs suggesting potential SSIs for these parameters at this location.

3.3 Current Status

In accordance with section 257.94(e)(2) of the CCR Rule, an Alternate Source Demonstration (ASD) is in the process of being completed to determine whether the noted calcium and TDS concentrations at well MW-16 may be related to the regulated units or whether they may be associated with a source other than the regulated units. The results of that demonstration will determine the next course of action(s) required to maintain compliance with the CCR Rule.

4.0 OTHER REQUIRED SUBMITTALS

4.1 Initial Statistical Evaluation Summary

The initial data to establish statistical background was collected as part of detection monitoring requirements under 257.94(b). Eight rounds of groundwater data were generated for all upgradient and downgradient monitoring wells for Appendix III and Appendix IV parameters. In addition, a ninth round and resample event was collected for subsequent use in statistical comparisons. The Statistical Evaluation Summary dated January 12, 2018 was prepared by KPRG and Associates, Inc. The work was completed in accordance with the CCR Compliance Statistical Approach for Groundwater Data Evaluation for the Waukegan Station dated October 10, 2017 and established PLs for each Appendix III parameter.

The completed initial detection monitoring statistical evaluations determined that there were potential SSIs in various downgradient monitoring wells relative to established background for boron, pH and sulfate. It was recommended to complete an ASD in accordance with Section 257.94(e)(2) of the CCR Rule to determine whether these SSIs may be associated with an actual release from the regulated unit(s) or if another potential source in the vicinity of the ash ponds may be affecting the local groundwater quality. The results of the ASD are discussed below.

4.2 Alternate Source Demonstration

The ASD was completed April 12, 2018 for boron, pH, and sulfate in accordance with Section257.94(e)(2) of the CCR Rule for the Waukegan Generating Station West and East Ash Ponds and as required under Section 257.94(e)(2) a full copy of the ASD is provided in Appendix B. Ash and water samples were collected from each of the two ponds (East and West) and analyzed using the Leaching Environmental Assessment Framework (LEAF) method to determine whether the noted SSIs may be associated with an actual release from the regulated unit(s) or if another potential source in the vicinity of the ash ponds may be affecting the local groundwater quality.

It was concluded that the SSIs for boron, pH, and sulfate are not the result of a release of leachate from the regulated units (East and West Ash Ponds) but rather from other potential source(s). The recommendation was to continue with routine detection monitoring.

5.0 SUMMARY/CONCLUSIONS AND RECOMMENDATIONS

The detection monitoring requirements in accordance with the CCR Rule have been successfully met. Groundwater monitoring wells that had analytical results showing parameter concentrations above established PLs were resampled to minimize potential for a false positive. An initial ASD was completed which determined that potential SSIs for boron, pH and sulfate at various well locations are from other sources, and not leakage of leachate from the regulated units (East and West Ash Ponds). The most recent semi-annual detection monitoring results for well MW-16 indicate a possible SSIs for calcium and TDS. Midwest Generation is in the process of completing an ASD for these two parameters is accordance with section 257.94(e)(2) of the CCR Rule. The station will stay in routine detection monitoring while the ASD is completed. Once the ASD is completed, appropriate recommendations will be made regarding whether the site should continue with routine detection monitoring or transition to an assessment monitoring program.

6.0 REFERENCES

- Federal Register, Environmental Protection Agency, 40 CFR Parts 257 and 261, Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals From Electric Utilities; Final Rule. Vol. 80, No. 74, Friday April 17, 2015.

- Patrick Engineering, Inc., Hydrogeologic Assessment Report – Waukegan Generating Station, Waukegan, IL. February 2011.

- KPRG and Associates, Inc., CCR Compliance Monitoring, Sampling and Analysis Plan, Midwest Generation, LLC Waukegan Generating Station. October 10, 2017.

- KPRG and Associates, Inc., CCR Compliance Statistical Approach for Groundwater Data Evaluation, Midwest Generation, LLC Waukegan Generating Station. October 10, 2017.

- KPRG and Associates, Inc., CCR Groundwater Monitoring Statistical Evaluation Summary - 2017, Midwest Generation, LLC Waukegan Generating Station. January 12, 2018.

- C.W. Fetter, Jr., Applied Hydrogeology. Charles E. Merrill Publishing Co., 1980.

Exhibit 4

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ENVIRONMENTAL CONSULTATION & REMEDIATION

KPRG and Associates, Inc.

CCR COMPLIANCE
ANNUAL GROUNDWATER MONITORING and CORRECTIVE ACTION REPORT – 2019
ASH BY-PASS BASIN AND ASH SURGE BASIN

Midwest Generation, LLC
Powerton Station
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January 31, 2020

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APPENDICES
A – Analytical Data Packages from 2019 Assessment Monitoring
B – Alternate Source Demonstration March 25, 2019

1.0 INTRODUCTION

Based on the results of the statistical evaluation summary completed in December 2018, an Alternate Source Demonstration (ASD) was performed for Ash Surge Basin (ASB) and Ash By-pass Basin (ABB) detected Appendix IV parameters that exceeded established Groundwater Protection Standards (GWPSs). The ASD was completed on March 25, 2019, in accordance with 40 CFR 257.95(g)(3)(ii) and concluded that noted parameters above the GWPS are associated with other potential alternate sources and not a release from the regulated units.

The Assessment Monitoring requirements in accordance with the Federal Register, Environmental Protection Agency, 40 CFR Parts 257.95, Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule dated April 17, 2015 (CCR Rule) have been completed for the ash pond monitoring wells located at the Midwest Generation, LLC (Midwest Generation) Powerton Generating Station. The wells sampled were selected to meet the monitoring requirements of the CCR Rule for the ASB and the ABB. The monitoring well network around these ponds consists of monitoring wells (MW-01 [upgradient], MW-08, MW-09 [upgradient], MW-11, MW-12, MW-15, MW-17, MW-18 and MW-19 [upgradient]) as shown on Figure 1.

With the vacating of Section 257.100(b) through (d) in October 2016, the inactive Former Ash Basin (FAB), which is being planned for closure, was added to the CCR units that would require monitoring under the CCR Rule. Wells MW-02 through MW-05 and MW-10 were added to the CCR sampling program specifically for the FAB and are not part of the monitoring program for the Ash Surge Basin and Ash By-pass Basin. The FAB monitoring results are discussed under separate cover.

This annual report covers the work performed relative to CCR groundwater monitoring for the 2019 calendar year for the ASB and ABB. It does not duplicate information or activities previously reported for 2018. It is prepared in accordance with Section 257.90(e)(1-5) and summarizes the sampling procedures used, provides an evaluation of groundwater flow conditions, summarizes the analytical data generated, and summarizes the results of an alternate source demonstration completed at the site.

2.0 FIELD PROCEDURES AND GROUNDWATER FLOW EVALUATION

2.1 Field Procedures

As previously noted, the CCR groundwater monitoring network around the ASB and ABB consists of monitoring wells (MW-01 [upgradient], MW-08, MW-09 [upgradient], MW-11, MW-12, MW-15, MW-17, MW-18 and MW-19 [upgradient]) as shown on Figure 1. As part of sampling procedures, the integrity of all monitoring wells was inspected and water levels obtained using an electronic water level meter (see summary of water level discussion below). All wells were found in generally good condition.

All groundwater samples were collected using the low-flow sampling technique from dedicated pumps. The samples were not filtered prior to analysis to provide for total metals concentrations as opposed to dissolved metals concentrations. One duplicate sample was collected from a randomly selected monitoring well per sampling event for quality assurance purposes.

2.2 Groundwater Flow Evaluation

Water level data measurements were obtained from monitoring wells during each round of groundwater sampling. A complete round of water levels was collected prior to initiating sampling, and the water level data are summarized in Table 1. It is noted that water levels were also concurrently measured at other monitoring well locations in the area that are not part of the CCR monitoring network for the ASB and ABB. The full set of water levels were used to generate a groundwater flow map for each sampling event. It is also noted that CCR monitoring wells MW-08, MW-12, MW-15 and MW-17 are screened within a shallow, localized, saturated clay/silt unit which is underlain by a more extensive sand unit. The remaining monitoring wells, have deeper screens, within the more extensive sand unit. The water levels from wells screened in the clay/silt unit and the water levels from monitoring wells screened within the sand unit were evaluated separately and used to generate groundwater flow maps for each unit. These maps are provided on Figures 2 through 5.

In accordance with general groundwater sampling requirements under Section 257.93(c), Table 2 provides a summary of the flow direction and an estimated rate of groundwater flow for each sampling event. The flow rate was calculated using the following equation:

$$V_s = \frac{K\,dh}{n_e\,dl}$$, where

V_s is seepage velocity (distance/time)
K is hydraulic conductivity (distance/time)
dh/dl is hydraulic gradient (unitless)
n_e is effective porosity (unitless)

The average hydraulic conductivities of 3.28 x 10^{-7} ft/sec (silt/clay unit) in Table 2 was estimated from literature (Freeze and Cherry, 1979). The hydraulic conductivity of 3.81 x 10^{-3} (sandy unit) used in Table 2 was obtained from the Hydrogeologic Assessment Report dated February 2011 and prepared by Patrick Engineering. The estimated effective porosities of the silt/clay materials (0.40) and of the sandy materials (0.35) were obtained from literature (Applied Hydrogeology, Fetter, 1980). The second 2019 semi-annual sampling event showed a decrease in gradient for the sand unit when compared to previous sampling events.

3.0 ANALYTICAL DATA AND STATUS OF EVALUATIONS

3.1 Sampling Summary

The groundwater sampling summary from 2019 is provided in Table 3, in accordance with 257.90 (e)(3).

3.2 Data Summary

In accordance with assessment monitoring requirements, a complete round of CCR well groundwater samples were collected in April/May and November 2019. Wells were analyzed for both Appendix III and previously detected Appendix IV parameters.

Confirmatory resampling events were limited to any potential statistically significant increases (SSI) for specific parameters at specific wells for parameters that were not covered in the ASD. The second 2019 semi-annual sampling data indicated Appendix IV parameters lead and cobalt above the established GWPSs at well location MW-01. Confirmatory resampling on December 26. 2019 showed both parameters below the established GWPSs, which is consistent with previous sampling events.

The analytical data from the ABB and ASB assessment monitoring groundwater sampling for Appendix III and IV parameters are provided in Tables 4 and 5, respectively. Table 4 includes Prediction Limits (PLs) for Appendix III parameters and Table 5 includes Groundwater Protection Standards (GWPS) for detected Appendix IV compounds. Both tables include the sample dates and whether the specific well is considered upgradient or downgradient relative to groundwater flow and the regulated unit(s). All duplicate values were within an acceptable range. The analytical data packages from these sampling events are provided in Appendix A.

3.3 Current Status

The ASB and ABB were transitioned from detection monitoring to assessment monitoring in April, 2018 and currently remain in assessment monitoring.

4.0 OTHER REQUIRED SUBMITTALS

4.1 Alternate Source Demonstration

An ASD for detected Appendix IV parameters above established GWPSs was completed on March 25, 2019 in accordance with Section 257.95(g)(3)(ii) for the Powerton Generating Station ASB and ABB. As required under section 257.95(g)(3)(ii) a full copy of the ASD is provided in Appendix B. Ash and water samples were collected from each of the two ponds (ASB and ABB) and analyzed using the Leaching Environmental Assessment Framework (LEAF) method to determine whether the noted detections above GWPSs may be associated with an actual release from the regulated unit(s) or if another potential historical source in the vicinity of the ash ponds may be affecting the local groundwater quality.

It was concluded that the ASB and ABB are not the source of downgradient monitoring well detections above established GWPSs and that there is an alternate source(s) of impacts.

5.0 SUMMARY/CONCLUSIONS AND RECOMMENDATIONS

The assessment monitoring requirements in accordance with the CCR rule are being successfully met. Groundwater monitoring wells that had analytical results showing parameter concentrations above established PLs or GWPSs were resampled to minimize potential for a false positive. An ASD for detected Appendix IV parameters above established GWPSs was completed and determined that the ASB and ABB are not the source of downgradient monitoring well detections above established GWPSs and that there is an alternate source(s) of impacts. The most recent semi-annual detection monitoring results for well MW-01 indicated a possible SSI for lead and cobalt. The confirmatory resample showed both parameters below the GWPSs. At this time it is recommended that the station remain in routine assessment monitoring.

Exhibit 5

Appendix B
Alternate Source Demonstration March 25, 2019

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ENVIRONMENTAL CONSULTATION & REMEDIATION

KPRG and Associates, Inc.

ALTERNATE SOURCE DEMONSTRATION
CCR GROUNDWATER MONITORING
POWERTON GENERATING STATION

March 25, 2019

Ms. Sharene Shealey
Midwest Generation, LLC
529 E. Romeo Road
Romeoville, IL 60446

VIA E-MAIL

Re: Alternate Source Demonstration – Appendix IV Parameters
Powerton Generating Station – Ash By-pass Basin and Ash Surge Basin

Dear Ms. Shealey:

The Midwest Generation, LLC (Midwest Generation) Powerton Station is currently in assessment monitoring for the Ash By-pass Basin (ABB) and Ash Surge Basin (ASB) in accordance with the Federal Register, Environmental Protection Agency, 40 CFR Part 257.95, Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule dated April 17, 2015 (CCR Rule). The wells being sampled were selected to meet the monitoring requirements of the CCR Rule for the ABB and the ASB. The monitoring well network around these basins consists of nine monitoring wells (MW-01 [upgradient], MW-08, MW-09 [upgradient], MW-11, MW-12, MW-15, MW-17, MW-18 and MW-19 [upgradient]) as shown on Figure 1.

Pursuant to Part 257.95(h)(1-3) of the CCR Rule, the applicable site specific Groundwater Protection Standards (GWPSs) for the twelve detected Appendix IV parameters were established in accordance with procedures defined in CCR Compliance Statistical Approach for Groundwater Data Evaluation, Midwest Generation Powerton Generating Station. This evaluation was summarized in a letter report titled Statistical Evaluation Summary CCR Groundwater Assessment Monitoring Powerton Generating Station dated December 26, 2018. The evaluation identified arsenic, barium, molybdenum, selenium and thallium above established GWPSs at several well locations with none of the individual well locations having all five of the parameters at elevated levels. In accordance with the CCR Rule, Midwest Generation conducted an Alternate Source Demonstration (ASD) under provisions in Section 257.95(g)(ii) to determine whether these SSIs may be

associated with an actual release from the regulated unit(s) or if another potential source in the vicinity of the basins may be affecting the local groundwater quality.

This report summarizes the results of the ASD completed in accordance with 40 CFR 257.95(g)(ii) for the Powerton Generating Station ABB and ASB. The report is structured to provide a documentation of field investigation activities, a presentation of Leaching Environmental Assessment Framework (LEAF) Test data, an alternate source evaluation of the potential SSI parameters, conclusions and recommendations. Each is discussed separately below. The statistical evaluation data tables from December 26, 2018 are provided in Attachment 1 for reference.

DOCUMENTATION OF FIELD ACTIVITIES

To assist in evaluating a potential alternate source(s), both basin water and ash samples were collected. One water sample was collected from the ASB and one water sample was collected from the ABB. The water samples were collected directly into laboratory prepared containers, transported on ice under a completed chain-of-custody to the analytical laboratory and analyzed for CCR Appendix IV assessment monitoring parameters. Analytical data package is provided in Attachment 2.

One composite ash sample was collected for each of the two basins (ASB and ABB). The composite samples consisted of a series of equivalent grab samples from across the length of each basin, from the inlet area to the outfall, to minimize potential skewing of the sample due to gradation changes (i.e., a larger coarse fraction near the inlet and larger fine fraction near outfall). The individual grab samples were thoroughly mixed to form a single composite sample for each basin. The composite samples were transferred directly into laboratory prepared containers, placed on ice and shipped to the analytical laboratory under a completed chain-of-custody. The ash sediment samples were analyzed using the LEAF test using Method 1313. Under this method, each ash sediment sample underwent leaching over a range of eight pH values plus under "Natural pH" conditions. The Natural pH condition is the actual pH of the ash itself measured in the laboratory prior to any pH modifications performed under the LEAF Test. The collected leachate from each pH value was analyzed for CCR Appendix IV assessment monitoring parameters. The analytical data package is provided in Attachment 2.

LEAF TEST DATA

The results of the basin water and the ash LEAF Test analyses are provided in Tables 1 and 2, respectively. A review of Table 2 indicates that the Natural pH of the leachate ranges from 9.0 in the ABB to 8.6 in the ASB. The basin water pH was at 8.2 and 7.3 for the ABB and ASB, respectively (Table 1).

The LEAF Test data for the five Appendix IV parameters that had detections above the GWPS are illustrated in graphical form on Figures 2 through 6 as a function of pH. On those figures are also plotted the results of the "Natural pH" test samples, upgradient monitoring wells MW-01, MW-09 and MW-19 and the monitoring well data from the

affected wells which are the subject of this evaluation (MW-11, MW-12, MW-15 and MW-17) for the May and August 2018 sampling events (the assessment monitoring events which were compared to established GWPSs). For values reported as not-detected, one-half of the detection limit was used on the plots.

ALTERNATE SOURCE EVALUATION OF THE SSI PARAMETERS

Monitoring wells MW-11 and MW-12 are the immediate downgradient monitoring points for the ABB and wells MW-09 and MW-19 are considered local upgradient monitoring points. For statistical evaluation purposes, well MW-01 was also considered for representation of background. Downgradient monitoring well MW-11 is screened within a gravelly sand unit and indicated detections of arsenic and barium above the respective GWPSs. Downgradient well MW-12 is screened within a silty clay unit and indicated only detections of arsenic above the GWPS for that parameter.

Monitoring wells MW-15 and MW-17 are both immediately downgradient of the ASB and wells MW-11 and MW-12, discussed above to be downgradient relative to the ABB, may also be considered local upgradient of the ASB (they are downgradient wells for the ABB but upgradient of the ASB, located generally between the two basins; see Figure 1). Wells MW-15 and MW-17 are also both completed within areas of historical fill material placement which includes ash. Both are screened within a silty clay unit.

Arsenic

The established GWPS for arsenic is set at 0.011 mg/l. Arsenic detections in the May and August 2018 sampling events at well location MW-11 ranged from 0.089 mg/l to 0.68 mg/l, at well MW-12 0.09 mg/l to 0.12 mg/l and at well MW-17 0.087 mg/l to 0.42 mg/l.

A review of all available CCR monitoring data for the three noted upgradient/background wells shows arsenic concentrations to range from not detected to 0.0081 mg/l, however, in the May and August 2018 sampling events, arsenic was not detected in any of these three wells. LEAF Test data for arsenic in leachate under "Natural pH" conditions was 0.0048 mg/l and 0.0033 mg/l in the ABB and ASB, respectively. The basin water collected showed arsenic concentrations between 0.0019 mg/l (ABB) and 0.0032 mg/l (ASB). It is noted that these Natural pH and basin water concentrations are well below the established GWPS. If leachate was being released from the basins and mixing with background water quality, the resulting mixture would not exceed the established GWPS suggesting the elevated arsenic in wells MW-11, MW-12 and MW-17 is from a different source and not associated with a release from the regulated units.

Further review of the LEAF Test data indicates that the only conditions under which the leachate in either the ABB or the ASB show arsenic concentrations in excess of the GWPS is either under very basic conditions (pH greater than 10.5) or very acidic condition (pH less than 4). Basic conditions above pH 10.5 have not been

documented at the site and are generally not associated with bottom ash. Similarly, acidic conditions are highly unlikely and are generally not associated with bottom ash. In addition, if the noted arsenic detections in wells MW-11, MW-12 and MW-17 were associated with some unexplained high or low swings in the pH within the basins, then the pH in the groundwater samples would also reflect an associated increase or decrease which would result in the elevated arsenic detections being correlated to pH. Figure 7 provides a plot of the arsenic and associated pH values for the three subject monitoring wells. Based on the LEAF Test data, the relationship between arsenic and pH to the basic side of neutral (pH>7) should be positive linear and to the acid side of neutral (pH<7) inverse linear (i.e., increasing arsenic with decreasing pH). No such correlations are seen on Figure 7 which again indicates a source of the arsenic other than the regulated units.

Barium

There was only one barium detection above the GWPS which was at well location MW-11 in the August 2018 sampling. Barium was detected at 3.0 mg/l and the GWPS is established at 2.0 mg/l. A review of the other historical data from well MW-11 indicates previous barium concentrations ranging from 0.30 mg/l to 1.4 mg/l.

A review of all available CCR monitoring data for the three noted upgradient/background wells shows barium concentrations to range from 0.027 mg/l to 0.089 mg/l. LEAF Test data for barium in leachate under "Natural pH" conditions was 0.35 mg/l and 0.15 mg/l in the ABB and ASB, respectively. The basin water collected showed barium concentrations between 0.056 mg/l (ABB) and 0.15 mg/l (ASB). It is noted that these Natural pH leachate and basin water concentrations are well below the established GWPS. If leachate was being released from the basins and mixing with background water quality, the resulting mixture would not exceed the established GWPS suggesting the elevated barium in well MW-11 is from a different localized source and not associated with a release from the regulated units.

Further reviewing the LEAF Test data indicates that the only conditions under which the leachate in either the ABB or the ASB show barium concentrations in excess of the GWPS is under acidic conditions (pH 5.5 or less). Acidic conditions are highly unlikely and generally not associated with bottom ash. However, if the noted elevated barium detection in well MW-11 is associated with some unexplained and unlikely downward shift in pH within the ABB, then the pH in the groundwater sample would also reflect an associated decrease which would result in the elevated barium detection being inversely correlated to pH (i.e., increasing barium with decreasing pH). Figure 8 provides a plot of the barium and associated pH values for MW-11 along with a linear regression analysis of the data. The regression analysis shows the R^2 value for the regression line to be approximately 0.002 which indicates no correlation between these two parameters. Looking at the data distribution, the highest detections are clearly not associated with the lowest

pH values. Additional trend analysis using both Linear Regression and Sen's Slope estimator methods using the Sanitas™ statistical software for barium at MW-11 over time showed no statistically significant trends (see Attachment 3). These observations further indicate a localized barium source other than the regulated units.

Another factor to consider is that this is a single high detection above the GWPS. The most likely explanation is that this single high value is an unrepresentative outlier associated with either an analytical artifact or a higher suspended sediment load within the sample skewing the result upwards once preserved in the field with acid. If either of these two potential scenarios is the source of the elevated detection, the resultant data is not reflective of actual groundwater quality.

Molybdenum

There was only one molybdenum detection above the GWPS which was at well location MW-17 in the May 2018 sampling. Molybdenum was detected at 0.13 mg/l and the GWPS is established at 0.10 mg/l. A review of the other historical data from well MW-17 indicates previous molybdenum concentrations ranging from 0.019 mg/l to 0.12 mg/l.

A review of all available CCR monitoring data for the three noted upgradient/background wells shows molybdenum concentrations to range from not detected to 0.053 mg/l. The molybdenum concentrations at wells MW-11 and MW-12 ranged from not detected to 0.028 mg/l. LEAF Test data for molybdenum in leachate under "Natural pH" conditions was estimated at 0.0039 mg/l and 0.0029 mg/l in the ABB and ASB, respectively. The basin water collected showed molybdenum concentrations of 0.096 mg/l (ABB) and 0.01 mg/l (ASB). Well MW-17 is immediately downgradient of the ASB. It is noted that the Natural pH leachate concentrations and ASB basin water concentrations are well below the established GWPS. If leachate was being released from the basins and mixing with background water quality, the resulting mixture would not exceed the established GWPS. In fact, even the highest concentration of molybdenum generated in the LEAF Testing was only 0.0064 mg/l (over an order of magnitude lower than the GWPS) at a pH of 13 which is not a likely condition for bottom ash. The LEAF Test data basically document that the bottom ash within the subject basins is not a significant source of molybdenum, even under the most extreme conditions, indicating that the elevated molybdenum concentration in well MW-17 is from a different localized source and not associated with a release from the regulated units.

Selenium

Selenium was detected above the GWPS at only one downgradient monitoring well (MW-15). The concentration range was from 0.06 mg/l to 0.077 mg/l and the GWPS is established at 0.05 mg/l. A review of the other historical data from well

MW-15 indicates previous selenium concentrations ranging from 0.0032 mg/l to 0.045 mg/l.

A review of all available CCR monitoring data for the three noted upgradient/background wells shows selenium concentrations to range from not detected to 0.011 mg/l. The selenium concentrations at wells MW-11 and MW-12 were all non-detected. LEAF Test data for selenium in leachate under "Natural pH" conditions were not detected in both the ABB and ASB ash samples. The basin water collected showed a selenium concentration estimated at 0.002 mg/l in the ABB sample and was not detected in the ASB sample. It is noted that these Natural pH and basin water concentrations are well below the established GWPS. If leachate was being released from the basins and mixing with background water quality, the resulting mixture would not exceed the established GWPS. In fact, even the highest concentration of selenium generated in the LEAF Testing was only estimated at 0.041 mg/l at a pH of 2 which is not a likely condition for bottom ash. The LEAF Test data basically document that the bottom ash within the subject basins is not a significant source of selenium, even under the most extreme conditions, indicating that the elevated selenium concentration in well MW-15 is from a different localized source and not associated with a release from the regulated units.

Thallium

Thallium was detected above the GWPS at only one downgradient monitoring well (MW-17). The concentration range was from 0.0023 mg/l to 0.0068 mg/l and the GWPS is established at 0.002 mg/l. A review of the other historical data from well MW-17 indicates previous thallium concentrations ranging from not detected to 0.0075 mg/l.

A review of all available CCR monitoring data for the three noted upgradient/background wells shows thallium concentrations to be not detected. The thallium concentrations at wells MW-11 and MW-12 were all non-detected. LEAF Test data for thallium in leachate under "Natural pH" conditions were not detected in both the ABB and ASB ash samples. The basin water collected showed a thallium concentration estimated at 0.000091 mg/l in the ASB sample and was not detected in the ABB sample. It is noted that these Natural pH and basin water concentrations and/or detection limits are well below the established GWPS. If leachate was being released from the basins and mixing with background water quality, the resulting mixture would not exceed the established GWPS. Further evaluation of the LEAF Test data indicates that thallium is only detected in leachate on the acidic side of the pH scale and leachate concentrations only exceed the GWPS under conditions of a pH of approximately 4 or less. These acidic concentrations are not a likely condition for bottom ash. This would also indicate that the thallium concentration is an inverse function of pH (i.e., the lower the pH the higher the thallium concentration). Figure 9 provides a thallium versus pH plot for monitoring well MW-17 along with a linear regression analysis. The plot indicates poor correlation

with an R^2 factor of 0.31 and that any such correlation is linear positive (i.e., increasing concentration with increasing pH) as opposed to inverse as seen in the LEAF Test data. Additional trend analysis using both Linear Regression and Sen's Slope estimator methods using the Sanitas™ statistical software for thallium at MW-17 over time showed no statistically significant trends (see Attachment 3). Combined, these observations indicate that the bottom ash within the subject basins is not a significant source of thallium under any expected site conditions and that the elevated thallium concentration in well MW-17 is from a different localized source and not associated with a release from the regulated units.

CONCLUSIONS/RECOMMENDATIONS

Based on the discussions provided above, the noted arsenic, barium, molybdenum, selenium and thallium concentrations detected above the GWPS at several well locations have been evaluated and determined to be associated with other potential alternate sources and not a release from the regulated units. It is recommended to continue with assessment monitoring on a semi-annual basis in accordance with Sections 257.95(d) and (e) of the CCR Rule.

If there are any questions, please contact me at 262-781-0475.

Sincerely,
KPRG and Associates, Inc.

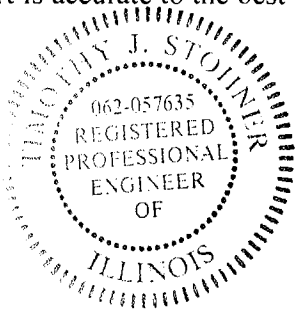
Richard R. Gnat, P.G.
Principal

Timothy Stohner, P.E.
Project Manager/Sr. Engineer

cc: David Bacher, NRG
Joseph Kotas, Midwest Generation

CERTIFICATION

In accordance with Section 257.94(e)(2) of the CCR Rule, I hereby certify based on a review of the information contained within this CCR Alternate Source Demonstration dated March 25, 2019, that the information contained in this report is accurate to the best of my knowledge.



Certified by:
Date: March 25, 2019

Timothy Stohner, P.E.
Illinois Professional Engineer Registration No.: 062.057635
KPRG and Associates, Inc.

Exhibit 6

APPENDIX B
Alternate Source Demonstration April 12, 2018

K P R G

ENVIRONMENTAL CONSULTATION & REMEDIATION

KPRG and Associates, Inc.

ALTERNATE SOURCE DEMONSTRATION
CCR GROUNDWATER MONITORING
WILL COUNTY GENERATING STATION

April 12, 2018

Ms. Sharene Shealey
Midwest Generation, LLC
529 E. Romeo Road
Romeoville, IL 60446

VIA E-MAIL

Re: Alternate Source Demonstration
Will County Generating Station – Ash Ponds

Dear Ms. Shealey:

The initial Detection Monitoring requirements in accordance with the Federal Register, Environmental Protection Agency, 40 CFR Parts 257.94, Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule dated April 17, 2015 (CCR Rule) have been completed for the ash pond monitoring wells located at the Midwest Generation, LLC (Midwest Generation) Will County Generating Station. The wells sampled were selected by Midwest Generation to meet the monitoring requirements of the CCR Rule for Ash Ponds 2 South (2S) and 3 South (3S). The CCR monitoring well network around these ponds consists of six monitoring wells (MW-05, MW-06, MW-09, MW-10, MW-11 and MW-12) as shown on Figure 1. Wells MW-05 and MW-06 are upgradient wells.

A statistical evaluation of the initial detection monitoring data was completed and submitted to Midwest Generation. The statistical evaluations were completed in accordance with the CCR Compliance Statistical Approach for Groundwater Data Evaluation, Midwest Generation Will County Generating Station dated October 10, 2017. The evaluations included outlier testing, spatial/temporal variability testing, distributional testing, and the establishment of statistical Prediction Limits (PLs) for all Appendix III compounds to which the ninth round of groundwater detection monitoring data were compared to determine whether there may be a statistically significant increase (SSI) for a specific compound at each well location. The evaluations were performed with the assistance of the Sanitas™ statistical software package and provided in the Statistical Evaluation Summary – 2017 CCR Groundwater Monitoring Will County Generating

Station dated January 12, 2018. The following conclusion/recommendations were provided:

> "The completed detection monitoring statistical evaluations have determined that there are SSIs in downgradient monitoring wells relative to established background for chloride, fluoride and TDS. At this time, KPRG recommends completing an alternate source demonstration to determine whether these exceedances may be associated with an actual release from the regulated unit(s) or if another potential historical source in the vicinity of the ash ponds may be affecting the local groundwater quality. If the alternate source demonstration is successful, then detection monitoring will resume. If the alternate source demonstration is not successful, then a transition to an assessment monitoring program complying with Section 257.95 will be required."

This report summarizes the results of the Alternate Source Demonstration in accordance with 40 CFR 257.94(e)(2) completed for the Will County Generating Station Ash Ponds 2S and 3S. The report is structured to provide a documentation of field investigation activities, a summary of LEAF Test data observations, an alternate source evaluation of the SSI parameters, conclusions and recommendations. Each is discussed separately below. The statistical evaluation data tables from the January 12, 2018 submittal are provided in Attachment 1 for reference.

DOCUMENTATION OF FIELD ACTIVITIES

To assist in evaluating a potential alternate source, both pond water and ash samples were collected. A pond water sample was collected from ash pond 3S directly into laboratory prepared containers, transported on ice under a completed chain-of-custody to the analytical laboratory and analyzed for CCR Appendix III detection monitoring parameters. No sample was collected for ash pond 2S due to frozen conditions. The analytical data package is provided in Attachment 2.

One composite ash sample was collected for each of the two ponds (2S and 3S). The composite samples consisted of a series of equivalent grab samples from across the length of the pond, from the inlet area to the outfall, to minimize potential skewing of the sample due to gradation changes (i.e., a larger coarse fraction near the inlet and a larger fine fraction near outfall). The individual grab samples were thoroughly mixed to form a single composite sample for each pond. The composite sample was transferred directly into laboratory prepared containers, placed on ice and shipped to the analytical laboratory under a completed chain-of-custody. The ash sediment samples were analyzed using the Leaching Environmental Assessment Framework (LEAF) test using Method 1313. Under this method, each ash sediment sample underwent leaching over a range of eight pH values plus under "Natural pH" conditions. The Natural pH condition is the actual pH of the ash itself measured in the laboratory prior to any pH modifications performed under the LEAF Test. The collected leachate from each pH value was analyzed for CCR Appendix III detection monitoring parameters. The analytical data package is included in Attachment 2.

LEAF TEST DATA OBSERVATIONS

The results of the pond water and the ash LEAF Test analyses are provided in Tables 1 and 2, respectively. A review of Tables 1 and 2 indicates that the Natural pH of the ash leachate ranges from 8.8 to 9.2 which is higher by an order of magnitude, or more, than the noted pH of the pond water sample (7.8). This suggests that the pond water sample is not fully representative of equilibrium conditions of expected pore water within the ash sediment and, therefore, that the compound specific data from the pond water sample may also not be representative of leachate under equilibrium conditions. Based on this observation, the focus of this analysis will rely on the results of the LEAF Test data and in particular the data from the "Natural pH" samples.

Focusing on the LEAF Test data, it is noted that fluoride appears to be fairly minor component of the ash leachate with most measurements at varying pH levels being below reporting limits. The Natural pH fluoride test data for Pond 2S was <0.10 mg/l and the Natural pH fluoride test data for Pond 3S was 0.31 mg/l. The remaining analytical constituent LEAF Test data are illustrated in graphical form on Figures 2 through 8 as a function of pH. On those figures are also plotted the results of the "Natural pH" test samples and the up- and downgradient monitoring well data from the September 2017 sampling event (the initial detection monitoring event which was compared to established statistical background). In general, the following observations are made:

- Boron – The boron leachate concertation is a function of pH with concentrations decreasing from a pH of 2 through a pH of 12. There is a noted disparity in boron concentrations above a pH of 12 with Pond 2S showing a substantial increase in boron concentration and Pond 3S fairly consistent with the overall curve trend. The Natural pH sample data plots close to where it would be expected on the LEAF Test curves. The boron concentrations at all downgradient wells are slightly lower than the boron concentration noted for the Natural pH test analyses for both ash samples. The upgradient monitoring well detections for boron are within the same range as the Natural pH test analyses for both ash samples.

- Sulfate – The sulfate leachate concertation shows some scatter relative to pH. The Natural pH test samples plot within an expected range for sulfate based on their pH as compared to the two LEAF Test curves. The upgradient well sulfate data plots similar to the Natural pH analyses for both ash samples and most downgradient monitoring wells show lower sulfate concentrations than from the Natural pH analyses for both ash samples.

- Calcium – The calcium leachate concentration is a function of pH with concentrations decreasing with increasing pH. The Natural pH sample data for both Ponds 2S and 3S plots close to where it would be expected on the LEAF Test curve with calcium concentrations ranging from 59 to 95 mg/l. The upgradient well concentrations fall within the noted Natural pH test range for both ash samples. Downgradient wells generally show lower concentrations than within the noted Natural pH test range for both ash samples.

- Chloride – There were some non-detect values within the LEAF Test chloride data. For these cases, one-half of the noted detection limit was used for graphing purposes. The chloride concentrations do not appear to be a function of pH with a relatively narrow range of concentrations. The Natural pH test data and the upgradient monitoring well data all plot within a similar range as defined by the LEAF Test data. All downgradient monitoring wells show elevated chloride levels relative to the LEAF Test data.

- ORP – The oxidation-reduction potential (ORP) is a known function of pH with ORP generally decreasing with increasing pH. This is reflected in the LEAF Test curves. The Natural pH sample data for both Ponds 2S and 3S plots slightly lower than what would be expected on the LEAF Test curves. The ORP in all downgradient (and upgradient) monitoring wells plot lower than the LEAF Test curve and Natural pH test data for both ash samples.

- Specific Conductance (SC) – The SC measurements have a clear correlation with pH with measurements decreasing from a pH of 2 to a pH of 10 and then again increasing sharply as a pH of 13 is approached. The SC values of the Natural pH samples both plot slightly below the LEAF Test curve. The specific conductivity values in both the up- and downgradient monitoring wells plots below the Natural pH test data for both ash samples.

- Total Dissolved Solids (TDS) – The TDS LEAF Test curves mimic the SC curves with concentrations decreasing to a pH of just over 10 and then increasing as pH increases. The TDS values of the Natural pH samples both plot slightly below the LEAF Test curve with a narrow range of 590 to 610 mg/l. The TDS concentrations in the upgradient wells and downgradient wells are above the concentration range for both ash samples.

ALTERNATE SOURCE EVALUATOIN OF THE SSI PARAMETERS

As previously noted, the three parameters that were determined to have SSIs in downgradient monitoring wells relative to established background were chloride, fluoride and TDS. Each is discussed separately below.

Chloride

Downgradient monitoring wells MW-09 and MW-12 had potential SSIs for chloride during the September 2017 sampling event relative to the established pooled upgradient background. The two exceeding chloride concentrations were 310 and 270 mg/l, respectively with an established background of 149 mg/l. As discussed above in the LEAF Test curve evaluation, the chloride concentrations are independent of pH. The range of detected chloride concentrations from the LEAF Testing, including the Natural pH test, is 12 to 210 mg/l with an average of 48.7 (using one-half reporting limit for non-detect values). It is also noted that the 210 mg/l value appears to be an outlier with the next highest LEAF Test concentration

being 69 mg/l. The upgradient well chloride concentrations were 67 to 78 mg/l. Based on this data distribution, the elevated chloride concentrations detected in downgradient wells MW-09 and MW-12 must have a source other than the leachate from the ponds.

Fluoride

Downgradient monitoring well MW-10 had a potential SSI for this parameter during the September 2017 sampling event relative to the established pooled upgradient background. The exceeding fluoride concentration was 0.77 mg/l which was just above the established background of 0.72 mg/l. Most of the LEAF Test data shows no detections of fluoride. The two Natural pH test samples reported fluoride at <0.10 mg/l (Pond 2S) and 0.31 mg/l (Pond 3S). The upgradient well fluoride concentrations ranged from 0.40 to 0.52 mg/l. Based on this data distribution, the elevated fluoride concentration detected in monitoring well MW-10 must have a different source other than the leachate from the ponds.

TDS

Downgradient monitoring well MW-12 had a potential SSI for this parameter during the September 2017 sampling event relative to the established upgradient background. The exceeding TDS concentration was 1,400 mg/l which was above the established background of 950 mg/l. The TDS concentrations in the Natural pH test data ranged from 590 mg/l to 610 mg/l. The upgradient well TDS concentrations ranged from 740 mg/l to 1,000 mg/l. Based on this data, the elevated TDS concentration detected in monitoring well MW-12 must have a different source other than the leachate from the ponds.

CONCLUSIONS/RECOMMENDATIONS

Based on the data evaluation and discussions provided above, it is concluded that the noted SSIs for chloride, fluoride and TDS are not the result of leakage of leachate from the regulated units (Ponds 2S and 3S) but rather from other potential sources. This is based on the following:

- Upgradient monitoring well concentrations of fluoride and TDS are higher than those measured for ash leachate at Natural pH conditions.

- The ash leachate at Natural pH conditions does not contain a sufficient concentration of each of these constituents to result in the measured downgradient well concentrations.

It is therefore, recommended to continue with routine detection monitoring at this time. It is noted that since upgradient well chemistry for various Appendix III constituents is similar to ash leachate chemistry at natural pH levels, it is also recommended to include intra-well statistical evaluations/comparisons for the downgradient wells in addition to the current inter-well evaluations.

If there are any questions, please contact me at 262-781-0475.

Sincerely,
KPRG and Associates, Inc.

Richard R. Gnat, P.G.
Principal

Timothy Stohner, P.E.
Project Manager/Sr. Engineer

cc: David Bacher, NRG
Peter O'Day, Midwest Generation

CERTIFICATION

In accordance with Section 257.94(e)(2) of the CCR Rule, I hereby certify based on a review of the information contained within this CCR Alternate Source Demonstration dated April 12, 2018, that the information contained in this report is accurate to the best of my knowledge.

Certified by:
Date: April 12, 2018

Timothy Stohner, P.E.
Illinois Professional Engineer Registration No.: 062.057635
KPRG and Associates, Inc.

Exhibit 7

KIRK
Engineering & Natural Resources, Inc.
Engineers, Scientists, and Natural Resource Planners

April 22, 2020

Flora Champenois
Senior Research & Policy Analyst, Coal Program
Earthjustice
50 California St. #500
San Francisco, CA 94111

Subject: Landfill permit by rule proposal, Docket ID No. EPA–HQ–OLEM–2019–0361

Dear Flora;

This letter describes our technical evaluation of the U.S. EPA permitting proposal for coal combustion residual (CCR) disposal landfills.

Summary of Opinion

The proposed "permit by rule" scheme for certain new and expanded CCR landfills, set forth in proposed rule § 257.128, will not adequately support the existing regulatory requirements at 40 CFR part 257 subpart D. We disagree with the contention in the proposed rule that design, operation, and monitoring requirements for landfills which would meet the permit by rule criteria is straightforward enough to be exempt from permit review. We provide information showing landfill design and construction deficiencies are the leading controllable factors causing landfill failures which pollute groundwater and the environment. The design and construction process benefits and environmental risks are significantly lessened by adequate EPA oversight and site-specific permitting review.

Background

U.S. EPA is proposing to implement rules under the Resource Conservation and Recovery Act (RCRA) for permitting of CCR disposal facilities. The proposed rule is published at 85 Fed. Reg. 9940 and is open for public comment. We were tasked with providing technical review and opinion of EPA's proposed permitting of certain new and expanded landfills using a "permit by rule" scheme, set forth in proposed rule § 257.128. The permit by rule would allow owners of new or expanded CCR landfills that meet certain criteria to permit the facility simply by complying with the relevant landfill design and operation criteria at 40 CFR part 257 subpart D. Permit by rule is in effect an exemption from a site-specific permitting and proposed engineering review performed by EPA. Permit by rule is also an exemption from public review in that the public is not offered an opportunity to provide further information or to comment on the proposal for the landfill. Permit by rule is proposed to apply to design, construction, and operation of the landfill. Our task was to evaluate potential issues that could arise from the absence of agency and public oversight for this proposed permit by rule.

To complete our review, we looked at relevant scientific literature, case studies, and performance audits of landfills and landfill groundwater monitoring system. The landfill performance literature includes studies of the leakage rates of properly designed and operated RCRA subtitle D landfills, reviews of the impacts of design, construction, and operation & maintenance (O&M) deficiencies on landfill leakage, as well as case studies of landfill failures and lessons learned. Much of the information available on landfill performance is from the municipal solid waste (MSW) and hazardous waste (subtitle C) sphere, owing to the fact that CCR

has only recently been federally regulated and past CCR disposal practices rarely met subtitle D landfill design specifications; although there are a few older CCR landfills that were the subject of our referenced performance design studies. These published MSW and hazardous waste studies are relevant to CCR landfill permitting because the design, construction, and O&M of CCR facilities share much in common with these other RCRA regulated landfills and many of the lessons learned during the three decades of operation of other RCRA landfills apply equally to CCR landfills.

Our review is also informed by our own professional experience evaluating and remedying pollution at CCR facilities, including our knowledge of site-specific conditions which have led to pollution of groundwaters at CCR facilities. Our experience has also shown that involving the public in CCR facility regulatory decisions benefits that process because members of the public often have additional site specific knowledge and their input and review improves both management and pollution prevention at CCR disposal facilities.

Problem description

Design and construction deficiencies are the leading controllable factors causing landfill failures which pollute groundwater and the environment. The problem of landfill leakage and failures is well described in scientific and landfill industry literature and is summarized in the sections below. Even the best landfills leak and leakage rates from properly designed and operated landfills have been measured to be greater than anticipated during design (EPA 2017). When landfill design, construction and operation are deficient, leakage and pollution from landfills are more severe.

Groundwater monitoring systems at landfills must also be carefully designed so that they are capable of sampling contamination which may be leaking and migrating from landfills. If the monitoring system is deficient, it may not be recognized that there is a failure at the landfill.

Optimal engineering design and construction plans for landfills, and monitoring systems require consideration of site-specific conditions. In addition to this, a robust quality assurance program is needed to ensure design and performance standards are met. The following sections provide further detail on the most common causes of landfill and monitoring system failures and provide recommendations on how the proposed CCR permitting program can best address these issues.

Design, construction, and operational deficiencies

Bonaparte et al. (2002) provide one of the only wide-ranging reviews available of landfill failure type and cause at U.S. landfills. Their analysis of the principal causes of landfill failures determined that the principal human factors contributing to landfill failure were design (48%) and construction (38%) related deficiencies; operational deficiencies accounted for 14% of failures. It is our opinion that failure rates of new permit by rule CCR landfills would exceed those reported by Bonaparte (et al. 2002) because of no agency oversight or public review. The RCRA permitting system should focus on methods to address landfill design and construction deficiencies and thereby reduce the incidence of landfills not meeting performance criteria and negatively impacting the environment.

Landfill Design

The proposed rule implies that landfills which meet the permit by rule criteria (§ 257.128) are somehow easier to design, construct, and operate than other CCR facilities which do require a site-specific individual permit.

The proposed rule states (85 Fed. Reg. 9955):

> *"Because the requirements in subpart D applicable to the CCR units meeting the proposed criteria in § 257.128(a) are fairly straightforward, EPA does not believe issuance of an individual CCR permit*

> *would add significant value as far as clarifying applicable requirements, Agency review of an application, or public comment."*

Clearly, future CCR landfills will be located in exceptionally different physiographic, climatic, hydrogeologic, geotechnical, and water supply/quality settings. Assessing each planned landfill site is required for applying standard engineering design principles and this is not straightforward. Each proposed landfill requires a unique design and a cookie-cutter approach is problematic, prone to errors, and agency and public review is merited. Our opinion is that the requirements in subpart D which are applicable to CCR units for which a general or individual permit is proposed are no less straightforward than the criteria which need to be met for landfills which meet the permit by rule criteria. Designing, constructing, and operating a CCR landfill is no less complex, prone to error, and requires no less exacting standards than performing those for a surface impoundment. In either case, the design process benefits and environmental risks are significantly lessened by adequate oversight and site-specific permitting review. EPA has not provided sufficient evidence to the contrary.

There are many examples of how permitting oversight would benefit the design process. A permit writer would have in-depth knowledge, credentials, and access to information on how specific landfill design and components have performed in similar settings. The permit writer would have the ability to apply lessons learned at other regional facilities to advise design and engineering of the landfill to ensure that the performance criteria in the Federal CCR Rule are met. Third-party contractors hired by EPA to review landfill and construction plans as part of a permit program would also have the credentials and experience to improve facility design, construction, and operation.

The permit writer would help to ensure that landfill design includes the correct liners, engineering standards, adequate quality control and assurance, and number of monitoring wells, but also meets the performance standards of the Federal CCR Rule. This point is critical, meeting the environmental protection standards at § 257.50-257.104 requires more than selecting the correct landfill components to meet regulatory criteria. Those components must also be constructed, operated, and maintained to meet the performance criteria in the regulations. Landfill contractors may incorrectly install components either by error or purposely to save money. For example considering regulation § 257.70 (b), without adequate permit oversight and quality assurance you may get "the lower component consisting of at least a two-foot layer of compacted soil" but not "with a hydraulic conductivity of no more than 1×10^{-7} centimeters per second (cm/sec)." The agency and public oversight that comes with an individual site-specific permit would greatly increase the likelihood that performance criteria are met.

EPA's own landfill performance review (Bonaparte et al. 2002) is clear with respect to the need for adequate oversight and quality assurance review: "Procedures exist to avoid the types of issues and problems identified in this report. Unfortunately, as most clearly demonstrated by Appendix F of this report, landfill industry personnel do not always utilize adequate design, testing, construction, and operation/maintenance practices." And that report was written in part by people who consult for the coal power industry.

Quality Assurance

In the absence of individual permit review, the quality assurance required by Federal CCR Rule is extremely limited, relying only on the certification of a professional engineer to attest that the regulatory criteria are met. For example, with regards to landfill construction § 257.70 (f) requires:

> *"certification from a qualified professional engineer or approval from the Participating State Director or approval from EPA where EPA is the permitting authority that the design of the composite liner (or, if applicable, alternative composite liner) and the leachate collection and removal system have been constructed in accordance with the requirements of this section."*

The concept that a qualified professional engineer certification is sufficient for designing and constructing significant facilities that last in perpetuity, such as CCR landfills, is simply inadequate. The engineering world encourages critical third party review of significant facility designs in an effort to improve facilities and protect public health and the environment. EPA's permitting system should provide for unbiased review by a qualified professional engineer.

Existing provisions § 257.70 (e) and (f) allow the landfill owner/operator to construct and operate a new or expanded CCR landfill without certification of a professional engineer if approval is instead provided by the participating state director or EPA. In these cases, EPA or the approved state permitting program *must* ensure their permit review includes approval by a qualified professional engineer. If EPA is intending with the permit by rule proposal that a landfill could receive "approval" – in lieu of certification by a qualified professional engineer – without *any* review by any professional engineer, that will not provide adequate protection that landfills are designed and constructed adequately for site specific conditions.

Review of the quality assurance plan by a qualified professional engineer is critically important because the likelihood of design and construction defects increases as oversight lessens. Numerous authors and case studies have reported on the need for a robust quality assurance program during landfill design and construction (NRC 2007, Bonaparte et al. 2002, Montoro et al. 2015). Landfill liner components rely on proper installation to minimize defects and to ensure that composite liners provide effective backup leakage control for failures in the primary geomembrane and independent quality control staff are recommended to oversee installations (Meegoda et al. 2016).

A primary reason the quality assurance is so important is that most landfill components such as composite liners and leachate collection systems are buried after waste is placed in the landfill. It is therefore impossible to monitor for component defects until performance problems appear elsewhere, such as in groundwater monitoring (NRC 2007).

Examples of design and construction deficiencies which can be addressed by robust design and construction quality assurance programs are abundant:

1. Construction quality assurance is needed to ensure geomembranes are not damaged during installation (NRC 2007). Geomembrane damage is commonly caused by punctures and tears due to construction equipment and activities, exposure of the liner to solar heating, and defective seam welding. Adherence to a site specific quality assurance plan will limit the potential for performance deficiencies resulting from installation damage.

2. Bonaparte et al. (2002) show how temperature-induced wrinkles in a plastic geomembrane, which can occur from solar heat during installation and early stages of landfill operation, will remain and lessen liner leachate retention ability as well as shorten liner service life.

3. Thiel and Richardson (2005) demonstrate how geosynthetic clay liners (GCLs), commonly used for composite liners and cover systems, can shrink and fail as observed in actual field setting, from a small number of wet-dry cycles.

4. GCL liners can separate due to moisture and temperature extremes before they are covered with waste (NRC 2007).

5. Shrink/swell-caused desiccation cracking occurs in both GCLs and compact clay liners (CCLs) when they are left exposed during construction or operation, leading to increased hydraulic conductivities that do not meet regulatory performance criteria. This is common in applications where there is not sufficient overburden pressure, such as where the bottom liner is exposed for a long period of time. It

is also common in the conditions typical of a top liner throughout its service life, because top liners are exposed to higher temperatures from solar heating of the landfill cap (NRC 2007).

6. To avoid construction-caused holes in GCLs, more care (greater construction quality assurance) must be taken during liner construction and placement of the waste that when a compact clay liner is used (NRC 2007).

7. Leachate collection systems are prone to clogging by inorganic precipitates (Fleming et al. 1999; Maliva et al. 2000). Geotextiles and drain piping are prone to clogging (Rowe et al., 2004; Bonaparte et al. 2002). Appropriate leachate collection and drainage system design should consider the specific physical and chemical properties of the coal ash.

Site specific permitting would allow permitting agency to assure that construction uses a state-of-the-practice construction quality assurance (CQA) program to ensure that § 257.70 criteria are met in the constructed landfill. The benefits of a robust site-specific quality assurance plan are well described in the literature:

1. Forget et al. (2005) show leak densities to be significantly lower for systems installed with state-of-the-practice CQA programs compared to those installed without one.

2. Bonaparte et al. (2002) detail that landfills that used conventional CQA programs for geomembrane liners had substantially lower leakage rates.

3. Bonaparte et al. (2002) determined that cover system design and liner construction are the most common causes of failure, both of which can be better addressed by improved design review and CQA methods.

4. State-of-the-practice design and CQA programs for geomembrane puncture resistance are described in part in the Puncture protection of geomembranes series published by Wilson-Fahmy et al. (1996); Narejo et al. (1996); Koerner et al. (1996).

5. Stormwater runoff and ponding caused by design deficiencies contribute to runon problems and increased leachate generation at landfills. Runon/runoff controls need to be tailored to the specific soils and climate of a site to prevent liner and cover system displacement. Landfill designs need adequate surface water runon controls and operation plans should be site specifically tailored to limit the active area of the landfill to keep leachate volume within system capacity (Bonaparte et al. 2002).

Groundwater Monitoring System Design

CCR landfills designed to Federal CCR Rule specifications rely on the groundwater monitoring system to detect leakage and monitor for landfill failures. Most landfill components such as composite liners and leachate collection systems are buried after waste is placed in the landfill. It is therefore impossible to monitor for component defects until contamination is detected, typically during groundwater monitoring (NRC 2007). Monitoring systems must be adequately designed to be able to perform this job. Adequate oversight and quality assurance are needed to ensure groundwater monitoring systems are designed and constructed correctly.

It is essential that groundwater monitoring wells be designed based on site-specific conditions. Groundwater and hydrogeologic conditions are commonly complex and heterogenous, resulting in challenges to designing a monitoring system capable of measuring impacts from a landfill. The groundwater monitoring system criteria at § 257.91 are not ensured without permit oversight because there is a disincentive for CCR landfill owners to install wells at appropriate locations and depths because they are more likely to detect pollution. Our experience is it is also common for facility owners to discontinue monitoring of background wells and

rely on intra-well analyses to define background conditions partly in an attempt to limit the amount of groundwater data that is publicly available.

Landfill monitoring systems commonly have severe deficiencies in their ability to capture contaminant plumes. This is partly because leakage from landfills will occur from isolated punctures, tears, and construction failures such as poor welds in the liner. The contaminant plume from such a failure is often not detected by a limited network of conventional monitoring wells. Research shows that groundwater contaminant plumes from landfill leaks are characterized by poor dispersion and narrow plumes, reflecting the need for downgradient monitoring wells to be carefully sited based on site specific hydrogeology (Cherry 1983; MacFarlane et al. 1983). The spacing of monitoring wells in both the vertical and horizontal directions (depth and aerial spacing) is commonly too large to detect the main impacts of the type of landfill leakages or spills most likely to cause groundwater contamination (Cherry 1990).

§ 257.91 requires a monitoring system to both "accurately represent the quality of groundwater passing the waste boundary of the CCR unit" and "all potential contaminant pathways must be monitored." The way to ensure this is by site specific permit review of hydrogeologic conditions and monitoring well location and construction. Without agency oversight, dishonest players in the industry are afforded the ability of purposely designing monitoring systems that appear to, but do not, meet requirements under 257.91.

Site-Specific Review

Site-specific factors affect all CCR disposal facilities. The proposed rule provides for site-specific review of a CCR facility covered by an individual permit (85 Fed. Reg. 9959):

> *"At a minimum, this would include information about the locations of any floodplains, wetlands, endangered species, fault lines or unstable areas, measured and modeled groundwater elevations, subsurface lithology including any confining units, surface water features, soil and subsoil characteristics, groundwater well locations and uses and adjacent land uses."*
>
> *"<u>These features have the potential to impact every aspect of the CCR unit and the effectiveness of the compliance approaches</u> to be incorporated in the CCR permit. These include impacts to the effectiveness of the liner, stability of the unit, operation of the unit and its control structures, the effectiveness of proposed monitoring approaches and well locations, determination of background concentration of regulated contaminants, the appropriateness of proposed closure procedures, considerations of other applicable federal requirements listed in proposed § 257.122, and the appropriateness or effectiveness of any corrective action remedy, including monitoring to assess the effectiveness of that remedy." (underline added for emphasis)*

These site-specific factors have similar potential effects on the performance of landfills which are proposed to be covered by permit by rule and would be exempt from site-specific permit review. EPA has not provided sufficient information to show otherwise. The likelihood of design and construction defects increases as oversight lessens; this includes the absence of agency oversight and public review which would occur under a permit by rule implementation.

Members of the public often have irreplaceable knowledge of local hydrogeology, soil, geology/seismic, and climatic conditions which are relevant to siting and construction of CCR landfills. It's our professional experience that state natural resource agencies and geologic surveys and researchers at nearby colleges and universities often have the most accurate and in-depth knowledge of these site specific conditions. Consultants who work for coal plant owner/operators may be from out-of-state and lack this site-specific knowledge. In a permit by rule process, there is less incentive for those consultants to seek out local site-specific knowledge. A public process is needed to ensure this local site-specific knowledge is included in

planning for landfill design, construction, and O&M and to ensure these meet Subpart D technical requirements.

Site-specific review, public comment, and conditioning of individual permits to site conditions is needed for EPA to have the necessary information to understand the proposed design, construction, and O&M plans and to be able to question engineering designs, identify sensitive receptors, and issue an accurate protectiveness determination for a landfill.

Agency oversight of rule compliance

Our professional experience with the current self-implementing scheme for the Federal CCR Rule is that some CCR facility owners chose not to comply with the full requirements of the rule, either due to an error in interpreting the rule or because it is costly to comply with all of the criteria. Site-specific individual permit review would help to eliminate the occurrence of CCR facilities which are not fully compliant with Federal CCR Rule criteria. This is because EPA would presumably apply its interpretation of the rule uniformly for CCR units it permits across the nation and because potential "bad actors" would be prevented from skirting rule requirements.

To give just a couple of examples of CCR facilities that we are aware of where owner/operators are not fully compliant with the existing Federal CCR Rule:

1. Talen Montana, LLC is co-owner and sole operator of the Colstrip Steam Electric Station in Montana. Talen does not consider the "STEP A Cell" leaky coal ash surface impoundment at the site to be regulated under the Federal CCR Rule (Table 2 of Appendix A of Geosyntec, 2019). No documentation has been provided for this surface impoundment per § 257.105 - 257.107. Other available documentation from the site indicates that coal ash in the STEP A Cell still contains free liquids, defined under the rule as "liquids that readily separate from the solid portion of a waste under ambient temperature and pressure" (40 CFR § 257.53). Table ATT-2-1-2 of Geosyntec (2019) shows that STEP A Cell contains 30 feet of "Fly ash, saturated." The Federal CCR Rule applies to inactive surface impoundments at active electric utilities, defined as impoundments that no longer receive CCR on or after October 19, 2015 and still contain both CCR and liquids on or after October 19, 2015 (40 CFR § 257.50 (c) and § 257.53). Closure requirements that apply to inactive surface impoundments include §257.102 (d)(2)(i), which requires that free liquids be eliminated before final cover is installed.

Talen appears to have interpreted free liquids to mean only standing water at the surface of a CCR impoundment. The STEP A Cell coal ash impoundment has caused known severe groundwater contamination issues that have impacted public human health. Despite this it is currently falling through the cracks of a federal regulatory system with a lack of agency oversight.

2. Luminant Generation Company LLC owns and operates the Martin Lake Steam Electric Station in Rusk County, Texas. The A1 Landfill was built in 1980 upon 70-170 feet of mine spoil comprised of various clays and presents significant site-specific risks associated with potential clay saturation and settling or mass movement of mine spoil. Luminant's Unstable Area Demonstration acknowledges these risks but presents a professional engineer's certification without providing any supporting information or references (Golding Associates 2018). The Unstable Area Demonstration states that historic design and geotechnical investigative information were reviewed; but no one outside of the company's sphere has access to that information. This is the type of information vacuum that the Federal CCR Rule is intended to avoid. There is simply no way for anyone to check that the engineer made the correct decision in certifying the landfill and addressing dangers to human health and the environment. This is an example of the type of deficient information reporting and absence of unbiased review by a qualified professional engineer that will occur in a permitting system without agency oversight.

Conclusions

Optimal design and construction plans for landfills and monitoring systems requires consideration of the site-specific conditions and a robust quality assurance program to ensure design and performance standards are met. Landfill design and construction deficiencies are the human-caused factors that led to the majority of landfill failures. Design and construction are also the processes that can be most easily improved by better oversight and review during a permitting process. The evidence shows that individual permitting is needed to allow EPA to determine how the technical criteria in subpart D apply to a CCR facility's specific operations and site conditions.

No other regulatory program lacks agency oversight and permitting for design and construction of significant facilities that are in place in perpetuity. Without agency and public review, and a defined permitting process with third party review, there will undoubtedly be increased CCR landfill failures under the new proposed rule through engineering miscalculations, construction error, or by a deception from a few dishonest players. Our opinion is that all CCR landfills will benefit from site-specific review of design, construction, and O&M plans. Individual permitting provides a high level of site-specific review. Permit by rule does not adequately ensure that site-specific conditions are considered. Public comment afforded by the individual permitting process allows members of the public with site-specific knowledge to assist EPA in identifying relevant permit conditioning so that it meets Subpart D performance requirements and is protective of the environment.

Qualifications

We express the opinions and recommendations in this letter based on our qualifications as consultants working on RCRA facilities and coal ash sites. Our qualifications are summarized here; full resumes are attached.

Scott M. Payne, Ph.D., P.G.

Dr. Payne has over 34 years of experience as a professional hydrogeologist and environmental consultant. He has extensive experience in planning, project management, environmental assessment, surface and groundwater protection, and environmental analysis and permitting. He has extensive experience in toxic waste site studies and cleanup, lined impoundment design, landfill assessment, Superfund and RCRA regulatory support. He has worked on dozens of other CERCLA and RCRA facilities across the U.S. Dr. Payne is the author of *Strategies for Accelerating Cleanup at Toxic Waste Sites* published internationally by Lewis Publishers of New York. In his book, he outlines streamlining regulatory processes, effectively negotiating decisions and actions, environmental leadership, and applying practical solutions to remedy environmental problems. Dr. Payne served as an adjunct professor at Montana State University and taught surface and groundwater modeling for graduate and undergraduate students in the Environmental Science and Land Resource Department.

Ian Magruder

Mr. Magruder has 20 years' professional experience working on toxic and hazardous waste site characterization, remediation, and water quality protection. He has worked extensively in recent years reviewing cleanup plans for coal ash sites written under state and federal regulatory authority and working with State of Montana Department of Environmental Quality to better understand coal ash groundwater contaminant remediation plans. Mr. Magruder writes and reviews sampling and analysis plans and work plans for contaminated site remediation and waste characterization studies. He has taken hundreds of soil and groundwater samples for inorganic and organic contaminants including metals, inorganics, petroleum contaminants, solvents, PCBs, pesticides, and radionuclides. He has provided construction and health and safety oversight of remediation construction projects. Mr. Magruder has served for 17 years as a technical

advisor for a Superfund committee in Butte, Montana and has evaluated the risks inherent in mine waste and wood treatment chemicals to humans and the environment. That experience includes review of EPA risk assessment, feasibility, remedial investigation, and remedial action plans. Mr. Magruder has a Master of Science degree in in Geology with a hydrogeologic emphasis. He has an extensive background in modeling and formerly studied under one of the industry's leading authors of applied groundwater modeling.

Best Regards,

Scott M. Payne, PhD, PG
Principle Scientist
KirK Engineering & Natural Resources, Inc.

Ian Magruder, M.S.
Senior Hydrogeologist
KirK Engineering & Natural Resources, Inc.

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SCOTT M. PAYNE, Ph.D., P.G.

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SUMMARY

Dr. Payne has 34 years of experience as a principal hydrogeologist, Superfund, and RCRA specialist.

EXPERIENCE

Dr. Payne has over 34 years of experience as a professional hydrogeologist and environmental consultant. He has extensive experience in planning, project management, environmental assessment, surface and groundwater protection, and environmental analysis and permitting. He has extensive experience in toxic waste site studies and cleanup, lined impoundment design, landfill assessment, Superfund and RCRA regulatory support; monitoring physical and chemical conditions of surface water and groundwater, interpreting surface and groundwater interaction and chemistry; waste water treatment; environmental and water policy development; and conducting analytical and numerical surface water and groundwater flow / solute transport models. Dr. Payne served as an adjunct professor at Montana State University and taught surface and groundwater modeling for graduate and undergraduate students in the Environmental Science and Land Resource Department.

Dr. Payne gained his hazardous waste management experience through work conducted for the U.S. Navy in California. He previously served as the program manager for environmental activities at the Fleet Industrial Supply Center, Oakland, California, under the Comprehensive Long-term Environmental Action Navy (CLEAN) Contract. He has worked on dozens of other CERCLA and RCRA facilities across the Western U.S.

Dr. Payne is the author of *Strategies for Accelerating Cleanup at Toxic Waste Sites* published internationally by Lewis Publishers of New York. In his book he outlines streamlining regulatory processes, effectively negotiating decisions and actions, environmental leadership, and applying practical solutions to remedy environmental problems.

Dr. Payne's litigation support experience for hazardous waste site legal proceedings includes providing expert witness support in cases involving a proposed Controlled Groundwater Area associated with a RCRA corrective action site. Here he reviewed the project for completeness and technical merit in terms of impact the proposed plan would have on adjacent properties. His hazardous waste litigation work also includes a State of Montana CECRA Superfund site where the public was exposed to groundwater and vapor intrusion from leaked solvent organic contaminants. As an expert witness, he provided professional opinions on monitoring well construction, water use from wells, and groundwater flow and solute transport modeling.

EMPLOYMENT HISTORY

- KirK Engineering & Natural Resources, Inc., 1998 - Present (business owner)
- Tetra Tech EM Inc., Program Manager, 1991 - 1998
- Hydrometrics, Sr. Hydrogeologist, 1988 - 1991
- University of Montana, Research Assistant/Teaching Assistant, 1987 - 1988
- Environmental Solutions, Inc. (now TRC), Hydrogeologist, 1985 – 1986

EDUCATION

- B.S., Earth Science, Northland College, 1985
- M.S., Geology with a Hydrogeology Emphasis, University of Montana, 1989
- Ph.D., Geosciences with a Hydrogeology Emphasis, University of Montana 2009

FIELD EXPERIENCE

- Designed, installed and logged over 200 monitoring wells, boreholes, water wells
- Designed, installed and logged over 50 water supply and production wells
- Performed over 75 aquifer tests and numerous slug / packer tests, and interpreted results
- Mapped geology and groundwater systems throughout the western US
- Numerous field applications of electromagnetic, resistively, and magnetic geophysics
- Collected over one thousand groundwater and surface water quality samples
- Collected over three thousand soil samples
- Interpreted thousands of organic, metals, & common ion water and soil chemistry reports
- Measured hundreds of stream flows on streams and rivers
- Completed over 100 miles of riparian assessments in western Montana
- Completed dozens of CERCLA, RCRA, UST, TSCA, CWA studies at various scales
- Completed dozens of water supply, water conservation, & water rights studies
- Completed dozens of watershed chemical, physical, and biologic assessments
- Completed multiple groundwater and surface water hydrology & solute transport models

PROFESSIONAL CREDENTIALS, AFFILIATIONS, AND COMMUNITY SERVICE

- Professional Geologist, Wyoming, PG-1676, 1993 - present
- Professional Geologist, California, RG-6199, 1995 – present
- Private Pilot 3547110
- National AWRA member
- Madison County Airport Board

PUBLICATIONS AND PRESENTATIONS

Donohue, D.A., Huffsmith, R.L., Payne, S.M., 1994, Identification of a High Yield Aquifer Deep in the Helena Valley, West-Central Montana. October 13 and 14 AWRA Conference, Missoula, Montana.

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IAN MAGRUDER, M.S.

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SUMMARY

Mr. Magruder has 20 years of experience as a professional hydrogeologist and environmental consultant with extensive expertise working on toxic and hazardous waste sites, remediation planning, and Superfund.

EXPERIENCE

Mr. Magruder has 20 years' experience as a professional hydrogeologist and environmental consultant and has extensive experience working on toxic and hazardous waste characterization, contaminated site remediation, and Brownfields redevelopment. He has written cleanup and disposal plans for coal ash facilities and reviews coal ash groundwater remediation plans. He has significant experience writing and reviewing sampling and analysis plans and work plans for contaminated site remediation. He has extensive waste characterization and cleanup verification sampling experience for remediation projects and excels at working in difficult and remote field sites. He has taken hundreds of soil samples for inorganic and organic contaminants including, phytosanitary, metals, petroleum contaminants, solvents, PCBs, pesticides, and radionuclides.

Mr. Magruder has served for seventeen years as a technical advisor for mine waste and wood treatment Superfund sites. For his Superfund work he has evaluated the contaminant risks inherent in toxic waste sites and has recognized contaminant pathways and human and environmental risks which were not identified by other federal or private studies. This experience includes review of EPA risk assessments, remedial investigation and feasibility studies, remedial action plans, and records of decision.

Mr. Magruder has an extensive background in modeling and formerly studied under one of the industry's leading authors of applied groundwater modeling. His modeling includes geochemical fate and transport, discharge chemistry and mixing zones, groundwater-surface water interactions, and land application of discharge water.

EMPLOYMENT HISTORY

- KirK Engineering & Natural Resources, Inc., Senior Hydrogeologist, 2002 – present
- Montana Bureau of Mines and Geology Research Hydrology Division, Research Specialist II, 2001
- Contract Hydrogeologist for the Ruby Valley Conservation District, 2000

EDUCATION

- M.S., Geology (hydrogeology emphasis). University of Montana, Missoula, Montana, 2006
- B.A., Geology with High Honors (environmental geology emphasis). University of Montana, Missoula, Montana, 1998

PROFESSIONAL CREDENTIALS

- Missoula County Board of Health, Water Quality Advisory Council – Council Chair, member 2006-present.
- Technical advisor, DNRC Montana Water Supply Initiative, Clark Fork/Kootenai Basin Advisory Council.
- Manuscript reviewer for the journal Ground Water, National Ground Water Association.
- Clark Fork River Task Force technical advisor 2013-2015

Exhibit 8

CITY OF CHICAGO

RULES

Control of Emissions from Handling and Storing Bulk Materials

Effective January 25, 2019

Mayor Rahm Emanuel **Commissioner Julie Morita, M.D.**

BY AUTHORITY VESTED IN THE COMMISSIONER OF THE DEPARTMENT OF PUBLIC HEALTH PURSUANT 2-ll2-160(b) AND 11-4-760(e), ll-4-770 AND 11-4-800 THE RULES REGARDING CONTROL OF EMISSIONS FROM HANDLING AND STORING BULK MATERIALS, WHICH WERE PUBLISHED ON MARCH 13, 2014, ARE HEREBY AMENDED AND REIUSSED, AS FOLLOWS:

By Order of the Commissioner:

Signed: _____ Date: 1/24/2019

Commissioner Julie Morita, M.D.

Published: 1/25/19

Effective: 1/25/19

(THESE UPDATED RULES SUPERSEDE THE RULES ENTITLED, "AIR POLLUTION CONTROL: EMISSIONS FROM HANDLING AND STORAGE OF BULK MATERIALS," WHICH WERE PUBLISHED AND BECAME EFFECTIVE ON MARCH 13, 2014)

CITY OF CHICAGO
DEPARTMENT OF PUBLIC HEALTH

RULES FOR CONTROL OF EMISSIONS FROM HANDLING AND STORING BULK MATERIALS

Whereas, pursuant to Chapters 2-112 and 11-4 of the Municipal Code of Chicago (the "Code"), the Department of Public Health (the "Department") is charged with enforcement of environmental regulations within the City of Chicago, including the enforcement of regulations intended to reduce the risk of harm to public health or the environment from air pollution; and

Whereas, pursuant to the authority granted by Section 2-112-160(b) of the Code, the Commissioner of Health (the "Commissioner") is authorized to issue rules necessary or proper for the implementation of environmental ordinances and to accomplish the purposes of Chapter 11-4 of the Code, and is further authorized to make reasonable administrative and procedural regulations or rules interpreting or clarifying the requirements which are specifically prescribed in Chapter 11-4 of the Code; and

Whereas, this general rule-making authority includes any rules necessary to implement Article II of Chapter 11-4 of the Code, Sections 11-4-600 through 11-4-810, the "Air Pollution Control Ordinance"; and

Whereas, this general rule-making authority also includes any rules necessary to implement Article VIII of Chapter 11-4 of the Code, Sections 11-4-1410 through 11-4-1460, "Pollution of Waters"; and

Whereas, Section 11-4-800 of the Code further authorizes the Commissioner to issue rules to implement Article II of Chapter 11-4 of the Code; and

Whereas, Section 11-4-760(e) of the Code authorizes the Commissioner to promulgate additional rules for the proper management of any substance or material that may become airborne or be scattered by the wind; and

Whereas, in addition, Section 11-4-770 of the Code provides that, for the purpose of minimizing air pollution, the Commissioner may prescribe, by rules and regulations, reasonable, specific operating and maintenance practices for buildings, structures, premises, open areas, automobiles and/or truck parking and sales lots, private roadways, rights-of-way, storage piles of materials, yards, vessels, vehicles, construction, sandblasting, alteration, building, demolition or wrecking operations and any other enterprise which has or involves any matter, material or substance susceptible to being windborne and for the handling, transportation, disposition or other operation with respect to any material subject to being windborne; and

Whereas, Chicago is a densely populated metropolitan area, such that industrial uses are sometimes in close proximity to residential uses; now, therefore,

I, Julie Morita, M.D., Commissioner, Department of Health, City of Chicago, issue the following rules pursuant to the authority granted to me by Sections 2-112-160, 11-4-760(e), 11-4-770, and 11-4-800 of the Municipal Code of Chicago.

PART A: INTRODUCTION

1.0 Scope and Purpose. The purpose of these Rules is to prescribe reasonable, specific operating and maintenance practices to minimize emissions of airborne particulate matter from the storage, on-site handling, loading, unloading, stockpiling, and Processing of Bulk Solid Materials as defined herein, including but not limited to ores, coal, and coke, including petroleum coke ("petcoke") and metallurgical coke ("metcoke"). These Rules apply to any owner, operator, or other person who stores, loads, unloads, stockpiles, handles on-site, Processes, or uses Bulk Solid Materials. Part B sets forth requirements that are applicable to all Bulk Solid Material Facilities. Part C sets forth requirements that are applicable only to Coke or Coal Bulk Material Facilities. Part D sets forth requirements that are applicable only to facilities that handle Manganese-Bearing Materials. Part E sets forth requirements that are applicable only to Bulk Solid Material Facilities that have outdoor storage piles and that are not Coke or Coal Bulk Material Facilities. Part F sets forth compliance and variance provisions for all Bulk Solid Material Facilities.

2.0 Definitions. For purposes of these rules, the following definitions shall apply:

(1) ASTM means the American Society for Testing and Materials.
(2) BLEND or MIX means combining two or more Bulk Solid Materials.
(3) BULK SOLID MATERIAL means any Non-Packaged solid substance or material that can be used as a fuel or as an ingredient in a manufacturing process that may become airborne or be scattered by the wind and that, except for coke and coal, is stored at a Facility in an amount equal to or greater than 25 cubic yards at any one time, including but not limited to ores, coal, and coke, including petcoke and metcoke, but shall not include salt, grains, Construction and Demolition Materials, materials that are handled or stored pursuant to a recycling, reprocessing, or waste handling Facility permit under Chapter 11-4 of the Code, or materials used in manufacturing cement at a facility that has obtained a construction permit and prevention of significant deterioration approval from the Illinois Environmental Protection Agency.
(4) CHEMICAL STABILIZER is any chemical dust suppressant which is not prohibited for the uses proposed in these rules or by any other applicable law, and which meets all applicable specifications required by any federal, state, or local agency.
(5) COAL is a solid, brittle, carbonaceous rock classified as anthracite, bituminous, subbituminous, or lignite by ASTM Designation D388-77.
(6) COKE is a solid carbonaceous material derived from the distillation of coal (including metallurgical coke) or from oil refinery coker units or other cracking processes (including petroleum coke).

(7) COKE OR COAL BULK MATERIAL FACILITY is a source, site, or facility where coke or coal is stored, loaded, unloaded, stockpiled, handled on-site, blended, Processed, or otherwise managed.

(8) CONSTRUCTION OR DEMOLITION MATERIAL means material used in or resulting from the construction, remodeling, repair, landscaping, or demolition of utilities, structures, buildings, and roads, including but not limited to stockpiles of crushed stone, sand and gravel, hot mix asphalt plants or ready mixed concrete plants.

(9) EXISTING FACILITY is a Facility that is properly permitted by the Commissioner, and subject to a Certificate of Operation issued by the Commissioner, as of the issuance date of these Rules and is limited to operations within Facility boundaries as the boundaries exist on the issuance date of these Rules.

(10) FACILITY is all contiguous land, and structures, other appurtenances, and improvements on the land, used for storing, on-site handling, loading, unloading, stockpiling or Processing Bulk Solid Material.

(11) FUGITIVE DUST means any solid particulate matter that becomes airborne by natural or human-made activities, excluding engine combustion exhaust and particulate matter emitted from a properly permitted exhaust stack equipped with a pollution control device.

(12) HIGH WIND CONDITIONS is when average wind speeds exceed 15 miles per hour over two consecutive five minute intervals of time.

(13) INTERNAL ROAD means any route within a facility that is not located in an area normally used for staging or storage of material and that has evidence of repeated prior travel by, or is otherwise regularly used by, Vehicles for transporting materials to, from, or within a Facility.

(14) MANGANESE-BEARING BULK MATERIAL means ferrous manganese, manganese silicate, manganese alloy, manganese ore, or any other material from which manganese is extracted or emitted or otherwise becomes airborne.

(15) MANGANESE-BEARING BULK MATERIAL FACILITY is a source, site, or facility where Non-Packaged Manganese-Bearing Bulk Material is stored, loaded, unloaded, stockpiled, handled on-site, blended, Processed, or otherwise managed.

(16) MANGANESE LIMIT (ML) is the concentration of manganese equal to or greater than 0.30 micrograms per cubic meter as averaged over a rolling three-month period.

(17) METALLURGICAL COKE, or METCOKE, is a carbon material resulting from the manufactured purification of multifarious blends of bituminous coal.

(18) MOIST MATERIAL means material with a moisture content of 3% by weight as determined by ASTM analysis, unless another standard is established by an applicable State Permit, Law, Rule or Regulation.

(19) NON-PACKAGED means not fully containerized to prevent the possibility of any dust escaping from the package the entire time the material is in the possession of the owner or operator.

(20) OWNER OR OPERATOR means any person who has legal title to any Facility, who has charge, care or control of any Facility, who is in possession of any Facility or any part thereof, or who is entitled to control or direct the management of any Facility.

(21) PERSON is any individual, partnership, co-partnership, firm, company, limited liability company, corporation, association, joint stock company, trust, estate, political subdivision, state agency, or any other legal entity, or their legal representative, agent or assigns.
(22) PETROLEUM COKE, or PETCOKE, is a solid carbonaceous residue produced from a coker after cracking and distillation from petroleum refining operations, including such residues produced by petroleum upgraders in addition to petroleum refining.
(23) PM10 means particulate matter less than or equal to 10 microns in diameter.
(24) PROCESS OR PROCESSING means any chemical, industrial, commercial, or manufacturing operation or activity that causes, or has the potential to cause, the emission of airborne particles including, but not limited to, blending, mixing, crushing, screening, breaking, wet or dry cleaning, thermal drying, and chemically treating.
(25) REPORTABLE ACTION LEVEL means the positive difference between the level of PM10 measured at the upwind monitor(s) at a Facility and the level of PM10 measured at the downwind monitor(s) at a Facility that will trigger response activities under a contingency plan pursuant to Section 3.0(3)(~~f~~g) as established in the Fugitive Dust Plan submitted by a Facility under Section 3.0(3). The Reportable Action Level may vary based on the value of the difference, and based on the concentration of PM10 detected at the downwind monitor(s) at a Facility.
(26) TRANSFER POINT is the location at or within a facility where material being moved, carried, or conveyed is dropped or deposited.
(27) VEHICLE is any car, truck, railcar, or marine vessel.

PART B: BULK SOLID MATERIAL FACILITIES

3.0 Operating and Maintenance Practices. Any Facility that Processes, handles on-site, transfers, loads, unloads, stockpiles, or stores Bulk Solid Materials shall comply with all of the following requirements:

(1) Certificate of Operation – Required. Every Owner or Operator of a Facility subject to these Rules must possess a certificate of operation issued in accordance with Section 11-4-660 of the Code. The Department reserves the right to impose dust control requirements, in addition to the requirements set forth in these Rules, as conditions of the Facility's certificate of operation, if the Commissioner finds that the Facility has failed to control fugitive dust.

(2) Fugitive Dust – Prohibited. The Facility Owner or Operator shall prevent the discharge into the atmosphere of visible fugitive dust as specified below:

a) Visible Dust. The Facility Owner or Operator shall not cause or allow any Fugitive Dust that is visible beyond the property line of the Facility;

b) Opacity Limit. The Facility Owner or Operator shall not cause or allow any Fugitive Dust within the property line of the Facility at any Bulk Solid Material storage pile, Transfer Point, roadway or parking area that exceeds 10% opacity, or other applicable opacity standard set forth in an applicable

State Permit, Law, Rule or Regulation, including but not limited to the Environmental Protection Act and 35 Ill. Admin Code Part 212.

c) Measurement of Opacity. Opacity shall be determined based on a visual reading in accordance with the measurement method specified in 35 Ill. Admin. Code 212.109 (often referred to as "Method 9 testing").

d) Testing of Visible Emissions and Opacity Limits. The Facility Owner or Operator shall, on at least a quarterly basis, periodically perform tests of visible fugitive dust and opacity in accordance with the protocol set forth in the approved Fugitive Dust Plan.

(3) Fugitive Dust Plan – Required. Every Owner or Operator of a Facility subject to these Rules must prepare, submit, and follow a Fugitive Dust Plan. The Fugitive Dust Plan shall be updated on an annual basis and submitted to the Department for review and approval on or before January 31 every year, provided that the first Fugitive Dust Plan shall be due within ninety (90) days of the issuance of these Rules. For Facilities that are constructed or become subject to these Rules after they take effect, the first Fugitive Dust Plan shall be submitted with the Facility's application for a certificate of operation and before the Facility accepts any Bulk Solid Materials. If the Commissioner finds that the submitted Fugitive Dust Plan is missing any required information or is insufficient to ensure compliance with these Rules, the Commissioner may disapprove the Fugitive Dust Plan and request submission of a modified Fugitive Dust Plan. If the Facility Owner or Operator plans to make any change, modification, or addition to any Facility component described in the most recently submitted Fugitive Dust Plan, the Facility Owner or Operator shall submit an amended Fugitive Dust Plan to the Department for review and approval at least thirty (30) days prior to such change, modification, or addition. The Fugitive Dust Plan shall include, at a minimum, the following components:

a) A site map, drawn to scale, depicting the following information:

i. Facility boundaries;

ii. All buildings, Internal Roads and utilities on Facility property;

iii. All roadways within one quarter mile of the perimeter of the Facility that are within the City of Chicago and that are used for transport of material to or from the Facility;

iv. All potential emissions points at the Facility, including a depiction of the footprints of all Bulk Solid Material storage piles; and

v. The locations of all control devices and monitoring devices, including the fugitive dust monitors required under 3.0(4) and the wind speed monitor required under 3.0(6);

b) A description of the Facility's operations, including a list of all Bulk Solid Materials handled at the Facility;

c) A description of the truck routes within one quarter mile of the perimeter of the Facility that are used to transport material to or from the Facility, including an explanation of how dust will be minimized during transport (e.g., travel on paved roads where possible, minimize truck speeds, etc.) and a description of the measures that will be used to ensure trucks are cleaned of loose material before they leave the Facility;

d) A calculation showing the Facility's maximum total indoor and outdoor Bulk Solid Material storage capacity in tons or cubic yards. In the first Fugitive Dust Plan, due within ninety days of the issuance of these Rules, the calculation shall be certified by signature of an authorized representative of the Owner or Operator and shall be accompanied by evidence of authority to sign on behalf of the Owner or Operator;

e) A description of all control measures, devices, and technologies to be used to minimize and control Fugitive Dust, a statement certifying that all control measures, devices, and technologies have been properly calibrated and maintained, and a statement that all appropriate Facility staff have been trained on the proper application and operation of all such control measures, devices, and technologies;

f) A dust monitoring plan that describes:

   i. The placement, operation, and maintenance of the PM10 monitors required under paragraph 3.0(4); and

   ii. The schedule and plan for quarterly testing to ensure compliance with the prohibition on Fugitive Dust set forth in 3.0(2). Such testing must be a) conducted by a professional trained and certified to read opacity in accordance with the measurement method specified in 35 Ill. Admin. Code 212.109, and b) conducted during a range of weather conditions to ensure that representative conditions are the Facility are covered;

g) A contingency plan describing the Owner's or Operator's response activities when the monitors required under paragraph 3.0(4) detect PM10 that exceeds the Reportable Action Level as defined in Section 2.0 above. The response activities should consist of a range of increasingly aggressive measures appropriate to different levels of exceedance;

h) A contingency plan for an alternative method of monitoring in the event of malfunction or failure of the approved PM10 monitors;

i) A description of the Facility's recordkeeping system, which shall include a schedule for routine inspection, testing, and maintenance as required in 3.0(18); and

j) A factsheet or executive summary of the Fugitive Dust Plan designed to inform the public of the Facility's plan to control and minimize fugitive dust.

The Department will post the summary, together with the approved Fugitive Dust Plan, on the City's website.

(4) Fugitive Dust Monitoring. Unless, pursuant to the Variance procedure set forth in 10.0 below, the Facility Owner or Operator establishes that the Facility's operations do not result in off-site fugitive dust emissions, the Facility Owner or Operator must install, operate, and maintain, according to manufacturer's specifications, permanent, continuous Federal Equivalent Method (FEM) real-time PM10 monitors around the perimeter of the Facility in accordance with the requirements specified below:

a) During the first year of monitoring, at least four monitors shall be placed at or near the boundaries of the Facility to monitor for Fugitive Dust in the ambient air around the Facility, with monitor locations subject to approval of the Department and consistent with the most recent U.S. Environmental Protection Agency protocols and guidance for ambient air quality monitoring siting criteria;

b) During the second and subsequent years of monitoring, monitors shall be placed in accordance with an approved dust monitoring plan that shall be based on the data observed in the first year, with monitors located at a minimum of two upwind and two downwind locations and additional monitors as appropriate depending on the size of the facility and other relevant factors such as variability of wind direction at the site and the proximity of neighborhoods;

c) All data collected shall be consistent with units in the National Ambient Air Quality Standards for PM10, and ambient monitoring practices must comply with current U.S. Environmental Protection Agency protocols and guidance for ambient air quality monitoring, including but not limited to those for data completeness, calibration, inspection, maintenance, and site and instrument logs;

d) A data logger shall be attached to the monitors to record readings from the monitors, and the Facility Owner or Operator shall notify the Department, in writing within 24 hours, each time the monitors exceed the Reportable Action Level set forth in the Fugitive Dust Plan and any time monitoring equipment has malfunctioned preventing readings or logging of data; and

e) The Facility Owner or Operator shall maintain a log of all routine and non-routine maintenance and calibration activities associated with each fugitive dust monitor.

f) On a monthly basis, the Facility Owner or Operator shall submit the hourly data for each fugitive dust monitor in an Excel spreadsheet, together with the meteorological station data for the same time period. The monthly monitoring reports shall be submitted within 14 days of the end of the month in which the data was collected, via email to CDPHPermits@cityofchicago.org, in a format specified by the Department.

(5) Additional Monitoring. In addition to requiring monitoring pursuant to Section 3.0(4) for Bulk Material Facilities and Section 6.0 for Manganese-Bearing Bulk Material Facilities, the Department may require the Facility Owner or Operator to install, operate, and maintain other monitoring methods, including but not limited to video recording and one or more filter-based monitoring sites. The Department may require such methods when PM10 monitoring does not provide sufficient information regarding fugitive dust for the Commissioner to adequately assess the health impacts of such emissions. Any additional monitoring methods shall meet the specifications set forth in an approved Fugitive Dust Plan. The Department may require that this plan include procedures similar or equivalent to those set forth in Section 6.0 below for Manganese-Bearing Bulk Material Facilities. In the event that additional monitoring is required, the Department will provide a reasonable time period for equipment installation.

(6) Wind Monitoring. The Facility Owner or Operator shall install, operate and maintain, according to manufacturer's specifications, a weather station or other permanent device to monitor and log wind speed and wind direction at the Facility at an unobstructed, unsheltered area, centrally positioned in relation to the storage piles, and at a minimum height of 10 meters above ground level, unless another height is appropriate pursuant to applicable U.S. Environmental Protection Agency protocols and guidance.

(7) Conveyors. All conveyors shall be covered or enclosed conveyors in order to reduce or eliminate fugitive dust emissions to the maximum extent practicable.

(8) Transfer Points. The Facility Owner or Operator shall maintain all material transfer points in compliance with one of the following measures in order to ensure compliance with the opacity limit set forth in 3.0(2)(b):

a) Total enclosure;

b) Water spray system sufficient to control Fugitive Dust emissions during operations;

c) Vented to air pollution control equipment which is in full operation and permitted by the Commissioner; or

d) Transfer only Moist Material and conduct such transfer in a manner that minimizes the exposed drop.

(9) Transport. When transport is by truck, the Facility Owner or Operator shall ensure that:

a) All vehicles and off-road mobile heavy equipment handling or transporting bulk solid material shall adhere to the posted speed limit within the Facility, which shall be no more than 8 miles per hour;

b) Except for Existing Facilities, material is received or transferred only in truck trailers that, within one quarter mile of the perimeter of the Facility and within the City of Chicago, are driven only on paved roads;

c) All outgoing material transport trucks, whether loaded or empty, are cleaned so that:

i. Any part of any tractor, trailer or tire exterior surface, excluding the inside of the trailers, are free of all loose material; and

ii. The material removed by the truck cleaning operation is collected and recycled or otherwise disposed of so that it does not result in Fugitive Dust emissions.

d) All outgoing material transport trucks, whether loaded or empty, pass through a wheel wash station and pass over rumble strips that will vibrate the trucks and shake off loose material and dust, unless the approved Fugitive Dust Plan specifies other measures to ensure that the trucks will not cause any track-out of materials onto the public way.

(10) Vehicle Covering and other Dust Control. The Facility Owner or Operator shall not load material into any truck trailer, railcar, or barge unless measures are in place to prevent material from escaping from the Vehicle as follows:

a) Truck trailers must be immediately covered after being loaded in one of the following manners:

i. A solid sliding cover or stackable cover on the top of the truck trailer that is kept completely closed except during loading; or
ii. A continuous tarp that completely covers the truck trailer and that is installed or constructed to prevent wind from entering over the leading edge of the trailer rim into the interior of the trailer.

b) Railcars and barges must be loaded in a manner that will control dust through the use of best management practices such as, but not limited to, the use of solid covers, the application of dust suppression agents and/or water, and the profiling of materials to prevent wind erosion.

(11) Vehicle Leaking. Facility owners or operators shall not load material into truck trailers, railcars, or barges such that a vehicle leaks material or liquid that contains material onto Internal Roads or into waterways. If a vehicle leaks material or liquid that contains material onto an Internal Road or into a waterway, the Facility Owner or Operator shall clean the affected road within one hour with a street sweeper or water and shall clean the affected waterway immediately.

(12) Truck Loading and Unloading. For enclosed Coke or Coal Bulk Material storage piles, the Facility Owner or Operator shall conduct material truck loading and unloading only in an enclosed structure that is either equipped with a water spray

system to be used as needed to prevent visible dust emissions or vented to permitted air pollution control equipment that is operated during loading and unloading activities. The ends of the structure shall have overlapping flaps that reduce the opening, sliding doors which shall remain closed except to allow the trucks to enter and leave, or other equally effective devices. For outdoor Bulk Solid Material storage, the Facility Owner or Operator shall ensure that truck loading and unloading occurs in compliance with the requirements for Transfer Points specified in 3.0(~~7~~8).

(13) Railcar Loading and Unloading. For enclosed Coke or Coal Bulk Material storage piles, the Facility Owner or Operator shall conduct railcar material loading and unloading only in an enclosed structure that is either equipped with a water spray system operated to prevent visible dust emissions, or vented to permitted air pollution control equipment that is operated during loading and unloading activities. The ends of the structure shall have overlapping flaps, sliding doors or other equally effective devices, which shall remain closed except to allow the railcars to enter and leave. For outdoor Bulk Solid Material storage, the Facility Owner or Operator shall ensure that railcar loading and unloading occurs in compliance with the requirements for Transfer Points specified in 3.0(8).

(14) Barge and Boat Loading and Unloading. The Facility Owner or Operator shall conduct barge/boat material loading only through an enclosed chute that uses a water spray system, or an air pollution control system or other mechanism described in the approved Fugitive Dust Plan, in order to control Fugitive Dust emissions during operations. Barge unloading shall be conducted in a manner that will minimize dust in accordance with measures set forth in the Fugitive Dust Plan and in compliance with the requirements for Transfer Points specified in 3.0(8).

(15) Paving. The Facility Owner or Operator shall pave, with a durable material that is not susceptible to becoming windborne, and in a manner sufficient to bear the expected level of traffic at the Facility, and maintain as paved all Internal Roads within the Facility that are used for transporting or moving material.

(16) Roadway Cleaning. In order to clean roads of spilled and tracked material, the Facility Owner or Operator shall use a street sweeper to clean any paved road that is used to transport material inside or within one quarter mile of the perimeter of the Facility and shall comply with all of the following requirements:

a) The street sweeper shall be equipped with a water spray, for use during non-freezing weather, and a vacuum system to prevent Fugitive Dust during street sweeping;

b) The street sweeping shall be sufficient so that not more than 4 hours elapses between each street sweeper cleaning or after every 100 truck material receipts or dispatches, but not less than one time daily when the Facility is open for business, unless the roads are free and clear of any material transported to or from the Facility; and

c) Each 24 hour day, the day beginning at 12:01 A.M., the Facility Owner or Operator shall document whether for that day the Facility Owner or Operator is street sweeping every four hours or every 100 trucks, or whether the roads are free and clear of any material transported to or from the Facility. The record shall show the date and time when street sweeping was performed and the truck count, as applicable.

(17) Spilled Material. The Facility Owner or Operator shall maintain all areas within the Facility not regularly used for storage of material free of any spilled or misplaced material by removing such material by the end of each work shift.

(18) Recordkeeping. The Facility Owner or Operator shall keep and maintain Facility logs as follows:

a) Record daily, all cleaning and street sweeping;

b) Record daily, the weather conditions, including wind speed and direction, documented by the weather station or other device installed pursuant to 3.0(6);

c) Record the application of water and/or Chemical Stabilizer pursuant to paragraphs 3.0(7), 3.0(9), 3.0(11), 3.0(12), 3.0(13), and/or 5.0(7), as applicable, and note any instances when such application is suspended for any reason, including but not limited to, weather conditions;

d) Record any instances when activities are suspended due to high winds as required by paragraph 7.0(4), as applicable;

e) Record the results of the continuous monitoring for Fugitive Dust as required in paragraph 3.0(4), indicate any instances when a monitor detects Fugitive Dust that exceeds the Reportable Action Level set forth in the Fugitive Dust Plan, and record the action taken to respond to the detection of Fugitive Dust;

f) Record quarterly, the results of the tests of visual Fugitive Dust and opacity as required in paragraph 3.0(2)(d);

g) Record the results of the filter-based metals monitoring as required in paragraph 3.0(5) or 6.0, as applicable;

h) Maintain a schedule for routine inspection, maintenance, and testing of all control measures, devices, and technologies, including a schedule for inspection of Bulk Solid Material piles, inspection of all monitors, and inspection of off-site areas for the presence of dust; and identify the person or persons responsible for such inspections, maintenance, and testing;

i) All records required to be kept pursuant to these Rules shall be kept and maintained at the Facility and be available for inspection for a minimum of three (3) years from the date the record is created.

PART C: COKE OR COAL BULK MATERIAL FACILITIES

4.0 Enclosure of Coke and Coal. The Owner or Operator of a Coke or Coal Bulk Material Facility shall maintain all Coke and Coal in fully enclosed structures in accordance with the enclosure requirements set forth in 4.0(2).

(1) Enclosure Plan. The owner or operator of any Coke or Coal Bulk Material Facility shall submit to the Department for review and approval a plan (the "Enclosure Plan") for total enclosure of all coke piles, coal piles, conveyors, Transfer Points, and Processing areas at the Facility. The Enclosure Plan shall include:

a) A construction schedule prepared using the critical path method for completion of engineering, procurement, permitting, and construction of the enclosure; and

b) An Interim Fugitive Dust Plan that shall include, at a minimum, the following components:

i. A site map, drawn to scale, depicting the following information:

1. Facility boundaries;

2. All buildings, Internal Roadways and utilities on Facility property;

3. All roadways within one quarter mile of the perimeter of the Facility that are within the City of Chicago and that are used for transport of material to or from the Facility;

4. All potential emissions points at the Facility, including a depiction of the footprints of all Coke or Coal Bulk Material piles;

5. The locations of all control devices and monitoring devices, including the fugitive dust monitors required under 3.0(4) and the wind speed monitor required under 3.0(6);

ii. A site map, drawn to scale, depicting the boundaries of any associated Coke or Coal Bulk Material Facility owned or operated by the Owner or Operator at which the Owner or Operator intends to temporarily store Coke or Coal Bulk Materials during implementation of the Enclosure Plan, and including all the information required in 4.0(1)(b)(i) above;

iii. A description of the Facility's operations, including a list of all Coke or Coal Bulk Materials handled at the Facility or any associated Coke or Coal Bulk Material Facility;

iv. A description of all control measures, devices, and technologies to be used to minimize and control Fugitive Dust during transport to or from the Facility and any associated Coke or Coal Bulk Material Facility while

materials are staged, loaded, unloaded, Processed, or otherwise handled at the Facility and any associated Coke or Coal Bulk Material Facility;

v. A dust monitoring plan that describes the placement, operation, and maintenance of the PM10 monitors required under paragraph 3.0(4), including an explanation of the Reportable Action Level;

vi. A contingency plan describing the Owner's or Operator's response activities when the monitors required under paragraph 3.0(4) detect PM10 that exceeds the Reportable Action Level established pursuant to 3.0(3)(e)(i) above, and a contingency plan for an alternative method of monitoring in the event of malfunction or failure of the approved PM10 monitors; and

vii. A description of the Facility's recordkeeping system, which shall include a schedule for routine inspection and maintenance of the control measures, devices, and technologies, and the identity of the person or persons responsible for such maintenance and testing.

(2) Enclosure Requirements. Fully enclosed structures or buildings for all Coke and Coal handling, storage, and transfer operations must meet the following requirements:

a) They shall be completely roofed and walled, entirely surround Coke or Coal Bulk Materials, and be designed, permitted, and constructed in accordance with applicable Building Code requirements.

b) They shall be properly maintained.

c) They shall use a permitted air pollution control system and/or have the ability to apply water to materials within the structure or building in order to control Fugitive Dust emissions sufficiently at designed vents and at any other openings, including entrances and exits; and

d) Any entrances or exits for material or Vehicles shall have overlapping flaps or sliding doors, which shall remain closed except to allow material or Vehicles to enter and leave or to allow people to enter and exit. Devices other than overlapping flaps or sliding doors may be used instead if the Fugitive Dust Plan demonstrates that the performance for dust control at the openings will be equivalent or superior to that of overlapping flaps and sliding doors.

(3) Interim Requirements. During implementation of the Enclosure Plan, Coke and Coal may be maintained in outdoor stockpiles subject to the following:

a) The approved Interim Fugitive Dust Plan required in 4.0(1)(b);

b) The requirements for all Bulk Storage Material Facilities set forth in Part B above; and

c) The requirements for outdoor storage of bulk solid materials set forth in Part D below.

PART D: MANGANESE-BEARING BULK MATERIAL FACILITY OPERATIONS

5.0 Enclosure of Manganese-Bearing Bulk Material. The Owner or Operator of a Manganese-Bearing Bulk Material Facility shall maintain all Non-Packaged Manganese-Bearing Bulk Material in fully enclosed structures in accordance with the enclosure requirements set forth in 5.0(2) below. The operations covered by this full enclosure requirement include, but are not limited to, all piles, conveyors, transfer points, and processing areas.

(1) Enclosure Plan. The owner or operator of any Manganese-Bearing Bulk Material Facility shall submit to the Department for review and approval a plan (the "Enclosure Plan") for total enclosure of all Manganese-Bearing Bulk Material piles, conveyors, Transfer Points, and Processing areas at the Facility. The Enclosure Plan shall include:

a) For Facilities where a structure adequate to comply with these Rules does not already exist, a construction schedule prepared using the critical path method for completion of engineering, procurement, permitting, and construction of the enclosure; and

b) An Interim Fugitive Dust Plan that shall include, at a minimum, the following components:

i. A site map, drawn to scale, depicting the following information:

1. Facility boundaries;

2. All buildings, Internal Roads, and utilities on Facility property;

3. All roadways within one quarter mile of the perimeter of the Facility that are within the City of Chicago and that are used for transport of material to or from the Facility;

4. All potential emissions points at the Facility, including a depiction of the footprints of all Manganese-Bearing Bulk Material piles;

5. The locations of all control devices and monitoring devices, including the fugitive dust monitors required under 3.0(4) and the wind speed monitor required under 3.0(5);

ii. A site map, drawn to scale, depicting the boundaries of any associated Manganese-Bearing Bulk Material Facility owned or operated by the Owner or Operator at which the Owner or Operator intends to temporarily store Manganese-Bearing Bulk Material during implementation of the Enclosure Plan, and including all the information required in 5.0(1)(b)(i) above;

iii. A description of the Facility's operations, including a list of all Manganese-Bearing Bulk Material handled at the Facility or any associated Manganese-Bearing Bulk Material Facility;

iv. A description of all control measures, devices, and technologies to be used to minimize and control Fugitive Dust during transport to or from the Facility and any associated Manganese-Bearing Bulk Material Facility while materials are staged, loaded, unloaded, Processed, or otherwise handled at the Facility and any associated Manganese-Bearing Bulk Material Facility;

v. A dust monitoring plan that describes the placement, operation, and maintenance of the PM10 monitors required under paragraph 3.0(4), including an explanation of the Reportable Action Level;

vi. A contingency plan describing the Owner's or Operator's response activities when the monitors required under paragraph 3.0(4) detect PM10 that exceeds the Reportable Action Level established pursuant to 3.0(3)(f)(i) above, and a contingency plan for an alternative method of monitoring in the event of malfunction or failure of the approved PM10 monitors; and

vii. A description of the Facility's recordkeeping system, which shall include a schedule for routine inspection and maintenance of the control measures, devices, and technologies, and the identity of the person or persons responsible for such maintenance and testing.

(2) Enclosure Requirements. Fully enclosed structures or buildings for all Manganese-Bearing Bulk Material handling, storage, and transfer operations must meet the following requirements:

a) They shall be completely roofed and walled, entirely surround Manganese-Bearing Bulk Material, and be designed, permitted and constructed in accordance with applicable Building Code requirements.

b) They shall be properly maintained.

c) They shall use a permitted air pollution control system and/or have the ability to apply water to materials within a structure in order to control Fugitive Dust emissions sufficiently at designed vents and at any other openings, including entrances and exits; and

d) Any entrances or exits for material or Vehicles shall have overlapping flaps or sliding doors, which shall remain closed except to allow material or Vehicles to enter and leave or to allow people to enter and exit. Devices other than overlapping flaps or sliding doors may be used if the Fugitive Dust Plan demonstrates that the performance for dust control at the openings will be equivalent or superior to that of the overlapping flaps or sliding doors.

(3) Enclosure Cleaning. The Facility Owner or Operator must take measures to prevent manganese-containing fugitive dust from escaping the enclosed structure by maintaining good housekeeping practices. These practices must include, but are not limited to, the following:

a) Sweep the aisles at least once per shift on days when material is being transferred or otherwise handled; and

b) Water exterior doorways, including the floor, road, or pavement inside, outside, and near the doorways, at least once per shift on days when material is being transferred or otherwise handled.

6.0 Filter-Based Metals Monitoring at Manganese-Bearing Bulk Material Facilities. The Facility Owner or Operator of a Manganese-Bearing Bulk Material Facility must install, operate, and maintain, according to manufacturer's specifications, one Federal Reference Method (FRM) PM10 filter-based monitoring site at the Facility in accordance with the requirements specified below:

a) The Facility Owner or Operator must submit to the Department, for review and approval, a metals monitoring plan that sets forth a proposed location for the FRM monitor. Once approved, the manganese monitoring plan shall become a part of the Facility's Fugitive Dust Plan. The metals monitoring plan shall include a description of the placement, operation, and maintenance of the FRM monitor required under this section.

b) The FRM monitor shall be placed at a location specified in the approved metals monitoring plan required under 6.0(a) and consistent with the most recent U.S. Environmental Protection Agency protocols and guidance for ambient air quality monitoring siting criteria.

c) PM10 concentrations from filter-based sampling shall be determined according to 40 CFR 50, Appendix J to Part 50 – "Reference Method for the Determination of Particulate Matter as PM10 in the Atmosphere."

d) The PM10 filter-based instruments shall meet the specifications of FRM monitors, and the filter-based sampling shall follow the 3-day EPA Monitoring Schedule for 2018, each as posted on the U.S. Environmental Protection Agency website.

e) The PM10 filters collected will undergo gravimetric analysis and determination of the concentration of manganese in the collected sample. In addition, the collected sample will undergo gravimetric analysis and determination of the concentration of other toxic or hazardous substances, which may include arsenic, cadmium, chromium, lead, nickel, and vanadium, if the Department determines that the materials handled at the Facility are likely to contain such substances. The analyses and determinations must be specified in the approved metals monitoring plan and follow a current FRM/FEM laboratory method listed by the U.S. Environmental Protection Agency.

f) All data collected shall be consistent with units in the National Ambient Air Quality Standards for PM10, and ambient monitoring practices must comply with the most recent U.S. Environmental Protection Agency protocols and guidance for ambient air quality monitoring, including but not limited to those for quality assurance, data completeness, calibration, inspection, maintenance, and site and instrument logs.

g) The Facility Owner or Operator shall maintain a log of all routine and non-routine maintenance and calibration activities associated with each fugitive dust monitor.

h) Manganese concentrations as monitored under this section shall not exceed the ML. Exceedance of the ML constitutes a condition detrimental to health and is a violation of Section 7-28-060 of the Code.

i) On a monthly basis, the Facility Owner or Operator shall submit the raw laboratory data from the FRM filter-based PM_{10} monitor. The monthly filter-based monitoring reports shall be submitted within 28 days of the end of the month in which the data was collected, via email to CDPHPermits@cityofchicago.org, in a format specified by the Department.

PART E: OUTDOOR STORAGE OF BULK SOLID MATERIALS OTHER THAN COKE OR COAL

7.0 Outdoor Bulk Solid Material Storage. The Facility Owner or Operator may maintain outdoor Bulk Solid Material storage if the Facility meets all of the following requirements.

(1) Setbacks. Bulk material storage piles shall be located in accordance with setback requirements established in the Chicago Zoning Ordinance.

(2) Height Limit. The vertical distance from grade immediately adjacent to a pile to the highest point of that pile shall be no greater than 30 feet. The Facility Owner or Operator shall install and maintain a post or other visible measurement marker to demonstrate the height of each pile.

(3) Protection of Waterways. Outdoor storage piles shall be set back at least 50 feet from any waterway, except that material in the process of being unloaded from or loaded to a barge may be located within 50 feet of a waterway for a period of time not to exceed 24 hours so long as no materials will fall, erode, be thrown, discharged, dumped, disposed of, or deposited in the waterway at any time.

(4) High Wind Events. Disturbance of outdoor Bulk Solid Material piles, including but not limited to outdoor loading, unloading, and any other Processing, shall be suspended during High Wind Conditions, as detected by the wind monitor required under 3.0(6), unless alternate measures are implemented to effectively control dust in accordance with the approved Fugitive Dust Control Plan.

(5) Dust Suppressant System. The Facility Owner or Operator must apply Chemical Stabilizers and/or maintain and operate water spray bars, a misting system, water spray systems and/or water trucks to prevent Fugitive Dust emissions in violation of 3.0(2), in accordance with the following requirements:

a) Except pursuant to 7.0(5)(c) below, the dust suppressant system shall be operable and able to dispense water, water-based solutions, and/or Chemical Stabilizers at all times unless all bulk storage material piles are covered.

b) When the temperature falls below 32 degrees Fahrenheit, the Facility must use Chemical Stabilizers and/or water heating systems to ensure that dust suppression continues.

c) If any part of the dust suppressant system is undergoing maintenance or otherwise becomes inoperable, the Facility Owner or Operator must suspend disturbance of Bulk Material piles that would be controlled by the inoperable portion of the dust suppressant system until such time as the system becomes operable again.

(6) Runoff Management. The Facility Owner or Operator shall install and maintain stormwater management, erosion and sediment controls sufficient to:

a) Prevent runoff from the pile onto neighboring parcels, public ways, or any water bodies;

b) Prevent runoff from entering into public sewers or any entry points into the stormwater collection system, unless such discharges are in compliance with all applicable discharge permits;

c) Address timely and effective ways to respond to spills and/or visible migration of pollutants that could occur onsite or offsite;

d) Demonstrate that the site is graded in such a way as to ensure proper drainage and to prevent pooling of water; and

e) Ensure compliance with an approved Stormwater Management Plan pursuant to Chapter 11-18 of the Municipal Code, as applicable.

PART F: COMPLIANCE

8.0 Implementation Schedule. These Rules shall take effect in three phases as follows:

(1) Parts A, B, C, E, and F shall take effect immediately upon issuance of these Rules;
(2) Part D, Section 6.0(a) shall take effect within thirty days.
(3) All other Sections of Part D shall take effect ninety days from the issuance of these Rules.

The Commissioner may, at the Commissioner's sole discretion, grant extensions of the timeframes provided, in accordance with the Variance provisions set forth in 10.0 below, upon request and only for good cause shown by the Facility Owner or Operator.

9.0 Penalties. In accordance with Section 11-4-810 of the Code, any person who violates any provision of these Rules shall be fined not less than $1,000 nor more than $5,000. Each day of any violation of these Rules shall constitute a separate and distinct offense, and for each such violation the fines imposed shall be assessed per day.

10.0 Variance from Rules.

(1) Applications for a Variance. The Facility Owner or Operator may apply to the Commissioner for a variance from any Regulation set forth in Parts B, D, E, or F above in accordance with the provisions set forth in 10.0(2) below.

(2) Requirements of the Variance Application. The request for a variance must be in writing and must set forth, in detail, all of the following:

a) A statement identifying the regulation or requirement from which the variance is requested;

b) A description of the process or activity for which the variance is requested, including pertinent data on location, size, and the population and geographic area affected by, or potentially affected by, the process or activity;

c) The quantity and types of materials used in the process or activity in connection with which the variance is requested, as appropriate;

d) A demonstration that issuance of the variance will not create a public nuisance or adversely impact the surrounding area, surrounding environment, or surrounding property uses;

e) A statement explaining:

i. Why compliance with the Rules imposes an arbitrary or unreasonable hardship;

ii. Why compliance cannot be accomplished during the required timeframe due to events beyond the Facility Owner or Operator's control such as permitting delays or natural disasters; or

iii. Why the proposed alternative measure is preferable.

f) A description of the proposed methods to achieve compliance with the Rules and a timetable for achieving that compliance, if applicable;

g) A discussion of alternate methods of compliance and of the factors influencing the choice of applying for a variance;

h) A statement regarding the person's current status as related to the subject matter of the variance request;

i) For any request for a variance from the enclosure deadline set forth in 6.0(5), the applicant must submit all of the information required in sections 10.0(2)(a) through (h) above and shall also submit 1) fugitive dust monitoring reports for the four months prior to the date of the variance application and 2) in the event that the variance is granted, monthly fugitive dust monitoring reports for the duration of the variance which shall be due fourteen (14) days following the end of the month which the report covers. The monthly fugitive dust monitoring reports required by this section shall be submitted in an electronic format as specified in the Variance.

(3) Criteria for Reviewing Applications.

a) In determining whether to grant a variance, the Commissioner will consider public comments received pursuant to 10.0(4) and will evaluate the information provided in the application to meet the requirements of 10.0(2). Particular consideration will be given to the following information:

i. Inclusion of a definite compliance program;

ii. Evaluation of all reasonable alternatives for compliance;

iii. Demonstration that any adverse impacts will be minimal.

b) The Commissioner may deny the variance if the application for the variance is incomplete or if the application is outside the scope of relief provided by variances.

c) The Commissioner may grant a variance in whole or in part, and may attach reasonable conditions to the variance, or require alternative measures, to ensure minimization of any adverse impacts and to accomplish the purposes of Chapter 11-4 of the Code.

d) Issuance of a variance is at the sole discretion of the Commissioner. A variance may be revoked at any time if the Commissioner finds that operation of the Facility is creating a public nuisance or otherwise adversely impacting the surrounding area, surrounding environment, or surrounding property uses.

(4) Change in Facility Operations. If any part of the Facility's operation that is the subject of the variance expands or changes, then, at least thirty (30) days prior to the expansion or change in operation, the Facility Owner or Operator shall notify the Commissioner and either a) apply for a new variance or b) notify the Commissioner of the Owner or Operator's intent to comply with the regulation(s) that were the subject of the variance, in which case the variance will automatically terminate.

(5) Notice of Variance Applications. The Commissioner will not grant any variance under this section until members of the public have had an opportunity to submit written comments on the variance application. Public notice of all variance applications will be provided by publication in a newspaper of general circulation published within the city and by publication on the city's website. The Commissioner will accept written comments for a period of not less than thirty (30) days from the date of the notice.

11.0 Other Laws. These Rules in no way affect the responsibilities of the Facility owner and operator to comply with all other applicable federal, state or City laws, ordinances, or Rules, including but not limited to those regarding the construction, operation, maintenance, and closure of the Facility.

12.0 Severability. If any clause, sentence, paragraph, subsection, Section, or Part of these Rules is adjudged by any court of competent jurisdiction to be invalid, that judgment shall not affect, impair or invalidate the remainder of these Rules, but shall be confined in its operation to the clause, sentence, paragraph, subsection, Section or Part to which the judgment is rendered.

Exhibit 9

Inhalation of Fugitive Dust:

A Screening Assessment of the Risks Posed by Coal Combustion Waste Landfills

DRAFT

U.S. Environmental Protection Agency
Office of Solid Waste and Emergency Response
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460

May 2010

Table of Contents

1.0 Introduction

Inhalation of Fugitive Dust is intended to be a companion document to the U.S. Environmental Protection Agency's (EPA) 2009 *Human and Ecological Risk Assessment of Coal Combustion Wastes* (U.S. EPA, 2009). In 2007, EPA released its draft risk assessment (U.S. EPA, 2007). This document was released to a panel of five peer reviewers, and to the public via a notice of data availability (NODA) in the Federal Register.[1] In both the peer review and NODA, EPA received comments regarding fugitive dust. These comments pointed out that fugitive dust emissions during the operation of a coal combustion waste (CCW) management unit (WMU) were not addressed in the draft risk assessment (RA). However, since there was anecdotal evidence that fugitive dust was often emitted from WMUs, EPA decided to examine the potential for uncontrolled emissions from dry handling to lead to significant human health risks.

Figure 1 and Figure 2

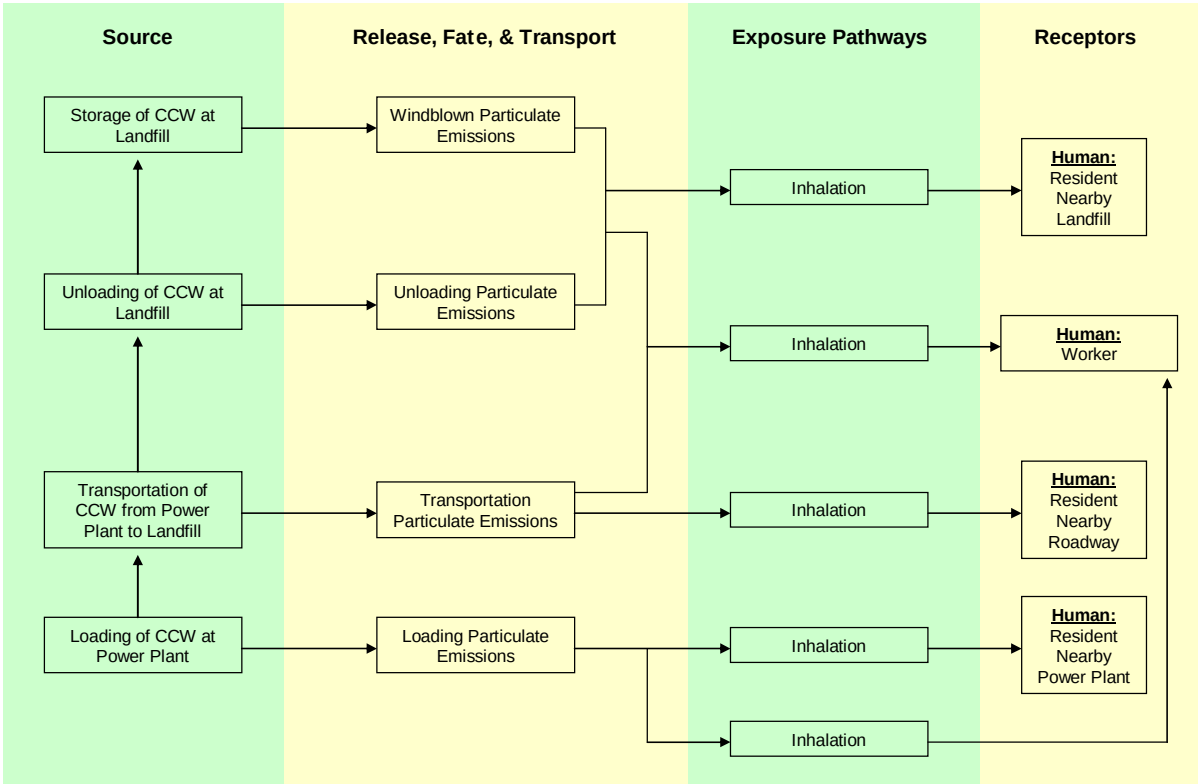
Fugitive dust associated with CCW landfilling operations.
***Top**: Gambrills, MD; **Bottom**: Four Corners, NM.*[2]

[1] Docket ID: EPA-HQ-RCRA-2006-0796. Document ID: EPA-HQ-RCRA-2006-0796-0042.
[2] Photos courtesy of Lisa Evans, Earthjustice

2.0 Inhalation of CCW Emitted from Landfilling Operations

When dry-handled, CCW will be emitted into the air by loading, transport, unloading, and wind erosion. Once in the air, it will likely migrate off-site as fugitive dust. As a result, workers and nearby residents could be exposed to significant amounts of coarse particulate matter (PM_{10}) and fine particulate matter ($PM_{2.5}$). The purpose of this assessment is therefore to assess whether the national ambient air quality standards (NAAQS) for particulate matter could be violated through CCW landfilling operations[3] without fugitive dust controls. This will be accomplished through a conservative screening analysis. Figure 3 below shows the conceptual model for the type of landfilling operation relevant here. If the inhalation pathway cannot be screened out, then it is possible for fugitive dust to pose a threat to human health, and regulation addressing fugitive dust should be considered. Conversely, if the inhalation pathway can be screened out, then it is highly unlikely that the inhalation of particulates from CCW landfills poses a significant risk to human health. However, there are two uncertainties inherent in this bright line screen evaluated in this report. First, there may be background levels of particulates which, when added to the levels calculated here may still pose significant risks. Second, it would still be possible for constituents adsorbed onto CCW particulates to pose a risk to human health. This screening evaluation does not address either background levels of particulates or a constituent-based exposure pathway.

Figure 3 – Fugitive Dust Conceptual Model for Dry Handling of CCW



[3] This does not include activities such as minefilling, reclamation of sand and gravel pits, or beneficial use.

2.1 Initial Scenario

Three groups of residents are likely to be exposed to fugitive dust as a result of the dry handling of CCW.[4] Residents living near a coal power plant could be exposed to emissions resulting from loading of the CCW. Residents near roads could be exposed to emissions during transportation. Finally, residents living near CCW landfills could be exposed from both the unloading and windblown emissions.

Residents living near a CCW landfill will often be exposed to more fugitive dust, and for longer periods of time, than those living near the roads or power plants themselves. This is the case because these residents would be exposed to emissions from both unloading of CCW and windblown emissions of CCW. Thus, only the residents living near CCW landfills will be considered further as they represent a highly exposed population. In addition, as a landfill gets closer to capacity, the less relative influence unloading emissions would have on total emissions. In the preliminary scenario considered, the entire landfill is left exposed to wind until the end of its useful life. Thus, windblown emissions could be considered representative of total emissions as they would dominate.

To estimate the concentration of fugitive dust in the air near a CCW landfill, the SCREEN3 model was used.[5] SCREEN3 (a screening version of ISC3) is a single source Gaussian plume model which provides maximum ground-level concentrations for point, area, flare, and volume sources. It was developed to provide an easy-to-use method of obtaining pollutant concentration estimates based on *Screening Procedures for Estimating the Air Quality Impact of Stationary Sources* (U.S. EPA, 1995c). A technical description of the SCREEN3 model is provided in Appendix E. The SCREEN3 outputs will then be compared to the relevant NAAQS as presented in Table 1 below.

Table 1 – NAAQS for Particulate Matter

Pollutant	Standard	Averaging Time
PM_{10}	150 $\mu g\ m^{-3}$	24-hour
$PM_{2.5}$	15.0 $\mu g\ m^{-3}$	Annual
$PM_{2.5}$	35 $\mu g\ m^{-3}$	24-hour

See 40 C.F.R. 50[6]

2.2 Emission Factors

In order to model the concentration of the particulate matter in the air, it is necessary to estimate the emission rate for the CCW managed in landfills. A point estimate for the windblown emission factor was calculated below using the equation for "Continuous Fugitive/Windblown Dust Emissions" (U.S. EPA, 1992):

[4] Workers who handle CCW would also be exposed to fugitive dust, but they are protected by OSHA regulations.
[5] SCREEN3 is publicly available at http://www.epa.gov/scram001/dispersion_screening.htm
[6] NAAQS available at http://www.epa.gov/air/criteria.html

$$E = 1.9\left(\frac{s}{1.5}\right)\frac{(365-p)}{235}\left(\frac{w}{15}\right)$$

where:

E = emission factor (kg d^{-1} ha^{-1})
s = material silt content (%)
p = number of days per year with more than 25 mm of precipitation (N/A)
w = percent of time wind speed exceeds 5.4 m s^{-1} (%)

The material silt content of 80% for fly ash was taken from Table 13.2.4-1 in AP-42, chapter 13 (2006). The default values in the workbook (U.S. EPA, 1992) of 0 for p and 20% for *w* were used in calculating this emission factor. The result (209.85 kg d^{-1} ha^{-1}) was converted to g s^{-1} m^{-2}, with a final emission rate of 2.43 x 10^{-4} g s^{-1} m^{-2}. While there are likely a range of emission factors, this screening assessment was not designed to evaluate all possible fugitive dust scenarios. Rather, the purpose is only to see if fugitive dust from dry-handling of CCW would likely pose a significant risk to human health. Thus, EPA believes its use of a best estimate emission factor is appropriate.

2.3 Length/Width, Distance to Receptor

Two other factors necessary to model fugitive dust are the length/width of the landfill and the distance to the receptor. Unlike the emission factor, EPA decided to use a range for these inputs. While it would have been possible to use a point estimate, there were orders of magnitude of difference between the smallest and largest CCW landfills and between the shortest and furthest distances to receptors. Thus, EPA used a range of percentiles to model the upper end of particulate matter that could reasonably be expected in the air breathed by a receptor. In keeping with the conservative nature of this assessment, the 50th through 90th percentiles of size and 10th through 50th percentiles of distance were used. The maximum size and minimum distance were excluded as they would be too conservative to be considered reasonable.

To be as realistic as possible, EPA based the landfill dimensions on actual CCW landfill data provided by the Council of Industrial Boiler Owners (CIBO, 1997) and Electric Power Research Institute (EPRI, 1997). Of the data available in those reports, 124 WMUs were landfills. These landfills were arranged to form a size distribution (in acres), and percentiles were calculated. These can be seen in Table 2 below. These distributions were converted from acres into square meters. The assumption was then made that the landfills were square. This allowed the calculation of the length and width of the landfills, reported as the side length in Table 2 below. For a further discussion of the landfill size distribution, see Appendix A – Landfill Size Data.

Table 2 – Distribution of Landfill Sizes

Percentile	in Acres	in m^2	side length (m)
50th	66.5	269,116	518.8
60th	85.0	343,983	586.5
70th	121.4	491,288	700.9
80th	208.4	843,365	918.3
90th	297.6	1,204,344	1,097.4

Raw data and percentiles are provided in Appendix A.

Distance to the nearest receptor, on the other hand, was not based on actual CCW landfill distances as no such data exists. While EPA acknowledges that this data would be useful, there is not sufficient time and resources to collect this data. Instead, because the receptors of interest are residents living near a CCW landfill, it is assumed that the distribution of closest receptors here would be the same as the distribution used in the RA. These can be seen in Table 3 below. For a further discussion of the landfill size distribution, see Appendix B – Distance to Receptor Data.

Table 3 – Distribution of Receptor Distances

Percentile	Distance (m)
10th	104
20th	183
30th	305
40th	366
50th	427

Further discussion and percentiles are provided in Appendix B.

Taken together, the combinations of sizes and distances to be modeled will attempt to provide both a true median (50th, 50th) and upper tail (90th, 10th) of the input distribution that would be modeled in a probabilistic assessment. Thus, although the model itself has a conservative bias, the results endeavor to present both a typical and upper tail risk.

2.4 Other Input Parameters for SCREEN3

In addition to the emission rates, the following input parameters are also required for the SCREEN3 modeling runs.

- Source Type: Area was chosen because the emissions would be coming off a landfill and not from a smokestack or other point source.
- Height of CCW Landfill: A height of 0m was chosen based on the assumption that the landfill would be dug into the ground, and not elevated. It was also a conservative assumption as elevated landfills actually generate lower particulate matter emissions for nearby receptors. This issue is addressed further in Appendix C.
- Receptor Height: 1.75m was chosen to be protective of a typical human receptor. (This is approximately the height in meters of a 5’9” individual.) This assumption is addressed further in Appendix C.
- Urban or Rural: Rural was chosen because CCW landfills are much more likely to be located in a rural setting. In addition, it is more conservative than the urban option. This issue is addressed further in Appendix C.
- Search for Maximum Direction: A positive setting was chosen as a conservative assumption so that the maximum air concentration would be located.

SCREEN3 requires the user to specify the modeling area. This area is the range of distances from the center of the source where SCREEN3 will estimate maximum concentrations. For this

study, the modeling area was defined as the region from 0 to 1,500m (just under a mile) from the center of the source to ensure that the 50th percentile distance listed above would be included. In addition, there is a user option to specify discrete distances. These are specific distances from the center of the source where the user can request SCREEN3 to estimate maximum concentrations. This specific distance is the distance to the receptor that is chosen from the distribution in Table 3 above.

Table 4 – Input parameters for SCREEN3

Parameter Description	Value
Source type	Area
Emission rate ($g/s\text{-}m^2$)	0.000243[1]
Height of storage pile (m)	0
Length of storage pile (m)	Variable[2]
Width of storage pile (m)	Variable[2]
Receptor height (m)	1.75
Urban or Rural	Rural
Search for maximum direction	Yes
Choice of meteorology	Full
Automated distance array	Yes
Minimum distance (m)	0
Maximum distance (m)	1500
Use discrete distances	Yes
Distance (m)	Variable[3]

[1] Calculated using the workbook (U.S. EPA, 1992)

[2] Based on EPRI landfill size data (EPRI, 1995)

[3] Based on landfill to well distances (U.S. EPA, 1988)

2.5 SCREEN3 Outputs

Using the inputs listed in Table 2, 3, and 4, SCREEN3 was used to estimate the concentration of CCW in the air at ground level under the windblown erosion scenario. After running the model with both 50th percentile values plugged in, a result of 13,390$\mu g\ m^{-3}$ was obtained. Since the values generated by SCREEN3 are maximum values, they should be compared to the 24-hour NAAQS. However, even under the assumption that 100% of the CCW was PM_{10}, this would still violate the 24-hour NAAQS for PM_{10} of 150 $\mu g\ m^{-3}$ by nearly two orders of magnitude. This indicates that the risks posed by fugitive dust cannot be screened out if no dust controls are applied before closure, and therefore it was unnecessary to run the screen with other percentiles.

3.0 Secondary Scenarios

Given that the risks of uncontrolled fugitive dust emissions could not be screened out, the next logical question was whether or not the risks given particular management options could be screened out. Perhaps covering or spraying the CCW on a regular basis to prevent emissions

could be adequate to protect human health. The appropriate question then is how frequently these controls should be applied to ensure the NAAQS are not exceeded. Some possible time frames might be yearly, monthly, weekly, and daily. To model these scenarios, caveats and additional information are required. First, assuming that a landfill is operated consistently over its life time, the life will affect how much of the landfill is being used over any period of time. In a previous groundwater risk assessment, EPA estimated that the operating life of a CCW landfill is 40 years (U.S. EPA, 1998a). EPA believes that this is still an accurate estimate, and thus, it is assumed for this assessment that all landfills will operate for 40 years. Since a landfill is assumed to operate consistently over a 40-year life, then the area of the landfill that is operated during any year can be stated as:

$$A_{yr} = \frac{A_{total}}{40}$$

where:

A_{yr}	=	the area of the landfill in use over a year (m^2)
A_{total}	=	the total landfill capacity (m^2)
40	=	life of a CCW landfill (N/A)

Once the portion of the WMU used over a single year is estimated, then it is also possible calculate the area of the landfill used monthly, weekly, and daily as follows:

$$A_{month} = \frac{A_{yr}}{12} \qquad A_{wk} = \frac{A_{yr}}{52} \qquad A_{d} = \frac{A_{yr}}{365}$$

where:

A_{month}	=	the area of the landfill in use over a month (m^2)
A_{wk}	=	the area of the landfill in use over a week (m^2)
A_{d}	=	the area of the landfill in use over a day (m^2)
A_{yr}	=	the area of the landfill in use over a year (m^2)
12	=	the number of months in one year (N/A)
52	=	the number of weeks in one year (N/A)
365	=	the number of days in one year (N/A)

Performing these calculations on each percentile from Table 2 above, the areas and side lengths for the portion of the WMU operated over each period of time is as follows:

Table 5 – Area (m^2) and Side (m) Distributions

	Yearly		Monthly		Weekly		Daily	
%ile	**Area**	**Side**	**Area**	**Side**	**Area**	**Side**	**Area**	**Side**
50th	6,728	82.0	561	23.7	129	11.4	18	4.3
60th	8,600	92.7	717	26.8	165	12.9	24	4.9
70th	12,282	110.8	1024	32.0	236	15.4	34	5.8
80th	21,084	145.2	1757	41.9	405	20.1	58	7.6
90th	30,109	173.5	2509	50.1	579	24.1	82	9.1

All values based on assumption that a WMU operates consistently for 40 years.

Here again, the size of the operating portion of the landfill is assumed to be a square, so each side is the square root of the area. One final assumption that must be made is the location of this operating portion of the landfill with respect to the receptor. For simplification, it will be assumed that the operating portion is in the very center of the landfill. Using the center will give results that estimate an average concentration over the entire lifetime of the landfill for a receptor located in any direction. This assumption is consistent with EPA's previous risk assessment where the air pathway was modeled (U.S. EPA, 1998b).

3.1 Model Runs and Outputs

The model was first run entering the 50th percentile values for both side length and distance to receptor. If this median exposure could not be screened, then higher risk scenarios were not evaluated. The results of these screens are presented in Table 6 below.

Table 6 – Median Scenario Outputs ($\mu g\ m^{-3}$)

Period	Particulates	Pass Screen? [1]
Yearly	1388	NO
Monthly	159.4	NO
Weekly	38.0	YES
Daily	5.4	YES

[1] The screen was passed if the NAAQS would not be exceeded.

Since weekly and daily controls for fugitive dust passed the screen using the median scenario inputs, further permutations of inputs were entered into the model to determine the likelihood that operating with this frequency of controls would be adequate to protect human health. These results are reported in Tables 7 and 8 below.

Table 7 – SCREEN3 Outputs ($\mu g\ m^{-3}$), Weekly Fugitive Dust Controls

	Distance to Nearest Receptor				
Landfill Size	**50th**	**40th**	**30th**	**20th**	**10th**
50th	38.0	44.3	52.5	78.3	107.5
60th	44.9	51.9	60.9	88.4	118.4
70th	56.6	64.3	74.2	104.0	134.6
80th	78.0	87.1	98.1	129.1	***159.5***
90th	95.9	105.9	117.8	149.1	***178.4***

See Appendix D for raw inputs and outputs.

Table 8 – SCREEN3 Outputs ($\mu g\ m^{-3}$), Daily Fugitive Dust Controls

	Distance to Nearest Receptor				
Landfill Size	**50th**	**40th**	**30th**	**20th**	**10th**
50th	5.4	6.4	7.6	11.3	15.7
60th	6.5	7.6	8.9	13.0	17.6
70th	8.1	9.2	10.7	15.1	19.7
80th	11.3	12.7	14.3	19.0	23.6
90th	13.9	15.42	17.2	21.9	26.4

See Appendix D for raw inputs and outputs.

4.0 Results and Discussion

As seen in Tables 6, 7, and 8, the risks posed by fugitive dust inhalation could not be screened out for every management time frame. However, certain conclusions can be drawn for each management consideration. The discussion of each time frame is below, but should be interpreted with several overarching uncertainties in mind.

- The SCREEN3 model is a conservative screening model. Thus, in most instances, the levels of particulate matter calculated here are likely higher than they actually would be.

- As the area of the landfill exposed to wind erosion decreases due to more frequent controls, unloading emissions would become a much more significant proportion of total emissions. Hence, the more frequently controls are used, the more important it would be to include unloading emissions to calculate an accurate concentration.

- Background levels of particulates were not factored into these calculations. Thus, the particulates calculated here could actually underestimate total particulates.

- The distances to the nearest receptor are not based on recent CCW landfill survey data and may therefore lead to an underestimate or overestimate of particulate levels.

- In the secondary scenarios, the operating portion of the landfill was assumed to be in the center of the landfill and not on the downwind edge. This may lead to an underestimate of particulate levels when that edge portion is used.

- A single emission factor was calculated based on national default inputs. For particular sites, the calculated emission factor could be higher or lower.

Finally, there are a few general trends between the inputs and outputs examined in Appendix C. With respect to the location of WMUs, those located in rural settings will cause much higher particulates concentrations than those in urban settings. Since a rural setting was assumed here, it is possible that some WMUs would present much lower risks to human health through the inhalation of fugitive dust. In addition, it was shown that landfills that are built up, as opposed to dug into the ground, would actually lead to lower particulates concentrations nearby. Thus, in the case of built up landfills, nearby residents would be presented with less risk than what was modeled here. However, receptors may be at ground level, presenting slightly higher risks.

4.1 Controls Applied Yearly

Even at the median risk, yearly management leads to a PM_{10} concentration almost an order of magnitude above the NAAQS. Although larger landfills and closer receptors were not modeled, they would have resulted in even higher exceedences. Therefore, controls applied only at the end of each operating year fail the screen, and have the potential to pose a significant risk to human health.

4.2 Controls Applied Monthly

At the median risk, monthly management leads to a PM_{10} concentration barely above the NAAQS. Although larger landfills and closer receptors were not modeled, they too would have resulted in exceedences. Consequently, controls applied each operating month fail the screen as run, and have the potential to pose a significant risk to human health.

4.3 Controls Applied Weekly

At the median risk, weekly management did not exceed the NAAQS for PM_{10}. Only if most or all of the particulates were $PM_{2.5}$ would there be any exceedance. However, this is not the case because CCW typically consists of only a few percent of $PM_{2.5}$ (EPRI, 1995). When larger landfills and closer receptors were modeled, most did not result in excess risk. Only when receptors were within the closest 10% of the distribution (within about 100m), and landfill sizes were large (over about 200 acres) did levels above the NAAQS result. Thus, in isolation, it is relatively likely that the median would not lead to excessive levels of particulates but that the upper tail could. Thus, the results are mixed, and it is uncertain whether these emissions alone would have the potential to pose a significant risk to human health.

4.4 Controls Applied Daily

At the median risk, daily management did not exceed the NAAQS for PM_{10} or $PM_{2.5}$. Even when larger landfills and closer receptors were modeled, most concentrations fell well below the NAAQS. Taken in isolation, it is certain that neither the median nor the upper-tail scenario would lead to excessive levels of particulates. Thus, without considering background levels, a weekly fugitive dust control would be sufficient to protect human health.

5.0 Conclusion

The purpose of this screening assessment was to determine whether the NAAQS could be violated through dry handling of CCW, and if so, what management options might be appropriate. Indeed, it was found that there is not only a possibility, but a strong likelihood that dry-handling would lead to the NAAQS being exceeded absent fugitive dust controls. Yearly and monthly controls were also found to have the potential to lead to significant risks. However, with this screen, it was uncertain whether weekly controls would have the potential to cause NAAQS exceedences, and even the most conservative evaluation of daily dust controls led to particulate concentrations well below the NAAQS. Thus, without further, more precise

evaluation, only daily controls can definitively be said not to cause excess levels of particulates in isolation.

6.0 References

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Appendix A – Landfill Size Data

The source of the data provided below was the compiled data set of CCW landfills and surface impoundments from Appendix B of the RA (U.S. EPA, 2007). That data set was derived from two voluntary industry surveys. The first was an EPRI comanagement survey for conventional utility coal combustion WMUs (EPRI, 1997). The second was a CIBO fluidized bed combustion (FBC) survey for FBC WMUs (CIBO, 1997). The EPRI survey included responses from 323 WMUs. These WMUs served 238 power plants in 36 states, and represented 62 million tons of CCW disposal annually. The CIBO survey included 45 responses from the estimated 84 facilities using FBC technology. While most of these facilities reported beneficially using CCW, 8 of those facilities reported disposing of CCW, and those that landfilled were included in this analysis.

Rank	LF Acres
1	3.4
2	4
3	4.61
4	8
5	9
6	9
7	10
8	11.77391
9	12
10	12
11	13
12	14
13	14
14	15
15	16.4
16	17
17	17
18	18
19	18
20	20
21	20
22	21.3
23	22
24	22
25	22
26	23
27	25
28	25.24
29	25.75
30	26
31	26
32	27
33	28.68322

34	30
35	30
36	30
37	33
38	35
39	36
40	36
41	37
42	38
43	39
44	40
45	40
46	40
47	41.2
48	45
49	45
50	48
51	49.20163
52	51
53	54
54	55
55	57
56	58
57	60
58	60
59	60
60	61
61	61
62	65
63	68
64	68
65	69
66	70
67	70
68	70
69	72
70	79
71	80
72	80
73	85
74	85
75	85
76	96
77	96
78	99
79	100
80	100
81	105

82	106
83	109
84	110
85	112.5
86	120
87	121
88	125
89	125
90	128.6242
91	130
92	150
93	155
94	174
95	176
96	200
97	200
98	200
99	206
100	212
101	220
102	230
103	241
104	246
105	247
106	250
107	250
108	255
109	280
110	290
111	292
112	300
113	300
114	309
115	312
116	315
117	320
118	339
119	400
120	434
121	540
122	596
123	825
124	900

Percentile	in Acres	in m²	side (m)
Min	3.4	13,759	117.3
5th	10.3	41,545	203.8
10th	14.3	57,870	240.6
15th	18.9	76,486	276.6
20th	22.6	91,459	302.4
25th	26.8	108,253	329.0
30th	34.8	140,831	375.3
35th	40.0	161,874	402.3
40th	48.2	195,222	441.8
45th	58.7	237,550	487.4
50th	66.5	269,116	518.8
55th	71.3	288,541	537.2
60th	85.0	343,983	586.5
65th	104.8	423,908	651.1
70th	121.4	491,288	700.9
75th	159.8	646,485	804.0
80th	208.4	843,365	918.3
85th	248.7	1,006,251	1,003.1
90th	297.6	1,204,344	1,097.4
95th	336.2	1,360,351	1,166.3
Max	900.0	3,642,170	1,908.4

Appendix B – Distance to Receptor Data

The residential scenario for the fugitive dust pathway analysis calculates exposure from a CCW landfill's emissions to the air. The receptor distances used were based on the distances used for residential wells in the RA (U.S. EPA, 2007). This assumes that the residence closest to a landfill would be the same residence that has the closest downgradient well. EPA believes this to be an adequately protective assumption since the closest distance is less than a meter, or directly against the edge of a landfill.

The well distances themselves were derived from sampling a nationwide distribution of the nearest downgradient residential well distances taken from a survey of municipal solid waste landfills (U.S. EPA, 1988). EPA recognizes that this is a significant uncertainty in the analysis. Based on an assumption that population densities around CCW landfills are roughly comparable to population densities that existed near the municipal landfills surveyed in U.S. EPA (1988), EPA believes that the MSW well distance distribution is a roughly representative of actual distances between CCW landfills and nearby residences. However, since not all residences have downgradient wells, there could be closer residences in other instances. While further data on the distances to the nearest residence would be useful to the analysis, such data is not readily available at this time.

Distribution of Receptor Distances

Percentile	Distance (m)
Min	0.6
10th	104
20th	183
30th	305
40th	366
50th	427
60th	610
70th	805
80th	914
90th	1,220
Max	1,610

Source: U.S. EPA (1988)

Appendix C – Sensitivity of Results to Inputs

Several assumptions about WMUs were made in Section 2.4. Among these were three assumptions that do not always hold true. The first was that WMUs will be located in rural locations. In fact, some coal power plants are located in or adjacent to major metropolitan areas. Second, it was assumed that the landfills would be dug into the ground, and would therefore have a height of 0m. However, there are landfills that are built up meters or tens of meters. Finally, it was assumed that the receptor was a standing individual of a typical height. Yet, this ignores situations where individuals are sitting, laying down, or even where infants are crawling. Therefore, to ensure that the model remained properly conservative, further runs were conducted to determine what affect (if any) altering these inputs would have on the modeled particulate matter concentrations.

The assumptions made in the actual screen turned out to be conservative, with the exception of the receptor height. As seen in the table below, air particulate matter concentrations in an urban setting tend to be much lower than those in a rural setting. Also evident is that piles that elevated tend to decrease the air concentrations to nearby receptors. However, the receptor at 0m would have slightly elevated particulates concentrations. While these tend to be very small percentage changes, they could underestimate the particulates lower receptors would be exposed to.

Comparison of Outputs Changing Rural/Urban and Height Inputs ($\mu g\ m^{-3}$)

Percentiles (size/distance)	as Modeled	in Urban Setting	with 10m Height	with 0m Receptor
50/50	5.4	0.6	3.6	6.8
60/40	7.6	0.8	4.8	7.7
70/30	10.7	1.1	6.8	10.8
80/20	19.0	1.9	11.9	19.3
90/10	26.4	2.7	17.8	26.8

All outputs were calculated under the daily management scenario

Appendix D – SCREEN3 Model Runs

The SCREEN3 model was run a total of 65 times to generate the data in this report. Below are the inputs and outputs for each model run. Table D.1 lists all of the common inputs used for all 65 model runs and Tables D.2 through D.7 list all of the uncommon inputs and the resulting outputs for each combination. It is important to note that the discrete distances entered here were calculated by adding the distance from the center of the landfill to the edge and the distance from the edge of the landfill to the receptor. The distance from the center of the landfill to the edge of the landfill was ½ the side length from the Table 2 distribution, and the distance from the edge of the landfill to the receptor was the Table 3 distribution.

Table D.1 – Common Inputs for SCREEN3

Parameter Description	Common Value
Source type	Area
Emission rate (g/s-m^2)	0.000243[1]
Height of storage pile (m)	0[2]
Receptor height (m)	1.75
Urban or Rural	Rural[3]
Search for maximum direction	Yes
Choice of meteorology	Full
Automated distance array	Yes
Minimum distance (m)	0
Maximum distance (m)	1500
Use discrete distances	Yes

[1] Calculated using the workbook (U.S. EPA, 1992).

[2] 10m was selected for the five model runs in Table D.6.

[3] Urban was selected for the five model runs in Table D.7.

Table D.2 – Variable Inputs and Outputs for Whole WMU Runs

Length of Storage Pile (m)	Width of Storage Pile (m)	Distance (m)	Output (µg m^{-3})
518.8	518.8	686.4	13,390

Table D.3 – Variable Inputs and Outputs for Table 6 Runs

Length of Storage Pile (m)	Width of Storage Pile (m)	Distance (m)	Output (µg m^{-3})
82.0	82.0	686.4	1388
23.7	23.7	686.4	159.4
11.4	11.4	686.4	38.0
4.3	4.3	686.4	5.4

Table D.4 – Variable Inputs and Outputs for Table 7 Runs

Length of Storage Pile (m)	Width of Storage Pile (m)	Distance (m)	Output (µg m^{-3})
11.4	11.4	606.4	38.0
12.9	12.9	720.3	44.9
15.4	15.4	777.5	56.6
20.1	20.1	886.2	78.0
24.1	24.1	975.7	95.9
11.4	11.4	625.4	44.3
12.9	12.9	659.3	51.9
15.4	15.4	716.5	64.3
20.1	20.1	825.2	87.1
24.1	24.1	914.7	105.9
11.4	11.4	564.4	52.5
12.9	12.9	598.3	60.9
15.4	15.4	655.5	74.2
20.1	20.1	764.2	98.1
24.1	24.1	853.7	117.8
11.4	11.4	442.4	78.3
12.9	12.9	476.3	88.4
15.4	15.4	533.5	104.0
20.1	20.1	642.2	129.1
24.1	24.1	731.7	149.1
11.4	11.4	363.4	107.5
12.9	12.9	397.3	118.4
15.4	15.4	454.5	134.6
20.1	20.1	563.2	159.5
24.1	24.1	652.7	178.4

Table D.5 – Variable Inputs and Outputs for Table 8 Runs

Length of Storage Pile (m)	Width of Storage Pile (m)	Distance (m)	Output (µg m^{-3})
4.3	4.3	606.4	5.4
4.9	4.9	720.3	6.5
5.8	5.8	777.5	8.1
7.6	7.6	886.2	11.3
9.1	9.1	975.7	13.9
4.3	4.3	625.4	6.4
4.9	4.9	659.3	7.6
5.8	5.8	716.5	9.2
7.6	7.6	825.2	12.7
9.1	9.1	914.7	15.42
4.3	4.3	564.4	7.6
4.9	4.9	598.3	8.9
5.8	5.8	655.5	10.7
7.6	7.6	764.2	14.3
9.1	9.1	853.7	17.2
4.3	4.3	442.4	11.3
4.9	4.9	476.3	13.0
5.8	5.8	533.5	15.1
7.6	7.6	642.2	19.0
9.1	9.1	731.7	21.9
4.3	4.3	363.4	15.7
4.9	4.9	397.3	17.6
5.8	5.8	454.5	19.7
7.6	7.6	563.2	23.6
9.1	9.1	652.7	26.4

Table D.6 – Variable Inputs and Outputs for Urban Runs

Length of Storage Pile (m)	Width of Storage Pile (m)	Distance (m)	Output (µg m^{-3})
4.3	4.3	606.4	0.6
4.9	4.9	659.3	0.8
5.8	5.8	655.5	1.1
7.6	7.6	642.2	1.9
9.1	9.1	652.7	2.7

Table D.7 – Variable Inputs and Outputs for 10m Height Runs

Length of Storage Pile (m)	Width of Storage Pile (m)	Distance (m)	Output (µg m^{-3})
4.3	4.3	606.4	3.6
4.9	4.9	659.3	4.8
5.8	5.8	655.5	6.8
7.6	7.6	642.2	11.9
9.1	9.1	652.7	17.8

Table D.8 – Variable Inputs and Outputs for 0m Receptor Runs

Length of Storage Pile (m)	Width of Storage Pile (m)	Distance (m)	Output (µg m^{-3})
4.3	4.3	606.4	6.8
4.9	4.9	659.3	7.7
5.8	5.8	655.5	10.8
7.6	7.6	642.2	19.3
9.1	9.1	652.7	26.8

Appendix E – Excerpts from the SCREEN3 Manual

The following excerpts selected below have been taken from the SCREEN3 Model User's Guide (U.S. EPA, 1995b). Pages 43-56 provide a technical description of the air modeling equations that are used by SCREEN3.

3. TECHNICAL DESCRIPTION

Most of the techniques used in the SCREEN model are based on assumptions and methods common to other EPA dispersion models. For the sake of brevity, lengthy technical descriptions that are available elsewhere are not duplicated here. This discussion will concentrate on how those methods are incorporated into SCREEN and on describing those techniques that are unique to SCREEN.

3.1 Basic Concepts of Dispersion Modeling

SCREEN uses a Gaussian plume model that incorporates source-related factors and meteorological factors to estimate pollutant concentration from continuous sources. It is assumed that the pollutant does not undergo any chemical reactions, and that no other removal processes, such as wet or dry deposition, act on the plume during its transport from the source. The Gaussian model equations and the interactions of the source-related and meteorological factors are described in Volume II of the ISC user's guide (EPA, 1995b), and in the Workbook of Atmospheric Dispersion Estimates (Turner, 1970).

The basic equation for determining ground-level concentrations under the plume centerline is:

$$
\begin{aligned}
X = Q/(2\pi u_s \sigma_y \sigma_z)\{ & \exp[-\tfrac{1}{2}((z_r-h_e)/\sigma_z)^2] \\
& + \exp[-\tfrac{1}{2}((z_r+h_e)/\sigma_z)^2] \\
& + \sum_{N=1}^{k} [\ \exp[-\tfrac{1}{2}((z_r-h_e-2Nz_i)/\sigma_z)^2] \\
& + \exp[-\tfrac{1}{2}((z_r+h_e-2Nz_i)/\sigma_z)^2] \\
& + \exp[-\tfrac{1}{2}((z_r-h_e+2Nz_i)/\sigma_z)^2] \\
& + \exp[-\tfrac{1}{2}((z_r+h_e+2Nz_i)/\sigma_z)^2]\ ]\ \} \qquad (1)
\end{aligned}
$$

where:

X	=	concentration (g/m^3)
Q	=	emission rate (g/s)
π	=	3.141593
u_s	=	stack height wind speed (m/s)
σ_y	=	lateral dispersion parameter (m)
σ_z	=	vertical dispersion parameter (m)
z_r	=	receptor height above ground (m)
h_e	=	plume centerline height (m)
z_i	=	mixing height (m)
k	=	summation limit for multiple reflections of plume off of the ground and elevated inversion, usually ≤ 4.

Note that for stable conditions and/or mixing heights greater than or equal to 10,000m, unlimited mixing is assumed and the summation term is assumed to be zero.

Equation 1 is used to model the plume impacts from point sources, flare releases, and volume releases in SCREEN. The SCREEN volume source option uses a virtual point source approach, as described in Volume II (Section 1.2.2) of the ISC model user's guide (EPA, 1995b). The user inputs the initial lateral and vertical dimensions of the volume source, as described in Section 2.7 above.

The SCREEN model uses a numerical integration algorithm for modeling impacts from area sources, as described in Volume II (Section 1.2.3) of the ISC model user's guide (EPA, 1995b). The area source is assumed to be a rectangular shape, and the model can be used to estimate concentrations within the area.

3.2 Worst Case Meteorological Conditions

SCREEN examines a range of stability classes and wind speeds to identify the "worst case" meteorological conditions, i.e., the combination of wind speed and stability that results in the maximum ground level concentrations. The wind speed and stability class combinations used by SCREEN are given in Table 2. The 10-meter wind speeds given in Table 2 are adjusted to stack height by SCREEN using the wind profile power law exponents given in Table 3-1 of the screening procedures document. For release heights of less than 10 meters, the wind speeds listed in Table 2 are used without adjustment. For distances greater than 50 km (available with the discrete distance option), SCREEN sets 2 m/s as the lower limit for the 10-meter wind speed to avoid unrealistic transport times. Table 2 includes some cases that may not be considered standard stability class/wind speed combinations, namely E with winds less than 2 m/s, and F with winds greater than 3 m/s. The combinations of E and winds of 1 - 1.5 m/s are often excluded because the algorithm developed by Turner (1964) to determine stability class from routine National Weather Service (NWS) observations excludes cases of E stability for wind speeds less than 4 knots (2 m/s). These combinations are included in SCREEN because they are valid combinations that could appear in a data set using on-site meteorological data with another stability class method. A wind speed of 6 knots (the highest speed for F stability in Turner's scheme) measured at a typical NWS anemometer height of 20 feet (6.1 meters) corresponds to a 10 meter wind speed of 4 m/s under F stability. Therefore the combination of F and 4 m/s has been included.

Table 2. Wind Speed and Stability Class Combinations Used by the SCREEN Model

Stability Class	10-m Wind Speed (m/s)												
	1	1.5	2	2.5	3	3.5	4	4.5	5	8	10	15	20
A	*	*	*	*	*								
B	*	*	*	*	*	*	*	*	*				
C	*	*	*	*	*	*	*	*	*	*	*		
D	*	*	*	*	*	*	*	*	*	*	*	*	*
E	*	*	*	*	*	*	*	*	*				
F	*	*	*	*	*	*	*						

The user has three choices of meteorological data to examine. The first choice, which should be used in most applications, is to use "Full Meteorology" which examines all six stability classes (five for urban sources) and their associated wind speeds. Using full meteorology with the automated distance array (described in Section 2), SCREEN prints out the maximum concentration for each distance, and the overall maximum and associated distance. The overall maximum concentration from SCREEN represents the controlling 1-hour value corresponding to the result from Procedures (a) - (c) in Step 4 of Section 4.2. Full meteorology is used instead of the A, C, and E or F subset used by the hand calculations because SCREEN provides maximum

concentrations as a function of distance, and stability classes A, C and E or F may not be controlling for all distances. The use of A, C, and E or F may also not give the maximum concentration when building downwash is considered. The second choice is to input a single stability class (1 = A, 2 = B, ..., 6 = F). SCREEN will examine a range of wind speeds for that stability class only. Using this option the user is able to determine the maximum concentrations associated with each of the individual procedures, (a) - (c), in Step 4 of Section 4.2. The third choice is to specify a single stability class and wind speed. The last two choices were originally put into SCREEN to facilitate testing only, but they may be useful if particular meteorological conditions are of concern. However, they are not recommended for routine uses of SCREEN.

The mixing height used in SCREEN for neutral and unstable conditions (classes A-D) is based on an estimate of the mechanically driven mixing height. The mechanical mixing height, z_m (m), is calculated (Randerson, 1984) as

$$z_m = 0.3\ u^*/f \qquad (2)$$

where: u^* = friction velocity (m/s)
f = Coriolis parameter (9.374×10^{-5} s^{-1} at 40° latitude)

Using a log-linear profile of the wind speed, and assuming a surface roughness length of about 0.3m, u^* is estimated from the 10-meter wind speed, u_{10}, as

$$u^* = 0.1\ u_{10} \qquad (3)$$

Substituting for u^* in Equation 2 we have

$$z_m = 320\ u_{10}. \qquad (4)$$

The mechanical mixing height is taken to be the minimum daytime mixing height. To be conservative for limited mixing calculations, if the value of z_m from Equation 3 is less than the plume height, h_e, then the mixing height used in calculating the concentration is set equal to $h_e + 1$. For stable conditions, the mixing height is set equal to 10,000m to represent unlimited mixing.

3.3 Plume Rise for Point Sources

The use of the methods of Briggs to estimate plume rise are discussed in detail in Section 1.1.4 of Volume II of the ISC user's guide (EPA, 1995b). These methods are also incorporated in the SCREEN model.

Stack tip downwash is estimated following Briggs (1973, p.4)

for all sources except those employing the Schulman-Scire downwash algorithm. Buoyancy flux for non-flare point sources is calculated from

$$F_b = gv_s d_s^2 (T_s - T_a)/(4T_s), \quad (5)$$

which is described in Section 4 of the screening procedures document and is equivalent to Briggs' (1975, p. 63) Equation 12.

Buoyancy flux for flare releases is estimated from

$$F_b = 1.66 \times 10^{-5} \times H, \quad (6)$$

where H is the total heat release rate of the flare (cal/s). This formula was derived from Equation 4.20 of Briggs (1969), assuming T_a = 293K, p = 1205 g/m, c_p = 0.24 cal/gK, and that the sensible heat release rate, Q_H = (0.45) H. The sensible heat rate is based on the assumption that 55 percent of the total heat released is lost due to radiation (Leahey and Davies, 1984). The buoyancy flux for flares is calculated in SCREEN by assuming effective stack parameters of v_s = 20 m/s, T_s = 1,273K, and solving for an effective stack diameter, $d_s = 9.88 \times 10^{-4} (Q_H)^{0.5}$.

The momentum flux, which is used in estimating plume rise for building downwash effects, is calculated from,

$$F_m = v_s^2 d_s^2 T_a/(4T_s). \quad (7)$$

The ISC user's guide (EPA, 1995b) describes the equations used to estimate buoyant plume rise and momentum plume rise for both unstable/neutral and stable conditions. Also described are transitional plume rise and how to estimate the distance to final rise. Final plume rise is used in SCREEN for all cases with the exception of the complex terrain screening procedure and for building downwash effects.

The buoyant line source plume rise formulas that are used for the Schulman-Scire downwash scheme are described in Section 1.1.4.11 of Volume II of the ISC user's guide (EPA, 1995b). These formulas apply to sources where $h_s \leq H_b + 0.5L_b$. For sources subject to downwash but not meeting this criterion, the downwash algorithms of Huber and Snyder (EPA, 1995b) are used, which employ the Briggs plume rise formulas referenced above.

3.4 Dispersion Parameters

The formulas used for calculating vertical (σ_z) and lateral (σ_y) dispersion parameters for rural and urban sites are described in Section 1.1.5 of Volume II of the ISC user's guide (EPA, 1995b).

3.5 Buoyancy Induced Dispersion

Throughout the SCREEN model, with the exception of the Schulman-Scire downwash algorithm, the dispersion parameters, σ_y and σ_z, are adjusted to account for the effects of buoyancy induced dispersion as follows:

$$\sigma_{ye} = (\sigma_y^2 + (\Delta h/3.5)^2)^{0.5} \quad (8)$$

$$\sigma_{ze} = (\sigma_z^2 + (\Delta h/3.5)^2)^{0.5}$$

where Δh is the distance-dependent plume rise. (Note that for inversion break-up and shoreline fumigation, distances are always beyond the distance to final rise, and therefore Δh = final plume rise).

3.6 Building Downwash

3.6.1 Cavity Recirculation Region

The cavity calculations are a revision of the procedure described in the Regional Workshops on Air Quality Modeling Summary Report, Appendix C (EPA, 1983), and are based largely on results published by Hosker (1984).

If non-zero building dimensions are input to SCREEN for either point or flare releases, then cavity calculations will be made as follows. The cavity height, h_c (m), is estimated based on the following equation from Hosker (1984):

$$h_c = h_b\ (1.0 + 1.6\ \exp\ (-1.3L/h_b)), \quad (9)$$

where: h_b = building height (m)
L = alongwind dimension of the building (m).

Using the plume height based on momentum rise at two building heights downwind, including stack tip downwash, a critical (i.e., minimum) stack height wind speed is calculated that will just put the plume into the cavity (defined by plume centerline height = cavity height). The critical wind speed is then adjusted from stack height to 10-meter using a power law with an exponent of 0.2 to represent neutral conditions (no attempt is made to differentiate between urban or rural sites or different stability classes). If the critical wind speed (adjusted to 10-meters) is less than or equal to 20 m/s, then a cavity concentration is calculated, otherwise the cavity concentration is assumed to be zero. Concentrations within the cavity, X_c, are estimated by the following approximation (Hosker, 1984):

$$X_c = Q/(1.5\ A_p\ u) \quad (10)$$

where: Q = emission rate (g/s)
A_p = $H_b \cdot W$ = cross-sectional area of the building normal to the wind (m^2)

W = crosswind dimension of the building (m)
u = wind speed (m/s).

For u, a value of one-half the stack height critical wind speed is used, but not greater than 10 m/s and not less than 1 m/s. Thus, the calculation of X_c is linked to the determination of a critical wind speed. The concentration, X_c, is assumed to be uniform within the cavity.

The cavity length, x_r, measured from the lee side of the building, is estimated by the following (Hosker, 1984):

(1) for short buildings ($L/h_b \leq 2$),

$$x_r = \frac{(A)(W)}{1.0 + B(W/h_b)} \qquad (11)$$

(2) for long buildings ($L/h_b \geq 2$),

$$x_r = \frac{1.75\ (W)}{1.0 + 0.25(W/h_b)} \qquad (12)$$

where: h_b = building height (m)
L = alongwind building dimension (m)
W = crosswind building dimension (m)
$A = -2.0 + 3.7\ (L/h_b)^{-1/3}$, and
$B = -0.15 + 0.305\ (L/h_b)^{-1/3}$.

The equations above for cavity height, concentration and cavity length are all sensitive to building orientation through the terms L, W and A_p. Therefore, the entire cavity procedure is performed for two orientations, first with the minimum horizontal dimension alongwind and second with the maximum horizontal dimension alongwind. For screening purposes, this is thought to give reasonable bounds on the cavity estimates. The first case will maximize the cavity height, and therefore minimize the critical wind speed. However, the A_p term will also be larger and will tend to reduce concentrations. The highest concentration that potentially effects ambient air should be used as the controlling value for the cavity procedure.

3.6.2 Wake Region

The calculations for the building wake region are based on the ISC model (EPA, 1995b). The wake effects are divided into two regions, one referred to as the "near wake" extending from $3L_b$ to $10L_b$ (L_b is the lesser of the building height, h_b, and maximum projected width), and the other as the "far wake" for distances greater than $10L_b$. For the SCREEN model, the maximum projected width is calculated from the input minimum and maximum

horizontal dimensions as $(L^2 + W^2)^{0.5}$. The remainder of the building wake calculations in SCREEN are based on the ISC user's guide (EPA, 1995b).

It should be noted that, unlike the cavity calculation, the comparison of plume height (due to momentum rise at two building heights) to wake height to determine if wake effects apply does not include stack tip downwash. This is done for consistency with the ISC model.

3.7 Fumigation

3.7.1 Inversion Break-up Fumigation

The inversion break-up screening calculations are based on procedures described in the Workbook of Atmospheric Dispersion Estimates (Turner, 1970). The distance to maximum fumigation is based on an estimate of the time required for the mixing layer to develop from the top of the stack to the top of the plume, using Equation 5.5 of Turner (1970):

$$x_{max} = u\, t_m$$
$$= (u\, p_a\, c_p/R)\, (\Delta\Theta/\Delta z)\, (h_i - h_s)\, [(h_i + h_s)/2] \qquad (13)$$

where:

x_{max} = downwind distance to maximum concentration (m)
t_m = time required for mixing layer to develop from top of stack to top of plume(s)
u = wind speed (2.5 m/s assumed)
p_a = ambient air density (1205 g/m^3 at 20°C)
c_p = specific heat of the air at constant pressure (0.24 cal/gK)
R = net rate of sensible heating of an air column by solar radiation (about 67 cal/m^2/s)
$\Delta\Theta/\Delta z$ = vertical potential temperature gradient (assume 0.035 K/m for F stability)
h_i = height of the top of the plume (m) = $h_e + 2\sigma_{ze}$ (h_e is the plume centerline height)
h_s = physical stack height (m).
σ_{ze} = vertical dispersion parameter incorporating buoyancy induced dispersion (m)

The values of u and $\Delta\Theta/\Delta z$ are based on assumed conditions of stability class F and stack height wind speed of 2.5 m/s for the stable layer above the inversion. The value of h_i incorporates the effect of buoyancy induced dispersion on σ_z, however, elevated terrain effects are ignored. The equation above is solved by iteration, starting from an initial guess of x_{max} = 5,000m.

The maximum ground-level concentration due to inversion break-up fumigation, X_f, is calculated from Equation 5.2 of Turner (1970).

$$X_f = Q/[(2\Pi)^{0.5}u(\sigma_{ye}+h_e/8)(h_e+2\sigma_{ze})] \quad (14)$$

where Q is the emission rate (g/s), and other terms are defined above. The dispersion parameters, σ_{ye} and σ_{ze}, incorporate the effects of buoyancy induced dispersion. If the distance to the maximum fumigation is less than 2000m, then SCREEN sets $X_f = 0$ since for such short distances the fumigation concentration is not likely to exceed the unstable/limited mixing concentration estimated by the simple terrain screening procedure.

3.7.2 Shoreline Fumigation

For rural sources within 3000m of a large body of water, maximum shoreline fumigation concentrations can be estimated by SCREEN. A stable onshore flow is assumed with stability class F ($\Delta\Theta/\Delta z$ = 0.035 K/m) and stack height wind speed of 2.5 m/s. Similar to the inversion break-up fumigation case, the maximum ground-level shoreline fumigation concentration is assumed to occur where the top of the stable plume intersects the top of the well-mixed thermal internal boundary layer (TIBL).

An evaluation of coastal fumigation models (EPA, 1987b) has shown that the TIBL height as a function of distance inland is well-represented in rural areas with relatively flat terrain by an equation of the form:

$$h_T = A\,[x]^{0.5} \quad (15)$$

where: h_T = height of the TIBL (m)
A = TIBL factor containing physics needed for TIBL parameterization (including heat flux) ($m^{½}$)
x = inland distance from shoreline (m).

Studies (e.g. Misra and Onlock, 1982) have shown that the TIBL factor, A, ranges from about 2 to 6. For screening purposes, A is conservatively set equal to 6, since this will minimize the distance to plume/TIBL intersection, and therefore tend to maximize the concentration estimate.

As with the inversion break-up case, the distance to maximum ground-level concentration is determined by iteration. The equation used for the shoreline fumigation case is:

$$x_{max} = [(h_e + 2\sigma_{ze})/6]^2 - x_s \quad (16)$$

where:
x_{max} = downwind distance to maximum concentration (m)
x_s = shortest distance from source to shoreline (m)
h_e = plume centerline height (m)
σ_{ze} = vertical dispersion parameter incorporating buoyancy induced dispersion (m)

Plume height is based on the assumed F stability and 2.5 m/s wind

speed, and the dispersion parameter (σ_{ze}) incorporates the effects of buoyancy induced dispersion. If x_{max} is less than 200m, then no shoreline fumigation calculation is made, since the plume may still be influenced by transitional rise and its interaction with the TIBL is more difficult to model.

The maximum ground-level concentration due to shoreline fumigation, X_f, is also calculated from Turner's (1970) Equation 5.2:

$$X_f = Q/[(2\Pi)^{0.5}u(\sigma_{ye}+h_e/8)(h_e+2\sigma_{ze})] \quad (14)$$

with σ_{ye} and σ_{ze} incorporating the effects of buoyancy induced dispersion.

Even though the calculation of x_{max} above accounts for the distance from the source to the shoreline in x_s, extra caution should be used in interpreting results as the value of x_s increases. The use of A=6 in Equations 15 and 16 may not be conservative in these cases since there will be an increased chance that the plume will be calculated as being below the TIBL height, and therefore no fumigation concentration estimated. Whereas a smaller value of A could put the plume above the TIBL with a potentially high fumigation concentration. Also, this screening procedure considers only TIBLs that begin formation at the shoreline, and neglects TIBLs that begin to form offshore.

3.8 Complex Terrain 24-hour Screen

The SCREEN model also contains the option to calculate maximum 24-hour concentrations for terrain elevations above stack height. A final plume height and distance to final rise are calculated based on the VALLEY model screening technique (Burt, 1977) assuming conditions of F stability (E for urban) and a stack height wind speed of 2.5 m/s. Stack tip downwash is incorporated in the plume rise calculation.

The user then inputs a terrain height and a distance (m) for the nearest terrain feature likely to experience plume impaction, taking into account complex terrain closer than the distance to final rise. If the plume height is at or below the terrain height for the distance entered, then SCREEN will make a 24-hour average concentration estimate using the VALLEY screening technique. If the terrain is above stack height but below plume centerline height, then SCREEN will make a VALLEY 24-hour estimate (assuming F or E and 2.5 m/s), and also estimate the maximum concentration across a full range of meteorological conditions using simple terrain procedures with terrain "chopped off" at physical stack height, and select the higher estimate. Calculations continue until a terrain height of zero is entered. For the VALLEY model concentration SCREEN will calculate a sector-averaged ground-level concentration with the plume centerline height (h_e) as the larger of 10.0m or the difference between plume height and terrain

height. The equation used is

$$X = \frac{2.032\ Q}{\sigma_{ze}\ u\ x}\ \exp\ [-0.5(h_e/\sigma_{ze})^2]. \qquad (17)$$

Note that for screening purposes, concentrations are not attenuated for terrain heights above plume height. The dispersion parameter, σ_{ze}, incorporates the effects of buoyancy induced dispersion (BID). For the simple terrain calculation SCREEN examines concentrations for the full range of meteorological conditions and selects the highest ground level concentration. Plume heights are reduced by the chopped off terrain height for the simple terrain calculation. To adjust the concentrations to 24-hour averages, the VALLEY screening value is multiplied by 0.25, as done in the VALLEY model, and the simple terrain value is multiplied by the 0.4 factor used in Step 5 of Section 4.2.

3.9 Non-regulatory Options

3.9.1 Brode 2 Mixing Height Option

The Brode 2 Mixing Height (Brode, 1991) option calculates a mixing height that is calculated based on the calculated plume height, the anemometer height wind speed and a stability-dependent factor which is compared to a stability-dependent minimum mixing height. The algorithm is expressed as:

$$ZI = MAX\ (ZI_{min},\ HE*(1.0 + ZI_{fact} * U_{10})$$

where ZI_{min} is 300m for A, 100m for B, and 30m for both C and D stabilities, and ZI_{fact} is 0.01 for A, 0.02 for B, 0.03 for C, and 0.04 for D stability. Brode found that the results of using this algorithm appear to provide a fairly consistent level of conservatism relative to the ISCST model.

3.9.2 Variable Anemometer Height Option

The anemometer height is used in adjusting the wind speed to stack height wind speed for cavity calculations based on the following power law function:

```
U0 = U0TEN*(AMAX1(10,HS)/ZREF)**0.20
U1 = U1TEN*(AMAX1(10,HS)/ZREF)**0.20

where:  U0TEN - initial wind speed value set to 20 m/s.
        U1TEN - initial wind speed value set to 1 m/s.
        HS    - stack height
        ZREF  - anemometer height
```

U0TEN is adjusted downward in speed and U1TEN is adjusted upward in speed in an iterative process until the minimum wind speed, UC, that will entrain the plume into a building's cavity is found. The critical wind speed is then adjusted to the anemometer height, using the reverse of the power law above, as follows:

UC10M = UC * (ZREF/AMAX1(10,HS))**0.20

where: UC10M - represents the critical wind speed at anemometer height, ZREF.

The variables HANE and ZREF are used interchangeably.

3.9.3 Schulman-Scire Building Downwash/Cavity Option

A non-regulatory building downwash/cavity algorithm (Schulman and Scire,1993) has been added as a non-regulatory option. This option is based on the diffusing plume approach with fractional capture of the plume by the near-wake recirculation cavity.

Extensive parameterization is used to define a building length scale, roof recirculation cavity, maximum height of the roof cavity, and the length of the downwind recirculation cavity (as measured from the lee face of the building).

A building length scale for flow and diffusion is defined as:

R = BS exp(2/3) * BL exp(1/3)

where: BS is the smaller of the building height and projected width for the minimum side orientation
BL is the larger of the building height and projected width for the maximum side orientation.

The length of the roof recirculation cavity is estimated as:

LC = 0.9 * R

The roof cavity will reattach to the roof if LC < L where L is the downwind length of the roof.

The maximum height of the roof cavity is defined as:

HC = 0.22 * R at x = 0.5 * R

where x is the downwind distance.

The program uses two algorithms to determine the height and width of the downwind recirculation cavity or near-wake. If the roof cavity reattaches to the roof, the height and width are:

HR = H where H is the building height

WR = W where W is the projected width normal to the wind.

If the roof cavity does not reattach, the height and width are:

HR = H + HC
WR = 0.6 * H + 1.1*W

and measured from the lee face of the building.

The length of the recirculation region is calculated using the formula:

$$LR = 1.8W/[(L/H)^{0.3} * (1.0 + 0.24W/H)]$$

with the restriction that L/H is set equal to 0.3 if L/H < 0.3, and L/H is set equal to 3.0 if L/H > 3.0.

The ground level concentration in the recirculation region is calculated assuming the mass fraction of the plume, below HR at the downwind end of the region, is captured into the region. The

calculation assumes a Gaussian distribution of the vertical mass of the plume at that point using the following formula:

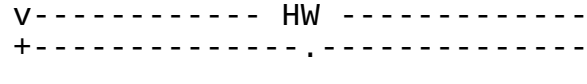
$$\sigma_z = 0.21R^{0.25} x^{0.75}$$

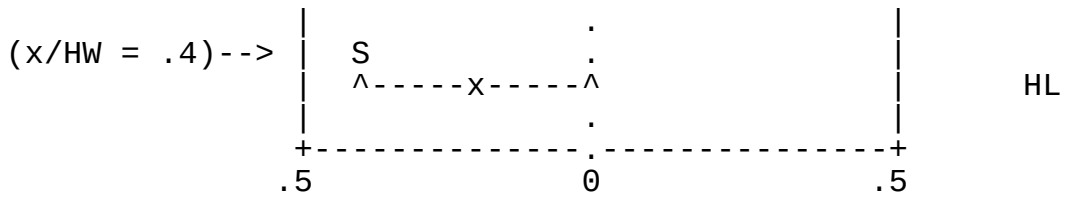
The cavity concentration, C, is then calculated as a fraction of the plume content using the following empirical formula:

$$C = f_c * B_0 Q/(B_0 w_0 A_0 + u_H s^2)$$

where: f_c is the mass fraction of the plume captured in the recirculation region
B_0 is an empirical constant approximately equal to 16
w_0 is the stack exit speed
A_0 is the stack exit face area
u_H is the upwind wind speed at roof level
s^2 is the "stretched string" distance between the stack base and the receptor.

The position of the stack on the roof is taken into consideration. A ratio is calculated based on the distance of the stack from a centerline of the building perpendicular to the wind flow for each of two orientations divided by the along wind flow length of the building. Below is an example where the along wind flow length is HW and the distance of the stack from the centerline is "x"; producing a ratio of .4. Note that the ratio is always a positive number. Ratios greater than .5 indicate that the stack is not on the roof.




(x/HW = .4)-->
S
HL
.5
0
.5

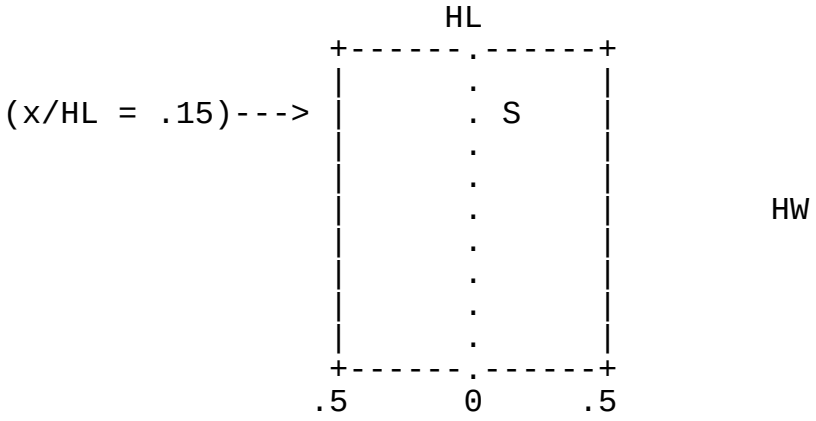

HL
(x/HL = .15)--->
S
HW
.5
0
.5

Exhibit 10

EPA/OSWER/ORCR

Damage Cases: Fugitive Dust Impact

Technical Support Document, Docket # EPA-HQ-RCRA-2009-0640

Alexander Livnat, Ph.D.

12/18/2014

Evidence of fugitive dust impact throughout the life cycle management of coal combustion residuals (CCR) has been available even prior to the publication of the proposed CCR rule in June 2010. Since the proposed rule was issued, a great deal of additional evidence has surfaced. This evidence, combined with the results of air quality risk screening conducted by EPA that demonstrated human health risk associated with CCR fugitive dust was instrumental in EPA's decision to regulate air quality issues associated with CCR management. This technical support paper documents all CCR fugitive dust impact cases known to EPA at the time the final CCR management rule was about to be signed.

EPA Region 2

Vitale Fly Ash Pit, Beverly, Massachusetts

Implicated Activity: Disposal, landfill (sand and gravel pit).

Description: An abandoned sand and gravel pit used as an unpermitted landfill between the 1950s and the mid-1970s. The Vitale Brothers, the site owners until 1980, accepted and disposed saltwater-quenched fly ash from New England Power Company along with other wastes.

Status: The site submitted a site-closure report February 1, 2007, and a preliminary screening of the site closure report was underway in July 2007, and is no longer active.

Impact Summary: In addition to groundwater and surface water impacts, there were complaints of fugitive dust from the site from neighbors located 500 feet away.

Study: Air sampling on one occasion in 1988 revealed arsenic concentrations of 2 ppb.

Regulatory and Legal Response: Unknown.

References:

Coal Combustion Waste Damage Case Assessments, July 2007, EPA (Case #2).

AES Coal Combustion Plant, Guayama, Salinas Area, Puerto Rico

Implicated Activity: Beneficial use (structural fill).

Description: In the absence of CCR disposal facilities, AES sells all its CCR (300K ton/year) at $0.15/ton, with free customer delivery, once recipient commits to limit the type of testing he can perform. CCR (mixed fly- and bottom ash, with added water, drying and cutting) are used as fill material in residential, commercial and road construction sites. The coal plant frequently stockpiles tens of thousands of tons of CCR in proximity to the Jobos Bay; particles of CCRs are mobilized by the Caribbean breeze into the Ocean.

Status: Active.

Impact Summary: Photographs of residential construction sites where CCRs were used in Salinas, PR, reflect virtual clouds of CCRs (particularly in the dry, December to May season) in spite of the fact that the Commonwealth government theoretically requires fugitive dust controls at construction sites.

Study: "A recent sample from the power plant indicates alpha particles of 9.9 pCi/g (nearly twice EPA's ARARs), in addition to 5.7 pCi/g beta particles and high levels of Arsenic (23 mg/kg) and other metals." The recommendations of a March 2006 University of Puerto Rico study: *Possible Applications for Circulating Fluidized Bed Combustion By-Products from the Guayama AES Power Plant* – for a great number of detailed CCR evaluations to better determine suitability of CCP for different applications have not been performed prior to its extensive use as a fill material.

Regulatory and Legal Response: Puerto Rico has weak regulatory system: When the Salinas Municipal landfill contaminated nearby wells, the government authorized relocation of the wells rather than requiring corrective action. New PR permitting regulations curtail public participation in siting processes and other activities requiring permits (Law 161, December 1, 2009). Puerto Rico's Environmental Quality Board (*Junta de Calidad Ambiental*) has no regulations in place regarding CCRs generation, disposal or secondary use. In 1996, the Board issued a resolution (Resolution 96-39-1; ratified by Resolution R-00-14-2, April 25, 2000) providing that EAS was not required to comply with the provisions applicable to installations that produce solid wastes. There are no permit or notification requirements for beneficial use projects, nor a requirement for independent characterization of CCR prior to its secondary use. The Guayama region, with one of the highest percentages of people of African descent in PR, including high poverty rates, unemployment and school dropout rates, qualifies as an environmental justice community.

Public Justice announced on September 26, 2012 an Intent to Sue AES due to its liberal use of CCR in construction projects that cause, among others, excessive fugitive dust.[1]

References:

Arlington, VA, Public Hearing, August 30, 2010:
http://www.epa.gov/osw/nonhaz/industrial/special/fossil/ccr-rule/ccr-hearing.htm

[1] http://publicjustice.net/sites/default/files/downloads/Final-AES-Notice-Letter-with-Appendicies-26Sep2012.pdf.

May 4, 2011 meeting between Ruth Santiago, a community activist, and EPA, Arlington, Virginia.

EPA Region 3

BBSS S&G Quarries, Constellation Energy, Gambrills, Anne Arundel County, Maryland

Implicated Activity: Disposal, structural fill (sand and gravel pits).

Description: Fugitive dust associated with reclamation work of two mining pits.

Status: Inactive. Site ceased receiving CCR as a result of contamination by heavy metals of adjacent drinking water wells.

Impact Summary: Complaints by neighboring residents.

Study: In December, 2007, Environmental Maryland documented the impacts of resuspended CCRs on a Maryland residential community adjacent to the Gambrills mine reclamation site in a study that showed that CCR fugitive dust (fly ash and/or coal ash), emanating from the disposal site, were present in all the samples collected throughout the community. Coal particulate represented between trace amounts (<1%) to 5% of the total particulate in these samples, with four of these samples containing more than trace amounts of post-combustion coal particulate. Fly ash was present at 12 of the 12 sampled sites; coal ash was present at eight sites; oil soot was present at six sites; and wood char was present at six sites. These grab-samples give an immediate picture of the particulate at that moment in time: depending on time, weather, and wind conditions, percentages could increase or decrease.

Regulatory and Legal Response: None specific to fugitive dust.

References:

Brad Heavner, Environment Maryland, comment to the docket: EPA-HQ-RCRA-2009-0640-4041.

Joshua Stewart, Airborne fly ash concerns residents, *Annapolis Capital,* September 26, 2007. Reprinted in http://www.croftonfirst.org/docs/Airborne_fly_ash_concerns_residents.pdf

Coal Ash Found In Dust at Homes Near Gambrills Dump, news release, Environmental America, January 3, 2008: http://www.environmentamerica.org/news-releases/clean-air/clean-air2/coal-ash-found-in-dust-at-homesnear-gambrills-dump (inaccessible, 3/16/2012)

Brandywine Coal Ash Landfill, Mirant MD Ash Management, LLC/Mirant Mid-Atlantic, LLC, Brandywine, Prince George's County, Maryland

Implicated Activity: Disposal (landfill).

Description: None available.

Status: Active.

Impact Summary: Windblown ash from the Brandywine coal ash landfill produces dense clouds of fugitive dust from large piles of uncovered ash. A children's playground is located 250 yards from the uncovered landfill, and there is a little league baseball field and kid's soccer field within several hundred yards of the coal ash site. About a dozen homes lie within a half-mile of the landfill.

Study: No air monitoring or soil/dust sampling has been completed as of May 2011.

Regulatory and Legal Response: None specific to fugitive dust. In April 2010, MDE filed suit in federal court maintaining that the disposal site was leaching pollutants in violation of the CWA and state law. A $1.9 million settlement was reached in January 2013.

References:

May 10, 2011 email, with an attachment and photos, from Lisa Evans, EarthJustice, to A. Livnat, EPA/OSWER.

Prince George's Cable TV News (CTV) documented the problem in a news segment: http://www.youtube.com/watch?v=xiT5aK0CV88.

Dominion Virginia Power's Battlefield Golf Course, Chesapeake, Virginia

Implicated Activity: Beneficial use (structural fill). (Also, a potential damage case site on account of groundwater contamination.)

Description: Between 2002 and 2007, Dominion Virginia Power built a 217-acre, 18-hole golf course with 1.5 million tons of coal ash. The coal ash was amended with 1.7 to 2.3 percent cement kiln dust. During construction of the golf course, neighbors and workers reported clouds of black dust migrating from the construction site to the adjacent residential neighborhoods.

Status: Inactive.

Impact Summary: Homeowners abutting the golf course reported that their homes, yards, cars, picnic tables and play equipment were covered with ash. They were reassured by Dominion Virginia Power it was harmless.

Study: None.

Regulatory and Legal Response: In March 2009, a lawsuit was filed by 400 residents from neighborhoods surrounding Battlefield Golf Club against Dominion Virginia Power, Combustion Products Management, VFL Technology, Battlefield Golf Club at Centerville owners MJM Golf LLC, and several related companies. The plaintiffs asked more than $1 billion in damages. The attorneys dropped that lawsuit in 2011, after the court dismissed substantial portions of the case. Whereas the judge ruled that the residents had not provided enough evidence that they had suffered damages from well water contamination,[2] one of the parts of the lawsuit allowed to move forward allege that airborne contaminants from the golf course pose a health risk.

In August 2009, another lawsuit was filed against Dominion Virginia Power against the same group of defendants. The suit maintained that the material has begun to leach into the groundwater feeding two neighborhoods in Chesapeake's Fentress section. It sought $1.25 billion to remove the fly ash, clean and restore the site, and bring public water and sewer to the neighborhoods. It also sought millions more to pay for homes, properties, medical bills and the nuisance created by the development. [3]

[2] Dominion Virginia Power funded an alternative, piped water supply system to the affected neighborhood.
[3] According to a former construction manager of the golf course, Dominion Virginia Power directed the building of the course with fly ash to disguise the project's true purpose—a coal ash dump. In a sworn statement, Derrick

In February 2012, a contractor who helped build the course filed a $10 million lawsuit in Chesapeake Circuit Court against Dominion and the company that transported the fly ash, alleging that the material used in shaping the course caused his kidney cancer. According to that suit, the plaintiff, Neil Wallace, inhaled fly ash particles while working at the site regularly over a five-year period and developed a cancerous kidney that was removed in 2010.[4]

In February 2012, lawyers representing nearly 400 people living near the Battlefield Golf Club at Centerville refiled a lawsuit, asking for damages related to toxic fly ash on which the course was built.[5] The lawsuit asks for $2 billion in damages. As of May 2013, a half-dozen lawsuits were still pending in Circuit Court.[6]

References:

Hazardous and Solid Waste Management System: Identification and Listing of Special Wastes; Disposal of Coal Combustion Residuals from Electric Utilities. EPA Proposed rule, June 21, 2010. http://www.regulations.gov/#!documentDetail;D=EPA-HQ-RCRA-2009-0640-0352

The Virginian Pilot (2013): *Chesapeake fly ash fight yields little resolution*, The Virginian Pilot, May 5, 2013. Accessed Online January 2013. http://hamptonroads.com/2013/05/chesapeake-fly-ash-fight-yields-little-resolution

Ash in Lungs: How Breathing Coal Ash is Hazardous to Your Health. Alan H. Lockwood and Lisa Evans, Physicians for Social Responsibility and EarthJustice. August 1, 2014: http://www.psr.org/news-events/homepage-story-archive.html?page=2

Indian River Power Plant – NRG Energy (Formerly: Delmarva Power), Burton Island, Millsboro, Delaware

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Howell, a former employee of the builder of the golf course, said, "It was clear that a golf course wasn't being built," stated Howell. "It was a coal ash dump. All Dominion ever cared about was tonnage and how much more they could dump."
Louis Hansen, The Virginian-Pilot, *Lawsuit claims Dominion saw golf course as 'coal ash dump*, August 27, 2009: http://hamptonroads.com/2009/08/lawsuit-claims-dominion-saw-golf-coursecoal-ash-dump

[4] *Chesapeake fly ash suit against Dominion refiled*. PilotOnline, February 22, 2012: http://hamptonroads.com/2012/02/chesapeake-fly-ash-suit-against-dominion-refiled
(Originally: Marjon Rostami, TheVirginian-Pilot, *Chesapeake fly ash suit against Dominion refilled*, February 22, 2012: http://hamptonroads.com/2012/02/chesapeake-fly-ash-suit-against-dominion-refiled).

[5] The suit was filed against Dominion Virginia Power, MJM Golf LLC - the golf club's owners - and two other parties involved in building the golf course.

[6] The Virginian Pilot (2013): Chesapeake fly ash fight yields little resolution, The Virginian Pilot, May 5, 2013. Accessed Online January 2013.
http://hamptonroads.com/2013/05/chesapeake-fly-ash-fight-yields-little-resolution

Implicated Activity: Disposal (landfill).

Status: Active. (A potential damage case on account of groundwater contamination).

Description: The Phase I Landfill mound loses 1.51 tons/year from wind erosion.[7]

Impact Summary: The population in the six zip codes around the facility is a lung cancer cluster with an incidence of 104.7 per 100,000 compared to Delaware's 76.9 rate; 16% of Indian River District-school children have special education needs compared to 9.7% upwind; and heart disease, stroke, and heart attack rates are all elevated.[8]

Study: In response to community requests, the Delaware Division of Public Health (DPH) and Delaware Department of Natural Resources and Environmental Control (DENRC) launched a series of studies. In July 2007, DPH issued a report concerning a cancer cluster investigation in the Indian River area of Sussex County. The DPH study confirmed the existence of a statistical cancer cluster, but did not identify any increased rate of unusual cancers or cancer incidence among young people. DPH stated that, without further information, it was not possible to assign a cause to the cancer cluster.[9]

In May 2008, the Air Surveillance Branch issued a report on a short-term study using portable battery-operated monitors to determine PM2.5 concentrations in the Indian River area. [10] The final report concluded that although the study period was too brief to fully investigate the relationship of concentrations to wind directions, Hysplit[11] was used to examine the track of the air parcels on the five highest $PM_{2.5}$ concentration days. The results were consistent with strong regional source influence, and didn't support a strong local source. A follow up, November 2009 study concluded that when considered as a whole, findings from the study do not rule out tobacco use and occupational exposure as contributing factors to the elevated lung cancer rate in the Indian River area. [12]

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[7] Citizens for Clean Power (CCP), comment to the proposed CCR rule docket: EPA-HQ-RCRA-2009-0640-0358.
[8] CCP, ibid.
[9] *Cancer Cluster Investigation, Indian River Area*, Delaware Health and Social Services Division of Public Health, 7/17/2007: http://dhss.delaware.gov/dph/dpc/files/irrpt071707.pdf.
[10] Between 12/2/2007 and 3/7/2008, with 26 scheduled sampling days.
[11] Hybrid Single Particle Lagrangian Integrated Trajectory Model.
[12] < Regardless of lung cancer status, Indian River participants were significantly more likely than non-Indian River participants to be heavy smokers and to have worked in a high-risk industry. Thus, baseline prevalence rates suggest that the Indian River community may have a unique lung cancer risk factor profile. When considered as a whole, findings from the IRCLS do not rule out tobacco use and occupational exposure as contributing factors to the elevated lung cancer rate in the Indian River area. Given the magnitude of odds ratios, tobacco use is the major factor that explains the original finding of the elevated lung cancer rate in the Indian River area of Sussex County, Delaware.>

On May 28, 2013, the State of Delaware issued a final report: The fall 2011 and fall 2012 sample collection periods included 32 participants recruited from the vicinity of the NRG Energy power plant in Sussex County, Delaware. The participants allowed personal, indoor residential and outdoor residential particulate matter samples to be collected over 3 consecutive days.[13] Data demonstrated that ambient background PM2.5 concentrations in southern Delaware are driven by long-range airborne transport from neighboring upwind states and metropolitan areas. These findings were criticized as the result of a faulty study, which used too small of a sample and by design, didn't capture the impact of long-term exposure to pollution.[14]

Regulatory and Legal Response: According to citizen Advocacy groups, Current permits and state regulations are ineffective other than to record reported dusting complaints. The State does not monitor PM downwind of the facility, as for its size only one sampler is needed for Sussex County (in Seaford, Delaware, 19 miles to the WNW).

A citizen suit brought by CCP for 6,304 documented violations of the CAA and the facility's own Title V state operating permit between 2004 and 2008. Before CCP's suit made it to court, DNREC filed a complaint against NRG Energy and the two settled out of court (NRG Energy paid $5,000 for its violations and had to purchase a $60,000 air quality monitor for the Department.) CCP charged DNERC was trying to preempt its lawsuit and alleged DNERC was not pursuing meaningful penalties or enforcing the law. The court held the state acted within its authority and "its DENRC and not the citizens, who is principally responsible for enforcing the law."

References:

Out of Control: Mounting Damages from Coal Ash Waste Sites, Thirty-one New Damage Cases of Contamination from Improperly Disposed Coal Combustion Waste. Environmental Integrity Project and EarthJustice. February 24, 2010. Case #1.
http://www.environmentalintegrity.org/news_reports/news_02_24_10.php

Citizens for Clean Power (CCP), comment to the docket: EPA-HQ-RCRA-2009-0640-0358.

Cancer Cluster Investigation, Indian River Area, Delaware Health and Social Services Division of Public Health, 7/17/2007: http://dhss.delaware.gov/dph/dpc/files/irrpt071707.pdf.

Delaware Air Quality Management $PM_{2.5}$ Indian River MiniVol Study, Final Report. Betsy Frey, Air Surveillance Branch, Air Quality Management Section, Division of Air and Waste

[13] During the fall 2011 season, the NRG Energy power plant was not operating while engineering upgrades designed to reduce pollutant emissions were installed. The fall 2012 sampling period was conducted while the power plant was operational, though not at 100% capacity.
[14] Critic chides cancer study: Indian River plant results called lame. Delawareonline, May 28, 2013: http://www.delawareonline.com/article/20130528/NEWS/305280081/

Management, Delaware Department of Natural Resources and Environmental Control, May 21, 2008.
Delaware Air Quality Management PM2.5 Indian River MiniVol Study

Lung Cancer in Sussex County, Delaware: Findings from the Indian River Community-Level Survey (IRCLS). Delaware Health and Social Services, Division of Public Health, November 2009. http://dhss.delaware.gov/dph/dpc/files/ircls_finalreport.pdf

Millsboro Inhalation Exposure and Biomonitoring Study. Delaware Department of Natural Resources and Environmental Control, Prepared by RTI International for State of Delaware Department of Natural Resources and Environmental Control, Department of Health and Social Services, Dover, DE, May 28, 2013.
http://www.dnrec.delaware.gov/Admin/Documents/Millsboro_Inhalation_Exposure_and_Biomonitoring_Study_Final_Repor_05282013.pdf

Millsboro Inhalation and Biomonitoring Report finds air pollution coming into Delaware problematic; "Personal air," indoor sources contributed most to toxic exposure. Delaware.gov, May 29th, 2013.
http://news.delaware.gov/2013/05/29/millsboro-inhalation-and-biomonitoring-report-finds-air-pollution-coming-into-delaware-problematic-%E2%80%9Cpersonal-air%E2%80%9D-indoor-sources-contributed-most-to-toxic-exposure/

First Energy's Bruce Mansfield Power Plant, Little Blue Run Impoundment, Shippingport, Greene Township, Pennsylvania

Implicated Activity: Disposal, Little Blue Run Surface Impoundment (a proven damage case on account of groundwater contamination).

Description: A history of recurring particulate emission incidents and fugitive dust violations.

Status: Active (Impoundment slated to become inactive and start closure on January 1, 2017.)

Impact Summary: Records provided by FirstEnergy showed that the Bruce Mansfield plant released harmful and illegal air pollution at least 257 times between November 22, 2002 and March 29, 2007. A stakeholder who lives within one mile of First Energy's Little Blue Run Fly Ash Impoundment testified:

> 'We had a dry spell in 1993. First Energy employees knocked on our door and told us to make sure we washed the vegetables from our garden and to stay indoors as much as possible. It seemed that because of the dry, cold weather and low water level in the impoundment, the fly ash, normally in a wet slurry form, had dried to a fine powder and blown through the air covering Hookstown and Georgetown in a layer of dust.'[15]
>
> "In (March) 2009, dry conditions on the surface of the Impoundment covered nearby residents' homes in a layer of coal ash fugitive dust, prompting a NOV."

Study: Analyses of the exposed CCR collected on February 2, 1993 from the surface of the Impoundment, yielded, among others 18 ppm arsenic, 33 ppm chromium, 3.2 ppm lead, 18 ppm nickel, and 1.5 ppm selenium.

Regulatory and Legal Response: PADEP issued several NOVs for groundwater contamination and fugitive dust; the earliest NOV on hand is a March 8, 1993 PA Air Quality Control/DENR letter to the Bruce Mansfield Power Company indicating violations of Sections 6.1 (a), 6.1(b) and 8 of the Air Pollution Control Act, and violations of 25 Pa Code $$123.1(a) and 123.2, that have occurred in the Impoundment, between January 30 and February 4, 1993. Subfreezing temperatures combined with strong winds lifted up CCR (gypsum, lime, limestone, and possibly, calcium sulfite) from an elevated bar in the Impoundment, generating heavy dust clouds that settled on adjacent properties, barns and range areas. It lead state and local officials to issue an air advisory for Greene Township and Hookstown. The advisory recommended that people stay indoors, especially those with respiratory problems, and those that have to be outdoors, protect themselves with a mask to avoid breathing in the dust. FirstEnergy responded by raising the water levels in the impoundment and by spraying a dust-inhibiting chemical on the sludge. The Company also said it is willing to provide lodging or other assistance for affected residents.

On March 12, 2009, Waste Management SW Region/DENR issued another NOV alleging violation, on March 4, 2009, of §§ 289.271(a)(7); and the Solid Waste Management Act, July 7, 1980, P.L. 380, as amended, 35 P.S. §§ 6018.101-6018.1003, for a repeat of the 1993 dust dispersion event under similar circumstances (subfreezing temperatures combined with high winds, resulting in settling of significant amounts of CCRs on the ground, houses, lawns, decks, and automobiles). First Energy applied wetting of the Impoundment and latex soil cementing agent for mitigation/control. PADEP required First Energy to modify its permitted nuisance control plan and submit regular documentation on inspections and corrective actions to reduce dusting potential, and a $24,500 penalty was imposed. In addition, PADEP required a

[15] David Sulkowski's testimonial: CCR proposed rule Pittsburgh Public Hearing, September 21, 2010, Pp. 81-83. http://www.epa.gov/osw/nonhaz/industrial/special/fossil/ccr-rule/transcripts/transcript-pittsburgh-pa.pdf

modification of the permit requiring more frequent inspections by FirstEnergy to reduce dusting potential. FirstEnergy responded to the NOV and corrected the situation.[16]
The Consent Decree issued by PADEP against FirstEnergy on July 26, 2012 required, among others, that FirstEnergy conduct monitoring sufficient to ensure that operation of the Impoundment will not cause or contribute to an exceedance of Ambient Air Quality Standards, in accordance with Section 131.1 of PADEP's regulations, 25 Pa. Code § 131.3.[17]

References:

Arlington, VA, Public Hearing, August 30, 2010:
http://www.epa.gov/osw/nonhaz/industrial/special/fossil/ccr-rule/ccr-hearing.htm

Pittsburgh, PA, Public Hearing, September 21, 2010:
http://www.epa.gov/osw/nonhaz/industrial/special/fossil/ccr-rule/ccr-hearing.htm

In Harm's Way: Lack of Federal Coal Ash Regulations Endangers Americans and Their Environment, Thirty-Nine New Damage Cases of Contamination from Improperly Disposed Coal Combustion Waste. Environmental Integrity Project, Earthjustice and Sierra Club, August 26, 2010.
http://www.environmentalintegrity.org/news_reports/08_26_10.php

Lisa Evans, EarthJustice, May 18, 2011 email to A. Livnat, EPA/OSWER.

PADEP's comment to the 2011 NODA docket: EPA-HQ-RCRA-2011-0392-0201.

[16] PADEP's comment to the 2011 NODA docket, EPA-HQ-RCRA-2011-0392-0201: Commonwealth of Pennsylvania Department of Environmental Protection Southwest Region: Review of the Environmental Integrity Project, Earthjustice and Sierra Club Report: In Harm's Way: Lack of Federal Coal Ash Regulations Endangers Americans and Their Environment, Thirty-nine New Damage Cases of Contamination, From Improperly Disposed Coal Combustion Waste August 26, 2010; Page 26.

[17] http://www.environmentalintegrity.org/news_reports/documents/FirstEnergyConsentDecreeFinal1.pdf, section (k). 'No later than ninety (90) days following entry of this Consent Decree, FirstEnergy shall submit for approval by the Department a plan for the establishment of a fugitive particulate monitoring system for the Impoundment. The plan shall propose monitoring site locations of sufficient number and spatial distribution to accurately determine the rates at which particulate emissions from the Impoundment are deposited in peripheral areas, and that monitors shall be constructed in conformance with the standards of ASTM D 1739-98. The location of the monitoring sites shall be initially based on a wind rose of the area derived from climatological data recorded at the nearest National Weather Service weather station. The plan shall further propose specifications for, and a location for the installation of, a meteorological monitoring station near the Impoundment that conforms to the provisions of "Meteorological Monitoring Guidance for Regulatory Modeling Applications", EPA-454/R-99-005, US Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, February 2000. FirstEnergy shall prepare and submit to the Department a quarterly report of all particulate monitoring results, no later than the last day of April, July, October and January of each year. Upon completion of one calendar year of meteorological monitoring data collection, FirstEnergy shall submit to the Department a re-evaluation of the fugitive particulate monitoring system based on the site-specific data.'

Mitchell Power Station, Allegheny Energy, Courtney, Pennsylvania

Implicated Activity: Disposal (landfill).

Description: None available.

Status: Active (issue addressed?)(A potential damage case on account of groundwater contamination).

Impact Summary: Unknown.

Study: None.

Regulatory and Legal Response: In 2001, PADEP issued a NOV for failure to minimize fugitive dust emissions from a Landfill NW of the power plant. Once the power plant improved its dust suppression methods, monitoring requirements for fugitive dust emissions were discontinued in 2004. There are no current administrative rulings or court decisions associated with the site.

References:

Out of Control: Mounting Damages from Coal Ash Waste Sites, Thirty-one New Damage Cases of Contamination from Improperly Disposed Coal Combustion Waste. Environmental Integrity Project and EarthJustice. February 24, 2010.
http://www.environmentalintegrity.org/news_reports/news_02_24_10.php

La Belle, Luzerne Township, Fayette County, Pennsylvania

Implicated Activity: Haulage and off-site disposal in a minefill and impoundment in a coal refuse and CCR disposal area, abandoned coal strip mine. (In addition, exceedance of the applicable groundwater and surface water standards.)

Description: Three foci of fugitive dust issues: (1) barge haul and downloading at the La Belle dock; (2) trucking from the dock to the reclaimed mine disposal site; and (3) airborne dust from the reclamation site.

Rejected coal and coarse and fine refuse was deposited at this site for an unknown number of years until the coal preparation plant ceased operation in 1994. It is estimated that approximately 40 million tons of coal waste material has been dumped on a 300-acre site in depths of up to 150 feet.[18] "The fine coal refuse was deposited in two large impoundments that are contained by massive embankments of coarse coal refuse. When operations ceased, the site was left in an abandoned, partially reclaimed condition with stability problems concerning one of the fine coal refuse impoundments.[19] In 1996, Matt Canastrale Contracting, Inc. (MCC) purchased the bankrupted LaBelle coal refuse landfill. The final sale was contingent upon site reclamation. It was decided to utilize coal ash in order to stabilized the impoundment and address the issues of water pollution.

The disposal site[20] accepts material from Allegheny Energy's Hatfield's Ferry coal-fired power plant in Greene County and from other power plants: Mitchell (FGD sulfite), Hatfield, and Elrama power plants, as well as from the Fayette and Greensburg thermal plants. In addition, First Energy, the operator of a power plant 75 miles north, plans to deposit more than 3 million tons of additional coal ash here every year starting in 2017, when its 1,300-acre Little Blue Run coal ash impoundment in Beaver County closes.

Status: Active.

Impact Summary: Both the General Permit WMGR052 and the Coal Refuse Mining Permit #26970702 strictly prohibit fugitive dust emissions from leaving the site:"[a]ll trucks which transport coal ash shall be covered with a suitable covering to minimize dust emissions during transit from each generating station to the disposal site." However, residents have not seen any trucks covered since the start of the coal ash dumping at the LaBelle site in 1998. And recently the LaBelle site excavator, Richard Lawson, admitted at a community meeting that he chose not to tarp any of the trucks believing that the tarps created more dust.[21]

[18] According to a BNA (March 2013) article, the site contains two vast piles of coal processing waste, known as "gob piles,'' with 40 million tons of refuse.

[19] The impoundment of concern has a footprint of approximately 24 acres and a contributing drainage area of approximately 87 acres. Comparison of pre-landfill mapping, post-1994 aerial photography, and drilling at various dates results in an impoundment depth range from 60 to 100 feet, averaging 74 feet. Several feet of standing water, contributed by precipitation falling on the surface of the drainage area, are present at all times in the impoundment and this water is loading the fine coal refuse and the laterally-confining coarse refuse. As early as 1984, the eastern slope of the coarse refuse embankment began to show signs of movement and various engineering plans were designed and implemented to some degree before the site was abandoned in 1994.

[20] The site comprises 361.5 - acres as coal refuse disposal area and 145.2 - acres as support area – coal ash and FGD disposal/reprocessing.

[21] Community Meeting at the Luzerne Township Volunteer Fire Hall, October 28, 2010.

Large loads of fly ash arrive in open, uncovered barges,[22] are unloaded onto trucks, with the crane sometimes dropping the ash onto the shoreline of the Monongahela River. Loaded trucks motor near a La Belle neighborhood in Luzerne Township without anything covering the fly ash as it's taken to a hilltop where it is dumped and left uncovered.

Instead of decreasing the fugitive dust emissions as the operator and his experts predicted, the emissions from the disposal site have actually increased as the low permeability cementitious (LPC) coal ash has been dumped. Hundreds of acres of coal ash are allowed to dry, over time, especially during hot, summer months. The dried ash becomes airborne and blankets the local communities in clouds of grey coal ash.[23] Winters winds carry the coal ash off the hilltop onto residents' properties.

Up the hill from the barge-unloading facility, LaBelle residents complain often about dust that settles on their properties and hangs in the air. Downwind from the dump site in Sauerkraut Hill residents say there are nine cases of cancer in the 18 houses, and in LaBelle there is a prevalence of pulmonary sicknesses. In La Belle, ash-like powder accumulates on window sills of houses, on appliances inside garages, and on apples trees in the yards. In summer months, swimming-pool filter cartridges have to be changed daily, instead of every two weeks, as recommended, because the previous day's filters are stained black.

Study: A sample of fly ash taken from the La Belle disposal site and tested by a local company, R.J. Lee Group, shows presence of arsenic and several heavy metals, most significantly lead. These represent levels in the actual ash, and not amounts found in the air or on neighboring properties. While there's no scientific proof that fly ash or other forms of pollution are causing health problems, Luzerne Township has elevated mortality levels for diseases that have been linked to pollution exposure, according to the Post-Gazette ecological study on mortality rates. Luzerne had 170 heart-disease deaths from 2000 through 2008, or 26 percent higher than the national average, which would project 135 deaths.

Regulatory and Legal Response: Uncovered trucks are a clear violation of the existing permits, and yet there have been no violations or fines issued by the PADEP. A petitions signed by 93 La Belle-area residents was sent to PADEP to seek an investigation and force the owner to clean up the process. PADEP officials investigated and ordered the company to dampen roads to reduce dust. Local residents believe, however, that PADEP's actions, to date, have been insufficient to correct the problems and protect the public. In October 2010, PADEP and concerned citizens toured the fly ash depot.

[22] In May 2006, a barge, presumably with a coal ash shipment from the Mitchell power plant sunk at the docking site, releasing tons of fly ash into the Monongahela River (EPA-HQ-RCRA-2006-0796 -0443 and EPA-HQ-RCRA-2009-0640-8243, page 17.)
[23] EPA-HQ-RCRA-2009-0640-8243, pp. 14-17.

A Notice of Violations and Notice of Intent to Sue was issued on March 13, 2013 by EIP for Citizens Coal Council against MCC for Violations of the Clean Streams Law, Air Pollution Control Act, the Resource Conservation and Recovery Act, the Clean Air Act, and Pennsylvania's Law Implementing the Requirements of the Surface Mining and Reclamation Act at the LaBelle, PA Coal Waste Mine Dump in Luzerne Township, PA. The lawsuit would be filed in the U.S. District Court for the Western District of Pennsylvania and would ask the court to require MCC to abate the alleged violations. In addition, Citizens Coal Council would ask the court to bar future violations and to impose civil penalties and award attorneys' fees.[24] On June 26, 2013, Public Justice and Environmental Integrity Project (EIP), representing Citizens Coal Council, filed a citizens' suit against (MCC).[25] In September 30, 2014, the U.S. District Court, W.D. Pennsylvania rejected the Motion to Dismiss filed by Defendant, Matt Canestrale Contracting, Inc. ("MCC"), pursuant to Rule 12(b)(1) for lack of subject matter jurisdiction.[26]

References:

'Large loads in La Belle', December 16, 2010, Pittsburgh Post-Gazette: http://www.post-gazette.com/pg/10350/1109211-114.stm#ixzz18IksbbGA;

G. Kuklish, comment EPA-HQ-RCRA-2009-0640-8243; 'Large loads in La Belle', March 29, 2012, Pittsburgh Post-Gazette: http://www.post-gazette.com/stories/news/health/large-loads-in-la-belle-277904/

Notice of Violation and Notice of Intent to Sue Matt Canestralle Contracting, Inc., March 23, 2013:
http://www.environmentalintegrity.org/news_reports/documents/LabelleNoticeLetter20130313.pdf

[24] *PA Contractor Faces Possible Lawsuit for Violations of Federal & State Pollution Laws at Coal Mine Dump*, EIP News and Reports, March 13, 2013: http://environmentalintegrity.org/archives/6130

[25] *Citizens Coal Council v. Matt Canestrale Contracting, Inc.* Public Justice. Complaint filed June 26, 2013: http://publicjustice.net/content/citizens-coal-council-v-matt-canestrale-contracting-inc and http://www.environmentalintegrity.org/news_reports/documents/2013_06_26_FINAL_CCC%20Canestrale%20Complaint.pdf

[26] *Citizens Coal Council, Plaintiff, V. Matt Canestrale Contracting, Inc., Defendant.* LEAGLE: http://leagle.com/decision/In%20FDCO%2020141006940/CITIZENS%20COAL%20COUNCIL%20v.%20MATT%20CANESTRALE%20CONTRACTING,%20INC. Plaintiff, Citizens Coal Council ("CCC"), brought this action under the citizen suit provision of the Resource Conservation and Recovery Act, 42 U.S.C. §6972(a)(1)(B) ("RCRA"), to abate an imminent and substantial endangerment to health or the environment allegedly caused by solid waste located on the LaBelle Coal Refuse Disposal Area, currently owned and operated by MCC. Plaintiff also asserts violations of various Pennsylvania statutes by MCC. For the reasons that follow, the Court will deny Defendant's motion to dismiss. The Court found that the Amended Complaint alleges sufficient facts to show that Plaintiff has asserted a plausible claim under ISE citizen suit provision of the RCRA, 42 U.S.C. §6972(a)(1)(B), to withstand MCC's motion to dismiss under Rule 12(b)(6). An appropriate order will follow.

http://news.bna.com/deln/DELNWB/split_display.adp?fedfid=29991193&vname=dennotallissues&jd=a0d6x4x2x1&split=0

Rostosky Ridge Road Collapse of CCR Pile, Forward Township, Allegheny County, Pennsylvania

Implicated Activity: Piling for beneficial use.

Description: Fly ash and "bottom ash" were removed from Allegheny Energy's Mitchell Power Plant and dispose of at River Hill Road in Forward Township to be used by the PA DOT for the maintenance of River Hill Road, and specifically as structural material for construction of the roadway, its embankment, and adjacent slope. A collapse of the ash pile was triggered by a break in the water main under River Hill Road. On January 25, 2005, thousands of tons of fly ash slid down a hillside and flowed into a creek and through a neighborhood located on Rostosky Ridge Road.[27] Approximately nine homes, a business (restaurant), and a mile of the creek were directly impacted by the landslide, which deposited large piles of fly ash in residential yards, flower beds, culverts, play areas, around garages and along the creek banks. Cleanup immediately following the slide in 2005 included removal and disposal of 1,500 tons of ash from the public parking lot at Gallatin Sunnyside Park, the commercial and affected residential properties on Rostosky Ridge Road, as well as from roadways, culverts, and creek banks. During the first week after the landslide, residents used township equipment to remove some of the fly ash from driveways, walkways, parking lots, and roadways, generally w/o the use of any protective gear. An uncovered dump truck transported the fly ash to a nearby ball field. The local fire department helped with wetting the streets to keep down dust levels.

Following this initial removal effort, PADEP contracted to remove the fly ash from the affected neighborhood yards, roadways, creek banks, and ball field. From January 2006 through August 2006, the DEP removed 40,000 tons of ash from the embankment, eliminating any risk of another release of fly ash from the slide area. When feasible, the PADEP contractor removed the fly ash with a vacuum truck and small equipment such as skid-loaders, mini-excavators, and backhoes. Hand tools such as rakes, shovels, and hoes were also used to remove the fly ash. The affected areas near the creek banks and culverts were flushed with water, allowing the fly

[27] The slide occurred when the old coal ash embankment adjacent to River Hill Road collapsed and temporarily dammed the stream at the embankment's base. When the ash dam failed, the ground broke loose and water, slurry and tree branches rushed down the hill onto Rostosky Ridge Road, just off Route 136. Some water and debris from the slide spilled onto Route 136 near Rapp's Restaurant.

ash deposits to enter the creek water. Nearly five years after the coal ash slide incident, work was expected to begin to remove the final remains of that slide.[28]

Status: Inactive (a one-time incident.)

Impact Summary: Following the landslide, residents stated that they were ill with a variety of flu-like symptoms, including sore throat, cough, fever, nausea, fatigue, diarrhea, and headaches.

Study: Based on a petition for a public health evaluation of the fly ash landslide, in March 2005, ATSDR conducted a preliminary review of available data, on the basis of which ATSDR classified the landslide site as a potential health hazard and made several recommendations, among which were removal of the remaining fly ash from the affected neighborhood and post-removal confirmatory sampling. ATSDR also agreed to complete a formal written health consultation evaluating all available data following the post-removal confirmatory sampling.[29]

Eleven samples were measured for PM10 in outdoor air. Because samples were not necessarily collected during fly ash removal activities, results may not represent peak exposure levels. The maximum PM10 24-hour average air concentration was 36.4 µg/m^3, which is below EPA's PM10 24-hour average NAAQS of 150 µg/m^3. It is not known what levels of PM2.5 were associated with measured PM10 levels. However, even assuming all of the particulate matter was <2.5 microns, the measured levels are also below EPA's PM2.5 24-hour average NAAQS of 65 µg/m^3. The limited air data suggests exposures to PM10 levels are not likely to be harmful to human health.

However, past exposures to fine particulate matter immediately following the landslide and during removal activities may have been at levels of health concern. Many epidemiologic studies have found consistent associations between exposure and harmful health effects for short-term, or acute, exposures (usually measured in days) to fine particulate matter. Acute exposures to fine particulate matter may also aggravate pre-existing respiratory conditions in sensitive individuals. Although measured PM10 levels from the one residential yard were below NAAQS values, the air measurements were not necessarily collected during peak exposure periods when residents were shoveling and removing fly ash from their yards. ATSDR considers it plausible that fine particles in the fly ash may have acted as a respiratory irritant in exposed adults and children during that time.

Following the landslide, fly ash could have been brought into vehicles and homes on the feet of family members and pets. In fact, during a February 2005 site visit, ATSDR staff

[28] Final fly ash clean-up begins - Pittsburgh Tribune-Review, January 18, 2010. http://www.pittsburghlive.com/x/valleyindependent/news/s_662812.html#ixzz1mDyrFKOx

[29] ATSDR Health Consultation: *Coal Fly Ash Landslide, Forward Township, Allegheny County, Pennsylvania*, June 1, 2006: http://www.atsdr.cdc.gov/HAC/pha/CoalFlyAshLandslide/CoalFlyAshLandslideHC060106.pdf

witnessed fly ash dust and indoor tracking of dirt into homes and cars in the affected neighborhood. Suspended fly ash particles in outdoor air could have entered a home through indoor-outdoor air exchange. A young child playing on a home's floor will have the maximum opportunity for ingestion, inhalation, and dermal exposure to dust.
An environmental services company engaged by legal counsel representing the affected residents conducted an interior home sampling investigation. In February, March, and April 2005, interior dust wipe samples from the surface of carpets, countertops, tables, windowsills, fans, furnace filters, and vacuum cleaner bags were collected by residents and sent for arsenic analysis. Arsenic was detected in some of the samples. Follow-up sampling in July 2005 also detected arsenic in dust wipe samples. Detections of arsenic in dust wipe samples are an indication that arsenic was, at some point, distributed throughout the home and was accessible to the occupants.

Results of the analysis of the urinary arsenic levels measured indicate that the participants were not exposed to high levels of arsenic two to three days prior to their urine collection. However, the urinary sampling time does not represent the time of peak exposure levels. None of the arsenic concentrations in toenails or fingernails exceeded the published reference ranges. However, because of the length of time required for nail growth, the results from the nail samples did not reflect peak exposure times at the site.

In July 2005, the Allegheny County Health Department issued a study, based on information and samples collected in March-April of that year.[30] The study tested for arsenic in urine, hair, and nail samples collected from potentially affected residents between February 5 and early April, 2005.

Overall, the biological testing of both studies was conducted to address community concerns about arsenic exposures following the landslide event. However, the timing of the biological testing does not allow these community concerns to be addressed.

Regulatory and Legal Response: In October 2006, residents along Rostosky Ridge Road and a portion of Rainbow Run Road filed a lawsuit in Allegheny County Court in an effort to force PADEP to clean the site. The suit claimed the PADEP violated the Clean Streams Act, the Air Pollution and Control Act and the Hazardous Sites Cleanup Act and created a private and public nuisance.[31]

[30] *Results of the Health Investigation Following Fly Ash Contamination in Forward Township, Allegheny County, Pennsylvania:* http://academics.rmu.edu/faculty/short/research/arsenic/ACHD-Arsenic-2005.pdf.

[31] The suit also named as defendants: Allegheny Energy, owner of the fly ash that had been generated at the company's Mitchell Power Station; the state Department of Transportation, for using fly ash to stabilize River Hill Road and maintaining the hazardous substance within its right-of-way and/or embankment supporting the road; the Municipal Authority of Westmoreland County (MAWC), because its water main ruptured, bringing the fly ash hillside down into the neighborhood; and Weavertown Environmental Group, because of alleged "negligent remediation at the site, which caused further harm."

The state maintained that tests previously conducted by the Allegheny County Department of Health found low levels of arsenic - consistent with an area where coal is burned to produce electricity. The agreement[32] called for more than $3 million in claims and damages to be paid to the commonwealth and to 25 residents on or near Rostosky Ridge Road. The commonwealth received approximately $1.8 million for cleanup costs and monitoring, with the rest going to the residents for compensation and damages.

References:

Barbara J. Diess comment to the 2007 NODA docket: EPA-HQ-RCRA-2006-0796-0424.

Health Consultation: Coal Fly Ash Landslide, Forward Township, Allegheny County, Pennsylvania: ATSDR, June 1, 2006.

East End Landfill (aka East End Resource Recovery), 1820 Darbytown Road, Henrico County, Virginia

Implicated Activity: Landfill disposal and structural fill.

Description: A landfill permitted only for C&D debris has been stockpiling and disposing of coal ash for nearly two years without a permit from the county. The landfill, operating since 1987 and located about 200 m from the closest residential area, accepts C&D debris from within a 150-mile radius of Richmond.

As of July 2009, the company ("TEEL"), however, had approval from the Virginia DEQ to use the materials as embankment, daily cover and firebreak material, as well as a structural fill to stabilize the 108 acres former, old Richmond City landfill while it is being excavated as part of a remediation process; after the company's petition for a 180-day trial to use the material, in March 2010 DEQ approved the landfill's request for permanent use[33]. Under previous violations, the company was fined more than $100,000 by the DEQ "in the previous year".

[32] September 15, 2009: http://www.newspapers.com/newspage/36312281/

[33] DEQ also approved incinerator fly ash, bottom ash, nonhazardous contaminated soil and petroleum-contaminated soil as acceptable cover materials and shredded tires as a drainage material. The use of CCBs is exempt from Virginia's Solid Waste management regulations when used in combination with a cementitious binder.

In December 2010, the Henrico County Board of Zoning Appeals denied a permit to deposit coal ash at the landfill.[34] After that decision, however, the company continued to bring more ash to the site.

Status: Active.

Impact Summary: Residents near the landfill have raised many concerns about coal ash being dumped near their homes, which has caused unsafe levels of dust and potential groundwater contamination. From 2008 to 2011, neighbors complained about a persistent rotten-egg smell, potential health hazards from coal ash stored at the landfill being blown into neighborhoods, and mud being tracked by trucks onto nearby roads.

Paragraph (19) of the County's late April 2011 filing of a complaint against TEEL at the Circuit Court of the County of Henrico states: "There is clearly observable harm from TEEL's continued receipt, storage and use of these materials (CCBs) at the property. See, e.g., Exhibit 8 (April 4,2011 video shot by County inspector showing massive quantities of fly ash blowing from the site)."

Study: None.

Regulatory and Legal Response: In 2009, the Virginia Department of Environmental Quality penalized the landfill's operator more than $100,000 for numerous site violations.[35]

In February 2011, the East End Landfill was issued a zoning violation. In April 2011, the Henrico County Board of Zoning upheld the zoning board NOV that orders the removal of piles of coal ash by June 30, 2011. Henrico County officials also filed a complaint against the landfill, initiating a process to obtain a temporary injunction to get the company to stop taking more coal ash at the site and to find a way to keep the ash from being spread by wind.[36]

[34] http://www2.timesdispatch.com/news/2010/dec/16/henrico-panel-denies-landfill-permit-coal-ash-ar-720607/ and http://www2.timesdispatch.com/news/2010/dec/17/TDMAIN01-henrico-panel-denies-landfill-permit-for--ar-721709/

[35] Henrico landfill looks to expand. Timesdispatch.com, June 27, 2013: http://www.timesdispatch.com/news/local/henrico/henrico-landfill-looks-to-expand/article_6c2a2505-d94a-54cc-86f6-668befe023ff.html

[36] Complaint attached to original email message from Lisa Evans, EarthJustice. See also http://www2.timesdispatch.com/news/2011/apr/28/1/henrico-board-denies-landfills-petition-to-take-co-ar-1002839/

In June 2013, the county's Board of Zoning Appeals voted to grant an expansion of the site's waste disposal area despite sizable opposition from neighbors, claiming a turnaround in the quality of the site's management since it has changed hands in 2011.[37]

References:

May 19, 2011 email from Lisa Evans, EarthJustice, to A. Livnat, EPA/OSWER.

Fort Martin Power Plant, Fort Martin, West Virginia

Implicated Activity: Disposal and haulage.

Description: Clouds of coal dust and fly ash blowing in the wind and dispersed by 50 coal ash trucks per hour on the highway from disposal and haulage. All four nearby streams are polluted by CCRs.

Status: Active.

Impact Summary: No information.

Study: None.

Regulatory and Legal Response: "WVDEP did not respond to any complaint letters nor have they taken any action." WVDEP responded that they are aware of the issues that are in the complaint. WVDEP stated that they have followed up on all the complaints that they have received for this area. WVDEP has not observed an impact from coal combustion residuals at this time. There are berms on the highway in the area, which do not contain coal combustion residuals that have been observed to create dust clouds when trucks run into them. This information has been passed to the Department of Highway.[38]

References:

[37] Henrico zoning board OKs expansion for landfill. Times Dispatch.com, June 29, 2013. http://www.timesdispatch.com/news/local/henrico/henrico-zoning-board-oks-expansion-for-landfill/article_431f8880-40b3-5ea4-973f-6337665bf5b8.html

[38] August 29, 2011 email from Rick Rogers, EPA R3 to A. Livnat, EPA/OSWER.

Pittsburgh, PA, September 21, 2010 Public Hearing:
http://www.epa.gov/osw/nonhaz/industrial/special/fossil/ccr-rule/ccr-hearing.htm

August 29, 2011 email from Rick Rogers, EPA R3 to A. Livnat, EPA/OSWER.

EPA Region 4

Arrowhead Landfill, Uniontown, Perry County, Alabama

Implicated Activity: Disposal (landfill) and beneficial use; haulage.

Description: The Arrowhead landfill has been taking TVA Kingston's 2008 ash spill waste, and using it as a landfill cover. Concerns were raised over fugitive dust and drinking water wells from waste disposal; it is also an environmental justice issue, as there is no air monitoring in the poor, black-American community, whereas respirators are used by workers at the CCR source location (in Kingston, TN). According to Earthjustice "…the ash was dumped in mounds as high as 60' without nothing covering them." Whereas shipments of TVA ash waste to the Perry County Landfill ended in late 2010, the residents are experiencing health problems that they believe are due to the improper disposal of the ash. "Levels of arsenic at more than 80 times the safe drinking water standards have been found in runoff near the LF."[39] Similar evidence was recorded by the Institute for Southern Studies.[40]

Status: Active.

Impact Summary: According to the May 2013 complaint, the impacts resulting from the activities authorized by Permit No. 53-03 include odors; increased populations of flies in and around the homes of many of the Complainants that are bothersome and that may be carriers of dozens of infectious viruses, bacteria, and parasites; increased populations of birds around the homes of many of the Complainants that deposit droppings and that may be carriers of dozens of infectious viruses, bacteria, and parasites; increased noise from operation of heavy machinery; decreased property values of many of the Complainants; and the frequent emission of fugitive dust from the landfill that causes particulate deposition on personal and real property of many of the Complainants, including homes, porches, vehicles, laundry, and

[39] February 10, 2012 blog post: http://earthjustice.org/blog/2012-february/tr-ash-talk-dumping-a-civil-rights-issue
[40] *Complaint cites health threats at Alabama dump taking TVA's spilled coal ash.* Facing South, February 17, 2010: http://www.southernstudies.org/2010/02/complaint-cites-health-threats-at-alabama-dump-taking-tvas-spilled-coal-ash.html

plantings. Dust and odors from the landfill caused residents of Uniontown to experience health problems, including respiratory illness, headaches, dizziness, nausea and vomiting.[41]

Study: None.

Regulatory and Legal Response: On January 3, 2012, 54 individuals from Perry County filed a Title VI Complaint,[42] concerned that environmental injustice incurred through permitting the disposal of 15,000 ton/day (municipal, non-hazardous commercial, and industrial) from 35 states; specifically, CCRs from Kingston, TN, a white majority, middle-class County, for disposal in a poor, high-minority population county in Alabama. This operation results, among others, in bad odors, noise, and frequent emissions of fugitive dust that causes particulate deposition on personal and real property of many Complainants, including homes, porches, vehicles, laundry, and plantings, all resulting in lowering of property values.[43] The complaint asks EPA to revoke funds that it gave to ADEM for its discriminatory actions, though the overall removal plan was authorized by EPA under Superfund.

On May 30, 2013, a complaint was filed by the law firm David A. Ludder, representing 34 complainants, pursuant to Title VI of the Civil Rights Act of 1964, 42 U.S.C. §§ 2000d to 2000d-7, and 40 C.F.R. Part 7, alleging that the Alabama Department of Environmental Management (ADEM) violated Title VI and EPA's implementing regulations by reissuing and modifying, on September 27, 2011 and February 3, 2012 respectively, Solid Waste Disposal Facility Permit No. 53-03 authorizing Perry County Associates, LLC to construct and operate the Arrowhead Landfill, a municipal solid waste landfill in Perry County, Alabama which has the effect of adversely and disparately impacting African-American residents in the adjacent community.[44] If a violation is found and ADEM is unable to demonstrate a substantial, legitimate justification for its action and to voluntarily implement a less discriminatory alternative that is practicable, Complainants petition EPA to initiate proceedings to deny, annul, suspend, or terminate EPA financial assistance to ADEM. [45]

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[41] *Ash in Lungs: How Breathing Coal Ash is Hazardous to Your Health*. Alan H. Lockwood and Lisa Evans, Physicians for Social Responsibility and EarthJustice. August 1, 2014: http://www.psr.org/news-events/homepage-story-archive.html?page=2

[42] *Alabama faces civil rights complaint over landfill taking waste from TVA coal ash disaster*. Facing South, January 5, 2012: http://www.southernstudies.org/2012/01/alabama-faces-civil-rights-complaint-over-landfill-taking-waste-from-tva-coal-ash-disaster.h. Title VI prohibits recipients of federal funds from engaging in discriminatory activity. *Alabama Department of Environmental Management Permitting of Arrowhead Landfill in Arrowhead County*, submitted to EPA's Office of Civil Rights on 1/12/2012: http://insideepa.com/iwpfile.html?file=feb2012%2Fepa2012_0293a.pdf.

[43] Exhibit F: Dust video, at http://www.enviro-lawyer.com/News-LandOfficeNews.html

[44] While the Harriman, Tennessee, community where the Kingston spill occurred is almost entirely white (91 percent) and middle class (median income $36,031), Uniontown is 90 percent African American, and 45.2 percent of its citizens live below the poverty line (median income $17,473). *Ash in Lungs,* ibid.

[45] http://insideepa.com/iwpfile.html?file=jul2013%2Fepa2013_1199b.pdf

According to the complaint, the first alleged discriminatory act is the reissuance (renewal) of Solid Waste Disposal Facility Permit No. 53-03 by ADEM to Perry County Associates, LLC on September 27, 2011. The second alleged discriminatory act is the modification of Permit No. 53-03 by ADEM on February 3, 2012. The permit modification authorizes Perry County Associates, LLC to expand the disposal area at the Arrowhead Landfill by 169.179 acres (66%). In 2010, certain residents of Perry County filed a civil action in the U.S. District Court for the Southern District of Alabama, Northern Division, against Phill-Con Services, LLC, the operator of the Arrowhead Landfill, to enforce an emission standard or limitation under the Clean Air Act, 42 U.S.C. 7401–7671q, and to enforce a standard, regulation, requirement, or prohibition under the Solid Waste Disposal Act, 42 U.S.C. 6901-6992k.

On September 26, 2012, EPA dismissed the September 27, 2011 and February 3, 2012 complaints without prejudice to refiling "within 60 days following termination or conclusion of" the aforesaid litigation. The foregoing litigation was terminated on April 16, 2013. EPA determined that ADEM has ample authority to regulate and control *fugitive dust emissions* from landfills. Although ADEM's fugitive dust rule was declared to be unconstitutional by the Alabama Supreme Court in *Ross Neely Express, Inc. v. Alabama Department of Environmental Management*, 437 So.2d 82 (Ala. 1983), Alabama has neither repealed the rule nor sought or obtained EPA approval of a revision of the State Implementation Plan. Accordingly, the rule continues to be included in the "applicable implementation plan" under the Clean Air Act.

In the complaints filed on January 6, 2012 and February 21, 2012, Complainants also alleged "the frequent tracking of dirt and other solids from the landfill onto County Road 1 where through traffic causes the dirt and other solids to become airborne particulates resulting in particulate deposition on personal and real property of many of the Complainants, including homes, porches, vehicles, laundry, and plantings." Subsequently, the Arrowhead Landfill relocated its entrance to Tayloe Road off U.S. Highway 82. This relocation has eliminated tracking of dirt on County Road 1.

References:

Arlington, VA, Public Hearing, August 30, 2010:
http://www.epa.gov/osw/nonhaz/industrial/special/fossil/ccr-rule/ccr-hearing.htm

Duke Energy's Riverbend Steam Plant, Mt. Holly, Mecklenburg CO., North Carolina

Implicated Activity: Piling for beneficial use.

Description: Pond-dredged ash piles on side of road are a source of fugitive dust. Ash also used for structural fill and various road uses.

Status: Active.

Impact Summary: *Complaint:* "Three years ago Duke dredged out the ponds, generating much fugitive dust that impacted the Stonewater development. The ash was heaped in a large, unmonitored mound beside the Horseshoe Bend Beach Road, the only access to the peninsula. It is a source of fugitive dust (ash accumulating on cars, houses), and presumably – of leaching to groundwater, which potentially risks many of the peninsula residents' drinking water wells." *Response:* "DWQ was not aware of the concern. DWQ is currently looking into the concern to see if any action is needed." [46]

Study: None.

Regulatory and Legal Response: No information.

References:

Charlotte, NC, Public Hearing, September 14, 2010:
http://www.epa.gov/osw/nonhaz/industrial/special/fossil/ccr-rule/ccr-hearing.htm

Progress Energy, Asheville (Arden), North Carolina

Implicated Activity: Beneficial use. (A potential damage case on account of groundwater contamination.)

Description: According to Progress Energy's response letter (February 9, 2009) to the January 22, 2009 NOV, the source area is an NPDES permitted surface impoundment rather than a stockpile area, hence no permit conditions are violated. The fugitive dust comprises cenospheres that in spite of the application of dust suppressing measures (mulch with dust suppressant, straw and wetting) become airborne during extended periods of winter subfreezing temperatures, when their harvesting from the top of the frozen pond is halted. In response to the NOV, Progress Energy stated that they are evaluating the establishment of an

[46] EPA-HQ-RCRA-2011-0392-0267, North Carolina Department of Environment and Natural Resources (NCDENR):

alternate harvesting area that has more wind buffer, as well as wind break options at the existing harvesting area.

Status: Active.

Impact Summary: Coal ash from waste disposal blowing and covering houses, garages and cars in the Lake Julian Trails housing development. One of the residents stated that after one bad incident Progress Energy washed everyone's house and had someone specially vacuum people's homes. He also stated that there was little or no enforcement, until the community started pushing someone to do something about it. The residents finally were able to get their state aquifer protection branch to issue an NOV. The power plant is supposed to be putting up an air monitoring system and come up with a plan to reduce dust. The power plant already came up with one plan to spray more and planted trees and shrubs for additional buffering.

Study: An analysis of a sample scraped off a resident's window sill in the Julian Lake Trails housing development (October 5, 2010) yielded the following, selected results (all in mg/Kg): arsenic: 37.7; chromium: 18.2; lead: 8.2; nickel: 8.2; selenium: 2.8; mercury: 0.047.

Regulatory and Legal Response: NC's Division of Water Quality issued (January 22, 2009) a NOV of Permit WQ0000020 for failing to take adequate provisions to prevent wind erosion and surface runoff from conveying ash from stockpile/storage areas onto adjacent property or into any surface waters. This resulted in the deposition of ash on property adjacent to Progress Energy's ash storage pond: ash from the ash pond had blown and accumulated on several properties (homes, cars and lawns) in the Lake Julian Trails housing development.

References:

Charlotte, NC, Public Hearing, September 14, 2010:
http://www.epa.gov/osw/nonhaz/industrial/special/fossil/ccr-rule/ccr-hearing.htm

Out of Control: Mounting Damages from Coal Ash Waste Sites, Thirty-one New Damage Cases of Contamination from Improperly Disposed Coal Combustion Waste. Environmental Integrity Project and EarthJustice. February 24, 2010.
http://www.environmentalintegrity.org/news_reports/news_02_24_10.php

May 19, 2011 and May 21, 2011 emails from Lisa Evans, EarthJustice, to A. Livnat, EPA/OSWER.

Swift Creek Structural Fill Site, ReUse Technology, Inc./Full Circle Solutions, Inc., Rocky Mount, North Carolina

Implicated Activity: Beneficial use (structural fill). (A proven damage case on account of groundwater contamination.)

Description: A 25-acre beneficial use structural fill received CCRs from six North Carolina and Virginia power plants, operated from 1991 through at least 2001. The site did not require a permit from NC DENR. CCR was placed only one foot above the water table and into a wetland, contaminating off-site groundwater and causing off-site coal ash dust impacts to adjacent property.

Status: Inactive.

Impact Summary: None available.

Study: None.

Regulatory and Legal Response: In its comment to the docket[47], NCDEQ conceded that *Out of Control's* damage assessment for the Swift Creek site "appears essentially accurate." A NOV and a Compliance Order were issued, but for violations unrelated to fugitive dust.

References:

Out of Control: Mounting Damages from Coal Ash Waste Sites, Thirty-one New Damage Cases of Contamination from Improperly Disposed Coal Combustion Waste, Case #14. Environmental Integrity Project and EarthJustice. February 24, 2010.
http://www.environmentalintegrity.org/news_reports/news_02_24_10.php

Harlan County, Kentucky

Implicated Activity: Unauthorized (?) disposal ('structural fills'?).

Description: A large number of open, illegal coal ash dumps throughout the state. Residents of Harlan County, Kentucky report open dumps of CCR that are compacted with bulldozers and covered with dirt. The illegal CCR dumps he is referring to are located within a couple of

[47] North Carolina DENR: EPA-HQ-RCRA-2009-0640-9282.2, p 11.

hundred feet of the Poore Fork of the Cumberland River and adjacent to US 119, the main road that links the city of Harlan and the Tri-Cities communities of Cumberland, Benham and Lynch.[48]

Status: Active.

Impact Summary: One observer said, "The workers who dump it and compact it do not use any protective equipment. Dust from it is flying around all the time."

Study: None.

Regulatory and Legal Response: None

References:

K.A. Owens, Kentuckians for the Commonwealth (KFTC) comment to the docket: EPA-HQ-RCRA-2009-0640-3934.

Louisville Gas & Electric Cane Run Power Plant, 5252 Cane Run Rd., Louisville, Kentucky 40216

Implicated Activity: Disposal (surface impoundments, landfill), on-site processing (ash treatment basin, sludge processing plant), storage (ash silo and stacks), haulage (trucks and roads.)

Description: During the over 50 years the Cane Run plant has been in operation, LG&E has constructed an unlined wet coal ash containment that is less than 100 yards from a residential neighborhood. Residents' homes are covered continually with a layer of dust from fly ash.[49] The current "Ash Mountain" is projected to reach capacity in 3-years. LG&E has applied for a new, 60-acres/160'-high landfill, to be located 800' from the closest residences. Currently residents are holding community meetings on a regular basis, and the Kentucky State Legislature is planning to hold hearings in the community to hear residents' concerns. Some

[48] According to SourceWatch: http://www.sourcewatch.org/index.php?title=Existing_U.S._Coal_Plants, the closest coal-fired power plants (<50 miles of US 119/Harlan-Tri City route) are: Eastman's Kingsport PP (Eastman Chemical Co.), Kingsport, TN; John Sevier Fossil Plant, TN; and Cooper Power Station, KY. This is not to suggest that any of these plants are implicated in the cited activity.

[49] Neighbors of Cane Run plant worry about health impact of coal ash Courier-Journal, April 19, 2011: http://www.courier-journal.com/article/20110419/GREEN/304190120/Neighbors-Cane-Run-plant-worry-about-health-impact-coal-ash?odyssey=tab%7Ctopnews%7Cimg%7CHome

residents said they believe LG&E officials know their plant causes ash and soot problems because the company has sometimes provided them with vouchers to pay for car washes. LG&E's representative acknowledged the company has paid for car washing, but only rarely, after an unusual incident at the plant. Under its permit, the company is allowed to emit fly ash from its smokestack, but if ash is leaving the landfill the company can be told to fix the problem.[50] The plant is scheduled to close by 2016: LG&E is planning to build a cleaner natural gas powered plant on its Cane Run property.

Status: Active.

Impact Summary: The residents experience fugitive dust from coal ash on a daily basis. Health problems and respiratory illnesses abound, and there are high rates of cancer.

Study: In February 2011, a Louisville Metro Air Pollution Control District inspector swabbed the outside sills on the front of the Little's house, about 150' from the eastern wall of the ash pond, and just down the block from the black face of the ash dump. A laboratory analysis confirmed fly ash in three samples. Air district spokesman Matt Stull confirmed that investigation.

On the other hand, a preliminary round of testing in March by the state at five locations in Claremont Acres, east of the plant, and Riverside Gardens to the north, "did not show significant levels of fly ash" on homes, Hubbard (Assistant Director of the Kentucky Division of Waste Management, which regulates the dump) said, adding that inspectors would like to return "when conditions are drier."

A study to evaluate surface dust samples deposited unto adjacent properties, ordered by LG&E from the RJ LEE Group, used adhesive lift samplers to collect six samples from three houses near the PP (4/18/2011). The SEM characterization identified significant, but variable amounts of fly ash and bottom ash in each of the samples, including untreated Hopper Ash and Pozotec (the former predominated by silicon-aluminum, and the latter - also with elevated calcium-sulfur). Based on backscattered electron images and X-ray maps, the PP concluded that they found 'nothing harmful in the results.'[51]

In a follow up study,[52] a multi-day sampling approach was employed to monitor particle deposition over time and to gain knowledge on the amount of time necessary to achieve an

[50] According to WFPL News, July 13, 2011: http://www.wfpl.org/2011/07/13/lge-report-finds-coal-ash-on-area-homes/

[51] Ash on residences study (July 8, 2011): TLH104154-Nuisance-dust-report-7-8-11-FINAL.pdf at http://archives.wfpl.org/wp-content/uploads/2011/07/. Note that the analytical techniques used are too insensitive for the detection of trace metal amounts.

[52] TLH104154-Passive-Sampling-Report_FINAL_July-13.pdf at http://archives.wfpl.org/wp-content/uploads/2011/07/

appropriate particle loading for detailed individual particle analysis. The UNC passive aerosol sampler was deployed. The UNC passive sampler is unique in its ability to estimate ambient concentrations (µg/m^3).

The CC (computer-controlled) SEM individual particle data were processed via the Wagner-Leith model to estimate ambient concentrations. Based on this process, the PM10 concentrations ranged from 9.4 to 14.7 µg/m^3 (average over sampling period).[53] In summary, the number of fly ash/bottom ash on the passive deposition samples and the UNC passive aerosol samples appeared to correlate well with the passive deposition samplers in that fly ash/bottom ash was a small component of the particulate matter collected on the initial set of samples. However, the results from the passive monitoring program did not correlate with the surface dust sample results. Given this discrepancy, it was recommended that sampling continue on an ongoing basis with the passive deposition samplers and the UNC passive samplers.

Regulatory and Legal Response: On July 20, 2011, the Air Pollution Control District (APCD), Louisville, Kentucky, issued a NOV accompanied by a $4,000 fine to LG&E for allowing particulates to move outside the plant's property and settle on adjacent residential properties, first in December 2010, then in February and April 2011. The NOV requires LG&E to submit, by August 26, 2011, a compliance plan for control of ash emissions from the plant and for remediation of particulate fallout on neighboring properties.[54]

On April 18, 2012, LG&E reached a settlement with the Louisville Metro APCD regarding several air emissions and fugitive dust violations in 2011 that resulted in two NOV. The Settlement stipulates, among others, that the Company shall submit to the District by April 30, 2012 a proposed plan for the application of dust suppressant to inactive open areas of the landfill. After notification from the District of its approval of the plan, Company shall comply with the plan.[55]

Equipment malfunction kept occurring at the Cane Run plant that release clouds of coal ash. A malfunction of the sludge processing plant (SPP, July 30-31, 2011) at the LG&E Cane Run power plant has sent a billowing cloud of ash into the air. On September 13, 2012, the SPP malfunctioned again. The SPP mixes the coal ash with other materials to turn it into Poz-O-Tec, a cementitious substance, so it can be put into the landfill. A video[56] shot by a resident who

[53] The UNC passive sampler has recently been used by the US Environmental Protection Agency to monitor coarse particles (PM10-2.5) in the Cleveland, Ohio area. Note, however, that in this study PM2.5 was not measured.
[54] According to an August 1st, 2011 posting of the Courier: *Air Pollution Control District, Louisville, Kentucky: Notice of Violation Letter 02246*: http://blogs.courier-journal.com/watchdogearth/files/2011/08/LGECaneRunNOV7-2011.pdf
[55] A list of LG&E's violations and resulting penalties between August 2011 and August 2013 can be accessed at: *LG&E Fined $65,000 for Odor Problems at Cane Run Power Plant*. The News for Louisville, August 5, 2013: http://wfpl.org/post/lge-fined-65000-odor-problems-cane-run-power-plant
[56] Multiple release are documented in a series of videos: http://www.youtube.com/user/kaeterina1; *Cane Run Sludge Plant Malfunction September 13, 2012*. Youtube, September 16, 2012:

lives across the street shows clouds of ash rising above the plant - and over the dust screen the company installed in April. A Plant representative said the ash was actively being released for seven minutes, before the plant was shut down. [57]

On September 6, 2013, *Hagens Bergman* submitted, on behalf of Greg Walker and Kathy Little, individually and on behalf of all others similarly situated, intend to file a citizen suit against Louisville Gas & Electric Company (LG&E) and its owners (collectively, the Cane Run Defendants), pursuant to: (1). 42 U.S.C. § 6972(a)(l)(A), for past and continuing RCRA violations; (2). 42 U.S.C. § 6972(a)(l)(B), for past and continuing violations of RCRA by having contributed and/or contributing to the handling, storage, hauling or disposal of solid and hazardous wastes at the Cane Run site in a manner that may present an imminent and substantial endangerment to health or the environment; and (3). 42 U.S.C. § 7604(a)(l), for past and continuing violations of the federal Clean Air Act (CAA).

The Intent to Sue claims that since at least 2008, the Cane Run Defendants have generated, handled, stored, treated, transported, and disposed of solid and hazardous wastes at the Cane Run site. These wastes are stored outdoors on the Cane Run site, including in a massive landfill, an Ash Treatment Basin, and as many as four ash ponds, which are at least partially dry and, thus, contain dry solid and hazardous wastes. The Cane Run plant has three active stacks, dedicated to three steam generators used in the production of electric power; a Sludge Processing Plant (SPP), which is used to process fly ash before storing it in the Landfill; and an Ash Silo, which is used to store fly ash for processing by the SPP.

None of these sources of fly ash, bottom ash, toxic metals, and other coal combustion particulates located on the Cane Run site (the Landfill, the Ash Treatment Basin, the Ponds, the SPP, the Ash Silo, trucks operated by the Cane Run Defendants, roads on the Cane Run site, and the Stacks) have adequate controls for insuring that these solid and hazardous wastes are not emitted into the atmosphere and deposited on the residential areas surrounding the site. As a result, the Cane Run Defendants have regularly and frequently released significant amounts of fly ash, bottom ash, toxic metals, and other coal combustion particulates, often in the form of dust clouds and storm water runoff, into the atmosphere and over ground. These releases have traveled for miles off of the site and, because of the Cane Run site's lack of controls, these releases are continuing. The solid and hazardous wastes released from the site have settled on the exteriors of surrounding homes and buildings, as well as on playgrounds, parks, lawns, pools, ponds, recreational items, and vehicles. These solid and hazardous wastes have also

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http://www.youtube.com/watch?v=BPgQCYsErGY; Ash blowing from cane run plant 8 16 12. Youtube, August 18, 2012: https://www.youtube.com/watch?v=ze0LNF7MNyI&index=4&list=UUwIapnG8JXDG0rCle0_HAFQ

[57] *Cane Run residents report more blowing ash.* Courier-journal, September 14, 2012: http://blogs.courier-journal.com/watchdogearth/2012/09/14/cane-run-residents-report-more-blowing-ash/; http://blogs.courier-journal.com/watchdogearth/2012/10/12/epa-reviews-cane-run-ash-problem/ and http://wfpl.org/post/coal-ash-problems-continue-cane-run.

migrated inside surrounding homes and buildings, where they settle in interior living and working spaces.

The Cane Run site is adjacent to residential neighborhoods containing thousands of homes. It is also in close proximity to parks, schools, roads, restaurants, and shopping areas. Residents of the areas surrounding the Cane Run site have complained to county, state, and federal officials regarding health problems stemming from exposure to particulates released from the Cane Run site, including respiratory ailments, severe eye irritation, sensitivity to strong sulfur odors, and elevated cancer rates.

The APCD is the Jefferson County agency charged with enforcing the District's environmental regulations, which are promulgated pursuant to Kentucky Revised Statutes, Chapter 77. Many of the APCD environmental regulations have been adopted by the USEPA, pursuant to Kentucky's State Implementation Plan (SIP) under the CAA. Violations of the APCD regulations adopted as part of Kentucky's SIP are therefore violations of the CAA. The APCD has repeatedly cited LG&E for violations of the District's environmental regulations relating to the Cane Run site's release of fly ash and other particulates into the surrounding community, as well as failing to control the strong sulfur odors produced by the Cane Run site's generation and storage of coal combustion by-products.

The Cane Run Defendants' activities have violated and are continuing to violate the Cane Run site's Operating Permit, issued pursuant to Title V of the CAA, and regulations which are part of Kentucky's SIP under the CAA. Between July 2011 and August 2013, five NOVs were issued for violations by Cane Run Defendant LG&E of scores of APCD regulations. Examples include “Visible Fugitive Emissions beyond the Property line settling onto surrounding neighborhood properties (December 2010, and February and April, 2011);" "On June 21, July 29, and August 4, 11, 12, and 22, 2011, source emitted clouds of dust into the atmosphere from its sludge processing plant that caused nuisance and annoyance to the residents of the neighborhood that surround it;" "The source allowed visible fugitive dust emissions to travel from the ash landfill, an in-plant road, and the SPP and to cross the plant's property line onto the neighboring residential area."

Substantially similar violations to those that are the subject of the APCD NOV's are continuing on at least a weekly basis at the Cane Run site because the Cane Run Defendants have failed to implement measures to control the emission of fly ash and its constituent toxic metals, bottom ash, and other particulates produced by the coal combustion process from the Landfill, the Ash Treatment Basin, the Ponds, the SPP, the Ash Silo, roads on the Cane Run site, and the Stacks at the Cane Run site, as well from trucks operated by the Cane Run Defendants.

The Cane Run site's Operating Permit does not allow particulate emissions from the Cane Run site's Landfill, Ash Treatment Basin, Ponds, roads on the Cane Run site, or from trucks operated by the Cane Run Defendants. As a result, particulate emissions from these sources are also violations of the CAA and are continuing on at least a weekly basis.

In November 2013, LG&E agreed to pay $113,250 penalty and comply with a pollution control and maintenance plan adopted in April — on top of $33,000 in other ash-related fines since 2011.

In July 2014, a federal court ruled that a class of residents alleging that Kentucky' Cane Run power plant covered their properties with coal ash may proceed with state tort law claims. The federal court ruled, on July 17, that the claims aren't preempted by the Clean Air Act (*Little v. Louisville Gas & Electric Co.,* 2014 BL 198330, W.D. Ky., No. 13-1214, 7/17/14). Residents alleged dust and coal ash emitted from the plant coat their homes and properties in violation of the CAA and RCRA. They also brought state law claims of nuisance, trespass and negligence. The defendants, Louisville Gas & Electric Co. and PPL Corp., moved to dismiss the state law claims as preempted by the Clean Air Act. The court found the plaintiffs' arguments persuasive: the court dismissed from the lawsuit the plaintiffs' claims under RCRA, and all but one of their claims under the CAA, saying that only the state law claims and one CAA claim for alleged operation of the Cane Run plant without a valid permit remain.

Recently, LG&E settled a lawsuit for fugitive dust, negligence, and nuisance in *Monika Burkhead, et al v. Louisville Gas and Electric Company*, U.S. District Court, Western District of Kentucky at Louisville**,** which involved over a hundred residents in the community of Riverside Gardens. Terms of the settlement are confidential.

References:

May 18, 2011 and July 14, 2011 emails with attachments from Lisa Evans, EarthJustice, to A. Livnat, EPA/OSWER.

Cane Run residents report more blowing ash/September 14, 2012: courier-Journal.com

EPA reviews Cane Run ash problem/October 12, 2012: courier-Journal.com

A letter of Intent to Sue LG&E Cane Run, September 16, 2013, an attachment in a November 4, 2013 email from Pete Raack, EPA/OECA to A. Livnat, EPA/OSWER.

Louisville faces concerns on coal ash: LG&E has agreed to pay fines for problems at Cane Run power plant, Courierjournal.com, Dec. 21, 2013.[58]

Coal Ash Claims Not Preempted by Air Act, Court Rules in Tort Suit against Power Plant.[59]

[58] http://www.courier-journal.com/article/20131221/GREEN/312210038/Louisville-faces-concerns-coal-ash?gcheck=1&nclick_check=1

[59] Bloomberg BNA Daily Environment Report, July 21, 2014: http://news.bna.com/deln/DELNWB/split_display.adp?fedfid=50244297&vname=dennotallissues&jd=a0f3p2v8j1

EPA Region 5

Duke Energy's Gibson Generating Station, Somerville & Mount Carmel Area, Indiana

Implicated Activity: Disposal (surface impoundment). (Also, a proven damage case on account of groundwater impact.)

Description: Residences of the ten trailers in East Mt. Carmel are blanketed regularly with coal ash dust blowing from the near full ash ponds in the summer; fugitive dust from waste disposal causes medical issues and covering cars with coal ash dust. Impact extends also to communities across the Wabash River in Illinois.
Status: Active.

Impact Summary: No information.

Study: None.

Regulatory and Legal Response: None.

References:

Knoxville, TN, Public Hearing, October 27, 2010:
http://www.epa.gov/osw/nonhaz/industrial/special/fossil/ccr-rule/ccr-hearing.htm

Louisville, KY, Public Hearing, September 28, 2010:
http://www.epa.gov/osw/nonhaz/industrial/special/fossil/ccr-rule/ccr-hearing.htm

Out of Control: Mounting Damages from Coal Ash Waste Sites, Thirty-one New Damage Cases of Contamination from Improperly Disposed Coal Combustion Waste. Environmental Integrity Project and EarthJustice. February 24, 2010.
http://www.environmentalintegrity.org/news_reports/news_02_24_10.php

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&split=0; *The U.S. District Court for the Western District of Kentucky's opinion in Little v. Louisville Gas & Electric Co.:*
http://www.bloomberglaw.com/public/document/Little_v_Louisville_Gas__Electric_Co_CIVIL_ACTION_NO_313CV01214JH

EarthJustice, comment to the docket: EPA-HQ-RCRA-2009-0640-6315.

Hoosier Energy Merom Station, Merom, West Old 54, Sullivan County, Indiana

Implicated Activity: Disposal (landfill). (Also, a potential damage case on account of groundwater impact.)

Description: Hoosier Energy disposes of its CCRs in landfills on-site. According to Hoosier Energy, the volume of waste disposed is approximately 2,050 cubic yards per day. The largest volume waste stream is fixated scrubber sludge (a mixture of fly ash, scrubber sludge and lime). The area surrounding the Merom generating facility includes residences (the closest: about 800' away from the active landfill cell)[60] and farm land. Dust blowing off the landfill has been a chronic problem, and has become worse over the last several years as the height of the current landfill, which is reaching capacity, has increased.

A permit for a new third landfill on-site has been recently issued by the Indiana Department of Environmental Management. The new landfill will be the larger in both footprint (112 acres) and height than the previous two landfills and is much closer to surrounding homes. It has an estimated life of 19 years. Although the new permit includes more dust control requirements than previous landfill permits, continued dust problems are anticipated because of the nature of the material and the disposal method.

Status: Active.

Impact Summary: The nearby residents' lives have been seriously impacted by the fugitive dust. The coal ash dust coats their homes, cars, outdoor furniture, toys, equipment and vegetable gardens. They must clean the outsides of their homes and windows frequently. They are forced to keep their windows and doors closed at all times. Nevertheless, coal ash dust gets into their homes and settles on the furniture and floors. Several nearby residents have infants, toddlers and young children or grandchildren and they worry about exposure to the dust both indoors and outdoors. They restrict outdoor play and must clean indoor surfaces frequently to try to minimize exposure.

Another neighbor, Mike Eslinger, testified that there are days that he cannot take his children outside to play because of the fugitive dust and the blue plume from the smoke stack is so bad. His house is covered with dust from the plant.[61] There have been problems reported with

[60] EPA measurement, Google Maps.
[61] In the Louisville Public Hearing, September 28, 2010. A July 26, 2010, consent decree between Hoosier Energy

unexplained illessnesses/deaths of livestock in the area and residents are concerned these problems may be associated with the coal ash dust, which settles on pastures where the livestock feed.

Study: Wipe dust samples from two of the neighbors kids toys showed lead at 1340 µg/wipe and arsenic at 2720 µg/wipe; lead on one of the resident's dressers in a bedroom was 886 µg/wipe. The same family (Miller) have had their daughter tested for lead and the results confirm lead exposure.

Regulatory and Legal Response: Mike Blann, a Hoosier Energy employee and neighbor, testified at the same hearing: "Personally over the years I have seen how the State of Indiana has regulated the power plant landfill in our backyards and can honestly say it is without doubt NOT working!"

The attorney representing the nearby, fugitive dust impacted residents (Rosemary G. Spalding, Spalding & Hilmes), reported that since July 2010, they have been engaged in making comments on behalf of their client group on a variety of Hoosier Energy-Merom (HE) environmental permits. These include a request for IDEM to enforce the permit for the current landfill, FP77-03, and public comments on HE's permit application for a new landfill, FP77-04. As a result of their endeavors, the IDEM revoked the variance for daily cover in FP77-03 (state operational rules requiring daily cover on the working face of the landfill (329 Indiana Administrative Code 10-28-11 and 12) and the variance request was denied in the FP77-04 application.

References:

Knoxville, TN, Public Hearing, October 27, 2010:
http://www.epa.gov/osw/nonhaz/industrial/special/fossil/ccr-rule/ccr-hearing.htm

Louisville, KY, Public Hearing, September 28, 2010:
http://www.epa.gov/osw/nonhaz/industrial/special/fossil/ccr-rule/ccr-hearing.htm

Coal Combustion Waste Damage Case Assessments, July 2007:
http://www.regulations.gov/#!documentDetail;D=EPA-HQ-RCRA-2006-0796-0015

May 24, 2011 email, with attached documents and photos, from Lisa Evans, EarthJustice, to A. Livnat, EPA/OSWER.

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and EPA requires Hoosier Energy to address, among others, a 'blue plume' composed of sulfuric acid mist that has been emitted from the plant for several years and documented extensively by its neighbors.

Spalding & Hilmes, PC, Law Firm. Commenter: Rosemary G. Spalding and Kathryn A. Watson, on behalf of Springer family et al., comment to the docket: EPA-HQ-RCRA-2009-0640-10019.

Ameren Coffeen Power Station and US Minerals, Coffeen, Illinois

Implicated Activity: Beneficial use.

Description: Complaints about fly ash from disposal on cars, homes, yards. According to IEPA,[62] its air program is not aware of any permitting issues/complaints concerning Coffeen Power Plant. Apparently, there is a company called *US Minerals* in Coffeen that processes boiler slag from the Coffeen Power Plant. IEPA had many complaints back in 2004 from citizens in Coffeen about blowing coal ash dust. The company installed fabric filters on the process and the complaints stopped.

U.S. Minerals, Montgomery County - *U.S. Minerals* is located on the south side of Coffeen and receives boiler slag from the Coffeen Power Plant, grinds and sizes the granules and ships them to facilities that make asphalt roofing shingles and blasting media. IEPA received dust complaints from Coffeen citizens in 2004, 2005, 2006 and a violation notification letter (VNL) was sent in 2006. The company installed bag houses on the process and the facility currently has a Bureau of Air (BOA) state operating permit. IEPA has not received recently any complaints about operations at this location.[63] *U.S. Minerals* uses the bottom ash from Coffeen Power Station for making construction materials. Coal ash is stored in large piles at the industrial site, a half mile north of Coffeen Power Station. The piles of coal ash do not have liners, covers, windbreaks, or silt fences to prevent erosion and release of pollutants to air and water.

Status: Active.

Impact Summary: Residents living next to *U.S. Minerals* have complained to Prairie Rivers Network personnel about lung and eye irritation, breathing problems and constant coating of their homes and vehicles with coal ash dust. The coal ash piles are still sitting on the ground without any air or water pollution controls in place."

Study: None.

[62] IEPA's response, 8/16/2011.
[63] IEPA, Other Coal Ash Sites, Case #6, September 2011: http://www.epa.state.il.us/water/ash-impoundment/documents/other-coal-ash-sites.pdf

Regulatory and Legal Response: OSHA fined *U.S. Minerals* nearly $400,000 on December 7, 2010 for more than two dozen safety violations endangering workers with dangerously high levels of hazardous ash dust without proper breathing equipment and training.[64]

References:

Chicago, IL, Public Hearing, September 16, 2010:
http://www.epa.gov/osw/nonhaz/industrial/special/fossil/ccr-rule/ccr-hearing.htm

Coal Combustion Waste Damage Case Assessments, July 2007.
http://www.regulations.gov/#!documentDetail;D=EPA-HQ-RCRA-2006-0796-0015

Email correspondence between Julie Gevrenov, EPA R5 and A. Livnat, EPA/OSWER: September 27, 2011 email to A. Livnat; September 29, 2011 and November 8, 2011 emails to J. Gevrenov.

Rocky Acres Coal Combustion By-Product Disposal Site – Bunge Corp., Oakwood, Vermilion County, Illinois[65]

Implicated Activity: Beneficial use (structural fill). (Also, groundwater contamination.)

Description: 380,000 tons of CCR from FBC coal-fired boilers at the Bunge N. America Co., which operates a dry corn mill in Dansville, Ill deposited on a 25-ac. site over a 10-year period in a ravine adjacent to the Grays Siding neighborhood. The subdivision is a rural community of 30 homes that all draw their drinking water from groundwater. The CCR fill site has been encroaching on residential property, and the residential community is adversely affected by uncontrolled fugitive dust from the site.

Status: Inactive.

Impact Summary: Fugitive dust reported as uncontrolled from 'waste disposal.' Several residents registered "citizen pollutant complaints" with IEPA due to the dust (February 26, 2002).

Study: None.

[64] Illinois at Risk, page 9, August 2011: http://prairierivers.org/wp-content/uploads/2011/08/Illinois-at-Risk.pdf; Specific information on OSHA's citations and penalty:
http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=NEWS_RELEASES&p_id=18918

[65] Site known also as Gray Sidings.

Regulatory and Legal Response: IEPA notified O/O that site was illegal open dump in 2006. Site owner declared bankruptcy; Bunge refuses liability. Bunge installed IEPA-requested GW monitoring wells, submitted GW Investigation Work Plan in 2007. Bunge is undertaking voluntary GW investigation. The site is now inactive.

Bills were proposed to tighten requirements for structural fill projects, requiring, among others, covering fly-ash by a 12" soil cover within 30 days of its placement or end of project.[66]

References:

Chicago, IL, Public Hearing, September 16, 2010:
http://www.epa.gov/osw/nonhaz/industrial/special/fossil/ccr-rule/ccr-hearing.htm

Out of Control: Mounting Damages from Coal Ash Waste Sites, Thirty-one New Damage Cases of Contamination from Improperly Disposed Coal Combustion Waste. Environmental Integrity Project and EarthJustice. February 24, 2010.
http://www.environmentalintegrity.org/news_reports/news_02_24_10.php

May 22, 2011 email, with attached documents and photos, from Lisa Evans, EarthJustice, to A. Livnat, EPA/OSWER.

Electric Energy, Inc., Met-South Coal Combustion Waste Disposal Facility, Joppa, Illinois

Implicated Activity: Disposal or beneficial use; haulage.

Description: Coal Ash placed on roads, resulting in being stirred up by each passing vehicle.
Status: Active (?)

Impact Summary: Fugitive dust from waste disposal causes chronic and acute respiratory problems. Coal Ash spreading to nearby houses and yards, causing serious health problems.

[66] On February 15, 2008, SB2567 (2007-08) was proposed , in the 95th General Assembly by Mike Frerichs, D-Champaign, and House Bill 4172 was proposed by Bill Black, R-Danville: http://www.ilga.gov/legislation/fulltext.asp?GAID=9&SessionID=51&GA=95&DocTypeID=SB&DocNum=2567&LegID=&SpecSess=&Session=

Study: IEPA's response to EPA R5 (August 16, 2011): IEPA is not aware of any citizen complaints of damage cases concerning Electric Energy, Inc., nor is their air program aware of any permitting issues.

From Scott Arnold, IEPA (August 17, 2011): "I checked this same complaint out about three years ago. It is a bogus complaint. EEI does NOT stack any ash at all. They haven't in since the 70's. The ash handling system stores the ash in silos and it is pneumatically moved to retention ponds.

The road in question, Liberty Ridge Road was black topped in the mid 80's. Any coal ash that was ever applied to that road has been encapsulated for roughly 30 years now. There is no potential for air pollution at either site. And BOL decided over three years ago, they weren't going to do anything about Liberty Road. There is no "clean up" on going. I was down in Joppa yesterday and confirmed all of the above."

Regulatory and Legal Response: None.

References:

Louisville, KY, Public Hearing, September 28, 2010:
http://www.epa.gov/osw/nonhaz/industrial/special/fossil/ccr-rule/ccr-hearing.htm

Chicago, IL, Public Hearing, September 16, 2010:
http://www.epa.gov/osw/nonhaz/industrial/special/fossil/ccr-rule/ccr-hearing.htm

EPA Region 6

Clean Hydro Reclamation (formerly: Making Money Having Fun, LLC) Landfill, Bokoshe, Le Flore County, Oklahoma

Implicated Activity: Reclamation of an open coal pit mine/landfilling; haulage. (Also, surface water contamination.)

Description: Making Money, Having Fun (renamed: Clean Hydro Reclamation), a coal ash company, has been dumping coal ash in Bokoshe from the coal-fired AES Shady Point power plant in nearby Panama, Oklahoma (7 miles east). Oklahoma law prohibits locating a coal ash dump any closer than 3 miles from an incorporated city: when *Making Money Having Fun*

(MMHF) applied to the Oklahoma Corporation Commission for a permit to dispose 'commercial waste', they left the 100-year old, incorporated town of Bokoshe off their maps. MMHF is building a coal ash wall at least 50' high and growing, dumping the ash first and only adding oil/gas wastewater later to reclaim the abandoned strip mine.[67] MMHF, in denial that there is a town (incorporated since 1899) of less than 20,000 within a 1.2 mile from the fill area, have been operating since 2001 without any intervention by a regulatory authority.

"Significant amounts of fugitive ash were seen every time a load of ash was dumped into the recirculating water stream. The fugitive ash lingered in the air and did not disperse quickly. Oklahoma's requirements (Title 45 § 11.913.14) are that dust control measures shall be taken where dust significantly reduces visibility of equipment operators. Haulage roads shall be wet down as necessary unless dust is controlled adequately by other methods. Dust control measures are also specifically mentioned in the permit. ODEQ has jurisdiction over fugitive dust and issues Air Quality Permits in that regard."[68]

Status: Active.

Impact Summary: The coal ash flies out of 80, 25-ton trucks/day as fugitive dust on their daily trips to Bokoshe. A video shows dust billowing hundreds of feet up in the air. Sometimes school busses drive through it. The coal ash then leaks mercury, arsenic and other metals into the groundwater that supplies drinking water and then runs down the 50 foot hill onto the neighbors' property. Over half of the school kids have asthma. The calves are stillborn. Fourteen of the 20 families living at the vicinity of the disposal site have/had at least one cancer case per family, including a toddler with leukemia, an 8th grade boy with breast cancer, and a 35-year-old teacher who has had cancer twice. Several of her same-age exercise buddies are dead from cancer.[69]

Study: None.

Regulatory and Legal Response: Following an April 15, 2009 meeting of concerned residents with the Air Quality Advisory Council/OKDEQ, they found that MMHF has been

[67] Two Clean Water Act Administrative orders were issued by EPA R6: (i) on Dec. 10, 2009 (Docket CWA#06-2010-1748), for discharging pollutants (900 to 4200 ppm TDS) to a tributary of the Buck creek; and (ii) on Feb. 22, 2010, another cease-and-Desist order. Due to lack of compliance (including requirements to eliminate the discharge of the pollutant water, and within 30 days, document and describe the corrective actions taken to eliminate the unauthorized discharge and provide a plan explaining how future waste stream will be managed). Late in 2010, the case was forwarded to DOJ. Because of surface water contamination problems, the Oklahoma Corporation Commission prohibited MMHF in 2010 from accepting water from oil and gas wells that was mixed with the fly ash.
[68] The earliest reference to a fugitive dust issue, in MMHF's Reclamation Pit #2. Cited from *U.S. EPA Site Visit Report Coal Combustion Waste Minefill Management Practices - Oklahoma - Draft Final Report,* September 9, 2002: http://www.epa.gov/waste/nonhaz/industrial/special/fossil/sites/ok-visit.pdf
[69] ABC News: *Oklahoma Town Fears Cancer, Asthma May Be Linked to Dump Site* (March 29, 2011): http://abcnews.go.com/US/oklahoma-town-fears-cancer-asthma-linked-dump-site/story?id=13240312

committing 5 separate violations of the CAA for seven years. However, in the subsequent Consent Order between OKDEQ and MMHF, there were no fines, penalties, or findings of violation.

On October 6, 2011, residents of Bokoshe[70] filed, in LeFlore County District Court, a lawsuit against AES Shady Point PP, MMHF LLC and its fly-ash operators individually, Thumbs Up Ranch, GCI Mining, Mountain Minerals and several trucking companies (overall, 24 defendants), "for their creation of a noxious and harmful nuisance, pollution and contamination, trespass, diminution of property values and business interest, and personal injury." According to the plaintiffs, people living in more than half of the homes near the fly-ash pit have had cancer, and they believe that the high number of respiratory illnesses – including asthma in children – among area residents is caused by dust blowing from the fly-ash pit. The lawsuit asks the court to force the defendants to stop the dumping, clean up the site, and pay for current and future fly-ash-related illnesses and property damage. The plaintiffs are asking more than $75,000 each in compensatory and punitive damages.[71]

In October 2012, the six Bokoshe plaintiffs in a class-action lawsuit that was filed in October 2011 against AES Corp. and the businesses serving its nearby AES Shady Point plant filed an amended petition,[72] adding 48 defendants that use the same disposal pit site. Summons were issued to the new defendants on October 10, 2012. A jury trial had been set for November 29, 2012.

References:

Dallas, TX, Public Hearing, September 8, 2010:
http://www.epa.gov/osw/nonhaz/industrial/special/fossil/ccr-rule/ccr-hearing.htm

[70] Bokoshe residents William and Diane Reese, Herman Tolbert, Tim Tanksley, Susan Holmes and Charles Tackett: http://swtimes.com/sections/news/dozens-defendants-added-class-action-coal-dust-lawsuit.html

[71] http://www.tulsaworld.com/news/article.aspx?articleid=20111102_12_A11_CUTLIN672607&subjectid=11

[72] *Dozens Of Defendants Added To Class-Action Coal Dust Lawsuit*: Times Record, Oct. 19, 2012: http://swtimes.com/sections/news/dozens-defendants-added-class-action-coal-dust-lawsuit.html**.** Among others, the amended petition adds oil and gas producers who also use the MMHF, aka Making Money Having Fun, Clean Hydro Reclamation and Clean Hydro Evacuation disposal pit site to dispose of their produced fluids, including saltwater and other contaminants, from oil and gas well drill sites and production sites. The *amended petition* alleges the transport of the produced fluids to the disposal pit has resulted in the release of hundreds of millions of gallons of contaminants into creeks, streams, rivers and other surface water drainages and impoundments, and specifically onto and under the homes, businesses and properties of the plaintiffs and their fellow class members. The lawsuit contends that more than 450 residents in and around Bokoshe have been affected by the businesses' actions.

Denver, CO, Public Hearing, September 2, 2010:
http://www.epa.gov/osw/nonhaz/industrial/special/fossil/ccr-rule/ccr-hearing.htm

Comment to the docket submitted by Jody Harlan, Chapter Vice Chair, Sierra Club Oklahoma: EPA-HQ-RCRA-2009-0640-2401

May 4, 2011 meeting between Susan Holmes, B.E.Cause and Lisa Evans, EarthJustice, with EPA/OSWER.

Tulsa World, 11/2/2011

Coal Ash chronicles, 2014: http://www.coalashchronicles.com/in-your-backyard/oklahoma

Arizona Public Service San Juan Generating Station and Four Corners Power Plant, New Mexico

Implicated Activity: Disposal (surface impoundments) and beneficial use (minefilling) (Also, groundwater and surface water contamination caused by minefilling.)

Description: In addition to the contamination of groundwater and surface water from the surface impoundments, APS does not control fugitive dust resulting from its disposal activities. The arid climate and often windy conditions on the Navajo Reservation make airborne ash from the uncovered and not reclaimed impoundments a serious problem. APS's decades-long failure to contain windblown ash has resulted in contamination of soil in areas surrounding the impoundments.

APS claims that active measures (dust suppressants, wetting, and compaction) are undertaken to control fugitive dust, and that Four Corners has been approached by the Navajo Nation to ask for application of CCPs on soils of the NAPI (irrigated agriculture) Project.[73]

Status: Active.

Impact Summary: Apparently associated with higher-than-normal rates of cancer (leukemia) and respiratory ailments attacking otherwise healthy, young Navajo residents in the Shiprock downwind area

[73] USWAG's comment to the 2007 NODA docket: EPA-HQ-RCRA-2006-0796-0446.

Study: None.

Regulatory and Legal Response: New Mexico does not require daily cover at disposal sites.

References:

Denver, CO, Public Hearing, September 2, 2010:
http://www.epa.gov/osw/nonhaz/industrial/special/fossil/ccr-rule/ccr-hearing.htm

Out of Control: Mounting Damages from Coal Ash Waste Sites, Thirty-one New Damage Cases of Contamination from Improperly Disposed Coal Combustion Waste. Environmental Integrity Project and EarthJustice. February 24, 2010.
http://www.environmentalintegrity.org/news_reports/news_02_24_10.php

Comment to the docket submitted by Marty Rustan on behalf of Lisa Evans, EarthJustice: EPA-HQ-RCRA-2006-0796-0446.

An October 24, 2006 complaint by a Navajo Reservation resident to Susan Bodine, the AA for OSWER, in a meeting at EPA HQs in Washington, DC.

EPA Region 8

Valmont Coal Plant, Boulder, Colorado

Implicated Activity: Haulage for disposal (conveyer belt).

Description: Fugitive dust blowing off plant (conveyer belt) as a result of high winds.

Status: Active.

Impact Summary: No information.

Study: None.

Regulatory and Legal Response: None.

References:

Denver, CO, Public Hearing, September 2, 2010:
http://www.epa.gov/osw/nonhaz/industrial/special/fossil/ccr-rule/ccr-hearing.htm

EPA Region 9

Nevada Energy, Reid Gardner Generating Station, Moapa, Nevada

Implicated Activity: Disposal, Class III industrial landfill, surface impoundments and ash haulage. (Also, a proven damage case on account of groundwater and surface water contamination.)

Description: The waste disposal site, directly adjacent to the power plant, is a 91-acre unlined landfill, less than one mile from the Moapa Band of Paiutes Tribal community on the Moapa River Indian Reservation in Southern Nevada. There are two major types of CCR management that seem to generate most of the fugitive dust that blows to the community of the Moapa Band of Paiutes: (i) Fly ash from the surface impoundments that is scooped out periodically and heaped for haulage to the coal ash landfill. There are also pond- solids, forming on the sides of the impoundments as liquid evaporates, entrained in droplets as liquid evaporates, or made air-borne by blowing wind, all being carried from the wastewater ponds; (ii) Some twenty uncovered trucks of coal ash per day are trucked from the ash ponds to the landfill over unpaved haul roads. The landfill is also higher in elevation and southeasterly of the tribal community. CCR dust is generated when the landfill surface is dry, disturbed by landfill activities, driven upon by haul trucks, or when ash escapes or is blown from the haul trucks. Winds in the vicinity of the power plant are frequently southern or southeasterly, so that ash mobilized by the winds frequently blows in the Moapa community. During high wind events, residents of the Reservation have observed dust from the vicinity of the landfill sweeping towards them.[74]

Status: Active.

Impact Summary: None available.

[74] Between 2008 and 2012, this occurred on September 19, 2008; April 14, 2009; April 23, 2009; April 20, 2010; December 13, 2010; June 30, 2010; April 7, 2011; and February 13, 2012

Study: Early in 2012, EPA R9 launched a fugitive dust study: "Region 9 is in the process of evaluating the dust/odor issues associated with the Reid Gardner (RG) facility. We are in the process of information gathering: Environmental permits and EIS documents and associated public comments; Meteorological data; Historic and current RG dust and odor complaint data; Effective engineering and process controls to minimize dust/odors from the management of CCRs; Damage case related information related to the management of CCR waste; RG analytical data for both slurried and landfilled CCR wastes; and on and off-site soil data, if available; to determine if the area has been adversely impacted from CCR related heavy metals."[75] Based on a recent feedback from EPA R9, it seems that Nevada Energy has put in place work practices in the recent two years to address both the odor and fugitive dust issues associated with the Plant's operations.[76]

Regulatory and Legal Response: Tribal community has complained for years about blowing dust from landfill area, aggravating respiratory ailments, and smells emanating from wastewater ponds. When NV Energy applied for the landfill expansion in 2006,[77] more than fifty comments from tribal members were generated against the expansion, which were all dismissed by BLM. More recently complaints have been documented in photos (April 2010, July 2010, April 2011, and May 2011). Complaints have been registered with the Nevada Department of Environmental Protection (NDEP), NV Energy, Southern Nevada Health District, and the Clark County Department of Air Quality. To this date (mid-2011), no written record or report on complaints has been provided to the Tribal community or Sierra Club.

Tribal members have commented on cultural life-ways being abrogated by the landfill's operation, such as the harvesting and hunting of local plants and small game, as well as the ability to conduct ceremonies and traditional religious observances outdoors. There is also no record of response to these complaints. During a dust storm 4-5 years ago, Tribal Member Calvin Meyers was told he "did not have the authority" to call in a complaint.

According to a June 24, 2010 Notice of Decision on a public comment period on the pending NDEP's issuance of groundwater permit number NEV91022, Nevada Energy, Inc., Reid Gardner Station (RGS), one of the letters submitted by the Paiutes addressed air emissions. The letter recommended conducting a health feasibility study to look at health consequences of living near RGS, to be paid for by NV Energy; and a tribal lifestyle study to identify exposure and risk. A public hearing was conducted on June 3, 2010, where "much of the comments dealt with issues outside the scope of the permit or regulations and authority of the Bureau of Water Pollution Control." The groundwater permit was granted and became effective June 25, 2010.

[75] A January 31, 2012 email from J. Schofield, EPA R9, to A. Livnat, EPA/OSWER.
[76] November 12, 2013 email from J. Schofield, EPA R9, to A. Livnat, EPA/OSWER.
[77] NV Energy received a tentative approval for a single-lined, 24-acre expansion of their coal ash landfill on BLM land.

The Solid Waste Authority for Southern Nevada is the Southern Nevada Health District. 347 letters were submitted to the Southern Nevada Health District opposing the landfill. Of these letters, seven include complaints of blowing dust, asthma, and falsified reports. To this date (mid-2011), there is no record of compliance violations or enforcement actions on the dry coal ash landfill at Reid Gardner.

On December 16, 2010, The Moapa Band of Paiutes et al sued U.S. BLM for violating NEPA when allowing the LF expansion on public land.[78] On October 6, 2011, in the case of the Moapa Band of Paiutes et al v. U.S. BLM et al and Nevada Power Co., the US District Court of Nevada denied the plaintiffs' request for Summary Judgment concerning BLM's failure to prepare an EIS, following FONSI in its Environmental Assessment regarding Nevada Energy's request for relocating its CCR evaporation ponds and expanding the landfill. Among others, the court stated (P. 11): "The BLM properly determined that the standards for fugitive dust and hydrogen sulfide fell within the range of National and State Ambient Quality Standards" (AR at 100-101), and that "BLM complied with its obligations under NEPA in determining that the Expansion would have no significant impact on air quality."

The September 9, 2011, South Nevada District Board of Health issued CCR landfill operation permit contains two sections on controlling fugitive dust (8g and 8h), and indicates that the installation of PM10 continuous monitoring was completed prior to March 1, 2011. While a significant step forward, the permit does not include any reporting requirement to the permitting authority, which obviates the enforcement aspect of this measure.

The April 8, 2011 Nevada Energy draft dust suppression plan for high-wind (>15 miles/hour) event days, developed by Nevada Energy as part of the permit requirements, does not spell out what additional measures, other than ceasing the disturbance of the coal and coal ash piles during high wind event days, would be undertaken to control excessive fugitive dust emissions

On October 10, 2011, the Moapa Band of Paiutes and the Sierra Club submitted a law suit against the S. Nevada Health Board, who had granted Nevada Energy a permit to expand the CCR LF. "When the wind blows from the south, the ash blows into the homes and the hair and food of my clients…State law is clear: The Board of Health is not entitled to license a public nuisance."[79]

On February 8, 2013, a Notice of Violation and Intention to Sue Pursuant to U.S.C.§ 6972 and 33 U.S.C. § 1365; the Moapa Band of Paiute Indians and the Sierra Club, was submitted by the Law

[78] High Country News, Case No. 2:10-CV-02021-KJD-LRL: http://www.hcn.org/greenjustice/blog/sierra-club-and-a-small-tribe-sue-the-blm-to-stop-the-expansion-of-a-coal-ash-landfill

[79] *Lawsuit aims to block expansion of NV Energy landfill;* Las Vegas Review-Journal, October 10, 2011: http://www.lvrj.com/news/lawsuit-aims-to-block-expansion-of-nv-energy-landfill-131491113.html

Offices of Charles M. Tebbutt, P.C., Eugene, Oregon, to NV Energy and the California Department of Water Resources.[80]

These and similar complaints were included in Appendix A of the August 8, 2013 Sierra Club and the Moapa Band of Paiute Indians citizen suit in federal court against Nevada Energy and the California Department of Water Resources, seeking cleanup of contaminated lands and waters surrounding the Reid Gardner plant.[81] Considering fugitive dust from Reid Gardner's facility, <Plaintiffs' members in the community center of the Tribal reservation live within a mile or two of the Reid Gardner facility, including its landfill, wastewater ponds, the generating station itself, its adjacent coal piles, and the facility's other sources of pollutants and contaminants. *Plaintiffs' members are reasonably concerned about harm to their health from breathing air contaminated with particulates from the coal ash landfill, solids from the wastewater evaporation ponds, coal dust, and other contaminants blown into the reservation from the Reid Gardner facility*. Plaintiffs' members are also concerned about the threat to their health caused by needing to shutter themselves indoors, including during hot weather, so as to avoid exposure to southerly winds that entrain contaminants from the facility.>

<Plaintiffs' members utilize the land and river in the area near the Reid Gardner facility for religious purposes and spiritual practice. CCW dust and associated fumes and gases from the Reid Gardner facility, including from the coal ash landfill and CCW ponds, impair Plaintiffs' ability to pursue these practices and undermines the quality of the experience. Plaintiffs also attempt to grow vegetables in their home gardens, and plaintiffs are reasonably concerned that toxic dust from the Reid Gardner facility deposited on their soil and vegetables renders their produce unsafe or otherwise impairs its quality.>

<Plaintiffs' members, volunteers and staff have seen and smelled the coal ash landfill and wastewater ponds, including the dust clouds they generate during periods of high wind and the odors that may be especially intense during hot periods.>

References:

[80] EPA Correspondence Management Control Number AX-13-000-2093; File Code 401_127_a General Correspondence Files Record copy (An April 29, 2013 email attachment from P. Raack, EPA/OECA to A. Livnat, EPA/OSWER).

[81] BNA Daily Environmental Report, August 13, 2013. *Moapa Band of Paiute Indians v. Nevada Power Co.,* D. Nev., No. 2:13-cv-01417, 8/8/13. The suit said that NV Energy reported "over 7,000 exceedances of state action levels for contaminants of concern" to the Nevada Division of Environmental Protection since 2008, covering several pollutants including chloride, sulfate, total dissolved solids, arsenic, boron, chromium, manganese, magnesium, molybdenum, selenium, and sodium. "Groundwater monitoring data also indicates that, in the period 2008-2012, there were additional exceedances of federal standards for toxic contaminants beyond those identified as exceedances of the less restrictive state action levels."
http://content.sierraclub.org/coal/sites/content.sierraclub.org.coal/files/docs/Doc%2301%20Complaint%208-13_0.pdf

May 12, 2011 email, with attachments of petitions and photos, from Lisa Evans, EarthJustice, to A. Livnat, EPA/OSWER.

Email exchanges between J. Schofield, EPA R9, with A. Livnat, EPA/OSWER (August 25, 2011; November 2, 2011; and November 13, 2013.)

October 10 press article on Paiute/Sierra Club suit to block Landfill expansion, 10/10/2011

April 29, 2013 email, with attachment, from P. Raack, EPA/OECA to A. Livnat, EPA/OSWER.

EPA Region 10

College Peat and Landscaping and Alaska Industrial Support, Inc., Fairbanks, Alaska

Implicated Activity: Storage and haulage for disposal and beneficial use.

Description: In Fairbanks, Alaska, two coal-fired power plants have no designated CCR landfill in the area. Power plants operated by Aurora Energy, LLC and the University of Alaska Fairbanks (UAF) use a contractor to dispose of their coal ash. The UAF produces 1 to 2 dump truck loads of coal ash daily. Until just a few years ago, this waste was used exclusively on campus as filler material for numerous construction projects such as roads, buildings, parking lots, and sports fields, and even for winter traction on icy roads and sidewalks. Today, coal ash is stockpiled at a local landscaping company until it is used as fill in local areas such as public spaces, roads, and residential neighborhoods. The landscaping company was recently notified of a violation of air pollution regulations in reference to coal ash disposal.

Status: Active.

Impact Summary: In June 2010, Local Fairbanks resident and Farmer's Market vendor Mary Zalar commented: 'Last spring, while selling our handcrafted wood bowls at our local Farmer's Market, a strong north wind blew coal ash into the market from where it is stored on adjacent property (College Peat & Landscaping stockpile next to the Farmer's Market). Our product was coated with a very obnoxious, persistent and pervasive black ash that was difficult to remove. My concern increased when I discovered there is no regular testing or regulation of the disposal of coal ash in our community.'

Study: At the request of local residents, a sampling project was conducted in June 2010 in the Fairbanks area to determine the toxicity in local sources of coal ash. Samples of coal ash from local power plants, waste disposal sites and reuse sites were found to contain a range of toxic heavy metals. In almost every case, the levels of toxic chemicals were found to be much higher than background soil samples from Fairbanks. In the coal ash samples, levels of arsenic and vanadium were found at concentrations that may harm human health. Two samples from the UAF coal fired power plant show arsenic concentrations more than 100 times higher than the standard for residential soils set by the EPA. Lastly, mercury was found at levels 70 times higher than background soils, and at levels high enough to be a concern if inhaled in the form of windblown dust.

Regulatory and Legal Response: In June 2010, the Alaska Department of Environmental Conservation (ADEC) sent a compliance letter to College Peat & Landscaping, citing concerns about fugitive dust emissions from its property onto the neighboring Farmer's Market. ADEC's inspection showed "excessive dust coming from a coal ash pile that was uncovered and was spreading dust & ash all over the tables at the Farmer's Market" in violation of *18 AAC 50.045(d) and 18 AAC 50.110: Air Pollution Prohibited*, creating a health concern for the vendors and customers. The cited entity was requested to take appropriate precautionary steps to prevent fugitive dust from coal ash storage piles and coal ash handling activities.

In August and September 2010, ADEC issued a letter alleging Possible Violation of Solid Waste Transport Regulation and a Confirmed Violation of Solid Waste Transport Regulation, respectively, alleging citizen complaints, then actual observation of Alaska Industrial Support, Inc. (AIS) trucks hauling uncovered loads of coal ash from the UAF power plant to the College Peat site, in violation of 18 AAC 60.015. The second letter forewarned that was another truck to be seen uncovered, ADEC would begin a formal enforcement action against AIS.

On May 16, 2011, a citizen (Teresa de Lima) submitted a CERCLA petition to EPA R10 to conduct a preliminary assessment of the suspected release of CCW at the owners parents' residential property and neighboring properties in Fairbank, AK, due to 8-10 daily trips of CCR hauling trucks from Aurora Energy's PP to a landfill, with inadequately covered load. The wetted load releases CCR-laden sooty water, leaving a CCRs trail in the streets and sidewalks. All her prior efforts to contact local and state authorities remained inadequately- or not addressed.[82]

Teresa de Lima (Affected Citizens in Fairbanks, Alaska HR2273) cites EPA's response to her May 2011 filing of a citizen's petition to EPA R10, accompanied by four photos documenting the fallout on her ailing parents' house:[83] In September 2011, EPA conducted soil testing on homes

[82] Petition referenced in *Aurora Energy Coal Power Plant preliminary Assessment, Fairbanks, AK*, TD: 11-06-0004, prepared by Ecology and Environment, Inc., for USEPA, Seattle, Washington, January 2012: http://groundtruthtrekking.org/static/uploads/files/EPA-PA-Fairbanks-Coal.pdfGOqKVt/EPA-PA-Fairbanks-Coal.pdf

[83] Her mother has very severe Rheumatoid Arthritis, Alzheimer, Cardiac and Gastroesophageal reflux disease (GERD). Her father, Parkinson; she cites scientists and doctors of the Physicians for Social Responsibility that these ailments can be directly linked to exposure. She also cites exposure of the residents on Van Horn Road, College

in the immediate area of the dirty polluter on First Avenue (the Aurora Energy power plant, which is owned by the Usibelli Coal Mine).[84] In an enclosed email April 18, 2012 message, she prods Erik Elram, the environmental liaison of Alaska's representative Don Young, to oppose the passage of HR2273 because of the adverse side effects of using CCW as road fill.

References:

Two emails (May 10, 2011 and May 11, 2011), with attached documents and photos, from Lisa Evans, Earthjustice, to A. Livnat, EPA/OSWER.

April 18, 2012 letters from Teresa de Lima, Affected Citizens in Fairbanks, Alaska to Lisa P. Jackson, EPA's Administrator, and to Erik Elam, the environmental liaison of Representative Don Young, U.S. Congress.

Estates to fugitive dust, including' significant health problems that have striken four individuals after having lived in close proximity to the coal (combustion) piles – i.e., respiratory ailments and Saircoidosis (a disease in which inflammation occurs in the lymph nodes, lungs, liver, eyes, skin, or other tissues).

[84] Remembering Don and Rose de Lima; Northern Line, Summer 2013, page 11: http://northern.org/media-library/document-archive/northern-line/2013/summer-2013-high-resolution-file-6-mb/at_download/file

Fugitive Dust Cases: Summary Table[85]

Case	State, Region	LF	SI	Minefill	Structural Fill	Road Application	Haulage	Captive Waste	Plant Operation	Active	Resolved	Inactive	Partially Active	Dust Only	Dust & Other Media	Air Dispersion Study	Particle Study	Health Study	State/Gov Action	Public Hearing	Damage Case[86]	Comment to Dockt	Court case, Intent to Sue, Settlement
AES Guayama, PR	PR R2				✓					✓					✓							✓	✓
Vitale Fly Ash Pit, Beverly	MA R2	✓										✓			✓						✓		
Gambrills	MD R3	✓										✓			✓		✓					✓	
Mirant Brandywine LF	MD R3	✓								✓					✓						✓		
Indian River, Millsboro	DE R3	✓							✓	✓					✓	✓		✓	✓			✓	✓
Case	**State, Region**	**LF**	**SI**	**Minefill**	**Structural Fill**	**Road Application**	**Haulage**	**Captive Waste**	**Plant Operation**	**Active**	**Resolved**	**Inactive**	**Partially Active**	**Dust Only**	**Dust & Other Media**	**Air Dispersion Study**	**Particle Study**	**Health Study**	**State/Gov Action**	**Public Hearing**	**Damage Case[87]**	**Comment to Dockt**	**Court case, Intent to Sue, Settlement**
Bruce Mansfield	PA R3		✓						✓	✓					✓			✓	✓	✓	✓		

[85] Entry marked only when parameter is relevant specifically to fugitive dust.
[86] Recognized or alleged damage case based on groundwater and/or surface water impact.
[87] Recognized or alleged damage case based on groundwater and/or surface water impact.

Case	State, Region	LF	SI	Minefill	Structural Fill	Road Application	Haulage	Captive Waste	Plant Operation	Active	Resolved	Inactive	Partially Active	Dust Only	Dust & Other Media	Air Dispersion Study	Particle Study	Health Study	State/Gov Action	Public Hearing	Damage Case[89]	Comment to Docket	Court case, Intent to Sue,
Shippingport																							
Mitchell PP, Courtney La Belle, Luzerne Township	PA R3	✓								✓	✓				?				✓		✓		
	PA R3			✓			✓			✓					✓								✓	✓
Rostosky Ridge Rd.	PA R3					✓						✓		✓				✓					✓	✓
East End LF, Henrico Co.	VA R3				✓														✓ **88**				
Battlefield Golf Course	VA R3				✓		✓					✓			✓					✓	✓		✓
Fort Martin PP, F. Martin	WV R3	?					✓			✓				?						✓			
Arrowhead LF, Uniontown	AL R4	✓					✓			✓					✓					✓			✓

[88] State endorsed site activities, but County issued a NOV for permit violation.

[89] Recognized or alleged damage case based on groundwater and/or surface water impact.

Case	State, Region	LF	SI	Minefill	Structural Fill	Road Application	Haulage	Captive Waste	Plant Operation	Active	Resolved	Inactive	Partially Active	Dust Only	Dust & Other Media	Air Dispersion Study	Particle Study	Health Study	State/Gov Action	Public Hearing	Damage Case[90]	Comment to Dockt	Court case, Intent to Sue, Settlement
Riverbend Steam P., Mt. Holly	NC R4		✓		✓	✓				✓					✓					✓			
PE Asheville	NC R4	✓								✓					✓		✓		✓	✓	✓		
Swift Creek Rocky Mount	NC R4				✓										✓				✓		✓		
Harlan Co., Off US 119	KY R4	?			?					✓				✓								✓	
Louisville G&E Cane Run	KY R4	✓	✓				✓		✓	✓				✓			✓		✓				✓ **91**
Duke Energy's Gibson, Somerville /Mt. Carmel	IN R5	?	✓							✓					✓					✓	✓		
Hoosier Energy Merom	IN R5	✓							✓	✓					✓		✓		✓	✓	✓	✓ **92**	✓ **93**

[90] Recognized or alleged damage case based on groundwater and/or surface water impact.

[91] (i) Settlement between LG &E and over 100 residents of the community of Riverside Gardens for fugitive dust, negligence and nuisance; (ii) Intent to Sue (9/6/2013).

[92] Proposed Rule Docket: EPA-HQ-RCRA-2009-0640-10019.

[93] NOV (8/2009); CO (7/2010) between Hoosier Energy and IEPA, $95K penalty and upgrade of pollution control technology.

Case	State, Region	LF	SI	Minefill	Structural Fill	Road Application	Haulage	Captive Waste	Plant Operation	Active	Resolved	Inactive	Partially Active	Dust Only	Dust & Other Media	Air Dispersion Study	Particle Study	Health Study	State/Gov Action	Public Hearing	Damage Case[95]	Comment to Dockt	Court case, Intent to Sue, Settlement
Ameren Coffeen/ US Minerals	IL R5								✓	✓					✓				✓ [94]	✓	✓		
Rocky Acres CCBP Disposal site, Bunge Corp., Oakwood	IL R5				✓			✓				✓			✓				✓	✓	✓		
Met-South CCW Disposal Facility, Joppa	IL R5	?	?			✓				✓				✓						✓			
MMHF LF, Bokoshe	OK R6	✓	✓	✓			✓			✓					✓				✓	✓		✓	✓ [97]
San Juan G. Station/ 4 Corners	NM R6			✓						✓					✓					✓	✓		

[94] OSHA fined *US Minerals* $400 K in Dec. 2012 for endangering their workers on multiple occasions with hazardous ash dust.
[95] Recognized or alleged damage case based on groundwater and/or surface water impact

[97] A class action Lawsuit against AES Shady point and additional 23 defendants, Oct. 2011, amended Oct. 2012.

Case	State, Region	LF	SI	Minefill	Structural Fill	Road Application	Haulage	Captive Waste	Plant Operation	Active	Resolved	Inactive	Partially Active	Dust Only	Dust & Other Media	Air Dispersion Study	Particle Study	Health Study	State/Gov Action	Public Hearing	Damage Case[98]	Comment to Dockt	Court case, Intent to Sue, Settlement
Valmont Coal Plant, Boulder	CO R8								✓	✓					✓					✓			
Nevada Energy Reid Gardner, Moapa	NV R9	✓	✓							✓					✓	✓ **99**			✓ 100		✓		✓ **101**
College Peat & Landscaping, AIS, Fairbanks	AK R10				✓		✓			✓				✓			✓		✓				✓ 102

[98] Recognized or alleged damage case based on groundwater and/or surface water impact.
[99] In 2012, EPA R9 launched a study to evaluate the dust/odor issues associated with the power plant.
[100] EPA R9 conducted a fact-finding visit to Reid Gardner and the Paiute Indians (Sep. 26, 2012), based on which findings' it has not pursued any enforcement action.
[101] (i) Against the Bureau of Land Management (Dec. 2010) for failing to prepare an EIS as a condition for authorizing a CCR LF expansion on public land; plaintiff's request denied (Oct. 2011); (ii) Lawsuit, Moapa Band of Paiutes and the Sierra Club against the S. Nevada Health Board (permitting agency), Oct. 2011; (iii) Intent to Sue, Moapa Band of Paiutes and the Sierra Club against Nevada Energy and the California Department of Water Resources (Feb., 2013).
[102] A City resident submitted (5/2011) a CERCLA petition to EPA R10 for assessment of fugitive dust releases on her parents' property next to the trucks' CCR hauling route. EPA R10 responded it would conduct soil testing at the impacted property.

Exhibit 11

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ASH IN LUNGS

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HOW BREATHING COAL ASH IS HAZARDOUS TO YOUR HEALTH

ALAN H. LOCKWOOD, MD, FAAN, FANA

Senior Scientist and Past President Physicians for Social Responsibility
and Emeritus Professor of Neurology, University at Buffalo

LISA EVANS, J.D.

Senior Administrative Counsel, Earthjustice

Special thanks to
Julie Weathering-Rice, PhD., Senior Scientist,
Bennett & Williams Environmental Consultants, Inc.,
and Karlana Lewis, Yale Law School
and Yale Environmental Protection Clinic.

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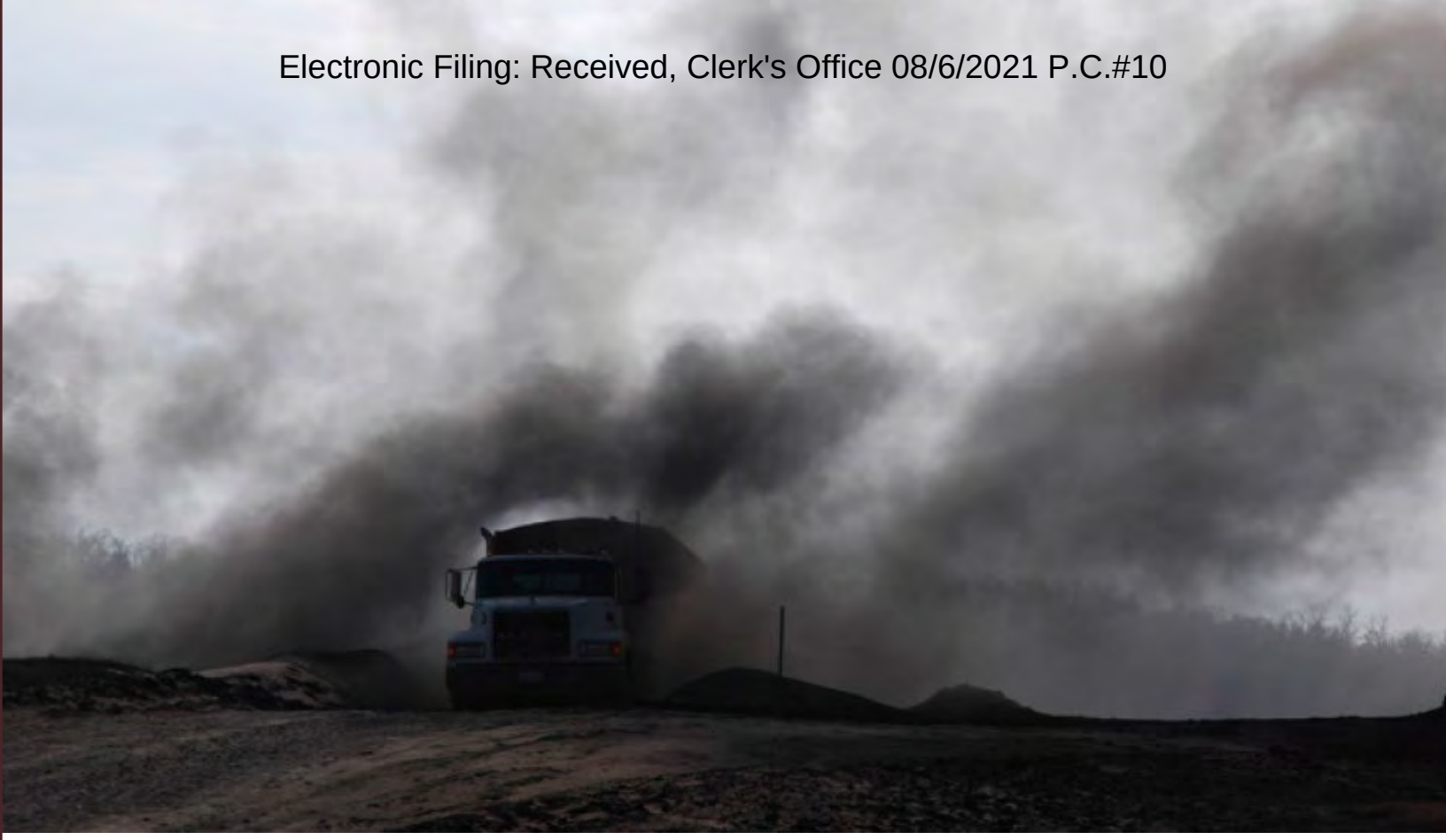


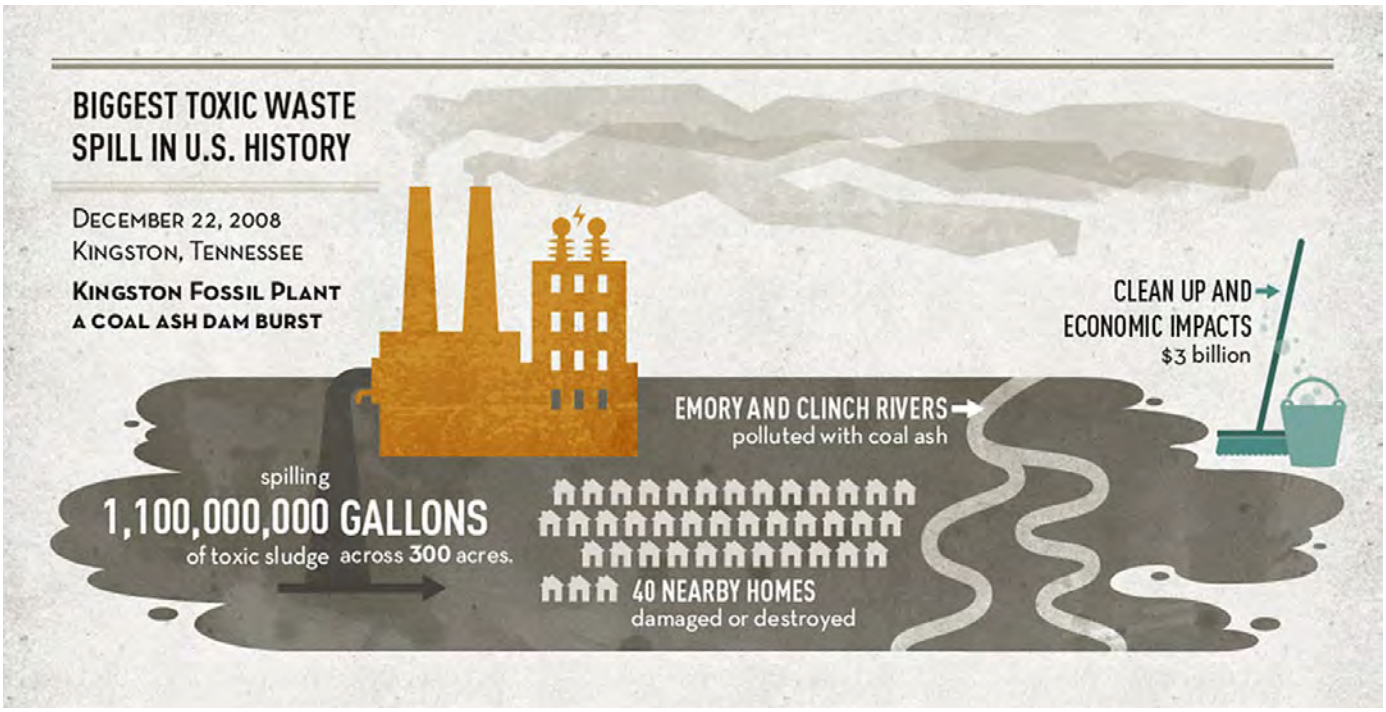
Toxic coal ash dust at the Making Money Having Fun Landfill in Bokoshe, OK.

INTRODUCTION

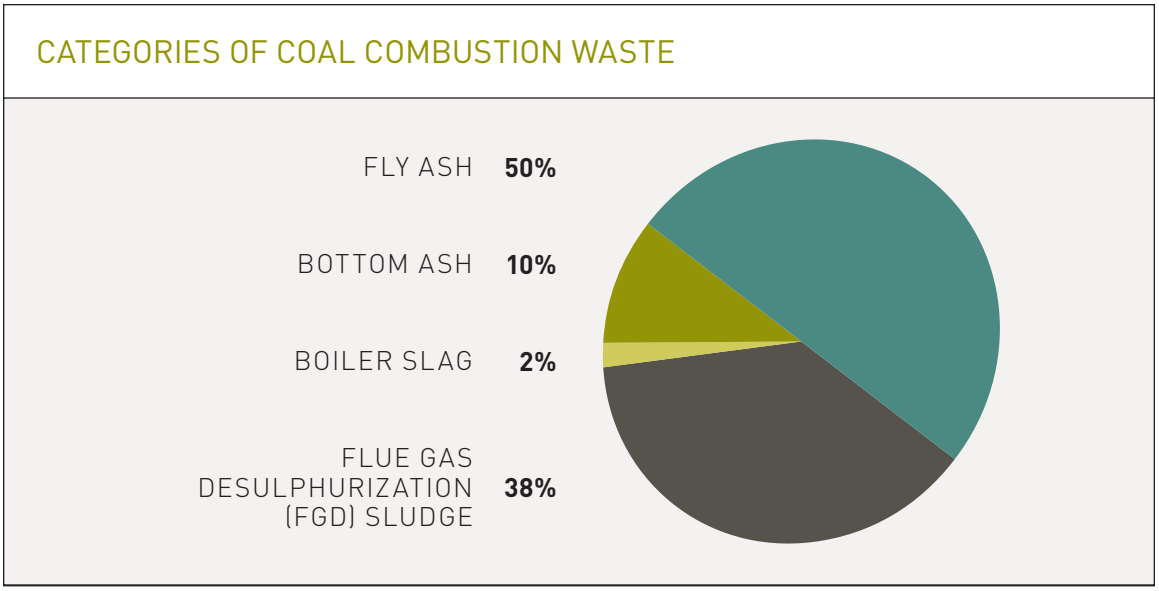
Take a deep breath. But if you live near a coal-burning power plant that dumps coal ash into a nearby landfill or lagoon, don't inhale too deeply because you're probably breathing fugitive dust made up of airborne coal ash filled with dangerous and toxic pollutants. Whether blown from an uncovered dump site or from the back of an open truck, toxic dust contaminates hundreds of fence line communities across the country. Acrid dust stings residents' eyes and throats, and asthmatics, young and old, are forced to reach for inhalers. Breathing this toxic dust can be deadly, and yet no federal standards exist to protect affected communities. This report describes the health impacts of the pollution found in coal ash dust. It also points to the imminent need for federal controls to limit exposure and protect the health of millions of Americans who live near coal ash dumps.

Coal combustion waste (or coal ash[1]), particularly fly ash, a major component of coal ash waste, poses significant health threats because of the toxic metals present in the ash, such as arsenic, mercury, chromium (including the highly toxic and carcinogenic chromium VI), lead, uranium, selenium, molybdenum, antimony, nickel, boron, cadmium, thallium, cobalt, copper, manganese, strontium, thorium, vanadium and others. Ironically, as coal plant pollution controls like electrostatic precipitators and baghouse filters become more effective at trapping fly ash and decreasing coal plant air pollution, the waste being dumped into coal ash waste streams is becoming more toxic.

Coal ash is best known for polluting our drinking water, lakes, rivers and streams, and the threat it poses when dumped into large earthen dams that can and do break, causing catastrophic spills and leaks. In February 2014, just days after the U.S. Environmental Protection Agency (EPA) announced a deadline for finalizing federal coal ash regulations, an underground pipe beneath a coal ash pond in North Carolina ruptured, sending 82,000 tons of coal ash into the Dan River. In December 2008, a massive coal ash pond at the Tennessee



Coal ash spilled from the TVA Kingston Power Plant covered 300 acres and damaged 40 nearby homes.



Coal ash is comprised of four categories of combustion waste. Fly ash makes up the largest percentage (about half) by weight. Fly ash is the lightest of the four wastes and the most likely to become airborne. It is carried up with hot flue gases and trapped by stack filters.

SOURCE: WWW.EPA.GOV/RADIATION/TENORM/COALANDCOALASH.HTML

Valley Authority's Kingston Fossil Plant in Harriman, Tennessee, burst, sending more than 1 billion gallons of coal ash sludge across 300 acres, destroying and damaging 40 nearby homes and polluting miles of two nearby rivers. These are two examples of more than 200 documented instances of coal ash contaminating nearby waters across the country.[2] Large-scale catastrophes are dangerous, well documented and publicized; but less visible dangers of coal ash pose another threat. When suspended in the air as dust, coal ash is a serious health hazard. The inhalation of toxic dust from disposal, transport and plant operations can cause serious injuries to workers and communities residing near coal ash dumps.

The huge volume of ash produced by the nation's 495 coal-burning power plants amplifies the risk.[3] In 2007, these plants together generated more than 140 million tons of coal ash, enough to fill train cars stretching from the North Pole to the South Pole.[4] This ash was disposed of in approximately 1,070 wet impoundments (or ponds), 435 landfills, hundreds of mines and uncounted numbers of gravel pits, piles and other sites.[5] When disposed, coal ash dust is emitted into the air by loading and unloading, transport and wind. Once in the air, it can migrate off-site as fugitive dust. As a result, workers and nearby residents could be exposed to significant amounts of coarse particulate matter (PM_{10}) and fine particulate matter ($PM_{2.5}$).

Protective practices to control toxic dust, such as moistening dry ash or covering it daily in a landfill, can minimize the dangers to public health. Yet there are currently *no* federal requirements to control fugitive toxic dust. At most coal ash dumps state regulations do not mandate daily cover, and adequate cover may only be required monthly or even yearly. The EPA found that such infrequent dust suppression has "the potential to lead to significant risks."[6]

WHY INHALING COAL ASH IS HARMFUL

EXPOSURE TO SMALL PARTICLE POLLUTION

Coal ash dust is small particles; the smaller the particle, the greater the health risks. The very smallest particles are inhaled into the deepest part of the lungs where they trigger inflammation and immunological reactions. Some particles gain access to the systemic circulation and travel to distant organs where they produce heart or lung disease, while others may enter the brain directly via the nerves in the nose. The disease-causing potential of small particles, particularly those less than 2.5 micrometers in their aerodynamic diameter ($PM_{2.5}$), has led the EPA to include them among the six criteria pollutants under the Clean Air Act, which requires national

When suspended in the air as dust, coal ash is a serious health hazard.

air quality standards for certain pollutants that cause adverse health impacts, including $PM_{2.5}$.[7]

As epidemiological research becomes more sophisticated due to improved techniques for monitoring air quality and advances in statistical and population sampling methods, it seems likely that there is no level at which $PM_{2.5}$ is assuredly free from causing adverse health effects. This principle became clear in a study of 51 metropolitan areas published in the *New England Journal of Medicine*, the world's leading peer-reviewed medical journal. The investigators who wrote this paper retrieved $PM_{2.5}$ and mortality data from the late 1970s and early 1980s and compared it to data obtained about two decades later. Uniformly, these analyses showed important increases in health benefits as the $PM_{2.5}$ concentrations fell. For example, in the Buffalo, New York, metropolitan area, a reduction of 13 micrograms per cubic meter of air was associated with a three- to four-year increase in life expectancy.

Many other studies published in leading peer-reviewed medical journals have shown similar results—higher particulate concentrations are associated with higher mortality rates. These studies link coal-derived particulates, including those from fly ash, to the four leading causes of death in the U.S.: heart disease, cancer, respiratory diseases and stroke. In addition, preliminary data may lead to adding Alzheimer's disease and Type II diabetes mellitus to this list. One study from the Women's Health Initiative is particularly instructive and important for several reasons. For one, it is big: more than 64,000 post-menopausal women participated. It was also done prospectively, i.e., at the time the women entered the study they were judged to be free from cardiovascular disease and were then followed for an average of about seven years. Thus, the occurrence of endpoints, including stroke, heart attack and the need for coronary artery bypass surgery, could be determined with great accuracy. The study showed that for a ten microgram per cubic meter increase in the concentration of $PM_{2.5}$, there was a 24 percent increase in the incidence of the aforementioned diseases.

Whereas initial studies examined long-term exposures to particulates, advances in statistical methods have made it possible to relate even brief increases in the concentration of $PM_{2.5}$ to transient increases in the risk for stroke, fatal heart rhythms and out-of-hospital cardiac arrest. This is made possible because increasing numbers of patients with heart disease have implanted cardiac defibrillators that can detect a potentially fatal heart rhythm and deliver a strong shock to the heart to restore a lifesaving normal rhythm. The painful shock causes patients to go to the hospital emergency room, where technicians are able to "talk" to the defibrillator using radio signals and retrieve the exact heart rhythm and the time at which the device went off. Investigators then compare this time and rhythm data to additional data from air pollution monitoring sites near the patient in order to relate the two seemingly separate data sets, joined by a common time. Times and pollutant levels chosen when the device did not fire off serve as controls.

Although burning coal is not the biggest source of $PM_{2.5}$, improvements in analytical techniques have made it possible to point the finger at coal with increasing confidence. Initially it was only possible to measure and identify the source of relatively large particulates. Subsequent improvements then made it possible to segregate particles in terms of size. Recently, investigators have applied statistical techniques coupled with advances in analytical chemistry to clearly identify the source of particles. Those with large amounts of silicon dioxide, the principle component of sand, arise from the earth's crust; particles with lead come from motor vehicles; and particles marked with selenium result from burning coal. Source-specific analytical techniques then showed that the selenium-containing particles were the most damaging to health—that is, the particles that arose from coal.

While inhalation of coal ash fine particle pollution poses the greatest threat to human health from fugitive coal ash dust, the composition of the coal ash dust poses additional inhalation effects as well.

HARMFUL EFFECTS OF SILICA EXPOSURE VIA INHALATION OF COAL ASH

The composition of fly ash dust can vary considerably depending on the coal that was burned, but all fly ash contains significant amounts of silica, in both crystalline and amorphous form.[8] Respirable crystalline silica in coal ash can lodge in the lungs and cause silicosis, or scarring of the lung tissue, which can result in a disabling and sometimes fatal lung disease. Chronic silicosis can occur after many years of mild overexposure to silica. While the damage may at first go undetected, irreversible damage can occur to the lungs from chronic exposure. Such exposure can result in fever, shortness of breath, loss of appetite and cyanosis (blue skin). In addition, the International Agency for Research on Cancer (IARC) has determined that silica causes lung cancer in humans, and the National Toxicology Program (NTP) and National Institute for Occupational Safety and Health (NIOSH) have also classified silica as a human carcinogen.

HARMFUL EXPOSURE TO EXCESSIVE RADIOACTIVITY

Fugitive coal ash dust also contains radioactive metals.[9] While each coal seam will have different levels of radioactive metals attached to the carbon, all coals have at least some level of naturally occurring radioactive materials, including uranium, thorium, potassium and their radioactive decay products including radium.[10] Burning coal concentrates the radionuclides approximately three to ten times the levels found in the initial coal seams. The radioactive metals stay with the coal ash when the carbon is burned off.[11]

If these dusts are inhaled, they can transport radioactive metals into a person's lungs. The

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radioactive metals will undergo radioactive decay and the resulting water-soluble radium can be transported to a person's bones where it will replace calcium. It will also undergo further decay to radon gas, the second leading cause of lung cancer after tobacco smoke in the United States. Radon gas is generated from the decay of radium. Being heavier than air, it tends to lay in pockets in low-lying areas unless mixed with air and carried away by wind. In addition, the dust does not have to be inhaled to be dangerous. Dust can contaminate surface water supplies

While inhalation of coal ash fine particle pollution poses the greatest threat to human health from fugitive coal ash dust, the composition of the coal ash dust poses additional inhalation effects as well.

where the soluble radium can contaminate drinking water and be ingested by humans or other species.

HARMFUL EXPOSURE TO MERCURY VIA COAL ASH

Mercury is of particular concern due to its high toxicity and its accumulation in fly ash and eventually into the coal ash waste stream. Implementation of the federal Clean Air Mercury Rule will significantly increase the mercury content in fly ash because the mercury capture required by the rule will result in more mercury ending up in the solid waste created by coal burning. According to EPA testing of fly ash at plants that had mercury controls, the mercury in ash increased by a median factor of 8.5, and in one case, by a factor of 70.[12] At the same time, other contaminants in fly ash such as arsenic and selenium also increased, concurrently elevating the risk to human health via inhalation of fugitive dust.

HARMFUL EXPOSURE TO HYDROGEN SULFIDE VIA COAL ASH

Hydrogen sulfide is a flammable, colorless gas with the characteristic odor of rotten eggs. Hydrogen sulfide is released primarily as a gas and spreads in the air. Because of the high sulfur level in coal ash, hydrogen sulfide is often released at coal ash landfills and impoundments. Communities near dumps or coal plants and workers at these facilities may be exposed to hydrogen sulfide by breathing contaminated air.

Exposure to low concentrations of hydrogen sulfide may cause nausea and irritation to the eyes, nose or throat.[13] It may also cause difficulty in breathing for some asthmatics. Children are sometimes exposed to more hydrogen sulfide than adults because hydrogen sulfide is heavier than air and children are shorter than adults. The sulfurous stench from coal ash dumps can also significantly degrade the quality of life of communities near disposal sites.

DANGERS TO WORKERS FROM INHALATION OF COAL ASH

The primary workplace health risks are associated with inhaling airborne fly ash. Depending on conditions in the plant, regulations may require employees to use respirators, wear disposable clothing or both when performing specific tasks. These employees may be the safest while performing those tasks since they are wearing protective gear. However, it is likely that many employees are exposed to and inhale substantial concentrations of fly ash in power plants while they are not wearing respirators or other protections. In a published study, the Electric Power Research Institute found that silica exposure in U.S. coal-fired power plants frequently exceeded NIOSH health standards in areas where fly ash was handled, particularly during activities involving the maintenance of air pollution devices (e.g., maintenance of baghouses or electrostatic precipitators).[14]

Landfill employees and workers handling coal ash in "beneficial use" operations (e.g., at structural fills and minefills) may also experience harmful exposure to airborne ash. Workers at the Arrowhead Landfill in Uniontown, Alabama,[15] which received 4 million tons of coal ash from the cleanup of the TVA Kingston spill in 2009–2010, reported significant injuries to health.[16] A construction manager overseeing the use of coal ash in the construction of a golf course has also claimed serious injury due to inhalation of fly ash.[17]

The primary workplace health risks are associated with inhaling airborne fly ash.

CHRIS JORDAN-BLOCH / EARTHJUSTICE

Much like other residents of Uniontown, AL, William Gibbs started seeing the paint peeling off his truck a few months after coal ash from the spill in Tennessee arrived at a nearby landfill. "If that's what it's doing to my truck, imagine what it's doing to me," said Gibbs.

DANGER TO COMMUNITIES NEAR COAL-BURNING PLANTS

Utility companies have three ways to dispose of toxic coal ash. An estimated 36 percent of coal ash is disposed of in dry landfills, usually at the power plant site where it was generated. Approximately twenty-one percent of coal ash is stored in wet impoundments or "ponds"—some as large as 1,000 acres.[18] The remaining 43–46 percent is reused in industrial applications, including many that involve large-scale disposal, such as large structural fill projects and filling mines with coal ash. More than 60 percent of all coal-burning plants have some type of onsite coal ash disposal, frequently consisting of at least one landfill, pond or silo.[19] Most have multiple disposal areas. Thus communities near power plants are frequently at risk of exposure to toxic dust.

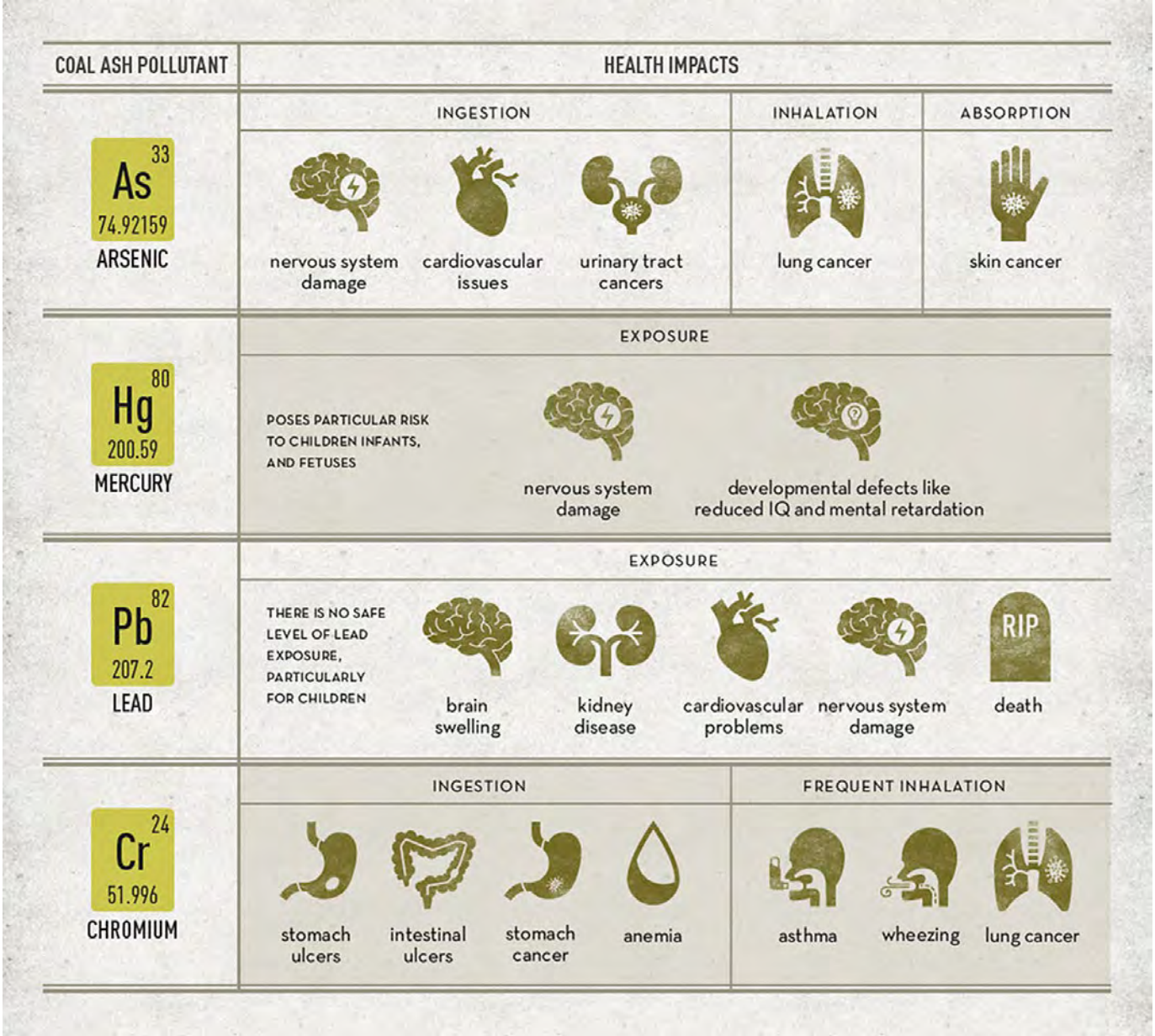
All forms of coal ash disposal can generate dangerous quantities of airborne ash due to mismanagement of ponds, landfills and reuse projects. Ponds in arid environments may be allowed to dry, resulting in wind dispersion of dried ash. Landfills may not be covered daily or capped, also resulting in unsafe levels of ash blowing from dumps. Also, where coal ash is used for fill in construction or on agricultural fields as a "soil amendment," the ash can readily blow or erode. Windblown particulates called "fugitive dust" also arise when ash is loaded, unloaded and transported.

REUSE OF ASH

NOT ALWAYS BENEFICIAL

Reuse can cause harmful levels of toxic dust and water pollution

SOURCE: AMERICAN COAL ASH ASSOCIATION, 2012 COAL COMBUSTION PRODUCT (CCP) PRODUCTION & USE SURVEY REPORT.



In 2009, the EPA documented the health threat from toxic dust near coal ash landfills in its draft screening risk assessment, *Inhalation of Fugitive Dust: A Screening Assessment of the Risks Posed by Coal Combustion Waste Landfills*.[20] The purpose of this screening assessment was to determine whether the National Ambient Air Quality Standards (NAAQS) could be violated through dry handling of coal ash, and if so, what management options might be needed to reduce the health risk. Indeed, the EPA found that "there is not only a possibility, but a strong likelihood that dry-handling would lead to the NAAQS being exceeded absent fugitive dust controls."[21] The EPA concluded that only daily controls (daily cover) can definitively prevent unhealthy releases of particulates.

However, a critique of the EPA's screening assessment found that it considerably underestimated the risk to human health from toxic dust. The EPA considered only one source of fugitive dust emissions from coal ash—wind erosion—and failed to assess the substantial emissions that occur during unloading and grading of the ash, as well as from trucks traveling on the deposited waste at the landfill.[22] In addition to toxic dust from coal ash, communities near waste disposal operations are exposed to carcinogenic diesel particulate emissions from trucks, on-site landfill equipment and diesel-powered

pumps and generators. To compound the problem, high background levels of particulate matter from nearby equipment may increase the potential for fugitive dust from coal ash to cause significant human health problems. If the EPA had taken all of these factors into account, it would have found even greater risks to communities living near coal ash dumps.

CHALLENGES TO CONTROLLING HUMAN EXPOSURE

Controlling respirable fugitive ash particles is a daunting task, principally because of two physical properties of coal ash. First, fly ash is inherently water repellant and tends to shed water droplets rather than absorb them. Thus simply wetting the material may not be effective in controlling the ash. Second, the small size of the particles (similar to talcum powder) adds to the difficulty of suppressing airborne dust. Unfortunately the most hazardous dust particles are the ones too small to see.[23]

STATE AND FEDERAL REGULATIONS ARE INADEQUATE TO PROTECT COMMUNITIES

No federal standards exist for reducing toxic dust

There are currently no federal regulations addressing the threat of toxic dust from coal ash disposal or placement operations. In addition, most state laws do not protect communities from fugitive dust.

While coal ash is regulated as a solid waste under the Resource Conservation and Recovery Act (RCRA), the general standards applying to fugitive dust at industrial waste landfills do not address the risks to human health posed by coal ash.[24] Further, while coal ash is classified as a hazardous substance under the federal Superfund law, no regulations address its safe disposal.[25] In 2010, the EPA proposed regulations under RCRA to address the threat from toxic coal ash dust, but these regulations have not yet been finalized.[26]

Protective practices to control toxic dust, such as moistening dry ash and covering it daily in a landfill, can minimize the dangers to public health. Yet at most coal ash dumps, state regulations do not mandate daily cover, and adequate cover may be required only monthly or annually. The EPA found such infrequent dust suppression has "the potential to lead to significant risks," adding that "yearly management leads to a PM_{10} concentration almost an order of magnitude above the [National Ambient Air Quality Standard]." The EPA concluded that most states do not require daily cover to control fugitive dust from landfills, and most states do not require caps on coal ash ponds to control dust.[27]

In fact, our survey of 37 of the top coal ash generating states in the U.S. found that less than half of the states mandate dust (e.g. moistening) controls at coal ash landfills, and only a single state requires dust controls at coal ash ponds.[28] In addition, only seven of the 37 states require daily cover at coal ash landfills.[29] Of the states that require dust controls, none require specific measures for the control of dust on a daily basis; significant discretion is left in the hands of state permitting authorities and facility operators. No state currently requires the specific limit on toxic dust from landfills and ponds proposed by the EPA in its 2010 proposed coal ash rule (a level not to exceed 35 micrograms per cubic meter).

Table 1 indicates the controls currently applicable in 37 of the top coal ash-generating states.

Our survey of 37 of the top coal ash generating states in the U.S. found that less than half of the states mandate dust controls at coal ash landfills, and only a single state requires dust controls at coal ash ponds.

TABLE 1: STATE COAL ASH FUGITIVE DUST CONTROLS

STATES	MANDATORY DUST CONTROLS AT COAL ASH LANDFILLS	MANDATORY DUST CONTROLS AT COAL ASH PONDS	MANDATORY DAILY COVER AT COAL ASH LANDFILLS
AL	NO	NO	NO
AZ	NO	NO	NO
CO	NO	NO	NO[30]
FL	NO	NO	NO
GA	NO	NO	NO[31]
IL	YES	NO	YES
IN	YES	NO	NO
IA	YES	NO	NO
KS	NO	NO	NO
KY	NO	NO	NO
LA	NO	NO	YES
MD	NO	NO	NO
MI	YES	NO	NO
MN	NO[32]	NO	NO[33]
MS	NO	NO	NO[34]
MO	YES	NO	NO[35]
MT	NO	NO	NO
NV	YES	NO	YES
NH	NO	NO	NO
NJ	YES	NO	YES
NM	NO	NO	NO
NY	NO[36]	NO	NO[37]
NC	YES	NO	YES
ND	NO[38]	NO	NO[39]
OH	NO	NO	NO
OK	NO[40]	NO	NO[41]
PA	YES	YES	YES
SC	YES	NO	NO
SD	NO[42]	NO	NO[43]
TN	NO[44]	NO	NO[45]
TX	NO	NO	NO
UT	NO	NO	NO
VA	NO[46]	NO	NO
WA	NO[47]	NO	NO
WI	YES	NO	NO[48]
WV	YES	NO	YES
WY	NO[49]	NO	NO[50]

HOW COMMUNITIES ARE IMPACTED BY TOXIC DUST FROM COAL ASH

The following six communities are among hundreds of American communities that are injured by toxic air emissions from coal ash.

1. Arrowhead Landfill: Toxic Dust and Odors Plague an Alabama Town

After the catastrophic collapse of the coal ash dam at TVA's Kingston plant in Harriman, Tennessee, in 2008, the nation's worst coal ash spill was dumped across state lines into the lives of residents in Uniontown, Alabama (population 1,775).[51]

With the approval of the Alabama Department of Environmental Management, the TVA chose to move the 4 million cubic yards of poisonous ash to the town's Arrowhead Landfill. But instead of using protective management techniques, the coal ash was dumped in uncovered mounds stacked six stories high, just 100 feet from nearby residents. Dust and odors from the landfill caused residents of Uniontown to experience health problems, including respiratory illness, headaches, dizziness, nausea and vomiting. Dust blanketed their homes, cars and gardens, and choking wafts of the "rotten egg" stench of hydrogen sulfide permeated their houses making life nearly unbearable.

The dumping was a blatant act of environmental injustice.[52] While the Harriman, Tennessee, community where the Kingston spill occurred is almost entirely white (91 percent) and middle class (median income $36,031), Uniontown is 90 percent African American, and 45.2 percent of its citizens live below the poverty line (median income $17,473). The transfer of the TVA coal ash to a community where the negative effects were disproportionately borne by African-Americans sparked residents to file a lawsuit in 2012 under Title VI of the Civil Rights Act of 1964.[53] Under Title VI, government agencies that receive federal funds must assess whether their permitting decisions result, even unintentionally, in racial inequality. In fall 2013, Earthjustice assumed representation of those impacted by the dumping.

The railcars loaded with toxic waste from Tennessee have ceased. But since the Arrowhead Landfill's permit allows the dump to continue to accept coal ash from more than two dozen states, there is no guarantee that the danger to the Uniontown residents has passed.

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"I wanted to move away from the noise and the hardness of the city. So I came here for some peace and quiet in the country. I wanted to hunt and fish and enjoy the weather in this beautiful place and now they've pushed this thing right on top of us. Now, I'm too old to move and no one would want to buy this place anyways," said William Gibbs.

2. An Ill Wind Blows Across a Native American Community

It starts with a warning. Next it is only a matter of which way the wind blows. In the evening, someone will go from house to house and tell the neighborhood that tomorrow will be a windy day and, perhaps, a bad air day. The next afternoon if the conditions are just wrong, coal ash dust blows from the nearby dump sites of Nevada Energy's Reid Gardner Power Station and moves like a sandstorm across the dry desert of the Moapa River Indian Reservation. The reservation is the ancestral home to a band of Paiute Indians whose homes sit only 300 yards from the plant.[54] Living in the shadow of Reid Gardner, the tribe has paid dearly with its health, and reaped little economic benefit.

The Reid Gardner "sandstorm" is made up of coal ash, and members of the tribe tell of health

MOAPA BAND OF PAIUTES

Toxic coal ash blows like a sandstorm straight at the homes on the Moapa River Reservation.

problems resulting from the blowing ash, including burning skin, sore throats, hyperthyroidism, heart problems and asthma. On bad days, residents stay inside. The toxic dust prevents use of the tribal lands for traditional activities, and members are concerned that their soil and water are poisoned with toxic pollutants from the ash.

3. Louisville Gas & Electric's Cane Run Generating Station: Years of Blowing Ash

The LG&E Cane Run Generating Station near Louisville, Kentucky, stores huge mountains of coal ash on site. For years, toxic dust clouds and odors have blown from the power plant's waste dumps onto the nearby community. Every day a continuous line of trucks haul ash from the power plant to the disposal site near a community of nearly 400 residents, many of whom live in rented trailers and mobile homes. A screen was erected between the ash pile and an adjacent cemetery in order to minimize the amount of wind-blown dust that escapes from the property. However, it seems to be purely cosmetic. In fact, videos of ash blowing over the top of the screen are regularly posted online.[55]

The Louisville Metro Air Pollution Control District has repeatedly responded to the toxic dust with notices of violations and fines.[56] In 2013, LG&E agreed to pay $113,250 and comply with a pollution control plan after ash and odors blowing from the plant's landfill affected residents living near the plant.[57] Two years earlier, LG&E paid $22,500 for repeatedly disregarding city regulations and allowing coal ash to blow into residential neighborhoods.[58] Environmental samples obtained from three homes near the plant all showed clear evidence of deposits of fly ash and bottom ash, as confirmed by scanning electron microscopy and spectral analysis.[59]

4. Battlefield Golf Course: "Beneficial Use" Gone Terribly Wrong

Between 2002 and 2007, Dominion Virginia Power opted for a cheap way to dispose of 1.5 million tons of coal ash. They built an 18-hole golf course with the toxic ash in Chesapeake, Virginia. Ever since, Battlefield Golf Course has been ground zero in the fight over harmful "beneficial uses" of coal ash.

SOUTHEASTCOALASH.ORG

The "mountain" rising behind the fence is coal ash generated by the power plant. The screen at the Cane Run Generating Station cannot stop the toxic dust from reaching neighbors.

During construction of the golf course, neighbors and workers reported clouds of black dust migrating from the construction site to the adjacent residential neighborhoods. Homeowners abutting the course reported that their homes, yards, cars, picnic tables and play equipment were covered with ash. They were told it was harmless.

According to a former construction manager of the golf course, Dominion directed the building of the course with fly ash to disguise the project's true purpose—a coal ash dump. In a sworn statement, Derrick Howell, a former employee of the builder of the golf course, said, "It was clear that a golf course wasn't being built," stated Howell. "It was a coal ash dump. All Dominion ever cared about was tonnage and how much more they could dump."[60]

As a result of the toxic dust and water contamination, the golf course has been the subject of several lawsuits, including a $2 billion lawsuit brought by nearby residents for damages. In addition, in 2012, a contractor filed a $10 million lawsuit against Dominion alleging that his inhalation of fly ash while building the course over five years contributed to his kidney cancer.[61]

5. Dust and Disease from Mine Dumping in La Belle, PA

In the small rural community of La Belle, Pennsylvania, an immense mine dump covers 500 acres and contains a mountain of 40 million tons of waste. Because of its conical shape and a pond at the top, resembling a crater, local residents refer to the dump as a "volcano" of mine waste and coal ash. First Energy—the operator of a power plant 75 miles north—plans to dump more than 3 million tons of additional coal ash here every year starting in 2016, when its 1,300-acre Little Blue Run coal ash impoundment in Beaver County closes.

This is very bad news for the residents of La Belle. In addition to water contamination, toxic dust blows from the dump and from uncovered trucks hauling coal ash. The waste blankets nearby homes, offices, yards and cars. Residents have documented large clouds of dust drifting from the dump. Analyses of the particles on residential properties reveal the presence of coal ash, including toxic metals such as antimony, arsenic, chromium, lead and fine particles.[62]

The residents of La Belle have turned to the court for relief. Represented by attorneys from Public Justice and the Environmental Integrity Project, a complaint alleging violations of numerous federal and state environmental statutes was filed against the dump operator in 2013.[63]

6. Toxic Ash from Coal Ash Ponds Threatens the Navajo Nation

In the Four Corners region, the Navajo Nation hosts one of the biggest coal-fired power plants in the West—the Arizona Public Service (APS) Four Corners Power Plant in Fruitland, New Mexico. Despite the plant's size, 25 percent of the reservation—an estimated 16,000 Navajo families—are without access to electricity.[64] The Navajo population is instead burdened by the enormous pollution created by the coal plant, including clouds of toxic dust from its half-dozen coal ash ponds and a landfill that rises 110 feet above the floor of the high desert.

Since 1962, APS has dumped approximately 30 million tons of coal ash in six immense wet dumpsites near the power plant. Fugitive dust from the coal ash ponds is a severe problem. Ash dries rapidly in the arid climate and is largely uncontained. Coal ash blown from the waste impoundments covers hundreds of acres

Coal ash ponds from APS' Four Corner's Power Plant rise more than 100 feet above the arid Navajo Reservation.

of the surrounding desert. On windy days, the air is literally filled with ash. Health problems, including asthma, are common among members of the Navajo Nation.

Additionally, Navajo people use their local environment to gather medicines for ceremony and wellness. According to the group Dine' Citizens Against Ruining the Environment, contamination from coal ash jeopardizes the Navajo people's ability to practice traditional healings, which is embedded in their culture.

CONCLUSION

Despite the obvious health risks to communities living near coal ash dump sites, no federal regulation regarding the storage and disposal of this toxic waste exists. The EPA proposed coal ash regulations in 2010, but has not finalized the rules. Earthjustice, on behalf of Physicians for Social Responsibility, Appalachian Voices, Chesapeake Climate Action Network, Environmental Integrity Project, Kentuckians For The Commonwealth, Moapa Band of Paiutes, Montana Environmental Information Center, Prairie Rivers Network, Sierra Club, Southern Alliance for Clean Energy and Western North Carolina Alliance, sued the EPA in federal court for its failure to follow the law and propose coal ash regulations in a timely manner. As a result of that lawsuit, the EPA will finalize the nation's first federal coal ash regulation by December 19, 2014.

But federal regulations for coal ash cannot come soon enough. An increasingly large number of studies show clear links between inhaled coal ash and adverse health outcomes. The huge volume of coal ash generated in the United States and the many dangerous ways it is dumped create a variety of pathways for harmful levels of human exposure. Communities across the nation are hurt by toxic dust because adequate controls are not in place to protect public health. Often those harmed are communities of color or low-income communities living along the fence lines of these coal ash dumps whose economic hardships make them even more vulnerable to injury. Requiring control of toxic dust through federally enforceable standards that protect all Americans nationwide, and switching from coal to cleaner, renewable energy sources, are well-documented and essential paths to better health.

Communities across the nation are hurt by toxic dust because adequate controls are not in place to protect public health. Often those harmed are communities of color or low-income communities living along the fence lines of these coal ash dumps.

NOTES

1. Coal ash is comprised of four categories of combustion waste. Fly ash makes up the largest percentage (about half) by weight. Fly ash is the lightest of the four wastes and the most likely to become airborne. It is carried up with hot flue gases and trapped by stack filters.

2. http://earthjustice.org/features/coal-ash-contaminated-sites

3. U.S. Energy Information Administration (EIA), *Form EIA-923, Power Plant Operations Report, Schedule 8. Part A. Annual Byproduct Disposition* (2012 Final Release).

4. U.S. Environmental Protection Agency. Hazardous and Solid Waste Management System Identification and Listing of Special Wastes; Disposal of Coal Combustion Residuals from Electric Utilities. Proposed rule. Page 344. http://www.epa.gov/wastes/nonhaz/industrial/special/fossil/ccr-rule/ccr-rule-prop.pdf.

5. *See* data submitted pursuant to U.S. Envtl. Prot. Agency. Environmental Protection Agency: 2010 Questionnaire for the Steam Electric Power Generating Effluent Guidelines. OMB Control No. 2040–0281. Approved May 20, 2010. *See also* U.S. Environmental Protection Agency, Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category; Proposed Rule, 78 Fed. Reg. 34,432, 34,516 (June 7, 2013).

6. U.S. Environmental Protection Agency. *Inhalation of Fugitive Dust: A Screening Assessment of the Risks Posed by Coal Combustion Waste Landfills* (*draft*), September 2009.

7. The Clean Air Act established six criteria pollutants and required the EPA to develop and periodically review National Ambient Air Quality Standards (NAAQS) for each of them. These standards are designed to help the Agency achieve its mission "to protect human health and the environment." As time has passed, the NAAQS have become more stringent, as the extent of their health impacts has become more and more evident.

8. Valencic, Aaron. "Dust Suppression in Coal Ash Applications," 2013 World of Coal Ash (WOCA) Conference, Lexington, KY, *available at* http://www.flyash.info/2013/098-Valencic-2013.pdf.

9. According to EPA, fly ash has a typical radiation level between a low of 2 pCi/g and a high of 9.7 pCi/g. *See* http://www.epa.gov/radiation/tenorm/coalandcoalash.html

10. *Id.*

11. *See* Figure 1. Graph from Radioactive Elements in Coal and Fly Ash: Abundance, Forms, and Environmental Significance. U.S. Geological Survey Fact Sheet FS-163-97. October, 1997.

12. U.S. Environmental Protection Agency, National Emission Standards for Hazardous Air Pollutants from the Portland Cement Manufacturing Industry, Federal Register, Vol 71, No. 244, December 20, 2006.

13. Agency for Toxic Substances and Disease Registry, Division of Toxicology and Environmental Medicine ToxFAQs, Hydrogen Sulfide, CAS #7783-06-4, July 2006.

14. Edison Electric Institute, Silica Exposure at Electric Utilities, EEI Safety and Health Webinar, July 22, 2009, 8, *available at* http://www3.eei.org/meetings/Meeting%20Documents/2009-07-22-IHIssuesWeb-Silica_Hatcher.pdf.

15. *See* http://earthjustice.org/slideshow/photo-essay-a-toxic-inheritance.

16. Holly Haworth, Oxford American, Something Inside of Us, Issue 82, Nov. 11, 2013, *available at* http://www.oxfordamerican.org/articles/2013/nov/11/something-inside-us/.

17. *See* Marjon Rostami, Norfolk Virginian-Pilot, "Chesapeake fly ash suit against Dominion refiled," February 22, 2012, *available at* http://hamptonroads.com/2012/02/chesapeake-fly-ash-suit-against-dominion-refiled, describing lawsuit by construction manager at the Battlefield Golf Course who alleges his cancer is attributable to arsenic exposure.

18. Barry Breen, Acting Assistant Administrator, Office of Solid Waste and Emergency Response, US EPA. Testimony delivered to Committee on Transportation and Infrastructure, Subcommittee on Water Resources and the Environment, U.S. House of Representatives, April 30, 2009.

19. U.S. Environmental Protection Agency, Regulatory Impact Analysis For EPA's Proposed RCRA Regulation Of Coal Combustion Residues (CCR) Generated by the Electric Utility Industry, April 30, 2010 at 33.

20. U.S. Environmental Protection Agency. *Inhalation of Fugitive Dust: A Screening Assessment of the Risks Posed by Coal Combustion Waste Landfills* (*draft*), September 2009.

21. *Id.*

22. Comments of Environmental Integrity Project, Sierra Club, Earthjustice et al., Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category; Proposed Rule, Docket ID No. EPA-HQ-OW-2009-0819, Appendix G, Petra Pless, "Refinement of EPA's 2009 Screening Assessment of Risks Posed by Inhalation of Fugitive Dust from Coal Combustion Waste Landfills Based on New Data for Landfill Size," September 20, 2013.

23. Peterson, Edwin. "An Aid to Fugitive Material Control in Coal Ash Application," 2011 World of Coal Ash, Denver, Co. *available at* http://www.flyash.info/2011/001-felde2011.pdf

24. See Comments, Earthjustice et al., Hazardous and Solid Waste Management System; Identification and Listing of Special Wastes; Disposal of Coal Combustion

Residuals From Electric Utilities; Proposed Rule, Docket ID No. EPA-HQ-RCRA-2009-0640, June 21, 2010, 34–35.

25. *See Eagle-Picher Industries v U.S. EPA*, 759 F.2d 922 (D.C. Cir. 1985).

26. EPA, Hazardous and Solid Waste Management System; Identification and Listing of Special Wastes; Disposal of Coal Combustion Residuals From Electric Utilities; Proposed Rule, 75 Fed. Reg. 35,128, 35,182 (proposed June 21, 2010).

27. U.S. EPA. "Estimation of Costs for Regulating Fossil Fuel Combustion Ash Management at Large Electric Utilities Under Part 258." Prepared by DPRA Incorporated. November 30, 2005.

28. See note 24, supra.

29. *Id*.

30. Allows variance for daily cover requirement.

31. Allows variance for daily cover requirement.

32. Dust controls can be waived by variance.

33. Allows variance for daily cover requirement.

34. Cover requirement is not daily.

35. Cover requirement is not daily.

36. Dust controls can be waived by variance.

37. Allows variance for daily cover requirement.

38. Dust controls can be waived by variance.

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42. Dust controls can be waived by variance.

43. Allows variance for daily cover requirement.

44. Dust controls can be waived by variance.

45. Cover requirement is not daily.

46. Dust controls can be waived by variance.

47. Dust controls can be waived by variance.

48. Cover requirement is not daily.

49. Dust controls can be waived by variance.

50. Cover requirement is not daily.

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64. http://www.ntua.com/.

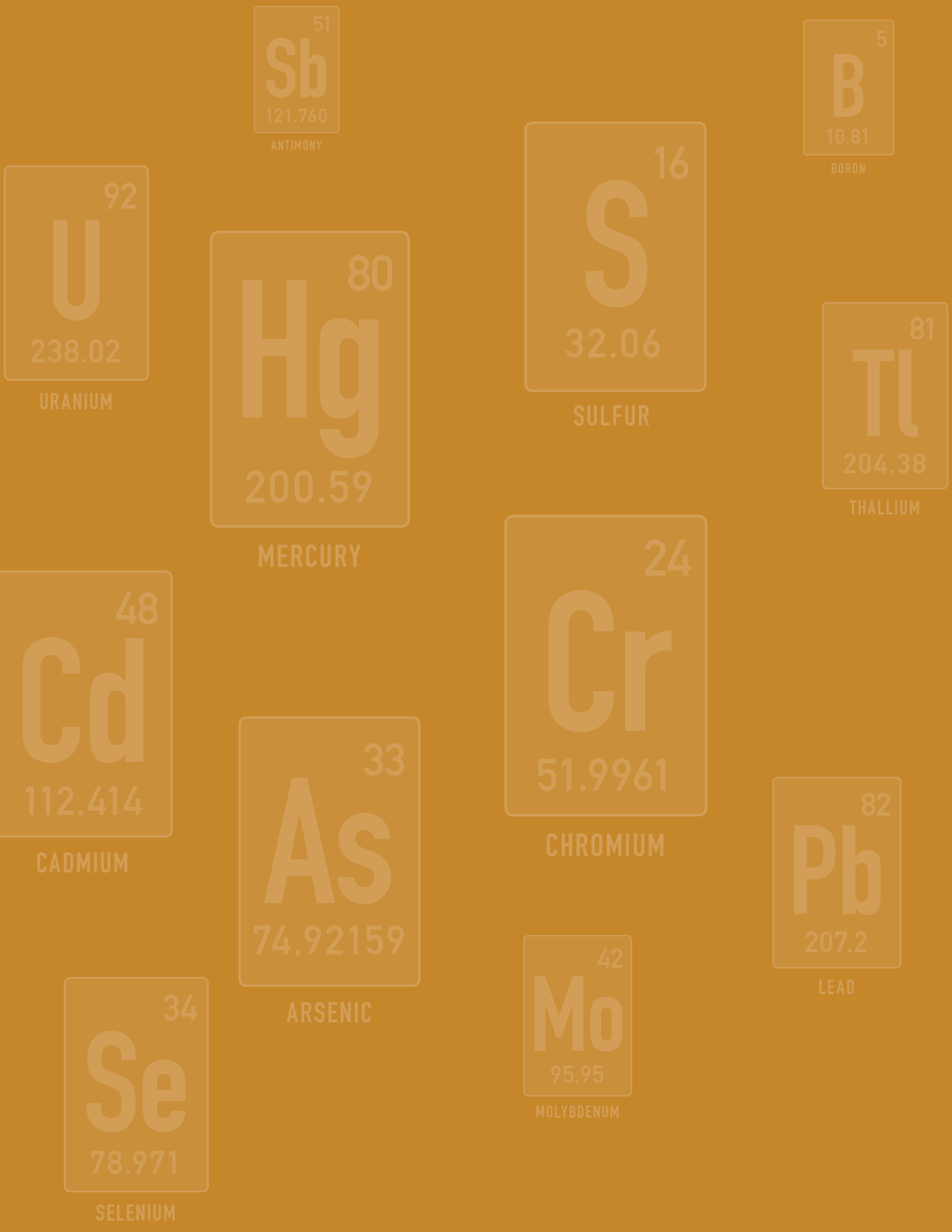
51
Sb
121.760
ANTIMONY
5
B
10.81
BORON
92
U
238.02
URANIUM
80
Hg
200.59
MERCURY
16
S
32.06
SULFUR
81
Tl
204.38
THALLIUM
48
Cd
112.414
CADMIUM
24
Cr
51.9961
CHROMIUM
33
As
74.92159
ARSENIC
82
Pb
207.2
LEAD
42
Mo
95.95
MOLYBDENUM
34
Se
78.971
SELENIUM

Exhibit 12

Review Article on Pollutional Haze

Air particulate matter and cardiovascular disease: the epidemiological, biomedical and clinical evidence

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Abstract: Air pollution is now becoming an independent risk factor for cardiovascular morbidity and mortality. Numerous epidemiological, biomedical and clinical studies indicate that ambient particulate matter (PM) in air pollution is strongly associated with increased cardiovascular disease such as myocardial infarction (MI), cardiac arrhythmias, ischemic stroke, vascular dysfunction, hypertension and atherosclerosis. The molecular mechanisms for PM-caused cardiovascular disease include directly toxicity to cardiovascular system or indirectly injury by inducing systemic inflammation and oxidative stress in peripheral circulation. Here, we review the linking between PM exposure and the occurrence of cardiovascular disease and discussed the possible underlying mechanisms for the observed PM induced increases in cardiovascular morbidity and mortality.

Keywords: Particulate matter (PM); cardiovascular disease; morbidity; mortality

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Introduction

Air pollution has now emerged as a leading problem for environmental health in the world. Especially in developing countries, it has become more serious than ever before. The potentially detrimental to health of air pollution has long been recognized, and many large epidemiological studies have clearly demonstrated the strong association between air pollution exposure and increased morbidity and mortality (1-3). Air pollutants include gaseous pollutants (e.g., carbon mono oxide, oxides of nitrogen, ozone and sulfur dioxide) and particulate matters (PMs). The relationship between respiratory vulnerability and air pollution has been well documented, and much attention has now been focused on the air pollution-induced cardiovascular risk in the past 15 years (4-6). Of those air pollutants, the ambient PM has become a major concern for cardiologists and specialists in environmental medicine. There is a mounting epidemiological, biomedical and clinical evidence that indicates the effects of ambient PM on cardiovascular health (5,7,8). In this review we summarize the main findings on the impact of PM particles on cardiovascular system and discuss the underlying molecular mechanisms of the effects of PM particles on cardiac muscle and vasculature.

The definition and composition of ambient particulate matter (PM)

Ambient PM is defined as the material suspended in the air in the form of minute solid particles or liquid droplets, which are derived from both human and natural activities. It is a heterogeneous mixture with varying size and chemical composition. In terms of their potential

influence on health, they are classified as PM10, PM2.5 and ultrafine particles (UFPs) subgroup according to their diameter. PM10 includes coarse particles with the aerodynamic diameter (AD) from 2.5 to 10 μm. The PM10 particles come from road and agricultural dust, tire wear emission, construction and demolition works or the mining operations (8). In addition, the natural activity such as wildfires and windblown dust are also the sources for PM10. Compared to PM10, the primary contributors of PM2.5 mainly come from the traffic and industry includes fuel combustion from power plant and oil refinery or the brake emissions of mobile. PM2.5 indicates those fine particles with AD less than 2.5 μm. Based on numerous epidemiological studies and large clinical observation, the PM2.5 has been considered as the main culprit of the adverse cardiovascular effects of air pollution on human health (5,6). UFPs include those particles diameters less than 0.1 μm, and the primary sources of UFPs are tailpipe emissions from mobile sources. Theoretically, PM10 particles preferentially deposit in the upper airways, meanwhile the PM2.5 and UFPs particles are much more easier to reach the smallest airways and alveoli and UFPs may further penetrate the alveolar-capillary membrane, which eventually spread into the systemic circulation. It has been reported that the UFPs particles can be found in remote organs (9). This finding may indicate that UFPs could induce specific organ toxic effects. In addition, the secondary particular matters, ambient aerosols appear when ambient particles interact with atmospheric gases (ozone, sulfur and nitric oxides and carbon monoxide) (8). Each of those aerosols can have independent and potentially synergistic or antagonistic effects with each other and with PM; however, at present, the cardiovascular health impact of exposure to combinations of those air pollutants is not well understood (5).

Pathophysiological mechanisms linking particulate matter (PM) particles and cardiovascular disease

In the past 15 years, numerous studies and in-depth reviews have demonstrated that PM particles play a significant role in the process of cardiovascular disease. *Table 1* summarizes the most recent studies [2014-2015] on PM-induced short-term and long-term cardiovascular effects. There is a strong link between the PM particles and the deaths caused due to cardiovascular diseases (4,21,28,31-33), and several pathways have recognized that can explain the link between PM particles and cardiovascular diseases, the first is the direct pathway. In this way, PM2.5, in particular UFPs directly translocate into the blood stream and remote target organ, and the other two pathways are indirect. For the indirect pathways, the one is mediated by pulmonary oxidative stress and inflammatory response, which is less acute and occur after several hours or days of inhalation (6,34). Interaction on the autonomic nervous system via specific lung receptors is an another indirect pathway well documented by many authors (6,8).

Direct actions of ultrafine particles (UFPs) on cardiovascular system

Due to the size, charge, chemical composition of UFPs, it is much easier to cross the pulmonary epithelium and the lung-blood barrier than PM10 and other coarse particulate. Thus, the translocation of UFPs into the blood stream and specific organ has been documented in animal studies (35-39). This exposure, even at low concentration, can translocate into blood steam and remote organ to cause potential cumulative toxicity (39). The translocation of UFPs to the blood stream has detrimental effects on cardiovascular system. After deposit on vascular endothelium, the UFPs can aggravate the local oxidative stress and inflammation, resulting the atherosclerotic plaque instability, and finally may lead to thrombus formation (40). Furthermore, increased ejection fraction and premature ventricular beats was observed in rats intravenously injected with UFPs isolated from ambient air (41). This inotropic effect of UFPs may be harmful to coronary heart disease patients, which increase the oxygen demand of the diseased hearts and aggravate the ischemic symptom. However, the *in vitro* results of UFPs on cardiac performance demonstrated that the UFPs have the cardiac depression effects, which can cause myocardial stunning and cardiac function deterioration (42). The seemed contradictable *in vivo* and *in vitro* results might be explained as the difference in circulation-mediated or direct cardiotoxicity of UFPs in these two models (8). Although not observed in human beings so far, these studies still indicated that UFPs has the cardiotoxicity effects and can directly affect the cardiac performance.

Indirect pathways of particulate matter (PM) particulates on cardiovascular system

Increased oxidative stress and activated inflammatory pathway in pulmonary due to exposure to PM particulate play a substantial role in this indirect pathway. Considerable

Table 1 The representative recent studies [2014-2015] on the short-term and long-term effects of exposure to PMs on cardiovascular system

Studies	Study population	Main findings
Short-term exposure studies		
Li *et al*. (10)	Case-crossover study in eight Chinese large cities	An increase of 10 μg/m^3 in 2-day moving average concentrations of PM10, SO_2 and NO_2, was significantly associated with increases of daily CHD mortality
MONICA/KORA study (11)	Case-crossover study of 15,417 MI cases in Germany	An association between short-term PMs concentration and numbers of MI, especially for nonfatal and recurrent events
MCAPS (12)	12-year of time series study in USA	Daily variation in PM10-2.5 is associated with emergency hospitalizations for cardiovascular diseases among elderly population (≥65 years)
MED-PARTICLES project (13)	Case-crossover study in ten southern European cities	Wildfires and PM10 were associated with increased cardiovascular mortality in urban residents
Chang *et al*. (14)	Case-crossover study in Taiwan from 2006-2010	Higher levels of PM2.5 enhance the risk of hospital admissions for CVD on cool days (<25 ℃)
EPHT program (15)	Case-crossover study in seven US states within the CDC EPHT network	Multiple cardiovascular outcomes in addition to AMI may be impacted by particulate air pollution in state-wide
MINAP (16)	Case-crossover study of over 400,000 MI events in England and Wales	The strong associations with air pollution were observed with selected non-MI CVD outcomes, while no clear evidence was found for pollution effects on STEMIs
Zhao *et al*. (17)	Time-series study of 56,940 outpatient in China	A 10 μg/m^3 increase in the present-day concentrations of PM10, SO_2, and NO_2 corresponded to increases of 0.56%, 2.07%, and 2.90% in outpatient arrhythmia visits
Raza *et al*. (18)	Case-crossover study of 5,973 cases in Stockholm county from 2000-2010	Short-term exposure (in 2 h) to moderate levels of O_3 is associated with an increased risk of out-of-hospital cardiac arrest (OHCA)
Bell *et al*. (19)	Time-series study of aged persons from four countries in USA	PM2.5 total mass and PM2.5 road dust were associated with increased cardiovascular hospitalizations, as were the PM2.5 constituent calcium, black carbon, vanadium, and zinc
Long-term exposure studies		
MESA project (20)	Time-series study in USA from 2000 to 2012	Long-term exposure to air pollution is related to the markers of inflammation and fibrinolysis
Qin *et al*. (21)	Cross-sectional study of 24,845 adults in Northeastern metropolitan China	Being overweight and obese may enhance the effects of air pollution on the prevalence of CVDs
Wolf *et al*. (22)	Cohort study of 100,166 persons in European followed on average for 11.5 years	A 100 ng/m³ increase in PM10 and a 50 ng/m³ increase in PM2.5 were associated with a 6% and 18% increase in coronary events
Wong *et al*. (23)	Cohort study of 66,820 aged persons in Hong Kong followed for 4 years	Mortality HRs per 10 μg/m^3 increase in PM2.5 were 1.22 for cardiovascular causes and 1.42 for ischemic heart disease
Chan *et al*. (24)	Cross-sectional study of 43,629 women in USA	Long-term PM2.5 and NO_2 exposures were associated with higher blood pressure (BP)
Pope *et al*. (25)	Cross-sectional study of 669,046 participants in USA	Long-term exposure may contribute to the development or exacerbation of cardiometabolic disorders, increasing risk of CVD, and cardiometabolic disease mortality
Kim *et al*. (26)	Cross-sectional study of 5,488 MESA participants in USA	Long-term concentrations of sulfur and OC, and possibly silicon, were associated with CIMT
Wilker *et al*. (27)	Cohort study of 5,112 participants in the Framingham Offsprings.	Higher levels of spatially PM2.5 at participant residences are associated with impaired conduit artery and microvascular function in middle-aged and elderly adults
Weichenthal *et al*. (28)	Cohort study of 83,378 participants in the USA	Rural PM2.5 may be associated with cardiovascular mortality in men, but not in women
Beelen *et al*. (29)	A joint analysis of data from 22 European cohorts consisted of 367,383 participants	Most hazard ratios for the association of air pollutants with mortality from overall CVD and with specific CVDs were approximately 1.0
Zhou *et al*. (30)	Prospective cohort study of 71,431 middle-aged Chinese men	Each 10 μg/m^3 PM10 was associated with a 1.8% increased risk of cardiovascular mortality

PM, particulate matter; MI, myocardial infarction.

evidence has proved that particulate air pollutants can trigger an inflammation related cascade when they deposit in the lung (43-46). Increased circulating level of pro-inflammatory cytokines such as CRP, IL-6, IL-8 and IL-1β were observed in healthy subjects when exposure to ambient PMs (46-50). Similar results have been reported in *in vivo* animal models and *in vitro* cellular models (51,52). Systemic inflammatory is a well-known risk factor for atherosclerosis progression, and those pro-inflammatory mediators are close related to increased blood coagulability and endothelial dysfunction and which finally can exacerbate myocardial ischemia. In addition, ROS-dependent mechanism was shown to involved in the PM particulates triggered pro-inflammatory pathway (47). Increased amounts of ROS were reported in rat lung and heart by means of *in situ* chemiluminescence after exposure to PMs (47). ROS was shown to be linked to atherosclerosis, vascular dysfunction, cardiac arrhythmias and myocardial injury (53,54).

Other mechanisms for particulate matter (PM)-induced cardiovascular disorders

In addition to the sizes of PMs, the quality of PMs (components) also played an important role in PM-related harmful effects. The components of PMs varies spatially and temporally, which includes health hazardous metals, such as copper, lead, iron, nickel and chromium originate from industrial combustion processes or traffic combustion. Other gaseous pollutants (e.g., CO, NO_2, NO_X, O_3 and SO_2 etc.) have also been demonstrated to be close related to the adverse outcomes of cardiovascular disease (10,17,18,24,26).

Furthermore, PM particulates are thought to stimulate autonomic nervous system (55), impairing autonomic balance and favoring sympathetic tone (56). The over activated sympathetic tone is closely related to increased cardiovascular risk through induction of pro-hypertensive vasoconstriction and the predisposition to arrhythmias (56). Recently, microRNAs (miRNAs) have emerged as attractive candidates to explore the impact of PM exposures on cardiovascular system (57,58). Experimental and clinical studies indicated that PMs can modulate those miRNAs involved in processes of systemic inflammation, endothelial dysfunction and atherosclerosis. Meanwhile, SNPs in miRNA-processing genes may also modify the associations between ambient pollution and cardiovascular disease (58,59). However, further work remains need to be addressed include linking specific PM exposures to subsequent health outcomes based on established miRNA expression profiles and experimentally validating putative downstream targets of the deregulated miRNAs.

The linking between ambient particulate matters (PMs) and cardiovascular disease

Cardiovascular (CV) mortality and particulate matter (PM) particulates exposure

The positive relationship between CV mortality and PM particulates exposure has been proved in many large time-series and case-crossover studies. Even a 10 $\mu g/m^3$ increase in short-term (<24 h) PM2.5 level increases the relative risk (RR) of daily cardiovascular mortality by ~0.4% to 1.0% (60). In addition, several landmark time-series studies have been conducted worldwide in recent years to address the daily PM-related CV and all-cause mortality. One of the largest was the National Morbidity, Mortality and Air Pollution Study (NMMAPS) (61,62). The APHEA (Air pollution and Health: A European Approach) and APHEA-2 projects investigated the relationship between short-term PM exposure and CV mortality in multiple European cities (63,64). Those large studies revealed that PM particulates including the coarse particulates, PM10, were significantly associated with daily all-cause and CV mortality. Similar time-series studies conducted in Asia countries (China, Thailand and Indian) further confirmed the relationship between the daily PM-exposure and CV mortality (65-67).

In addition to the short-term exposure of PM particulates, the longer-term exposure may have more deleterious effects on healthy and cardiovascular mortality giving the more accumulated PM exposure during the extended periods of time. Miller *et al.* revealed that long-term exposure to fine particulate air pollution was associated with the incidence of cardiovascular disease and death among postmenopausal women based on the data from 36 USA metropolitan areas (33). Many large prospective cohort studies and fine meta-analysis have further provided us with clear answers on the correlation between longer-term PM-exposure and CV mortality (29,68,69). However, a most recent large cohort study performed by Beelen *et al.* (29) did not found any association between PM and cardiovascular mortality. The explanation for the difference between this study and those of previous studies may be because of the changes in cardiovascular risk profile (e.g., reduced smoking and increased medication and medical treatment). And the changed risk profile finally altered the relationship between

air pollution and cardiovascular mortality. The extended reanalysis of the two large cohort studies—the Harvard Six Cities and ACS Studies further emphasized the notorious effects of PM2.5 on CV mortality (2,32,70). Furthermore, studies demonstrated that significantly reduction of PM2.5 level was associated with reduced mortality risk (70,71). However, unlike the results observed in short-term exposure studies, the reanalysis of ACS study demonstrated that the coarse particles (PM10) were generally not significantly related to CV mortality (32).

Ischemic heart disease (IHD) and particulate matter (PM) particulates exposure

An earlier hospital-based study (72) demonstrated that the incidence of myocardial infarction (MI) and angina was found to associate with atmospheric gases and/or black smoke. Another studies conducted in USA (4-year in 204 counties) and European (10-year in five major cities) indicated that hospital admission for IHD were positively associated with increased level of fine PM particulates (73,74). Furthermore, a very recent large prospective cohort study and meta-analysis in 11 European cohorts from the ESCAPE project confirmed that long term exposure to PM is associated with incidence of coronary events, and this association persists at levels of exposure even below the current European limit values (25 μg/m^3 for PM2.5, 40 μg/m^3 for PM10) (75). They concluded that with a 5 μg/m^3 increase in estimated annual mean PM2.5 was associated with a 13% increased risk of coronary events (HR 1.13, 95% confidence interval 0.98 to 1.30), and a 10 μg/m^3 increase in estimated annual mean PM10 was associated with a 12% increased risk of coronary events (1.12, 1.01 to 1.25). In California teachers cohort study (76), Lipsett *et al.* provided evidence linking long-term exposure to PM2.5 with increased risks of incident IHD mortality, particularly among postmenopausal women. Meanwhile, exposure to nitrogen oxides was also associated with elevated risks for IHD and all cardiovascular mortality. In addition to the long-term effects of PM on IHD, short-term elevated ambient fine PM concentrations has also been reported to increase the IHD hospital admission, which was further proved by numerous time-series, case-crossover and meta-analysis studies (69,77,78). Recently a large cohort study investigated the relationship between occupational particle exposure and the incidence of IHD in Swedish workers. They found that either exposure to a small job-exposure matrix (<1 μm) or large (>1 μm) was associated with an increased HR for acute MI, and the association was somewhat stronger for those exposed to small particles for more than 5 years (79).

Although few direct evidence for the induction of cardiac ischemia by exposure to ambient level of PM has been documented in real patient world, the experimental MI model provided more evidence linking PM exposure and increased infarct size and/or potential myocardial ischemia (80-82). The mechanisms for PM exposure induced myocardial ischemic injury can be attributed to increased systemic inflammation, altered endothelial function and enhanced thrombotic tendency (80,83). In addition, the PM exposure was found to be associated with a small but significant decrease in myocardial flow, especially in ischemic area in a conscious canine myocardial ischemic model (82). Moreover, traffic-related PM in patients with coronary artery disease was found to be strongly related to the incidence of ST-segment depression during 24-hour Holter monitoring.

Cardiac arrhythmias, out-of-hospital cardiac arrest (OHCA) and particulate matter (PM) particulates exposure

Several studies have observed a positive association between exposure to ambient PM and the incidence of ventricular arrhythmias in patients implanted with automatic defibrillators (84,85). A 5-year prospective study (86) in Taipei demonstrated that increased numbers of emergency room cardiac arrhythmia visits were significantly associated with PM2.5 on both warm days (>23 ℃) and cool days (<23 ℃), with an interquartile range rise associated with a 10% and 4% elevation in number of ER visits for cardiac arrhythmias, respectively. Very recently, another prospective follow-up study evaluated the association of air pollution with the onset of atrial fibrillation (AF) in 176 patients with dual chamber implantable cardioverter-defibrillators (ICDs). The authors revealed that PM2.5 is an acute trigger of AF, which was associated with increased odds of AF onset [26% (95% CI: 8-47%) increase for each 6.0 mg/m^3 increase in PM2.5 concentration] within hours following exposure in patients with known cardiac disease (87). Similarly, PM2.5 or fine PM-exposure has been reported to be associated with OHCA in Melbourne (88), Houston (89), New York (90), and many other cities or countries but not in Demark (91) and Seattle (92). These seemed inconsistent results may reflect different PM compositions due to different sources among the cities and countries. Furthermore, the lower

exposure levels in Demark and Seattle than in New York and Houston should also be considered.

In general, the incidence of sudden cardiac death and cardiac arrhythmias is closely related to the activity of the autonomic nervous system, and its activity in susceptible patients can be evaluated by measuring the changes in heart rate variability (HRV). HRV is mediated by a balance between sympathetic and parasympathetic branches of autonomous nervous system (34), which is recognized as a marker for prognosis the incidence of ventricular arrhythmia. Reduced HRV often predict the likelihood of developing ventricular arrhythmias in post-MI and heart failure patients (93,94). The reductions in HRV were observed on exposure to ambient, household or occupational PMs in healthy volunteer, susceptible patients, housewives and workers (95-97). In the studies in Beijing, the authors demonstrated an increase in HRV in healthy volunteers and CHD patients when exposure to ambient PM particles. On the contrary, the protective effects were observed when the participants used the highly efficient facemask (98,99). Although the mechanisms for PMs induced HRV and other changes in ECG remain largely unknown, some studies demonstrated that PM-induced cardiac electrophysiological changes can be prevented by inhibiting the transient receptor potential vanilloid receptor 1 (TRPV1) in the lungs (100). In addition, there have been relatively few researchers studied on the gene-PM exposure interactions, and most have done on a small number of loci for genetic polymorphisms. Some authors indicated that the associations between PM2.5 and HRV can be modified by gene polymorphisms of apolipoprotein E (APOE), lipoprotein lipase (LPL), vascular endothelial growth factor (VEGF) and glutathione S-transferase (GST) in general population, and the biological metabolism for PM related HRV changes might be related to the action on autonomic function via the lipid/endothelial metabolism and oxidative stress pathways (101,102).

Vascular function, blood pressure (BP), atherosclerosis and particulate matter (PM) particulates exposure

Experiments demonstrated that PM particulates can cause excess ROS formation thus leading to impairment of nitric oxide-dependent vascular dilation and enhancing vasoconstrictor in ex vivo and *in vivo* studies (5,103). Furthermore, exposure to PM has found to be associated with an increase in plasma concentration of endothelin-1 (ET-1), which is a putative potent endogenous vasoconstrictor to cause vascular endothelial dysfunction (104,105). Although the PM-related vascular dysfunction is documented in many articles, the results for BP response to acute PM exposure is inconsistent. Some controlled studies reported that PM exposure cause no changes among healthy adults, while other recent findings suggested that actual period of exposure to concentrated ambient particulate (CAP) significantly increase the diastolic BP (106), whereas no changes was observed with longer time of exposure (24 h) to PM (107). In that, those results suggested that this CAP induced BP changes might be more related to the PM-induced ANS imbalance which favored sympathetic over parasympathetic cardiovascular tone.

Although a recent meta-analysis from four European cohort studies in the ESCAPE study only find a positive but not significant associations between CIMT and long-term exposure to the PM2.5 (108), many epidemiological and animal evidences still documented that exposure to PMs plays a role in the development of atherosclerosis. Sun and his colleague demonstrated that exposure to environmentally relevant PM2.5 (regional northeastern of US) in conjunction with a high-fat chow diet in $ApoE^{-/-}$ mice for 6 months can cause endothelial dysfunction, increase the vascular plaque burden and accelerate the progression of atherosclerosis (109). The same results were reported in Beijing, Los Angeles and many other places when the $ApoE^{-/-}$ mice were exposure to the local ambient particle (110,111). To investigate the relation between individual-level estimates of long-term air pollution exposure and the progression of subclinical atherosclerosis, a large prospective, multicenter study named Multi-Ethnic Study of Atherosclerosis and Air Pollution (MESA Air) was initiated in 2004. That study demonstrated that long-term PM2.5 exposure was significantly associated with decreased endothelial function with increased IMT progression even over a relatively short follow-up period, which add to the literature on air pollution and the progression of atherosclerotic processes in humans (112,113). Even more, the authors observed that the slower IMT progression was related to greater reductions in PM2.5. A very recent study recalled the data [2000-2003] from the German Heinz Nixdorf Recall Study, which included a population-based cohort of 4,814 randomly selected participants. The study used a reliable indice, the thoracic aortic calcification (TAC), to evaluate the subclinical atherosclerosis. Their results demonstrated that long-term exposure to fine PM is independently associated with subclinical atherosclerosis (114). Taken together,

these findings may elucidate important pathways linking air pollution to the development of atherosclerosis.

Thrombus formation, blood coagulation and particulate matter (PM) particulate exposure

In vivo as well as *in vitro* studies demonstrated that PM particulates can induce pro-thrombotic effects by producing inflammatory mediators in the lungs and releasing into the blood circulation or directly translocation of small particulates from lung to the circulation. Nemmar *et al.* revealed that exposure of hamster to the diesel exhaust particles after photochemical injury resulted in platelet function abnormalities and thrombus formation both in arteries and veins (115). Mutlu GM and his colleague using IL-6 knockout (KO) mouse model demonstrated that IL-6 and its downstream signaling pathway plays a pivotal role in PM-induced prothrombotic state by increasing the expression of fibrinogen, factor VIII and tissue factor (TF), thus increasing the risk of both venous and arterial thrombosis (34,116). Furthermore, they also found that the prothrombotic effect of PM was further mitigated in macrophage-depleted mice (116). Those results may suggest that IL-6, macrophage and pulmonary inflammation are the necessary initial steps for PM-induced prothrombotic changes. Kilinç *et al.* documented the possible mechanisms for early and chronic exposure of PM (UFPs)-driven procoagulant activity in genetically modified mice [FXII($^{-/-}$)]. They revealed that PM promotes its early procoagulant actions mostly through the TF-driven extrinsic pathway of coagulation, whereas PM-driven long lasting thrombogenic effects are predominantly mediated via formation of activated FXII. Hence, they concluded that FXII-driven thrombin formation may be relevant to an enhanced thrombotic susceptibility upon chronic exposure to PM in humans (40). In addition to increasing the inflammatory mediators and prothrombotic proteins, particulate nanoparticles and other UFPs themselves could reach the circulation and directly enhance thrombus formation as analyzed by scanning electron microscopes (117). In real-world studies, the MONICA survey indicated that plasma viscosity was increased in both men and women when exposure to air pollutions (118). Recently, researchers studied the effects of short-term changes in exposure to UFPs on stroke, separately for ischaemic and hemorrhagic strokes, and ischaemic strokes with (likely embolic) and without (likely thrombotic) AF. Their results demonstrated that exposure to UFPs lead to a 21% increase in hospital admissions (per interquartile range of 5-day averages; 95% CI: 4-41%) for mild ischaemic stroke of without AF (likely thrombotic origin), which may further indicate the thrombotic and procoagulant actions of PM particles (119).

Conclusions

In summary, a wide array of experimental and epidemiological studies have unequivocally provided persuasive evidences on the negative impact of PMs on cardiovascular events and outcomes. In addition, numerous findings indicate that even a few hours to weeks of short-term exposure to PM particulates can trigger CVD-related mortality and events, especially among the susceptible individuals at great risk including the elderly or the patients with preexisting coronary artery disease. The underlying mechanisms for PM-caused cardiovascular disease include directly insults by UFPs translocating to the circulations and remote localization to the heart or indirectly injury by inducing systemic inflammation and oxidative stress in circulation, thus leading to cardiovascular damage. However, even the epidemiology and the biomedical studies will possibly help us better understand the underlying mechanisms and increase the effectiveness of our efforts to reduce the risk of air pollution—related cardiovascular disease, the major strategy in decreasing the harmful effects of air pollution is to reduce the air pollutants themselves. As the air pollution is becoming an ecological and social dilemma in the world, especially in developing countries like China, the social movements backed up by medical doctors, medias and government, therefore, might be great needed to combat with the deteriorating air pollution problem and finally to lower the associated cardiovascular risk.

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Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

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Exhibit 13

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BY EMAIL

November 16, 2010

Eric Schaeffer
Environmental Integrity Project
1 Thomas Circle, Suite 900
Washington, DC 20005

Re: Review of EPA's Inhalation of Fugitive Dust: A Screening Assessment of the Risks Posed by Coal Combustion Waste Landfills

Dear Mr. Schaeffer,

Per your request, I have reviewed *Inhalation of Fugitive Dust: A Screening Assessment of the Risks Posed by Coal Combustion Waste Landfills* (hereafter "Screening Assessment") published by the U.S. Environmental Protection Agency ("EPA") for review in September 2009.[1] My review concentrates on EPA's assumptions for the development of emission factors for airborne particulate emissions from coal combustion waste ("CCW") landfills.

My qualifications as an environmental expert include a doctorate in Environmental Science and Engineering ("D. Env.") from the University of California Los Angeles. My résumé is attached to this letter.

Background

In 2009, EPA published the *Human and Ecological Risk Assessment of Coal Combustion Wastes* ("2009 Risk Assessment"). During the peer review and notice of data availability to the public for the draft of this document, EPA received comments pointing out that health risks from fugitive dust particulate matter emissions during operation of a CCW landfill via the inhalation pathway were not addressed. In response, the EPA prepared the Screening Assessment as a companion document to the 2009 Risk Assessment intended to examine the potential for uncontrolled fugitive dust emissions from dry handling of CCW to lead to significant human health risks.[2]

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[1] U.S. Environmental Protection Agency, Inhalation of Fugitive Dust: A Screening Assessment of the Risks Posed by Coal Combustion Waste Landfills, Draft, September 2009.

[2] *Ibid*, p. 2.

The stated purpose of the Screening Assessment is "to assess whether the national ambient air quality standards … for particulate matter could be violated through CCW landfilling operations without fugitive dust controls ... via a conservative screening analysis."[3]

Executive Summary

After reviewing the Screening Assessment, I find that the methodology employed is overly simplistic, not sufficiently conservative and contains several errors. As a result, the Screening Assessment generally underestimates risks to receptors. For example, it is nonsensical to analyze the percentiles of landfill sizes and distances to receptors without acknowledging the extreme variability of emission factors for wind erosion, drop operations, and entrained road dust from equipment travel on unpaved landfill roads and their considerable contribution to total emissions of airborne particulates from a CCW landfill.

My comments should be viewed as suggestions regarding how the Screening Assessment could be improved and best used by the EPA in developing recommendations for CCW landfill management. Revision of the Screening Assessment taking into account the issues in my following comments would considerably improve the reliability of its results and conclusions. However, since the Screening Assessment for the most part underestimates risks to receptors, its conclusion to require daily controls as a safeguard for not causing excess levels of particulates at CCW landfills can be upheld without further review. In particular, daily landfill cover, rather than watering, is recommended for the best control, as watering alone is not sufficiently effective.

In addition, because of the substantial risks for residents living near CCW landfills, I recommend that the EPA conduct a full-scale health risk assessment that addresses both toxic constituents of fugitive dust emissions from landfills and emissions of diesel particulate matter from haul trucks, on-site heavy-duty landfill equipment, and diesel-powered pumps and generators.

Sincerely,

Petra Pless, D.Env.

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[3] *Ibid*, p. 3.

Comments

The following table of contents summarizes the organization of this letter:

I. Summary of Screening Assessment Methodology and Results

The Screening Assessment includes the following steps to determine whether airborne particulate matter from CCW landfills would potentially exceed the national ambient air quality standards ("NAAQS") for particulate matter smaller than or equal to 10 micrometers ("PM10") and smaller than or equal to 2.5 micrometers ("PM2.5"):

Initial Scenario (Uncontrolled Landfill)

1. Determined the receptors with the highest exposure to CCW particulate emissions as residents living near CCW landfills and the most important source of particulate matter at the CCW landfill as wind erosion. Emissions from unloading of CCW at the landfill were excluded assuming they would have an increasingly lower contribution relative to total emissions from the entire landfill area exposed to wind erosion as the landfill approaches capacity over its useful life. (Section 2.1.)
2. Determined an emission factor for particulates resulting from wind erosion of CCW landfills based on the equation for "Continuous Fugitive/Windblown Dust Emissions" in EPA's 1992 *Workbook of Screening Techniques for Assessing Impacts of Toxic Air Pollutants*. Calculation of the emission factor is based on the assumption that the CCW consists of fly ash and the landfill is not covered does not have any controls to reduce wind erosion. (Section 2.2.)
3. As conservative assumptions for modeling, determined the 50th through 90th percentiles of landfill sizes and side length assuming that the landfills were square; determined the 10th through 50th percentiles of landfill distances to residential receptors based on available data on the distance of residential wells to landfills. The maximum size of landfills and minimum distance from landfill to receptor were excluded as being too conservative to be considered reasonable. Taken together, the combination of sizes and distances do be modeled were assumed to provide both a true median (50th/50th) and upper tail (90th/10th) of the input distribution that would be modeled in a probabilistic assessment. (Section 2.3.)
4. Determined other input parameters for SCREEN3, a single-source Gaussian plume screening model which provides maximum ground-level concentrations for point, area, flare, and volume sources. (Section 2.4.)
5. SCREEN3 modeling for both 50th percentile values for landfill side length and distance to receptors found that uncontrolled particulate matter emissions from wind erosion of CCW landfills (13,390 $\mu g/m^3$) would exceed the 24-hour NAAQS for PM10 (150 $\mu g/m^3$) by almost two orders of magnitude. Thus, risks posed by fugitive dust cannot be screened out if no dust controls are applied to the landfill before closure. (Section 2.5.)

Secondary Scenarios (Controlled Landfill)

6. Assumed that only a fraction of the CCW landfill would be exposed to wind erosion and the other remaining portion of the landfill would be controlled 100% assuming yearly, monthly, weekly, or daily control via spraying or covering over the landfill's useful life of 40 years. It was assumed that the exposed fraction of the landfill would be square and located in the center of the landfill. (Section 3.0.)
7. SCREEN3 modeling for both 50th percentile values for landfill side length and distance to receptors found that fugitive dust emissions with yearly and monthly controls of the landfill

would exceed the 24-hour NAAQS for PM10. Since emission estimates for weekly and daily controls for fugitive dust were below the 24-hour NAAQS for PM10, further permutations of inputs were entered into the model to determine the likelihood that operating with those frequencies of controls would be adequate to protect human health. (Section 3.1.)

8. The Screening Assessment concludes that only daily controls of landfills would guarantee particulate matter concentrations below the NAAQS for PM10 and PM2.5. (Sections 4.0 and 5.0.)

II. Discussion of Screening Assessment Methodology

In general, the Screening Assessment's approach to evaluating the potential of airborne particulate matter from CCW landfills exceeding the NAAQS is reasonable. However, the methodology relies on several overly simplistic or not sufficiently conservative assumptions and contains a number of errors. A revision of the Screening Assessment to address these issues would greatly improve the reliability of its conclusions and any recommendations for CCW landfill management that can be derived from them.

II.A Assumption of Wind Erosion of CCW Landfill as Sole Source of Particulate Matter Emissions Is Not Adequate

Total fugitive dust emissions into the air from dry-handling CCW result from several distinct source activities: loading onto trucks, conveyors, railcars, or barges; emissions during transport from the power plant to a landfill; direct unloading from trucks or conveyors or unloading of railcars or barges via mobile equipment; wind erosion of piles in open trucks, railcars or conveyors; wind erosion from a landfill; and entrained road dust from truck and heavy-duty equipment traffic on paved and unpaved roads to and at a landfill. Potential receptors of airborne emissions include residents near the power plant, along the transportation route and at the landfill.

The Screening Assessment concludes that residents living near a CCW landfill would be exposed to higher emissions and for longer periods of time than residents living near power plants where CCW is handled or near roads where CCW is transported because residents near landfills would be exposed to emissions from both unloading and windblown emissions of CCWs. The Screening Assessment therefore only further considers residents near landfills as a highly exposed receptor population. The Screening Assessment further reasons that, the closer an uncovered landfill gets to capacity towards the end of its operating life, the less relative influence unloading emissions would have on total (uncontrolled) emissions. Consequently, the Screening Assessment considers windblown emissions as representative for its preliminary scenarios because they would dominate and, thus, only quantifies windblown emissions.[4] This assumption is overly simplistic and not supported by evidence as discussed in the following comments.

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[4] Screening Assessment, p. 4.

First, the Screening Assessment fails to provide even a preliminary estimate for sources of fugitive dust emissions other than windblown erosion and their relative contribution to total emissions from the landfill to verify that its assumption that wind erosion is the dominating emission source and other sources of emissions are negligible is defensible.

These other sources, *e.g.*, fugitive dust emissions associated with unloading of fly ash[5] at a CCW landfill, entrained road dust from equipment travel on unpaved roads at the landfill, and unloading can be substantial.

The Screening Assessment fails to even recognize entrained road dust emissions from equipment travel on unpaved roads at the landfill as a potential source of airborne particulates. Equipment at the landfill includes both haul trucks and mobile equipment such as dozers or scrapers. At CCW landfills the temporary roads frequently consist of the deposited material, *i.e.*, flyash, and are therefore, without proper management, prone to releasing clouds of dust when equipment travels over them. Entrained road dust emissions can be a major contributor to airborne fugitive dust, as shown in the photographs below. (Note plumes of dust emanating from vehicle tires.)

Figure 1: Dust clouds from vehicle travel on unpaved road at CCW landfill in Bokoshe, OK
Photo courtesy of Linda Evans, EarthJustice

[5] Fly ash is fine powder with a mean particle size of 50 micrometers ("μm"); between 60 and 90 percent of fly ash particles are finer than 75 μm.

Figure 2: Dust clouds from vehicle travel on unpaved road at a surface mine

From: Reed WR, Organiscak JA, Haul Road Dust Control Fugitive Dust Characteristics from Surface Mine Haul Roads and Methods of Control; http://www.cdc.gov/Niosh/mining/pubs/pdfs/hrdcf.pdf

The following photograph shows clouds of dust released during unloading of fly ash at a CCW landfill.

Figure 3: Fly ash dumping at CCW landfill in Bokoshe, OK

Source: Fly Ash in the Air We Breathe; http://www.intheairwebreathe.com/html/what_is_fly_ash_.html

In addition, dust is released when on-site equipment such as dozers and scrapers move, compact and contour the deposited fly ash. The following photographs show the variety of heavy-duty equipment operating simultaneously at a CCW landfill.

Figure 4: Fly ash management at Arrowhead Landfill, AL
Photo courtesy of John Wathen, Hurricane Creekkeeper, Waterkeeper Alliance

Figure 5: Fly ash management at Arrowhead Landfill, AL,
From: New York Times, Clash in Alabama Over Tennessee Coal Ash, August 29, 2009;
http://www.nytimes.com/2009/08/30/us/30ash.html?_r=2&ref=earth

Clearly, emissions of entrained road dust from equipment travel on unpaved roads, unloading, and compacting and contouring the landfill can be substantial and should not be excluded from the Screening Assessment without a quantitative demonstration that these

emissions are indeed negligible compared to the total emissions from wind erosion. This is particularly important for the daily and weekly control scenarios evaluated in the Screening Assessment's Section 3.0 when emissions associated with wind erosion are restricted to a small active portion of the landfill and entrained road dust emissions and emissions from unloading and entrained road dust from vehicle travel on unpaved roads will contribute a larger percentage to total emissions.

At a number of coal-fired power plants, the landfill is directly adjacent and CCW is transported via conveyor belts to the landfill. At such landfills, emissions result from the release of fly ash onto the piles at the landfill, particularly, when the drop height from the conveyor and the moisture content of the material are not properly controlled. Railcar transport results in emissions at the landfill from unloading railcars into dozers or other landfill equipment and unloading of that equipment.

The following sections provide estimates of particulate matter emission factors for equipment traffic on unpaved roads and drop operations and compare them to the emission factor developed by the Screening Assessment for particulate matter emissions from wind erosion.

1. Entrained Road Dust from Equipment Traffic on Unpaved Roads

Emission Factors Based on Vehicle Distance Traveled

Emission factors for entrained road dust from equipment traffic (trucks, front-end loaders, dozers, etc.) on unpaved roads to the active section of the landfill can be estimated using an equation in EPA's *Compilation of Air Pollutant Emission Factors* ("AP-42") for *Unpaved Roads* at industrial sites, *i.e.*, sites that are not publicly accessible:

$$E_{VMT} = k\,(s/12)^a\,(W/3)^b \qquad \textbf{Equation 1}$$

where:

E_{VMT} = particle size-specific emission factor (lb/VMT)
k = particle size-specific empirical constant (lb/VMT)
s = surface material silt content (%)
a = particle size-specific empirical constant (dimensionless)
W = mean vehicle weight (tons)
b = particle size-specific empirical constant (dimensionless)[6]

Because many landfills build their internal temporary roads out of the deposited material itself, the silt content of the fly ash can be assumed as a worst-case estimate for the unpaved road surface material silt content at a CCW landfill. For the following estimate, a

[6] U.S. Environmental Protection Agency, Compilation of Air Pollutant Emission Factors, 13.2.2 Unpaved Roads, updated November 2006.

lower-end value for the surface material silt content, 20%, was chosen based on the silt content determined for various roads in western surface coal mining, including haul roads to/from pit, plant road, scraper route, and freshly graded haul road (range 2.8%-29%; mean 5.1%-24%).[7] An upper-end value for the surface material silt content, 80%, was based on the silt content of fly ash as assumed by the Screening Assessment. Thus, based on Equation 1 and assuming a surface material silt content of 20% or 80% and a mean vehicle weight of 30 or 40 tons (average of vehicle weight full/vehicle weight empty) as lower and upper end variables, and the respective particle size-specific constants k, a, and b[8] for particulate matter equal to or smaller than 30 micrometers ("PM30")[9], PM10 and PM2.5, emission factors ("E_{VMT}") for the respective particle sizes in pounds per vehicle mile traveled ("lb/VMT") and grams per vehicle kilometer traveled ("g/VKmT") can be estimated as shown in Table 1 and Table 2 below.

Table 1: Particle size-specific emission factors for PM30, PM10, and PM2.5 for entrained road dust from unpaved roads (mean vehicle weight 30 tons)

Particulate Size	A Surface material silt content 20% E_{VMT} (lb/VMT)	A Surface material silt content 20% E_{VMT} (g/VKmT)[a]	B Surface material silt content 80% E_{VMT} (lb/VMT)	B Surface material silt content 80% E_{VMT} (g/VKmT)[a]
PM30	19.7	5,567	52.1	14,690
PM10	6.7	1,887	23.3	6,572
PM2.5	0.7	189	2.3	657

a 1 lb/VMT = 281.9 g/VKmT

Table 2: Particle size-specific emission factors for PM30, PM10, and PM2.5 for entrained road dust from unpaved roads (mean vehicle weight 40 tons)

Particulate Size	C Surface material silt content 20% E_{VMT} (lb/VMT)	C Surface material silt content 20% E_{VMT} (g/VKmT)[a]	D Surface material silt content 80% E_{VMT} (lb/VMT)	D Surface material silt content 80% E_{VMT} (g/VKmT)[a]
PM30	22.5	6,336	59.3	16,721
PM10	7.6	2,148	26.5	7,480
PM2.5	0.8	215	2.7	748

a 1 lb/VMT = 281.9 g/VKmT

[7] *Ibid*, Table 13.2.2-1.

[8] *Ibid*, Table 13.2.2-2:

Constant	PM30	PM10	PM2.5
k	4.9	1.5	0.15
a	0.7	0.9	0.9
b	0.45	0.45	0.45

[9] Particulate matter with an aerodynamic diameter less than or equal to 30 micrometers is sometimes termed "suspendable particulate" and is often used as a surrogate for total suspended particulate matter ("TSP").

As shown in Table 1 and Table 2, emissions per vehicle mile traveled increase proportionally with silt content. As shown, the surface material silt content of the road has greatly influences the emission factors: from 20% to 80% silt content, emission factors rise by a factor of 2.6 for PM10 and 3.5 for PM10 and PM2.5. (*See* Table 1, Columns A and B, and Table 2, Columns C and D.)

A higher mean vehicle weight also increases emission factors: at 20% silt content, the emission factors rise by 43% for PM30 and 33% for PM10 and PM2.5 with increasing mean vehicle weight from 30 to 40 tons. (*See* Table 1, Column A, and Table 2, Column C.) At higher silt contents, the influence of mean vehicle weight on emission factors is not as pronounced: at 80% silt content, an increase in mean vehicle weight increases emission factors by 14%. (*See* Table 1, Column B, and Table 2, Column D.)

Area-specific Emission Factors

The following provides estimates for area-specific emission factors for fugitive dust emissions from unpaved roads that can be compared to the area-specific emission factor determined by the Screening Assessment for wind erosion:

On an area (unit square meter)-basis, it depends how many vehicles travel over the same road on a given day. Conservatively assuming that each vehicle travels twice over the same portion of the road while driving to and from the active portion of the landfill as landfill roads are often narrow, *i.e.*, traveling a distance of two meters ("m") on each square meter unit road, and assuming that vehicles would access the landfill over the entire 24-hour day, the unit emission factors ("E"), in grams per second and square meter ("g s^{-1} m^{-2}") for the respective particle sizes for 1, 10, 20, and 50 vehicles per day can be estimated as shown in Table 3 for a road surface material silt content of 20% and assuming the landfill operates 24 hours per day and in Table 4, as a worst-case assumption, for a road surface material silt content of 80% and assuming the landfill operates 8 hours per day.

Table 3: Particle size-specific unit emission factors for PM30, PM10, and PM2.5 for entrained road dust from unpaved roads based on 20% silt content, mean vehicle weight of 30 tons, and 24 hours/day landfill operation

	E[a]			
Particulate Size	**1 vehicle/day (g s^{-1} m^{-2})**	**10 vehicles/day (g s^{-1} m^{-2})**	**20 vehicles/day (g s^{-1} m^{-2})**	**50 vehicles/day (g s^{-1} m^{-2})**
PM30	1.29E-04	1.29E-03	2.58E-03	6.44E-03
PM10	4.37E-05	4.37E-04	8.74E-04	2.18E-03
PM2.5	4.37E-06	4.37E-05	8.74E-05	2.18E-04

a E = (E_{VMT} in g/VKmT) x (2 m traveled/vehicle) x (number of vehicles/day) x (Km/1,000 m) x (day/24 hours) x (hours/28,800 seconds) x (m^{-2})

Table 4: Particle size-specific unit emission factors for PM30, PM10, and PM2.5 for entrained road dust from unpaved roads based on 80% silt content, mean vehicle weight of 40 tons, and 8 hours/day landfill operation

	E[a]			
Particulate Size	**1 vehicle/day ($g\ s^{-1}\ m^{-2}$)**	**10 vehicles/day ($g\ s^{-1}\ m^{-2}$)**	**20 vehicles/day ($g\ s^{-1}\ m^{-2}$)**	**50 vehicles/day ($g\ s^{-1}\ m^{-2}$)**
PM30	1.16E-03	1.16E-02	2.32E-02	5.81E-02
PM10	5.19E-04	5.19E-03	1.04E-02	2.60E-02
PM2.5	5.19E-05	5.19E-04	1.04E-03	2.60E-03

a E = (E_{VMT} in g/VKmT) x (2 m traveled/vehicle) x (number of vehicles/day) x (Km/1,000 m) x (day/8 hours) x (hours/28,800 seconds) x (m^{-2})

As the results in Table 3 and Table 4 show, the fugitive dust emission factors for PM30 for a unit square meter of road range from the same order of magnitude (1.29E-04 g s^{-1} m^{-2} for one vehicle per day, a silt content of 20%, and 24-hours of landfill operation per day; *see* shaded cell in Table 3) to being two orders of magnitude higher (5.10E-02 g s^{-1} m^{-2} for 50 vehicles per day, a silt content of 80%, and 8-hours of landfill operation per day compared to the Screening Assessment's unit emission factor (2.43E-04 g s^{-1} m^{-2}) for wind erosion; *see* shaded cell in Table 4). These emission factors are based on the mean vehicle weight of haul trucks only and do not take into account that the mean vehicle weight could be considerably higher due to operation of heavy-duty equipment on those roads, which would further increase emission factors.

Based on a three meter wide road leading to the active portion of a landfill (conservatively assumed at the opposite end of the landfill) and assuming a) 20% surface material silt content, a mean vehicle weight of 30 tons, and 24 hours of landfill operations per day as the lower bound variables and b) 80% surface material silt content, a mean vehicle weight of 40 tons, and 8 hours of landfill operation per day as the upper bound variables for one or 50 vehicles traveling the unpaved road per day, uncontrolled entrained road dust emissions in grams per second ("g/s") for the 50th and 90th percentile size landfills for PM30, PM10 and PM2.5 can be estimated as shown in Table 5.

Table 5: Uncontrolled entrained dust emissions from unpaved road assuming daily cover of landfill

	Landfill		**Road**		**Emissions (g/s)**					
					PM30		**PM10**		**PM2.5**	
	Total	Active portion	Length	Area	20% 30 tons 24 hours	80% 40 tons 8 hours	20% 30 tons 24 hours	80% 40 tons 8 hours	20% 30 tons 24 hours	80% 40 tons 8 hours
Percentile	Side (m)	Side (m)	(m)	(m^2)	1 vehicle	50 vehicles	1 vehicle	50 vehicles	1 vehicle	50 vehicles
50th	518.8	4.3	515	1,544	1.99E-01	2.99E+01	6.74E-02	1.34E+01	6.74E-03	1.34E+00
90th	1097.4	9.1	1,088	3,265	4.21E-01	6.32E+01	1.43E-01	2.83E+01	1.43E-02	2.83E+00

Based on the Screening Assessment's assumptions, airborne particulate emissions due to wind erosion of the active portions of landfill with daily cover for the 50th and 90th percentile

can be estimated at 4.37E-03 to 1.99E-02 g/s.[10] Compared to these estimates for wind erosion from active portions of a landfill with daily cover, entrained road dust PM30 emissions are orders of magnitude higher for both the 50th and 90th percentile size landfills and assuming either one or 50 vehicles traveling the unpaved road. (*See* shaded cells in Table 5).

This comparison illustrates the necessity of including fugitive emissions from unpaved roads in the estimates of fugitive dust emissions from CCW landfills and providing sound management requirements for their control. For further discussion of wind erosion from the active portion of a landfill, *see* Comment II.E.

These emission estimates do not account for trackout and re-entrainment of particulates through vehicle travel on paved roads. These emissions should be estimated separately with EPA's AP-42, Section 13.2.1, for *Paved Roads*.

2. Emissions Associated with Drop Operations

Unloading of CCW from trucks, conveyors, railcars, or barges at a landfill involves one or more so-called "drop operations," *i.e.*, dropping materials onto receiving surfaces. For example, truck dumping onto a pile is an example of a batch drop operation. Barge and railcar unloading requires loadout via on-site mobile equipment which then unload the materials at the active portion of the landfill in a batch drop operation. Unloading materials from a conveyor is an example of a continuous drop operation. Drop operations occur more or less instantaneously, often resulting in large clouds of dust released into the atmosphere, particularly, if the fly ash is uncontrolled, as shown in Figure 3.

The quantity of particulate emissions generated by a drop operation (*e.g.*, unloading of truck at landfill), in kilogram per metric ton ("kg/metric ton") of material transferred, may be estimated using the following empirical expression:

$$E = k\,(0.0016)\,(U/2.2)^{1.3} / (M/2)^{1.4} \qquad \textbf{Equation 2}$$

where:

E = particle size-specific emission factor (kg/metric ton)
k = particle size-specific multiplier (dimensionless)
U = mean wind speed, meters per second (m/s)
M = material moisture content (%)

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[10] Emissions from 50th percentile landfill area with daily cover: (2.43E-04 g s^{-1} m^{-2}) × (18 m^2 active landfill area) = 4.37E-03 g/s;
emissions from 90th percentile landfill area with daily cover: (2.43E-04 g s^{-1} m^{-2}) × (82 m^2 active landfill area) = 1.99E-02 g/s.

Equation 2 requires the assumption of wind speed for determining the emission factor. Table 6 shows the Beaufort wind force scale including a description of various wind speeds in meters per second ("m/s") and the resulting conditions on land.

Table 6: Beaufort wind force scale

Beaufort number	Wind speed (m/s)	Description	Land conditions
0	<0.3	Calm	Calm. Smoke rises vertically.
1	0.3-1.5	Light air	Smoke drift indicates wind direction, still wind vanes.
2	1.6-3.4	Light breeze	Wind felt on exposed skin. Leaves rustle, vanes begin to move.
3	3.4-5.4	Gentle breeze	Leaves and small twigs constantly moving, light flags extended.
4	5.5-7.9	Moderate breeze	Dust and loose paper raised. Small branches begin to move.
5	8.0-10.7	Fresh breeze	Branches of a moderate size move. Small trees in leaf begin to sway.
6	10.8-13.8	Strong breeze	Large branches in motion. Whistling heard in overhead wires. Umbrella use becomes difficult. Empty plastic garbage cans tip over.
7	13.6-17.1	High wind, moderate gale, near gale	Whole trees in motion. Effort needed to walk against the wind.
8	17.2-20.7	Gale, fresh gale	Some twigs broken from trees. Cars veer on road. Progress on foot is seriously impeded.
9	20.9-24.4	Strong gale	Some branches break off trees, and some small trees blow over. Construction/temporary signs and barricades blow over.
10	24.5-28.4	Storm, whole gale	Trees are broken off or uprooted, saplings bent and deformed. Poorly attached asphalt shingles and shingles in poor condition peel off roofs.
11	28.5-32.6	Violent storm	Widespread damage to vegetation. Many roofing surfaces are damaged; asphalt tiles that have curled up and/or fractured due to age may break away completely.
12	≥32.7	Hurricane force	Very widespread damage to vegetation. Some windows may break; mobile homes and poorly constructed sheds and barns are damaged. Debris may be hurled about.

Adapted from Wikipedia; http://en.wikipedia.org/wiki/Beaufort_scale

For purposes of establishing emission factors for drop operations, wind speeds of 5, 10, 20, and 30 m/s were chosen to demonstrate the influence of wind speed on emissions at the landfill. Based on these wind speeds and assuming a fly ash moisture content of 27%[11] and the particle size-specific multipliers k[12], the particle size-specific emission factors E can be estimated as shown in Table 7.

[11] U.S. Environmental Protection Agency, Compilation of Air Pollutant Emission Factors, 13.2.4 Aggregate Handling and Storage Piles, updated November 2006: mean moisture content for fly ash from four samples.

[12] *Ibid*, p. 13.2.4-4: k = 0.74 for PM30, 0.35 for PM10 and 0.053 for PM2.5.

Table 7: Particle size-specific emission factors for PM30, PM10, and PM2.5 for drop operations at various wind speeds

Particulate Size	E (kg/metric ton) at wind speed			
	5 m/s	10 m/s	20 m/s	30 m/s
PM30	9.00E-05	2.22E-04	5.46E-04	9.25E-04
PM10	4.26E-05	1.05E-04	2.58E-04	4.37E-04
PM2.5	6.45E-06	1.59E-05	3.91E-05	6.62E-05

As shown in Table 7, particulate matter emission factors increase by an order of magnitude for wind speeds between 5 m/s and 30 m/s. The wind speeds of interest for determining whether fugitive dust emissions from the landfill would potentially exceed the short-term NAAQS for PM10 and PM2.5 are those that provide a worst-case scenario, *i.e.*, windy or stormy conditions above 10 m/s.

Based on the emission factors Table 7 particulate matter emissions for one drop operation can be estimated assuming a 20 ton[13] load of CCW per truck as shown in Table 8.

Table 8: Particle size-specific emissions for PM30, PM10, and PM2.5 for 1 drop operation (20 tons) at various wind speeds

Particulate Size	Emissions (kg) at wind speed			
	5 m/s	10 m/s	20 m/s	30 m/s
PM30	1.63E-03	4.02E-03	9.90E-03	1.68E-02
PM10	7.73E-04	1.90E-03	4.68E-03	7.94E-03
PM2.5	1.17E-04	2.88E-04	7.09E-04	1.20E-03

As an example of the magnitude of drop operation emissions: A 1,000 Megawatt ("MWe") power plant with an average daily consumption of 12,000 tons of sub-bituminous coal produces about 2,400 tons of fly ash per day.[14] Since capture efficiencies range from 95% to 99.95%, most of this fly ash is captured for either landfilling (or reuse). Thus, assuming 2,300 tons of fly ash would be disposed of per day and assuming a 20-ton load for each truck, about 115 drop operations would occur every day at a landfill to dispose of the fly ash from one 1,000-MWe power plant (in addition, the power plant generates bottom ash and other CCW wastes).[15] Some landfills receive CCW from several facilities; some of the largest commercial landfills receiving industrial waste are permitted to receive up to 15,000 tons of

[13] 1 ton = 0.907 metric tons; 20 tons = 18.1 metric tons.

[14] Chen Y, Shah N, Huggins EE, Huffman GP, and Dozier A, Characterization of Ultrafine Coal Fly Ash Particles by Energy-filtered TEM, Journal of Microscopy, Vol. 217, Pt. 3, March 2005, pp. 225-234.

[15] (2,300 tons fly ash) / (20 ton load/truck) = 115 trucks/day.

waste per day.[16] Table 9 summarizes particulate emissions in kilogram per day ("kg/day") for drop operations of 2,300 tons of fly ash per day via 20 ton loads.

Table 9: Particle size-specific emissions for PM30, PM10, and PM2.5 for drop operation of 2,300 tons* of fly ash per day via 20 ton loads at various wind speeds

Particulate Size	Emissions (kg/day) at wind speed			
	5 m/s	10 m/s	20 m/s	30 m/s
PM30	1.88E-01	4.63E-01	1.14E+00	1.93E+00
PM10	8.88E-02	2.19E-01	5.39E-01	9.13E-01
PM2.5	1.35E-02	3.31E-02	8.16E-02	1.38E-01

* (2,300 tons) × (0.907 metric tons/ton) = 2,087 metric tons

As Table 9 shows, at wind speeds of 5 to 30 m/s, PM30 emissions attributable to truck drop operations at a landfill to dispose of fly ash from one 1000-MW coal-fired power plant range from 0.2 to 1.9 kg/day; PM10 emissions range from 0.09 kg/day to 0.9 kg/day. These emissions, which occur only during the operating hours of the landfill, must be added to the emission factors from wind erosion and entrained road dust from vehicle travel on unpaved roads.

Drop operations may occur several times for disposal of one load of fly ash: for example, if delivered via railcar or barge, the material will be dumped into a transfer vehicle (*see* Figure 4), moved to the active portion of the landfill and dropped off there. Thus, there will be two emission points (loading and unloading) for one load of CCW.

Figure 6: Fly ash unloading from rail cars at Arrowhead Landfill, AL
Photo courtesy of John Wathen, Hurricane Creekkeeper, Waterkeeper Alliance

[16] *See*, for example, the Arrowhead Landfill in Alabama: http://www.arrowheadlandfill.com/.

3. Emissions Associated with Landfill Equipment

Typically at a landfill, trucks dump their loads onto piles and then large off-road equipment, such as scrapers or dozers, move and compact the materials and smooth and contour the landfill. (*See* Figure 4, Figure 5, and Figure 7.)

Figure 7: Heavy-duty equipment at fly ash landfills
Left: from Center for Environment, Commerce and Energy;
http://cenvironment.blogspot.com/2010/03/constellation-energy-proposing-fly-ash.html
Right: from The Star Online: Grappling with Garbage, May 27, 2008;
http://snipurl.com/1fci88 [thestar_com_my]

Fugitive dust emissions from material handling with off-road equipment can be substantial and must be included in the estimates of total emissions from disposal of CCW at landfills. Emissions can be estimated following the instructions in EPA's AP-42, Section 11.9, for *Western Surface Coal Mining*.

II.B Assumptions for Estimating Particulate Emissions due to Wind Erosion Are Not Sufficiently Conservative

The Screening Assessment determined the emission factor for windblown particulate emissions from a CCW landfill using the equation for "Continuous Fugitive/Windblown Dust Emissions" in EPA's 1992 *Workbook of Screening Techniques for Assessing Impacts of Toxic Air Pollutants*:[17]

[17] Screening Assessment, pp. 4-5.

$$E = 1.9\ (s/1.5)\ (365-p)\ /\ (235)\ (w/15) \qquad \textbf{Equation 3}$$

where:

E = emission factor (kg day^{-1} hectare^{-1})
s = material silt content (%)
p = number of days per year with more than 25 mm of precipitation (dimensionless)
w = percent of time wind speed exceeds 5.4 m/s (%)

The Screening Assessment assumed a material silt content for fly ash of 80% and the default values in EPA's workbook of 0 for p and 20% for w to determine an emission factor of 2.43E-04 g s^{-1} m^{-2}.[18] Neither the Screening Assessment's assumptions nor the equation used provide a sufficiently conservative estimate for emissions from fly ash landfills.

Equation Is Only of Limited Value for Determining Worst-Case Emissions from CCW Landfills

First, the equation used by the Screening Assessment is of limited value for determining worst-case emissions from large-scale wind erosion of a CCW landfill. The equation had been developed to determine fugitive dust releases from "process losses, generated by mechanical action in material handling or windblown dust" originating "from a surface or a collection of small, poorly defined point sources," as shown in the following Figure.[19]

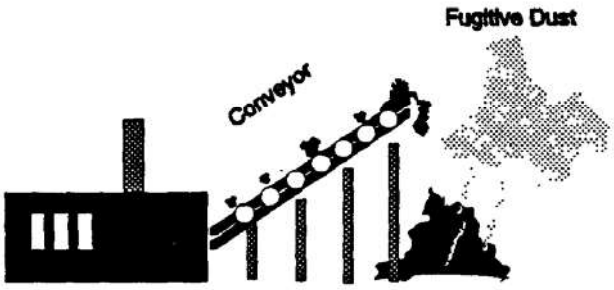

Figure 8: Fugitive dust from material handling or windblown dust
from: EPA, Workbook of Screening Techniques for Assessing Impacts of Toxic Air Pollutants, 1992, p. 4-11

The equation developed for this purpose is independent of wind speed (*see* Equation 3), assuming only a threshold wind speed at which particulates become airborne (5.4 m/s). Erosion potential has been found to increase rapidly with higher wind speeds resulting in considerably more airborne dust. Therefore, emissions should be related to wind gusts of highest magnitude.[20]

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[18] *Ibid*.

[19] U.S. Environmental Protection Agency, Workbook of Screening Techniques for Assessing Impacts of Toxic Air Pollutants, 1992, p. 4-11.

[20] U.S. Environmental Protection Agency, Compilation of Air Pollutant Emission Factors, 13.2.5 Industrial Wind Erosion, updated November 2006, p. 13.2.5-1.

While for most materials the erosion potential, *i.e.*, the finite availability of erodible material (mass/area), tends to decay during an erosion event, fly ash due to its small size can act as an *unlimited reservoir of erodible material* and can sustain emissions for periods of hours without substantial decreases in emission rates. Some natural crusting of the surface may bind available erodible material, thereby reducing the erosion potential when fly ash is stored without disturbance. However, at most landfills, the piles of fly ash are continuously added to, moved, compacted, etc.

Percentage of Wind Speed Exceeding 5.4 m/s Is Not Sufficiently Conservative

Second, while the Screening Assessment's assumptions may be acceptable for determining whether airborne particulate matter emissions through wind erosion of CCW landfills may lead to a violation of the *annual* NAAQS for PM10; the assumption for w of 20%, *i.e.*, the percent of time wind speed exceeds 5.4 m/s, is not acceptable for determining whether emissions would exceed short-term NAAQS, *i.e.*, the *24-hour* standards for PM10 and PM2.5. As shown in Table 6, a wind speed of 5.4 m/s is only a gentle breeze. A conservative screening assessment for this purpose must therefore assume that the wind speed exceeds 5.4 m/s for the entire 24-hour period of a day, *i.e.*, 100%. Thus, the Screening Assessment underestimated potential emissions from wind erosion at a CCW landfill by a factor of five.[21]

Terrain Assumptions for Wind Erosion from Landfill Are Not Representative

The Screening Assessment calculates emissions and models dispersion of fugitive dust based on the emission factor of 2.43E-04 g s^{-1} m^{-2} and based on the 50^{th} through as 90^{th} percentiles of landfill sizes. The Screening Assessment calculates these emissions as if the landfill were a flat, even grade area, *i.e.*, it assumes the footprint of the landfill for emission estimates.

In reality, a landfill is rarely a flat, even grade area but typically consists of elevated areas with piles of recently dumped material that are then moved, compacted, and contoured by off-road equipment, as shown in Figure 4 through Figure 5 and Figure 7.

The elevated portions of the landfill and the piles of fly ash present a considerably larger surface area subject to wind erosion than the footprint of the landfill alone. For example, a cone-shaped storage pile with a diameter of 10 meters and a height of 3 meters has a footprint of 78.5 square meters ("m^2")[22] but an exposed surface area of 91.6 m^2, a 17% increase.[23]

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[21] (100%) / (20%) = 5.

[22] Footprint of cone: $\pi \times r^2 = \pi \times (5\ m^2)^2 = 78.5\ m^2$;
exposed surface area of cone: $\pi \times r \times \sqrt{(r^2 + h^2)} = \pi \times (5\ m) \times \sqrt{(5\ m^2 + 3\ m^2)} = 91.6\ m^2$.

[23] $(91.6\ m^2) \times (78.5\ m^2) = 1.17$.

Use of AP-42, Industrial Wind Erosion, Appears to Be More Representative for Estimating Wind Erosion from Fly Ash Storage Piles

The EPA's AP-42, Section 13.2.5, provides a methodology to estimate emissions from frequently disturbed storage piles and exposed areas within an industrial facility. This section takes into account the shapes of the piles (conical and oval with flattop), the surface area created by piles, and the frequency of disturbance of piles, amongst other variables. This methodology appears to be more representative to determine worst-case emissions for particulate emissions due to wind erosion from CCW landfill than the equation used by the Screening Assessment.

The Screening Assessment's Conclusion that Elevated Landfills Result in Fewer Fugitive Particulate Emissions Is Incorrect

The Screening Assessment determines maximum emissions from the landfill for two scenarios: a) at zero meters height and b) at 10 meters height. The Screening Assessment finds "that landfills that are built up, as opposed to dug into the ground, would actually lead to lower particulates nearby."[24] As explained above, the Screening Assessment's assumptions and calculations are not representative of actual landfill conditions and, thus, the modeling fails to provide accurate results. If emissions are calculated as detailed above, ambient concentrations of particulate matter resulting from wind erosion of CCW landfills will be higher for elevated rather than for at-grade landfills.

II.C The Choice of 10th Percentile of Landfill Distance to Nearest Receptor Is Not Acceptable

The Screening Assessment determined distances of landfills to residential receptors based on available data on the distance of residential wells to landfills. The Screening Assessment determined that the closest recorded distance between a resident (well) and the landfill is 0.6 meters (2 feet) and recognizes that some residences may be even closer.[25] Yet, the Screening Assessment excluded the minimum distance from landfills to receptors as being too conservative to be considered reasonable.[26] In my opinion, excluding the potential receptors who reside directly adjacent to a landfill from a risk assessment is unconscionable. These receptors exist and their risk from exposure to airborne dust from the landfill should therefore be evaluated.

The conventional way of evaluating potential violations of NAAQS for industrial facilities is to determine pollutant concentrations in ambient air at the fence line. This convention should be used here as well.

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[24] Screening Assessment, p. 10.

[25] Screening Assessment, p. B-1.

[26] Screening Assessment, p. 5.

II.D Assumed Control Efficiency for Wind Erosion via Cover or Spraying of Active Portion of Landfill Is Unrealistic

For its secondary scenarios, the Screening Assessment estimated emissions due to wind erosion from a landfill assuming that only a portion of the landfill would be active and the inactive portion would be controlled by covering or spraying on a regular basis. The Screening Assessment calculates emissions from the active portion of the landfill assuming a 40-year operating life of the landfill and daily, weekly, monthly, or annual control via covering or spraying of the inactive portions assuming 100% control. These assumptions are overly simplistic and fail to provide a worst-case scenario of fugitive dust emissions from wind erosion of fly ash at a landfill.

Covering the inactive portions of the landfill or spraying on a regular basis does not result in 100% control of fugitive dust emissions. For example, continuous chemical treating of material loaded onto piles, coupled with watering or treatment of roadways, has been estimated to reduce total particulate emissions by up to 90 percent.[27] The control efficiency of watering an exposed area before high winds has been estimated at 90%. Further, spraying with water is only effective as long as the surface material is sufficiently wetted: in dry climates or high wind conditions, watering during the operating hours of the landfill may be insufficient to control fugitive dust during the night and result in increasing emissions as the surface material dries out again. The efficiency of using dust suppressants or gravel has been estimated at 84%. For landfill covers, depending on the type and the timing of its application, control efficiencies may also be far lower than 100%. For example, the effect of revegetation on wind erosion has been estimated at only 90%.[28] Thus, the Screening Assessment underestimates emissions from the active portion of the landfill for its daily, weekly, monthly, and annual scenarios.

II.E Assumed Sizes of Active Portions of Landfill Are Unrealistic

For its controlled exposure scenarios, the Screening Assessment assumed that only a fraction of the CCW landfill would be exposed to wind erosion and the other remaining portion of the landfill would be controlled 100% assuming yearly, monthly, weekly, or daily control via spraying or covering over the landfill's useful life of 40 years. It was assumed that the exposed fraction of the landfill would be square and located in the center of the landfill. The Screening Assessment determined the following distributions of areas in square meters (m^2) and sides in meters (m) for the active portions of landfills:

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[27] U.S. Environmental Protection Agency, Compilation of Air Pollutant Emission Factors, 13.2.4 Aggregate Handling and Storage Piles, updated November 2006, p. 13.2.4-5.

[28] Western Governors' Association, WRAP Fugitive Dust Handbook, September 7, 2006, p. 3; http://www.wrapair.org/forums/dejf/fdh/content/FDHandbook_Rev_06.pdf.

	Yearly		Monthly		Weekly		Daily	
%ile	Area	Side	Area	Side	Area	Side	Area	Side
50th	6,728	82.0	561	23.7	129	11.4	18	4.3
60th	8,600	92.7	717	26.8	165	12.9	24	4.9
70th	12,282	110.8	1024	32.0	236	15.4	34	5.8
80th	21,084	145.2	1757	41.9	405	20.1	58	7.6
90th	30,109	173.5	2509	50.1	579	24.1	82	9.1

[29]

Review of these estimates shows that at least some of the exposure scenarios evaluated in the Screening Assessment are unrealistic. For example, the 50th and 90th percentiles for the sides of an active portion of the landfills assuming daily control are only 18 to 82 square meters (194 to 883 square feet) with side lengths of 4.3 to 9.1 meters (14 to 30 feet). An area of 18 square meters can basically be covered by unloading the contents of one haul truck onto a pile. Managing this pile would involve spreading and compacting the CCW, resulting in a larger active area than 18 square meters. Clearly, the areas considered in the Screening Assessment for daily cover are too small to be managed with heavy-duty equipment on site and are orders of magnitude smaller than what is typically managed as an active portion at CCW landfills even with daily controls. Thus, the Screening Assessment underestimates wind erosion from landfills. As discussed in Comment II.A, emissions from drop operations, entrained road dust and managing the CCW on site would by far exceed emissions from those small areas. Consequently, daily cover should definitively be recommended to minimize fugitive dust emissions and resulting risks to receptors.

II.F Assumption of Active Portion in Center of Landfill Does Not Constitute Worst Case Scenario

To simplify modeling, the Screening Assessment assumes that the operating or active portion is at the very center of the landfill to "give results that estimate an average concentration over the entire lifetime of the landfill for a receptor located in any direction."[30] This assumption, which would be acceptable for determining long-term impacts of fugitive dust emissions from the landfill, *e.g.*, for determining cancer risks over the lifetime of nearby receptors, is *not* sufficiently conservative as a worst-case scenario to determine whether fugitive dust emissions would lead to exceedances of short-term 24-hour ambient air quality standards. In order to assess short-term exceedances, the Screening Assessment should be revised to assume that the operating portion of the landfill is at the fence line closest to a potential receptor.

For example, landfill operators frequently fill in a portion of the landfill nearest to the fence line first before moving to the more central portions of the landfill. For example, at the Arrowhead Landfill in Perry County, AL, where over three million tons of fly ash from the 2008 Tennessee Valley Authority ("TVA") Kingston Plant fly ash pond spill are currently being

[29] Screening Assessment, Table 5, p. 8.

[30] Screening Assessment, p. 9.

disposed off, the landfill operator started unloading in an area nearest to residents, as shown in the photographs below. (Note the proximity of residences to the active (black) portion of the landfill. The dust and odor from this fly ash disposal were so noxious that nearby residents filed suit against the landfill owners.)

Figure 9: Arrowhead Landfill, AL, disposal of fly ash from TVA Kingston pond spill
Photo courtesy of John Wathen, Hurricane Creekkeeper, Waterkeeper Alliance

Figure 10: Arrowhead Landfill, AL, disposal of TVA fly ash waste
Photo courtesy of John Wathen, Hurricane Creekkeeper, Waterkeeper Alliance

Figure 11: Proximity of Arrowhead Landfill, AL, to residence
Courtesy: John Wathen, Hurricane Creekkeeper, Waterkeeper Alliance

Figure 12: Arrowhead Landfill, AL, TVA fly ash waste with remnants of plastic cover as seen from a resident's porch
Courtesy: John Wathen, Hurricane Creekkeeper, Waterkeeper Alliance

Thus, the risks of fugitive dust emissions from the landfill leading to violations of the 24-hour NAAQS for PM10 and PM2.5 should be based on the active portion of the landfill being at the fence line to the closest receptor.

III. Potential Human Health Risks from Fugitive Dust via Inhalation Pathway Have Not Been Adequately Assessed

As summarized above, the Screening Assessment limits its analysis to the incremental risks of human exposure to particulate emissions in excess of NAAQS resulting from dry handling of CCW at landfills. As such, it addresses neither background concentrations of particulate matter nor a constituent-based exposure pathway.[31] In addition, it ignores the substantial emissions of carcinogenic diesel particulate emissions from haul trucks, on-site landfill equipment, and diesel-powered pumps and generators.

Coal combustion waste consists of fly ash, bottom ash, boiler slag, flue gas desulfurization ("FGD") residues, and fluidized bed combustion ("FBC") wastes and contains varying levels of toxic constituents, including metals such as arsenic, lead, mercury, cadmium, chromium, selenium and varying levels of alkalinity and crystalline silica. Trace element content also varies with the individual types of CCWs from a single boiler. Fly ash in particular, tends to be enriched in arsenic, boron, mercury, and lead. Table 10 shows concentration data in various CCWs in parts per million ("ppm").

Table 10: Concentrations of trace elements in various CCWs

	Fly Ash (ppm)		Bottom Ash (ppm)		Boiler Slag (ppm)	
Constituent	Median	Range	Median	Range	Median	Range
Aluminum[a]	—	—	—	—	—	—
Antimony[b]	4.6	0.2-205	4.0	0.18-8.4	0.8	0.25-1.0
Arsenic[b]	43.4	0.0003-391.0	4.7	0.80-36.5	4.5	0.01-254
Barium[b]	806.5	0.02-10,850	633	24-9,630	413	6.19-1,720
Beryllium[b]	5.0	0.200-2,105	2.2	1.4-2.9	7.0	7.0-7.0
Boron[b]	311	2.98-2,050	90.0	1.79-390	49.5	0.10-55.0
Cadmium[b]	3.4	0.01-76.0	3.1	0.050-5.5	40.5	0.01-40.5
Chromium[c]	136	3.6-437	120	3.4-350	—	—
ChromiumVI[b]	90	0.19-651	121.0	3.41-4,710	158	1.43-5,981
Cobalt[c]	35.9	4.90-79.0	24	7.1-60.4	—	—
Copper[c]	112	0.20-655	61.1	2.39-146.3	32.0	1.37-156
Fluorine[c]	29.0	0.40-320	50.0	2.5-104	—	—
Iron[a]	—	—	—	—	—	—
Lead[b]	56.8	0.02-273	13.2	0.86-843.0	8.0	0.40-120
Manganese[c]	250	24.5-750	297	56.7-769	—	—
Mercury[b]	0.1	0.013-49.5	0.009	0003-0.040	9.5	0.016-9.5
Molybdenum[a]	—	—	—	—	—	—
Nickel[b]	77.6	0.1-1,270	79.6	1.9-1,267	83.0	3.3-177
Potassium[a]	—	—	—	—	—	—
Selenium[b]	7.7	0.0003-49.5	0.8	0.007-9.0	4.5	0.10-14.0
Silver[b]	3.2	0.01-49.5	3.0	0.06-7.1	37.0	0.01-74.0
Strontium[c]	775	30.0-3,855	800	170-1,800	—	—
Thallium[b]	9.0	0.15-85.0	na	2.0	38.5	33.5-40.0
Vanadium[b]	252	43.5-5,015	141	24.0-264	75.0	75.0-320.0
Zinc[b]	148	0.28-2,200	52.6	3.80-717	35.8	4.43-530

[31] Screening Assessment, p. 3.

Table 10 contd.: Concentrations of trace elements in various CCWs

FGD (ppm)		FBC: Fly Ash (ppm)		FBC: Bed Ash (ppm)	
Median	Range	Median	Range	Median	Range
—	—	42,300	20-88,900	18,000	9-68,800
6.0	3.65-90.0	7.75	0.125-259	10	0.125-361
32.5	0.0075-341.0	27.55	2.8-176	14.6	2.5-80
162.5	0.08-2,280	348	31.3-2,690	184	7.3-453
29.3	0.900-49.5	2.23	1.08-11.5	1.21	0.5-8
60.0	5.00-633	39.1	0.025-2,470	14.1	0.025-304
3.9	0.005-81.9	1.25	0.013-6.68	1.02	0.0125-7.16
—	—	44.8	5.17-97.1	37	4.1-86
73.0	0.17-312	—	—	—	—
—	—	19	2.5-79.8	11.3	1.4-75.8
46.1	0.04-251.0	41.1	2-99	13.8	1.65-37.1
—	—	—	—	—	—
—	—	25,300	22.2-76,500	11,100	6.2-19,300
25.3	0.01-527.0	25	1.03-105	12.5	0.848-58
—	—	165	0.05-548	241	52.2-751
4.8	0.073-39.0	0.323	0.00005-129	0.05	0.00005-16.2
—	—	6.25	2.35-48.6	14.7	6-63.4
68.1	3.7-191.0	41.4	6.25-923	22	1-945
—	—	3510	1.13-10,200	584	1.3-8,980
4.5	0.0150-162.0	8.36	0.47-166	0.952	0.152-45
3.3	0.01-10.3	1.03	0.05-11.6	1	0.05-87.6
—	—	—	—	—	—
9.0	9.0-9.0	3.28	1.25-39	3.03	0.5-25
65.0	0.01-302.0	194	36.4-3,830	69	12-5,240
90.9	0.01-5,070	38.5	25-143	34	17.4-399

From: National Research Council, Managing Coal Combustion Residues in Mines, 2006, p. 42; http://www.nap.edu/openbook.php?record_id=11592&page=42#, pp. 42 and 43.

EPA recently published total metal concentration ranges in CCWs, which for some constituents, *e.g.*, arsenic ("As") are higher than shown in Table 10.

Table 11: Total metals concentration in CCWs (ppm)

Constituent	Mean	Minimum	Maximum
Antimony	6.32	0.00125	3100
Arsenic	24.7	0.00394	773
Barium	246.75	0.002	7230
Beryllium	2.8	0.025	31
Cadmium	1.05	0.000115	760.25
Chromium	27.8	0.005	5970
Lead	25	0.0074	1453
Mercury	0.18	0.000035	384.2
Nickel	32	0.0025	54055
Selenium	2.4075	0.0002	673
Silver	0.6965	0	3800
Thallium	1.75	0.09	100

From: U.S. Environmental Protection Agency, 40 CFR Parts 257, 261, 264 et al., Hazardous and Solid Waste Management System; Identification and Listing of Special Wastes; Disposal of Coal Combustion Residuals From Electric Utilities; Proposed Rule, Fed. Reg. Vol. 75, No. 118, June 21, 2010, p. 35169

Risks from exposure to these hazardous materials, including cancer risks and chronic and acute health risks, must be assessed in order to adequately characterize human health risks resulting from dry handling of CCW. The Screening Assessment does not evaluate these risks, nor were they adequately assessed in other EPA documents.

In response to a comment by peer reviewer Dr. William Hopkins, Virginia Polytechnic Institute and State University, regarding the lack of inhalation risks in the 2009 Risk Assessment, the EPA referred the commenter to a 1998 human and ecological risk analysis (*Non-groundwater Pathways, Human Health and Ecological Risk Analysis for Fossil Fuel Combustion Phase 2*; hereafter "1998 Risk Analysis") that evaluated cancer and chronic risks via the inhalation pathway by modeling chronic exposures to constituents in airborne CCW erosion from landfills. However, that assessment did not evaluate acute exposures to particulates. The EPA stated that it conducted the Screening Assessment to correct this deficiency.[32] There are several problems with this approach.

First, the potential exceedance of NAAQS due to airborne particulate matter from CCW landfills evaluated in the Screening Assessment is not an adequate substitute for assessing acute risks from exposure to toxic constituents of particulate matter.

Second, the 1998 Risk Analysis analyzed emissions from an active portion in the center of the landfill. While acceptable for long-term analyses, *i.e.*, cancer and chronic health impacts, this assumption is not acceptable for assessing short-term acute impacts.

Third, the 1998 Risk Analysis analyzed only non-mercury metals associated with emissions of particulates. The major reason for not including mercury in the analysis was that the risk assessment methodology for mercury is much more complex than for other metal constituents and that the methodology was, at the time under review by EPA's Office of Research and Development.[33] Yet, emissions of mercury are of particular concern due to its toxicity and its accumulation in fly ash. Implementation of the Clean Air Mercury Rule will further increase mercury content in fly ash. For example: according to EPA's *Preamble to the National Emission Standards for Hazardous Air Pollutants from the Portland Cement Manufacturing Industry* published December 20, 2006, sorbent injection processes significantly increase the mercury content of fly ash. Testing to date reveals that mercury in fly ash increases by a median factor of 8.5 and, in one case, the mercury content increased by a factor of 70. At the same time, other contaminant in fly ash such as arsenic and selenium also increase also increase concurrently increasing risks to human health via inhalation of fugitive dust.[34]

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[32] U.S. Environmental Protection Agency, Responses to Review Comments on Human and Ecological Risk Assessment for Coal Combustion Wastes, Final Draft, September 1, 2009, pp. 41-42.

[33] *Ibid*, pp. 24 and 45.

[34] U.S. Environmental Protection Agency, National Emission Standards for Hazardous Air Pollutants from the Portland Cement Manufacturing Industry, Federal Register, Vol. 71, No. 244, December 20, 2006.

Fourth, the 1998 Risk Analysis did not analyze another fly ash component of concern, lime ("CaO"). This chemical reacts with water to form calcium hydroxide ("$Ca(OH)_2$"), giving fly ash a pH somewhere between 10 and 12, a medium to strong base. The presence of lime in fly ash can cause lung damage if present in sufficient quantities.[35]

Fifth, 1998 Risk Analysis did not analyze the presence of fine crystalline silica in fly ash which has been linked with lung damage, in particular silicosis. The Occupational Health and Safety Administration ("OSHA") allows a maximum concentration of crystalline silica in ambient air of 0.10 milligram per cubic meter ("mg/m^3").

The 1998 Risk analysis found incremental cancer risks from hexavalent chromium of 3.5 in one million, below the threshold of 10 in one million; all other contaminants did not have appreciable cancer risks, *i.e.*, incremental cancer risks were below one in one million. However, as mentioned above, this health risk assessment did not take into account mercury, crystalline silica, or diesel particulate matter emissions from haul trucks, landfill mobile equipment, and diesel-powered pumps and generators at the landfill. Thus, cancer risks can be assumed to be considerably higher than estimated by the 1998 Risk Analysis and may well exceed the 10 in one million cancer threshold.

The Screening Assessment should be revised and used as a companion document for an in-depth health risk assessment examining inhalation exposure to airborne particulate emissions associated with CCW landfill operations.

IV. Recommendations for Landfill Management

Based on the above discussion and the risks found by Screening Assessment for airborne fugitive dust emissions associated with dry handling of fly ash at CCW landfills, daily cover should be recommended for all landfills. In addition, enclosure, watering and the use of chemical wetting agents are recommended as the principal means for control of temporary emissions at the landfill. Watering is useful mainly to reduce emissions from vehicle traffic in the storage pile area. Watering of the storage piles themselves typically has only a very temporary slight effect on total emissions. A much more effective technique is to apply chemical agents (such as surfactants) that permit more extensive wetting. Continuous chemical treating of material loaded onto piles, coupled with watering or treatment of roadways, can reduce total particulate emissions from storage operations by up to 90 percent.[36]

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[35] National Research Council, Managing Coal Combustion Residues in Mines, 2006, p. 36.

[36] U.S. Environmental Protection Agency, Compilation of Air Pollutant Emission Factors, 13.2.4 Aggregate Handling and Storage Piles, updated November 2006, p. 13.2.4-5.

The following summarizes recommendations for landfill management:

- Cover active areas of landfill daily;
- Stabilize, cover, or water exposed CCW piles at landfill;
- Place windbreaks upwind of storage piles;
- Stabilize or water unpaved roads at landfill;
- Minimize CCW freefall distance from drop operations from trucks, conveyors, or loaders;
- Avoid overloading of onsite equipment.
- Keep two feet of freeboard on trucks and cover during transport; and
- Avoid trackout onto public streets by installing wheel washers.

Additional recommendations for dry handling of materials can be found in the Western Governors' Association's *WRAP Fugitive Dust Handbook*, which is in part based on EPA's AP-42.[37]

V. Typographical Errors

The following typographical errors in the Screening Assessment should be corrected:

- In Section 4.4, Controls Applied Daily, the Screening Assessment incorrectly refers to "*weekly* fugitive dust control," rather than "*daily* fugitive dust control."[38]
- In Section 5.0, Conclusions, the Screening Assessment concludes that "*even* the most conservative evaluation of daily dust controls led to particulate concentrations well below the NAAQS," instead of "*only* the most conservative evaluation..."[39]

[37] Western Governors' Association, WRAP Fugitive Dust Handbook, September 7, 2006; http://www.wrapair.org/forums/dejf/fdh/content/FDHandbook_Rev_06.pdf.

[38] Screening Assessment, p. 11.

[39] Screening Assessment, p. 11.

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REPRESENTATIVE EXPERIENCE

Air Quality and Pollution Control

Projects include CEQA/NEPA review; attainment and non-attainment new source review ("NSR"), prevention of significant deterioration ("PSD") and Title V permitting; control technology analyses (BACT, LAER, RACT, BARCT, BART, MACT); technology evaluations and cost-effectiveness analyses; criteria and toxic pollutant emission inventories; emission offsets; ambient and source monitoring; analysis of emissions estimates and ambient air pollutant concentration modeling. Some typical projects include:

- Critically reviewed and prepared technical comments on the air quality, biology, noise, water quality, and public health and safety sections of CEQA/NEPA documents for numerous

commercial, residential, and industrial projects (*e.g.*, power plants, airports, residential developments, retail developments, hospitals, refineries, slaughterhouses, asphalt plants, food processing facilities, printing facilities, quarries, and mines) and provided litigation support in a number of cases filed under CEQA.

- Critically reviewed and prepared technical comments on the air quality and public health sections of the Los Angeles Airport Master Plan (Draft, Supplement, and Final Environmental Impact Statement/Environmental Impact Report) for the City of El Segundo. Provided technical comments on the Draft and Final General Conformity Determination for the preferred alternative submitted to the Federal Aviation Administration.
- For several California refineries, evaluated compliance of fired sources with Bay Area Air Quality Management District Rule 9-10. This required evaluation and review of hundreds of source tests to determine if refinery-wide emission caps and compliance monitoring provisions were being met.
- Critically reviewed and prepared technical comments on Draft Title V permits for several refineries and other industrial facilities in California.
- Evaluated the public health impacts of locating big-box retail developments in densely populated areas in California and Hawaii. Monitored and evaluated impacts of diesel exhaust emissions and noise on surrounding residential communities.
- In conjunction with the permitting of several residential and commercial developments, conducted studies to determine baseline concentrations of diesel exhaust particulate matter using an aethalometer.
- For an Indiana steel mill, evaluated technology to control NOx and CO emissions from fired sources, including electric arc furnaces and reheat furnaces, to establish BACT. This required a comprehensive review of U.S. and European operating experience. The lowest emission levels were being achieved by steel mills using selective catalytic reduction ("SCR") and selective non-catalytic reduction ("SNCR") in Sweden and The Netherlands.
- For a California petroleum coke calciner, evaluated technology to control NOx, CO, VOCs, and PM10 emissions from the kiln and pyroscrubbers to establish BACT and LAER. This required a review of state and federal clearinghouses, working with regulatory agencies and pollution control vendors, and obtaining and reviewing permits and emissions data from other similar facilities. The best-controlled facilities were located in the South Coast Air Quality Management District.
- For a Kentucky coal-fired power plant, identified the lowest NOx levels that had been permitted and demonstrated in practice to establish BACT. Reviewed operating experience of European, Japanese, and U.S. facilities and evaluated continuous emission monitoring data. The lowest NOx levels had been permitted and achieved in Denmark and in the U.S. in Texas and New York.
- In support of efforts to lower the CO BACT level for power plant emissions, evaluated the contribution of CO emissions to tropospheric ozone formation and co-authored report on same.
- Critically reviewed and prepared technical comments on applications for certification ("AFCs") for numerous natural-gas fired, solar, biomass, and geothermal power plants in California permitted by the California Energy Commission. The comments addressed construction and operational emissions inventories and dispersion modeling, BACT

determinations for combustion turbine generators, fluidized bed combustors, diesel emergency generators, etc.

- Critically reviewed and prepared technical comments on draft PSD permits for several natural gas-fired power plants in California, Indiana, and Oregon. The comments addressed emission inventories, greenhouse gas emissions, BACT, case-by-case MACT, compliance monitoring, cost-effectiveness analyses, and enforceability of permit limits.
- For a California refinery, evaluated technology to control NOx and CO emissions from CO Boilers to establish RACT/BARCT to comply with BAAQMD Rule 9-10. This required a review of BACT/RACT/LAER clearinghouses, working with regulatory agencies across the U.S., and reviewing federal and state regulations and State Implementation Plans ("SIPs"). The lowest levels were required in a South Coast Air Quality Management District rule and in the Texas SIP.
- In support of several federal lawsuits filed under the federal Clean Air Act, prepared cost-effectiveness analyses for SCR and oxidation catalysts for simple cycle gas turbines and evaluated opacity data.
- Provided litigation support for a CEQA lawsuit addressing the pollution control equipment at a proposed biomass cogeneration plant.
- Prepared comments and provided litigation support on several proposed regulations including the Mojave Desert Air Quality Management District Rule 1406 (fugitive dust emission reduction credits for road paving); South Coast Air Quality Management District Rule 1316, San Joaquin Valley Air Pollution Control District Rule 2201, Antelope Valley Air Quality Management District Regulation XIII, and Mojave Desert Air Quality Management District Regulation XIII (implementation of December 2002 amendments to the federal Clean Air Act).
- Critically reviewed draft permits for several ethanol plants in California, Indiana, Ohio, and Illinois and prepared technical comments.
- Reviewed state-wide average emissions, state-of-the-art control devices, and emissions standards for construction equipment and developed recommendations for mitigation measures for numerous large construction projects.
- Researched sustainable building concepts and alternative energy and determined their feasibility for residential and commercial developments, *e.g.*, regional shopping malls and hospitals.
- Provided comprehensive environmental and regulatory services for an industrial laundry chain. Facilitated permit process with the South Coast Air Quality Management District. Developed test protocol for VOC emissions, conducted field tests, and used mass balance methods to estimate emissions. Reduced disposal costs for solvent-containing waste streams by identifying alternative disposal options. Performed health risk screening for air toxics emissions. Provided permitting support. Renegotiated sewer surcharges with wastewater treatment plant. Identified new customers for shop-towel recycling services.
- Designed computer model to predict performance of biological air pollution control (biofilters) as part of a collaborative technology assessment project, co-funded by several major chemical manufacturers. Experience using a wide range of environmental software, including air dispersion models, air emission modeling software, database programs, and geographic information systems ("GIS").

Water Quality and Pollution Control

Experience in water quality and pollution control, including surface water and ground water quality and supply studies, evaluating water and wastewater treatment technologies, and identifying, evaluating and implementing pollution controls. Some typical projects include:

- Evaluated impacts of on-shore oil drilling activities on large-scale coastal erosion in Nigeria.
- For a 500-MW combined-cycle power plant, prepared a study to evaluate the impact of proposed groundwater pumping on local water quality and supply, including a nearby stream, springs, and a spring-fed waterfall. The study was docketed with the California Energy Commission.
- For a 500-MW combined-cycle power plant, identified and evaluated methods to reduce water use and water quality impacts. These included the use of zero-liquid-discharge systems and alternative cooling technologies, including dry and parallel wet-dry cooling. Prepared cost analyses and evaluated impact of options on water resources. This work led to a settlement in which parallel wet dry cooling and a crystallizer were selected, replacing 100 percent groundwater pumping and wastewater disposal to evaporation ponds.
- For a homeowner's association, reviewed a California Coastal Commission staff report on the replacement of 12,000 linear feet of wooden bulkhead with PVC sheet pile armor. Researched and evaluated impact of proposed project on lagoon water quality, including sediment resuspension, potential leaching of additives and sealants, and long-term stability. Summarized results in technical report.

Applied Ecology, Industrial Ecology and Risk Assessment

Experience in applied ecology, industrial ecology and risk assessment, including human and ecological risk assessments, life cycle assessment, evaluation and licensing of new chemicals, and fate and transport studies of contaminants. Experienced in botanical, phytoplankton, and intertidal species identification and water chemistry analyses. Some typical projects include:

- Conducted technical, ecological, and economic assessments of product lines from agricultural fiber crops for European equipment manufacturer; co-authored proprietary client reports.
- Developed life cycle assessment methodology for industrial products, including agricultural fiber crops and mineral fibers; analyzed technical feasibility and markets for thermal insulation materials from natural plant fibers and conducted comparative life cycle assessments.
- For the California Coastal Conservancy, San Francisco Estuary Institute, Invasive Spartina Project, evaluated the potential use of a new aquatic pesticide for eradication of non-native, invasive cordgrass (*Spartina spp.*) species in the San Francisco Estuary with respect to water quality, biological resources, and human health and safety. Assisted staff in preparing an amendment to the Final EIR.
- Evaluated likelihood that organochlorine pesticide concentrations detected at a U.S. naval air station are residuals from past applications of these pesticides consistent with manufacturers' recommendations. Retained as expert witness in federal court case.
- Prepared human health risk assessments of air pollutant emissions from several industrial and commercial establishments, including power plants, refineries, and commercial laundries.

- Managed and conducted laboratory studies to license pesticides. This work included the evaluation of the adequacy and identification of deficiencies in existing physical/chemical and health effects data sets, initiating and supervising studies to fill data gaps, conducting environmental fate and transport studies, and QA/QC compliance at subcontractor laboratories. Prepared licensing applications and coordinated the registration process with German environmental protection agencies. This work led to regulatory approval of several pesticide applications in less than six months.
- Designed and implemented database on physical/chemical properties, environmental fate, and health impacts of pesticides for a major multi-national pesticide manufacturer.
- Designed and managed experimental toxicological study on potential interference of delta-9-tetrahydrocannabinol in food products with U.S. employee drug testing; co-authored peer-reviewed publication.
- Critically reviewed and prepared technical comments on applications for certification for several natural-gas fired, solar, and geothermal power plants and transmission lines in California permitted by the California Energy Commission. The comments addressed avian collisions and electrocution, construction and operational noise impacts on wildlife, risks from brine ponds, and impacts on endangered species.
- For a 180-MW geothermal power plant, evaluated the impacts of plant construction and operation on the fragile desert ecosystem in the Salton Sea area. This work included baseline noise monitoring and assessing the impact of noise, brine handling and disposal, and air emissions on local biota, public health, and welfare.
- Designed research protocols for a coastal ecological inventory; developed sampling methodologies, coordinated field sampling, determined species abundance and distribution in intertidal zone, and conducted statistical data analyses.
- Designed and conducted limnological study on effects of physical/chemical parameters on phytoplankton succession; performed water chemistry analyses and identified phytoplankton species; co-authored two journal articles on results.
- Organized and conducted surveying and mapping of aquatic plant species in several lakes and rivers in Sweden and Germany as ecological indicators for the health of limnological ecosystems.

PRO BONO ACTIVITIES

Founding member of "SecondAid," a non-profit organization providing tsunami relief for the recovery of small family businesses in Sri Lanka. (www.secondaid.org.)

PROFESSIONAL AFFILIATIONS

Association of Environmental Professionals

PUBLICATIONS

Available upon request

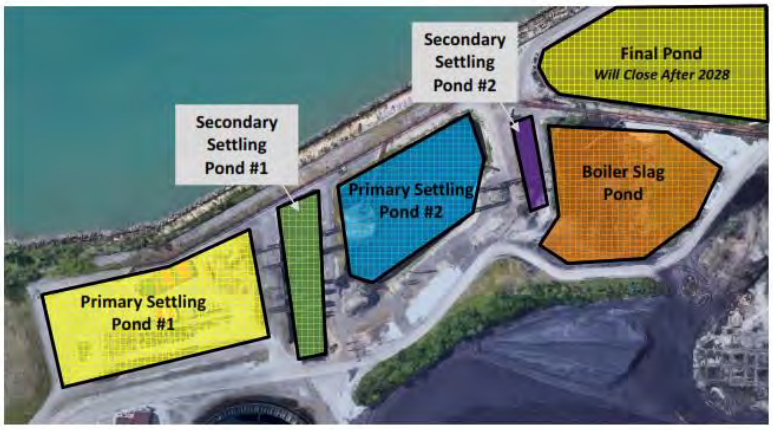
Exhibit 14

Comments on Fugitive Dust Management and Lack of Air Monitoring As Part of Coal-Ash Removal Project at NIPSCO Michigan City Generating Station (MCGS)

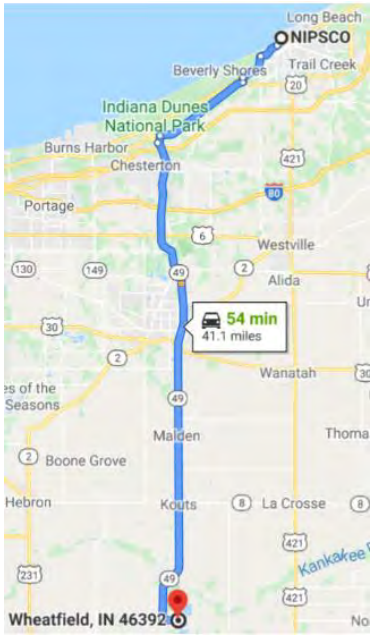
Introduction

NIPSCO plans to remove coal ash from five MCGS ponds shown in the figure below.

Estimated Area and Volumes	
Total Area	11.4 Acres
Ash Material	170,600 CY
Potential Beneficial Reuse	26,300 CY
Backfill Material	154,900 CY
Topsoil	9,200 CY



Per NIPSCO, ash will be beneficially reused or transported to a landfill at the RM Schahfer plant in Wheatfield, IN, roughly 41 miles away, per the route shown below.



Fugitive Dust Management

Given the nature of the activities, it should be assumed that dust (i.e., particulate matter (PM) of various sizes including PM10 and PM2.5) will be generated due to: ash removal from the ponds; processing after removal from the ponds such as drying to reduce moisture content; loadout onto haul trucks; during transportation; and during placement at the destination.

The only reference to any dust management in the closure documents is the following paragraph in Volume 1 of the Closure Application:

> Dust control will be a priority during the excavation performance as well as the CCR material transportation and former surface impoundment backfilling activities discussed in the following Closure Application sections. The contractor will be required to control and manage the dust throughout every phase of the project. The contractor will be required to meet the conditions of the MCGS's Air Quality Permit. A project specific Dust Control Plan will be one of the contractor's required submittals for performance of the excavation, transportation, and backfilling activities. This Dust Control Plan will be incorporated into NIPSCO's Annual CCR Fugitive Dust Control Plan.[1]

In addition, NIPSCO has prepared a document titled "Michigan City Generating Station Contractor Fugitive Dust Management Outline," whose purpose "is to describe how NIPSCO plans to manage fugitive dust during the Michigan City Generating Station (MCGS) Ash Pond Closure project." It is only an outline, however, and appears to provide direction to how a "Pond Closure Dust Management Plan" would be developed by the "civil contractor" for the project. Since it is not the plan itself but only an outline, it does not provide the necessary details to provide meaningful comments. As it stands, it is simply a conceptual document and the actual details of a fugitive dust plan, which will determine its effectiveness, are left to be developed by the contractor. As an outline, it is not enforceable because there are no quantitative targets nor required measures for how to achieve them – both being necessary elements of an effective plan.

While the elements of the plan, as noted in the outline are important, without far more detail they will not be effective since they are, at this point, just statements of purpose.

We provide below our initial comments on NIPSCO's outline of the future plan. The main outline elements are in italics followed by our comments.

[1] Wood, Surface Impoundment Closures (CCR Final Rule and RCRA Regulated), Closure Application, Volume 1 – Closure Plan and Drawings (Appendix A), December 18, 2018.

 Complete dust control is required at all times.

This is simply a "mission" statement, and it is not enforceable on its face.

 Provide sufficient water trucks for dust suppression at the project site. NIPSCO will have the right to direct the Civil Contractor to halt construction activities in the event of a dust suppression deficiency until the Civil Contractor addresses such deficiency.

"Sufficient" is not specific enough. The actual number of water trucks, their geographic responsibilities, the source of the water, as well as redundancies need to be specified. In the second sentence, since a "dust suppression deficiency" is not defined, it is too vague to be enforceable.

 Temporary stockpiles of material are to be monitored and covered with water as dust suppression or tarps as needed.

"Temporary" should be defined. How these will be "monitored" must also be specified.

 Considerations of what/how i.e., bed liners, leak-proof beds, sealed and locked tailgates, dog locks, covers/tarps, etc. the Civil Contractor proposes to use to prevent the CCR materials from spilling/leaking from the trucks during the hauling activity from MCGS to the landfill at RMSGS.

While this provides some good examples of what a leak-proof haul truck may need, it omits important additional aspects such as maintaining sufficient freeboard, minimizing vehicle speeds, how covers/tarps should be secured, etc. Again, more detail is required.[2]

o No vehicle shall be driven or moved on any public street, road, alley, highway, or other thoroughfare, unless such vehicle is so constructed as to prevent its contents from dripping, sifting, leaking, or otherwise escaping therefrom so as to create conditions which result in fugitive dust.

While this is an obviously desirable goal, how it will be implemented, detected, and therefore enforced is not discussed. Again, this is a "mission" statement.

o Fugitive dust emissions resulting from transportation of aggregate material by truck, front end loaders, or similar vehicles shall be controlled. Control measures may include one or more of the following:

 Tarping the vehicle.

[2] See, for example:

(i) Management approaches for Industrial Fugitive Dust Sources, Ontario, Canada, February 2017, available at https://www.ontario.ca/page/technical-bulletin-management-approaches-industrial-fugitive-dust-sources

(ii) City of Burbank, Fugitive Dust Control, available at https://www.burbankca.gov/home/showdocument?id=2874

 Maintaining the vehicle body in such a condition that prevents any leaks of liquid or aggregate material.

 Spraying the materials in the vehicle with a suitable and effective dust suppressant. All trucks moving aggregate material off-site must be tarped at a minimum.

 An alternate measure that provides equal or better control and approved by NIPSCO.

These are generic statements. Some don't make sense. For example how these methods will be used to control dust from front-end loaders is not clear since front-end loaders will presumably be used to move CCR waste in the ponds and possible also load the trucks. None of the options listed above would therefore apply as a practical matter. Terms such as "suitable and effective" and "equal or better" are too vague to be of any practical use.

o Fugitive dust emission resulting from activities involving CCR disposal shall be controlled. Control measures include the following:

 Hauling

 Wet suppression of the material being transported.

 Hauling the material covered.

 Minimizing the free fall distance when unloading from the particulate collection equipment and/or process equipment onto the hauling vehicle.

 An equivalent alternate measure that provides equal or better control and approved by NIPSCO.

 Unloading

 Applying water or suitable and effective chemical dust suppressant on an as needed basis to minimize visible emissions.

 Minimizing the free fall distance of the material.

 An equivalent alternate measure that provides equal or better control and approved by NIPSCO.

It is worth noting that "wet suppression" while desirable has to be carefully managed. Too much water added to the CCR will cause leaks in the trucks since it is almost impossible to maintain a liquid leak-free truck, especially if older trucks are allowed to be used. Bed liners are not perfect. "Minimizing" the free fall distance is vague. And, as noted earlier, "equal or better" is a meaningless comparison.

 Furnish a temporary truck wash system at MCGS and at RMSGS for use by the trucks before leaving each facility. The truck wash system will be a self-contained system to allow for better control of the washing, discharge of water, and accumulation of solids. The truck wash system should include a wheel wash with side curtains capable of containing the wash water within the unit.

A truck wash system is a conceptually good idea. However, its effectiveness depends entirely on its design and how it is used. Given that potentially many different types of haul trucks may be used to transport the CCR, without additional details, the effectiveness of the truck wash cannot be assessed at this time.

We also note that there is no discussion of pressure washing the sides of the truck so that materials that accumulate on the ledges and sides of the truck during loading at MCGG do not leave the site.

 Include GPS tracking equipment on the trucks used to haul the excavated CCR materials from MCGS to the landfill at NIPSCO RMSGS. Provide a submittal of the Civil Contractor's weekly reporting forms to ensure conformance with planned transportation routes.

Since the outline does not discuss the "planned" transportation routes and their appropriateness, the effectiveness of this measure is not clear.

 Include a procedure to address an abnormal visible dust event identified by NIPSCO's third party Dust Management Quality Assurance (DMQA) Contractor, NIPSCO, or the Civil Contractor.

NIPSCO intends to select a third-party DMQA as noted above and in the outline. However, this is not a substitute for actual air monitoring as discussed later in this document since it is presumed that this third-party effort will consist solely of periodic, visual, observations. PM2.5 is not typically visible to the eye. And, human observers cannot be present at all times at all activity areas. For example, NIPSCO states in the outline that this third-party contractor may "periodically" follow trucks along the route to ensure that no fugitive dust is released during hauling. But doing so "periodically" (and with notice) defeats the purpose since the contractor will undoubtedly make special efforts to be compliant during the known event. In addition, release of dust can occur when the site is not being actively worked, such as during a storm event at night. Detection of dust at such times may indicated the need for better ash storage practices, but this release would be missed if NIPSCO is entirely reliant on a third-party DMQA using visual monitoring on a periodic or occasional basis. Plus, a human observer cannot discern releases of PM2.5 during hauling simply by following a truck.

In summary, the outline provided by NIPSCO cannot be evaluated without substantially more detail that can only be included in the plan. This detail cannot be left to the contractor. NIPSCO should develop the plan and require the contractor to simply follow it. In addition, since the outline does not include any instrumented air monitoring, that is a significant deficiency. As noted above, simply hiring a third-party DMQA, as NIPSCO intends to do, does not substitute for actual air monitoring since the DMQA can only use visual means, at best, to determine the effectiveness of the dust suppression that is intended.

Air Monitoring

The discussion on dust management quoted above does not include any references to air monitoring. Ambient air monitoring is an essential aspect of any remediation project that has the potential to create PM/PM10/PM2.5 emissions that may affect not only the workers conducting the work but also members of the general public – at the sites themselves or during transportation.

The purpose of air monitoring is to ensure that the dust control approaches and techniques that will be used during remediation, transport, and placement are effective. Feedback from ambient air monitoring is often used to adjust or enhance dust control methods as needed.

A project-specific air monitoring plan should contain the following elements:

1. Scope – the plan should include baseline monitoring (i.e., pre-project monitoring) as well as monitoring during the project itself – for the entire expected duration of the project unless weather/precipitation events dictate that such monitoring can be suspended.

In addition, the monitoring should cover each aspect of the project including: activities at the MCGS, activities at RM Schahfer, and activities on the haul route, which passes through many areas where the public can be affected by dust released from the haul trucks.

2. Air Monitoring Strategy. The plan should clearly state the goals and objectives of the monitoring program and how they are to be achieved.

3. Pollutants. The monitoring should include continuous measurements for PM and PM2.5 as well as periodic sampling of metals and radionuclides (e.g., radium 226 and 226) from the dust collected in the PM monitors.

4. Monitoring Locations – The monitoring locations should include fixed and mobile monitors so that monitoring can be adjusted depending on the location of the activities. At least one or more fixed monitors should be located along the haul route to provide assurances that there is no dust entrainment when trucks pass through communities where the public can be exposed. As noted above, simply having a contractor follow a specific truck "periodically" is not sufficient to ensure that all haul trucks are properly cleaned, tarped, and therefore not releasing fugitive dust along the haul route. And, in addition to the actual pollutant monitors themselves, meteorological monitors should also be included at the MCGS and RM Schahfer locations, at a minimum.

By properly selecting the monitoring locations, false-positives can be avoided. For example, by having both upwind and downwind monitors (both of which can be moved, based on actual wind flow directions on any given day) across the working area, just the incremental dust from remediation activities can be measured, eliminating any other confounding factors. Similarly, for a fixed monitor located along the haul road, any impact from fugitive dust from a passing haul truck can be detected as a "spike" in the time history from such a monitor, if it is properly placed. If a haul truck passes and no (or an insignificant) increase of PM10/PM2.5 is detected then it can be assumed that the passing truck did not contribute to increased dust at the time of passage across the monitor. If, on the other hand, an increase or spike is observed at the time when a truck passes

the monitor, that is unambiguously attributable to the dust from the truck. These are examples where proper placement of the monitors will isolate just the dust from the remediation and hauling activities, avoiding any confounding impacts and false-positives.

5. Sampling Methods and Instruments. The monitoring plan should include details of the actual sampling methods and the instruments that will be used.

6. Sampling schedule. The frequency of analysis of the metals (suggested as monthly above) should be addressed.

7. Operational contingencies. The plan should address how weather conditions (i.e., wind speed) affects excavation, loading, hauling and disposal, and, in particular, when work must be temporarily halted due to weather conditions.

8. Placarding. The plan should describe how the haul trucks will be labeled to ensure first responders are aware of the hazardous nature of the material in the event of an accident or spill.

9. Worker training and protection. The plan should describe what training workers must receive prior to coal ash handling and transport and how workers will be protected from dust exposure.

10. Action Levels. The monitoring should discuss what constitutes an exceedance. For example, it is common to define an exceedance for PM as any increase greater than 50 ug/m3 between the upwind and downwind monitors. Similar levels should be defined for each of the pollutants, including metals.

11. Transparency. The monitoring plan should address how data will be disseminated to the Indiana Department of Environmental Management and to the public. In addition, the plan should discuss how exceedances of action levels will be addressed, including notices to the state and public.

12 . Finally, the monitoring should address quality assurance, notifications, and reporting obligations as well as defining the form of standard reports, etc.

An example of an air monitoring plan for a different project involving remediation of non-hazardous waste and transportation of the waste approximately three miles is provided in Attachment A. While the details will undoubtedly differ, the example simply shows what an air monitoring plan should include and the level of detail.

Attachment A – An Example of a Air Monitoring Plan for a Remediation Project

BMI COMMON AREAS
EASTSIDE DRY PONDS REMEDIATION

PHASE IIIB AIR MONITORING SUMMARY REPORT

Revision 1

Prepared for:

Basic Remediation COMPANY

HENDERSON, NEVADA

Prepared by:

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DECEMBER 30, 2009

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APPENDICES

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FIGURES

1.0 INTRODUCTION

Basic Remediation Company (BRC) retained Converse Consultants (Converse) and Tetra Tech EM Inc. (Tetra Tech) to complete a 5-month air sampling project to evaluate emissions resulting from the remediation (via excavation) of wastes from the dry ponds area (DPA) located in the Eastside area of the Basic Management Inc. (BMI) Common Areas located in Clark County, Nevada.[1] These ponds were located generally east of the sewer line alignment. This air sampling project is one phase of a 3-phased approach to evaluate air emissions from waste material hauling, dry/moisture-controlled pond excavations, and CAMU STA excavations. Reports on the other two phases – namely dealing with waste hauling across the haul road (Phase IIIA) and remediation activities at the Corrective Area Management Unit (CAMU) Slit Trench Area (Phase IIIC) have been submitted by BRC and approved by the Nevada Division of Environmental Protection (NDEP) previously.

Tetra Tech set up two temporary air-monitoring stations at the Eastside DPA and collected air samples over a 5-month period from January 6 through January 20 and again on July 3 through October 20, 2009. The 5-month period covered a substantial portion of the work associated with mass excavation and remediation of the Eastside DPA. Ambient samples at the downwind site BMI06 were collected over the entire sample period from January 6 through January 20 and July 3 through October 20, 2009. Ambient samples at the upwind site BMI11 were collected from January 6 through January 20, 2009. During the second phase of the IIIB monitoring from July 3 through October 20, 2009 ambient samples at the upwind site were collected from BMI08, which is approximately 800 feet west of BMI11. The upwind site location was changed due to safety and security reasons but still provided qualitative measurements for upwind samples, given that the bulk of the remediation activity moved from east to west during execution. Equipment was set up at each of the two stations to collect ambient air samples over a twenty-four hour (hr) period. In addition, meteorological data was collected during each sample event.

The sampling parameters were based on the BRC *Perimeter Air Monitoring Plan* (PAMP) (October 2008) and *Revised Draft BMI Complex Air Quality Monitoring Project – Phase III – Summary of Sampling Approach and Chemicals of Concern at Eastside and CAMU Areas* (Tetra Tech October 2008)

[1] Although the waste materials in the ponds were initially dry, BRC conducted appropriate pre-wetting of these ponds and implemented water management activities during remediation in order to minimize dust emissions and thereby meet its dust-control permit obligations. In a sense, the purpose of this air monitoring is to confirm that such dust-mitigation activities were effective.

reviewed and approved by the NDEP. Two identical air-sampling stations were constructed and the sampling equipment at each site of the two sites consisted of the following:

- Three identical polyurethane foam (PUF) hi-volume federal reference method (FRM) samplers designed to collect samples on three PUF cartridges for analysis of organic compounds contained in the U.S. Environmental Protection Agency (EPA) Compendium Methods TO-4, TO-9 and TO-13.
- One portable BGI PQ100 low-volume FRM (PQ100) sampler designed to collect samples on 47mm Teflon filters for analysis of total suspended particulate (TSP) and total metals contained in the U.S. EPA compendium methods IO-3.3 X-Ray Florescence.
- One SKC Model 224-PCXR8 (SKC) low-volume sample pump designed to collect samples on mixed cellulose ester (MCE) filters for analysis of asbestos using National Institute for Occupational Safety and Health (NIOSH) Method 7400 for phase contrast microscopy.
- One Honda EB 6500 gasoline-powered generators (or equivalent).

This report summarizes sample collection, analyses methodology, and analytical data collected between January 6 through January 20 and July 3 through October 20, 2009. The sampling approach, methodology, and summary of activities are presented in Section 2.0. The upwind/downwind analysis is presented in Section 3.0. The analytical data results and statistical analysis are presented in Section 4.0. Nevada Division of Environmental Protection comments and BRC responses to comments are provided in Appendix A; Field documentation forms are provided in Appendix B; calibration and sample volume calculation worksheets are provided in Appendix C; a CD containing laboratory analytical and electronic comprehensive validation reports, an electronic copy of the report and Table 3 is provided in Appendix D.

2.0 SAMPLING APPROACH

Based on the nature of the DPA excavations, one upwind and one downwind air monitoring station was identified in the Eastside DPA to collect air samples during the excavation of the dry, moisture-controlled management ponds. Each sample event included a 24-hour sample at each monitoring station collected twice per week. BMI06 downwind samples were collected from January 6 through January 20 and July 3 through October 20, 2009; BMI11 upwind samples were collected from January 6 through January 20, 2009; and BMI08 upwind samples were collected from July 3 through October 20, 2009.

2.1 SITE SELECTION AND LOCATIONS

Based on the prevailing wind direction, available ground space, and safe access at the Eastside DPA, BMI06 air monitoring station was placed to the north and BMI11 and BMI08 air monitoring stations were placed along the south side of the Eastside DPA. Sample sites BMI11 and BMI08 were located to represent potential upwind conditions while BMI06 was located to represent potential downwind conditions. The air monitoring station locations are provided in Figure 1.

2.2 SAMPLING EQUIPMENT CALIBRATION AND OPERATION

Tetra Tech assembled and calibrated the PUF, PQ100, and SKC air samplers prior to sample collection and after equipment had been serviced (battery changes). All samplers were calibrated using National Institute of Standards and Testing (NIST) or other authoritative reference certified equipment.

The initial calibrations on the PUF, BGI PQ100, and SKC samplers only required minor adjustments to set correct flow rates, but no major adjustments or equipment failures were observed. All equipment was checked again before sample collection began to ensure the correct flow rate(s) and timer operation.

Tetra Tech performed all calibrations according to EPA reference methods and all equipment was found to be within the calibration acceptance criteria prior to sample collection and equipment was operating within project goals. Equipment calibration worksheets are provided in Appendix B.

All PUF samplers were powered by portable gas-powered generators for each sample event. Samplers were set up and programmed at each station prior to sampling. Each station consisted of a sampling

platform and air samplers were secured to the platforms during the sample events. The sampling approach proposed by BRC and Tetra Tech and approved by NDEP was to collect 24-hr samples twice per week over a four month period during site excavation operations. It must be noted that a percentage of the PUF samplers ran for less than 24 hours.

All Phase IIIB samples collected and analyzed at each Dry Pond air monitoring station using EPA Methods TO-4, TO-9, and TO-13 were achieved using a portable on-site generator which had intermittent shutdowns and required refueling at least twice per sample event. The generator run-time varied for each sample event depending on ambient temperature and wind conditions. The generators were difficult to keep running continuously and had intermittent shutdowns due to motor stalling and wind gusts. In addition, each generator had to be refilled between 12-2 AM and again between 6-8AM. Each refilling took approximately 10 minutes.

The BMI Field team was instructed to collect samples for a 24-hour period based on the time run indicator on the battery-powered TSP/metals sampler. Therefore the TO-4, TO-9, and TO-13 samples were in most cases collected for slightly less than an actual 24-hour period.

Even though sample durations were less than 24-hours, the sample results were valid for the exposure period and represent an emission profile while work was being conducted. If a generator lost power, the TO-4, TO-9, and TO-13 sample would temporarily lose power and start back up when the generator began running again. Sample concentrations were not diluted or inherently decreased by a slightly shortened sample period. Furthermore, if emissions from site activities were occurring, they would be captured by the air monitoring stations. If PUF samplers lost power during a sample event, it was usually between 4 – 6 AM.

The first sample event occurred on January 6, 2009 and sampling continued through January 20, 2009, after which the equipment was relocated to the CAMU Slit Trench Area. The sampling resumed on July 3, 2009 and continued through October 20, 2009. All sample parameters were documented on BMI Site field documentation forms before and after each sample event. In total, 35 sample events were completed on the following dates:

- January 6, 9, 13, 16, 20, 2009
- July 3, 7, 10, 14, 17, 21, 24, 28, 31, 2009

- August 4, 7, 11, 14, 18, 21, 25, 2009
- September 2, 4, 11, 15, 18, 22, 25, 29, 2009
- October 2, 6, 9, 13, 16, 20, 2009

2.3 SAMPLE NOMENCLATURE

All samples collected at the Eastside DPA were given a sample ID according to the sample location and sample date as follows:

- BMI06-012009 (where BMI denotes site location, 06 denotes site #06 and 012009 denotes that sample was collected on January 20, 2009).

This sample nomenclature was used for all samples collected at the Eastside DPA and allows the reader to easily identify the location and date of the sample collection parameters.

2.4 SAMPLE PARAMETERS

Air samples were collected at the established monitoring stations for the analysis of site related chemicals including organochlorine pesticides, Polychlorinated Dibenzo-p-dioxins (PCDDs), Polychlorinated Dibenzo-p-furans (PCDFs), Polychlorinated biphenyls (PCBs), VOCs/SVOCs, TSP, metals, and asbestos fibers. Upon completion of each sample event, the samples and associated information was recorded on chain-of-custody (COC) sheets and submitted to the respective laboratories for analysis. The COC included the sample identification number, sample location, sample time, beginning and ending flow rate (to calculate sample volume) and the required analysis. For all samples collected at the Eastside DPA field blanks were collected on a frequency of 10 percent (one in 10 samples) for quality control purposes. The sampling and analysis procedures are summarized below. In addition, a summary of sample collection, sample handling, and analysis specifications procedures is provided in Table 1.

2.4.1 ORGANIC COMPOUNDS

At each sampling location, three PUF samplers were used to collect PUF samples for the analysis of organochlorine pesticides, PCDDs, PCDFs, PCBs, and VOCs/SVOCs using EPA Compendium Methods TO-4, TO-9, and TO-13. The PUF samplers draw approximately 0.2 standard cubic meters per minute of ambient air onto a 102 millimeter (mm) diameter quartz glass filter followed by a polyurethane foam plug and XAD resin contained in a glass cartridge. The actual sample rate varied based on sampler calibration, ambient temperature and pressure, and filter loading during the sample event, but sample flow rates were

within manufacturer's specifications. The TO-9 and TO-13 samples were analyzed using gas chromatography and mass spectrometry (GC/MS) and the TO-4 samples were analyzed using GC/Multi-Detector Detection (GC/MD). All PUF (organic) samples were submitted with COC form(s) to Air Toxics Ltd. Laboratory and Frontier Ltd. Laboratory for analysis. A summary of sample collection, sample handling, and analysis specifications procedures is provided in Table 1. All PUF sampler calibration and sample volume calculation spreadsheets have been provided in Appendix B.

2.4.2 TOTAL SUSPE NDED PARTICULATE MATTER AND METALS

At each sampling location, one PQ100 sampler was used to collect samples for TSP and metals. The PQ100 sampler draws approximately 0.0167 cubic meters per minute (approximately 24 total cubic meters) of ambient air onto the filter media. The TSP and metals samples were collected using 47 mm Teflon filter media and analyzed using USEPA Compendium Method IO-2.1 (gravimetric analysis). The TSP samples underwent additional analysis for metals using USEPA Compendium Method IO-3.3 X-Ray Fluorescence (Protocol number 6). All TSP and metals samples were submitted with COC form(s) to Chester Labnet Laboratory for analysis. A summary of sample collection, sample handling, and analysis specifications procedures is provided in Table 1.

2.4.3 ASBESTOS

At each sampling location, one SKC low volume sampler was used to collect samples for asbestos analysis using NIOSH Method 7400. The sampling system consisted of a low-flow pump attached to a 25-millimeter MCE filter. The SKC samplers draw approximately 1 liter per minute (lpm) (approximately 720 total liters) of ambient air onto the MCE filter. The samples were analyzed using NIOSH Method 7400 (Phase Contrast Light Microscopy). All asbestos samples were submitted with COC form(s) to AESL Laboratory for analysis. A summary of sample collection, sample handling, and analysis specifications procedures is provided in Table 1.

2.5 SIGNIFICANT SITE-RELATED EVENTS AND SAMPLING ANOMALIES

During the process of the Eastside DPA excavations, the following sampling anomalies were reported by Tetra Tech personnel and documented on field documentation sheets:

- The generator at BMI11 was stolen sometime during the weekend of January 10. An immediate replacement was unavailable from the rental company; therefore no sample was collected from BMI11 for the sample event on January 13, 2009.

- The TO-4 sample for BMI08 was not collected on August 7, 2009 due to a sample cartridge malfunction. The cartridge had slipped and became lodged in the unit.

- During the August 14, 2009 sample event, Tetra Tech field personnel were unable to access BMI06 as someone had incorrectly locked the gate bypassing Tetra Tech's padlock; Site personnel were unavailable to assist with unlocking the gate.

- The TO-13 sample for BMI08 was not collected on September 18, 2009 due to another sample cartridge malfunction.

- The generator at BMI08 was stolen sometime during the weekend of September 27. An immediate replacement was unavailable from the rental company; therefore no sample was collected from BMI08 for the sample event on September 29, 2009.

- The TO-9 sample for BMI06 was not collected on October 13, 2009 due to a sample shipment error from the laboratory.

- During the last sample event on October 20, 2009 the entire BMI remediation operation was shut down due to hazardous high wind conditions with winds gusting to over 30 mph.

3.0 UPWIND AND DOWN WIND ANALYSIS

Based on discussions with the NDEP and its consultants, Tetra Tech developed an approach for the assessment of upwind versus downwind air quality monitoring data collected during this air sampling project at the Eastside Site. The objective of the upwind/downwind evaluation was to evaluate if the DPA excavation operations contributed to the degradation of the existing air quality in the vicinity of the work area. This analysis was performed with a meteorological dataset of thirty-five sample events. Table 2 represents meteorological conditions measured during Eastside DPA sampling from January 6 through January 20, 2009 and July 3 through October 20, 2009.

3.1 METEOROLOGICAL DATA SUMMARY

The upwind/downwind evaluation was conducted using meteorological data and on-site data collected at sites BMI06, BMI08 and BMI11. Meteorological data including wind speed and direction were measured continuously at the on-site meteorological monitoring station operated by Tetra Tech near the Eastside entrance gate.

3.2 APPROACH

The general approach for conducting the upwind/downwind evaluation consists of the following steps:

- Determine predominant wind directions
- Assign upwind/downwind stations
- Compare upwind/downwind results
- Determine those air sample results that exceeded either the RBC or PRG screening criteria
- Conduct a statistical analysis

3.3 DETERMINE PREDOMINANT WIND DIRECTION

If the wind is variable, assigning a predominant wind direction may be subject to qualitative interpretations. Tetra Tech defined predominant wind direction based on the average wind direction as follows:

- The average wind direction occurred in the following five quadrants: South, southeast, southwest, west, and northeast

3.4 ASSIGN UPWIND/DOWNWIND STATIONS

Meteorological data was recorded for the duration of the 5-month sample event and the prevailing wind direction was generally from the southwest or the southeast. Two events were inconclusive with respect to upwind/downwind determination as average wind directions were out of the west and northeast. A summary of meteorological data during the sample events is presented in Table 2.

3.5 COMPARE UPWIND/DOWNWIND RESULTS

To meet project objectives the upwind concentrations of chemical constituents were compared to their corresponding downwind concentrations using two methods: 1) difference in concentration (in µg/m3), and 2) a matched-pairs design and resulting difference in concentration.

4.0 ANALYTICAL RESULTS

The air quality sample data collected at the Eastside DPA locations contains a wide range of chemical compounds as discussed earlier. All sample data was compared to EPA Region 3 risk-based concentrations (RBC) table (April 2006), EPA Region 9 preliminary remediation goals (PRG) table (October 2004), and EPA Region 6 human health medium-specific screening levels (MSSL) table (March 2008) to determine if ambient concentrations exceeded criteria. In most cases the RBC, PRG, and MSSL concentration values were either identical or very close.

The sample results demonstrate that a majority of organic (PUF) compounds were detected in measurable concentrations in ambient air at the Eastside locations. However, the majority of organic compounds did not exceed the RBC, PRG, or MSSL screening criteria. The compounds detected have been further evaluated. In addition, TSP, metals, and airborne fibers were detected.

A statistical analysis was completed for selected chemicals found in upwind and down samples using a matched-pairs design. Differences in chemical concentration (upwind-downwind) were evaluated for samples that had a valid ambient concentration for both the upwind and downwind sample.

A summary of laboratory and statistical analytical results for each subset of chemical compounds is provided below.

4.1 TSP AND METALS RESULTS

TSP was detected in all samples and concentrations ranged from 3.5 $\mu g/m^3$ to 117.4 $\mu g/m^3$. The average concentration was 19.8$\mu g/m^3$. No screening criteria or federal standards currently exist for TSP. A statistical analysis of the difference between 33 upwind BMI11 and BMI08 samples and 33 downwind BMI06samples demonstrated that there was no statistical increase at the downwind locations. A complete summary and statistical analysis of all TSP results are presented in Table 3 (Excel file on CD) Table 4, Figure 2, and Section 4.4.

Metals were detected in a majority of the TSP samples and concentrations were reported with an uncertainty of plus/minus 3 standard deviations. The XRF detection method identifies concentrations in extremely low concentration ranges (of less than 0.001 $\mu g/m^3$). The results were compared to the RBC,

PRG, and MSSL screening criterion (of those available) and four metals exceeded these criteria: Manganese, Cobalt, Arsenic, and Cadmium. It should be noted that these are the same metals detected during initial background (Phase I) air sampling.

Manganese concentrations ranged from 0.0018 µg/m^3 to 0.1611 µg/m^3 and the average concentration was 0.0448 µg/m^3. The Manganese PRG and MMSL of 0.051 µg/m^3 (RBC of 0.052 µg/m^3) was exceeded by 30 samples**.** 15 of these samples were collected at the upwind sites BMI11 and BMI08 and 15 samples were collected the downwind site BMI06. A statistical analysis of the difference between 33 upwind samples and 33 downwind samples demonstrated that there was no statistical increase in Manganese from upwind to downwind.

Cobalt concentrations ranged from 0.0003 µg/m^3 to 0.0043 µg/m^3 and the average concentration was 0.0014µg/m^3. The Cobalt PRG and MSSL of 0.001 µg/m^3 was exceeded by seven samples. Three of these samples were collected at upwind site BMI11 and BMI08 and four of these samples were collected at downwind site BMI06. A statistical analysis of Cobalt concentrations was not feasible due to the limited number of matched pairs between the upwind samples and downwind samples. However, the average Cobalt concentration increase (in µg/m^3) from upwind to downwind was actually a decrease of -0.00036 µg/m^3. It must be noted that this data set represents a significant decrease in Cobalt detections from the earlier Phase I sampling.

Arsenic concentrations ranged from 0.0001 µg/m^3 to 0.058 µg/m^3 and the average concentration was 0.0012 µg/m^3. The Arsenic PRG of 0.0004 µg/m^3, RBC of 0.00041 µg/m^3, and MSSL of 0.00045 µg/m^3 was exceeded by 33 samples. 16 of these samples were collected at the upwind sites BMI11 and BMI08 and 17 samples were collected the downwind site BMI06. A statistical analysis of the difference between 33 upwind samples and 33 downwind samples demonstrated that there was no statistical increase in Arsenic from upwind to downwind.

Cadmium concentrations ranged from 0.0005 µg/m^3 to 0.0066 µg/m^3 and the average concentration was 0.0031 µg/m^3. The Cadmium RBC of 0.001 µg/m^3 and PRG/MSSL of 0.001 µg/m^3 were exceeded by 53 samples. 27 of these samples were collected at the upwind sites BMI11 and BMI08 and 26 samples were collected the downwind site BMI06. A statistical analysis of the difference between 30 upwind samples and 30 downwind samples demonstrated that there was no statistical increase in Cadmium from upwind to downwind.

It must be noted that a majority of the Manganese, Cobalt, Arsenic, and Cadmium concentrations were reported at less than three times the XRF analytical uncertainty and have been so flagged. Given the lack of a distinct pattern or difference in upwind versus downwind concentrations it does not appear that remediation activities at the Eastside DPA negatively impacted air quality with respect to these and other metals concentrations.

While it can be argued that the upwind monitors are not entirely upwind all of the time and the downwind monitors are not downwind all of the time, the distinct lack of overall (average) differences between these two sets of ambient concentrations across multiple chemicals demonstrates a high level of consistency. If in fact, the excavation work had been the source of air emissions, a distinct pattern of higher downwind (or upwind) concentrations would have been observed, for many chemicals. Furthermore, Manganese, Cobalt, Arsenic, and Cadmium were present in the initial upwind Phase I samples and have been consistently detected in upwind samples throughout the entirety of this air monitoring project. In addition, Manganese, Cobalt, Arsenic, and Cadmium concentrations were detected at the BMI Plant Site upwind air monitoring station at Basic Water Company reservoirs, approximately 1 mile southeast of the BMI industrial complex. This presents an argument that these metals are present throughout the Henderson area and are part of the area-wide background pollutants. A complete summary and statistical analysis of metals results are presented in Table 3 (Excel file on CD), Table 4, Figure 2, and Section 4.4.

4.2 ORGANIC COMPOUND RESULTS

Six out of 27 Organochlorine pesticides (TO-4) chemical compounds were detected above laboratory detection limits and included alpha-BHC, beta-BHC, gamma-BHC (Lindane), 4,4'-DDE, 4,4'-DDT, and Endosulfan I.

Alpha-BHC concentrations ranged from 0.0005 µg/m^3 to 0.0042 µg/m^3 and the average concentration was 0.0011 µg/m^3. The alpha-BHC RBC and PRG/MSSL of 0.001 µg/m^3 was exceeded by five samples. One of these samples were collected at the upwind site BMI08 and BMI11 and 4 samples were collected the downwind site BMI06. A statistical analysis of the difference between five upwind samples and five downwind samples demonstrated that there was no statistical increase in alpha-BHC from upwind to downwind.

Beta-BHC concentrations ranged from 0.00096 µg/m^3 to 0.0015 µg/m^3 and the average concentration was 0.0012 µg/m^3. The beta-BHC RBC of 0.0035 µg/m^3 was not exceeded by any sample. Over the course of the 5-month monitoring beta-BHC was only detected on ten samples. Eight of those detection occurred during July, one in September, and one in October. Of the eight detections in July, four occurred at the upwind BMI08 site and four occurred at the downwind BMI06 site. Based on this limited data set no conclusive determinations can be made. However, the average beta-BHC concentration increase (in µg/m^3) from upwind to downwind was 0.00005 µg/m^3.

Gamma-BHC was only detected during one sample event on July 24, 2009 at both the upwind BMI08 and downwind BMI06 locations. Both samples had a concentration of 0.00096 µg/m^3. The gamma-BHC RBC of 0.0048 µg/m^3 was not exceeded by either sample.

4-4'-DDE concentrations ranged from 0.00032 µg/m^3 to 0.0034 µg/m^3 and the average concentration was 0.0011 µg/m^3. The 4-4'-DDE PRG/MSSL of 0.02 µg/m^3 was not exceeded by any samples. A total of eighteen detections occurred at the upwind sites BMI11 and BMI08 and 25 detections occurred at the downwind site BMI06. A statistical analysis of the difference between 13 upwind samples and 13 downwind samples demonstrated that there was a statistical increase in 4,4'-DDE from upwind to downwind. This is further discussed in the Section 4.4. However, no health-based screening criteria were exceeded by the 4-4'-DDE concentrations.

4,4'-DDT was only detected during one sample event on September 2, 2009 at the downwind site BMI06 with a concentration of 0.00057 µg/m^3. The 4,4'-DDT PRG/MSSL of 0.02 µg/m^3 was not exceeded by the sample.

Endosulfan I was only detected during two sample events during July 2009. The first event occurred on July 3, 2009 at upwind site BMI-08 with a concentration of 0.00044 µg/m^3. The second event occurred on July 31, 2009 at the upwind site BMI-08 and downwind site BMI06 with concentrations of 0.001 µg/m^3 and 0.00098 µg/m^3, respectively. The Endosulfan I PRG/MSSL is 22.0 µg/m^3 was not exceeded by any of the three samples. In fact, results were far smaller than the PRG/MSSL.

25 PCDDs/PCDFS (TO-9) chemical compounds were detected above laboratory detection limits, ranging from 0.005 picograms (pg)/m^3 (0.000000005 µg/m^3) to 43.7 pg/m^3 (0.0000437µg/m^3). The total toxic equivalent value (TEQ) was calculated from toxicity equivalence factors (World Health Organization

2005) for each of the upwind and downwind samples and compared to the 2,3,7,8-TCDD screening value of 0.045 pg/m^3. Consistent with previous sampling results at the Eastside Area, All 68 TO-9 samples with a calculated TEQ were above this screening value. In addition, one PCDD/PCDF exceeded the MSSL screening criteria and included 2,3,7,8-TCDD.

The upwind versus downwind statistical analysis completed for the PCDDs/PCDFS data does not appears to show any upwind/downwind trends with the exception of the sample events on September 25 and 29, 2009. Elevated PCDDs/PCDFS concentrations were detected during these sample events. The upwind and downwind TEQ concentrations on September 25 were 0.299 and 1.542 pg/m^3, respectively. This represents a TEQ increase of 1.243 pg/m^3. The exact cause of the September 25 increase could not be identified. The downwind concentration on September 29 was 0.598. Unfortunately, no upwind sample was collected on this date due to a stolen generator (as described in Section 2.5) so a comparison to an upwind concentration cannot be completed for the September 29 sample event.

2,3,7,8-TCDD concentrations ranged from 0.0043 pg/m^3 to 0.135 pg/m^3 and the average concentration was 0.020 pg/m^3. The 2,3,7,8-TCDD PRG and MSSL of 0.045 pg/m^3 was exceeded by 4 samples. Two of these samples were collected at the upwind site BMI08 and two samples were collected at the downwind site BMI06. It should be noted that all 4 exceedances occurred between September 25 and October 20, 2009. A statistical analysis of the difference between 28 upwind samples and 28 downwind samples demonstrated that there was no statistical increase in 2,3,7,8-TCDD from upwind to downwind.

Tetra Tech inquired into site activities on September 25 and 29, 2009 but there were no unusual events that occurred that could explain the elevated dioxin concentrations on these days. A complete summary and statistical analysis of PCDDs/PCDFS (TO-9) chemical compounds results are presented in Table 3 (Excel file on CD), Table 4, Figure 2, and Section 4.4.

Twenty-six VOCs/SVOCs (TO-13) chemical compounds were detected above laboratory detection limits. Of the twenty-six detected compounds, only three exceeded RBC, PRG, or MSSL screening criteria. These are Hexachlorobenzene, N-Nitroso-di-n-propylamine, Benzo(a)anthracene.

Hexachlorobenzene concentrations ranged from 0.0045 µg/m^3 to 0.100 µg/m^3 and the average concentration was 0.0208 µg/m^3. The Hexachlorobenzene RBC and PRG/MSSL of 0.004 µg/m^3 was exceeded by 47 samples. 15 of these samples were collected at the upwind sites BMI11 and BMI08 and

32 samples were collected the downwind site BMI06. A statistical analysis of the difference between 14 upwind samples and 14 downwind samples demonstrated that there was no statistical increase in Hexachlorobenzene from upwind to downwind.

N-Nitroso-di-n-propylamine was only detected during one sample event on July 17, 2009 at the upwind site BMI-08 with a concentration of 0.054 µg/m^3. The N-Nitroso-di-n-propylamine RBC of 0.0009 µg/m^3 was exceeded by this single sample.

Benzo(a)anthracene was also only detected during one sample event on July 17, 2009 at the upwind site BMI-08 with a concentration of 0.12 µg/m^3. The Benzo(a)anthracene MSSL of 0.007 µg/m^3 was exceeded by this one sample.

As such, given the lack of detection of the majority of VOC/SVOC compounds above their respective RBC, PRG or MSSL values and the lack of a distinct upwind/downwind relationship for the hexachlorobenzene detections and the sporadic (single sample) detections of only two other compounds discussed above, there does not appear to be an issue with VOC/SVOC compounds at the site.

A complete summary and statistical analysis of all VOCs/SVOCs (TO-13) chemical compounds results are presented in Table 3 (Excel file on CD), Table 4, Figure 2, and Section 4.4.

4.3 ASBESTOS RESULTS

The asbestos samples were analyzed using NIOSH Method 7400 PCM. The PCM method gives a number index of airborne fibers. It is primarily used for estimating asbestos concentrations, though PCM does not differentiate between asbestos and other fibers. Asbestos fibers include chrysotile, cummingtonite-grunerite asbestos (amosite), anthophyllite asbestos, tremolite asbestos, crocidolite, and actinolite asbestos and any of these minerals which have been chemically treated or altered. The precise chemical formulation of each species varies with the location from which it was mined. Therefore, the use of PCM is a generally accepted method for screening airborne fibers. The Occupational Safety and Health Administration (OSHA) has set an exposure limit of 0.1 fiber per cubic centimeter (cc) of air as an 8-hour time-weighted average (TWA) and a limit of 1.0 fiber per cc averaged over a sampling period of thirty (30) minutes.

The asbestos samples ranged in concentration from 0.0006 fibers per cc to 0.0055 fibers per cc and the average concentration was 0.0014 fibers per cc. The OSHA TWA limit of 0.1 fibers per cc was not exceeded in any samples and asbestos concentrations at the off site locations were consistent with asbestos concentrations during the background Phase I sampling. A complete summary of all asbestos results are presented in Table 3 (Excel file on CD).

4.4 STATISTICAL COMPARISON OF UPWIND AND DOWNWIND CONCENTRATIONS

Concentrations of selected chemicals in upwind and downwind samples were compared using a matched-pairs design. Differences in chemical concentration (upwind-downwind) were evaluated for samples collected during 33 sample events between January 6, 2009 and October 20, 2009.

Both parametric (t-test) and nonparametric (Wilcoxon signed-rank test or Fong's modified sign test) paired difference tests were used to determine whether concentrations were statistically significantly higher in the downwind group of samples. All tests were conducted using the JMP 7 (version 7.0.2) statistical software package (SAS Institute) and followed methods described in Helsel (2005), Zar (1996), and Fong et al. (2003). All tests evaluated the following one-sided null (H0) and alternative (HA) hypotheses:

H0: downwind concentrations < upwind concentrations
HA: downwind concentrations > upwind concentrations

A 5 percent ($p < 0.05$) level of significance (i.e., equivalent to a 95 percent confidence level) was used to interpret the test results. Test selection depended on the detection status of the paired results for each sampling event. Testing was only conducted for chemicals with results for at least five sampling events.

For chemicals where all pairs of results were detected, both the paired-difference t-test and Wilcoxon signed-rank test were conducted. These paired-difference tests test whether the overall mean (or median in the case of the nonparametric test) difference for all matched pairs of samples is zero. That is, some differences (upwind-downwind) may be positive (indicating the higher result is from the upwind sample) and some may be negative (indicating the higher result is from the downwind sample), but if there is no net difference between pairs the mean difference will be zero (or not distinguishable from zero within the context of the statistical tests).

The paired-difference t-test and Wilcoxon signed-rank tests are only strictly appropriate when all of the analytical results are detected (Helsel 2005). When censored (i.e., results below the detection limit [BDL] or results set to a fixed reporting limit) results are present, specialized versions of both the parametric (e.g., maximum likelihood estimation) and nonparametric (e.g., paired Prentice-Wilcoxon test, modified sign test) tests that explicitly account for varying frequencies of censored data are recommended.

Fong's modified sign test (Helsel 2005, Fong et al. 2003) was used in the present analysis for all chemicals with one or more censored results in the data for at least one sampling event. The sign test calculates the number of differences (upwind-downwind) that are greater than and lesser than zero, and determines whether the departure from zero is statistically significant. Fong's version of the sign test includes a modification to account for ties (i.e., the upwind and downwind results are equal), which are ignored in the standard version of the test. Fong's sign test was implemented using the R-language algorithm (translated to a script for use in JMP) presented in Huston and Juarez-Colunga (2009). Huston and Juarez-Colunga (2009) discuss the technique for coding paired differences for censored data as interval estimates, as well as the approach in Fong et al. (2003) for treating ties.

Metals results reported by the analytical laboratory as zero were set to a concentration equal to one standard deviation, as established by the laboratory. Because the treatment of results reported as zero constitutes another form of censorship, these results were treated as censored in the statistical analysis. Otherwise this assumption would automatically create an unnecessary bias that will skew the data.

Results below the detection limit were reported as BDL, rather than at a fixed, numeric detection limit due to the variability in air sampling equipment volumetric flow rates. This slight variability could unnecessarily skew the statistical analysis for matched pair samples reported as below detection limit (BDL). All events where BDL was reported for at least one result were also excluded from analysis. It should be noted that exclusion of this data represents a loss of information; therefore, the results for chemicals with a high proportion of excluded events may be less reliable and should be interpreted with caution.

Results of the statistical comparisons for 65 chemicals are summarized in Table 4. The raw output from the JMP software is provided in Figure 2. The conclusions presented in Table 4 are based on the most sensitive of the t-test and signed-rank test results (i.e., lowest p value) for chemicals with all detected

results, and on Fong's modified sign test for chemicals with one or more censored results. As noted earlier, only 4,4'-DDE had results that indicated a statistically significantly higher concentrations in the downwind samples - although it should be noted that data for 20 sampling events were excluded because results were reported as BDL. A series of graphics are included in the panels for each chemical in Figure 2 that show the relative distribution of the observed differences for all matched pairs of samples. Figure 2 also provides the time series plots (plots of observed result versus sequential sampling event) for the upwind and downwind results. A key is provided at the end of Figure 2 to aid in the interpretation of the raw statistical output. Chemicals with the highest proportion of excluded data (15 to 27 events) are presented at the end of Figure 2.

5.0 REFERENCES

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APPENDIX A

NEVADA DIVISION OF ENVIRONMENTAL PROTECTION COMMENTS AND BRC RESPONSES TO COMMENTS

APPENDIX B

FIELD DOCUMENTATION FORMS

APPENDIX C

CALIBRATION AND SAMPLE VOLUME CALCULATION WORKSHEETS

APPENDIX D

CD CONTAINING LABORATORY ANALYTICAL RESULTS AND ECVP REPORTS, TABLE 3, AND COMPLETE REPORT

FIGURES

FIGURE 1 INSERTED HERE

FIGURE 2 INSERTED HERE

TABLES

TABLE 1

SAMPLE COLLECTION SAMPLE HANDLING AND ANALYSIS SPECIFICATIONS FOR EASTSIDE DRY PONDS AREA AIR SAMPLING STATIONS

HENDERSON, NEVADA

Analytical Parameter	Equipment Manufacturer/ Model	Sample Media	Sample Frequency/ Sample Events	Sample Handling Temperature/ hold time	Laboratory/ Analytical Method
Organochlorine Pesticides (TO-4A)	Tisch Environmental/ TE-1000	Polyurethane foam cartridge/102 mm quartz fiber filter	24hr. (or less) cont. sample/every 3 days/10 events	<4°C/7 days	Air Toxics Ltd./Method TO-4A
PCDDs/PCDFs (TO-9A)	Tisch Environmental/ TE-1000	Polyurethane foam cartridge/102 mm quartz fiber filter	24hr. (or less) cont. sample/every 3 days/10 events	<4°C/7 days	Frontier Ltd./Method TO-9A
VOCs/SVOCs (TO-13A)	Tisch Environmental/ TE-1000	Polyurethane foam cartridge/102 mm quartz fiber filter	24hr. (or less) cont. sample/every 3 days/10 events	<4°C/7 days	Air Toxics Ltd./Method TO-13A
TSP/Metals	BGI, Inc./PQ100	47mm Teflon fiber filter	24hr. (or less) cont. sample/every 3 days/10 events	None/30 days	Chester Labnet/ Method IO-2.1; Method IO-3.3
Asbestos	SKC, Inc. 224-PCXR8	25mm mixed cellulose ester filter	24hr. (or less) cont. sample/every 3 days/10	None/N/A	AES Laboratory/ NIOSH 7400

Notes:

< = less than
°C = degree Celsius
cont. = continuous
hr = hour
PM_{10} = particulate matter less than 10-microns
N/A = not applicable
$\mu g/m^3$ = microgram per cubic meter

TABLE 2
METEOROLGICAL DATA RECORD DURING EASTSIDE DRY PONDS SAMPLING
JANUARY 06 –JANURY 20, 2009 AND JULY 03 –OCTOBER 20, 2009

HENDERSON, NEVADA

Sample Date	Average Wind Degrees	Average Wind Speed (m/s)	Quadrant Wind Blowing From	Respective Upwind Site	Respective Downwind Site
January 6, 2009	110.19	0.99	Southeast	BMI11	BMI06
January 9, 2009	154.62	1.61	Southeast	BMI11	BMI06
January 13, 2009	145.83	2.16	Southeast	BMI11	BMI06
January 16, 2009	179.32	1.67	South	BMI11	BMI06
January 20, 2009	205.72	0.96	Southwest	BMI11	BMI06
July 3, 2009	120.61	2.03	Northeast	BMI08	BMI06
July 7, 2009	204.64	5.08	Southwest	BMI08	BMI06
July 10, 2009	181.57	3.47	South	BMI08	BMI06
July 14, 2009	194.37	3.58	South	BMI08	BMI06
July 17, 2009	170.36	2.05	South	BMI08	BMI06
July 21, 2009	149.71	3.32	Southeast	BMI08	BMI06
July 24, 2009	148.42	2.01	Southeast	BMI08	BMI06
July 28, 2009	120.97	2.01	Southeast	BMI08	BMI06
July 31, 2009	136.54	2.71	Southeast	BMI08	BMI06
August 4, 2009	197.15	2.85	Southwest	BMI08	BMI06
August 7, 2009	225.43	6.61	Southwest	BMI08	BMI06
August 11, 2009	149.25	1.57	Southeast	BMI08	BMI06
August 14, 2009	186.09	3.62	South	BMI08	BMI06
August 18, 2009	152.29	2.03	Southeast	BMI08	BMI06
August 21, 2009	177.95	1.40	South	BMI08	BMI06
August 25, 2009	155.17	1.90	Southeast	BMI08	BMI06
September 2, 2009	139.78	2.30	Southeast	BMI08	BMI06
September 4, 2009	185.43	1.81	South	BMI08	BMI06
September 11, 2009	165.91	1.38	Southeast	BMI08	BMI06
September 15, 2009	211.98	3.56	Southwest	BMI08	BMI06
September 18, 2009	138.85	1.17	Southeast	BMI08	BMI06
September 22, 2009	39.05	4.89	Northeast	Indeterminate	Indeterminate
September 25, 2009	162.78	1.10	Southeast	BMI08	BMI06
September 29, 2009	155.58	3.09	Southeast	BMI08	BMI06

TABLE 2 (cont.)

Sample Date	Average Wind Degrees	Average Wind Speed (m/s)	Quadrant Wind Blowing From	Respective Upwind Site	Respective Downwind Site
October 2, 2009	136.80	1.74	Southeast	BMI08	BMI06
October 6, 2009	202.26	1.54	Southwest	BMI08	BMI06
October 9, 2009	181.22	1.43	South	BMI08	BMI06
October 13, 2009	185.05	3.97	South	BMI08	BMI06
October 16, 2009	226.57	1.16	Southwest	BMI08	BMI06
October 20, 2009	263.68	5.72	West	Indeterminate	Indeterminate

Notes:

m/s meters per second

TABLE 3

EASTSIDE DRY PONDS AREA AIR QUALITY MONITORING SUMMARY

JANUARY 6 – 20, 2009 AND JULY 3 THROUGH OCTOBER 20, 2009

(EXCEL FILE ON ATTACHED CD)

TABLE 4

SUMMARY STATISTICS AND RESULTS FOR PAIRED-DIFFERENCE TESTS COMPARING CHEMICAL CONCENTRATIONS IN UPWIND AND DOWNWIND SAMPLES EASTSIDE DRY PONDS AREA

Chemical	Units	Number of Excluded Events[a]	Upwind		Downwind		Mean Difference[b]	Paired Difference Test[c]			Downwind Significantly Greater Than Upwind?[c]
			Detection Frequency	Maximum Detected	Detection Frequency	Maximum Detected	(Upwind-Downwind)	*t*-Test p	Signed-Rank Test p	Modified Sign Test p	
1,2,3,4,6,7,8-HpCDD	pg/m^3	1	32 / 32	2.3	32 / 32	1.0	-5.70	0.17	0.78	--	No
1,2,3,4,6,7,8-HpCDF	pg/m^3	1	32 / 32	24.78	32 / 32	9.84	-54.7	0.17	0.93	--	No
1,2,3,4,7,8-HxCDD	pg/m^3	3	30 / 30	0.35	30 / 30	0.15	-0.907	0.17	0.88	--	No
1,2,3,4,7,8-HxCDF	pg/m^3	1	32 / 32	2.61	32 / 32	4.06	-24.0	0.17	0.95	--	No
1,2,3,4,7,8,9-HpCFD	pg/m^3	1	32 / 32	8.39	32 / 32	3.31	-22.1	0.17	0.92	--	No
1,2,3,6,7,8-HxCDD	pg/m^3	3	30 / 30	0.66	30 / 30	0.29	-1.71	0.17	0.89	--	No
1,2,3,6,7,8-HxCDF	pg/m^3	1	32 / 32	6.81	32 / 32	2.89	-17.4	0.17	0.94	--	No
1,2,3,7,8-PeCDD	pg/m^3	4	29 / 29	0.45	29 / 29	0.19	-1.44	0.17	0.89	--	No
1,2,3,7,8-PeCDF	pg/m^3	1	32 / 32	4.97	32 / 32	2.13	-12.3	0.17	0.97	--	No
1,2,3,7,8,9-HxCDD	pg/m^3	3	30 / 30	0.52	30 / 30	0.23	-1.27	0.17	0.83	--	No
1,2,3,7,8,9-HxCDF	pg/m^3	2	31 / 31	2.62	31 / 31	1.06	-6.82	0.17	0.94	--	No
1,4-Dichlorobenzene	µg/m^3	16	17 / 17	0.094	17 / 17	0.041	0.013	1.00	1.00	--	No
2-Methyl-naphthalene	µg/m^3	3	30 / 30	0.520	30 / 30	0.580	0.039	0.93	1.00	--	No
2,3,4,6,7,8-HxCDF	pg/m^3	1	32 / 32	3.50	32 / 32	1.51	-9.40	0.17	0.96	--	No
2,3,4,7,8-PeCDF	pg/m^3	2	31 / 31	2.44	31 / 31	0.94	-6.34	0.17	0.92	--	No
2,3,7,8-TCDD	pg/m^3	5	28 / 28	0.20	28 / 28	0.09	-0.69	0.17	0.98	--	No
2,3,7,8-TCDF	pg/m^3	1	32 / 32	2.56	32 / 32	1.05	-6.87	0.17	0.95	--	No
4,4'-DDE	µg/m^3	20	13 / 13	0.003	13 / 13	0.003	-0.0004	0.02	0.03	--	Yes
alpha-BHC	µg/m^3	28	5 / 5	0.002	5 / 5	0.002	-0.001	0.15	0.22	--	No
Aluminum	µg/m^3	0	33 / 33	1.34	33 / 33	1.040	0.075	0.94	0.92	--	No
Barium	µg/m^3	0	32 / 33	0.124	32 / 33	0.213	15 / 18 / 0	--	--	0.36	No

Chemical	Units	Number of Excluded Events[a]	Upwind		Downwind		Mean Difference[b]	Paired Difference Test[c]			Downwind Significantly Greater Than Upwind?[c]
			Detection Frequency	Maximum Detected	Detection Frequency	Maximum Detected	(Upwind-Downwind)	*t*-Test p	Signed-Rank Test p	Modified Sign Test p	
Benzoic Acid	µg/m^3	18	15 / 15	0.680	15 / 15	0.390	0.151	0.33	0.50	--	No
beta-BHC	µg/m^3	30	3 / 3	0.001	3 / 3	0.001	N/A	N/A	N/A	N/A	N/A
Bromine	µg/m^3	0	32 / 33	0.006	33 / 33	0.006	14 / 18 / 1	--	--	0.29	No
Cadmium	µg/m^3	0	30 / 33	0.006	27 / 33	0.007	14 / 15 / 4	--	--	0.50	No
Calcium	µg/m^3	0	33 / 33	3.12	33 / 33	2.42	0.092	0.86	0.72	--	No
Chlorine	µg/m^3	0	33 / 33	0.436	33 / 33	0.471	-0.024	0.82	0.77	--	No
Chromium	µg/m^3	0	33 / 33	0.009	32 / 33	0.023	15 / 16 / 2	--	--	0.50	No
Copper	µg/m^3	0	32 / 33	0.023	33 / 33	0.046	21 / 12 / 0	--	--	0.92	No
Dimethyl phthalate	µg/m^3	32	1 / 1	0.020	1 / 1	0.032	N/A	N/A	N/A	N/A	N/A
Gallium	µg/m^3	0	24 / 33	0.001	21 / 33	0.001	12 / 8 / 11	--	--	0.53	No
Hexachlorobenzene	µg/m^3	19	14 / 14	0.100	14 / 14	0.071	0.007	0.17	0.86	--	No
Indium	µg/m^3	0	28 / 33	0.009	28 / 33	0.010	14 / 15 / 4	--	--	0.50	No
Iron	µg/m^3	0	33 / 33	1.19	33 / 33	0.986	0.037	0.97	0.92	--	No
Lead	µg/m^3	0	30 / 33	0.026	30 / 33	0.030	15 / 17 / 1	--	--	0.39	No
Magnesium	µg/m^3	0	33 / 33	0.586	33 / 33	0.413	0.042	0.92	0.88	--	No
Manganese	µg/m^3	0	33 / 33	0.158	33 / 33	0.161	0.005	0.64	0.70	--	No
Naphthalene	µg/m^3	3	30 / 30	0.700	30 / 30	0.690	0.068	0.63	0.69	--	No
OCDD	pg/m^3	1	32 / 32	39.6	32 / 32	265	-7.09	0.18	0.44	--	No
OCDF	pg/m^3	1	32 / 32	927	32 / 32	7,410	-200	0.18	0.59	--	No
Palladium	µg/m^3	0	29 / 33	0.009	28 / 33	0.006	14 / 14 / 5	--	--	0.50	No
Phenanthrene	µg/m^3	24	9 / 9	0.021	9 / 9	0.013	0.005	0.17	0.89	--	No
Phenol	µg/m^3	26	7 / 7	0.110	7 / 7	0.094	0.029	0.17	0.95	--	No
Potassium	µg/m^3	0	33 / 33	0.748	33 / 33	0.586	0.031	0.17	0.96	--	No
Rubidium	µg/m^3	0	30 / 33	0.004	29 / 33	0.002	11 / 15 / 6	--	--	0.39	No

Chemical	Units	Number of Excluded Events[a]	Upwind		Downwind		Mean Difference[b]	Paired Difference Test[c]			Downwind Significantly Greater Than Upwind?[c]
			Detection Frequency	Maximum Detected	Detection Frequency	Maximum Detected	(Upwind-Downwind)	*t*-Test p	Signed-Rank Test p	Modified Sign Test p	
Selenium	µg/m^3	0	26 / 33	0.001	28 / 33	0.001	16 / 5 / 12	--	--	0.68	No
Silicon	µg/m^3	0	33 / 33	3.781	33 / 33	2.75	0.180	0.17	0.96	--	No
Silver	µg/m^3	0	29 / 33	0.008	29 / 33	0.008	15 / 14 / 4	--	--	0.50	No
Strontium	µg/m^3	0	33 / 33	0.039	33 / 33	0.029	0.001	0.68	0.78	--	No
Sulfur	µg/m^3	0	33 / 33	0.629	33 / 33	0.675	0.007	0.17	0.78	--	No
Tin	µg/m^3	0	29 / 33	0.009	27 / 33	0.007	11 / 13 / 8	--	--	0.47	No
Titanium	µg/m^3	0	33 / 33	0.303	33 / 33	0.546	-0.023	0.17	0.88	--	No
Total HpCDD	pg/m^3	1	32 / 32	3.59	32 / 32	1.55	-8.77	0.17	0.95	--	No
Total HpCDF	pg/m^3	1	32 / 32	46.63	32 / 32	18.34	-107	0.17	0.92	--	No
Total HxCDD	pg/m^3	2	31 / 31	4.98	31 / 31	2.15	-11.6	0.17	0.89	--	No
Total HxCDF	pg/m^3	1	32 / 32	52.77	32 / 32	22.33	-130	0.17	0.94	--	No
Total PeCDD	pg/m^3	2	31 / 31	5.69	31 / 31	2.23	-13.7	0.17	0.89	--	No
Total PeCDF	pg/m^3	1	32 / 32	50.85	32 / 32	21.33	-113	0.17	0.97	--	No
Total TCDD	pg/m^3	1	32 / 32	7.88	32 / 32	2.64	-14.7	0.17	0.83	--	No
Total TCDF	pg/m^3	1	32 / 32	46.06	32 / 32	16.99	-110	0.17	0.94	--	No
TSP	µg/m^3	0	33 / 33	117	33 / 33	49.9	5.68	1.00	1.00	--	No
Vanadium	µg/m^3	0	32 / 33	0.026	32 / 33	0.057	17 / 15 / 1	--	--	0.61	No
Yttrium	µg/m^3	0	22 / 33	0.001	21 / 33	0.001	12 / 9 / 10	--	--	0.52	No
Zinc	µg/m^3	0	33 / 33	0.023	33 / 33	0.018	0.000	0.17	0.92	--	No
Zirconium	µg/m^3	0	32 / 33	0.040	33 / 33	0.082	17 / 16 / 0	--	--	0.50	No

TABLE 4 (cont.)

Notes:

[a] The mean difference for all pairs (Upwind-Downwind) of samples

[b] Parametric (t-test) and nonparametric (Wilcoxon signed-rank) paired difference tests of the following 1-sided null (H0) and alternative (HA) hypotheses- H_0: Downwind < Upwind; H_A: Downwind > Upwind. p is the significance level for the tests. If p is less than or equal to 0.05 H0 is rejected and it is concluded that the downwind results are significantly higher. Results should be interpreted witih caution for chemicals with censored (nondetect) results in one or both data sets. Censored results were evaluated at the detection limit. Specialized parametric (maximum likelihood estimation) and nonparametric (paired Prentice-Wilcoxon tests) methods that account for left-censored results are recommended to eliminate potential bias in these cases, however, these tests are not currently available in mainstream commercial statistical software packages. Only chemicals with at least 80 percent detected results in both the upwind and downwind data sets are presented in this table (results reported as zero by the laboratory were set to one standard deviation in the database and therefore were treated as censored results for the purpose of calculating the 80 percent minimum threshold for inclusion in this table).

[c] Conclusion based on the most sensitive (lowest p value) test result.

$\mu g/m^3$ micrograms per cubic meter

pg/m^3 picograms per cubic meter

Exhibit 15

Chapter 42
SOLID WASTE AND ILLEGAL DUMPING*

***Cross reference—**Designation of public servants to have concurrent authority with police officers to enforce ordinances designated as blight violation; § 1-1-10(a); authorization for public servants to issue and serve blight violations, § 1-1-10(b); enforcement of blight violations, Ch. 3, Art. II; building construction and property maintenance, generally, Ch. 8; requirement for holder of wrecking permit to provide for suitable disposal of solid waste resulting from wrecking operation, § 8-2-20; requirement for holder of wrecking permit to remove all excess solid waste from site above grade, § 8-2-20; prohibition against accumulation of solid waste on exterior of buildings, premises, and structures, § 8-15-101; requirement for solid waste to be separated and stored in approved containers on exterior of buildings, premises, and structures, § 8-15-101; prohibition against using building, premises, or structure for storage or handling of solid waste to preclude place for rodent harborage, § 8-15-105; prohibition against permitting solid waste to accumulate on any portion of the exterior lot of vacant building or structure, § 8-15-113; prohibition against accumulation of solid waste on interior of buildings and structures, § 8-15-331; requirement for domestic solid waste from buildings and structures to be separated, stored, and disposed of in accordance with this chapter, § 8-15-332; requirement for commercial solid waste from buildings and structures to be separated, stored, and disposed of in accordance with this chapter, § 8-15-333; requirement for demolition deferral after show cause hearing before City Council for owner or party-in-interest to file statement, among other things, that premises is free from solid waste, § 8-17-26; environment, generally, Ch. 16; nuisances, § 16-2-1 *et seq*.; requirements for solid waste receptacles and storage areas in food establishments, § 19-3-851 *et seq*.; adoption of Michigan Public Health Code, § 20-1-1; licenses, Ch. 28; offenses, Ch. 31; prohibition against disposing of solid waste or construction solid waste upon parks, public places, or boulevards, § 33-1-19; disposal of solid waste by stationary and street vendors, § 34-1-11; requirement for rubbish and garbage receptacles in public lodging houses, § 36-1- 31; storage, preparation, collection, transport, disposal, and placement of solid waste at public markets, § 37-1-9; secondhand goods, Ch. 41; streets, sidewalks, and other public places, generally, Ch. 43; prohibition against permitting dust, dirt, or other solid waste to remain on sidewalk in front of or adjacent to side of any house, premises, building or lot, § 43-6-3; prohibition against obstructing or encumbering public wharf, street, alley, or public place with animals, boxes, signs, barrels, posts, fences, buildings, dirt, stones, bricks, solid waste, or any other material with exception, § 43-8-2; requirement during building construction to keep one-half of sidewalk space in front of premises where permit is granted free and unobstructed of solid waste, dirt, snow, and ice for purpose of passage, § 43-8-34; prohibition against storing dirt from excavations and solid waste taken from buildings on sidewalks and roadway of streets, § 43-8-36; prohibition against disposing of solid waste or depositing bodily discharges within any vehicle or station area of the Detroit People Mover System except in provided receptacles, § 47-4-11; prohibition against disposing of solid waste or depositing bodily discharges within any vehicle or station area of the Streetcar System except in provided receptacles, § 47-8-30; prohibition against depositing or permitting the deposit of garbage or litter into park waters, § 49-3-2.

Case law annotation--Garbage lacks a sufficient value to form the basis of a vested property right so as to authorize a court of equity to enjoin the enforcement of a penal ordinance regulating its disposal; *Gardner* v *Michigan,* 199 US 325; 50 L Ed 212; 26 S Ct 106 (1905).

Federal law reference—Solid waste disposal, 42 USC 6901 *et seq*.

State law reference—Michigan Garbage Disposal Act, MCL 123.361 *et seq*.; solid waste facilities, MCL 324.4301 *et seq*.; hazardous waste management act, MCL 324.11101 *et seq*.; hazardous materials transportation act, MCL 29.471 *et seq*.; solid waste management, MCL 324.11501 *et seq*.; waste reduction assistance, MCL 324.14501 *et seq*.; clean Michigan fund, MCL 324.19101 *et seq*.; Michigan Low-level Radioactive Waste Authority Act, MCL 333.26201 *et seq*.

ARTICLE I. GENERALLY

DIVISION 1. DEFINITIONS AND ENFORCEMENT

Sec. 42-1-1. Definitions: A-B.

For purposes of this chapter, the following words and phrases shall have the meanings respectively ascribed to them by this section:

Approved means that equipment, method or procedure, which, for Article II of this chapter, the Director of the Department of Public Works or the Director of the Buildings, Safety Engineering, and Environmental Department, and for Article III of this chapter, the Chief of Police, designates as acceptable, having been, by demonstration or test, proven workable and safe for its intended purpose.

Approved containers means receptacles designated for use in specific areas or for specific uses by the Director of the Department of Public Works, which are limited to Courville containers, large movable or stationary containers, and portable containers as defined in this section.

Asphalt milling, also known as asphalt grinding or RAP (Reclaimed Asphalt Pavement) means the fine particles of bitumen and inorganic material that are produced by the mechanical grinding of bituminous concrete surfaces.

ASTM means the American Society for Testing and Materials.

Authorized local official means a police officer, or other City personnel, who is authorized by the Director of the Department of Public Works in accordance with Chapter 3 of this Code, *Administrative Hearings and Enforcement, and Administrative Appeals*, to issue a blight violation in accordance with this chapter and provisions of this Code that are designated as blight violations.

Blight violation means any unlawful act, or any omission or failure to act, which is designated by this Code as a blight violation pursuant to Section 4l(4) of the Michigan Home Rule City Act, being MCL 117.1

Blight violation determination means a determination that:

(1) An alleged violator is responsible for one or more blight violations as a result of the admission of responsibility for the allegation in a blight violation notice; or

(2) After an administrative hearing that a person is or is not responsible for one or more blight violations; or

(3) As a result of a decision and order of default for failing to appear as directed by the blight violation notice, or other notice regarding one or more blight violations, at a scheduled appearance at the Blight Administrative Hearings Bureau in accordance with Section 4q(8)(c) of the Michigan Home Rule City Act, being MCL 117.4q(8)(c).

Blight violation notice means a written violation notice prepared by an authorized local official, which directs an alleged violator:

(1) To pay the civil fine(s) fine specified in the notice, including any required fees or costs, for one or more blight violations in accordance with the fines, fees, or costs specified in this Code; and

(2) To appear at the Blight Administrative Hearings Bureau regarding the occurrence or existence of one or more blight violations pursuant to Section 4q(8) of the Michigan Home Rule City Act, being MCL 117.4q(8).

Blight violation proceeding means an administrative process that results in a blight violation determination.

Bulk solid material means:

(1) Any solid substance or material that can be used as a fuel or as an ingredient or component in a manufacturing or construction process, that may create fugitive dust, and that is accumulated in an amount of 50 cubic yards or more at any one time, including, but not limited to, asphalt millings, ores, iron and steel slag, gravel, sand, and lime stone, but does not mean salt, grains, commercial solid waste, or garbage; and

(2) Any carbonaceous material regardless of the amount but does not mean material stored in nurseries, garden centers, and farm supply stores.

Bulk solid waste means solid waste that is larger than can be stored in an approved container or greater than ten cubic feet, including appliances, beds, cradles, furniture, refrigerators, stoves, water heaters, other bulk heavy items, and four or fewer scrap tires.

(Code 1984, §§ 22-1-1, 22-5-5; Ord. No. 15-02, § 1(22-2-1), eff. 9-27-2002; Ord. No. 06-03, § 1(22-1-1), eff. 4-9-2003; Ord. No. 17-04, § 1(22-1-1), eff. 6-15-2004; Ord. No. 35-04, § 1(22-1-1), eff. 12-1-2004; Ord. No. 36-06, § 1(22-1-1), eff. 1-21-2007; Ord. No. 23-07, § 1(22-1-1), eff. 7-6-2007; Ord. No. 20-09, § 1(22-1-1), eff. 12-4-2009; Ord. No. 32-17, § 1(22-5-5), eff. 12-6-2017)

Sec. 42-1-2. Definitions: C-D.

For purposes of this chapter, the following words and phrases shall have the meanings respectively ascribed to them by this section:

Carbonaceous bulk solid material means bulk solid material that includes carbonaceous material.

Carbonaceous bulk solid material facility means a source, site, or facility where carbonaceous bulk solid material is stored, loaded, unloaded, stockpiled, handled on-site, blended, processed, or otherwise managed.

Carbonaceous material means a solid substance that occurs naturally or exists as a result of a human-made process that is rich in carbon, and includes, but is not limited to, coal and coke in its various forms, including, but not limited to, nut coke, coke breeze, petroleum coke, and metallurgical coke, but excluding asphalt millings.

CFR means the United States Code of Federal Regulations.

Chemical stabilizer is means any chemical dust suppressant which is not prohibited for the uses regulated by this chapter or by any other applicable law, and meets all applicable specifications required by any federal, state, or local agency.

Coal means a solid, brittle, carbonaceous rock classified as anthracite, bituminous, subbituminous, or lignite by ASTM Designation D388-77.

Coke means a solid carbonaceous material derived from the distillation of coal, (including metallurgical coke), or from oil refinery coker units or other cracking processes, (including petroleum coke), and includes, but is not limited to, nut coke and coke breeze.

Commercial establishments means all businesses, non-profit organizations, churches, governmental agencies, and other such institutions, which cannot be classified as residential structures, as well as residential structures containing five (5) or more household units.

Commercial solid waste means:

(1) The solid waste resulting from the operation of commercial establishments; and

(2) Construction solid waste, but does not include domestic solid waste.

Construction bulk solid material means bulk solid material that can be used in a construction process and includes asphalt millings, ores, iron and steel slag, gravel, sand, and limestone.

Construction solid waste means waste from building construction, alteration, demolition or repair, and dirt from excavations.

Courville containers means receptacles which are 100, 300 or 400 gallons in capacity, are the property of the City, are provided by the Department of Public Works for use at residential structures and commercial establishments, and are mechanically emptied.

Domestic solid waste means the solid waste resulting from the usual routine of housekeeping, but does not include commercial solid waste.

(Code 1984, §§ 22-1-1, 22-5-5; Ord. No. 15-02, § 1(22-2-1), eff. 9-27-2002; Ord. No. 06-03, § 1(22-1-1), eff. 4-9-2003; Ord. No. 17-04, § 1(22-1-1), eff. 6-15-2004; Ord. No. 35-04, § 1(22-1-1), eff. 12-1-2004; Ord. No. 36-06, § 1(22-1-1), eff. 1-21-2007; Ord. No. 23-07, § 1(22-1-1), eff. 7-6-2007; Ord. No. 20-09, § 1(22-1-1), eff. 12-4-2009; Ord. No. 32-17, § 1(22-5-5), eff. 12-6-2017)

Sec. 42-1-3. Definitions: E-H.

For purposes of this chapter, the following words and phrases shall have the meanings respectively ascribed to them by this section:

Emergency means any condition or situation that reasonably constitutes a threat to public interest, safety, or welfare.

Erected means new buildings, or any addition to a structure or any conversion of use or occupancy of a structure, which results either in new or increased production of food wastes, except the remodeling of kitchens in one-or two-family dwellings or the replacement of residential kitchen sinks.

Facility means all contiguous land, and structures, other appurtenances, and improvements on the land, used for storing, on-site handling, loading, unloading, stock piling or processing bulk solid material.

Food wastes means vegetable or animal matter, or a combination thereof, produced or developed as the result of preparation, processing, marketing, cooking, serving, distributing, sale, spoilage, decay, deterioration, storage or in any other manner of food which renders such unfit, undesirable or unacceptable for sale, distribution, or human consumption.

Fugitive dust means any solid particulate matter that becomes airborne by natural or human-made activities, excluding engine combustion exhaust and particulate matter emitted from a properly permitted exhaust stack equipped with a pollution control device.

Garbage means, as likewise defined in Section 11503 of the Michigan Natural Resources and Environmental Protection Act, being MCL 324.11503, rejected food wastes, including waste accumulation of animal, fruit, or vegetable matter used or intended for food or that attends the preparation, use, cooking, dealing in, or dealing with the storing of meat, fish, fowl, fruit, or vegetable matter.

Generator means the person responsible for creating, disposing, storing, or transporting of solid waste, medical waste, or hazardous waste.

Hazardous waste means any chemical or other material or substance defined as hazardous waste or substance under Parts 111 and 201 of the Michigan Natural Resources and Environmental Protection Act, respectively, being MCL 324.11101 *et seq*., and MCL 324.20101 *et seq*.

High wind conditions means when average wind speeds exceed 20 miles per hour over two consecutive five minute intervals of time.

Homestead or *primary homestead* means the tax parcel for which a valid principal residence exemption has been filed and is in existence under Section 7cc of the Michigan General Property Tax Act, being MCL 211.7cc.

Household units means the individual residences of the residents of the City of Detroit.

(Code 1984, §§ 22-1-1, 22-2-54(f), 22-5-5; Ord. No. 15-02, § 1(22-2-1), eff. 9-27-2002; Ord. No. 06-03, § 1(22-1-1), eff. 4-9-2003; Ord. No. 17-04, § 1(22-1-1), eff. 6-15-2004; Ord. No. 35-04, § 1(22-1-1), eff. 12-1-2004; Ord. No. 36-06, § 1(22-1-1), eff. 1-21-2007; Ord. No. 23-07, § 1(22-1-1), eff. 7-6-2007; Ord. No. 20-09, § 1(22-1-1), eff. 12-4-2009; Ord. No. 01-17, §1(22-2-54(f)), eff. 4-10-2017; Ord. No. 32-17, § 1(22-5-5), eff. 12-6-2017)

Sec. 42-1-4. Definitions: I-M.

For purposes of this chapter, the following words and phrases shall have the meanings respectively ascribed to them by this section:

Industrial site means a location where heavy warehousing, manufacturing, processing, assembling, utility generation, tool and dye operations, pumping, fabricating, iron working, welding, grinding, and the like occurs.

Industrial site solid waste means garbage, as defined in this section, and rubbish, as defined in this section, resulting from the daily activities of persons at industrial sites, but does not include industrial waste, as defined in this section.

Industrial waste means the liquid, solid, or gaseous waste or form of energy, or combination thereof, resulting from any processing of industry, manufacturing, business, trade or research, including the development, recovery, or processing of natural resources.

Internal road means any route within a facility that is not located in an area normally used for staging or storage of material and that has evidence of repeated prior travel by, or is otherwise regularly used by, vehicles for transporting materials to, from, or within a facility.

Large movable or stationary containers means receptacles which are two-cubic yards, three-cubic yards, or six-cubic yards or larger in capacity and are mechanically emptied.

Litter means, as likewise defined by Section 8901(a)(i) of the Michigan Natural Resources and Environmental Protection Act, being MCL 324.8901(a)(i), all rubbish, refuse, waste material, garbage, offal, paper, glass, cans, bottles, trash, debris, or other foreign substances when the amount is under five-cubic feet.

Manifest means a form provided or approved by the Michigan Department of Environmental Quality that is used for identifying the quantity, composition, (including class, curie count, and radio-active nuclides), origin, routing, and destination of waste from the point of generation to the point of disposal, treatment, or storage within the meaning of Section 11103(8) of the Michigan Natural Resources and Environmental Protection Act, being MCL 324.11103(8).

Medical waste means any of the following that are not generated from a household, or a farm operation or other agricultural business:

(1) Cultures and stocks of infectious agents and associated biologicals, including laboratory waste, biological production wastes, discarded live and attenuated vaccines, culture dishes, and related devices;
(2) Liquid human and animal waste, including blood and blood products and bodily fluids, but not including urine or materials stained with blood or body fluids;
(3) Pathological waste;
(4) Sharps; and
(5) Contaminated wastes from animals that have been exposed to agents infectious to humans, these being primarily research animals.

Metallurgical coke, or metcoke, means a carbonaceous material resulting from the manufactured purification of coal.

Municipal solid waste means solid waste material from residential structures that is classified as domestic solid waste, from commercial establishments that is classified as commercial solid waste, and from industrial sites as industrial solid waste.

(Code 1984, §§ 22-1-1, 22-5-5; Ord. No. 15-02, § 1(22-2-1), eff. 9-27-2002; Ord. No. 06-03, § 1(22-1-1), eff. 4-9-2003; Ord. No. 17-04, § 1(22-1-1), eff. 6-15-2004; Ord. No. 35-04, § 1(22-1-1), eff. 12-1-2004; Ord. No. 36-06, § 1(22-1-1), eff. 1-21-2007; Ord. No. 23-07, § 1(22-1-1), eff. 7-6-2007; Ord. No. 20-09, § 1(22-1-1), eff. 12-4-2009; Ord. No. 32-17, § 1(22-5-5), eff. 12-6-2017)

Sec. 42-1-5. Definitions: N-Q.

For purposes of this chapter, the following words and phrases shall have the meanings respectively ascribed to them by this section:

On-site disposal means the disposal within the premises by approved methods or system of any food wastes produced or developed therein.

Opacity means the highest degree to which visibility of a background, (e.g., for example, blue sky), is reduced by fugitive dust, expressed as a percentage where zero percent represents no interference by fugitive dust and 100 percent represents zero visibility due to complete interference by fugitive dust.

Owner or operator means any person whether owner, occupant, tenant, lessee, agent or other person who:

(1) Has legal or equitable title to any facility, private property, or water; or
(2) Has charge, care or control of any facility, private property, or water; or
(3) Is in possession of any facility private property or water or any part thereof; or
(4) Is entitled to control or direct the management of any facility, private property, or water.

Pathological waste means human organs, tissues, body parts other than teeth, products of conception, and fluids removed by trauma or during surgery, autopsy, or other medical procedure, and not fixed in formaldehyde but does not mean a fetus or fetal body parts.

Person means an individual, partnership, co-partnership, firm, company, limited-liability company, corporation, association, sole proprietorship, joint venture, joint stock company, trust, estate, political subdivision, state agency, owner, operator or generator, or any other legal entity, or its legal representative, agent, or assigns.

Petroleum coke, or *petcoke*, means a solid carbonaceous residue produced from a coker after cracking and distillation from petroleum refining operations, including such residues produced by petroleum upgraders in addition to petroleum refining.

PM10 means particulate matter that has an aerodynamic diameter less than or equal to a nominal 10 micrometers, as measured by a reference test specified in 40 CFR Part 51, Appendix M.

Portable containers means receptacles which are not more than 30 gallons in capacity and are manually emptied.

Private property or water means any of the following:

(1) A privately-owned right-of-way of a road or highway, a body of water or watercourse, or the shore or beach of the body of water or watercourse, including the ice above the water;

(2) A privately-owned park, playground, building, structure, parking lot, vacant lot, or conservation or recreation area;

(3) Residential or farm properties or timberlands; or

(4) Motor vehicles or vessels.

Process or *processing* means any chemical, industrial, commercial, or manufacturing operation or activity that causes, or has the potential to cause, the emission of airborne particles including, but not limited to, blending, mixing, crushing, screening, breaking, wet or dry cleaning, thermal drying, and chemically treating.

Qualified bulk solid materials means bulk solid materials that satisfy all of the following:

(1) Are construction bulk solid materials;

(2) Are not part of an active construction site described in Section 22-5-10(b) 42-2-10(b) of this Code;

(3) Are not carbonaceous bulk solid material; and

(4) Are a fugitive dust source or a potential fugitive dust source.

(Code 1984, §§ 22-1-1, 22-5-5, 22-5-6(f); Ord. No. 15-02, § 1(22-2-1), eff. 9-27-2002; Ord. No. 06-03, § 1(22-1-1), eff. 4-9-2003; Ord. No. 17-04, § 1(22-1-1), eff. 6-15-2004; Ord. No. 35-04, § 1(22-1-1), eff. 12-1-2004; Ord. No. 36-06, § 1(22-1-1), eff. 1-21-2007; Ord. No. 23-07, § 1(22-1-1), eff. 7-6-2007; Ord. No. 20-09, § 1(22-1-1), eff. 12-4-2009; Ord. No. 32-17, §1(22-5-5, 22-5-6(f)), eff. 12-6-2017)

Sec. 42-1-6. Definitions: R-S.

For purposes of this chapter, the following words and phrases shall have the meanings respectively ascribed to them by this section:

Repeat means a second, or any subsequent, blight violation determination regarding a blight violation notice that is made within a one-year period for the same blight violation, except for a determination by an administrative hearings officer that a person is not responsible for a blight violation for the first or subsequent violation.

Reportable action level means a PM10 level of 150 micrograms per cubic meter or more measured at a facility that will trigger response activities under a contingency plan pursuant to Section 42-2-179(9) of this Code as established in the Fugitive Dust Plan submitted by a facility under Section 42-2-178 of this Code.

Residential structures means the household units of the residents of the City of Detroit.

Rubbish means, as likewise defined by Section 11505 of the Michigan Natural Resources and Environmental Protection Act, being MCL 324.11505, non-putrescible solid waste, excluding ashes, consisting of both combustible and noncombustible waste, including paper, cardboard, metal containers, yard clippings, wood, glass, bedding, crockery, demolished building materials, or litter of any kind that may be a detriment to the public health and safety.

Scrap processor means, as likewise defined in Section 3 of the Michigan Secondhand Dealer and Junk Dealers Act, being MCL 445.403, a person, utilizing machinery and equipment and operating from a fixed location, whose principal business is the processing and manufacturing of iron, steel, nonferrous metals, paper, plastic, or glass, into prepared grades of products suitable for consumption by recycling mills, foundries, and other scrap processors.

Scrap tire hauler means a person transporting scrap tires within the meaning of Section 16901(k) of the Michigan Natural Resources and Environmental Protection Act, being MCL 324.16901(k).

Scrap tires means continuous solid or pneumatic rubber coverings, which were manufactured to encircle a wheel for use in the operation of any motorized vehicle and are no longer being used for their original intended purpose as defined by Section 16901 of the Michigan Natural Resources and Environmental Protection Act, being MCL 324.16901.

Senior citizen means an individual, or either one or two persons filing a joint income tax return, who is 65 years of age or older on the July 1st within the service period for which a senior discount applies.

Sharps means needles, syringes, scalpels, and intravenous tubing with needles attached.

Solid waste means any material defined as a solid waste within the meaning of Part 115 of the Michigan Natural Resources and Environmental Protection Act, being MCL 324.11501 *et seq*., and 42 USC 6901 *et seq*., and specifically includes the terms “scrap” and “litter” as defined by Part 89 of the Michigan Natural Resources and Environmental Protection Act, being MCL 324.8901 *et seq*., and the term “medical waste” as defined in this section.

Solid waste hauler means a person who owns or operates a solid waste transporting unit within the meaning of Section 11506(2) of the Michigan Natural Resources and Environmental Protection Act, being MCL 324.11506(2).

Solid waste transporting unit means, as likewise defined in Section 11506(4) of the Michigan Natural Resources and Environmental Protection Act, being MCL 324.11506(4), a container that may be an integral part of a truck or other piece of equipment used for the transportation of solid waste.

State Operating Plan means an operating program for a fugitive dust source or potential fugitive dust source under Section 5524 of the Michigan Natural Resources and Environmental Protection Act, being MCL 324.5524, which includes a Fugitive Dust Control Program under R 336.1371 and R 336.1372 of the Michigan Administrative Code.

(Code 1984, §§ 22-1-1, 22-2-54(f), 22-5-5, 22-5-6(f), 22-5-7(g); Ord. No. 15-02, § 1(22-2-1), eff. 9-27-2002; Ord. No. 06-03,§ 1(22-1-1), eff. 4-9-2003; Ord. No. 17-04, § 1(22-1-1), eff. 6-15-2004; Ord. No. 35-04, § 1(22-1-1), eff. 12-1-2004; Ord. No. 36-06, § 1(22-1-1), eff. 1-21-2007; Ord. No. 23-07, § 1(22-1-1), eff. 7-6-2007; Ord. No. 20-09, § 1(22-1-1), eff. 12-4-2009; Ord. No. 01-17, § 1(22-2-54(f)), eff. 4-10-2017; Ord. No. 32-17, § 1(22-5-5, 22-5-6(f), 22-5-7(g)), eff. 12-6-2017)

Sec. 42-1-7. Definitions: T-Z.

For purposes of this chapter, the following words and phrases shall have the meanings respectively ascribed to them by this section:

Transfer point means the location at or within a facility where material being moved, carried, or conveyed is dropped or deposited.

Unapproved containers means all receptacles, which are not approved containers.

Vehicle means every motor vehicle which is required to be registered under the Michigan Vehicle Code, being MCL 257.1 *et seq*.

Vessel, when used in this chapter except in Article II, Division 5, Subdivision B, *Bulk Solid Materials*, means a vessel which is required to be numbered under the Michigan Marine Safety Act, being MCL 324.80101 *et seq*.

Vessel, when used in Article II, Division 5, Subdivision B, *Bulk Solid Materials*, means every description of watercraft used or capable of being used as a means of transportation on water.

Violation means any act which is prohibited or made or declared to be a blight violation by any section of this chapter, and any omission or failure to act where the act is required by any section of this chapter.

Violator means a person who is responsible for a blight violation.

Wind screen means a structure that is sufficient to deflect the wind away from stored or conveyed material to reduce fugitive dust emissions to compliance levels, is adjacent to three sides of stored material and for conveyed material is adjacent to both sides of and extends along the entire length of the conveyor, and is tall enough to extend above and below both the conveyor and conveyed material.

(Code 1984, §§ 22-1-1, 22-5-5; Ord. No. 15-02, § 1(22-2-1), eff. 9-27-2002; Ord. No. 06-03, § 1(22-1-1), eff. 4-9-2003; Ord. No. 17-04, § 1(22-1-1), eff. 6-15-2004; Ord. No. 35-04, § 1(22-1-1), eff. 12-1-2004; Ord. No. 36-06, § 1(22-1-1), eff. 1-21-2007; Ord. No. 23-07, § 1(22-1-1), eff. 7-6-2007; Ord. No. 20-09, § 1(22-1-1), eff. 12-4-2009; Ord. No. 32-17, § 1(22-5-5),eff. 12-6-2017)

Sec. 42-1-8. Violation of this chapter deemed to be a blight violation; warning notice by authorized local official permitted prior to issuance of blight violation notice in certain circumstances.

(a) In accordance with Section 3-2-1 of this Code, a violation of this chapter is deemed to be a blight violation, unless specifically stated to be a misdemeanor. As set forth in Section 42-1-61 of this Code, the City, through its Corporation Counsel, may institute an appropriate legal action or proceeding in equity to prevent, restrain, correct, or abate any violation of the provisions of this chapter.

(b) In accordance with Section 3-2-21 of this Code, an authorized local official is authorized to issue a warning notice prior to the issuance of a blight violation notice.

(Code 1984, § 22-1-2; Ord. No. 15-02, § 1(22-1-2), eff. 9-27-2002; Ord. No. 35-04, § 1(22-1-2), eff. 12-1-2004; Ord. No. 20-09, § 1(22-1-2), eff. 12-4-2009)

Sec. 42-1-9. Penalties.

(a) In accordance with Chapter 3 of this Code, *Administrative Hearings and Enforcement, and Administrative Appeals*, any person, or anyone acting on behalf of said person, who admits responsibility, or is found to be responsible, through a blight violation determination, for violation of any provision of this chapter shall be subject to a civil fine as provided for in Division 2 of this article, and to removal costs as provided for in Division 3 of this article.

(b) In the case of a firm or a partnership, the civil fine may be imposed upon the partners or members thereof, and in the case of a corporation, the civil fine may be imposed upon the officers thereof.

(c) Where the blight violation is issued and an admission of responsibility is made for the violation at the Blight Administrative Hearings Bureau:

(1) A civil fine that is paid before the administrative hearing date shall be reduced by ten percent.

(2) A civil fine that is paid after the administrative hearing date shall be increased by ten percent;

(3) A civil fine that is paid on the administrative hearing date shall be neither reduced nor increased.

(d) Each day that a violation continues shall constitute a separate violation. The imposition of a fine under this chapter shall not be construed to excuse or to permit the continuation of any violation and, upon a blight violation determination, the violator may be subject to a civil fine for each day the violation continues. The determination as to whether an act or a failure to act is a continuing violation is within the discretion of the hearings officer.

(Code 1984, § 22-1-4; Ord. No. 15-02, § 1(22-1-4), eff. 9-27-2002; Ord. No. 35-04, § 1(22-1-4), eff. 12-1-2004)

Secs. 42-1-10--42-1-20. Reserved.

DIVISION 2. CIVIL FINES FOR VIOLATIONS

Sec. 42-1-27. Civil fines for violation of Section 42-2-154, 42-2-155(b) and 42-2-156(b) of this Code regarding bulk solid material; cost of removal incurred by City of Detroit; factors to be considered by hearings officer when determining fine; burden of proof for factors upon violator.

(a) A person who violates any of the provisions of Section 42-2-154, Section 42-2-155(b) or Section 42-2-156(b) of this Code, is responsible for a blight violation and, for the first violation, is subject to a civil fine of $1,000.00 and, in accordance with Section 42-1-41 of this Code, is responsible for the cost of removal by the City.

(b) For a repeat or subsequent blight violation under Section 42-2-154, Section 42-2-155(b) or Section 42-2-156(b) of this Code, a person shall be subject to a civil fine not less than $2,500.00 and, in accordance with Section 42- 1-41 of this Code, is responsible for the cost of removal by the City.

(c) Each day on which any violation of any of the provisions of Section 42-2-154, Section 42-2-155(b) or Section 42-2-156(b) of this Code, continues shall constitute a separate violation and, upon a blight violation determination, may be subject to a civil fine for each day the violation continues. The determination as to whether an act or a failure to act is a continuing violation is within the discretion of the hearings officer. The imposition of a fine under this section shall not be construed to excuse or to permit the continuation of any violation.

(d) When determining the amount of a civil fine issued under Subsections (a) or (b) of this section, the hearings officer shall consider all of the following factors:

(1) The type of bulk solid material;
(2) The nature of the violation;
(3) The duration of the violation;
(4) The preventability of the violation;
(5) The potential and actual effect on the surrounding neighborhood or the environment;
(6) The economic benefit to the violator;
(7) The violator’s recalcitrance or efforts to comply with law; and
(8) The economic impact of the fine on the violator.

These factors shall only be considered where the hearings officer determines that the violator has made all good faith efforts to correct and terminate the violation. The violator shall have the burden of proof regarding the presence and degree of any factor to be considered by the hearings officer is determining the amount of the fine. In each case, the fine shall be set within the range that is delineated in Subsections (a) or (b) of this section.

(Code 1984, § 22-1-17; Ord. No. 32-17, § 1(22-1-17), eff. 12-6-2017)

Secs. 42-1-28--42-1-40. Reserved.

DIVISION 3. ADDITIONAL PENALTIES FOR VIOLATIONS

Sec. 42-1-41. Costs and fees for removing solid, medical or hazardous waste.

In addition to any other penalty or sanction provided for in this chapter, or by any other applicable state or federal law, a violator shall pay the following, as applicable:

(1) The cost of removing all solid waste, medical waste, or hazardous waste which is the subject of the violation and the cost of damage to any land, water, wildlife, vegetation, or other natural resource, or to any facility which is damaged by the violation of this chapter. The United States Environmental Protection Agency's Illegal Dumping Economic Assessment--Cost Estimating Model or the actual costs incurred by the Department of Public Works, or other City department, shall be considered sufficient proof of the cost to the City. Costs collected under this section shall be used to reimburse the Department of Public Works or other appropriate department for the cost of removing said solid waste, medical waste, or hazardous waste; and
(2) The reasonable fees that result from impoundment and storage under Section 42-1-42 of this Code, which are calculated as beginning on the date of impoundment. Fees collected under this section shall be disbursed to the Detroit Police Department, or to other appropriate departments that impounded the vehicle involved in the violation of this chapter.

(Code 1984, § 22-1-31; Ord. No. 15-02, § 1(22-1-31), eff. 9-27-2002; Ord. No. 06-03, § 1(22-1-31), eff. 4-9-2003; Ord. No.

35-04, § 1(22-1-31), eff. 12-1-2004)

Sec. 42-1-42. Impoundment and procedure for release of a vehicle; forfeiture of bond.

(a) *Impoundment and procedure for release of a vehicle.* A police officer may impound a vehicle that is operated in the commission of a violation of this chapter. Upon impoundment, the vehicle is subject to a lien, subordinate to a prior lien of record, in the amount of any fine, costs, and damages that the violator may be ordered to pay under this chapter. The person who is issued the blight violation, or a person with an ownership interest in the vehicle, may obtain release of the vehicle by taking one of the following actions:

(1) Appearing at the Blight Administrative Hearings Bureau, admitting responsibility, and pay all fines, costs and fees; or

(2) Admitting responsibility with explanation, or denying responsibility for the violation at the Blight Administrative Hearings Bureau, and providing a copy of a certified bond in the amount of $1,500.00; or

(3) Where there is a blight violation determination by the Blight Administrative Hearings Bureau that the alleged violator is not responsible for the violation, the vehicle shall be released, and the administrative hearings officer shall assess, against the City, costs payable to the person who sustained any damage to the vehicle directly resulting from its impoundment.

(b) *Forfeiture of bond.* Where a blight violation determination regarding this chapter is made and the violator fails to pay any fine, costs or damages, or any installment as required within 120 days after a blight violation determination is made under this chapter, payment shall be satisfied in the following order of priority:

(1) Any bond that is posted under Subsection (a) of this section shall be forfeited and applied to the fines, costs, damages, or installment. In such instance, the Blight Administrative Hearings Bureau shall certify any remaining unpaid amount to the City.

(2) The Corporation Counsel, or the Corporation Counsel's designee, may enforce the lien, in accordance with Section 42-1-43 of this Code, by a foreclosure sale which shall be conducted in the manner provided for and be subject to the same rights as apply in the case of execution sales under Sections 6031, 6032, 6041, 6042, and 6044 through 6047 of the Michigan Revised Judicature Act of 1961, being MCL 600.6031, 600.6032, 600.6041, 600.6042 and 600.6044 through 600.4047.

(Code 1984, § 22-1-32; Ord. No. 15-02, § 1(22-1-22), eff. 9-27-2002; Ord. No. 06-03, § 1(22-1-32), eff. 4-9-2003; Ord. No. 35-04, § 1(22-1-32), eff. 12-1-2004)

Sec. 42-1-43. Foreclosure sale of vehicles.

Not less than 21 days before the foreclosure sale under Section 42-1-42 of this Code, the Corporation Counsel, or the Corporation Counsel's designee, shall send, by certified mail, written notice of the time and place of the foreclosure sale to each person with a known ownership interest in, or lien of record on, the vehicle. In addition, not less than ten days before the foreclosure sale, the Corporation Counsel, or the Corporation Counsel's designee, shall publish notice of the time and place of the foreclosure sale twice in a newspaper of general circulation in the county where the vehicle was impounded. The proceeds of the foreclosure sale shall be distributed in the following order of priority:

(1) To discharge any lien on the vehicle that was recorded prior to the creation of the lien under Section 42-1-42 of this Code;

(2) To the Clerk of the Court for the payment of the fines, costs, and damages that the violator was ordered to pay;

(3) To discharge any lien on the vehicle that was recorded after the creation of the lien under Section 42-1-42 of this Code; and

(4) To the owner of the vehicle.

(Code 1984, § 22-1-33; Ord. No. 15-02, § 1(22-1-33), eff. 9-27-2002; Ord. No. 06-03, § 1(22-1-33), eff. 4-9-2003)

Sec. 42-1-44. Justice system assessment fee.

In accordance with Section 4q(13) of the Michigan Home Rule City Act, being MCL 117.4q(13), and Section 3-3-5(a) of this Code, the Blight Administrative Hearings Bureau shall impose a justice system assessment fee for each blight violation determination.

(Code 1984, § 22-1-34; Ord. No. 15-02, § 1(22-1-34), eff. 9-27-2002; Ord. No. 35-04, § 1(22-1-34), eff. 12-1-2004)

Sec. 42-1-45. Administrative processing and adjudication fee.

In accordance with Section 3-3-5(b) of this Code, each blight violation notice shall be subject to an administrative processing and adjudication fee as approved by City Council.

(Code 1984, § 22-1-35; Ord. No. 15-02, § 1(22-1-34), eff. 9-27-2002; Ord. No. 35-04, § 1(22-1-35), eff. 12-1-2004)

Secs. 42-1-46--42-1-60. Reserved.

DIVISION 4. LEGAL AND EQUITABLE REMEDIES REMAIN AVAILABLE

Sec. 42-1-61. Legal and equitable remedies unimpaired.

Nothing in this chapter shall be an exclusive remedy, or be construed to impair or bar any cause of action or legal or equitable remedy of any person or the public under applicable environmental laws and regulations for injury or damage arising from the emission or release from any source, into the atmosphere, water or ground.

(Code 1984, § 22-1-41; Ord. No. 15-02, § 1(22-1-41), eff. 9-27-2002; Ord. No. 35-04, § 1(22-1-41), eff. 12-1-2004)

Secs. 42-1-62--42-1-80. Reserved.

ARTICLE II. STORAGE, PREPARATION, COLLECTION, TRANSPORT, DISPOSAL, AND PLACEMENT

DIVISION 1. GENERALLY

Sec. 42-2-1. Purpose and intent of this article.

It is the intent of City Council that this article be liberally construed for the purpose of providing a sanitary and satisfactory method of storage, preparation, collection, transport, disposal and placement of municipal solid waste, and for the maintenance of public and private property in a clean, orderly, and sanitary condition to ensure the peace, health, safety, and welfare of the People of the City of Detroit.

(Code 1984, § 22-2-1; Ord. No. 15-02, § 1(22-2-1), eff. 9-27-2002; Ord. No. 35-04, § 1(22-2-1), eff. 12-1-2004)

Sec. 42-2-2. Conditions on which collection is dependent; frequency of collection.

(a) The collection of all domestic solid waste, commercial solid waste or industrial site solid waste is conditioned upon observance of all provisions of this chapter by persons in household units, commercial establishments and industrial sites. Collection is subject to weather and other conditions beyond the control of the Department of Public Works.

(b) Collection frequency shall be determined by the Department of Public Works. For commercial solid waste and industrial site solid waste, the Department of Public Works shall have the right to determine whether collections are made.

(Code 1984, § 22-2-2; Ord. No. 35-04, § 1(22-2-2), eff. 12-1-2004; Ord. No. 23-07, § 1(22-2-2), eff. 7-6-2007)

Secs. 42-2-3--42-2-20. Reserved.

DIVISION 5. ILLEGAL DUMPING

Subdivision B. Bulk Solid Materials
Part I. In General

Sec. 42-2-151. Purpose and scope.

(a) The purpose of this subdivision is to regulate the storage and transporting, including loading and unloading, of bulk solid materials in order to minimize the proliferation of fugitive dust that has the potential to collect in residents' homes and vehicles and to protect residents from potential health hazards of inhaling fugitive dust including pulmonary inflammation and fibrosis, and to classify non-compliant bulk solid material storage as a visual nuisance and blight within the City and along its waterways.

(b) This subdivision prescribes reasonable, specific operating, and maintenance practices to minimize emissions of fugitive dust from the storage, on-site transporting or handling, loading, unloading, stockpiling, and processing of bulk solid materials as defined in Section 42-1-1 of this Code. This subdivision applies to any owner, operator, or other person who processes, handles or transports onsite, transfers, loads, unloads, stockpiles, or stores bulk solid materials.

(c) This subdivision provides criteria to assure that processing, handling, transporting, loading, unloading, stockpiling and storage of bulk solid materials is conducted in accordance with a fugitive dust plan compliant with the standards and criteria set forth in Section 5524 of the Michigan Natural Resources and Environmental Protection Act, being MCL 324.5524, and in R 336.1371 and R 336.1372 of the Michigan Administrative Code, subject to such additional requirements as may be imposed by this subdivision and this chapter.

(Code 1984, § 22-5-1; Ord. No. 32-17, § 1(22-5-1), eff. 12-6-2017)

Sec. 42-2-152. Authority under Michigan Natural Resources and Environmental Protection Act.

The provision of this subdivision are authorized by and adopted pursuant to Part 55 of the Michigan Natural Resources and Environmental Protection Act, titled "Air Pollution Control," particularly Sections 5540 and 5542, being MCL 324.5540 and 324.5542, and specifically Section 5542(1), being MCL 324.5542(1), which provides: "(1) Nothing in this part or in any rule promulgated under this part invalidates any existing ordinance or regulation having requirements equal to or greater than the minimum applicable requirements of this part or prevents any political subdivision from adopting similar provisions if their requirements are equal to or greater than the minimum applicable requirements of this part."

(Code 1984, § 22-5-2; Ord. No. 32-17, § 1(22-5-2), eff. 12-6-2017)

Sec. 42-2-153. Other laws.

The requirements of this subdivision do not affect the responsibilities of the facility owner and operator to comply with all other applicable federal or state law or regulations, or this Code, including, but not limited to, those regarding the zoning, construction, operation, maintenance, and closure of the facility, whether or not such other laws are specifically referenced in this subdivision.

(Code 1984, § 22-5-3; Ord. No. 32-17, § 1(22-5-3), eff. 12-6-2017)

Sec. 42-2-154. Dumping, storing, or depositing bulk solid material on any publicly-owned property, or private property or water, without permit; exception; other violations of subdivision.

(a) Unless otherwise provided for in this chapter, the dumping, storing, or depositing of bulk solid material on any private property, public property, right of way, or surface water or around any approved or portable container is illegal dumping and is a blight violation subject to the fines and penalties provided for in Section 42-1-27 of this Code, provided, that asphalt millings removed as part of a public paving or repaving project conducted, controlled, or funded by the City, the County of Wayne, the State of Michigan, or the United States and temporarily stored on or adjacent to that project for reuse in that project is not illegal dumping if the temporary-storage period does not exceed 45 days.

(b) A violation of this subdivision that is not described in Subsection (a) of this section, including, but not limited to, the escape of fugitive dust from an otherwise authorized collection of bulk solid material in an amount that exceeds the opacity limit specified in Section 5524(2) of the Michigan Natural Resources and Environmental Protection, being MCL 324.5524(2), regardless of qualification under Section 5524(1) of the Michigan Natural Resources and Environmental Protection Act, being MCL 324.5524(1), is unlawful and is subject to the fines and penalties provided for in Section 42-1-27 of this Code.

(Code 1984, § 22-2-83(g), (h); Ord. No. 32-17, § 1(22-2-83(g), (h)), eff. 12-6-2017)

Sec. 42-2-155. Alternative compliance for qualified solid bulk materials.

(a) Notwithstanding Parts II through V of this subdivision, the owner or operator of a facility that processes, handles or transfers on-site, transfers, loads, unloads, stockpiles, or stores qualified solid bulk materials shall be deemed in compliance with this subdivision where all of the following apply:

(1) The owner or operator has submitted a state operating plan for the facility pursuant to Section 5524 of the Michigan Natural Resources and Environmental Protection Act, being MCL 324.5524, and R 336.1371 and 336.1372 of the Michigan Administrative Code, in compliance with Section 5524 of the Michigan Natural Resources and Environmental Protection Act, being MCL 324.5524;

(2) The state operating plan, including any amendment, is effective and the owner or operator is in compliance with the state operating plan; and

(3) The state operating plan includes the information required by Section 5524(5) of the Michigan Natural Resources Environmental Protection Act, being MCL 324.5524(5), and all of the following additional information is included in the state operating plan, included in an active national pollutant discharge elimination system or active groundwater permit for the facility issued by the Michigan Department of Environmental Quality, or included with any supplemental information filed with the Buildings, Safety Engineering, and Environmental Department with an application for a Certificate of Alternative Compliance under this section:

a. A site map for the facility that includes all of the information required under Section 42-2-179(3)(b) to (e) of this Code;

b. A description of the facility's operations, including a list of all bulk solid materials that are construction bulk solid materials handled at, processed at, or transported to, from, or within the facility;

c. A description of the control measures, devices, and technologies to be used to minimize and control fugitive dust at the facility consistent with any applicable standard for density of emissions under R 336.1301 of the Michigan Administrative Code, a description of how all control measures, devices, and technologies will be maintained and calibrated to ensure their continued effectiveness, and a description of the training provided to staff regarding the proper application and operation of the control measures, devices, and technologies;

d. A description of the owner or operator's system for recordkeeping compliant with the requirements otherwise applicable under Section 42-2-191(1), (2) and (6) of this Code, the system of recordkeeping for the owner or operator's compliance with Subsections (3)c and h of this section, and compliant with a requirement that the owner or operator keep and maintain the records described in this subsection at the facility and available for inspection by the Buildings, Safety Engineering, and Environmental Department for at least three years after creation;

e. A description of the owner or operator's measures to comply with any applicable setback requirements under a state law, rule, or permit, or applicable under Chapter 50 of this Code, *Zoning*;

f. A description of measures to comply with the requirements relating to height limits and screening of piles otherwise applicable under Section 42-2-213 of this Code;

g. A description of protections for water ways consistent with the requirements of any applicable state law, rule, or permit, or the requirements of this Code or a permit issued by the City;

h. A description of the owner or operator's measures to monitor wind speeds at the facility and to suspend disturbance of piles of qualified bulk solid materials, including, but not limited to, outdoor loading, unloading, and any other processing, during high wind conditions unless alternate measures are implemented to effectively control dust in accordance with any applicable state operating plan or permit; and

i. A description of storm water management, erosion, sediment control, and drainage measures to control runoff or migration at or from the facility in a manner consistent with requirements under any applicable state law, rule, or permit, or with any requirement of this Code or a City permit, or both.

(4) If the owner or operator is relying only upon a state operating plan for compliance with this section, the owner or operator files a copy of the state operating plan and any amendments to document compliance with this section and all of the following apply:

a. Within 45 days of receipt, the Buildings, Safety Engineering, and Environmental Department reviews the operating plan and any amendments, and inspects the facility for compliance with the requirements of this section to determine whether the operating plan and any amendments satisfy the requirements of this section and are adequate to protect the public health and the environment and to prevent the emission of fugitive dust that causes unreasonable interference with the comfortable enjoyment of life and property;

b. Within 45 days of the inspection, the Buildings, Safety Engineering, and Environmental Department determines and notifies the owner or operator of the facility in writing that the owner or operator of the facility is in compliance with this section; and

c. The owner or operator remains in compliance with this section.

(5) If the owner or operator is relying upon a state permit not part of a state operating plan or other supplemental information filed with the Buildings, Safety Engineering, and Environmental Department in addition to a state operating plan for compliance with this section, the owner or operator complies with all of the following:

a. The owner or operator files a copy of the state operating plan and any amendments and any supplemental information to document compliance with this section with the Buildings, Safety Engineering, and Environmental Department along with an application for alternative compliance under this section on a form determined by the Buildings, Safety Engineering, and Environmental Department;

b. Within 45 days of receipt, the Buildings, Safety Engineering, and Environmental Department:

1. Reviews the application and other documents submitted,

2. Inspects the facility for compliance with the requirements of this section to determine whether the application and other documents submitted satisfy the requirements of this section and are adequate to protect the public health and the environment and to prevent the emission of fugitive dust that causes unreasonable interference with the comfortable enjoyment of life and property, and

3. Issues a Certificate of Alternative Compliance confirming compliance with this section; and

c. The owner or operator remains in compliance with this section. The Buildings, Safety Engineering, and Environmental Department may revoke a Certificate of Alternative Compliance issued under this section if an owner or operator does not remain in compliance with this section.

(b) If an owner or operator of a facility is deemed in compliance with this subdivision through Subsection (a) of this section and the owner or operator either violates the requirements of the state operating plan or permit for the facility or otherwise violates Section 5524 of the Michigan Natural Resources and Environmental Protection Act, being MCL 324.5524, or R 336.1371 and 336.1372 of the Michigan Administrative Code, and the Michigan Department of Environmental Quality or another state officer or agency does not act to remedy or penalize the violation, the violation may enforced as a blight violation under Section 42-1-27 of this Code.

(c) Subsection (b) of this section shall not be an exclusive remedy, or be construed to impair or bar any cause of action or legal or equitable remedy of any person or the public under applicable laws and regulations.

(d) The Buildings, Safety Engineering, and Environmental Department shall conduct semi-annual inspections for the purpose of monitoring compliance with this section and may conduct other inspections for the purpose of monitoring compliance with this subdivision. If the Buildings, Safety Engineering, and Environmental Department determines that an owner or operator is not complying with the requirements of this subdivision, including, but not limited to this section, the Buildings, Safety Engineering, and Environmental Department shall require the owner or operator to take action to comply with this subdivision or both, and shall impose fines authorized under this chapter for each day that the owner or operator fails to take the action required by the Buildings, Safety Engineering, and Environmental Department.

(e) An owner or operator of a facility not in compliance with this section at any time must comply with Parts II through V of this subdivision. An owner or operator of a facility shall not be deemed in compliance with this section if one or more of the following apply:

(1) The State determines that the owner or operator is not in compliance with a state operating program or state permit applicable to the facility;

(2) The Buildings, Safety Engineering, and Environmental Department determines that the owner or operator has not complied with the requirements of this section; or

(3) The owner or operator of the facility violates R 336.1901 of the Michigan Administrative Code.

(Code 1984, § 22-5-6; Ord. No. 32-17, § 1(22-5-6), eff. 12-6-2017)

Sec. 42-2-156. Alternative compliance for scrap processors.

(a) Notwithstanding Parts II through V of this subdivision, a scrap processor shall be deemed in compliance with this subdivision where all of the following apply:

(1) The scrap processor holds a business license as a scrap metal dealer that is issued by the Buildings, Safety Engineering, and Environmental Department under Chapter 41, Article IV, of this Code and the business license has not expired without submission of a renewal application or been suspended or revoked;

(2) The scrap processor does not handle or transfer on-site, transfer, load, unload, stockpile, store, or process carbonaceous bulk solid materials at the facility for which the business license described in Subsection (a)(1) of this section was issued;

(3) The scrap processor is in compliance with all of the following:

a. Chapter 41, Article IV, of this Code;

b. Sections 7, 9, and 10 of the Michigan Scrap Metal Regulatory Act, being MCL 445.427, 445.429, and 445.430; and

c. Any applicable standard for density of emissions under R 336.1301 of the Michigan Administrative Code.

(4) The scrap processor does not engage in a milling activity at the facility for which the business license described in Subsection (a)(1) of this section was issued that generates fugitive dust visible beyond the property line of the facility in violation of an applicable permit for the facility or an applicable standard for density of emissions under R 336.1301 of the Michigan Administrative Code; and

(5) The scrap processor uses measures to mitigate out-going material transport vehicles from causing any track-out of materials onto the public way such as rumble strips or wheel wash stations, or both;

(b) Where a scrap processor is deemed in compliance with Subsection (a)(1) of this section, the scrap processor violates R 336.1301 of the Michigan Administrative Code, and a state officer or agency does not act to remedy or penalize the violation, the violation may be enforced as a blight violation under Section 42-1-27 of this Code.

(c) Nothing in Subsection (b) of this section shall be an exclusive remedy, or be construed to impair or bar any cause of action or legal or equitable remedy of any person or the public under applicable laws and regulations.

(d) The Buildings, Safety Engineering, and Environmental Department shall conduct semiannual inspections for the purpose of monitoring compliance with this section and may conduct other inspections for the purpose of monitoring compliance with this subdivision.

(e) An owner or operator of a facility not in compliance at any time with this section must comply with Parts II through V of this subdivision.

(Code 1984, § 22-5-7; Ord. No. 32-17, § 1(22-5-7), eff. 12-6-2017)

Secs. 42-2-157--42-2-170. Reserved.

Part II. Bulk Solid Material Facilities—General Requirements

Sec. 42-2-171. Operating and maintenance practices.

(a) Except as provided for in Subsections (b) and (c) of this section, a facility that processes, handles or transfers on-site, transfers, loads, unloads, stockpiles, or stores bulk solid materials shall comply with the requirements of this subdivision.

(b) A location that is an active construction site with all appropriate building permits and to which bulk solid materials are delivered for use in the construction at that site or at which bulk solid materials are temporarily situated for use in the construction at that site shall not be considered a facility subject to the requirements of this subdivision.

(c) Asphalt millings removed as part of a public paving or repaving project conducted, controlled, or funded by the City, the County of Wayne, the State of Michigan, or the United States and temporarily stored on or adjacent to the project for reuse in the project shall not be considered a facility subject to the requirements of this subdivision if the temporary storage period does not exceed 45 days.

(Code 1984, § 22-5-10; Ord. No. 32-17, § 1(22-5-10), eff. 12-6-2017)

Sec. 42-2-172. Certificate of Operation.

(a) Every owner or operator of a facility subject to this subdivision must possess a Certificate of Operation that is issued by the Buildings, Safety Engineering, and Environmental Department.

(b) The owner or operator shall submit to the Buildings, Safety Engineering, and Environmental Department an application for a Certificate of Operation. Upon the owner or operator providing evidence of compliance with the provisions of this subdivision, including, where applicable, submitting an approved fugitive dust plan or an approved enclosure plan, or both, and upon payment of the fee established by the Director of the Buildings, Safety Engineering, and Environmental Department pursuant to a schedule of fees, to cover the cost of application review and compliance inspection. The Buildings, Safety Engineering, and Environmental Department shall issue a Certificate of Operation in accordance with the provisions of this subdivision.

(c) The Certificate of Operation shall be conditioned upon continued compliance with this subdivision.

(d) The Buildings, Safety Engineering, and Environmental Department may impose dust control requirements, in addition to the requirements set forth in this subdivision, as a condition of the facility's Certificate of Operation, if the Buildings, Safety Engineering, and Environmental Department finds that the facility has failed to demonstrate its ability to control fugitive dust and the additional dust control requirements are necessary to protect the public health and environment.

(e) In the case of a facility operating under all applicable permits issued by the Buildings, Safety Engineering, and Environmental Department and subject to a Certificate of Operation issued by the Buildings, Safety Engineering, and Environmental Department as of the effective date of the ordinance that enacted this section, the Buildings, Safety Engineering, and Environmental Department may issue a temporary Certificate of Operation.

(Code 1984, § 22-5-11; Ord. No. 32-17, § 1(22-5-11), eff. 12-6-2017)

Sec. 42-2-173. Reviewing and approving applications.

(a) In determining whether to approve a fugitive dust plan and issue a Certificate of Operation, the Buildings, Safety Engineering, and Environmental Department shall solicit comments from the Health Department and the Water and Sewerage Department. The Buildings, Safety Engineering, and Environmental Department shall evaluate the information provided in the application to meet the requirements of this subdivision.

(b) The Director of the Buildings, Safety Engineering, and Environmental Department shall deny the application if it is incomplete or if the application does not demonstrate compliance with the requirements of this subdivision.

(c) The Director of the Buildings, Safety Engineering, and Environmental Department may attach reasonable conditions to the Certificate of Operation to ensure minimization of any adverse impacts.

(Code 1984, § 22-5-12; Ord. No. 32-17, § 1(22-5-12), eff. 12-6-2017)

Sec. 42-2-174. Change in facility operations.

Where any part of the facility's operation expands or changes, then, at least 30 days before the expansion or change in operation, the facility owner or operator shall notify the Director of the Buildings, Safety Engineering, and Environmental Department, submit an application to amend the Certificate of Operation, and submit a revised fugitive dust plan or establish to the Buildings, Safety Engineering, and Environmental Department's satisfaction that the expanded or changed operation will be compliant with the existing fugitive dust plan.

(Code 1984, § 22-5-13; Ord. No. 32-17, § 1(22-5-13), eff. 12-6-2017)

Sec. 42-2-175. Inspections by Buildings, Safety Engineering, and Environmental Department.

The Buildings, Safety Engineering, and Environmental Department shall conduct inspections for the purpose of monitoring compliance with this subdivision on a semiannual basis. The Buildings, Safety Engineering, and Environmental Department may conduct inspections for the purpose of monitoring compliance with this subdivision in response to any complaint received by the Buildings, Safety Engineering, and Environmental Department or the Buildings, Safety Engineering, and Environmental Department's reasonable suspicion of a violation of this subdivision.

(Code 1984, § 22-5-14; Ord. No. 32-17, § 1(22-5-14), eff. 12-6-2017)

Sec. 42-2-176. Fugitive dust.

(a) A facility owner or operator shall prevent the discharge into the atmosphere of visible fugitive dust as specified in this division.

(b) A facility owner or operator shall not cause or allow any fugitive dust that is visible beyond the property line of the facility. The facility owner or operator shall prevent the discharge into the atmosphere of visible fugitive dust as specified in this division.

(Code 1984, § 22-5-15; Ord. No. 32-17, § 1(22-5-15), eff. 12-6-2017)

Sec. 42-2-177. Opacity limits; measurement.

(a) An owner, operator or other person responsible for any fugitive dust source subject to this subdivision shall not cause or allow the emission of fugitive dust from any road, lot, or storage pile, including any material handling activity at a storage pile that has an opacity greater than five percent.

(b) An owner or operator of a facility subject to this subdivision shall not cause or allow any fugitive dust beyond the property line of the facility that has an opacity greater than zero percent.

(c) Opacity shall be determined by reference test method 9d, as defined in Section 5525(j) of the Michigan Natural Resources and Environmental Protection Act, being MCL 324.5525(j).

(d) The facility owner or operator shall perform, on at least a quarterly basis, tests of visual fugitive dust and opacity in accordance with the protocol set forth in the approved fugitive dust plan.

(Code 1984, § 22-5-16; Ord. No. 32-17, § 1(22-5-16), eff. 12-6-2017)

Sec. 42-2-178. Fugitive dust plan--Required.

(a) Every owner or operator of a facility subject to this subdivision must submit and follow a fugitive dust plan.

(b) If the owner or operator of the facility has obtained approval from the Stale of Michigan of a state operating plan as defined in Section 42-1-6 of this Code pursuant to state laws or regulations, including but not limited to Section 5524 of the Michigan Natural Resources and Environmental Protection Act, being MCL 324.5524, and R 336.1371 and R 336.1372 of the Michigan Administrative Code and the State Operating Plan, including any amendments, is currently legally enforceable and in effect, then the owner or operator of the facility shall provide a complete and current copy of the State Operating Plan, including any amendments to the Buildings, Safety Engineering, and Environmental Department, along with a statement indicating where and how the requirements of this subdivision are addressed by the State Operating Plan. Unless the Buildings, Safety Engineering, and Environmental Department makes specific findings that the State Operating Plan contains deficiencies or omissions that would render it insufficient to ensure compliance with this subdivision, the State Operating Plan shall be presumed to satisfy the requirements of this subdivision. The owner or operator shall notify the Buildings, Safety Engineering, and Environmental Department in advance of any submissions of new or amended state operating plans. Notwithstanding this subsection, the owner or operator of the facility shall install, operate, and maintain fugitive dust monitors pursuant to Section 42-2-180 of this Code unless the owner or operator of the facility conducts fugitive dust monitoring that is no less stringent than the requirements of Section 42-2-180 of this Code.

(c) If, at any time, the Buildings, Safety Engineering, and Environmental Department finds that the submitted fugitive dust plan is missing any required information or is insufficient to ensure compliance with this subdivision, the Buildings, Safety Engineering, and Environmental Department shall disapprove the fugitive dust plan and require submission of an amended fugitive dust plan. If there is any change, modification, or addition to any facility component described in an approved fugitive dust plan, the facility owner or operator shall submit an amended fugitive dust plan to the Buildings, Safety Engineering, and Environmental Department for review and approval at least 30 days before such change, modification, or addition.

(d) The first fugitive dust plan shall be due within 180 days of the effective date of the ordinance that enacted this subdivision. For facilities that are constructed or become subject to this subdivision after enactment, the first fugitive dust plan shall be submitted with the facility's application for a Certificate of Operation and before the facility accepts any bulk solid materials. After April 30 and before July 1 of each year, the owner or occupant of the facility shall submit to the Buildings, Safety Engineering, and Environmental Department an annual update to the fugitive dust plan for the Buildings, Safety Engineering, and Environmental Department’s review.

(Code 1984, § 22-5-17; Ord. No. 32-17, § 1(22-5-17), eff. 12-6-2017)

Sec. 42-2-179. Fugitive dust plan--Contents.

The fugitive dust plan shall include, at a minimum, the following components:

(1) The name and address of the facility:

(2) The name, address, and contact information of the owner or operator responsible for implementation of the fugitive dust plan

(3) A site map, drawn to scale, depicting the following information:

a. Facility boundaries;

b. All buildings, internal roadways, and utilities on facility property;

c. All roadways and transportation corridors within one quarter mile of the perimeter of the facility that are used for transport of material to or from the facility;

d. The location of all floor drains, storm drains, and storm water outfalls;
e. All potential emissions points at the facility, including a depiction of the footprints of all bulk solid material storage piles; and
f. The locations of all control devices and monitoring devices, including the fugitive dust monitors required under Section 42-2-180 of this Code and the wind monitors required under Section 42-2-181 of this Code;

(4) A description of the facility's operations, including a list of all bulk solid materials handled at, processed at, or transported to, from, or within the facility;

(5) A description of the truck routes within one quarter mile of the perimeter of the facility that are used to transport material to and from the facility, including an explanation of how dust will be minimized during transport, for example, travel on paved roads where possible, minimize truck speeds, and the like, and a description of the measures that will be used to ensure trucks are cleaned of loose material before they leave the facility;

(6) A calculation showing the facility's maximum total indoor and outdoor bulk solid material storage capacity in tons or cubic yards, in the first fugitive dust plan, due within 180 days of the ordinance that enacted this subdivision, the calculation shall be certified by signature of an authorized representative of the owner or operator and shall be accompanied by evidence of authority to sign on behalf of the owner or operator;

(7) A description of the control measures, devices, and technologies to be used to minimize and control fugitive dust, a description of how all control measures, devices, and technologies will be maintained and calibrated to ensure their continued effectiveness, and a description of the training provided to staff regarding the proper application and operation of the control measures, devices, and technologies;

(8) A dust monitoring plan that describes:

a. The placement, operation, and maintenance of the PM10 monitors if required under Section 42-2-180 of this Code; and
b. The schedule and plan for quarterly testing to ensure compliance with the prohibition on fugitive dust set forth in this subdivision. Such testing must be:
1. Conducted by a professional trained and certified to read opacity in accordance with the measurement method specified in Section 42-2-177 of this Code; and
2. Conducted during a range of weather conditions to ensure that representative conditions at the facility are covered;

(9) A contingency plan describing the owner's or operator's response activities when PM10 exceeds the reportable action level. The response activities should consist of a range of increasingly aggressive measures appropriate to different levels of exceedance;

(10) A contingency plan for an alternative method of monitoring in the event of malfunction or failure of any required PM10 monitors;

(11) A description of the facility's recordkeeping system, which shall include a schedule for routine inspection, testing, and maintenance as required in Section 42-2-191 of this Code;

(12) Other information as the Buildings, Safety Engineering, and Environmental Department may require to facilitate its review of the fugitive dust plan; and

(13) A fact sheet or executive summary of the fugitive dust plan designed to inform the public of the facility's plan to control and minimize fugitive dust, which may be posted on the City's website.

(Code 1984, § 22-5-18; Ord. No. 32-17, § 1(22-5-18), eff. 12-6-2017)

Sec. 42-2-180. Fugitive dust monitoring.

Unless, either pursuant to the variance procedure set forth in Part V of this subdivision or because the facility does not include carbonaceous bulk solid materials and is enclosed in accordance with Section 42-2-203 of this Code, the facility owner or operator establishes that the facility's operations do not and will not result in off-site fugitive dust emissions, the owner or operator of the facility shall install, operate, and maintain around the perimeter of the facility, according to manufacturer's specifications, permanent, continuous Federal Equivalent Method (FEM) real-time PM10 monitors, or other sensors acceptable to the Buildings, Safety

Engineering, and Environmental Department and the Health Department that provide equivalent information, in accordance with the following specific requirements:

(1) During the first year of monitoring, at least two monitors must be located at opposite ends of the facility to monitor fugitive dust in the ambient air around the facility:

(2) During the second and subsequent years of monitoring, monitors must be placed at the facility in compliance with an approved fugitive dust monitoring plan for the facility based on data collected from monitors placed Subsection (1) of this section;

(3) A data logger shall be attached to the monitors to record readings from the monitors, and the facility owner or operator shall notify the Buildings, Safety Engineering, and Environmental Department, in writing within 24 hours, each time the monitors exceed the reportable action level set forth in the fugitive dust plan and any time monitoring equipment has malfunctioned preventing readings or logging of data; and

(4) The facility owner or operator shall maintain a log of all routine and non-routine maintenance and calibration activities associated with each fugitive dust monitor.

(Code 1984, § 22-5-19; Ord. No. 32-17, § 1(22-5-19), eff. 12-6-2017)

Sec. 42-2-181. Wind monitoring.

(a) Except as provided in Subsection (b) of this section, the owner or operator shall install, operate, and maintain, according to manufacturer's specifications, a weather station or other permanent device to monitor and log wind speed and wind direction at the facility at an unobstructed, unsheltered area, centrally positioned in relation to the storage piles, and at a minimum height of 15 feet above ground level, unless the Buildings, Safety Engineering, and Environmental Department determines that another height is appropriate pursuant to applicable U.S. Environmental Protection Agency protocols and guidance.

(b) Subsection (a) of this section does not apply to bulk solid materials other than carbonaceous bulk solid materials if all handling and storage of the bulk solid materials is conducted within enclosed buildings, vehicles, and conveyors.

(Code 1984, § 22-5-20; Ord. No. 32-17, § 1(22-5-20), eff. 12-6-2017)

Sec. 42-2-182. Conveyors and transfer points.

The owner or operator shall install, operate, and maintain conveyors and material transfer points in compliance with one or a combination of the following measures in order to ensure compliance with the opacity limit set forth in Section 42-2-177 of this Code;

(1) Total enclosure;

(2) Water spray system sufficient to control fugitive dust emissions during operations:

(3) Vented to air pollution control equipment which is in full operation; or

(4) Transfer only moist material with a minimum moisture content of eight percent by weight as determined by ASTM analysis, unless another standard is established by an applicable state law or rule, and conduct the transfer in a manner that minimizes the exposed drop.

(Code 1984, § 22-5-21; Ord. No. 32-17, § 1(22-5-21), eff. 12-6-2017)

Sec. 42-2-183. Transport.

When transport is by truck, the facility owner or operator shall ensure that:

(1) All vehicles and off-road mobile heavy equipment handling or transporting bulk solid material shall adhere to the posted speed limit within the facility, which shall be no more than eight miles per hour;

(2) Except for existing facilities, material is received or transferred only in truck beds or trailers that, within one quarter mile of the perimeter of the facility, are driven only on paved roads;

(3) Unless the approved fugitive dust plan specifies an aggregate street sweeping plan or other measures to ensure that the trucks will not cause any unaddressed track-out of materials onto the public way, all outgoing material transport trucks, whether loaded or empty, are cleaned so that:

a. Any part of any tractor, bed. Trailer or the exterior surface, excluding the inside of the beds or trailer, are free of all loose material; an

b. The material removed by the truck cleaning operation is collected and recycled or otherwise disposed of so that it does not result in fugitive dust emissions.

(4) All outgoing material transport trucks, whether loaded or empty, pass over rumble strips that will vibrate the trucks and shake off loose material and dust.

(5) Unless the approved fugitive dust plan specifies an aggressive street sweeping plan or other measures in addition to the rumble strips to ensure that the trucks will not cause any unaddressed trackout of materials onto the public way, all outgoing material transport trucks, whether loaded or empty, pass through a wheel wash station.

(Code 1984, § 22-5-22; Ord. No. 32-17, § 1(22-5-22), eff. 12-6-2017)

Sec. 42-2-184. Coverings and other dust control.

The facility owner or operator shall not load material into any truck bed or trailer, railcar, or vessel unless measures are in place to prevent material from escaping from the truck bed or trailer, railcar, or vessel as follows:

(1) Truck beds and trailers must be immediately covered before leaving the futility in one of the following manners:

a. A solid sliding cover or stackable cover on the top of the truck bed or trailer that is kept completely closed except during loading; or

b. A continuous tarp that completely covers the truck bed or trailer and that is installed or constructed to prevent wind from entering over the leading edge of the bed or trailer rim into the interior of the bed or trailer.

(2) Railcars and vessels must be loaded in a manner that will control dust through the use of best management practices such as, but not limited to, the use of solid covers, the application of dust suppression agents and/or water, and the profiling of materials to prevent wind erosion.

(Code 1984, § 22-5-23; Ord. No. 32-17, § 1(22-5-23), eff. 12-6-2017)

Sec. 42-2-185. Prohibition against leakage.

Facility owners or operators shall not load material into a truck bed or trailer, railcar, or vessel such that the truck bed or trailer, railcar, or vessel leaks material or liquid that contains material onto internal roads or into waterways. Where the truck bed or trailer, railcar, or vessel leaks material or liquid that contains material onto an internal road or into a waterway, the facility owner or operator shall clean the affected road within one hour with a street sweeper or water and shall clean the affected waterway immediately.

(Code 1984, § 22-5-24; Ord. No. 32-17, § 1(22-5-24), eff. 12-6-2017)

Sec. 42-2-186. Truck loading and unloading.

For enclosed carbonaceous bulk solid material storage piles, the facility owner or operator shall conduct material truck loading and unloading only in an enclosed structure that is either equipped with a water spray system to be used as needed to prevent visible dust emissions or vented to permitted air pollution control equipment that is operated during loading and unloading activities. The ends of the structure shall have overlapping flaps that reduce the opening, sliding doors which shall remain closed except to allow the trucks to enter and leave, or other equally effective devices. For outdoor bulk solid material storage, the facility owner or operator shall ensure that truck loading and unloading occurs in compliance with the requirements for transfer points specified in Section 42-2-182 of this Code.

(Code 1984, § 22-5-25; Ord. No. 32-17, § 1(22-5-25), eff. 12-6-2017)

Sec. 42-2-187. Railcar loading and unloading.

For enclosed carbonaceous bulk solid material storage piles, the facility owner or operator shall conduct railcar material loading and unloading only in an enclosed structure that is either equipped with a water spray system operated to prevent visible dust emissions or vented to permitted air pollution control equipment that is operated during loading and unloading activities. The ends of the structure shall have overlapping flaps, sliding doors or other equally effective devices, which shall remain closed except to allow the railcars to enter and leave. For outdoor bulk solid material storage, the facility owner or operator shall ensure that railcar loading and unloading occurs in compliance with the requirements for transfer points specified in Section 42-2-182 of this Code.

(Code 1984, § 22-5-26; Ord. No. 32-17, § 1(22-5-26), eff. 12-6-2017)

Sec. 42-2-188. Vessel loading and unloading.

The facility owner or operator shall conduct vessel material loading only through an enclosed chute that uses a water spray system, or an air pollution control system or other mechanism described in the approved fugitive dust plan, in order to control fugitive dust emissions during operations. Vessel unloading shall be conducted in a manner that will minimize dust in accordance with measures set forth in the fugitive dust plan and in compliance with the requirements for transfer points specified in Section 42-2-182 of this Code.

(Code 1984, § 22-5-27; Ord. No. 32-17, § 1(22-5-27), eff. 12-6-2017)

Sec. 42-2-189. Roadway cleaning.

In order to clean roads of spilled and tracked material, the facility owner or operator shall use street sweeper to clean any paved road that is used to transport material inside or within one quarter mile of the perimeter of the facility and shall comply with all of the following requirements:

(1) The street sweeper shall be equipped with a water spray for use during non-freezing weather and a vacuum system to prevent fugitive dust during street sweeping:

(2) The street sweeping shall be sufficient so that not more than eight hours elapses between each street sweeper cleaning or after every 100 truck material receipts or dispatches, but not less than one time daily when the facility is open for business, unless the roads are free and clear of any material transported to or from the facility; and

(3) Each day, the facility owner or operator shall document whether for that day the facility owner or operator is street sweeping every eight hours or every 100 trucks, or whether the roads are free and clear of any material transported to or from the facility. The record shall show the date and time when street sweeping was performed and the truck count, as applicable.

(Code 1984, § 22-5-29; Ord. No. 32-17, § 1(22-5-29), eff. 12-6-2017)

Sec. 42-2-190. Spilled material.

The facility owner or operator shall maintain all areas within the facility not regularly used for storage of bulk solid material free of any spilled or misplaced material by removing such material by the end of each work shift.

(Code 1984, § 22-5-30; Ord. No. 32-17, § 1(22-5-30), eff. 12-6-2017)

Sec. 42-2-191. Recordkeeping.

The facility owner or operator shall keep and maintain facility logs as follows:

(1) Record daily, all cleaning and street sweeping;

(2) Record the application of water and/or chemical stabilizers as applicable, and note any instances when such application is suspended for any reason, including but not limited to, weather conditions;

(3)Record any instances when activities are suspended due to high winds as required by Section 42-2-215 of this Code as applicable;

(4) Record the results of the continuous monitoring for fugitive dust as required in Section 42- 2-180 of this Code, indicate any instances when a monitor detects fugitive dust that exceeds the reportable action level set forth in the fugitive dust plan, and record the action taken to respond to the detection of fugitive dust;

(5) Record quarterly, the results of the tests of visual fugitive dust and opacity as required in Section 42-2-177 of this Code;

(6) Maintain a schedule for routine inspection, maintenance, and testing of all control measures, devices, and technologies, including a schedule for inspection of bulk solid material piles, inspection of any monitors and inspection of off-site areas for the presence of dust, and identify the person or persons responsible for such inspections, maintenance, and testing;

(7) All records that are required to be kept pursuant to this subdivision shall be submitted to the Buildings, Safety Engineering, and Environmental Department on a quarterly basis and kept and maintained at the facility and be available for inspection for a minimum of three years from the date the record is created.

(Code 1984, § 22-5-31; Ord. No. 32-17, § 1(22-5-31), eff. 12-6-2017)

Sec. 42-2-192. Inspections.

Inspections for the purpose of monitoring compliance with this subdivision shall be conducted by the Buildings, Safety Engineering, and Environmental Department on at least a semiannual basis and in response to any complaint received by the Buildings, Safety Engineering, and Environmental Department.

(Code 1984, § 22-5-32; Ord. No. 32-17, § 1(22-5-32), eff. 12-6-2017)

Secs. 42-2-193--42-2-200. Reserved.

Part III. Carbonaceous Bulk Solid Material Facilities

Sec. 42-2-201. Enclosure of carbonaceous bulk solid material.

The owner or operator of a carbonaceous bulk solid material facility shall maintain all carbonaceous bulk solid material in fully enclosed structures in accordance with the enclosure requirements set forth in this division.

(Code 1984, § 22-5-40; Ord. No. 32-17, § 1(22-5-40), eff. 12-6-2017)

Sec. 42-2-202. Enclosure plan.

The owner or operator of any carbonaceous bulk solid material facility shall submit to the Buildings, Safety Engineering, and Environmental Department for review and approval a plan (the “enclosure plan”) for total enclosure of all carbonaceous bulk solid material piles, conveyors, transfer points, and processing areas at the facility. The enclosure plan shall include:

(1) A construction schedule prepared using the critical path method for completion of engineering, procurement, permitting, and construction of the enclosure; and

(2) A fugitive dust plan that shall include, at a minimum, the following components:

a. A site map, drawn to scale depicting the following information;

1. Facility boundaries
2. All buildings, internal roads and utilities on facility property;
3. All roadways within one quarter mile of the perimeter of the facility that are used for transport of material to or from the facility
4. The location of all floor drains, storm drains, and storm water outfalls;

5. All potential fugitive dust emissions points at the facility, including a depiction of the footprints of all carbonaceous bulk solid material piles;

6. The locations of all control devices and monitoring devices, including the fugitive dust monitors required under Section 42-2-180 of this Code and the wind monitor required under Section 42-2-181 of this Code.

b. A site maps drawn to scale, depicting the boundaries of any associated carbonaceous bulk solid material facility owned or operated by the owner or operator at which the owner or operator intends to temporarily store carbonaceous bulk solid materials during implementation of the enclosure plan, and including all the information required in Subsection (2)a of this section;

c. A description of the facility's operations, including a list of all carbonaceous bulk solid materials handled at the facility;

d. A description of all control measures, devices, and technologies to be used to minimize and control fugitive dust during transport to and from the facility while materials are staged, loaded, unloaded, processed, or otherwise handled at the facility;

e. A dust monitoring plan that describes the placement, operation, and maintenance of the PM10 monitors required under Section 42-2-180 of this Code, including an explanation of the background levels or PM10 leaving a facility that will determine the reportable action level (20 percent increase) based on the concentration of PM10 detected at the downwind monitor(s) at a facility;

f. A contingency plan describing the owner's or operator's response activities when the monitor required under Section 42-2-180 of this Code detect PM10 that exceeds the reportable action level established pursuant to Section 42-2-179(7) of this Code, and a contingency plan for an alternative method of monitoring in the event of malfunction or failure of the approved PM10 monitors;

g. A spill control and pollution prevention plan describing the owner's or operator's response activities to address spills of any stored materials and to protect and prevent any stored material from spilling into any floor drains, storm drains, or storm water outfalls; and

h. A description of the facility's recordkeeping system, which shall include a schedule for routine inspection and maintenance of the control measures, devices, and technologies, and the identity of the person or persons responsible for such maintenance and testing.

(Code 1984, § 22-5-41; Ord. No. 32-17, § 1(22-5-41), eff. 12-6-2017)

Sec. 42-2-203. Enclosure requirements.

Fully-enclosed structures for all carbonaceous bulk solid material handling, storage, and transfer operations must satisfy the following requirements:

(1) Structures used to store, handle, or transfer carbonaceous bulk solid materials must be completely enclosed structures with an impervious floor, four walls, and an approved roof;

(2) Structures used to store, handle, or transfer carbonaceous bulk solid materials shall be designed, permitted, and constructed in accordance with Chapter 8, Article II, of this Code, *Building Code*, Chapter 50 of this Code, *Zoning*, and other applicable state laws and regulations;

(3) Structures used to store, handle, or transfer carbonaceous bulk solid materials shall be properly maintained and shall be equipped with and shall use a permitted air pollution control system and/or the ability to apply water to materials within a structure sufficient to control fugitive dust emissions at designed vents and at any other openings, including entrances and exits;

(4) Entrances and exits for material or vehicles shall have overlapping flaps, sliding doors or other devices(s), which shall remain closed except to allow material or vehicles to enter and leave or to allow people to enter and exit, provided, that if devices other than overlapping flaps or sliding doors are used, then the performance for dust control at the openings must be shown in the fugitive dust plan to be equivalent to or better than that of the overlapping flaps or sliding doors used in conjunction with the required air pollution controls as determined by the Buildings, Safety Engineering, and Environmental Department; and

(5) Fully enclosed structures in compliance with this section need not comply with the fugitive dust monitoring requirements of Section 42-2-180 of this Code.

(Code 1984, § 22-5-42; Ord. No. 32-17, § 1(22-5-42), eff. 12-6-2017)

Secs. 42-2-204--42-2-210. Reserved.

Part IV. Outdoor Storage of Bulk Solid Materials Other Than Carbonaceous Bulk Solid Materials

Sec. 42-2-211. Outdoor bulk solid material storage.

The facility owner or operator may maintain outdoor storage of bulk solid material other than carbonaceous bulk solid material if the facility meets all of the requirements of this division.

(Code 1984, § 22-5-50; Ord. No. 32-17, § 1(22-5-50), eff. 12-6-2017)

Sec. 42-2-212. Setbacks.

Bulk solid material storage piles shall be located in accordance with setback requirements established in Chapter 50 of this Code, *Zoning*.

(Code 1984, § 22-5-51; Ord. No. 32-17, § 1(22-5-51), eff. 12-6-2017)

Sec. 42-2-213. Height limit; screening from view.

The vertical distance from grade immediately adjacent to a pile to the highest point of that pile shall be no greater than 50 feet. The facility owner or operator shall install and maintain, or otherwise have available at the facility, equipment or devices used to measure the height of each pile, with the equipment or devices available for use by an inspector during any inspection or use by the owner or operator of the facility to demonstrate compliance with the height limit to the satisfaction of the inspector during any inspection. Piles shall be screened from view or adjacent rights-of-way and from view of properties adjacent to the facility at the level of the right-of-way or separated from the facility by a right-of-way if the properties are located in districts zoned residential, SD4, or PR in conformance with Chapter 50, Article XIV, Division 2, Subdivision D, in particular Sections 50-14-365 and 50-14-367 of this Code.

(Code 1984, § 22-5-52; Ord. No. 32-17, § 1(22-5-52), eff. 12-6-2017)

Sec. 42-2-214. Protection of waterways.

Outdoor storage piles shall be set back at least 25 feet from any waterway, except that material in the process of being unloaded from or loaded to a vessel may be located within 25 feet of a waterway for a period of time not to exceed 24 hours so long as no materials are allowed to fall, erode, be thrown, discharged, dumped, disposed of, or deposited in the waterway at any time, the Buildings, Safety Engineering, and Environmental Department may reduce the 25 feet setback requirement upon receipt and verification of information that a shorter setback satisfies runoff and engineering requirements specific to the site.

(Code 1984, § 22-5-53; Ord. No. 32-17, § 1(22-5-53), eff. 12-6-2017)

Sec. 42-2-215. High-wind events.

Disturbance of outdoor bulk solid material piles, including but not limited to outdoor loading, unloading, and any other processing, shall be suspended during high wind conditions unless alternate measures are implemented to effectively control dust in accordance with the approved fugitive dust plan.

(Code 1984, § 22-5-54; Ord. No. 32-17, § 1(22-5-54), eff. 12-6-2017)

Sec. 42-2-216. Dust-suppressant system.

The Buildings, Safety Engineering, and Environmental Department shall require the facility owner or operator to apply chemical stabilizers and/or maintain and operate wind screens, water spray bars, a misting

system, water spray systems, and/or water trucks to prevent fugitive dust emissions in violation of Sections 42-2-176 and 42-2-177 of this Code, in accordance with the following requirements:

(1) Except pursuant to Subsection (3) of this section, the dust suppressant system shall be operable and able to dispense water, water-based solutions, and/or chemical stabilizers at all times unless all bulk storage material piles are covered or protected by wind screens.
(2) When the temperature falls below 32 degrees Fahrenheit, the facility must use chemical stabilizers and/or water heating systems to ensure that dust suppression continues.
(3) If any part of the dust suppressant system is undergoing maintenance or otherwise becomes inoperable, the facility owner or operator must suspend disturbance of bulk solid material piles that would be controlled by the inoperable portion of the dust suppressant system until such time as the system becomes operable again.

(Code 1984, § 22-5-55; Ord. No. 32-17, § 1(22-5-55), eff. 12-6-2017)

Sec. 42-2-217. Run-off management.

The facility owner or operator shall install and maintain storm water management, erosion, and sediment controls, pursuant to a written plan, sufficient to:

(1) Prevent runoff from the pile onto neighboring parcels, public ways, or any water bodies;
(2) Prevent runoff from entering into public sewers or any entry points into the storm water collection system, unless such discharges are in compliance with all applicable discharge permits
(3) Address timely and effective ways to respond to spills and/or visible migration of pollutants that could occur on site or offsite
(4) Demonstrate that the site is graded in such a way as to ensure proper drainage and to prevent pooling of water.

(Code 1984, § 22-5-56; Ord. No. 32-17, § 1(22-5-56), eff. 12-6-2017)

Secs. 42-2-218--42-2-230. Reserved.

Part V. Variances

Sec. 42-2-231. Applications for a variance; fee.

The facility owner or operator may apply to the Director of the Buildings, Safety Engineering, and Environmental Department for a variance from any requirement or provision set forth in Part II, Part III, or Part IV of this subdivision in accordance with the provisions set forth in Part V of this subdivision. The Director of the Buildings, Safety Engineering, and Environmental Department may establish a schedule of fees pursuant to which a variance review fee may be assessed per application.

(Code 1984, § 22-5-60; Ord. No. 32-17, § 1(22-5-60), eff. 12-6-2017)

Sec. 42-2-232. Requirements of the variance application.

The request for a variance must be in writing and must set forth, in detail, all of the following:

(1) A statement identifying the provision or requirement of this subdivision from which the variance is requested;

(2) A description of the process or activity for which the variance is requested, including pertinent data on location, size, and the population and geographic area affected by, or potentially affected by, the process or activity;

(3) The quantity and types of materials used in the process or activity in connection with which the variance is requested, as appropriate;

(4) A demonstration that issuance of the variance will not create a public nuisance or adversely impact the surrounding area, surrounding environment, or surrounding property uses;

(5) A statement explaining:

a. Why compliance with the regulations imposes an arbitrary or unreasonable hardship;
b. Why compliance cannot be accomplished during the required timeframe due to events beyond the facility owner or operator's control such as permitting delays or natural disasters; or
c. Why the proposed alternative measure is superior or preferable.

(6) A description of the proposed methods to achieve compliance with the regulations and a timetable for achieving that compliance, if applicable;

(7) A discussion of alternate methods of compliance and of the factors influencing the choice of applying for a variance;

(8) A statement regarding the person's current status as related to the subject matter of the variance request;

(9) For any request for a variance from the enclosure deadline set forth in Section 42-2-252 of this Code, if the applicant is not the owner or operator of a facility operating on the effective date of the ordinance that enacted this section, the applicant must submit all of the information required in Subsections (1) through (8) of this section and shall also submit all of the following:

a. Fugitive dust monitoring reports for the four months before the date of the variance application, and
b. In the event that the variance is granted, monthly fugitive dust monitoring reports for the duration of the variance which shall be due 14 days following the end of the month which the report covers.

(10) The monthly fugitive dust monitoring reports required by this section shall be submitted in an electronic format as specified in the variance.

(Code 1984, § 22-5-61; Ord. No. 32-17, § 1(22-5-61), eff. 12-6-2017)

Sec. 42-2-233. Criteria for reviewing applications.

(a) In determining whether to grant a variance, the Director of the Buildings, Safety Engineering, and Environmental Department will consider public comments received pursuant to Section 42-2-235 of this Code and will evaluate the information provided in the application to meet the requirements of Section 42-2-232 of this Code. Particular consideration will be given to the following information:

(1) Inclusion of a definite compliance program;
(2) Evaluation of all reasonable alternatives for compliance;
(3) Demonstration that any adverse impacts will be minimal.

(b) The Director of the Buildings, Safety Engineering, and Environmental Department shall deny the variance if the application for the variance is incomplete or if the application is outside the scope of relief provided by variances.

(c) The Director of the Buildings, Safety Engineering, and Environmental Department may deny a variance, may grant a variance in whole or in part, and may attach reasonable conditions to the variance to ensure minimization of any adverse impacts.

(d) Granting a variance is at the sole discretion of the Director of the Buildings, Safety Engineering, and Environmental Department. A variance may be revoked at any time if the Director of the Buildings, Safety Engineering, and Environmental Department finds that operation of the facility is creating a public nuisance or otherwise adversely impacting the surrounding area, surrounding environment, or surrounding property uses.

(Code 1984, § 22-5-62; Ord. No. 32-17, § 1(22-5-62), eff. 12-6-2017)

Sec. 42-2-234. Change in facility operations.

If any part of the facility's operation that is the subject of the variance expands or changes, then, at least 30 days before the expansion or change in operation, the facility owner or operator shall notify the Director of the Buildings, Safety Engineering, and Environmental Department and either apply for a new variance or notify the Director of the Buildings, Safety Engineering, and Environmental Department of the owner or operator's intent to comply with the requirements that were the subject of the variance, in which case the variance will automatically terminate.

(Code 1984, § 22-5-63; Ord. No. 32-17, § 1(22-5-63), eff. 12-6-2017)

Sec. 42-2-235. Notice of variance applications; public hearing; public comment.

The Director of the Buildings, Safety Engineering, and Environmental Department shall not grant any variance under this section until after a public hearing at which members of the public have had an opportunity to comment on the variance application. Members of the public shall also have the opportunity to submit written comments on the variance application. The Director of the Buildings, Safety Engineering, and Environmental Department shall provide notice of all variance applications by:

(1) Publication in a newspaper of general circulation published within the City;
(2) Posting on the City's website; and
(3) Mailed or delivered notice to all addresses located within 300 feet of the boundaries of the facility seeking the variance.

The public hearing shall be held not less than 14 days after publication of the notice. The Director of the Buildings, Safety Engineering, and Environmental Department shall accept written comments for a period of not less than 30 days from the date of publication of the notice. The Director of the Buildings, Safety Engineering, and Environmental Department shall not make a decision until after close of the comment period. Notice of the decision shall be posted on the City's website.

(Code 1984, § 22-5-64; Ord. No. 32-17, § 1(22-5-64), eff. 12-6-2017)

Secs. 42-2-236--42-2-250. Reserved.

Part VI. Implementation and Compliance

Sec. 42-2-251. Implementation schedule.

The provisions of this subdivision shall take effect in three phases as follows:

(1) The following sections and subsections shall take effect immediately upon the effective date of the ordinance that enacted this subdivision:

a. All sections with respect to new facilities or expansions of facilities, except those portions in operation on the effective date of the ordinance that enacted this subdivision
b. All sections within Part I of this subdivision, *In General*;
c. All sections within Part V of this subdivision, *Variances*;
d. Sec. 42-2-171, Operating and Maintenance Practices;
e. Sec. 42-2-172, Certificate of Operation;
f. Sec. 42-2-173, Reviewing and Approving Applications;
g. Sec. 42-2-174, Change in Facility Operations;
h. Sec. 42-2-175, Inspections by Buildings, Safety Engineering, and Environmental Department;
i. Sec. 42-2-177, Opacity Limits: Measurement;
j. Sec. 42-2-185, Prohibition Against Leakage;
k. Sec. 42-2-189, Roadway Cleaning;
l. Sec. 42-2-190, Spilled Material;
m. Sec. 42-2-191(1), Recordkeeping--Daily cleaning;
n. Sec. 42-2-191(6), Recordkeeping--Maintain Schedule for Routine Inspection;
o. Sec. 42-2-191(7), Recordkeeping--Timeframe for Maintenance of Required Records;
p. Sec. 42-2-192, Inspections;
q. Sec. 42-2-251, Implementation Schedule;
r. Sec. 42-2-253, Enclosure Reporting;
s. Sec. 42-2-254, Issuance of Certificate of Operation;
t. Sec. 42-2-27, Penalties;
u. Sec. 42-2-255, Public Health Fund.

(2) For facilities in operation on the effective date of the ordinance that enacted this subdivision, the following sections and subsections shall take effect 180 days from the effective date of the ordinance that enacted this subdivision:

a. Sec. 42-2-176, Fugitive Dust;
b. Sec. 42-2-178, Fugitive Dust Plan--Required;
c. Sec. 42-2-179, Fugitive Dust Plan--Contents;
d. Sec. 42-2-180, Fugitive Dust Monitoring;
e. Sec. 42-2-181, Wind Monitoring;
f. Sec. 42-2-182, Conveyors and Transfer Points;
g. Sec. 42-2-183, Transport;
h. Sec. 42-2-184, Coverings and Other Dust Control;
i. Sec. 42-2-186, Truck Loading and Unloading;
j. Sec. 42-2-187, Railcar Loading and Unloading;
k. Sec. 42-2-188, Vessel Loading and Unloading;
l. Sec. 42-2-191(2), Recordkeeping--Weather Conditions;
m. Sec.42-2-191(2), Recordkeeping--Application of Water or Chemical Stabilizer;
n. Sec. 42-2-191(3), Recordkeeping--Suspension of Activities Due to High Winds;
o. Sec. 42-2-191(4), Recordkeeping--Dust Monitoring Results;
p. Sec. 42-2-191(5), Recordkeeping--Record Quarterly Tests of Visual Fugitive Dust;
q. Sec. 42-2-201, Enclosure of Carbonaceous Bulk Solid Material;
r. Sec. 42-2-202, Enclosure Plan;
s. All sections within Part IV of this subdivision, Outdoor Storage of Bulk Solid Materials Other than Carbonaceous Bulk Solid Materials.

(3) For facilities in operation on the effective date of the ordinance that enacted this subdivision, the following sections shall take effect two years from the effective date of the ordinance that enacted this subdivision:

a. Sec. 42-2-203, Enclosure Requirements.
b. Sec. 42-2-252, Enclosure Deadline.

(Code 1984, § 22-5-70; Ord. No. 32-17, § 1(22-5-70), eff. 12-6-2017)

Sec. 42-2-252. Enclosure deadline.

(a) For facilities continuing in operation on the effective date of the ordinance that enacted this subdivision: Within two years from the submission of the enclosure plan, as required by Section 42-2-202 of this Code, and Section 42-2-251(2)(q) of this Code, all carbonaceous bulk solid materials must be either fully enclosed or removed from the facility, as required by Section 42-2-201 of this Code.

(b) For new facilities, expansion or recommencement of operation of existing facilities, compliance with the enclosure requirements is a condition to receiving a Certificate of Operation.

(Code 1984, § 22-5-71; Ord. No. 32-17, § 1(22-5-71), eff. 12-6-2017)

Sec. 42-2-253. Enclosure reporting.

During the two-year period provided in 42-2-251(3) of this Code, the facility owner or operator shall submit to the Buildings, Safety Engineering, and Environmental Department quarterly reports describing the work completed within the previous quarter, and the work planned in the current quarter and following quarter, towards compliance with these sections. The first report shall be due on the 15th day of the second month following the effective date of the ordinance that enacted this subdivision, with subsequent reports due on the 15th day of the month following each calendar quarter. The address to submit the reports is:

Buildings, Safety Engineering, and Environmental Department
Attn: Environmental Affairs Division
Two Woodward Avenue, 4th Floor
Detroit, MI Michigan 48226

The Director of the Buildings, Safety Engineering, and Environmental Department may, at the Director's sole discretion, grant extensions of the timeframes provided, in accordance with the variance provisions set forth in Part V of this subdivision upon request and only for good cause shown by the facility owner or operator.

(Code 1984, § 22-5-72; Ord. No. 32-17, § 1(22-5-72), eff. 12-6-2017)

Sec. 42-2-254. Issuance of Certificate of Operation.

Upon the owner or operator providing evidence of compliance with the provisions of this subdivision, including but not limited to submitting an approved fugitive dust plan and where applicable, an approved fugitive dust plan and enclosure plan, and upon payment of the fee established by the Director of the Buildings, Safety Engineering, and Environmental Department pursuant to a schedule of fees, to cover the cost of application review and compliance inspection. The Buildings, Safety Engineering, and Environmental Department shall issue a Certificate of Operation. The Certificate of Operation shall be conditioned upon continued compliance with this subdivision.

(Code 1984, § 22-5-73; Ord. No. 32-17, § 1(22-5-73), eff. 12-6-2017)

Sec. 42-2-255. Public Health Fund.

(a) The Public Health Fund is created as a separate depository fund. The Public Health Fund shall consist of the following:
(1) Money deposited in the Public Health Fund under Subsection (c) of this section;
(2) Money appropriated or allocated to the Public Health Fund by resolution or by this Code; and
(3) Donations of money to the Public Health Fund from any other source.

(b) Money in the Public Health Fund at the close of a fiscal year will remain in the Public Health Fund and not revert to the General Fund.

(c) Notwithstanding a contrary provision of this Code, a penalty or fine paid to the City for a violation of this subdivision must be credited to and deposited in the Public Health Fund.

(d) The Health Department and the Buildings, Safety Engineering, and Environmental Department may expend money from the Public Health Fund upon appropriation only for activities promoting the public health and wellness of residents of the City and to mitigate negative health impacts of pollution on residents of the City, including, but not limited to, enforcement of this subdivision, purchasing, installation use, and maintenance of air monitoring equipment, installation of vegetation to buffer the impact of activities subject to regulation under this subdivision, and conducting health impact assessments.

(e) A grant or other donation to the Public Health Fund must be accepted by City Council and is subject to any conditions on the grant or donation.

(f) An agreement or contract for expenditure of money from the Public Health Fund must be approved by the City Council and the Mayor.

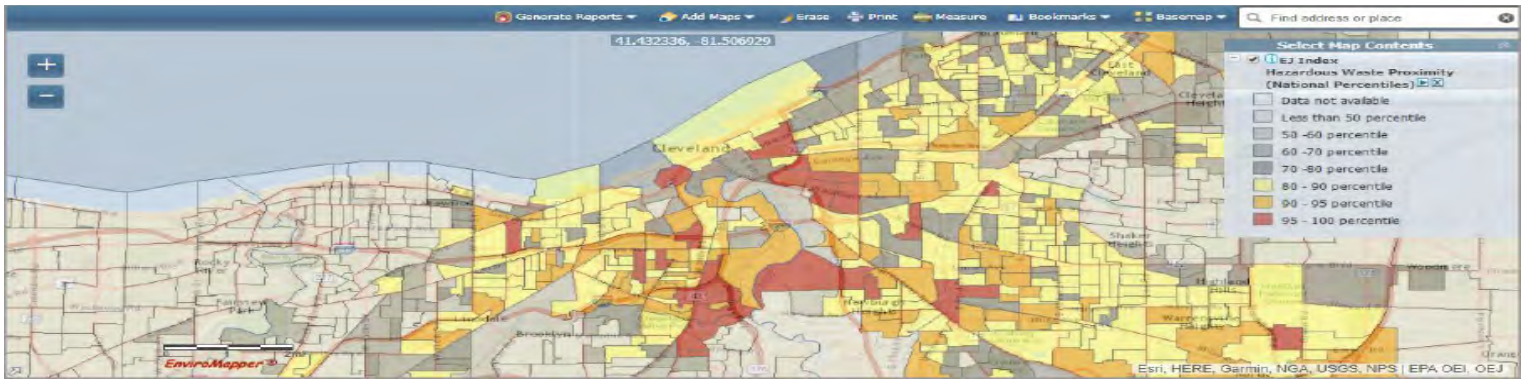
(Code 1984, § 22-5-75; Ord. No. 32-17, § 1(22-5-75), eff. 12-6-2017)

Secs. 42-2-256--42-2-300. Reserved.

Exhibit 16

United States Environmental Protection Agency

EJSCREEN Fact Sheet



How does EPA use EJSCREEN?

EPA uses EJSCREEN to identify areas that may have higher environmental burdens and vulnerable populations as the Agency develops programs, policies and activities that may affect communities. A few examples of what EJSCREEN supports across the Agency include:

- Informing outreach and engagement practices;
- As an initial screen for voluntary programs, enhanced outreach in permitting, and prioritizing enforcement work;
- Developing retrospective reports of EPA work; and
- Enhancing place-based activities.

EJSCREEN is not used by EPA staff for any of the following:

- As a means to identify or label an area as an "EJ community;"
- To quantify specific risk values for a selected area; or
- As the sole basis for EPA decision-making or making a determination regarding the existence or absence of EJ concerns.

Additionally, note that EPA is not requiring state, local, or tribal partners to use EJSCREEN in any context.

What is Environmental Justice?

EPA defines environmental justice (EJ) as, "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies." EPA's goal is to provide an environment where all people enjoy the same degree of protection from environmental and health hazards and equal access to the decision-making process to maintain a healthy environment in which to live, learn, and work.

What is EJSCREEN?

An important first step to ensuring environmental justice for all people in this country is to identify the areas where people are most vulnerable or likely to be exposed to different types of pollution. For this reason, EPA developed EJSCREEN to help aid in efforts to ensure programs, policies, and resources are appropriately inclusive and consider the needs of communities most burdened by pollution.

Proximity to traffic is one of the 11 environmental indicators.

EJSCREEN is an environmental justice screening and mapping tool that utilizes standard and nationally-consistent data to highlight places that may have higher environmental burdens and vulnerable populations. The tool provides both summary and detailed information at a high geographic resolution for both demographic and environmental indicators.

EJSCREEN also provides 11 EJ Indexes, which combine demographic information with a single environmental indicator (such as proximity to traffic) that can help identify communities that may have a high combination of environmental burdens and vulnerable populations. The tool displays this information in color-coded maps, bar charts, and standard reports on an easy to use web interface. All of this information can be used to assist efforts by stakeholders and advocates to protect human health and the environment in communities affected by pollution.

How can EJSCREEN be accessed?

EJSCREEN will be available as part of EPA's GeoPlatform that helps coordinate mapping activities, applications, and data across the Agency. It will be available through the EPA website, and will not require any downloads to use the tool.

What are the limitations of the tool?

For EPA's purposes, EJSCREEN will be used as an initial step in highlighting locations that may be candidates for further review. But EPA recognizes that screening level results have significant limitations and are not intended or designed to provide a risk assessment. For example, EJSCREEN does not provide data on every environmental impact and demographic indicator that may be relevant to a particular location, and data may be several years old. Thus, EPA will supplement EJSCREEN outputs with additional information and local knowledge before making any decisions about potential environmental justice issues.

Users of this tool should also be aware that screening tools are subject to substantial uncertainty in their demographic and environmental data, particularly when looking at small geographic areas like a census block group. Lastly, while the use of percentiles provides useful perspective by putting the 11 environmental indicators in common units, it simply means those two scores are equally common (or equally rare) in the United States. It does not mean the risks are equal or comparable.

How can the public use EJSCREEN?

EJSCREEN can be a useful tool to help communities and others identify areas with higher environmental and economic burdens in order to participate meaningfully in decision-making processes that impact their health and environment.

The public will be able to use EJSCREEN to access high-resolution environmental and demographic information for communities in the United States. The tool may help users identify areas with minority and/or low-income populations, potential air and water quality issues, and other factors that may be of interest. EJSCREEN may also be used to support educational programs, grant writing, community awareness efforts, and other purposes.

What kind of data does EJSCREEN use?

Because EJSCREEN is intended as a national tool, environmental and demographic data selected for the tool must be nationally available at the Census tract or block group level. EPA uses demographic data from the U.S. Census Bureau American Community 5-year Summary Survey (ACS), which include demographic indicators for race/ethnicity, poverty, age, educational level and language barriers.

Demographic Indicator	Description (Source: 2014 - 2018 ACS Estimates)
Low-Income	Percentage of block group population at or below twice the federal "poverty level"
Minority	All people other than non-Hispanic white-alone individuals
Less than high school education	Percentage of people age 25 or older without a high school diploma
Linguistic isolation	Percentage of people in household in which all members over age 14 years speak English less than "very well"
Individuals under age 5	Percentage of people under the age of 5
Individuals over age 64	Percentage of people over the age of 64

EJSCREEN puts each indicator or index value in perspective by reporting the value as a percentile. For example, the lead paint indicator may show 60% of housing in an area was built prior to 1960. It may not be obvious whether this is a relatively high or low value, compared to the rest of the nation or state. Therefore, EJSCREEN also reports that 60% pre-1960 puts the area at the 80th percentile. For a place at the 80th percentile nationwide, that means 20% of the US population has a higher value.

The 11 environmental indicators are based on information developed from direct measurements, proxy estimates of pollution exposure, and facility location information. Environmental and proximity indicators are screening-level proxies for exposure or risk – not actual exposure or risk.

Environmental Indicator	Year of Data
Particulate Matter (PM 2.5)	2017
Ozone	2017
NATA Diesel Particulate Matter	2014
NATA Air Toxics Cancer Risk	2014
NATA Respiratory Hazard Index	2014
Lead Paint Indicator	2014-2018
Traffic Proximity	2017
Proximity to Superfund (NPL) Sites	2020
Proximity to Risk Management Plan (RMP) Facilities	2020
Proximity to Hazardous Waste Facilities	2020
Wastewater Discharger Indicator	2020

EPA

For More Information

To find more detailed information about EJSCREEN visit: https://www.epa.gov/ejscreen
For questions, requests, feedback, and issues using EJSCREEN, e-mail enviromail_group@epa.gov.

Exhibit 17

Long-Term Renewable Resources Procurement Plan

Final Revised Plan

Prepared to conform with the Illinois Commerce Commission's Final Order in Docket No. 19-0995, dated February 18, 2020.

April 20, 2020

Prepared in accordance with the Illinois Power Agency Act (20 ILCS 3855), and the Illinois Public Utilities Act (220 ILCS 5)

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Appendices*

* Appendix C is no longer applicable to this Plan. The Agency's approach to REC pricing is unchanged from the Initial Plan (as discussed in Chapter 6 herein), therefore Appendices D and E were not updated for this Revised Plan. Appendices C, D, and E from the Initial Plan may be found at: https://www2.illinois.gov/sites/ipa/Pages/2018-Long-Term-Renewable-Appendices.aspx. Additionally, an updated Appendix B prepared for this Final Revised Plan can be found on the Illinois Power Agency's website at: https://www2.illinois.gov/sites/ipa/Pages/2020-LTRRPP-Appendices.aspx.

1. Introduction

This is the Final version of the first Revised Long-Term Renewable Resources Procurement Plan ("Revised Plan" or "Plan") of the Illinois Power Agency ("IPA" or "Agency"), consistent with the Final Order of the Illinois Commerce Commission ("ICC" or "Commission") entered on February 18, 2020.

The Initial Long-Term Renewable Resources Procurement Plan ("Initial Plan") was developed by the IPA pursuant to the provisions of Sections 1-56(b) and 1-75(c) of the Illinois Power Agency Act ("Act" or "IPA Act"), and Section 16-111.5 of the Public Utilities Act ("PUA"). That Initial Plan[1] was developed under authority established through Public Act 99-0906 ("P.A. 99-0906"), enacted December 7, 2016 (effective June 1, 2017), which substantially revised the Illinois Renewable Portfolio Standard ("Illinois RPS" or "RPS"). The Initial Plan covered the Agency's renewable energy resources procurement and programmatic activities for 2018 and 2019 and was approved by the Commission on April 3, 2018 in Docket No. 17-0838. The Agency published the final Initial Plan on August 6, 2018.

Section 16-111.5(b)(5)(ii)(B) of the Public Utilities Act provides that "[the Agency] shall review, and may revise, the plan at least every 2 years thereafter." This process of developing the Revised Plan constitutes the Agency's first such update. That subparagraph further provides that "[t]o the extent practicable, the Agency shall review and propose any revisions to the long-term renewable energy resources procurement plan in conjunction with the Agency's other planning and approval processes conducted under this Section." On August 15, 2019 a draft Revised Plan was released for public comment concurrently with the IPA's release of its draft 2020 Electricity Procurement Plan.[2] The Revised Plan was filed for Commission approval on October 21, 2019 and reflected the Agency's consideration of comments received on the draft Revised Plan. Under Section 16-111.5(b)(5)(ii)(C) of the PUA, the Commission then had 120 days to review the Revised Plan and enter is Order confirming or modifying the Plan.

The Initial Plan addressed the Agency's proposed set of programs and competitive procurements to acquire renewable energy credits ("RECs") for RPS compliance obligations applicable to three Illinois electric utilities: Ameren Illinois Company ("Ameren Illinois"), Commonwealth Edison Company ("ComEd"), and MidAmerican Energy Company ("MidAmerican"). The Initial Plan also described how the Agency would develop and implement the Illinois Solar for All ("ILSFA") Program, which utilizes a combination of funds held by the Agency in the Renewable Energy Resources Fund ("RERF") and funds supplied by the utilities from ratepayer collections, to support the development of photovoltaic ("PV") resources, along with job training opportunities (supported separately) to benefit low-income households and environmental justice communities. The Revised Plan updated those programs and procurements where applicable.

This Final Revised Plan reflects changes arising from the Commission's Order confirming and modifying the filed Plan. The Revised Plan as filed has been amended consistent with the IPA's

[1] The Initial Plan is available at https://www2.illinois.gov/sites/ipa/Documents/2019ProcurementPlan/Long%20Term%20Renewable%20Resources%20Procurement%20Plan%20%288-6-18%29.pdf.

[22] While the draft Revised Plan was initially released for public comment with a schedule of 30 days for the receipt of public comments and a subsequent 14 day period for the Agency to update the Plan based on those comments, on September 3, 2019 the Agency announced an update to that timeline to 45 and 21 days, respectively, after reconsideration of certain language in Section 16-111.5(b)(5)(ii) of the Public Utilities Act.
See: https://www2.illinois.gov/sites/ipa/Documents/Draft%20Revised%20Plan%20-%20Summer%202019/Revised%20Plan%20Schedule%20Update%20(3%20September%202019).pdf.

understanding of the Final Order issued by the Commission in Docket No. 19-0995. While the Agency has strived to fully and accurately reflect the Commission's Order in this update, in the case of any unintended inconsistencies between this Final Revised Plan and the Commission's Order, the Final Order issued by the Commission shall govern. The Revised Plan covers the Agency's proposals for procurements and programs that could be conducted during calendar years 2020 and 2021. As discussed throughout the Plan, absent legislative changes, RPS budget limitations will constrain the ability of the Agency to conduct additional procurements or expand program capacity for its Adjustable Block Program. Therefore, this Revised Plan provides a general framework for changes to procurements and programs should additional funding become available.[3] The Agency expects that as part of its annual procurement planning process conducted in calendar year 2021 (for implementation in 2022), it will again update and revise this Plan.

1.1. Initial Plan Accomplishments

Subsequent to the approval of the Initial Plan by the Commission on April 3, 2018, the Agency has completed the following implementation activities:

- First Subsequent Forward Procurement (1.980 million RECs annually from new utility-scale wind projects.[4] October 2018)
- Photovoltaic Forward Procurement (2 million RECs annually from new utility-scale solar projects.[5] November 2018)
- Brownfield Site Photovoltaic Procurement (Met statutory target of 40,000 RECs annually from new brownfield site photovoltaic projects. July 2019)
- Adjustable Block Program opened for Approved Vendor registration on November 1, 2018 and for project applications on January 30, 2019.
- Illinois Solar for All Program opened for Approved Vendor registration on February 19, 2019, for project applications for the 2018-2019 program year on May 15, 2019, and for the 2019-20 program year on September 4, 2019.
- Second Subsequent Forward Procurement (1 million RECs annually from new utility-scale wind projects. Conducted December 2019). No projects were selected in this procurement.
- Community Renewable Generation Procurement (50,000 RECs annually over 15 years from community renewable generation projects that are not photovoltaic. Conducted December 2019). No projects were selected in this procurement.
- Low-Income Community Solar Pilot Procurement ($20 million budget for 15-year REC delivery contracts. Conducted December 2019).

These activities are in addition to the Initial Forward procurements authorized through Section 1-75(c)(1)(G)(i)-(ii) of the Act and conducted in the second half of 2017 and first half of 2018; those were conducted under P.A. 99-0906, but not through the development and approval of the Initial Plan.

[3] The Illinois Solar for All Program is not impacted by the same budget constraints as it features somewhat distinct funding sources, and this Revised Plan proposes updates to the administration of that program.

[4] The law defines "utility-scale wind project" as an electric generating facility that (1) generates electricity using wind; and (2) has a nameplate capacity that is greater than 2,000 kilowatts. 20 ILCS 3855/1-10.

[5] The law defines "utility-scale solar project" as an electric generating facility that (1) generates electricity using photovoltaic cells; and (2) has a nameplate capacity that is greater than 2,000 kilowatts. 20 ILCS 3855/1-10.

Remaining activities approved in the Initial Plan include continuing to fill previously authorized blocks in the Small Distributed Generation category of the Adjustable Block Program.[6]

1.2. Plan Organization

This Final Revised Plan contains eight chapters.

Chapter 1 is this Introduction. It contains a brief overview of the Plan and a set of Action Items that the Agency requested that the Commission expressly adopt as part of its approval of this Revised Plan.

Chapter 2 provides an overview of the legislative/regulatory requirements contained in the Illinois Power Agency Act and the Public Utilities Act (particularly those that result from the enactment of Public Act 99-0906) that led to the development of the Initial Plan, and this Revised Plan, and the implementation of the resulting programs and procurements by the Illinois Power Agency.

Chapter 3 contains calculations of RPS targets, summaries of RPS portfolios, and summaries of RPS budgets. For this Revised Plan, it provides proposals related to calculating MidAmerican's RPS obligations and budgets, treatment of utility-held Alternative Compliance Payments, and a discussion of the forecast budget limitations that will constrain activities for the next several years.

Chapter 4 discusses the eligibility of RECs for use in the Illinois RPS. In particular, it addresses two requirements of the RPS: eligibility of RECs from facilities in adjacent states, and the requirement that RECs cannot be procured from facilities that recover their costs through regulated rates.

Chapter 5 describes the competitive procurement process and the potential procurements the Agency could consider conducting if funding becomes available. These include procurements for RECs from new brownfield site photovoltaic projects, utility-scale photovoltaic projects, and utility-scale wind projects.

Chapter 6 describes the Adjustable Block Program. This includes details on the structure of the blocks, REC (and adder) prices, the application process, payment terms, the process for adjusting prices, the process for approving vendors, project specifications, consumer protections, delivery requirements, and more. For this Revised Plan, the Agency proposed certain adjustments to the program structure contained in the Initial Plan and proposed a framework for managing waitlists of projects.

Chapter 7 describes the Community Renewable Generation Program including standards for co-location, eligibility of projects located in municipal utilities and rural electric cooperatives, subscriber requirements, consumer protections, legal issues around marketing claims related to RECs, and the responsibilities of utilities. In this Revised Plan, the Agency proposed certain clarifications of co-location requirements and additional codification of consumer protection requirements.

Chapter 8 describes the Illinois Solar for All Program including the program funding and design, customer terms, conditions, and eligibility, and an approach to designating environmental justice communities. For this Revised Plan, the Agency proposed certain adjustments to the program structure contained in the Initial Plan.

[6] As approved through Docket No. 19-0995, the Agency is also authorized to conduct an additional utility-scale wind procurement under this Revised Plan in light of no projects having been selected in the Second Subsequent Procurement under the Initial Plan.

1.3. Action Plan

In this Revised Plan, the IPA recommended the following items for ICC action as part of the Plan's approval:

1. Approve the RPS targets, and budget estimates for Ameren Illinois, ComEd, and MidAmerican for the delivery years 2020-2021 through 2021-2022 contained in Chapter 3, and additionally that Ameren Illinois, ComEd, and MidAmerican will provide updated load forecasts and budget data to the Agency on a biannual basis (each spring and fall) to allow the Agency to update those numbers.
2. Approve the Agency's approach to prioritizing the use of any future available budget funds contained in Chapter 3.
3. Approve the continuation of the Agency's approach for considering and weighting the public interest criteria related to facilities located in adjacent states that is contained in Chapter 4.
4. Approve the proposed procurements contained in Chapter 5.[7]
5. Approve the continuation of the basic design of the Adjustable Block Program contained in Chapter 6, including the block design, schedule of REC prices (and adders), and program terms and conditions as well as the updates proposed in this Revised Plan.
6. Approve the continuation of the basic design and terms and conditions of the Community Renewable Generation Program contained in Chapter 7 as well as the updates proposed in this Revised Plan.
7. Approve the continuation of the basic design and terms and conditions of the Illinois Solar for All Program contained in Chapter 8 as well as the updates proposed in this Revised Plan.

The Illinois Power Agency respectfully submits this Final Revised Long-Term Renewable Resources Procurement Plan, which reflects the Commission's Final Order in Docket No. 19-0995 confirming and modifying this Plan consistent with Section 16-111.5 of the PUA.

[7] This includes a utility-scale wind procurement for 1,000,000 RECs delivered annual to occur no later than May 31, 2021. This utility-scale wind procurement was authorized to bring RECs under contract previously expected from the Fall 2019 utility-scale wind procurement. See Docket No. 19-0995, Final Order dated February 18, 2020 at 18.

2. Legislative/Regulatory Requirements of the Plan

As with the original Long-Term Plan, this Chapter of the IPA's Revised Long-Term Renewable Resources Procurement Plan describes the legislative and regulatory requirements applicable to the Long-Term Renewables Plan, retaining much of the background discussion from the Initial Plan.

A Legislative Compliance Index, Appendix A, provides a complete cross-index of regulatory/legislative requirements and the specific sections of this Revised Plan that address each requirement identified.

2.1. Renewable Energy Resource Procurement Prior to Public Act 99-0906

Public Act 99-0906 did not introduce a Renewable Portfolio Standard into Illinois law, and the IPA's Long-Term Renewable Resources Procurement Plan is not the first Plan that the Agency produced addressing renewable energy resources procurement. Instead, the Agency has been producing procurement plans addressing renewable energy resource procurements since 2008 and conducting renewable energy resource procurements since 2009, and it is helpful to understand the background of the Illinois RPS's original structure and subsequent challenges in understanding the changes made through P.A. 99-0906 and the choices made through its implementation.

Prior to P.A. 99-0906, the Illinois RPS effectively had three compliance mechanisms depending on a customer's supply source: eligible retail customer procurements, Alternative Retail Electric Supplier ("ARES") compliance, and hourly pricing customer compliance payments.

2.1.1. Original RPS—Eligible Retail Customer Load

Of the three former RPS compliance mechanisms, the compliance pathway that looked most like the revised RPS enacted through P.A. 99-0906 was that which applied to "eligible retail customers," or those customers still taking default supply service from their electric utility (ComEd and Ameren Illinois, and starting in 2015, MidAmerican). The Agency's annual procurement plans (developed primarily to propose procurements intended to meet the energy, capacity, and other standard wholesale product requirements of eligible retail customers) also were required to include procurement proposals intended to meet annually-climbing, percentage-based renewable energy resource targets. As with block energy procured by the Agency, the applicable utility would be the counterparty to any resulting contracts.

Sub-targets were also introduced to the overall procurement volumes: of the renewable energy resources procured, 75% were required to come from wind, 6% from photovoltaics, and 1% from distributed generation. Prior to June 1, 2011, resources from Illinois were expressly prioritized (looking next to adjoining states if none was available, and then to elsewhere); after June 1, 2011, the RPS required looking to Illinois and adjoining states together as a first priority, and then to elsewhere. Funds available for use under RPS contracts were subject to a rate impact cap—a fixed bill impact cap percentage (2.015% of 2007 rates), which was then applied to eligible retail customer load to produce a renewable resources procurement budget.

This system may have worked more effectively had Illinois not experienced significant volatility in the size of its eligible retail customer load. But it did, primarily for the following reason: upon the establishment of the IPA in 2007, the General Assembly required that the electric utilities enter into relatively long-term energy supply contracts (known as the "swap contracts") to serve eligible retail customer load. In the years that followed, energy prices plummeted in the wholesale market, and

these agreements served to inflate the default supply rate well above that which could be offered by a competitive supplier. From 2011 to 2013, massive waves of default supply customers switched to ARES, often through opt-out municipal aggregation (municipalities, whether individually or in a coalition with others, leveraging economies of scale to negotiate favorable electric supply rates for their residents, under authority of Section 1-92 of the Act), and eligible retail customer load dwindled—with the annual available renewable resources budget declining correspondingly.

As part of its 2009 Annual Procurement Plan, the Agency proposed, and the Commission approved, a procurement for "bundled" (energy and REC) long-term contracts from renewable energy suppliers (known as the Long-Term Power Purchase Agreements, or "LTPPAs"). The LTPPA contracts were executed through a 2010 procurement event, with winning suppliers receiving 20 year bundled contracts to help meet future years' RPS targets. While this procurement helped facilitate significant new renewable energy development in Illinois (especially in the form of wind projects), it also provided a floor of annual payment obligations under the renewable resources budget for future years.

As the annual renewable resources budget declined due to customer switching, not only was funding unavailable to conduct additional renewable energy resource procurements, funding was no longer available to meet the full commitments of the LTPPAs described above—resulting in two years in which ComEd's LTPPAs were curtailed, or payment not made through the renewable resources budget for the full expected output. And while some load has switched back to default supply service in recent years, future budget uncertainty made entering into any additional long-term agreements unworkable (especially if such contracts were to be junior in priority to the existing 2010 LTPPAs). Because the Agency could not have visibility into budgets available in future years, outside of targeted distributed generation ("DG") procurements (which were statutorily required to be at least 5 year contracts), the Agency's annual procurement plans after the 2010 LTPPAs proposed only the procurement of one-year contracts to meet each upcoming delivery year's renewable energy resource obligations. As obtaining financing for developing new facilities generally required revenue certainty over a long period, this short-term focus left the prior RPS as an ineffective (or "broken") tool for facilitating the development of new renewable energy generation.

2.1.2. Original RPS—Hourly Pricing Customers

For hourly pricing customers, Section 1-75(c)(5) of the Act required that the applicable electric utility apply "the lesser of the maximum alternative compliance payment rate or the most recent estimated alternative compliance payment rate for its service territory for the corresponding compliance period" to hourly pricing customers. Those funds were held by the electric utility—and thus not subject to the transfer, sweep, and appropriation risks facing special state funds—and subject to the Agency's annual procurement planning process.

In recent years, because contracts with distributed generation systems required contracts of at least 5 years, the IPA used these hourly Alternative Compliance Payments ("ACPs") to serve as the funding source for DG procurements, including its most recent DG procurements approved in the IPA's 2017 Annual Procurement Plan.

As discussed more fully in Chapter 3, even accounting for payments still to be made under those DG procurements, some balance of prior-collected hourly ACPs remains for renewable energy resource

procurement under programs and procurements developed under P.A. 99-0906's revisions to Section 1-75(c)(1) of the IPA Act.[8]

2.1.3. Original RPS—ARES Compliance

Lastly, adopted in 2009, the ARES RPS compliance mechanism was more complex. Under Section 16-115D of the Public Utilities Act, each ARES carried a percentage-based renewable portfolio standard requirement similar to the Section 1-75(c) requirement as a percentage of its sales, but could satisfy its obligation by making alternative compliance payments at a rate reflecting that rate paid by eligible retail customers for no less than 50% of its obligation. For the remaining 50% of its obligation, the ARES could either pay additional alternative compliance payments and/or self-procure RECs (with a requirement that any RECs procured for compliance be produced by facilities within the regional transmission territories of PJM Interconnection, L.L.C. ("PJM") and Midcontinent Independent System Operator, Inc. ("MISO"), a relatively broad geographic footprint).

With ARES competing with one another for customers (and, for residential and small commercial customers, also competing against default supply service), this paradigm created an incentive for an ARES to comply at the lowest cost possible.[9] Thus, alternative compliance payments were generally made for the minimum 50% amount (as the rate applicable to those ACPs reflected more expensive procurements made by the Agency to serve other ends, such as through the 2010 LTPPAs), and the self-procurement obligation was not structured to lead to the development of new renewable energy generation.

Alternative compliance payments were deposited into the IPA-administered Renewable Energy Resources Fund. Leveraging this fund for procurements carried significant challenges. As the IPA explained in its Supplemental Photovoltaic Procurement Plan (released in 2014 and approved in 2015):[10]

> *The procurement of renewable energy resources using the RERF is subject to a set of unique constraints. First, unlike with the utility renewable resources budgets, the RERF may only be used to procure renewable energy credits. While the term "renewable energy resources" is defined in the Illinois Power Agency Act as RECs or both renewable energy and associated RECs,[11] the Public Utilities Act makes clear that "alternative compliance payments . . . shall be deposited in the Illinois Power Agency Renewable Energy Resources Fund and used to procure renewable energy credits."[12]*
>
> *Second, Section 1-56(c) of the IPA Act calls on the IPA to use the RERF to "procure renewable energy resources at least once each year in conjunction with a procurement event for electric utilities required to comply with Section 1-75 of the Act."[13] Given the IPA's strategy of advance purchases to hedge load requirements and the unexpectedly*

[8] While any remaining ACP funds (including hourly ACPs and ACPs paid to utilities by ARES) are considered part of the available RPS budget for planning purposes, as funds are already collected, these ACP funds do not count against Section 1-75(c)(1)(E)'s rate impact cap.

[9] To the extent that a customer sought a more environmentally friendly product, the ARES could always offer a "green" product including 100% of megawatt-hours matched with renewable energy credits, disconnected from any RPS compliance obligation.

[10] The characterizations of state law in this excerpt refer to the requirements of the Illinois Power Agency Act prior to Public Act 99-0906.

[11] 20 ILCS 3855/1-10.

[12] 220 ILCS 5/16-115D(d)(4).

[13] 20 ILCS 3855/1-56(c).

high levels of migration to alternative retail electric suppliers, corresponding energy procurement events for electric utilities had not occurred since 2012.[14] This has left the Agency without a procurement event "in conjunction with" which it could procure RECs using the RERF.

Third, Section 1-56(d) of the IPA Act requires that "the price paid to procure renewable energy credits" using the RERF "shall not exceed the winning bid prices paid for like resources procured for electric utilities required to comply with Section 1-75 of this Act."[15] The lack of a conjoining procurement event has also left the Agency without a statutorily envisioned price ceiling for "like resources," further constraining procurement using the RERF.

Fourth, the IPA Act clearly articulates a preference for longer-term contracts using the RERF, presumably to provide a stable stream of revenue necessary to incent the development of new resources. Section 1-56(c) of the IPA Act calls for the Agency to, "whenever possible, enter into long-term contracts on an annual basis for a portion of the incremental requirement for the given procurement year."[16] Similarly, Section 1-56(b) of the Act requires that any contracts for resources from distributed generation ("DG") must run a minimum of 5 years.[17] But due to unsettled and dynamic load migration between utility and alternative supplier service, the Agency must approach long-term contracting with prudence and care, as the RERF's future balance is subject to the whims of future customer switching.[18]

In addition to the above risks, as a special state fund, the RERF could always be—and indeed was—subject to the risks of borrowing and transfers. In 2010, $6.7 million was transferred out of the RERF, although ultimately repaid back into it. In 2015, $98 million was permanently transferred from the RERF to the state's General Revenue Fund ("GRF") to make up for insufficient Fiscal Year 2015 general revenues. And in August 2017, $150 million was temporarily transferred from the RERF to the GRF (after $12 million was permanently transferred from the RERF to the state's Public Utilities Fund in June 2017), leaving the RERF's balance temporarily below the level needed to cover existing contractual obligations ($37.5 million was transferred back into the RERF from the GRF in April 2018).[19] Given these risks, and given recent periods in which the state failed to enact a budget (and thus the IPA lacked appropriation authority to make payments under contracts regardless of actual funds available), the State of Illinois was an unattractive counterparty for REC delivery contracts.

With the majority of Illinois electric load being served by ARES, this stood as no small problem—while the RPS covered the vast majority of electricity delivered in the state, very little new renewable generation was able to be developed through it. Significant amounts were being paid into the RERF

[14] After not having procured energy in 2013, the Agency did conduct energy procurements in April 2014 and September 2014.

[15] 20 ILCS 3855/1-56(d).

[16] 20 ILCS 3855/1-56(c).

[17] 20 ILCS 3855/1-56(b).

[18] For further discussion of the challenges associated with entering into long-term contracts using funding streams subject to load migration changes, see filings made in Commission dockets approving the IPA's 2013 and 2014 annual procurement plans (Docket Nos. 12-0544 and 13-0546).

[19] The transfer of $150 million was pursuant to Section 5h.5 of the State Finance Act (30 ILCS 105/5h.5) which authorizes transfers from special funds to the General Revenue Fund for liquidity purposes. As recently modified by Public Act 101-0010, that Section also contains a provision that funds will be repaid within "48 months after the date on which they were borrowed," and a provision to transfer funds back to special funds as needed to "satisfy outstanding expenditure obligations on a timely basis."

each year to support renewable energy development, yet the money was unable to be effectively leveraged for that purpose. While ARES were procuring millions of RECs in aggregate each year, the incentive structure facing those suppliers made it highly unlikely that those RECs would be sourced from anything other than the lowest-priced seller: generally, facilities already built and financed, and potentially from projects in vertically integrated states with costs already being fully recovered through rates. Hence, parties seeking changes to this system often characterized it as a "broken RPS,"[20] and one that would require a comprehensive legislative overhaul to be properly fixed.

2.2. Public Act 99-0906

The Agency's obligation to develop a Long-Term Renewable Resources Procurement Plan stems from requirements included in Public Act 99-0906, known colloquially as the "Future Energy Jobs Act" and referred to herein as P.A. 99-0906. P.A. 99-0906, was passed by both the Illinois House and Senate during the last days of the 99th General Assembly on December 1, 2016, and was signed into law on December 7, 2016 with an effective date of June 1, 2017.

In addition to the requirement that the Agency develop its Long-Term Renewable Resources Procurement Plan and implement the programs and procurement discussed herein, P.A. 99-0906 also contained other significant reforms to Illinois energy law. Among those reforms included the establishment of a zero emission standard requiring the Agency to develop a Zero Emission Standard Procurement Plan for the procurement of zero emission credits from zero emission (i.e., nuclear) generating facilities;[21] revisions to the state's energy efficiency portfolio standard found in Article VIII of the Public Utilities Act (220 ILCS 5) including the adoption of cumulative savings targets for energy efficiency programs and measures, and the elimination of the statutory pathway by which incremental energy efficiency programs were included in the IPA's annual procurement plans;[22] additional financial assistance for low-income ratepayers;[23] bill crediting for the energy production associated with subscriptions to community renewable generation;[24] and a smart inverter rebate for behind-the-meter generating facilities.[25]

More pertinently for purposes of this Plan, P.A. 99-0906 constituted a comprehensive overhaul of the state's renewable energy portfolio standard, elements of which can be found in Sections 1-56 and 1-75(c) of the IPA Act and Section 16-115D of the PUA. Under the prior Illinois RPS, compliance and planning depended on how a customer's supply requirements were met, with three separate compliance mechanisms for by default utility supply service, hourly-pricing customers, and load served by Alternative Retail Electric Suppliers. As discussed further below, changes to the Illinois RPS through P.A. 99-0906 have transitioned the state's RPS to a streamlined, centralized planning

[20] One notable success story from the RERF was the Supplemental Photovoltaic Procurement process, which resulted in the development of roughly 30 MW of new distributed generation photovoltaics in Illinois through five-year REC contracts using the RERF. But even this process required legislative changes to be effectuated, with the Agency's authority to develop its Supplemental Photovoltaic Procurement Plan coming from Public Act 98-0672 (signed into law in 2014), which created new Section 1-56(i) of the IPA Act.

[21] The Agency's Zero Emission Standard Procurement Plan, developed pursuant to new Section 1-75(d-5) of the Act, was filed with the Commission on July 31, 2017 and was approved by the Commission on September 11, 2017. See ICC Docket No. 17-0333.

[22] See 220 ILCS 5/16-111.5B.

[23] See 220 ILCS 5/8-103B(c) (requiring ComEd and Ameren Illinois to allocate $25 million and $8.5 million, respectively, annually for low-income energy efficiency programs); 305 ILCS 20/18(c)(5), (5.5), (7) (authorizing Percentage of Income Payment Plan ("PIPP") qualified customers to receive credits under a utility's Arrearage Reduction Program, and creating a new Supplemental Arrearage Reduction Program for utility customers who cannot join the PIPP due to timing or funding constraints); 220 ILCS 5/16-108.10 (creating new $10 million annual funding stream over five years for low-income assistance programs for ComEd customers).

[24] See 220 ILCS 5/16-107.5(*l*).

[25] See 220 ILCS 5/16-107.6.

and procurement process, with both RPS targets and available budgets determined on the basis of an electric utility's load for all retail customers[26] with funding collected through a delivery services charge. The state's approach to meeting its RPS targets is now addressed through the initial development and continued refinement of this Long-Term Renewable Resources Procurement Plan, with the Plan proposing programs and procurements necessary to meet the new requirements of Illinois law and satisfying the law's new emphasis on both using the RPS as a tool to facilitate the development of new generating facilities and expanding access to the benefits of renewable energy across a broader cross-section of the state's economy.

2.2.1. Legislative Findings

This new emphasis was reflected in the legislative findings associated with Public Act 99-0906. Specifically, in enacting P.A. 99-0906, the General Assembly found that "[t]o ensure that the State and its citizens, including low-income citizens, are equipped to enjoy the opportunities and benefits of the smart grid and evolving clean energy marketplace," P.A. 99-0906 should serve to "maximize the impact" of the state's RPS.[27] This includes direction that the State should "encourage . . . the adoption and deployment of cost-effective distributed energy resource technologies and devices, such as photovoltaics, which can encourage private investment in renewable energy resources, stimulate economic growth, enhance the continued diversification of Illinois' energy resource mix, and protect the Illinois environment; investment in renewable energy resources, including, but not limited to, photovoltaic distributed generation, which should benefit all citizens of the State, including low-income households."[28]

These themes are also found in the legislative findings and declarations of the IPA Act enacted through P.A. 99-0906. The IPA Act now finds and declares that" [d]eveloping new renewable energy resources in Illinois, including brownfield solar projects and community solar projects, will help to diversify Illinois electricity supply, avoid and reduce pollution, reduce peak demand, and enhance public health and well-being of Illinois residents."[29] Other findings also reinforce the value of community solar in expanding access to renewable energy,[30] and the value of developing brownfield site solar projects to "help return blighted or contaminated land to productive use while enhancing public health and the well-being of Illinois residents."[31]

This approach to the state's RPS was a meaningful shift in the logic governing the state's renewable energy requirements: prior to 2017, the state's approach to its RPS could have been understood as governed by the logic that statutory compliance should be achieved at "the lowest total cost over time, taking into account any benefits of price stability,"[32] as this criteria governed the Agency's

[26] For MidAmerican, the IPA understands that Section 1-75(c)'s renewable energy procurement targets generally relates to the supply procured for MidAmerican's jurisdictional eligible retail customers and not all retail sales in its service territory. Given recent changes to MidAmerican's eligible retail customer load forecasting methodology and the need to protect against curtailments and annual fluctuations, the IPA is proposing a fixed percentage approach to determining both these targets and to resultant budget availability as discussed further in Chapter 3.

[27] P.A. 99-0906, § 1(a).

[28] P.A. 99-0906, § 1(a)(1). In the legislative findings of P.A. 99-0906, the General Assembly also specifically found that "low-income customers should be included within the State's efforts to expand the use of distributed generation technologies and devices." P.A. 99-0906, § 1(b).

[29] 20 ILCS 3855/1-5(6).

[30] 20 ILCS 3855/1-5(7).

[31] 20 ILCS 3855/1-5(8).

[32] See 220 ILCS 5/16-111.5(d)(4).

annual procurement plan, in which renewable energy procurements were proposed. Through changes effected by P.A. 99-0906, state law now seeks outcomes of specific types—more equitable and diverse access to the benefits of renewable energy, and an emphasis on facilitating the development of new generation and maximizing its environmental benefits—in achieving compliance with the technical requirements of the law.

Guidance found in the RPS law itself also reflects that approach. Specifically, Section 1-75(c)(1)(I) of the IPA Act requires that the IPA "shall design its long-term renewable energy procurement plan to maximize the State's interest in the health, safety, and welfare of its residents, including but not limited to minimizing sulfur dioxide, nitrogen oxide, particulate matter and other pollution that adversely affects public health in this State, increasing fuel and resource diversity in this State, enhancing the reliability and resiliency of the electricity distribution system in this State, meeting goals to limit carbon dioxide emissions under federal or State law, and contributing to a cleaner and healthier environment for the citizens of this State." The Agency believes both its original and this revised Long-Term Renewable Resources Procurement Plan reflect these aspirations.

2.2.2. Changes to the RPS

Public Act 99-0906 also ushered in several changes to the RPS, including the introduction of new concepts, terms, and prescriptive requirements. As was done in the Initial Plan, several of these concepts are discussed below, in the subsections later in this chapter, and in the Chapters that follow.

2.2.3. New Concepts and Terms

First, as discussed further below, P.A. 99-0906 demonstrated a shift in compliance focus from compliance through the procurement of "renewable energy resources"—which may be either 1) a renewable energy credit associated with a megawatt-hour ("MWh") of generation, or 2) that REC plus the associated generation—to compliance through the purchase and retirement of "renewable energy credits."[33] This makes intuitive sense; the purchase of energy is not addressed through this planning process, and the Agency's planning for any energy purchases can only be for utility default supply customers ("eligible retail customers") through the development of a separate procurement plan (which focuses on a shorter timeframe than many of the REC contracts envisioned in the revised RPS).

Second, P.A. 99-0906 introduced the concept of a "community renewable generation project" to Illinois law. As defined by the IPA Act,[34] this is an electric generating facility that

> (1) is powered by wind, solar thermal energy, photovoltaic cells or panels, biodiesel, crops and untreated and unadulterated organic waste biomass, tree waste, and hydropower that does not involve new construction or significant expansion of hydropower dams;
>
> (2) is interconnected at the distribution system level of an electric utility as defined in this Section, a municipal utility as defined in this Section that owns or operates electric distribution facilities, a public utility as defined in Section 3-105 of the Public Utilities Act, or an electric cooperative, as defined in Section 3-119 of the Public Utilities Act;

[33] See, e.g., 20 ILCS 3855/1-75(c)(1)(B), (C). The law continues to recognize that "renewable energy resources" may be used to satisfy the RPS, but focuses this Plan only on the procurement of "renewable energy credits" (which, standing alone, also may constitute "renewable energy resources").

[34] See 20 ILCS 3855/1-10.

(3) credits the value of electricity generated by the facility to the subscribers of the facility; and

(4) is limited in nameplate capacity[35] to less than or equal to 2,000 kilowatts.

A subscriber's subscription to such a facility is an "interest" in that facility, "expressed in kilowatts" and sized primarily to offset part or all of the subscriber's electricity usage, and may not constitute more than 40% of the facility's nameplate capacity.[36] Photovoltaic powered community renewable generating projects are frequently described herein (as well as in Sections 1-10 and 1-56(b) of the IPA Act) as "community solar" projects, and feature distinct procurement targets in the Illinois RPS.

Third, P.A. 99-0906 requires the development of an "adjustable block program" ("ABP"). Used to facilitate the development of new community solar and distributed photovoltaic generation, the Adjustable Block Program is required to feature a "transparent schedule of prices and quantities" for RECs "to enable the photovoltaic market to scale up and for renewable energy credit prices to adjust at a predictable rate over time."[37] This represented a significant shift in the state's approach to procuring renewable energy; prior to the ABP (and to the Illinois Solar for All Program), past efforts to procure renewable energy resources focused on competitive sealed bidding, pay-as-bid procurement events. Most bidder and supplier information, including resulting contract prices and quantities for winning bidders, was kept confidential. While these competitive procurement elements continue to be utilized for other activities under the Illinois RPS (including "forward procurements"), other compliance pathways now feature open application to a program featuring price and quantity transparency.

Fourth, both the Illinois Solar for All Program and the Adjustable Block Program require "prepayment" (or partial prepayment) for a stream of RECs to be delivered over the course of a 15-year contract. This likewise constituted a departure from prior activities under the Illinois RPS, all of which featured payment for RECs only upon delivery and invoice.

This, of course, is not a comprehensive list; many other new terms and concepts were also introduced through P.A. 99-0906. This non-exhaustive list is intended only to provide context for the discussions that follow.

2.2.4. Long-Term Renewable Resources Procurement Plan

As referenced above, P.A. 99-0906 required the IPA to develop a Long-Term Renewable Resources Procurement Plan. That original Long-Term Renewable Resources Procurement Plan or "Initial Plan" was filed with the Illinois Commerce Commission on December 4, 2017, and approved by the Commission on April 3, 2018 through Docket No. 17-0838.

This was a departure from past practice under the Illinois RPS; previously, Illinois law required that renewable energy resource procurements used to meet the requirements of Section 1-75(c) of the IPA Act be proposed through the Agency's annual procurement plan developed pursuant to Section 16-111.5 of the PUA. As required under Section 16-111.5, those plans were developed, published,

[35] "Nameplate capacity" is defined in the law as the aggregate inverter nameplate capacity in kilowatts AC. 20 ILCS 3855/1-10.

[36] Id.

[37] 20 ILCS 3855/1-75(c)(1)(K).

filed with the ICC, and approved by the ICC on an annual basis (and still are, with a more limited focus) with a planning horizon of the five upcoming delivery years.

By contrast, the Long-Term Renewable Resources Procurement Plan—prepared pursuant to Section 16-111.5(b)(5) of the PUA, introduced through P.A. 99-0906—was initially prepared in 2017, was approved by the ICC in 2018, is to be revised at least every two years (with this Revised Plan constituting the first such revision), and "shall include procurement programs and competitive procurement events necessary to meet the goals"[38] set forth in Section 1-75(c) of the IPA Act—which contains annual targets out until 2030.

2.2.5. Plan Requirements

While Illinois law lacks any single list of required elements for the Plan, both Section 16-111.5(b) of the PUA and Sections 1-56(b) and 1-75(c) of the IPA Act contain discrete requirements.

2.2.5.1. Section 16-111.5(b) Requirements

Section 16-111.5(b)(5) of the PUA provides that "[t]he Agency shall prepare a long-term renewable resources procurement plan for the procurement of renewable energy credits under Sections 1-56 and 1-75 of the Illinois Power Agency Act for delivery beginning in the 2017 delivery year,"[39] with "delivery year" defined as "the consecutive 12-month period beginning June 1 of a given year and ending May 31 of the following year"[40]—i.e., the first delivery year for which the Plan was developed was 2017-2018. As a consequence, the IPA's Initial Plan as filed proposed procurements necessary to meet "2017 delivery year" goals, as well as targets for future delivery years. However, as discussed further in Chapter 5,[41] the Commission's Order in Docket No. 17-0838 directed that no procurements be held to meet Section 1-75(c)(1)(B) of the Act's 2017 delivery year renewable energy credit procurement goals,[42] and the IPA does not propose additional procurements specifically designed to meet upcoming years' Section 1-75(c)(1)(B)'s annual percentage-based goals through this Revised Plan.

The PUA also contains three discrete requirements for what the Plan must contain:

First, the Plan must "[i]dentify the procurement programs and competitive procurement events consistent with the applicable requirements of the Illinois Power Agency Act and shall be designed to achieve the goals set forth in subsection (c) of Section 1-75 of that Act."[43] While the term "competitive procurement event" is not specifically defined in the IPA Act or the PUA, the IPA understands the term "competitive procurement event" to be an element of, if not commensurate with, a "competitive procurement process" or "competitive bid process," which the PUA describes subject to the requirements of Section 16-111.5(e)-(i) where applicable (i.e., conducted in a manner consistent with the Agency's prior competitive procurements).[44] The term "program" presumably

[38] 20 ILCS 3855/1-75(c)(1)(A).

[39] 220 ILCS 5/16-111.5(b)(5).

[40] 20 ILCS 3855/1-10.

[41] See generally the discussion of "Spot Procurements."

[42] See Docket No. 17-0838, Final Order dated April 3, 2018 at 42.

[43] 220 ILCS 5/16-111.5(b)(5)(ii)(B)(aa).

[44] 220 ILCS 5/16-111.5(b)(5)(iii).

refers to the programs specifically referenced in Section 1-56(b) and Sections 1-75(c)(1)(K) and (N) of the IPA Act.

As with the Initial Plan, this Revised Plan's specific procurement programs and procurement events designed to meet the goals of Section 1-75(c) can be found in Chapters 5 through 8.

Second, the Plan must "[i]nclude a schedule for procurements for renewable energy credits from utility-scale wind projects, utility-scale solar projects, and brownfield site photovoltaic projects consistent with subparagraph (G) of paragraph (1) of subsection (c) of Section 1-75 of the Illinois Power Agency Act."[45] This subparagraph concerns the quantitative procurement targets for RECs from new solar and wind facilities found in Section 1-75(c), and the schedule for those procurements can be found in Chapter 5.

Third, the Plan must "[i]dentify the process whereby the Agency will submit to the Commission for review and approval the proposed contracts to implement the programs required by such plan."[46] Under the prior RPS, pursuant to Section 16-111.5(e) of the PUA, the IPA's procurement administrator developed standard contract forms in consultation with other parties. A Commission decision was required only if parties could not agree on the contract form, and the standard form contract was required to be executed by winning bidders after a competitive procurement result (the results of which were subject to Commission approval). Under this revised model for use in implementing programs, both REC delivery contracts and the IPA's program administrator contracts[47] must first be approved by the Commission prior to execution.[48] The IPA's process for submitting contracts to the Commission for review and approval can be found in Chapters 6 and 8 of the Plan; it does not meaningfully differ from that which was proposed in the Initial Plan. As this requirement concerns only "the programs required by such plan," this requirement does not impact the contract development process for the competitive procurements described in Chapter 5, although Commission approval is also required prior to the execution of contracts for competitive procurements under the process described in Section 16-111.5(e)-(i).

2.2.5.2. Section 1-75(c) Requirements

Section 1-75(c) of the IPA Act contains the most robust set of requirements for the long-term plan; those include the following:

First, the Plan must "include the goals for procurement of renewable energy credits to meet at least the following overall percentages: 13% by the 2017 delivery year; increasing by at least 1.5% each delivery year thereafter to at least 25% by the 2025 delivery year; and continuing at no less than 25% for each delivery year thereafter."[49] These percentages are described as a portion of eligible

[45] 220 ILCS 5/16-111.5(b)(5)(ii)(B)(bb).

[46] 220 ILCS 5/16-111.5(b)(5)(ii)(B)(cc).

[47] For the Agency's third-party program administrators, Section 16-111.5(b)(5)(iii) provides that "[t]hird parties shall not begin implementing any programs or receive any payment under this Section until the Commission has approved the contract or contracts under the process authorized by the Commission in item (D) of subparagraph (ii) of paragraph (5) of this subsection (b) and the third party and the Agency or utility, as applicable, have executed the contract."

[48] In its Order approving the Plan, the Commission held that under Section 16-111.5(b)(5)(iii)'s requirements, "it must review the individual [REC delivery] contracts between the utilities and Approved Vendors and "not just a master contract, although "a master contract that is updated by a confirmation agreement providing the batch details regarding seller, buyer, price, term, project location, etc. is a reasonable approach." Docket No. 17-0838, Final Order dated April 3, 2018 at 116.

[49] 20 ILCS 3855/1-75(c)(1)(B).

retail sales, which now includes sales by alternative retail electric suppliers. The law also contains a requirement that "in the event of a conflict between these goals and the new wind and new photovoltaic procurement requirements," the long-term plan shall prioritize the new wind and photovoltaic requirements.[50]

In Docket No. 17-0838, the Commission's Order approving the Initial Plan determined that any procurements originally proposed to meet annual percentage-based renewable energy credit procurement goals should be cancelled to avoid any potential conflicts with meeting "statutory long-term new build requirements."[51] As budget constraints have become a more acute concern given the massive progress in new renewable energy development spurred on by programs and procurements conducted under the Initial Plan (and corresponding budget impacts from REC delivery contracts), this Revised Plan has been designed in a manner that likewise reduces the likelihood of any such conflict occurring. Further discussion can be found in Chapter 3.

Second, the Plan "shall include the procurement of renewable energy credits in amounts equal to at least" the new wind and new photovoltaics targets found in Section 1-75(c)(1)(C) of the IPA Act. These targets are 2 million RECs from "new wind projects" by the 2020 delivery year, 3 million by 2025, and 4 million by 2030. "New photovoltaic projects" feature the same overall procurement targets, while also containing requirements that at least 50% of new PV RECs be procured through the Adjustable Block Program (and thus from distributed generation or community solar projects), at least 40% from utility-scale (above 2 MW) photovoltaic projects, and at least 2% from brownfield site photovoltaic projects that are not community renewable generation projects. Further discussion of these quantitative new build targets, including a discussion of progress made toward meeting these targets to date, can be found in Chapters 3 and 5.

Third, the law requires that, to the extent that annual RPS spending budgets[52] for each utility become a binding constraint, the Plan "shall prioritize compliance with the requirements of this subsection (c) regarding renewable energy credits" in the manner discussed in Section 1-75(c)(1)(F), which features the following priority ranking:

> (i) renewable energy credits under existing contractual obligations;
>
> (i-5) funding for the Illinois Solar for All Program as described in Section 1-75(c)(1)(O);[53]
>
> (ii) renewable energy credits necessary to comply with the new wind and new photovoltaic procurement requirements in Section 1-75(c)(1)(C); and
>
> (iii) renewable energy credits necessary to meet the remaining requirements of Section 1-75(c) (including the percentage-based delivery year goals in Section 1-75(c)(1)(B)).[54]

The IPA is committed to ensuring that this priority ranking is reflected in this Revised Plan and has assembled its Plan cognizant of and sensitive to this prioritization.

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[50] Id.

[51] Docket No. 17-0838, Final Order dated April 3, 2018 at 42.

[52] The statutory cost cap and resulting budgets for RPS spending, directed in Section 1-75(c)(1)(E) of the Act, are discussed in more detail in Section 2.4.4 and Chapter 3 of this Revised Plan.

[53] This requirement is discussed further in the subsection below.

[54] 20 ILCS 3855/1-75(c)(1)(F).

Fourth, the law requires that renewable energy credits procured under the Initial Forward Procurements shall be included in the Agency's long-term plan and shall apply to Section 1-75(c)'s goals.[55] The results of the Initial Forward Procurements, conducted in three events from August 2017 through April 2018, are reflected in the Agency's target procurement quantities found later in Chapter 3 of this Revised Plan.

Fifth, the Plan must set forth the process by which adjustments may be made when the cumulative amount of renewable energy credits projected to be delivered from all new wind projects in a given delivery year exceeds the cumulative amount of renewable energy credits projected to be delivered from all new photovoltaic projects in that delivery year by 200,000 or more renewable energy credits.[56] This provision is presumably intended to provide some balancing between wind and solar quantities under contract.

In its Order approving the Initial Plan, the Commission clarified that this balancing requirement becomes effective as of June 1, 2021, the original statutory deadline for deliveries from projects having initial forward procurement contracts (and not earlier, as argued by some parties in Docket No. 17-0838).[57] Since that time, Public Act 101-0113—signed into law on July 19, 2019—modified Sections 1-75(c)(1)(G)(i)-(ii) of the IPA Act such that these subparagraphs now provide that should an initial forward procurement project have "delays in the establishment of an operating interconnection with the applicable transmission or distribution system as a result of the actions or inactions of the transmission or distribution provider, or other causes for force majeure as outlined in the procurement contract," this statutory deadline may be extended to June 1, 2022. From the Act, it is unclear whether this would also then extend the effective date of the wind/solar balancing requirement outlined in Section 1-75(c)(1)(G)(iv) of the Act; the IPA proposes that it would, as the logic informing this determination would support aligning the effective date of the balancing requirement with the new required date for first deliveries under initial forward procurement contracts.[58]

Sixth, the Plan must describe in detail how each "public interest factor" enumerated in Section 1-75(c)(1)(I) "shall be considered and weighted for facilities located in states adjacent to Illinois" in determining whether those facilities' RECs may be considered "eligible" to satisfy the Illinois RPS. This limitation of eligible RECs to Illinois and adjacent states constitutes a departure from pre-P.A. 99-0906 practice under the RPS, under which competitive procurements first looked to RECs from Illinois and adjoining states and then to "elsewhere" in attempting to satisfy targets, and may serve to significantly limit the pool of renewable energy credits eligible to meet the RPS. The Agency's approach for applying these criteria can be found in Chapter 4; it does not differ materially from that which was proposed in its Initial Plan and approved by the Commission in Docket No. 17-0838.

Seventh, the Plan shall provide that renewable energy credits previously allocated from generating systems previously understood not to be rate-based for a state-regulated entity, but which end up being so rate-based, shall be made up through a procurement conducted in the Agency's next procurement event. This connects back to a statutory requirement that "renewable energy credits

[55] 20 ILCS 3855/1-75(c)(1)(G)(i).

[56] 20 ILCS 3855/1-75(c)(1)(G)(iv).

[57] See Docket No. 17-0838, Final Order dated April 3, 2018 at 47-48.

[58] As no party contested this issue in Docket No. 19-0995, the IPA understands that the wind/solar balancing requirement found in Section 1-75(c)(1)(G)(iv) of the IPA Act becomes effective as of June 1, 2022.

shall not be eligible to be counted toward" RPS targets "if they are sourced from a generating unit whose costs were being recovered through rates regulated by this State or any other state or states on or after January 1, 2017."[59] It appears that this could be accomplished through an adjustment in procurement volumes for subsequent procurement events, and the IPA commits through this Revised Plan to make any such adjustments. To date, the IPA is unaware of any instances for which this provision (which is reflected in all program and procurement contracts) has needed to be enforced.

Eighth, the Plan "shall include an Adjustable Block program for the procurement of renewable energy credits from new photovoltaic projects that are distributed renewable energy generation devices or new photovoltaic community renewable generation projects."[60] A description of the Agency's Adjustable Block Program, which has been open for project applications since January 30, 2019, and any proposed adjustments thereto, can be found in Chapter 6.

Ninth, and last among the requirements found in Section 1-75(c), the Plan "shall include a community renewable generation program," with a requirement that the Agency "establish the terms, conditions, and program requirements for community renewable generation projects with a goal to expand renewable energy generating facility access to a broader group of energy consumers, to ensure robust participation opportunities for residential and small commercial customers and those who cannot install renewable energy on their own properties" and that any subscriptions to such projects "be portable and transferable."[61]

Because community solar is a subset of "community renewable generation projects"—which can include generating technologies such as wind, solar thermal, biodiesel, biomass, tree waste, and hydropower—*only* establishing an Adjustable Block Program featuring a community solar component would not satisfy this statutory requirement.[62] For a distinct, *non-PV* community renewable generation program, the IPA's Initial Plan set out a competitive procurement event with bids selected on the basis of price. This procurement event was held in late 2019 and no bids were selected.[63]

2.2.5.3. Illinois Solar for All Requirements

As discussed further below, in recognition of a finding that "the State should encourage . . . investment in renewable energy resources, including, but not limited to, photovoltaic distributed generation, which should benefit all citizens of the State, including low-income households," revisions to Section 1-56 of the IPA Act requires the creation of "the Illinois Solar for All Program, which shall include incentives for low-income distributed generation and community solar projects [. . .] to bring photovoltaics to low-income communities in this State."[64] In so doing, the Agency must "include a

[59] 20 ILCS 3855/1-75(c)(1)(J).

[60] 20 ILCS 3855/1-75(c)(1)(K).

[61] 20 ILCS 3855/1-75(c)(1)(N).

[62] More specifically, Section 1-75(c)(1)(N) provides that "[t]he Agency shall purchase renewable energy credits from subscribed shares of photovoltaic community renewable generation projects **through the Adjustable Block program** described in subparagraph (K) of this paragraph (1) or through the Illinois Solar for All Program described in Section 1-56 of this Act" (emphasis added). (As the IPA cannot be the counterparty to REC delivery contracts under Section 1-75(c), the Agency understands "purchase" effectively to mean "procure" in this context.)

[63] More information about the community renewable generation procurement can be found here: https://www.ipa-energyrfp.com/2019-community-renewable-generation-program-forward-procurement-aic-and-comed.

[64] 20 ILCS 3855/1-56(b)(2).

description of its proposed approach to the design, administration, implementation and evaluation of the Illinois Solar for All Program" in the Plan and "propose the Illinois Solar for All Program terms, conditions, and requirements,"[65] including REC prices (which may be through a formula).

The Illinois Solar for All Program began accepting project applications on May 15, 2019. A more comprehensive description of the Agency's Illinois Solar for All Program, including any revisions made thereto, can be found in Chapter 8.

In addition to describing what the Illinois Solar for All Program is and how it will be administered, the law also requires that should the IPA hire a third-party program administrator (or administrators) to assist with the administration of the Illinois Solar for All Program, the Plan shall identify at what interval it must report to the Agency and the Commission (provided that interval is at least quarterly). After an RFQ/RFP process, the IPA retained Elevate Energy to administer the Illinois Solar for All Program in September 2018. The Plan shall also provide for an independent evaluation of the program, and must contain a definition of the term "environmental justice" community. After a similar RFQ/RFP process, the IPA retained APPRISE, Inc. to serve as the Illinois Solar for All Program's independent evaluator in August 2019. These issues are further addressed in Chapter 8.

The Plan must also ensure that the Illinois Solar for All program is funded. Specifically, Section 1-75(c)(1)(O) of the Act provides that the Plan "shall allocate 5% of the funds available under the plan for the applicable delivery year, or $10,000,000 per delivery year, whichever is greater, to fund the programs." The IPA understands that the intention of this language in Section 1-75(c)(1)(O) is that 5% of utility-collected funds, or $10 million, whichever is greater, would be made available annually for Illinois Solar for All—in addition to whatever may be spent in a given year through the RERF.

Notwithstanding the language discussed in the paragraph above, the law also requires that for each of three particular delivery years—"the delivery years beginning June 1, 2017, June 1, 2021, and June 1, 2025"—the Plan "shall allocate 10% of the funds available under the plan for the applicable delivery year, or $20,000,000 per delivery year, whichever is greater," and $10,000,000 of such funds shall be used by ComEd to implement its Commission-approved workforce development plan filed under Section 16-108.12 of the PUA.[66]

If additional funding for Illinois Solar for All programs is available under Section 16-108(k)[67] of the PUA, then the Plan "shall provide for the Agency to procure contracts in an amount that does not exceed the funding," with the applicable utility or utilities as the counterparty to such contracts.[68] The IPA filed its Illinois Solar for All Supplemental Funding Plan for approval with the Illinois Commerce Commission on August 30, 2018. That Plan concluded as follows regarding whether to use any funding shortfall to provide additional funding for the Illinois Solar for All Program:

> Taking into account the status of the Illinois Solar for All Program, the statutory priority attached to ILSFA's annual RRB allocation, the legally-required availability of RERF funds

[65] 20 ILCS 3855/1-56(b)(4).

[66] 20 ILCS 3855/1-75(c)(1)(O). See also Docket No. 17-0332, in which ComEd's Workforce Development Implementation Plan was approved.

[67] As discussed in Sections 2.6.1 and 8.4.3, up to one-half of excess collections by utilities for RPS purposes in each of the 2017-2018, 2018-2019, and 2019-2020 delivery years may be used for the Solar for All Program in the event of a "funding shortfall." 220 ILCS 5/16-108(k).

[68] 220 ILCS 5/16-108(k).

previously transferred to general funds under Section 5h.5 of the State Finance Act, Section 1-56(h)'s requirement that the RERF "shall not be subject to sweeps, administrative charges, or chargebacks," and thus the expected availability of funding sufficient to satisfy the Solar for All annual budgets included in the Long-Term Plan, the IPA does not propose supplemental funding for Illinois Solar for All using the Section 16-108(k) supplemental funding mechanism.[69]

The Illinois Commerce Commission affirmed this determination in Docket No. 18-1457. The Supplemental Funding Plan did note, however, that the Agency would seek to work with stakeholders and potentially reopen that proceeding should a change in circumstances (namely, permanent depletion of the RERF's balance) necessitate funding the Illinois Solar for All Program using the 16-108(k) funding shortfall mechanism.[70]

2.2.6. Items Not Included in Long-Term Renewable Resource Procurement Plan

While the Plan sets forth the IPA's proposed approach to meeting the state's renewable energy resource procurement targets, it is not the sole mechanism for facilitating the development of renewable energy in Illinois or providing value for the environmental attributes of electricity generation. Thus, many items that may be of interest to readers of this Revised Plan are not directly addressed in this Plan, and below is a non-exhaustive list of those items not addressed in the Plan:

- Contracts or tariffs for the sale of energy from renewable energy generating facilities, whether through bilateral contracts, wholesale market sales, community renewable generation bill crediting, or net metering;
- Previously effective renewable energy resource procurement obligations applicable to alternative retail electric suppliers under Section 16-115D of the PUA;
- The procurement of zero emission credits from zero emission facilities (i.e., nuclear generating facilities) under Section 1-75(d-5) of the IPA Act;
- Workforce development plans produced by a utility pursuant to Section 16-108.12 of the PUA;
- Renewable energy generating device installer certification requirements developed pursuant to Section 16-128A of the PUA;
- Renewable energy provider supplier diversity goals under Section 5-117(b) of the PUA;
- Tariff filings or modifications for the collection of funds used by utilities to pay for renewable energy credit and zero emission credit delivery contracts;
- Specific renewable energy generating projects, proposals, or sites, including any municipal, county, or non-IPA state permitting required;
- "Green" or "clean energy" retail supply products marketed and sold by alternative retail electric suppliers;
- Requirements and processes for the interconnection of new renewable energy generating facilities, including projects facilitated by IPA-administered programs and procurements.

These issues may indeed be of significant interest to the Agency, and in some cases, their presence or resolution informed decisions made in this Revised Plan. However, as they do not fall within the

[69] Final Illinois Solar for All Supplemental Funding Plan, dated November 26, 2018, at 30.

[70] See id. at 31.

scope and jurisdiction of what the IPA may propose and the Commission may approve as part of this Revised Plan, specific proposals related to the above-listed topics are not made within this document.

2.2.7. Revised Plan Development and Approval

The Initial Plan was released by the Agency as a draft on September 29, 2017, filed with the Commission for approval after public comments and revisions on December 4, 2017, and approved by the Commission on April 3, 2018 via Docket No. 17-0838.

Section 16-111.5(b)(5) of the PUA provides that the Agency "shall review, and may revise, the plan at least every 2 years" after the initial Plan. Further, "[t]o the extent practicable, the Agency shall review and propose any revisions to the long-term renewable energy resources procurement plan in conjunction with the Agency's other planning and approval processes"[71] conducted under Section 16-111.5 of the PUA. The Agency understands this to refer to the annual procurement plan development and approval process referenced in Section 16-111.5(d).[72]

The Agency develops its annual plan in July and August of each year, publishes that plan for comment by August 15, receives comments on that plan over 30 days, and then files that plan with the Commission 14 days later. The IPA took a similar approach for this revised Long-Term Plan, but with certain modifications. The draft Revised Plan was published on August 15 of this year, but per the requirements of Section 16-111.5(b)(5)(ii) of the PUA, the Agency announced[73] on September 3, 2019 a comment period of 45 days, resulting in a comment deadline of September 30, 2019.[74]

During the comment period, the Agency was also required to hold public hearings for receiving public comment on the Plan in the service territory of each affected utility. The Agency held public hearings on September 3, 2019 in Chicago (ComEd), and September 4, 2019 in Springfield (Ameren Illinois) and Moline (MidAmerican). No comments were received at these public hearings.

Written comments were received from 21 stakeholders: AES Distributed Energy, Ameren Illinois, Ameresco, Borrego Solar, Carbon Solutions Group – Updated, Citizens Utility Board, Clean Grid Alliance, ComEd, Community Energy Solar, Cypress Creek Renewables, Environmental Defense Fund, Environmental Law & Policy Center and Vote Solar, ICC Staff, Illinois Solar for All Working Group, Joint Solar Parties, Natural Resources Defense Council, Shariff Shakir, SRECTrade, Summit Ridge Energy, Sunrise Energy Ventures, and Trajectory Energy Partners.[75]

After the September 30, 2019 comment deadline, the IPA then took 21 days (again, as allowed under Section 16-111.5(b)(5)(ii)) to revise its draft Revised Plan. The Revised Plan was filed with the Commission for approval on October 21, 2019.

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[71] 220 ILCS 5/16-111.5(b)(5)(ii)(B).

[72] Section 1-75(c)(1)(A) of the Act contains a similar provision, stating that "[t]he Agency shall review, and may revise on an expedited basis, the long-term renewable resources procurement plan at least every 2 years, which shall be conducted in conjunction with the procurement plan under Section 16-111.5 of the Public Utilities Act to the extent practicable to minimize administrative expense."

[73] See https://www2.illinois.gov/sites/ipa/Documents/Draft%20Revised%20Plan%20-%20Summer%202019/Revised%20Plan%20Schedule%20Update%20(3%20September%202019).pdf.

[74] 30 days from August 15, 2019 is actually September 14, 2019, which is a Saturday; under the statute on statutes (5 ILCS 70/1.11), this 30-day deadline instead falls on September 16. 2019.

[75] Comments received by the Agency on the Draft Revised Plan may be found at: https://www2.illinois.gov/sites/ipa/Pages/2020-Draft-LTRRPP-Comments.aspx.

The Commission's approval of this Final Revised Plan took the form of a docketed proceeding pursuant to the Commission's Rules of Practice.[76] Within 14 days of the filing of the Revised Plan, parties taking issue with the plan were required to file an objection with the Commission by November 4, 2019.[77] The Commission granted Petitions to Intervene filed by Ameren Illinois Company, the Joint Solar Parties, Carbon Solutions Group, Cypress Creek Renewables, the Environmental Law & Policy Center, Vote Solar, the Natural Resources Defense Council, Commonwealth Edison Company, Summit Ridge Energy, the Illinois Chamber of Commerce, and the Citizens Utility Board; Commission Staff and the Illinois Attorney General's Office also participated in the proceeding.

Pursuant to the schedule set by the Administrative Law Judge, Responses to Objections were due on or by December 3, 2019, and Replies to Responses on or by December 17, 2019. The Administrative Law Judge issued a Proposed Order on January 15, 2020. Briefs on Exceptions were due by January 24, 2020, and Reply Briefs on Exceptions were due on January 31, 2020.

The Commission issued its Final Order approving the plan with certain modifications on February 18, 2020, within the 120-day timeline prescribed by statute.[78] The Commission found that "the Revised Long-term Renewable Resources Procurement Plan, as modified herein, will reasonably and prudently accomplish the requirements of Section 1-56 and subsection (c) of Section 1-75 of the Illinois Power Agency Act[.]"[79]

2.2.8. Plan Updates

While the Agency's long-term renewable resources procurement plan features a "long-term" focus, many elements informing future program and procurement decisions—technological progress, marketplace changes, the success or failure of work undertaken under a prior-approved approach—were unknowable at the time of the Initial Plan's publishing and are still unknowable as of the time of this first revision.

As described above, the PUA provides that the Agency "shall review, and may revise, the plan at least every 2 years" after the Initial Plan, and "shall review and propose any revisions to the long-term renewable energy resources procurement plan in conjunction with the Agency's other planning and approval processes"[80] conducted under Section 16-111.5 of the PUA—specifically, the annual procurement plan development and approval process referenced in Section 16-111.5(d). At present, and absent a statutory shift through new legislation, the Agency tentatively plans for its next revisions to its Long-Term Renewable Resources Procurement Plan to be proposed in 2021, as part of the development and approval process of the IPA's 2022 annual procurement plan, which will take effect for calendar year 2022.

The PUA also requires that "the Commission shall hold an informal hearing for the purpose of receiving comments on the prior year's procurement process and any recommendations for change"

[76] 83 Ill. Adm. Code 200, *et. seg.*

[77] 220 ILCS 5/16-111.5(b)(5)(ii)(C).

[78] Id.

[79] Docket 19-0995, Final Order dated February 18, 2020 at 109.

[80] 220 ILCS 5/16-111.5(b)(5)(ii)(B).

on or before July 1 of each year.[81] This has taken the form of written recommendations, technical or substantive, being submitted to the Commission and posted publicly on the Commission's website.[82]

2.3. The RPS and Percentage-Based Goals of the RPS

The Illinois RPS shares similarity with other state RPSs which require that a certain percentage of electricity sales be met with a climbing percentage of renewable energy or renewable energy credit procurement. For Illinois, this total is 25% by 2025: "13% by the 2017 delivery year; increasing by at least 1.5% each delivery year thereafter to at least 25% by the 2025 delivery year; and continuing at no less than 25% for each delivery year thereafter."[83]

2.3.1. Load Applicable to RPS Goals

At first blush, the Agency's 25% by 2025 goal appears to mirror the Section 1-75(c)(1) targets found in Illinois law prior to P.A. 99-0906. However, prior to P.A. 99-0906, only "eligible retail customer" load—meaning load associated with utility default supply customers, and not customers taking supply through alternative retail electric suppliers or through hourly pricing—was subject to this requirement. In recent years, only 30-50% of potentially eligible retail customer load actually received default supply service, while competitive class customers (including all medium to large commercial and industrial customers—who represent approximately half of total load) had no default supply option. Stated differently, while the RPS featured a "25% by 2025" requirement prior to P.A. 99-0906, the vast majority of retail customer load in Illinois was not covered by Section 1-75(c)(1)'s "25% by 2025" RPS goal.

Over two delivery years (beginning with the 2017 delivery year), P.A. 99-0906 transitioned those goals applicable only to "eligible retail customer" load to goals applicable to all "all load for retail customers." For the 2017 delivery year, those goals were "equal to at least 13% of each utility's load for eligible retail customers and 13% of the *applicable portion* of each utility's load for retail customers who are not eligible retail customers," with the applicable portion at 50%. For the 2018 delivery year, the percentage goal increased to 14.5% while the applicable portion increased to 75%. For the 2019 delivery year, the percentage goal increased to 16% and now applies to all retail customer load, including load associated with ARES customers.[84]

One exception exists to this load calculation transition: under Section 1-75(c)(1)(H), if an ARES owned one or more renewable generating facilities that were not wind or photovoltaic as of December 31, 2015, then that ARES may elect "to supply its retail customers with renewable energy credits from the facility or facilities" so long as those facilities continued to be owned by that ARES. This self-procurement from ARES-owned facilities by the ARES thus serves to reduce the statutory renewable energy resource obligation by the amount of RECs self-procured.[85]

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[81] 220 ILCS 5/16-111.5(b)(5)(vi). Information about the Commission's informal hearing can be found here: https://www.icc.illinois.gov/downloads/public/procurement/Public%20Notice%20of%20Informal%20Hearing%20Issued%20July%2012%202018.pdf.

[82] For example, see: https://www.icc.illinois.gov/workshops/Electricity-Procurement-Process-for-Plan-Years-Beginning-June-2019.

[83] 20 ILCS 3855/1-75(c)(1)(B).

[84] Id.

[85] For the 2019-2020 delivery year, see the following report on the RECs supplied under this provision: https://www2.illinois.gov/sites/ipa/Documents/2019ProcurementPlan/ARES-REC-Report-2019-2020-delivery-year-04-01-2019.pdf. The RPS goals described in Chapter 3 account for these RECs.

Further discussion of how these percentage-based multipliers apply to retail customer load to create actual REC procurement targets can be found in Chapter 3. As further discussed within that Chapter, of the renewable energy credits procured under Section 1-75(c), "at least 75% shall come from wind and photovoltaic projects."[86]

Notably, these requirements only apply to load served by Illinois' major electric distribution utilities: ComEd, Ameren Illinois, and that portion of MidAmerican load for which the IPA conducts procurements. The Illinois RPS goals do not apply to load served by municipal electric utilities, rural electric cooperatives, or Mt. Carmel Public Utility, and those entities do not have renewable energy procurement obligations under Illinois law.

2.3.2. Eligible Projects for the Illinois RPS

Not all renewable energy generating facilities are eligible to sell RECs into the Illinois RPS. Changes made through P.A. 99-0906 significantly narrowed the universe of facilities capable of generating RECs which qualify for the RPS, and specific criteria applicable to RECs or facilities producing those RECs are discussed further below.

2.3.2.1. Eligible Generating Technologies

The Illinois Power Agency Act's definition of "renewable energy resource" sets forth the generating technologies capable of producing RECs eligible for the Illinois RPS. As set forth in Section 1-10 of the IPA Act, the underlying energy must be generated "from wind, solar thermal energy, photovoltaic cells and panels, biodiesel, anaerobic digestion, crops and untreated and unadulterated organic waste biomass, tree waste, and hydropower that does not involve new construction or significant expansion of hydropower dams," as well as "landfill gas produced in the State." While this language largely mirrors the definition of "renewable energy resource" prior to P.A. 99-0906, that Act deleted the inclusion of "other alternative sources of environmentally preferable energy" from the former definition, thus clarifying that only those generating technologies delineated in the definition may qualify.[87]

The Act also sets forth certain generating technologies categorically incapable of producing RECs eligible for the Illinois RPS, which include "the incineration or burning of tires, garbage, general household, institutional, and commercial waste, industrial lunchroom or office waste, landscape waste other than tree waste, railroad crossties, utility poles, or construction or demolition debris, other than untreated and unadulterated waste wood."[88]

Please note that these requirements are merely threshold requirements for the Illinois RPS; specific programs, such as the Adjustable Block Program, or procurement targets may carry additional limitations.

[86] 20 ILCS 3855/1-75(c)(1)(C).

[87] The Agency understands that hydropower facilities featuring new turbines added to existing non-hydropower dams would not be eligible to participate as these facilities would constitute a newly constructed "hydropower" dam, and would thus be prohibited under Section 1-10 of the IPA Act's limitation of eligible hydropower only to "hydropower that does not involve new construction or significant expansion of hydropower dams."

[88] 20 ILCS 3855/1-10.

2.3.2.2. Eligible Projects—Locational

P.A. 99-0906 introduced new locational and public interest benefit requirements for generating facilities seeking to sell RECs into the Illinois RPS. From the introduction of the Illinois RPS in 2007 to June 1, 2011, Section 1-75(c) required the Agency to first look to renewable energy resources from Illinois, then to resources from states adjoining Illinois, and then to elsewhere. After June 1, 2011, the IPA first looked to resources from Illinois and adjoining states, and next to "elsewhere."

Through Section 1-75(c)(1)(I), a generating facility's RECs are no longer prioritized based on location; instead, the facility either qualifies for the Illinois RPS, or it does not.

Section 1-75(c)(1)(I) provides that the Plan must be designed "to maximize the State's interest in the health, safety, and welfare of its residents, including but not limited to minimizing sulfur dioxide, nitrogen oxide, particulate matter and other pollution that adversely affects public health in this State, increasing fuel and resource diversity in this State, enhancing the reliability and resiliency of the electricity distribution system in this State, meeting goals to limit carbon dioxide emissions under federal or State law, and contributing to a cleaner and healthier environment for the citizens of this State." While the statute presumes that a facility located in-state provides those benefits at a sufficient level, the Agency may also "may qualify renewable energy credits from facilities located in states adjacent to Illinois if the generator demonstrates and the Agency determines that the operation of such facility or facilities will help promote the State's interest in the health, safety, and welfare of its residents" based on this public interest criteria. As the law provides no discussion of potentially qualifying facilities located in states not "adjacent to Illinois," facilities located in those states cannot produce RECs for satisfying the Illinois RPS.

As with the Initial Plan, the Agency's discussion of how to apply these criteria to adjacent state facilities, as well as a listing of which states are considered "adjacent" to Illinois, can be found in Chapter 4.

2.3.2.3. Eligible Projects—Cost Recovery

Through Section 1-75(c)(1)(J), P.A. 99-0906 introduces an additional requirement on generating facilities seeking to generate RECs eligible for the Illinois RPS: "a generating unit whose costs were being recovered through rates regulated by this State or any other state or states on or after January 1, 2017" is ineligible. The statute's rationale behind this change is to "promote the competitive development of renewable energy resources in furtherance of the State's interest in the health, safety, and welfare of its residents." In application, the Agency has come to understand that this limitation does not apply to municipal utilities or rural cooperatives that effectively serve as vertically-integrated utilities (as even insofar as they can achieve full cost recovery for the development of renewable energy generating facilities through rates, their rates are in most cases still not regulated by "this state or any other state or states"[89]), but would still apply to *non-electric* utilities (e.g., water, gas, telecommunications) regulated by the Illinois Commerce Commission or by another state for which rate recovery could be sought for a photovoltaic system participating in the Illinois RPS.

The law also offers more punitive consequences if a non-regulated rate facility becomes a regulated rate facility after the execution of an Illinois RPS contract; in such a situation, the contract must be

[89] The Agency is aware that in Michigan, Kentucky, and Indiana, certain rural electric cooperatives may fall under state rate regulation, and the same true of certain municipal electric utilities in Wisconsin.

terminated and "the supplier of the credits must return 110% of all payments received under the contract"[90] (with those payments then being used for the procurement of additional RECs from new wind or photovoltaic generation in the Agency's next procurement event). Since the passage of P.A. 99-0906, contracts developed for the Agency's programs and procurements have contained provisions reflecting this penalty.

The Agency's approach to these issues is discussed in Chapter 4.

2.3.2.4. Installer Requirements

Certain facilities seeking to participate in the RPS are also subject to an installer qualification requirement. Specifically, after June 1, 2017, RECs from "new photovoltaic projects or new distributed renewable energy generation devices [. . .] must be procured from devices installed by a qualified person in compliance with the requirements of Section 16-128A of the Public Utilities Act and any rules or regulations adopted thereunder."[91]

In Docket No. 17-0268, the Illinois Commerce Commission adopted its Title 83, Part 461 administrative rules for the installation of new utility-scale photovoltaic generating projects under Section 16-128A of the PUA. In that proceeding, the Commission adopted the following definition for the term "qualified person" for new utility-scale solar installations:

> *"Qualified person" means a person who performs installations on behalf of the certificate holder and who has completed at least one of the following programs requiring lab or field work and received a certification of satisfactory completion: an apprenticeship as a journeyman electrician from a USDOL-registered or an applicable state-agency-registered electrical apprenticeship and training program; a North American Board of Certified Energy Practitioners (NABCEP) distributed generation technology certification program; an electrical training program for in-house employees established and administered by an electric utility regulated by the Commission; or an Associate in Applied Science degree from an Illinois Community College Board-approved community college program in solar generation technology.*[92]

The Part 461 rules also provide a definition of the term "install":

> *"Install" means to perform the electrical wiring and connections necessary to interconnect the new solar project with the electric utility's transmission or distribution system at the point of interconnection between the project and the utility. "Install" in this Part specifically does not mean:*
>
> - *Electrical wiring and connections to interconnect the new solar project performed by utility workers;*
> - *Electrical wiring and connections internal to the new solar project performed by the manufacturer;*

[90] 20 ILCS 3855/1-75(c)(1)(J).

[91] 20 ILCS 3855/1-75(c)(7). The "qualified person" requirement is expressly not applicable to the Illinois Solar for All Program (see 20 ILCS 3855/1-56(b)(2), final paragraph), although installers of ILSFA projects must, under state law, still have ICC certification under Part 468 as Distributed Generation Installers.

[92] 83 Ill. Adm. Code § 461.10.

- *The on-site construction and installation of a solar panel or a collector substation; or*
- *Tasks relating to construction, planning and project management performed by individuals such as an inspector, management planner, consultant, project designer, or contractor for the project or their employees.*

Definitions of these terms were initially approved by the Commission in a Second Notice Order entered on August 25, 2017, and approved with modification by the state's Joint Committee on Administrative Rules ("JCAR") on October 24, 2017 with an effective date of October 26, 2017.

Any parties seeking to develop new photovoltaic projects or DG projects in Illinois should also be aware of the Commission's Part 461 and Part 468 rules (governing distributed generation installers) and certification process more generally as well. The definition of "Qualified person"[93] may preclude the inclusion of self-installed new photovoltaic projects in the Adjustable Block Program (unless the self-installer meets the "qualified person" definition).

2.3.3. Compliance Mechanism: RECs vs. "Renewable Energy Resources"

One other change to the Illinois RPS through P.A. 99-0906 concerned an added focus on the use of RECs as the compliance mechanism for meeting Illinois renewable energy procurement targets. Prior to P.A. 99-0906, Section 1-75(c) required renewable energy procurement targets to be met through the procurement of "renewable energy resources"—either a REC, or the REC and its underlying energy. While the vast majority of the IPA's procurement activities focused only on the procurement of RECs, the 2010 long-term power purchase agreements are 20-year contracts for the delivery of a "bundled" REC and energy product.

Rather than using the term "renewable energy resources," Section 1-75(c)(1)(B) requires that the Plan "shall include the goals for procurement of renewable energy credits"[94] to meet the statute's targets. While the description of the ARES load transition later in that same subparagraph (B) uses the term "renewable energy resources," subparagraph (C) and later subparagraphs also refer only to the procurement of "renewable energy credits" (although subparagraph (E) references "renewable energy resources").

A shift in focus from "resources" to "RECs" makes intuitive sense; the IPA's prior Section 1-75(c) renewable energy planning and procurement processes were conducted in conjunction with the development of its annual procurement plan for meeting the energy supply requirements of eligible retail customers, and used to meet procurement requirements specific to that customer base. While the IPA now conducts renewable energy planning and procurement processes to (eventually) meet goals and targets applicable to all retail customer load,[95] its energy procurements still focus only on eligible retail customer load—thus creating a disconnect between the universes of supply requirements served by these two exercises.

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[93] For the definition of "qualified person" under Part 468, please see 83 Ill. Adm. Code § 468.20, http://www.ilga.gov/commission/jcar/admincode/083/083004680000200R.html.

[94] Emphasis added.

[95] Specifically, the IPA's long-term renewable resources procurement plan shall include renewable resource procurement for 100% of retail customer load beginning with the delivery year beginning June 1, 2019, after procuring for an increasing portion of retail customer load for the prior two delivery years. See 20 ILCS 3855/1-75(c)(1)(B).

Since the passage of P.A. 99-0906 and the competitive procurement events that followed, the IPA has become aware of concerns held by developers of utility-scale renewable energy projects that there may be a shallow market for long-term bilateral energy off-take agreements for geographically-qualifying new projects, which developers believe are necessary for providing the revenue certainty required for financing new facility construction. That concern will likely only grow in future years if additional utility-scale REC procurements are authorized, as buyers that may have been able to commit to purchase the generation of the first wave of these projects may no longer have room in their energy portfolios.[96] While the IPA continues to believe it is an open question as to whether it *could* eventually procure a bundled REC and energy product through the Plan or future revisions to it, or some combination of its concurrent planning and procurement processes, any such proposal carries numerous statutory and policy concerns, including but not limited to the following:

- Syncing developer need for long-term revenue certainty with shorter-term focus of IPA energy procurement planning horizons;
- Inability under law to bind competitive retail suppliers (which serve the majority of the Illinois market), municipal electric utilities, or rural electric co-operatives to purchase energy off-take from specific projects;
- Ensuring cost parity across customer classes (as default supply is procured for residential and small commercial customers);
- Managing fluctuating "eligible retail customer" supply levels due to ongoing customer switching;
- Ensuring that energy procured meets the "lowest total cost over time, taking into account any benefits of price stability" goal reiterated throughout the IPA Act and PUA.

To date, the IPA has not received proposals for the procurement of a bundled product (or for the separate procurement of energy from projects facilitated through IPA REC procurements) that sufficiently address these statutory and policy concerns. Absent statutory changes, the Agency continues not to propose any bundled product procurements as part of this Revised Plan and has no plans to do so in the near-term, but remains open to further proposals and feedback.

2.3.4. RPS Funding and Rate Impact Cap

The procurement of renewable energy credits is limited by an annual procurement budget established through a rate impact cap. Specifically, "the total of renewable energy resources procured under the procurement plan for any single year . . . shall be reduced for all retail customers based on the amount necessary to limit the annual estimated average net increase due to the costs of these resources included in the amounts paid by eligible retail customers in connection with electric service to no more than the greater of 2.015% of the amount paid per kilowatthour by those customers during the year ending May 31, 2007 or the incremental amount per kilowatthour paid for these resources in 2011."[97] The greater of these amounts—the 2007 amount per kilowatt-hour ("kWh"), as both amounts are known and, for each utility, it is greater[98]—then "shall be applied to the actual amount of kilowatthours of electricity delivered, or applicable portion of such amount [. . .] by the electric utility in the delivery year immediately prior to the procurement to all retail

[96] These concerns were reinforced through comments received in the IPA's April 2020 utility-scale wind procurement comment process; for those comments, see: https://www2.illinois.gov/sites/ipa/Pages/wind-comments-2020.aspx.

[97] 20 ILCS 3855/1-75(c)(1)(E).

[98] The specific cost cap rate for each of the three utilities is shown in Table 3-4 in Chapter 3 of this Revised Plan.

customers in its service territory." This produces an annual REC procurement budget for the "costs of those resources" in a given year.[99]

Through the budgets established under the rate impact cap and the associated tariffs for the collection of funds, the applicable electric utility "shall be entitled to recover all of its costs associated with the procurement of renewable energy credits" under the Plan, including "associated reasonable expenses for implementing the procurement programs, including, but not limited to, the costs of administering and evaluating the Adjustable Block program."[100] As a result, annual procurement budgets based only on REC costs would be inaccurate, and some estimate of associated administrative expenses must be included and taken into account. For a limited period, Section 16-108(k) of the PUA allows for a given delivery year's unspent budget amounts to be "rolled over" to be available for later delivery years' expenditures. Specifically, rather than conducting annual reconciliations of collections and costs, the Commission "shall instead conduct a single review, reconciliation, and true-up associated with renewable energy resources' collections and costs for the 4-year period beginning June 1, 2017 and ending May 31, 2021, provided that the review, reconciliation, and true-up shall not be initiated until after August 31, 2021."[101] Over that four-year period prior to the eventual reconciliation, "the utility shall be permitted to collect and retain funds under this subsection (k) and to purchase renewable energy resources under an approved long-term renewable resources procurement plan using those funds regardless of the delivery year in which the funds were collected during the 4-year period."

Through the first two years of implementation of P.A. 99-0906, the eventual sunsetting of this rollover period is beginning to pose a challenge: nearly two years were required for the development and approval of the Initial Plan, the development of program requirements and project application processes for each of the ABP and Illinois Solar for All, and the selection of projects in each program's first phase. As a consequence, two years of RPS budgets were collected with few payments made. Many systems that successfully applied to the Adjustable Block Program (especially community solar projects) may not be energized until sometime in 2020 (or later), leaving a smaller portion of their payments eligible to be funded through collections made in the first four years. Additionally, projects facilitated through utility-scale procurements may not become energized and begin delivering RECs until sometime in 2021 or 2022.

Absent a statutory extension of this rollover period, a possible consequence is a refund back to ratepayers of collections previously made to fund renewable energy resource procurement after the rollover period sunsets on June 1, 2021 (as renewable energy resources expenditures under Initial Plan programs and other prior contractual commitments would not have been made by that date in an amount equaling the four-year sum of RPS rider collections). Following that date, beginning with the 2021-2022 delivery year, annual renewable energy resources expenditures cannot exceed annual RPS rider collections, as there will be an annual reconciliation under Section 16-108(k). Moreover, as available funds become constrained, there could also be a spike in budget impacts as projects

[99] The exception referenced above in Section 1-75(c)(1)(H) serves to reduce available budgets as well, as "the charges that would otherwise be applicable to the retail customers of the alternative retail electric supplier . . . shall be reduced by the ratio of the quantity of renewable energy credits supplied by the alternative retail electric supplier compared to that supplier's target renewable energy credit quantity."

[100] 20 ILCS 3855/1-75(c)(6).

[101] Changes under P.A. 99-0906 also provide that the utility shall not be required to "advance any payment or pay any amounts that exceed the actual amount of revenues collected by the utility" under its Section 16-108(k) RPS rider, and "contracts executed under this Section shall expressly incorporate this limitation." 20 ILCS 3855/1-75(c)(1)(L)(vii); also see 220 ILCS 5/16-111.5(b)(5)(iv).

become energized en masse—leading to the need to draw upon additional funding sources (such as previously-collected alternative compliance payments) to ensure contract obligations can be met.

Further discussion of the rate impact cap, the projected budgets produced under the rate impact cap, and the potential impacts of the above-referenced rollover period sunsetting on June 1, 2021 can be found in Chapter 3.

2.3.5. Employment Opportunities

The law also provides that "the renewable energy credit procurements, Adjustable Block solar program, and community renewable generation program shall provide employment opportunities for all segments of the population and workforce, including minority-owned and female-owned business enterprises, and shall not, consistent with State and federal law, discriminate based on race or socioeconomic status."[102] The IPA believes strongly in the principles outlined in this statement in the law, and hopes that both its Initial Plan and this Revised Plan—including provisions to lower the barrier to entry in the Adjustable Block Program for minority-owned and female owned businesses, its Illinois Solar for All proposals, its approach to generation in adjacent states, and its approach to the geographic diversity of projects within Illinois—properly takes those considerations into account and will result in those opportunities being provided. As outlined in Section 6.17, in this Revised Plan the Agency is proposing additional reporting by Adjustable Block Program Approved Vendors on the utilization of graduates of job training programs

2.4. Quantitative New Build Targets of the RPS

Section 1-75(c)(1)(B) of the IPA Act establishes percentage-based umbrella goals for RECs required to be procured based on a percentage of applicable retail customer load, but within those umbrella requirements, other, more specific requirements must also be met—and indeed prioritized above meeting those percentage-based goals.

One such requirement is the procurement of RECs from "new wind projects" and "new photovoltaic projects" found in Section 1-75(c)(1)(C). Rather than expressed as a percentage of load, these requirements are expressed on a quantitative basis (i.e., a fixed, statutorily-defined minimum number of RECs) while still counting toward the overall renewables percentage-based procurement goals.

2.4.1. Quantitative Procurement Requirements

The quantitative targets found in Section 1-75(c)(1)(C) are straightforward and symmetrical, and operate as follows:

By the end of the 2020 delivery year (May 31, 2021):

- At least 2,000,000 renewable energy credits for each delivery year shall come from new wind projects; and
- At least 2,000,000 renewable energy credits for each delivery year shall come from new photovoltaic projects.

By the end of the 2025 delivery year (May 31, 2026):

[102] 20 ILCS 3855/1-75(c)(7).

- At least 3,000,000 renewable energy credits for each delivery year shall come from new wind projects; and
- At least 3,000,000 renewable energy credits for each delivery year shall come from new photovoltaic projects.

By the end of the 2030 delivery year (May 31, 2031):

- At least 4,000,000 renewable energy credits for each delivery year shall come from new wind projects; and
- At least 4,000,000 renewable energy credits for each delivery year shall come from new photovoltaic projects.

For the "new photovoltaic project" requirement, at least 50% must be procured from solar photovoltaic projects using the Adjustable Block Program (used to support distributed generation and community solar, as discussed further below), at least 40% from utility-scale solar projects, and at least 2% from non-community solar brownfield site photovoltaic projects.[103] The Agency has interpreted this "at least 50%" concept to be first, in terms of RECs (as opposed to budget or installed capacity), and also, of the quantitative target amounts listed in the law (as, in each of Sections 1-75(c)(1)(C)(i), (ii), and (iii) "of that amount" references the REC amount expressly preceding it in the law), and not necessarily 50% of the overall number of RECs procured.[104]

Significant progress has been made since the development of the IPA's Initial Plan on meeting these targets, with millions of RECs under contract to be delivered annually from new wind and new photovoltaic projects. Further discussion of this progress can be found in Chapter 3 of this Revised Plan, while the Agency's discussion of competitive procurements for meeting these targets can be found in Chapter 5.

2.4.2. "New wind project" and "new photovoltaic project" Definition

The definitions of a "new wind project" and a "new photovoltaic project" are also addressed through the statute. What constitutes a "new photovoltaic project" is straightforward; it is a "photovoltaic

[103] The IPA Act, as modified by P.A. 99-0906, defines a "brownfield site photovoltaic project" as:

> *[P]hotovoltaics that are:*
>
> *(1) interconnected to an electric utility as defined in this Section, a municipal utility as defined in this Section, a public utility as defined in Section 3-105 of the Public Utilities Act, or an electric cooperative, as defined in Section 3-119 of the Public Utilities Act; and*
>
> *(2) located at a site that is regulated by any of the following entities under the following programs:*
>
> *(A) the United States Environmental Protection Agency under the federal Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended;*
>
> *(B)the United States Environmental Protection Agency under the Corrective Action Program of the federal Resource Conservation and Recovery Act, as amended;*
>
> *(C) the Illinois Environmental Protection Agency under the Illinois Site Remediation Program; or*
>
> *(D) the Illinois Environmental Protection Agency under the Illinois Solid Waste Program.*

20 ILCS 3855/1-10.

[104] Thus, if the Adjustable Block Program were to exceed the targets of 1,000,000 RECs delivered annually by the end of 2020-2021 and 1,500,000 RECs by the end of 2025-2026, the "at least 40%" requirement for utility-scale photovoltaic projects remains at 40% of the new photovoltaic targets stated in the law, or 800,000 RECs by the end of the 2020 delivery year and 1,200,000 RECs by the end of the 2025 delivery year. 20 ILCS 3855/1-75(c)(1)(C)(i), (ii). The reverse must likewise be true (supra-target outcomes for utility-scale photovoltaic procurements do not increase ABP targets), as the Commission in Docket No. 17-0838 authorized utility-scale photovoltaic procurements resulting in significantly more utility-scale PV RECs under contract than the Adjustable Block Program could possibly sustain given budget limitations.

renewable energy facilit[y] that [is] energized after June 1, 2017."[105] Projects developed under Section 1-56 of the IPA Act (i.e., supplemental photovoltaic and Illinois Solar for All projects) are not eligible to meet quantitative "new photovoltaic project" targets.[106]

The definition of a "new wind project" is more awkward. The law defines "new wind projects" as "wind renewable energy facilities that are energized after June 1, 2017 for the delivery year commencing June 1, 2017 or within 3 years after the date the Commission approves contracts for subsequent delivery years."[107] The IPA understands that "for subsequent delivery years"—projects for which contracts are entered into on or after June 1, 2018—the "3 years after the date" of contract approval is effectively a deadline by when the facility must be "energized" for it to retain its "new" status under the law going forward. Stated differently, if the facility is able to be energized within 3 years after the date on which the Commission approves its REC contract, then those RECs may be counted toward the "new wind project" procurement targets in the law over the life of the contract. However, if the wind project cannot energize within 3 years after Commission approval, its RECs may not be used to count toward quantitative "new wind project" targets, and resultant REC delivery contracts should reflect a consequence for that change in legal status (as the project's RECs would then have less value in meeting the requirements of the RPS; they would meet the percentage goals of Section 1-75(c)(1)(B) of the Act, but not the quantitative REC targets of Section 1-75(c)(1)(C)).

Both of these definitions raise the question of what constitutes a facility being "energized." Unlike interconnection, where official approval is required and associated forms are produced and executed on a specific date, "energized" is more nebulous and, unfortunately, not defined through the law. Faced with a similar quandary in developing its Supplemental Photovoltaic Procurement Plan, the Agency settled on a definition of "energized" as being "the date by which the System has been turned on for a period of 24 consecutive hours and is operational for purposes of generating electricity regardless of whether the system has registered with a REC tracking system." Parties could then substantiate a system's energization through a certification accompanied by the submission of various forms establishing a system's energization timeline. The Agency notes that unlike the Supplemental Photovoltaic Procurement process, in which payment for RECs was made after REC generation and only upon delivery and invoice to the Agency, the Adjustable Block Program and the Illinois Solar for All Program feature prepayment for some, or all, of the RECs from a system upon energization. Therefore, as discussed in Chapters 6 and 8, consideration is also given to a system being registered in a tracking system to generate RECs in addition to the date on which interconnection to the utility was approved.

2.4.3. Initial Forward Procurements

Independent of (and, in some cases, prior to) the development of the Initial Plan, P.A. 99-0906 required the IPA to conduct "initial forward procurements" of RECs from "from new utility-scale wind projects" and "from new utility-scale solar projects and brownfield site photovoltaic projects."[108] Conducted through competitive procurement processes subject to applicable requirements of Section 16-111.5 of the PUA, the Initial Forward Procurement sought 15-year REC delivery contracts set to begin delivery on June 1, 2019 at the earliest and—initially—June 1, 2021 at the latest (that

[105] 20 ILCS 3855/1-10.

[106] Id.

[107] 20 ILCS 3855/1-75(c)(1)(C).

[108] 20 ILCS 3855/1-75(c)(1)(G)(i), (ii).

deadline has since been extended to June 1, 2022 through Public Act 101-0113 in the case of certain development risks). For both wind and solar, the targeted overall REC procurement quantities were 1,000,000 RECs delivered annually from each generating technology, with a single wind procurement event required to take place within 160 days of June 1, 2017 and the solar procurement potentially conducted across multiple procurement events up to one year from June 1, 2017.[109]

Section 1-75(c)(1)(G) of the Act provides that RECs procured through the Initial Forward Procurement "shall be included in the Agency's Long-Term Renewable Resources Procurement Plan and shall apply to all renewable energy goals"[110] found in Section 1-75(c) of the IPA Act, including the quantitative "new wind" and "new photovoltaic" targets discussed above. The Agency's Initial Forward Procurement events for new utility-scale wind and new photovoltaics, conducted in 2017 and 2018, have concluded;[111] the results of the Initial Forward Procurement, as well as how those results inform remaining quantitative procurement targets, are discussed further in Chapters 3 and 5.

2.4.4. Subsequent Forward Procurements

Section 1-75(c)(1)(G)(iii) also floats the concept of "subsequent forward procurements." That section sets forth conditions applicable to subsequent forward procurements: they must be "for utility-scale wind projects," they "shall solicit at least 1,000,000 renewable energy credits delivered annually per procurement event," and they shall be "planned, scheduled, and designed such that the cumulative amount of [RECs] delivered from all new wind projects in each delivery year shall not exceed the Agency's projection of the cumulative amount of [RECs] that will be delivered from all new photovoltaic projects," in that same delivery year.

The law does not contain statements either requiring that the Agency actually conduct a Subsequent Forward Procurement, or requiring that RECs from utility-scale wind projects may only be procured using a Subsequent Forward Procurement approach. However, in Docket No. 17-0838, the Commission approved two Subsequent Forward Procurements for RECs from new utility-scale wind projects as part of the Initial Plan, allowing the Agency to potentially meet its Section 1-75(c)(1)(C)(i) 2020 and 2025 Delivery Year quantitative new wind targets (and nearly achieving its 2030 targets as well).

RECs under contract from Subsequent Forward Procurements are included in tables found in Chapter 3, while further discussion of competitive procurement events including any proposed Subsequent Forward Procurements can be found in Chapter 5.

2.4.5. Balancing Expected Wind RECs vs. Solar RECs

In addition to the condition placed on subsequent forward procurements mentioned above, the law also contains a more general requirement that RECs under contract from new wind projects not significantly exceed RECs under contract from new photovoltaic projects. Specifically, if the projected amount of RECs from new wind projects to be delivered in a given delivery year exceeds the projected amount of RECs from new photovoltaic projects by 200,000 or more RECs, then "the

[109] Id.

[110] Id.

[111] More information about the Initial Forward Procurements can be found at on the IPA Procurement Administrator's website at the following address: https://www.ipa-energyrfp.com/2017-2018-initial-forward-procurements.

Agency shall within 60 days adjust the procurement programs in the long-term renewable resources procurement plan to ensure that the projected cumulative amount of renewable energy credits to be delivered from all new wind projects does not exceed the projected cumulative amount of renewable energy credits to be delivered from all new photovoltaic projects by 200,000 or more renewable energy credits."[112]

This requirement is not intended to be applicable to results from the Initial Forward Procurements, at least initially. Given that the Initial Forward Procurement calls for 1,000,000 RECs from "new wind projects" to be procured "within 160 days after the effective date" of P.A. 99-0906, but the Initial Forward Procurement from "new photovoltaic projects" is to be procured "within one year after the effective date," the law openly accommodates a longer time horizon for bringing solar RECs under contract from the initial forward procurements. As the law expressly establishes this matching requirement as only applicable "at any time after the time set for delivery of renewable energy credits pursuant to the initial procurements,"[113] the Agency understands that this requirement becomes applicable to its planning process after June 1, 2022, the latest date for first delivery of RECs from the initial forward procurements as discussed in Section 2.2.5.2 above.[114]

The law also provides that the Agency shall provide "its projection of the renewable energy credits to be delivered from all projects in each delivery year" on a "quarterly basis."[115] While the IPA will continue to regularly track RECs from new wind projects versus new photovoltaic projects internally, it understands that these quarterly updates would only need to begin being formally provided upon the matching requirement becoming applicable to its planning process.

Further discussion of this requirement, including the current balance of RECs under contract from new wind projects versus new photovoltaic projects, can be found in Chapter 3.

2.5. Adjustable Block & Community Renewable Generation Programs

As referenced above, at least 50% of the quantitative new photovoltaic targets found in Section 1-75(c)(1)(C) of the IPA Act shall be procured "from solar photovoltaic projects using the program outlined in subparagraph (K) of this paragraph (1) from distributed renewable energy generation devices or community renewable generation projects"—i.e., using the Adjustable Block Program.

2.5.1. Adjustable Block Program

At its core, the Adjustable Block Program is perhaps most notable for what it is not: it is not a "competitive procurement event" using "pay as bid" pricing with selection of bids on the basis of price. Nor is it a project selection process through which public interest criteria, such as those set forth in Section 1-75(c)(1)(I) or those employed for the selection of winning bids under the Zero Emission Standard found in Section 1-75(d-5) of the Act, determine the winning bidder.

Instead, the Adjustable Block Program provides "a transparent schedule of prices and quantities to enable the photovoltaic market to scale up and for renewable energy credit prices to adjust at a predictable rate over time."[116] Stated differently, a party seeking a REC contract—such as a

[112] 20 ILCS 3855/1-75(c)(1)(G)(iv).

[113] Id.

[114] See Docket No. 17-0838, Final Order dated April 3, 2018 at 47-48.

[115] 20 ILCS 3855/1-75(c)(1)(G)(iv).

[116] 20 ILCS 3855/1-75(c)(1)(K).

photovoltaic distributed generation or community solar project developer—knows the REC price in advance, and should generally have visibility into when and how that price may change. The law sets forth other requirements of the Adjustable Block Program: it must include "a schedule of standard block purchase prices to be offered; a series of steps, with associated nameplate capacity and purchase prices that adjust from step to step; and automatic opening of the next step as soon as the nameplate capacity and available purchase prices for an open step are fully committed or reserved."[117] Thus, each block constitutes a quantity of nameplate capacity with a REC price[118] attached to that block, and when a block is fully subscribed by qualifying projects, projects may then qualify for the next block (which features a different price). The Agency understands that "automatic opening" as used in the law need not be "immediate" or "instantaneous," and instead that "automatic" refers to the ability for the block to open in a predictable manner not requiring additional administrative action.[119]

2.5.1.1. Adjustable Block Program—Projects

The Adjustable Block Program is applicable to only two project types: photovoltaic distributed renewable energy generation devices (i.e., solar DG), and photovoltaic community renewable generation projects (i.e., community solar[120]).

Under Illinois law, a photovoltaic distributed renewable energy generation device must be:

(1) Powered by photovoltaics;
(2) interconnected at the distribution system level of either an electric utility as defined in this Section, a municipal utility as defined in this Section that owns or operates electric distribution facilities, or a rural electric cooperative as defined in Section 3-119 of the Public Utilities Act (and thus, must be located in Illinois to be interconnected to such an entity);
(3) located on the customer side of the customer's electric meter and is primarily used to offset that customer's electricity load; and
(4) limited in nameplate capacity to less than or equal to 2,000 kilowatts.[121]

Under Illinois law, a photovoltaic community renewable generation project is a generation facility that:

(1) is powered by photovoltaics;
(2) is interconnected at the distribution system level of an electric utility as defined in this Section, a municipal utility as defined in this Section that owns or operates electric distribution facilities, a public utility as defined in Section 3-105 of the Public Utilities Act, or an electric cooperative, as defined in Section 3-119 of the Public Utilities Act (and thus, must be located in Illinois to be interconnected to such an entity);

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[117] Id.

[118] Prices can be a set value, or established as the product of a formula.

[119] Through its Final Order in Docket No. 19-0995, the Commission further reinforced this paragraph's description of what is statutorily required from an "Adjustable Block Program" by finding that a proposal under which block prices would be set through a reverse auction "would require legislative action." Docket No. 19-0995, Final Order dated February 18. 2020 at 46.

[120] There are other forms of community solar recognized by Illinois law, including (A) properties owned or leased by multiple customers that contribute to the operation of an eligible renewable electrical generating facility, and (B) individual units, apartments, or properties located in a single building that are owned or leased by multiple customers and collectively served by a common eligible renewable electrical generating facility. 220 ILCS 5/16-107.5(*l*)(1). These forms of community solar are not eligible for the Adjustable Block Program.

[121] 20 ILCS 3855/1-10.

(3) credits the value of electricity generated by the facility to the subscribers of the facility; and
(4) is limited in nameplate capacity to less than or equal to 2,000 kilowatts.[122]

Only new projects—those "energized on or after June 1, 2017"—are eligible for the Adjustable Block Program.

In terms of what project types participate at what level within the Adjustable Block Program, the law provides the following delineation:

(1) At least 25% from distributed renewable energy generation devices with a nameplate capacity of no more than 10 kilowatts;
(2) At least 25% from distributed renewable energy generation devices with a nameplate capacity of more than 10 kilowatts and no more than 2,000 kilowatts.[123]
(3) At least 25% from photovoltaic community renewable generation projects.
(4) The remaining 25% shall be allocated as specified by the Agency in the long-term renewable resources procurement plan.[124]

Through the Commission's determination in Docket No. 17-0838 requiring the remaining 25% allocation for the first phase of the Adjustable Block Program (25% of 1,000,000 RECs delivered annually, or of 666 MW of new installed capacity after applying a standard capacity factor) be withheld to be later allocated at the Agency's discretion,[125] it is clear that this language does not necessarily require express allocation to one (or a specific combination) of these three categories through this Plan, and that some or all of the "remaining 25%" could instead be allocated to adjust for ongoing program performance. This issue is discussed further in Chapter 6.

The law also provides that the Adjustable Block Program shall ensure that RECs are procured from "projects in diverse locations and are not concentrated in a few geographic areas." The Agency has spent time reviewing the geographic distribution of projects supported thus far through the Adjustable Block Program, and has found that the Program generally features very strong geographic diversity. Some exceptions certainly exist – for instance, while community solar projects facilitated through the program look well-dispersed on a map of the state, development has almost exclusively occurred in less populated rural areas featuring lower land cost – but the IPA has generally been pleased with the degree to which the thousands of projects supported to date through the Adjustable Block Program demonstrate geographic diversity.

Moving forward, the Agency commits to monitor the locations of proposed and completed projects. Further discussion of this issue can be found in Chapter 6.

2.5.1.2. Adjustable Block Program—Contracts

Section 1-75(c)(1)(L) sets forth certain requirements applicable to REC delivery contracts entered into through the Adjustable Block Program. The first is that contracts must be "at least 15 years in length," i.e., for at least 15 years of REC deliveries under the contract. Payment for RECs is made by

[122] Id.

[123] The Agency may create sub-categories within this category to account for the differences between projects for small commercial customers, large commercial customers, and public or non-profit customers.

[124] 20 ILCS 3855/1-75(c)(1)(K).

[125] See Docket No. 17-0838, Final Order dated April 3, 2018 at 60; for the IPA's April 3, 2019 decision allocating discretionary capacity, see: http://illinoisabp.com/wp-content/uploads/2019/04/Discretionary-Capacity-Rationale-4.3.19.pdf.

(and RECs are delivered to) the applicable electric utility (which is then required to retire the RECs), and payment is required by law to occur according to the following schedule:

For DG systems of no more than 10 kW, "the renewable energy credit purchase price shall be paid in full by the contracting utilities at the time that the facility producing the renewable energy credits is interconnected at the distribution system level of the utility and energized."[126] The Agency understands "purchase price" to refer to the sum of payments for RECs required to be made under the contract—i.e. full prepayment.[127]

For larger DG systems and community solar projects, "20 percent of the renewable energy credit purchase price shall be paid by the contracting utilities at the time that the facility producing the renewable energy credits is interconnected at the distribution system level of the utility and energized" with the remaining portion "paid ratably over the subsequent 4-year period."[128]

Prepayment poses unique challenges—while RECs are required to be delivered when generated to meet annual utility compliance obligations, prepayment reduces the incentive to actually deliver RECs. On this point, the law requires that each contract "shall include provisions to ensure the delivery of the renewable energy credits for the full term of the contract."

The Revised Plan's proposed approach to Adjustable Block Program contracts generally (including certain recommended changes to the contract form published on January 30, 2019 for which the Agency expressly sought Commission approval), as well as to the clawback provisions, collateral requirements, and other contract elements intended to ensure REC delivery, can be found in Chapter 6.

2.5.1.3. Adjustable Block Program—Changes

Unlike a competitive procurement process, through which changes in market conditions may be reflected in bidders' bids, the Adjustable Block Program requires that the Agency project future market conditions through establishing future block sizes and prices.

The law envisions these changes occurring in two ways: first, the Agency "may periodically review its prior decisions establishing the number of blocks, the amount of generation capacity in each block, and the purchase price for each block, and may propose, on an expedited basis, changes to these previously set values" subject to the Section 16-111.5 plan revision process.[129]

Second, "[p]rogram modifications to any price, capacity block, or other program element that do not deviate from the Commission's approved value by more than 25% shall take effect immediately and are not subject to Commission review and approval."[130] To prevent the requirement that the Agency seek formal administrative approval for large modifications from being effectively ignored, the Agency believes this threshold should be understood as a 25% change based on the last formally

[126] 20 ILCS 3855/1-75(c)(1)(L)(ii). The Agency understands this provision to mean that a system 10 kW in size would be included in this category.

[127] All prepayment remains subject to the amounts actually collected by the utilities under its Section 16-108(k) tariffs, however. (See Section 1-75(c)(1)(L)(vii)).

[128] 20 ILCS 3855/1-75(c)(1)(L)(iii).

[129] 20 ILCS 3855/1-75(c)(1)(K).

[130] 20 ILCS 3855/1-75(c)(1)(M).

approved (i.e., through establishment or revision of the Plan via Commission's Section 16-111.5 approval process) level.

For the Initial Plan, the Commission determined that "the final REC prices the IPA will publish should be filed within 60 days as a compliance filing" in Docket No. 17-0838.[131] Accordingly, the Agency published its REC prices for the Adjustable Block Program as a compliance filing in Docket No. 17-0838 on June 4, 2018 and these served as the baseline for any subsequent modifications of up to 25%.[132] For establishing a baseline for future price adjustments, this Final version of the Revised Plan filed with the ICC on April 20, 2020 provides those baseline prices. REC prices are shown in Table 6-2 of the Revised Plan. They are unchanged from the REC prices published in the version of the Revised Plan that was filed for ICC approval on October 21, 2019 in Docket No. 19-0995, and, aside from providing prices for Block 5, generally follow the prices found in the Initial Plan.[133]

Section 1-75(c)(1)(M) of the Act requires that the Agency "consider stakeholder feedback when making adjustments to the Adjustable Block design" and "notify stakeholders in advance of any planned change." Likewise, the law requires that "[t]he Agency and its consultant or consultants shall monitor block activity, share program activity with stakeholders and conduct regularly scheduled meetings to discuss program activity and market conditions." In implementing the program, the Agency has to date attempted to seek stakeholder feedback for the development of key program requirements or new forms and documents; such documents are published on the program website (www.illinoisabp.com) and new requirements generally become reflected in the Adjustable Block Program Guidebook.[134] The program website also features a program dashboard updated daily to provide stakeholders with daily updates on block activity,[135] and recently added project information spreadsheets to provide increased transparency about photovoltaic projects supported through the Adjustable Block Program.[136] And in preparing this Revised Plan, in addition to the comment process and public hearings required by law, the Agency held both in-person workshops and a written comment process in the summer of 2019 through which comments on program activity and market conditions were offered by stakeholders.[137]

As described further in Chapter 6, the Agency will continue to monitor program performance closely and shall seek to be proactive in communicating with stakeholders about program performance and making any necessary changes to the structure of the Adjustable Block Program.

[131] Docket No. 17-0838, Final Order dated April 3, 2018 at 73-74.

[132] See id.

[133] In Docket No. 19-0995, the Commission additionally determined that "REC prices must be lower to both efficiently invest ratepayer money and limit oversubscription resulting in a lottery process" given the oversubscription of certain categories of the Adjustable Block Program upon the program's opening. To effectuate any price changes, the Commission held that "workshops should be held and stakeholder input considered." However, no specific changes to REC prices were directed through that Order. See Docket No. 19-0995, Final Order dated February 18, 2020 at 46.

[134] Both the presently effective Guidebook and prior editions of the Guidebook can be found here: http://illinoisabp.com/program-guidebook.

[135] The Adjustable Block Program dashboard can be found here: http://illinoisabp.com/dashboard-home.

[136] Project application disclosure information can be found here: http://illinoisabp.com/project-information-disclosure-process.

[137] Information about the IPA's June 20, 2019 and June 26, 2019 workshops, as well its request for comments and comments received, can be found here: https://www2.illinois.gov/sites/ipa/Pages/RenewableResourcesWorkshops.aspx.

2.5.2. Community Renewable Generation Program

P.A. 99-0906 also requires the establishment of a "community renewable generation program."[138] Unlike with the Adjustable Block Program, the law does not set forth procurement targets or a proposed contract structure for this program; the Agency thus has latitude to design its Community Renewable Generation Program in any manner otherwise consistent with state law and done "with a goal to expand renewable energy generating facility access to a broader group of energy consumers, to ensure robust participation opportunities for residential and small commercial customers and those who cannot install renewable energy on their own properties."[139]

The statutorily-envisioned interaction between the Agency's Community Renewable Generation Program, and the portion of the Agency's Adjustable Block Program set-aside for community solar, is ambiguous; the law simply references that "subscribed shares of photovoltaic community renewable generation projects" shall be purchased through the Adjustable Block Program.[140] Thus, the IPA understands the community solar portion of its Adjustable Block Program to be something of a subset of its Community Renewable Generation Program, with a standalone Community Renewable Generation Program required to be established to provide support for community renewable generation projects using technology other than photovoltaics.

2.5.2.1. Portability and Transferability of Subscriptions

Section 1-75(c)(1)(N) requires that "subscriptions" to community renewable generation projects under the Community Renewable Generation Program must be portable (i.e., retained by the subscriber even if the subscriber relocates or changes its address within the same utility service territory) and transferable (i.e., a subscriber may assign or sell subscriptions to another person within the same utility service territory). These requirements apply to subscriptions for community solar projects participating in the Adjustable Block Program as well.

During the implementation of the Adjustable Block Program, some entities have raised questions regarding the scope of the portability and transferability of community solar subscriptions. It seems clear that the law did not envision completely unconditional portability or transferability: if a resident holding a community solar subscription were to move from a large house to a small apartment, the resultant drop in consumption would necessitate, at minimum, downsizing of the community solar subscription. Likewise, there may be numerous reasons why a transferee may be an unworkable recipient of an existing subscriber's community solar subscription, from being legally ineligible (outside of that utility's service territory) to posing a more significant non-payment risk than the transferor. At the same time, allowing unbounded Approved Vendor-imposed restrictions on portability or transferability could easily defeat the spirit of the law's requirement that subscriptions be portable and transferable.

Through this Plan revision process and other contemporaneous activities, the Agency hopes to provide more clarity around what restrictions on the portability and transferability of community solar subscriptions should be acceptable under the Adjustable Block Program and Community Renewable Generation Program. Further discussion of this topic may be found in Section 7.6.2.

[138] 20 ILCS 3855/1-75(c)(1)(N).

[139] Id.

[140] Id.

2.5.2.2. Opt-Out Municipal Aggregation

Certain stakeholders have raised the question of whether community renewable generation project subscriptions (specifically, community solar subscriptions) may be eligible for execution via opt-out municipal aggregation authorized under Section 1-92 of the IPA Act. Under opt-out municipal aggregation, municipalities (after passing authorizing referenda) may aggregate their residential and small commercial customer load and contract with an alternative retail electric supplier to supply those customers with "energy and related services" at a negotiated supply rate unless that customer expressly chooses to "opt-out" of the transaction.

For the IPA, in its role as the entity charged with administering the Adjustable Block Program, Community Renewable Generation Program, and Illinois Solar for Program, this raises, at minimum, two questions:

First, is the enrollment of a customer into a subscription for a community solar project without their direct authorization or consent (i.e., on an "opt-out" basis) legally authorized by Section 1-92 of the IPA Act's governmental aggregation provisions?

Second, even if legally authorized, would that relieve Approved Vendors from program-related responsibilities with respect to individual subscribers, including the requirement that each customer complete a disclosure form acknowledging participation in the program?

The IPA is highly skeptical that opt-out municipal aggregation could legally cover community solar subscriptions, which were not contemplated anywhere in Illinois law when Section 1-92 was enacted via Public Act 96-0176 in 2009 (and notes that countless implementation issues would be raised under such an approach).[141]Only the second of these questions falls within the scope of this Plan. On that question, the Agency's disclosure form requirements found in Chapter 6 are fundamental to subscribers receiving standardized information. Those requirements constitute the backbone of the Agency's efforts to deliver uniform content about the rights and obligations under a ratepayer-funded program to everyday citizens. That standardized information and express acknowledgment by a subscriber is an essential form of education that must be provided to each individual participant to produce a transparent, positive experience through its programs. Thus, even if some colorable argument could be made that community solar subscribers could be enrolled without each individual subscriber having offered its direct consent to a given subscription, the Agency would not allow for its program-specific consumer protection requirements—including its standardized brochure and the receipt and execution of a disclosure form—to be waived.

In approving this Revised Plan, the Commission agreed with the Agency that any community solar subscription aggregation program (if legally possible) for a project participating in the ABP or ILSFA would be required to ensure that every individual subscriber receives and executes an individualized standard disclosure form, pursuant to Section 6.13 of this Revised Plan.[142] The Commission likewise agreed with the Agency that the question of whether opt-out municipal aggregation for community solar subscriptions is legally authorized under Section 1-92 of the IPA Act is an issue outside the

[141] Any community renewable generation project that does not participate in an IPA-administered program or procurement may freely operate outside of this Revised Plan's requirements. However, given the Agency's express statutory role (separate from its role administering renewable resources programs under this Plan) assisting governmental aggregation programs under Section 1-92(g) of the Act, the Agency's perspective should at least carry valuable advisory authority.

[142] Docket No. 19-0995, Final Order dated Feb. 18, 2020 at 7.

scope of Plan approval, finding that "this proceeding is not the forum for the Commission to decide the legality of opt-out municipal aggregation for community solar subscriptions, as numerous interested stakeholders - such as the many municipalities that might be interested and the private brokers that might assist them in soliciting bids - would not be on notice that the issue is being decided."[143]

Further discussion of the IPA's Community Renewable Generation Program can be found in Chapter 7.

2.6. Illinois Solar for All Program

As described in Section 1-56(b) of the IPA Act, the Illinois Solar for All Program shall "include incentives for low-income distributed generation and community solar projects, and other associated approved expenditures" in order "to bring photovoltaics to low-income communities in this State in a manner that maximizes the development of new photovoltaic generating facilities, to create a long-term, low-income solar marketplace throughout this State, to integrate, through interaction with stakeholders, with existing energy efficiency initiatives, and to minimize administrative costs." Further, the program shall be "designed to grow the low-income solar market."[144]

A statutory overview of the Illinois Solar for All Program (which began accepting project applications on May 15, 2019), as well as the individual sub-programs under the Illinois Solar for All banner, is below.

2.6.1. Illinois Solar for All—Overview

At its core, the Illinois Solar for All Program is an incentive program—through more generous REC contracts, the Illinois Solar for All Program incents low-income (as well as non-profit and public facility) participation in solar photovoltaic projects, whether as a system owner, community solar project subscriber, or system host. Those RECs are retired (either by the Agency or a utility, depending on which entity was the REC contract counterparty) to satisfy Section 1-75(c) compliance obligations just as with the other procurements and programs described above, while the additional premium helps produce benefits specific to growing the low-income solar marketplace and ensuring more equitable access to the benefits of clean energy. Thus, structurally, the law envisions the Solar for All Program's incentive being offered through contracts for the delivery of RECs at a premium price above what would otherwise be available, reflecting the additional incentive necessary to ensure low-income participation, with the Agency also having the ability to offer full contract prepayment or otherwise relax (or enhance) requirements in recognition of the unique challenges facing low-income project development.

While the program features no hard targets or goals for the quantity of RECs required to be procured, it does feature defined funding sources. First, Illinois Solar for All is funded through the Renewable Energy Resources Fund. At the time of publishing this draft Plan, the existing balance of the RERF is presently just over $50 million, with an additional $112.5 million remaining transferred to the state's General Revenue Fund for liquidity purposes. The IPA considers any contractual obligations from the RERF pre-dating Illinois Solar for All (specifically, Supplemental Photovoltaic Procurement contracts) to be senior to any new obligations entered into through the Illinois Solar for All

[143] Id.

[144] 20 ILCS 3855/1-56(b)(2).

Program,[145] and approximately $13.9 million in such prior obligations remain outstanding.[146] State law[147] requires that the remaining $112.5 million be transferred back into the RERF within 48 months of its transfer in August 2017, but no additional alternative compliance payments are due to be made into the RERF.[148]

Second, Illinois Solar for All is funded through a portion of funds collected by the utilities under their Section 16-108(k) RPS tariffs for purchases made under Section 1-75(c) of the IPA Act. Under Section 1-75(c)(1)(O), "5% of the funds available under the plan for the applicable delivery year, or $10,000,000 per delivery year, whichever is greater" is available for Illinois Solar for All annually in most years; while "for the delivery years beginning June 1, 2017, June 1, 2021, and June 1, 2025, the long-term renewable resources procurement plan shall allocate 10% of the funds available under the plan for the applicable delivery year, or $20,000,000 per delivery year, whichever is greater" with $10 million in each of those three delivery years going toward funding ComEd's workforce development plan. This mechanism ensures a base level of Illinois Solar for All funding annually, which is crucial given the uncertainty surrounding the RERF.

Third, Section 16-108(k) of the PUA contains the following provision:

> *If the amount of funds collected during the delivery year commencing June 1, 2017, exceeds the costs incurred during that delivery year, then up to half of this excess amount, as calculated on June 1, 2018, may be used to fund the programs under subsection (b) of Section 1-56 of the Illinois Power Agency Act in the same proportion the programs are funded under that subsection (b). However, any amount identified under this subsection (k) to fund programs under subsection (b) of Section 1-56 of the Illinois Power Agency Act shall be reduced if it exceeds the funding shortfall. For purposes of this Section, "funding shortfall" means the difference between $200,000,000 and the amount appropriated by the General Assembly to the Illinois Power Agency Renewable Energy Resources Fund during the period that commences on the effective date of this amendatory act of the 99th General Assembly and ends on August 1, 2018.*

Similar provisions exist in Section 16-108(k) for each of the delivery years commencing June 1, 2018 and June 1, 2019, meaning that there is no single "amount appropriated by the General Assembly to the Illinois Power Agency Renewable Energy Resources Fund" for the 14 months referenced in the paragraph above; instead, there are three separate fiscal year appropriations[149] covered by this period. Section 16-108(k) provides that should funding for Illinois Solar for All be available[150] under

[145] This appears to be the intent evident in Section 1-56(b) as well, as that section prefaces the percentage-based allocation of RERF funds with the qualifier "monies available in the Illinois Power Agency Renewable Energy Resources Fund and not otherwise committed to contracts executed under subsection (i) of this Section." (emphasis added)

[146] Supplemental Photovoltaic Procurement contracts were for the delivery of RECs for 5 years, with payment for RECs made upon delivery; the procurement's original budget was $30 million.

[147] 30 ILCS 105/5h.5(b).

[148] Section 16-115D of the PUA provides that while "[t]hrough May 31, 2017, all alternative compliance payments by alternative retail electric suppliers shall be deposited in the Illinois Power Agency Renewable Energy Resources Fund," "beginning with the delivery year commencing June 1, 2017, all alternative compliance payments by alternative retail electric suppliers shall be remitted to the applicable electric utility" and not deposited into the RERF. (220 ILCS 5/16-115D(d)(4), (4.5).) See also 83 Ill. Adm. Code Part 455.

[149] These are the appropriations for Fiscal Year 2017 (July 1, 2016 through June 30, 2017), Fiscal Year 2018 (July 1, 2017 through June 30, 2017), and Fiscal Year 2019 (July 1, 2018 through June 30, 2019).

[150] Following each of the 2017-2018, 2018-2019, and 2019-2020 delivery years, the Agency asked or will ask each of ComEd, Ameren Illinois, and MidAmerican to provide an accounting of the utility's RPS rider collections during the preceding delivery year and the costs it incurred for Section 1-75(c) contracts during that delivery year.

this mechanism, then "the Agency shall submit a procurement plan to the Commission no later than September 1, 2018, that proposes how the Agency will procure programs on behalf of the applicable utility."[151]

The IPA filed its Illinois Solar for All Supplemental Funding Plan for approval with the Illinois Commerce Commission on August 30, 2018. That Plan concluded as follows regarding whether to use any unspent RPS rider collections to provide additional funding for the Illinois Solar for All Program:

> Taking into account the status of the Illinois Solar for All Program, the statutory priority attached to ILSFA's annual RRB allocation, the legally-required availability of RERF funds previously transferred to general funds under Section 5h.5 of the State Finance Act, Section 1-56(h)'s requirement that the RERF "shall not be subject to sweeps, administrative charges, or chargebacks," and thus the expected availability of funding sufficient to satisfy the Solar for All annual budgets included in the Long-Term Plan, the IPA does not propose supplemental funding for Illinois Solar for All using the Section 16-108(k) supplemental funding mechanism.[152]

The Illinois Commerce Commission affirmed this determination in Docket No. 18-1457, entering its Final Order on October 25, 2018. The Supplemental Funding Plan did note, however, that the Agency would seek to work with stakeholders and potentially reopen that proceeding should a change in circumstances (namely, permanent depletion of the RERF's balance) necessitate funding the Illinois Solar for All Program using the 16-108(k) funding shortfall mechanism.[153]

Under the Illinois Solar for All Program, payments "shall be in exchange for an assignment of all renewable energy credits generated by the system during the first 15 years of operation and shall be structured to overcome barriers to participation in the solar market by the low-income community."[154] The contract "may pay for such renewable energy credits through an upfront payment per installed kilowatt of nameplate capacity paid once the device is interconnected at the distribution system level of the utility and is energized," giving the Agency flexibility in proposing contract structures.[155]

The counterparty to Illinois Solar for All contracts entered into using RERF funds is the Agency, while the counterparty to contracts entered into using utility funds is the applicable utility.

While the Act does not require any particular annual budgetary allocation to ILSFA, the Agency chose in the Initial Plan, and continues to propose in this Revised Plan, to allocate funds and consider project applications within ILSFA based on "program years," which track the same period of time as energy delivery years (June 1st of one year to May 31st of the following year). The Agency's proposed budget allocations by program year are described in detail in Chapter 8.

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[151] 20 ILCS 3855/1-56(b)(7). Perhaps notably, while the requirement that the IPA submit a Plan is prescriptive, Section 16-108(k)'s funding allocation language is merely "permissive" ("up to half this excess amount . . . **may** be used to fund the programs"). The IPA thus did not need to propose, nor did the Commission need to approve, a full (or any) statutorily authorized allocation.

[152] Docket No. 18-1457, Final Illinois Solar for All Funding Shortfall Plan, dated November 26, 2018, at 30.

[153] See id. at 31.

[154] 20 ILCS 3855/1-56(b)(3).

[155] Id.

In addition to payments for REC delivery contracts, the law provides that "[t]he Agency shall ensure collaboration with community agencies, and allocate up to 5% of the funds available under the Illinois Solar for All Program to community-based groups to assist in grassroots education efforts related to the Illinois Solar for All Program."[156] Notably, for grassroots education efforts, this amount is not based only on the balance of the RERF; it is instead "up to 5% of the funds available under the Illinois Solar for All Program," and thus also inclusive of any Section 1-75(c) or 16-108(k) funds. In implementation, the Agency decided to award grassroots education contracts through a competitive RFP process, with those entities serving as subcontractors to the Agency's Illinois Solar for All Program Administrator and performing grassroots education activities under that master contract.[157]

In addition to grassroots education, "costs associated with procuring experts, consultants, and the program administrator . . . and related incremental costs, and costs related to the evaluation of the Illinois Solar for All Program" may be paid out of the RERF.[158]

2.6.2. Illinois Solar for All—Sub-programs

Illinois Solar for All is designed to incent specific defined project types, and to this end, Illinois Solar for All features four sub-programs with percentage-based Fund balance allocations applicable to each. Notably, and as described further in Chapter 8, the Agency understands these percentage-based allocations to be applicable only to RERF funds, and not to funds collected by the utilities but available for Illinois Solar for All use (as the law uses the phrasing "monies available in the Illinois Power Agency Renewable Energy Resources Fund"[159] in making those percentage-based assignments).

For the first three sub-programs, these allocations may be changed if, after stakeholder input through a stakeholder process, the Agency or its administrator determines that incentives for any those three sub-programs "have not been adequately subscribed to fully utilize the Illinois Power Agency Renewable Energy Resources Fund."[160] As explained further in Chapter 8, there have been varying levels of initial participation across the three sub-programs; however, the Agency believes that given that Illinois Solar for All opened for project applications only months ago, any such reallocation of funding would be premature.

The first three sub-programs also contain "a goal . . . that a minimum of 25% of the incentives for this program be allocated to community photovoltaic projects in environmental justice communities."[161] The Agency's definition offered to the term "environmental justice community" is discussed further in Chapter 8 and, at present, is described more comprehensively on the Illinois Solar for All website, which allows for users to search qualification status by address.[162]

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[156] Id.

[157] More information on the Illinois Solar for All grassroots education process can be found here: https://www.illinoissfa.com/grassroots-education and in Section 8.15.5.

[158] 20 ILCS 3855/1-56(b)(3).

[159] 20 ILCS 3855/1-56(b)(2).

[160] Id.

[161] 20 ILCS 3855/1-56(b)(2)(A), (B), (C).

[162] See: https://www.illinoissfa.com/environmental-justice-communities.

Discussion of the four sub-programs is below. In addition to these four sub-programs, "a party may propose an additional low-income solar or solar incentive program, or modifications to the programs proposed" and that additional program or modification will be approved "if the additional or modified program more effectively maximizes the benefits to low-income customers after taking into account all relevant factors, including, but not limited to, the extent to which a competitive market for low-income solar has developed."[163]

2.6.2.1. Low-Income Distributed Generation Incentive

The Low-Income Distributed Generation Incentive sub-program "provide[s] incentives to low-income customers, either directly or through solar providers, to increase the participation of low-income households in photovoltaic on-site distributed generation."[164] Used for this sub-program and others, the term "solar provider" has no definition in the statute; to allow the market to determine appropriate models, the Agency has determined that "solar providers" can refer to any entity which has a contractual relationship with the low-income customer in connection with the underlying photovoltaic system (whether in the form of purchase, leasing, installation, aggregation, or financing).

This program contains a firm, unequivocal commitment to using job trainees; the law provides that "companies participating in this program that install solar panels shall commit to hiring job trainees for a portion of their low-income installations,"[165] although the term "portion" is undefined in the law. Nevertheless, the IPA believes that "portion" should not be understood as too small to be de minimis, nor too large to be a "majority" (a term which likely would have been used had it been intended), and its determination for the required level of job trainee participation is discussed further in Chapter 8.

For this sub-program, the law also requires that "an administrator shall facilitate partnering the companies that install solar panels with entities that provide solar panel installation job training."[166] The IPA understands this to mean its third-party Program Administrator engaging in such facilitation and this is presently part of the Program Administrator's scope of work.

The law also includes a provision that "[c]ontracts entered into under this paragraph may be entered into with an entity that will develop and administer the program."[167] It is unclear how the administrator could leverage state funds for this use, and at present, all such contracts will be entered into between Approved Vendors (Sellers) and the State of Illinois or a participating utility (Buyers).

This sub-program is allocated 22.5% of available RERF funds.

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[163] 20 ILCS 3855/1-56(b)(4). While an additional program (focused on multi-family properties) was proposed by Elevate Energy and GRID Alternatives in Docket No. 17-0838, that proposal was not adopted by the Commission; instead, the Commission suggested that the IPA "monitor the treatment of multi-family buildings under the Low-Income Distributed Generation Incentive sub-program" and "include the results of that monitoring for the Commission and explain its decision regarding whether to propose a program for this market segment" as part of its 2019 Plan revision filing. Docket No. 17-0838, Final Order dated April 3, 2018 at 153. No additional programs were proposed in Docket No. 19-0995.

[164] 20 ILCS 3855/1-56(b)(2)(A).

[165] Id.

[166] Id.

[167] Id.

2.6.2.2. Low-Income Community Solar Project Initiative

Through the low-income community solar project initiative, "[i]ncentives shall be offered to low-income customers, either directly or through developers, to increase the participation of low-income subscribers of community solar projects."[168] Again, the term "developer" is undefined; as community solar project subscriptions may be actively marketed by entities other than the literal definition of photovoltaic project "developers," no guidance is provided as to whether this phrasing is intended to include all entities marketing such subscriptions or only the project's actual developer. The Agency has interpreted "developer" to be an Approved Vendor or their project partner.

A requirement of this program is that each participating project's developer "shall identify its partnership with community stakeholders regarding the location, development, and participation in the project."[169] Undefined in this phrasing is what constitutes a "community stakeholder," or whether the project itself must include "community stakeholders" from the community in which the project is located (presumably so), the community of any subscribers (unclear), or both (also unclear).

The law further provides that "[i]ncentives should also be offered to community solar projects that are 100% low-income subscriber owned, which includes low-income households, not-for-profit organizations, and affordable housing owners."[170] This phrasing leaves program eligibility unclear—must all subscribers be "low-income" for eligibility, or—as the law uses the term "also" in designating 100% low-income projects for eligibility—only a portion (and if so, what portion)? Not all subscriptions are "ownership"; does ownership matter, and should it result in a heightened incentive? These questions have no obvious answer from the law, but the Agency's approaches are discussed further in Chapter 8.

The law also provides that "[c]ontracts entered into under this paragraph may be entered into with developers,"[171] which the IPA has interpreted to mean that a project developer, upon a sufficient showing of low-income participation, may qualify for a contract award.

This sub-program is allocated 37.5% of available RERF funds.

2.6.2.3. Incentives for Non-profits and Public Facilities

The third sub-program provides that funding "shall be used to support on-site photovoltaic distributed renewable energy generation devices to serve the load associated with not-for-profit customers and to support photovoltaic distributed renewable energy generation that uses photovoltaic technology to serve the load associated with public sector customers taking service at public buildings."[172] Stated differently, the program operates similarly to the first sub-program—an incentive for on-site DG through a higher-priced REC contract—only with different eligibility requirements (not-for-profit customers and public sector customers taking service at public buildings).

[168] 20 ILCS 3855/1-56(b)(2)(B).

[169] Id.

[170] Id.

[171] Id.

[172] 20 ILCS 3855/1-56(b)(2)(C).

This raises the question of whether all non-profits and all public sector entities may qualify for the sub-program, or whether some nexus with the broader "low-income" intent of Illinois Solar for All is required. As discussed further in Chapter 8, the IPA believes that some level of community involvement may be required to maintain consistency with the spirit of the law.[173]

This sub-program also combines referenced elements of each of the prior programs, stating that "[c]ontracts may be entered into with an entity that will develop and administer the program or with developers,"[174] which carries similar challenges to those referenced above.

This sub-program is allocated 15% of available RERF funds.

2.6.2.4. Low-Income Community Solar Pilot Projects

The fourth sub-program allows that "persons, including, but not limited to, electric utilities, shall propose pilot community solar projects."[175] Such projects are allowed by law to be larger than 2 megawatts ("MW"), but "the amount paid per project under this program may not exceed $20,000,000."[176] Such projects "must result in economic benefits for the members of the community in which the project will be located" and "must include a partnership with at least one community-based organization" (with that term again undefined).[177]

Beyond the allowance that the project may be proposed by an electric utility and may be larger than the law otherwise allows, it is not clear what other requirements make such facilities sufficiently distinct so as to be considered a "pilot project." While it may be tempting to require demonstration of innovation through this program, at present, the IPA does not believe that any additional limitations or conditions on such projects should be inferred.

While the manner through which contracts are entered into in the other sub-programs is not established in the statute, the low-income community solar pilot project sub-program must be "competitively bid by the Agency," which the Agency understands to be consistent with the procurement requirements of Section 16-111.5 of the PUA where applicable.

The law further provides that funding under this sub-program "may not be distributed solely to a utility," and that some funds "must include a project partnership that includes community ownership by the project subscribers." The IPA thus understands that, for bid selection purposes, disbursement to an entity other than a utility is a prerequisite for a utility bid to win, while satisfying the referenced partnership through a winning bid is a prerequisite for any other bid to win.

As with the other sub-programs, the law again provides that contracts under the Low-Income Community Solar Pilot Project program "may be entered into with an entity that will develop and administer the program or with developers."[178]

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[173] More information on what is presently required from qualifying non-profits and public facilities can be found here: https://www.illinoissfa.com/programs/nonprofit-organizations-and-public-agencies.

[174] Id.

[175] 20 ILCS 3855/1-56(b)(2)(D).

[176] Id.

[177] Id.

[178] 20 ILCS 3855/1-56(b)(2)(D).

This sub-program is allocated 25% of available RERF funds.

2.6.3. Illinois Solar for All—Additional Requirements

Section 1-56(b) also provides that, under Illinois Solar for All, "[e]ach contract that provides for the installation of solar facilities shall provide that the solar facilities will produce energy and economic benefits, at a level determined by the Agency to be reasonable, for the participating low income customer."[179] The Agency believes that this requirement is in part met through the premium attached to the REC price under Illinois Solar for All (and "energy benefits" for community solar and distributed generation projects are already handled though bill crediting and net metering provisions over which the Agency lacks jurisdiction), and provides support for consumer protections to ensure that low income customers indeed receive benefits in entering into contractual arrangements with installers, project developers, aggregators, or other intermediaries. Those specific requirements are discussed in more detail in Section 6.13 and Chapter 8.

Illinois Solar for All contracts must also "ensure the wholesale market value of the energy is credited to participating low-income customers or organizations,"[180] which, again, is an issue handled through net metering, but can be emphasized in resulting contracts. Contracts must also ensure that "tangible economic benefits flow directly to program participants, except in the case of low-income multi-family housing where the low-income customer does not directly pay for energy;"[181] while it is unclear from the law what constitutes a "tangible economic benefit" (or, for that matter, a "program participant," especially if the underlying contract is with a project developer or other such entity), the Agency will continue to require, consistent with the Commission Order approving the Initial Plan,[182] that ongoing annualized payments by the customer (if any) must be less than 50% of the annual first year estimated production and/or utility default service net metering value to be received by the customer. Additionally, this language appears to provide further support for ensuring that marketing practices are standardized such that low-income customers receive clear, standardized information about the benefits to be expected from an Illinois Solar for All project.

The law also seeks for priority to be given to projects that "demonstrate meaningful involvement of low-income community members in designing the initial proposal."[183] Here again, the law provides no definition of "meaningful involvement" nor does it define a "low-income community member," and it is unclear whether this would be distinct from an "environmental justice community" or what constitutes a community "member." The law further provides that "[a]cceptable proposals to implement projects must demonstrate the applicant's ability to conduct initial community outreach, education, and recruitment of low-income participants in the community;" again, the term "participants in the community" is undefined and entirely unclear, but the Agency does understand this language as providing that entities seeking to market installations or community solar subscriptions using Illinois Solar for All contracts must, at a minimum, be certified by the Agency and possess some baseline level of demonstrated competency. The Agency's approach to vendor certification through its Approved Vendor process is discussed further in Chapters 6 and 8.

[179] 20 ILCS 3855/1-56(b)(2).

[180] Id.

[181] Id.

[182] Docket No. 17-0838, Final Order dated April 3, 2018 at 150-151.

[183] 20 ILCS 3855/1-56(b)(2).

As growing the low-income solar market involves more than just REC delivery contracts making photovoltaics more economic, the law also requires that projects "must include job training opportunities if available," and seeks that such job training opportunities should be effected through coordination with the job training programs proposed in ComEd's Workforce Development Plan. The Agency's approach to encouraging that projects use job trainees to help build the low-income solar marketplace is discussed further in Chapter 8.

2.6.4. Illinois Solar for All—Third-party Program Administrator

To assist the Agency in its administration of the Illinois Solar for All Program, Section 1-56(b)(5) provides that the Agency may retain a third-party program administrator (or administrators) through a Request For Qualifications and competitive bid process. The selection criteria and requirements must include, but are not limited to, "experience in administering low-income energy programs and overseeing statewide clean energy or energy efficiency services."

As both its Illinois Solar for All third-party program administrator and the "expert consulting firms" to assist with implementing and operating the Adjustable Block Program merely "may" be retained, the Agency understands that it could, in theory, use the same entity to assist it with the implementation of both programs (and is not prohibited from using either third-party administrator to assist it with the implementation of the Community Renewable Generation Program).[184] In September 2018, after the conclusion of its RFQ and RFP process, the Agency entered into a contract with Elevate Energy ("Elevate") under which Elevate serves as the third-party program administrator for the Illinois Solar for All Program.

2.7 2019 Legislative Proposals

During the Spring 2019 session of the Illinois General Assembly, multiple bills were introduced that would impact the IPA's planning and procurement processes for not only procuring renewable energy credits, but also for supporting the development of additional renewable energy generation more generally. These bills included the following:

- HB 3624/SB 2132 (the "Clean Energy Jobs Act")
- HB 2861/SB 660 (known colloquially as the "Clean Energy Progress Act")
- HB 2966/SB 1781 (known colloquially as the "Path to 100 Act")
- HB 2713/SB 2080 (the "Coal to Solar and Energy Storage Act")
- HB 125/SB 135 (the "Competitive Clean Energy Act")

The Spring 2019 session concluded on May 31, 2019 without any of the above bills making significant advancement.[185] The General Assembly concluded its veto session on November 14, 2019, again without enacting any energy legislation. None of the bills listed above, nor any new energy bills, advanced prior to the General Assembly going on hiatus starting in March 2020 due to the presently-ongoing COVID-19 pandemic.

As of the publishing of this Final Revised Plan (April 20, 2020), the Agency understands that negotiations among at least certain principal bill interests are ongoing, and that working groups

[184] In its Order approving the Plan, the Commission rejected a proposal requiring that the IPA use separate administrators for the Adjustable Block Program and Illinois Solar for All Program and rejected a proposed requirement that the program administrator and its subcontractors be limited to non-profit entities. See Docket No. 17-0838, Final Order dated April 3, 2018 at 161-164.

[185] For more background, see: https://www.dailyherald.com/news/20190521/energy-legislation-on-the-back-burner-in-springfield.

continue to convene – even if virtually or by phone rather than in person – to continue discussing potential legislation. However, as no legislation significantly reforming the Agency's responsibilities under this Plan has passed as of the time of the Plan's approval or the filing of this Final Revised Plan, the Agency will faithfully implement the Plan as described herein.

The Agency is presently monitoring legislative discussions and has been an active participant in hearings, working group meetings, and other discussions in which its interests and responsibilities are implicated. Should any legislation pass which significantly modifies the Agency's responsibilities under this Revised Plan, the Agency hopes that any such legislation will expressly address which portions of the Agency's Revised Plan, if any, shall continue to remain in effect.

3. RPS Goals, Targets, and Budgets

The original Illinois Renewable Portfolio Standard was established in 2007 through Public Act 95-0481 and became effective on June 1, 2008. That RPS set annual percentage goals relative to eligible retail loads in the state for the procurement of renewable energy resources, starting with at least 2% by the beginning of the 2008-2009 delivery year and rising to 25% by the 2025-2026 delivery year.[186] These goals initially applied only to the load associated with "eligible retail customers"—the residential and small commercial customers who receive fixed-price bundled service from the utilities, rather than switching to hourly priced service or to service from an Alternative Retail Electric Supplier. In 2009, Public Act 96-0033 added Section 16-115D to the Public Utilities Act, which created separate RPS obligations for ARES. The ARES RPS goals were based on the quantity of metered electricity delivered by the ARES to retail customers in Illinois, but with very different compliance mechanisms as explained in Section 2.1.3 above.

P.A. 99-0906 revised the RPS to apply the goals to all retail customers and to phase out the ARES compliance obligations over a two-year period which terminated on May 31, 2019 (see Section 3.2 for more information). These revisions also consolidated the RPS into a single, centralized planning mechanism for procurements and programs as described in this Plan.

The revisions to the RPS include a number of REC procurement goals and targets. As used in this Revised Plan, the Agency considers a "goal" to be an overall percentage of load to be procured in the form of RECs for a given year based upon that year's mandated RPS requirement.[187] A "target," on the other hand, is the number of RECs for a specific procurement event or program based upon the specific goal or numerical mandate.

Under the changes to the RPS made via P.A. 99-0906, the annual RPS percentage goal remains the same as was previously found in Section 1-75(c)(1) of the IPA Act—17.5% in the 2020-2021 delivery year, rising incrementally by 1.5 percentage points annually to 25% by 2025-2026—but this goal is now applied to all retail electricity sales rather than sales limited to eligible retail customers. Meeting the RPS goals of the Act for this Revised Plan would require procuring an additional 16.2 million RECs for the 2020-2021 delivery year, increasing to the forecasted procurement of an additional 19.8 million RECs for the 2030-2031 delivery year.

In addition, specific REC targets call for various quantities of RECs to be procured in increasing steps starting with the 2017-2018 delivery year through the end of the 2030-2031 delivery year, including:

- 1,000,000 RECs from new utility-scale wind projects and 1,000,000 RECs from new utility-scale and brownfield site solar projects to be delivered annually (with delivery beginning no earlier than June 1, 2019, and no later than June 1, 2021[188]) procured through the Initial Forward Procurement which was conducted separately from the Initial Plan; and

- A total of at least 2,000,000 RECs delivered annually each from new wind and new photovoltaic projects by the end of the 2020-2021 delivery year, ramping up to 3,000,000

[186] 220 ILCS 5/16-111.5(a).

[187] For example, the RPS "goal" for the 2020-2021 delivery year is 17.5% of the retail load.

[188] Public Act 101-0113 allows for an extension of this date if "the project has delays in the establishment of an operating interconnection with the applicable transmission or distribution system as a result of the actions or inactions of the transmission or distribution provider, or other causes for force majeure as outlined in the procurement contract." In such a case, the first REC delivery deadline may be extended to "not later than June 1, 2022."

RECs delivered annually each from new wind and new photovoltaic projects by the end of the 2025-2026 delivery year, and reaching 4,000,000 RECs delivered annually each from new wind and new photovoltaic projects by the end of 2030-2031. (RECs from the Initial Forward Procurement count toward these targets.)

This Chapter contains calculations of RPS targets, summaries of RPS portfolios, and summaries of RPS budgets for delivery years 2020-2021 through 2025-2026. Additional details are available in Appendix B.

3.1. Statewide Goals and Allocation of Cost and RECs from RPS Procurements to Each Utility

The specific numerical targets included in the Act—for instance, the 2,000,000 RECs from new wind and new photovoltaics by 2020-21—are *statewide* targets which do not specify individualized REC targets for each utility. In 2017, 2018, and 2019, the Agency procured RECs through its competitive procurements based on statewide RPS targets rather than individual targets by utility. Contract quantities stemming from those procurements were then assigned to each of the three participating utilities based on an RPS Budget-weighted basis.

For this Revised Plan, the Agency proposes to continue conducting the procurement of RECs (to the extent possible given budget constraints discussed elsewhere in this Chapter) based on statewide RPS goals and targets which, due to changes in load forecasts and the presence of new RECs under contract, have been updated from those contained in the Initial Plan. The cost of the RECs associated with RPS procurements will be allocated to each utility through REC procurement contracts specific to the applicable utility (and independent of supplier performance under other utilities' contracts), based on each utility's Renewable Portfolio Standard Budget ("RPS Budget"). Table 3-1 shows the proposed allocation across each of the three utilities based on each utility's cost cap rate and eligible load.[189]

[189] This allocation method was initially developed to allocate the RECs from the August 31, 2017 Initial Forward Procurement and was based on the RPS Budget for 2020-2021, which uses the prior year delivered volumes as reference. The 2019-2020 reference delivery year was used because it will be the first year when all load, including that served by ARES, will be under the IPA's REC procurements, thus making the resulting RPS Budget a better representation of future RPS Budgets. As shown in Table 3-1, the allocation to each utility is based on the utility's share of the 2020-2021 delivery year RPS Budget. As noted in Chapter 6, the same allocation will be used for the Adjustable Block Program procurements to each utility.

Table 3-1: Utility REC Cost Allocations

Utility	Reference Year Forecasted Delivered Volume [MWh][190]	Cost Cap Rate[191] [$/MWh]	RPS Budget for 2020-2021 Delivery Year [$][192]	Allocation Based on RPS Budget for 2020-2021 Delivery Year [%]
Ameren Illinois	35,079,537	1.8054	63,332,597	27.793%
ComEd	86,640,000	1.8917	163,896,888	71.925%
MidAmerican*	517,599	1.2415	642,599	0.282%

*MidAmerican Applicable load, explained in Section 3.4

Under this allocation, for every $1,000,000 of cost incurred to procure RECs, $277,930 and associated REC contracts would be allocated to Ameren Illinois, $719,250 and associated RECs to ComEd, and $2,820 and associated RECs to MidAmerican.

3.2. Impact of the Phase out of Alternative Retail Electric Supplier RPS Obligations

P.A. 99-0906 resulted in changes to the requirements for ARES RPS compliance. As outlined in Section 2.1.3, prior to P.A. 99-0906's revisions to Section 16-115D of the Public Utilities Act, ARES could meet their compliance requirements through Alternative Compliance Payments ("ACP") or through a combination of ACPs, generation using eligible renewable resources, purchasing electricity generated using eligible renewable resources, and purchasing RECs.

Under the RPS requirements enacted through P.A. 99-0906, after a two-year transition period that ended May 31, 2019, the IPA is now responsible for procuring RECs for virtually all retail load in Illinois, including load served by ARES. During the transition period, the REC quantity associated with ARES load covered by the Agency's programs and procurements was based on 50% of ARES load for the 2017-2018 delivery year and 75% for the 2018-2019 delivery year. For the 2019-2020 and each delivery year thereafter, the Agency is responsible for procuring the REC quantity associated with 100% of ARES load through its programs and procurements.[193] Therefore, ARES no longer have an obligation to procure RECs or make ACPs for RPS compliance.[194]

The impact of the ARES RPS compliance obligation phase-out is that the volume of RECs required to be procured by the IPA to meet Section 1-75(c)(1)(B)'s percentage-based goals increased significantly over the prior volumes required to meet those same percentages.

3.3. Section 1-75(c)(1)(H)(i) ARES Option to Supply RECs for their Retail Customers

Section 1-75(c)(1)(H) of the Act provides an exception to the phase out of ARES RPS obligations described in Section 3.2. Under this exception, an ARES may use self-supplied RECs to meet a portion

[190] The 2019-2020 delivery year is the reference year for the 2020-2021 delivery year.

[191] The Cost Cap Rate for each utility is defined in Section 1-75(c)(1)(F) of the Act as "the greater of 2.015% of the amount paid per kilowatthour by [eligible retail] customers during the year ending May 31, 2007 or the incremental amount per kilowatthour paid for these resources in 2011." 2.015% of the bundled price paid per kWh by eligible retail customers in the 2006-2007 delivery year was 0.18054 cents for Ameren Illinois, 0.18917 cents for ComEd, and 0.12415 cents for MidAmerican. The incremental amount per kWh paid for renewable resources in 2011 was 0.00584 cents for Ameren Illinois, and 0.0057 cents for ComEd. MidAmerican did not participate in IPA-administered renewable energy procurements in 2011; therefore, it did not have an incremental amount for that year.

[192] Beginning with the 2019-2020 delivery year, the RPS Budget for each utility is calculated by multiplying the values of the preceding two columns of the table, as specified by Section 1-75(c)(1)(F) of the Act ("To arrive at a maximum dollar amount of renewable energy resources to be procured for the particular delivery year, the resulting per kilowatthour amount shall be applied to the actual amount of kilowatthours of electricity delivered […] by the electric utility in the delivery year immediately prior to the procurement to all retail customers in its service territory.").

[193] 20 ILCS 3855/1-75(c)(1)(B); 220 ILCS 5/16-115D(a)(3.5).

[194] 220 ILCS 5/16-115D(i).

(and possibly all) of the REC procurement requirements applicable to its load. To do so, the ARES had to first make an informational filing to the ICC within 45 days of the effective date of Public Act 99-0906 (i.e., within 45 days of June 1, 2017), indicating that it owned a generating facility or facilities as of December 31, 2015, that produced RECs eligible to meet the RPS, provided that those facilities were not powered by wind or solar photovoltaics. The ARES must also notify the Agency and the applicable utility by February 28 of each year of its election to supply RECs to its retail customers and include the amount of RECs to be supplied.

One ARES informational filing covering an owned generation facility outside of Illinois was submitted on a confidential basis to the ICC by the deadline of July 15, 2017.

Section 1-75(c)(1)(H) of the Act provides that the procurement of renewable energy resources for a given year shall be reduced if the ARES uses RECs from an ARES-owned generation facility to supply its retail customers. The amount of RECs that can be supplied by ARES-owned/ generation is subject to several limitations. Specifically, the Act provides that:

> *"For the delivery year beginning June 1, 2018, the maximum amount of renewable energy credits to be supplied by an alternative retail electric supplier under this subparagraph (H) shall be 68% multiplied by 25% multiplied by 14.5% multiplied by the amount of metered electricity (megawatt-hours) delivered by the alternative retail electric supplier to Illinois retail customers during the delivery year ending May 31, 2016."* [195]
>
> *"For delivery years beginning June 1, 2019 and each year thereafter, the maximum amount of renewable energy credits to be supplied by an alternative retail electric supplier under this subparagraph (H) shall be 68% multiplied by 50% multiplied by 16% multiplied by the amount of metered electricity (megawatt-hours) delivered by the alternative retail electric supplier to Illinois retail customers during the delivery year ending May 31, 2016, provided that the 16% value shall increase by 1.5% each delivery year thereafter to 25% by the delivery year beginning June 1, 2025, and thereafter the 25% value shall apply to each delivery year."* [196]

The Act limits the total amount of RECs that can be supplied by all ARES through owned generation:

> *"For each delivery year, the total amount of renewable energy credits supplied by all alternative retail electric suppliers shall not exceed 9% of the Illinois target renewable energy credit quantity. The Illinois target renewable energy credit quantity for the delivery year beginning June 1, 2018 is 14.5% multiplied by the total amount of metered electricity (megawatt-hours) delivered in the delivery year immediately preceding that delivery year, provided that the 14.5% shall increase by 1.5% each delivery year thereafter to 25% by the delivery year beginning June 1, 2025, and thereafter the 25% value shall apply to each delivery year."*[197]

[195] 20 ILCS 3855/1-75(c)(1)(H)(iii).

[196] Id.

[197] Id.

In order to take into account the self-supply by the ARES, the Act requires that the charges which are applicable to the retail customers of the ARES be reduced by the ratio of the RECs supplied by the ARES to the ARES's RPS target. Specifically, the Act states that:

> *"If the requirements set forth in items (i) through (iii) of this subparagraph (H) are met, the charges that would otherwise be applicable to the retail customers of the alternative retail electric supplier under paragraph (6) of this subsection (c) for the applicable delivery year shall be reduced by the ratio of the quantity of renewable energy credits supplied by the alternative retail electric supplier compared to that supplier's target renewable energy credit quantity. The supplier's target renewable energy credit quantity for the delivery year beginning June 1, 2018 is 14.5% multiplied by the total amount of metered electricity (megawatt-hours) delivered by the alternative retail supplier in that delivery year, provided that the 14.5% shall increase by 1.5% each delivery year thereafter to 25% by the delivery year beginning June 1, 2025, and thereafter the 25% value shall apply to each delivery year."*[198]

By April 1 of each year, the IPA posts a report to its website outlining on the aggregate number of RECs being supplied by the ARES for the upcoming delivery year under this provision, starting June 1.[199] This quantity will be accounted as RECs from "other technologies" (i.e., other than wind or solar) and will reduce the overall RPS Target for that delivery year. Those targets are shown (unadjusted) in Table 3-13.

3.4. MidAmerican Volumes

While procurement plans are required to be prepared annually for Ameren Illinois and ComEd, Section 16-111.5(a) of the PUA states that "[a] small multi-jurisdictional electric utility . . . may elect to procure power and energy for all or a portion of its eligible Illinois retail customers" in accordance with the planning and procurement provisions found in the IPA Act. On April 9, 2015, MidAmerican first formally notified the IPA of its intent to procure power and energy for a portion of its eligible retail customer load through the IPA through its participation. That portion is essentially the incremental load that is not forecasted to be supplied in Illinois by what MidAmerican, a vertically-integrated utility in Iowa that owns generation there (as well as a share of the Quad Cities nuclear plant in Cordova, IL), assigns to Illinois as its jurisdictional generation. Each year since, MidAmerican has remained a part of that process to meet the remaining "portion" of its load.

MidAmerican's status as a multi-jurisdictional utility that uses its own generating resources to meet a portion of its Illinois load creates a unique situation for RPS compliance. Unlike Ameren Illinois and ComEd, for which all retail load is subject to the RPS goals and targets (subject to limited exceptions outlined above), the MidAmerican load for which the RPS goals and targets are applicable has traditionally been only that load that is subject to the IPA's annual planning and procurement process for conventional power. As mentioned above, that amount has been the forecast load in excess of

[198] Id.

[199] For the 2020-2021 delivery year, see: https://www2.illinois.gov/sites/ipa/Documents/2020-2021%20Delivery%20Year%20ARES%20REC%20Report.pdf..

MidAmerican's Illinois-allocated generation in any given delivery year, which has generally been only 25-35% of its total jurisdictional load.[200]

As a significantly smaller Illinois utility to begin with, and with only a portion of its load applicable to the Illinois RPS, the MidAmerican share of Illinois RPS and Zero Emission standard contracts has often been only a fraction of that allocated to ComEd and Ameren Illinois.

3.4.1. Change to MidAmerican's Load Forecast Methodology

In 2018, MidAmerican proposed and the Commission approved a change in approach to forecast MidAmerican's generation used for electricity procurement.[201] This change caused a sudden and significant reduction of the load subject to the IPA electricity procurement process, as seen in Table 3-2 below.

Table 3-2: MidAmerican Applicable Load and RPS Budget before and after Change in Forecast Approach

Compliance Delivery Year	Reference Delivery Year	Applicable Load Before Change [MWh][202]	Applicable Load After Change [MWh][203]	RPS Budget Before Change [$]	RPS Budget After Change [$]
2020-2021	2019-2020	616,844	0	765,812	0
2021-2022	2020-2021	527,768	0	655,224	0
2022-2023	2021-2022	519,093	126	644,454	156
2023-2024	2022-2023	509,457	400	632,491	497
2024-2025	2023-2024	390,919	644	485,326	800
2025-2026	2024-2025	372,831	929	462,870	1,153

In the 2019 Electricity Procurement Plan, the IPA explained the change in approach to forecast MidAmerican's generation:

> *In reviewing the load forecast and resource portfolio information supplied by MidAmerican for the 2019 Plan, the IPA notes that MidAmerican revised the methodology used for its generation supply forecast. The prior forecast methodology utilized production cost models to dispatch the Illinois Historical Resources whenever the expected cost to generate electricity is less than the expected cost of acquiring it in the market. The revised methodology is based on the utilization of MISO Unforced Capacity ("UCAP") from the baseload Illinois Historical Resources to determine the generation available to meet MidAmerican's Illinois eligible load.*[204]

[200] The Commission specified this approach for the procurement of renewable resources to meet the RPS compliance targets applicable to MidAmerican in Docket No. 15-0541, determining that only the portion of MidAmerican's load subject to the IPA's planning and procurement process is subject to Section 1-75(c) of the Act's requirements.

[201] Docket No. 18-1564, Final Order dated November 26, 2018.

[202] Based on load volumes presented in the Initial Plan.

[203] Based on volumes provided by MidAmerican in its response submitted for the preparation of this Revised Plan.

[204] MidAmerican allocates 10.86% of the UCAP ratings of its baseload units for Illinois Historical Generation.

MidAmerican's revised methodology utilizes the full capability of each baseload generation asset, represented by the UCAP MW values as determined by MISO for each year's Planning Resource Auction. The UCAP values de-rate generating unit capabilities by considering historical forced outage rates and operating conditions under summer peak conditions. The IPA, for the 2019 Plan, recommends no changes to the determination of monthly on-peak and off-peak block energy requirements other than the replacement of generation production values with the UCAP values for each of the following baseload resources:

- *Coal resources including: Neal Unit #3, Neal Unit #4, Walter Scott Unit #3, Louisa Generating Station, and Ottumwa Generating Station.*
- *Nuclear Resources: Quad Cities Nuclear Power Station.*

The supply capability that is determined is netted against the forecast of MidAmerican Illinois load to calculate the monthly on-peak and off-peak shortfalls which will be met with energy block purchases in the IPA procurements. In determining the amount of block energy products to be procured for MidAmerican, the IPA treats the allocation of capacity and energy from MidAmerican's Illinois Historical Resources in a manner analogous to a series of standard energy blocks. This approach is consistent with the 2018 Procurement Plan approved by the Commission.

As shown in Table 3-2 above, one unintended consequence of this reduction is that it would cause the annual commitments of already procured RECs and associated spending to exceed MidAmerican's projected RPS annual budget using the prior-applied methodology for determining that budget amount. Stated differently, MidAmerican was previously assigned contracts assuming it would have ~$650,000 available to spend annually on renewable energy procurement. Upon those obligations becoming due and payments needing to be made, applying MidAmerican's new load forecasting methodology in combination with the prior approach to determining MidAmerican's RPS budget would result in MidAmerican only potentially having hundreds of dollars available for renewable energy resource procurement.

This could have left entities holding contracts with MidAmerican at risk of contact curtailment (i.e., the curtailment of delivered contract quantities in line with money available for payment), as absent an alternative interpretation to calculating MidAmerican's available RPS budget, MidAmerican would not be authorized to meet those contract obligations without exceeding its statutory RPS rate impact cap. Such a curtailment could have caused some new renewable energy facilities dependent on revenue from MidAmerican's contracts to suffer losses, leaving them potentially unable to generate enough revenue to cover costs.

3.4.2. Proposal to Correct Unintended Consequences of MidAmerican's Changed Forecast Approach

As described in more detail throughout Chapter 2, a primary objective informing Public Act 99-0906's reforms to the Illinois RPS was to reduce year-over-year funding volatility that effectively paralyzed leveraging RPS funds to support the development of new renewable energy generation. While such volatility was not completely eliminated – the load forecasts received from ComEd and Ameren Illinois feature lower funding availability than the Agency perhaps expected, due to projected decline in the demand for electricity – year-over-year changes for those utilities remain relatively minor, and enough stabilization was introduced to allow for the execution of the types of

long-term contracts providing sufficient revenue certainty to allow developers to secure financing to develop new renewable generation. Within the spirit of these efforts, the Agency believes steps must be taken to stabilize MidAmerican's year over year RPS budgets. By so doing, the Agency can ensure that those funds collected can be put toward their intended use (facilitating the development of new generation), while protecting existing contract holders against unforeseen curtailments.[205]

Perhaps notably, MidAmerican's Zero Emissions Credit ("ZEC") payment calculation uses a fixed percentage allocator based upon the ratio of the supply gap (electricity procured by the IPA on behalf of MidAmerican) to MidAmerican's retail load. In determining that percentage (13.266%), actual load data for the 2016-2017 delivery year was used.

The IPA believes a similar approach is warranted for MidAmerican's RPS budgets. Thus, the IPA proposes in this Revised Plan to use a proxy to calculate MidAmerican's Applicable Load. This proxy for applicable load would likewise be a percentage of MidAmerican's total Illinois retail load.

Going forward, the Agency proposes that MidAmerican's Applicable Load for the purposes of RPS compliance (i.e., calculations of REC targets, budgets, and allocation of REC contracts in this Revised Plan) should be fixed at 26.025% of MidAmerican's annual total Illinois retail load. This percentage was calculated as follows: the average of MidAmerican's applicable load from the Initial Plan for the DYs 2019-2020 through 2037-2038 is 526,880 MWh. The average of the total retail load provided by MidAmerican in their July 2019 data response for the same period is 2,024,484 MWh. The ratio of the average applicable load from the Initial Plan to the average total retail load provided by MidAmerican in its data response yields a 26.025% proxy.[206]

Adopting this proposal produces Applicable Load volumes that are equivalent to those used in the Initial Plan, as shown on Table 3-3, which formed the basis to calculate MidAmerican's targets and budgets that supported MidAmerican's allocation of REC contracts and corresponding spending. Additionally, as can be observed in the Table below, MidAmerican's resulting Applicable Load and corresponding budget is relatively stable, year over year, helping to ensure not only that existing contracts are not curtailed, but also that the year to year volatility that resulted in years of advocacy to "fix" a "broken" RPS does not persist for MidAmerican.

As this proposal was uncontested in Docket No. 19-0995, the IPA understands this proposal to have been adopted by the Commission through its Final Order in that proceeding approving the Plan.

[205] The risk of under collection may not be an issue through 2020-2021, as through that period, MidAmerican's balance collected in prior delivery years (which may then be "rolled over" for future years until 2020-2021) should be sufficient to cover its contracted annual RPS expenditures.

[206] The Agency notes that it did not receive any objections to this proposed approach in comments received on its draft Revised Plan. Rather, the Clean Grid Alliance, Environmental Law and Policy Center/Vote Solar, and the Natural Resources Defense Council expressed support for it.

Table 3-3: Comparison of MidAmerican's Applicable Load Using the Generation Forecast before Change and the Proposed Proxy for Determining Applicable Load and Budget

Compliance Delivery Year	Reference Delivery Year	Applicable Load Before Change August 1, 2017 [MWh][207]	RPS Budget Before Change August 1, 2017 [$][208]	Applicable Load Using Proxy [MWh][209]	RPS Budget Using Proxy [$]
2019-2020	2018-2019	704,364	874,468	528,791	656,494
2020-2021	2019-2020	616,844	765,812	517,599	642,599
2021-2022	2020-2021	527,768	655,224	518,437	643,640
2022-2023	2021-2022	519,093	644,454	519,350	644,774
2023-2024	2022-2023	509,457	632,491	520,308	645,963
2024-2025	2023-2024	390,919	485,326	521,252	647,135
2025-2026	2024-2025	372,831	462,870	522,222	648,338
2026-2027	2025-2026	475,331	590,123	523,149	649,490
2027-2028	2026-2027	395,422	490,916	524,135	650,713
2028-2029	2027-2028	472,535	586,652	525,148	651,972
2029-2030	2028-2029	432,084	536,432	526,220	653,302
2030-2031	2029-2030	396,202	491,885	527,567	654,974
2031-2032	2030-2031	405,524	503,458	529,097	656,875
2032-2033	2031-2032	386,254	479,534	530,592	658,730
2033-2034	2032-2033	556,310	690,659	532,165	660,683
2034-2035	2033-2034	795,579	987,711	533,702	662,592
2035-2036	2034-2035	706,470	877,083	535,287	664,559
2036-2037	2035-2036	693,364	860,811	536,991	666,675
2037-2038	2036-2037	654,366	812,395	538,704	668,801
	Total All Years	10,010,717	**12,428,305**	10,010,717	**12,428,305**

For the balance of this Revised Plan, MidAmerican's Applicable Load will be determined by using the proxy approach proposed in this Section.

[207] Based on load volumes presented in the Initial Plan.

[208] Budget used in the Initial Plan.

[209] Applicable Load equals 26.025% of Forecast Retail Load.

3.5. Cost Cap and Cost Recovery

The IPA's procurement of RECs on behalf of Illinois electric utilities is subject to monetary limitations in the form of a cost cap that limits the annual average net increase to all eligible retail customers to "no more than the greater of 2.015% of the amount paid per kilowatt-hour by those customers during the year ending May 31, 2007 or the incremental amount per kilowatt-hour paid for these resources in 2011."[210] On a percentage basis, the cost cap determined under these criteria is unchanged from the RPS cost cap predating Public Act 99-0906; however, it is now applied to the actual quantity of electricity delivered in the prior delivery year to all applicable retail customers in the utility's service territory.[211] The cost cap rate, in cents per kilowatt-hour, is provided in Table 3-4.

Table 3-4: REC Procurement Cost Cap Rate by Utility[212]

Utility	RPS Cost Cap Rate [¢/kWh]
Ameren Illinois	0.18054
ComEd	0.18917
MidAmerican	0.12415

Each utility is entitled to recover the costs of the RECs procured to meet the RPS compliance requirements, subject to the cost cap limitations, along with "…the reasonable costs that the utility incurs as part of the procurement process and to implement and comply with plans and processes approved by the Commission…"[213]

Since the start of the 2017-2018 delivery year, the utilities are able to recover all of their costs—whether associated with RECs previously procured through prior-executed contracts, procured through the Initial Forward Procurements, procured through other competitive procurements, or procured through the other programs resulting from the implementation of the IPA's long-term renewable resource procurement plans[214]—through tariffs applicable to all of the utilities' customers. These tariffs took effect as of the June 2017 billing period and allow collections by utilities to recover the costs of RECs procured by the IPA. The Commission will conduct a single review, reconciliation and true-up of the utility's collections covering REC costs for the 2017-2018, 2018-2019, 2019-2020, and 2020-2021 delivery years no earlier than August 31, 2021.[215, 216]

3.6. RPS Compliance Procurement Priorities

The Act provides guidelines for prioritizing the REC procurements in the event that the cost cap limitations conflict with the RPS goals and targets such that the IPA cannot procure sufficient

[210] 20 ILCS 3855/1-75(c)(1)(E).

[211] Id.

[212] These figures are the same rates used in the IPA's 2017 Electricity Procurement Plan approved by the Commission. See: https://www2.illinois.gov/sites/ipa/pages/Prior_Approved_Plans.aspx at 12.

[213] 220 ILCS 5/16-108(k).

[214] For which the utility is the counterparty; for the Illinois Solar for All Program, the State of Illinois is (or will be) the counterparty to many REC delivery contracts with those payments funded using the Renewable Energy Resources Fund.

[215] See id.

[216] Subject to limits (discussed in Chapters 2 and 8 of this Revised Plan) based on any shortfall of funding to the IPA's Renewable Energy Resources Fund, a portion of any over-collection, up to half, in each of the 2017-2018, 2018-2019, and 2019-2020 delivery years may be used to fund the Illinois Solar for All Program.

additional quantities of RECs to meet goals or targets.[217] These priorities regarding the procurement of RECs take the following order, arranged based on descending priority:

- RECs procured under existing contracts;
- RECs procured with funding for the Illinois Solar for All Program;
- RECs procured to comply with the new wind and solar photovoltaic procurement requirements (including the Adjustable Block Program);
- RECs procured to meet the remaining RPS targets (REC Gap).

Based on the list above, the procurement of RECs under existing contractual obligations will have the highest priority, with the procurement of RECs to meet remaining RPS requirements having the lowest priority. The RPS Budget for each year will therefore be allocated in the order of these priorities, until goals are met, or there are no remaining funds available for that year (as well as allocation of expected expenditures for future years).

3.7. Wind/Solar Matching Requirement and Solar Split

The Act defines the annual REC targets for wind and solar generation in terms of the timing of the annual quantities to be procured and the technology preferences for the facilities generating the RECs.[218] The overall quantity of RECs procured to meet the RPS goals must include at least a combined 75% from wind and photovoltaic projects. This is a change from the prior RPS construct, under which there was a goal that 75% of the renewable energy resources come from wind, 6% from photovoltaics, and 1% from distributed generation.[219]

In addition to the wind and photovoltaic requirements that apply to the overall RPS goals, there are also specific numerical targets that apply to RECs from new wind and new photovoltaic projects. New projects are those projects energized after June 1, 2017.[220] The REC target deliveries from new projects from each technology are 2,000,000 RECs by the end of the 2020-2021 delivery year, 3,000,000 RECs by the end of the 2025-2026 delivery year, and 4,000,000 RECs by the end of the 2030-2031 delivery year. The new photovoltaic project REC procurement targets are further broken down to reflect the procurement of at least 50% of these targets from distributed photovoltaic renewable generation projects or photovoltaic community renewable generation projects using the Adjustable Block Program, at least 40% from utility-scale photovoltaic projects, at least 2% from brownfield site photovoltaic projects that are not community solar projects, and the remaining 8% not specified but determined through this Plan.

Furthermore, the total amount of RECs targeted for delivery from all new wind sources is intended not to exceed the total amount of RECs to be delivered from all new photovoltaic projects. In the event that the projected cumulative quantity of new wind project RECs to be delivered exceeds the quantity of new solar project RECs projected to be delivered by 200,000 RECs or more, the procurement targets for the programs contained in the Initial Plan will be adjusted as needed to bring the wind

[217] 20 ILCS 3855/1-75(c)(1)(F).

[218] 20 ILCS 3855/1-75(c)(1)(C).

[219] 220 ILCS 5/16-111.5(a).

[220] The IPA, in accounting for RECs from new projects towards the Section 1-75(c)(1)(C) REC targets, excludes RECs procured through the DG Procurements in 2017 because of their relative small quantity and uncertainty around their energized date. They are, however, included in compliance calculations to ensure that at least a combined 75% of RECs be from wind and photovoltaic projects.

and solar REC quantities back into balance.[221] Per the definition of "new photovoltaic projects" in the Act, RECs procured as part of the Illinois Solar for All Program (see Chapter 8) cannot be counted as new photovoltaic RECs for purpose of meeting Section 1-75(c)(1)(C)'s quantitative targets and therefore are not accounted as such in this Revised Plan, although these RECs would count toward the overall 75% of RECs coming from wind or photovoltaic resources.

In its Order approving the Initial Plan, the Commission confirmed that this balancing or "matching" requirement becomes effective as of June 1, 2021 (the last point at which projects from the Initial Forward Procurements can begin delivery of RECs).[222] Since that time, Public Act 101-0113 was signed into law, which extends the last point at which projects from the Initial Forward Procurements can begin delivery of RECs to "not later than June 1, 2022" should the project feature "delays in the establishment of an operating interconnection with the applicable transmission or distribution system as a result of the actions or inactions of the transmission or distribution provider, or other causes for force majeure as outlined in the procurement contract." As discussed in Chapter 2, this change in state law then should extend the applicable date under which the "matching" requirement until this new date on which deliveries from Initial Forward Procurement projects could be initiated; the IPA's proposal that the deadline for the matching requirement extend to June 1, 2022 was uncontested in Docket No. 19-0995 approving the Plan.

3.8. REC Portfolio

For the planning and development of the various procurements and programs under this Revised Plan, it is necessary to aggregate the utility level portfolios of all existing RECs under contract, including/in addition to all expected (procured and to be procured upon the closing of all blocks authorized under the Initial Plan) RECs under the Adjustable Block Program, into a single, statewide portfolio of RECs. That resulting statewide portfolio can then be examined against REC goals and targets mandated in the Act to estimate gaps that need to be closed through future procurement of RECs.

The following sections examine existing REC portfolios and the resulting statewide REC Portfolio after accounting for expected deliveries of RECs resulting from the planned Forward Procurement of utility-scale wind RECs, and the balance of the Adjustable Block Program.

3.9. Existing REC Portfolios - RECs Already Under Contract

The tables that follow show the existing REC portfolio of each utility and the aggregated statewide portfolio as of April 20, 2020.[223] The following glossary applies to these tables:

- "LTPPA" includes RECs procured under the Long-Term Power Purchase Agreements entered into in 2010;
- "Legacy DG" includes RECs procured under the Distributed Generation procurement events conducted by the IPA in 2015, 2016, and 2017;
- "Forward Procurements" include RECs procured under the initial forward procurements and the procurement events conducted to date by the IPA pursuant to the Initial Plan;

[221] Docket No. 17-0838, Final Order dated April 3, 2018 at 47-48.

[222] 20 ILCS 3855/1-75(c)(1)(B), (C).

[223] ILSFA REC commitments have been included in the utilities' existing REC portfolios (where a utility is contractual counterparty) for the 2018-2019 and 2019-2020 program years.

- "IPA Programs Solar" includes existing RECs procured and under contract resulting from the Adjustable Block Program and the Illinois Solar for All Program as of April 10, 2020.

Additionally, summary estimates of RECs to be procured and under contract upon the closing of all blocks authorized under the Initial Plan for the Adjustable Block Program (i.e., the new installed photovoltaic capacity estimated as needed to meet 2020's 1,000,000 REC target) are presented in Section 3.10, and additional details are presented in Chapter 6.

Table 3-5: Ameren Illinois Existing REC Portfolio

Del. Year	LTPPA Wind RECs	LTPPA Solar RECs	Legacy DG Solar RECs	Forward Procurements Wind RECs	Forward Procurements Solar RECs[224]	IPA Programs Solar RECs	Total Wind RECs	Total Solar RECs	Total RECs
2020-21	596,571	3,429	7,475	409,153	280,828	215,734	1,005,724	507,466	1,513,190
2021-22	596,571	3,429	7,040	863,696	883,363	287,668	1,460,267	1,181,501	2,641,768
2022-23	596,571	3,429	4,529	863,696	883,363	287,644	1,460,267	1,178,966	2,639,233
2023-24	596,571	3,429	4,330	863,696	883,363	287,621	1,460,267	1,178,743	2,639,010
2024-25	596,571	3,429	-	863,696	883,363	287,597	1,460,267	1,174,389	2,634,656
2025-26	596,571	3,429	-	863,696	883,363	287,573	1,460,267	1,174,366	2,634,633

[224] Including Brownfield Site Photovoltaics.

Table 3-6: ComEd Existing REC Portfolio

Del. Year	LTPPA Wind RECs	LTPPA Solar RECs	Legacy DG Solar RECs	Forward Procurements Wind RECs	Forward Procurements Solar RECs[225]	IPA Programs Solar RECs	Total Wind RECs	Total Solar RECs	Total RECs
2020-21	1,233,838	27,887	21,181	981,244	673,490	533,562	2,215,082	1,256,120	3,471,202
2021-22	1,233,838	27,887	20,138	2,071,340	2,118,507	703,621	3,305,178	2,870,153	6,175,331
2022-23	1,233,838	27,887	-	2,071,340	2,118,507	703,593	3,305,178	2,849,987	6,155,165
2023-24	1,233,838	27,887	-	2,071,340	2,118,507	703,565	3,305,178	2,849,959	6,155,137
2024-25	1,233,838	27,887	-	2,071,340	2,118,507	703,538	3,305,178	2,849,932	6,155,110
2025-26	1,233,838	27,887	-	2,071,340	2,118,507	703,510	3,305,178	2,849,904	6,155,082

Table 3-7: MidAmerican Existing REC Portfolio

Del. Year	LTPPA Wind RECs	LTPPA Solar RECs	Legacy DG Solar RECs	Forward Procurements Wind RECs	Forward Procurements Solar RECs [226]	IPA Programs Solar RECs	Total Wind RECs	Total Solar RECs	Total RECs
2020-21	-	-	580	4,603	3,160	3,272	4,603	7,012	11,615
2021-22	-	-	449	9,717	9,939	6,544	9,717	16,932	26,649
2022-23	-	-	-	9,717	9,939	6,544	9,717	16,483	26,200
2023-24	-	-	-	9,717	9,939	6,544	9,717	16,483	26,200
2024-25	-	-	-	9,717	9,939	6,544	9,717	16,483	26,200
2025-26	-	-	-	9,717	9,939	6,544	9,717	16,483	26,200

3.10. Forward Procurements Scheduled for the Fall of 2019, Planned Utility-Scale Wind Forward Procurement, and Balance of RECs to be Procured under the Adjustable Block Program

In accordance with competitive procurements approved in the Initial Plan, the Agency conducted two competitive procurements events in the Fall of 2019: the Second Subsequent Forward Procurement

[225] Including Brownfield Site Photovoltaics.

[226] Including Brownfield Site Photovoltaics.

for utility-scale wind projects (described in Section 5.8.2 of the Initial Plan), and the Community Renewable Generation Program Forward Procurement (described in Section 5.8.4 of the Initial Plan). Neither of these procurement events resulted in the procurement of RECs. The Agency, as described in Section 5.9.2, plans to conduct a utility-scale wind forward procurement in the Fall of 2020 or the Spring of 2021; volumes and delivery assumptions for this procurement are shown in Table 3-8 below.

Also, as described in Section 6.17 of this Revised Plan, the Adjustable Block Program is presently in the process of being implemented, with some blocks still open and some quantities targeted in the Initial Plan yet to be procured. The balance and deliverable estimates of ABP RECs yet to be procured and under contract is shown in Table 3-9.

Table 3-8: Planned Utility-Scale Wind Forward Procurement

Delivery Year	Utility Scale Target Wind RECs (estimate)
2021-2022	
2022-2023	
2023-2024	1,000,000
2024-2025	1,000,000
2025-2026	1,000,000

Table 3-9: Balance of ABP RECs to be Procured[227]

Delivery Year	Balance of ABP Solar RECs (estimate)
2020-2021	141,029
2021-2022	160,129
2022-2023	160,129
2023-2024	160,129
2024-2025	160,129
2025-2026	160,129

[227] Chapter 6, particularly Table 6-5, provides further details of the Adjustable Block Program procurement of RECs.

3.11. Statewide REC Portfolio

The utilities' existing REC portfolios, plus the expected RECs resulting from the scheduled procurements in the Fall of 2019, plus the estimated Adjustable Block Program balance of RECs to be procured and under contract,[228] in the aggregate, produce the Statewide REC Portfolio presented in Table 3-10. This table indicates the volume of RECs expected to be available to meet the various RPS goals and targets mandated in the Act without new authorization for additional procurements or program capacity.

Table 3-10: Statewide REC Portfolio

Del. Year	Existing Wind RECs	Existing Solar RECs	Fall 2020/Spring 2021 Utility-Scale Forward Wind RECs (estimate)	Other Technology RECs Supplied by ARES[229]	Balance of ABP Solar RECs (estimate)	Total Wind RECs[230]	Total Solar RECs	Total All RECs
2020-2021	3,225,409	1,770,597	-	1,569,978	141,029	3,225,409	1,911,626	6,707,013
2021-2022	4,775,162	4,068,586	-		160,129	4,775,162	4,228,714	9,003,876
2022-2023	4,775,162	4,045,436	-		160,129	4,775,162	4,205,564	8,980,726
2023-2024	4,775,162	4,045,185	1,000,000		160,129	5,775,162	4,205,314	9,980,476
2024-2025	4,775,162	4,040,804	1,000,000		160,129	5,775,162	4,200,932	9,976,094
2025-2026	4,775,162	4,040,752	1,000,000		160,129	5,775,162	4,200,881	9,976,043

3.12. Loads, RPS Goals and Targets, and REC Gaps

To start the procurement planning process, it is first necessary to calculate the annual REC targets and gaps to be filled. In the prior Section, a statewide REC portfolio was presented. The REC quantities in that portfolio will be used in conjunction with the REC targets developed in this Section to estimate REC gaps.

3.13. Applicable Retail Customer Load

The table below shows the forecasted retail customer load subject to RPS compliance through the 2025-2026 delivery year.[231] Because the Act mandates that statewide RPS goals are applied to all retail customer load by the 2019-2020 delivery year and beyond, this table takes into account that transition.

[228] REC deliveries for ABP are based on the "Assumed Energization" rate shown in Table 3-23.

[229] ARES option to supply RECs is discussed in Section 3.3 above.

[230] These totals reflect quantities from the LTPPAs, which do not count against Section 1-75(c)(1)(G)(iv)'s balancing requirement (as these are not from "new" projects, as that term is defined in the Act); as a result, these totals do not demonstrate that the 200,000 REC wind/solar balancing requirement is expected to be exceeded.

[231] As customary, in support of the IPA procurement processes, in the summer of 2019 the utilities developed and provided the actual and forecast loads used in this Revised Plan.

Table 3-11: Retail Customer Load Applicable to the Compliance Year

Compliance Delivery Year	Reference Delivery Year	Ameren Illinois [MWh]	ComEd [MWh]	MidAmerican [MWh]	Statewide [MWh]
2020-2021	2019-2020	35,079,537	86,640,000	517,599	122,237,136
2021-2022	2020-2021	34,608,468	85,892,000	518,437	121,018,905
2022-2023	2021-2022	34,330,656	85,314,000	519,350	120,164,007
2023-2024	2022-2023	34,093,802	84,797,000	520,308	119,411,110
2024-2025	2023-2024	33,873,550	84,578,000	521,252	118,972,802
2025-2026	2024-2025	33,873,550	84,258,000	522,222	118,653,772

The Agency notes that, for the forecast quantity used for the 2020-2021 delivery year, the Ameren Illinois load declined 7.73% from the forecast numbers included in the Initial Plan, for ComEd it declined by 0.43%, and for MidAmerican 16.09%.[232] This decrease in forecasted load will have a corresponding impact on estimated annual RPS goals and budget collections. The impact of variations in load forecasts is discussed further in Section 3.20.1.

3.14. RPS Goals and Targets

RPS annual goals are expressed as percentages in Section 1-75(c)(1)(B) of the Act. To determine the number of RECs required to meet the goals (the "Overall RPS Target"), the delivery year RPS goal is applied to the reference year applicable retail customer load ("Applicable Load") as shown in equation (1).

(1) Delivery Year Overall RPS Target = Delivery Year RPS Goal * Reference Year Applicable Load

The statewide RPS Goals and Targets for 2020-2021 through 2025-2026 are shown in the table below.

[232] Note that the MidAmerican load is impacted by the proposed adjustment to the calculation methodology contained in Section 3.4 and thus reflects a methodological change.

Table 3-12: Statewide RPS Goals and Targets

Delivery Year	RPS Goal	Reference Year	Reference Year Load (Applicable Load) [MWh]	Overall RPS Target [RECs]
2020-2021	17.5%	2019-2020	122,237,136	21,391,499
2021-2022	19.0%	2020-2021	121,018,905	22,993,592
2022-2023	20.5%	2021-2022	120,164,007	24,633,621
2023-2024	22.0%	2022-2023	119,411,110	26,270,444
2024-2025	23.5%	2023-2024	118,972,802	27,958,609
2025-2026	25.0%	2024-2025	118,653,772	29,663,443

3.15. Overall REC Procurement Targets - REC Gap

The overall number of RECs needed to be procured for each year to meet annual goals, the "REC Gap", is simply the difference between the RPS Target RECs from Table 3-12 and the total number of RECs in the Statewide REC Portfolio from Table 3-10, as shown below.

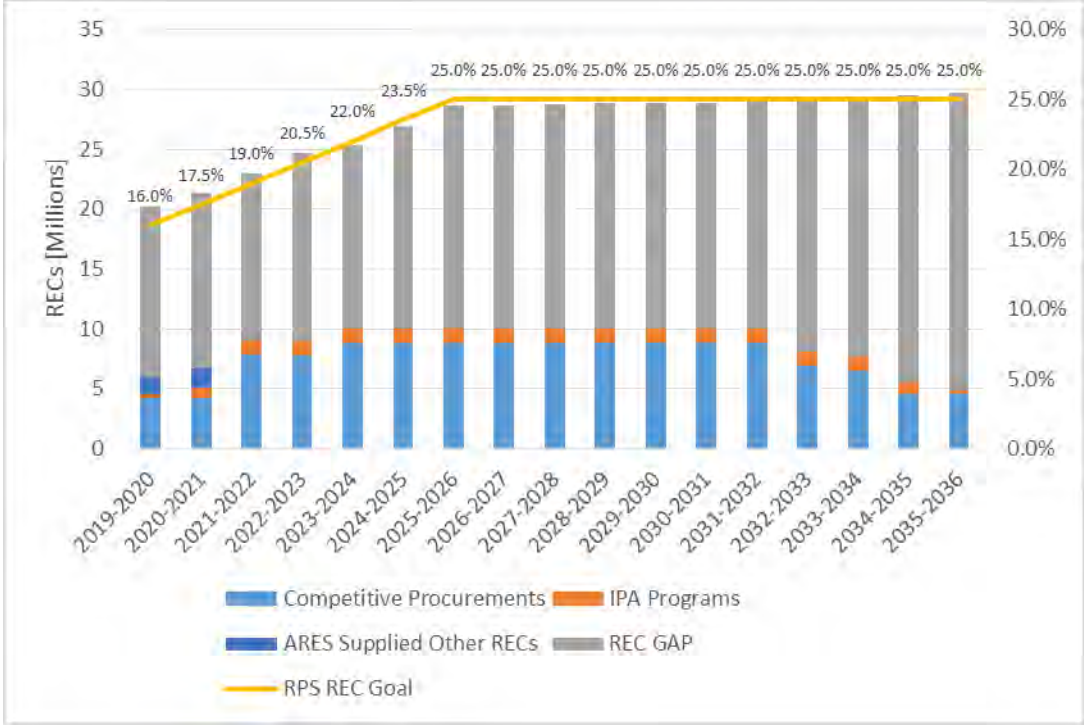
Table 3-13: Statewide Overall REC Gap[233]

Delivery Year	Overall RPS Target RECs	Statewide Portfolio Total All RECs	REC Gap
2020-2021	21,391,499	5,137,035	16,254,463
2021-2022	22,993,592	9,003,876	13,989,716
2022-2023	24,633,621	8,980,726	15,652,895
2023-2024	26,270,444	9,980,476	16,289,969
2024-2025	27,958,609	9,976,094	17,982,514
2025-2026	29,663,443	9,976,043	19,687,400

Figure 3-1 below provides a visual representation of the annual Statewide RPS Goals, REC Portfolio, and REC Gap discussed in this Section.

[233] Unadjusted for RECs supplied by ARES.

Figure 3-1: Statewide Annual RPS Goal, REC Portfolio and REC Gap



3.16. Procurement Targets to Meet Specific Wind-Solar Requirement and Overall RPS Targets

Section 1-75(c)(1)(C) of the Act, as explained in Section 2.3.1, requires that the overall quantity of RECs procured to meet the RPS goals must include at least a combined 75% from wind and photovoltaic projects. Table 3-14 below shows that currently nearly the entire portfolio of RECs is made up of RECs from wind and photovoltaic projects.

Table 3-14: Statewide Wind and Solar RECs in the Portfolio

Delivery Year	Total RECs	Wind RECs[234]	Solar RECs	Combined Wind and Solar RECs	Percentage of Wind and Solar RECs in Portfolio
2020-2021	5,137,035[235]	3,225,409	1,911,626	5,137,035	100%
2021-2022	9,003,876	4,775,162	4,228,714	9,003,876	100%
2022-2023	8,980,726	4,775,162	4,205,564	8,980,726	100%
2023-2024	9,980,476	5,775,162	4,205,314	9,980,476	100%
2024-2025	9,976,094	5,775,162	4,200,932	9,976,094	100%
2025-2026	9,976,043	5,775,162	4,200,881	9,976,043	100%

3.17. RPS Budget

As described in Section 3.5, the Act imposes monetary limitations on the RPS in the form of a cost cap that limits the annual average net increase in rates to retail customers. The cost cap rate, in cents per kilowatt-hour, is unique to each utility and is provided in Table 3-4. The cents per kilowatt-hour rate is applied to the actual electricity (expressed in kilowatt-hours) delivered in the delivery year immediately prior to determine a maximum dollar amount which constitutes the RPS Budget for the delivery year. Specifically, the Act states that:

> *"Notwithstanding the requirements of this subsection (c), the total of renewable energy resources procured under the procurement plan for any single year shall be subject to the limitations of this subparagraph (E). Such procurement shall be reduced for all retail customers based on the amount necessary to limit the annual estimated average net increase due to the costs of these resources included in the amounts paid by eligible retail customers in connection with electric service to no more than the greater of 2.015% of the amount paid per kilowatthour by those customers during the year ending May 31, 2007 or the incremental amount per kilowatthour paid for these resources in 2011. To arrive at a maximum dollar amount of renewable energy resources to be procured for the particular delivery year, the resulting per kilowatthour amount shall be applied to the actual amount of kilowatthours of electricity delivered, or applicable portion of such amount as specified in paragraph (1) of this subsection (c), as applicable, by the electric utility in the delivery year immediately prior to the procurement to all retail customers in its service territory. The calculations required by this subparagraph (E) shall be made only once for each delivery year at the time that the renewable energy resources are procured. Once the determination as to the amount of renewable energy resources to procure is made based on the calculations set forth in this subparagraph (E) and the contracts procuring those amounts are executed, no subsequent rate impact*

[234] These totals reflect quantities from the LTPPAs, which do not count against Section 1-75(c)(1)(G)(iv)'s balancing requirement (as these are not from "new" projects, as that term is defined in the Act); as a result, these totals do not demonstrate that the 200,000 REC wind/solar balancing requirement is expected to be exceeded.

[235] Total RECs does not include RECs supplied by ARES under the provision of Section 1-75(c)(1)(H)(i) as those were not "procured" through the programs and procurements contained in Section 1-75(c)(1)

determinations shall be made and no adjustments to those contract amounts shall be allowed. All costs incurred under such contracts shall be fully recoverable by the electric utility as provided in this Section."[236]

A utility's annual RPS Budget is calculated as shown in equation (2).

(2) Annual RPS Budget ($/Year) = Prior Year Delivered Electricity (MWh) * Cost Cap Rate ($/MWh)

A utility's delivery year remaining available net RPS Budget ("Available Net RPS Budget") is determined by subtracting from the utility's total RPS Budget the direct financial obligations associated with existing REC contracts ("Contracted REC Spend"), the estimated direct financial obligations associated with the Forward Procurements scheduled for the Fall of 2019 and the balance of the Adjustable Block Program REC procurement authorized under the Initial Plan ("Scheduled REC Spend"), and indirect costs: (i) allocation to fund the Illinois Solar for All Program, (ii) allocation to fund job training programs, and (iii) set aside for administrative expenses ("Set Asides Allocation"), as shown in equation (3).[237]

(3) Delivery Year Available Net RPS Budget = Annual RPS Budget (equation 2) – Contracted REC Spend – Scheduled REC Spend – Set Asides Allocation

For the purpose of establishing funds available for REC purchases, as explained in the following Section, the Available Net RPS Budget amount will be adjusted prior to any procurement to account for rollover unspent funds from prior years, and utility-held Alternative Compliance Payments.

3.17.1. Utilities Budgets

Table 3-15 through Table 3-17 show, for each utility, the corresponding RPS Budget, Contracted REC Spend, Planned REC Spend associated with the competitive procurement planned for the Fall of 2020 or Spring of 2021 and the balance of the ABP REC procurement, the allocation of administrative Set Asides including the ILSFA Program allocation, the Available Net RPS Budget, and an estimate of the roll-over balance for delivery years 2019-2020 through 2025-2026. Table 3-19 summarizes those tables at a statewide level. The Available Net RPS Budget is an estimate that will be updated prior to conducting competitive REC procurements and prior to the expansion of Programs under this Revised Plan that depend on the RPS Budget.

The values contained in these tables reflect RPS funds collections and project completion rates (and thus REC expenditures) based upon load forecasts and assumed energization rates used for the development of this revised Plan from the Fall of 2019. A new section of the final version of this Revised Plan, Section 3.20.1, provides an analysis of slower project energization rates that may result from the disruptions created by the COVID-19 pandemic. RPS funds collection under Section 16-108(k) of the PUA will likely also be impacted by the

[236] 20 ILCS 3855/1-75(c)(1)(E).

[237] In the event that the cost cap limitations conflict with the RPS goals and targets such that the IPA cannot procure sufficient additional quantities of RECs to meet the RPS goals or targets, priority for procurement shall first be given to RECs under existing contractual obligations, followed by RECs for the Illinois Solar for All Program, followed by RECs necessary to comply with the new wind and solar procurement requirements, and finally RECs necessary to meet the remaining RPS requirements. 20 ILCS 3855/1-75(c)(1)(F). In its Order approving the Initial Plan, the Commission determined that "such a conflict is possible" if the Agency were to conduct procurements to meet the remaining RPS requirements (i.e., the annual goals found in Section 1-75(c)(1)(B) of the Act), and thus granted various parties' requests to cancel those procurements. Docket No. 17-0838, Final Order dated April 3, 2018 at 41-42.

decreased economic activity created by COVID-19 although the magnitude and longevity of that impact is not yet known.

In addition to direct expenditures on RECs, RPS budgets also feature allocations for several additional purposes, collectively referred to as "Set Asides". First, pursuant to Section 1-75(c)(1)(O) of the Act, the greater of 5% (of the combined RPS budgets of the utilities) or $10,000,000 each year will be allocated to the Illinois Solar for All Program. See Section 0 for details on that allocation. Second, also pursuant to Section 1-75(c)(1)(O), in each of the delivery years 2017-2018, 2021-2022, and 2025-2026, $10,000,000 of ComEd's RPS Budget will be allocated to fund solar job training programs pursuant to Section 16-108.12 of the PUA. Third, a reasonable amount of each budget will be set aside for administrative expenses (including, but not limited to, expenses related to development of this Revised Plan and future updates, the management of procurements and programs, Adjustable Block Program Administrator expenses not covered by fees charged to participants, and fees charged by tracking systems for the retirement of RECs). The IPA, for this Revised Plan, proposes to set aside 0.65% of the budget for these administrative expenses, and will refine this Set Aside as more information becomes available.[238] Table 3-18 shows the annual RPS funds to be allocated to each of these Set Asides.

Unspent funds for delivery years 2017-2018 through 2019-2020 will roll over and be available for the subsequent delivery year. Up to half of any roll over funds, moreover, may be allocated to cover any "funding shortfall" for the Illinois Solar for All Program (see Sections 2.6.1 and 8.4.3 for more details); however, at this time no allocation is planned or expected.[239] The Agency will request updated data from the utilities each spring and fall and will update RPS budgets and goals to reflect that updated information. The update will be posted to the Agency's website. The Agency will use those updates to make determinations related to utilization of any available funds as described further in Section 3.22.

The estimated expenditures presented in these tables are intentionally a high-end estimate that assumes all projects contracted to produce RECs are successfully completed and deliver RECs in accordance with the schedule shown in Table 3-10. Additionally, the estimates assume that, for community solar projects in the Adjustable Block Program, such projects satisfy the high end of adders for small subscribers (e.g., all projects have over 75% small subscribers by capacity). This allows these tables to portray the most constrained view of RPS budgets, which the Agency believes is the appropriate approach to take for planning purposes. Should projects fail to become energized, or should community solar subscription mixes change, it is possible that actual expenditures will be lower. At this time, the Agency lacks sufficient information to confidently predict those occurrences.

During the 2017-2018 through the 2020-2021 delivery years, RPS funds collected by the utilities and not spent each year are effectively "rolled over" to be available for the next delivery year. Because the first two years of collections primarily saw the development of the Initial Plan and building out programs for implementation, and because projects from competitive procurements have generally not yet began making deliveries, significant balances have accrued for the utilities to date. Funds from this four-year period not spent by the end of the 2020-2021 delivery year will be refunded to customers per Section 16-108(k) of the PUA. The potential amounts of those refunds are shown in

[238] The percentage set aside for administrative expenses assumes a retirement fee of 5 cents per REC and an estimated one million dollars for program administration cost annually.

[239] See 220 ILCS 5/16-108(k) and ICC Docket No. 18-1457.

the top cell (corresponding to 2020-2021) of the Remaining RPS Funds Balance column of Table 3-15 through Table 3-17. For the same reason, the Accumulated RPS Funds Balance column has no values for delivery years *after* 2020-2021.

The Available Net RPS Budgets do not include the ACPs held by the utilities[240] These ACP funds are potentially available to fill the shortfalls listed for delivery years 2021-2022 through 2023-2024. As of April 10, 2020, Ameren Illinois has $34,297,300 in uncommitted ACPs, and ComEd has $65,927,046. Based on present load forecasts and cost assumptions, these amounts would be barely sufficient to cover the total projected shortfalls ($27,890,552 for Ameren Illinois and $56,635,045 for ComEd).

For further discussion of the Agency's proposed update to the use of the utility-held ACPs, see Section 3.19.

Table 3-15: Ameren Illinois RPS Budget ($)

DY	Accumulated RPS Funds at Start of DY	Annual RPS Collection	Total Available	REC Spend Already Under Contract	Anticipated Approved REC Spend[241]	Set Asides[242]	Total Expenditures	Remaining RPS Funds Balance at end of DY	ACP Balance at Start of DY	ACP Drawdown for DG REC Payments and Balancing the RPS Budget
20-21	93,348,046	63,332,597	156,680,643	65,745,235	30,561,172	3,578,292	99,884,699	56,795,943	37,573,682	933,851
21-22	-	62,482,128	62,482,128	65,945,567	6,300,622	3,542,733	75,788,922	(13,306,794)	36,639,831	14,173,518
22-23	-	61,980,567	61,980,567	62,505,125	1,807,455	3,517,705	67,830,285	(5,849,718)	22,466,313	6,227,174
23-24	-	61,552,950	61,552,950	61,064,125	3,197,108	3,495,651	67,756,884	(6,203,934)	16,239,140	6,556,009
24-25	-	61,155,307	61,155,307	48,559,799	2,745,244	3,482,920	54,787,963	6,367,344	9,683,131	-
25-26	-	61,155,307	61,155,307	21,852,147	1,841,516	3,473,433	27,167,097	33,988,211	9,683,131	-

[240] ACPs were collected either from hourly pricing customers prior to June 1, 2017 or from ARES for their RPS obligations after June 1, 2017.

[241] Includes the balance of approved ABP Procurement, and the planned Fall 2020 or Spring 2021 Utility-Scale Wind Procurement.

[242] See Table 3-18.

Table 3-16: ComEd RPS Budget ($)

DY	Accumulated RPS Funds at Start of DY	Annual RPS Collection	Total Available	REC Spend Already Under Contract	Anticipated Approved REC Spend[243]	Set Asides[244]	Total Expenditures	Remaining RPS Funds Balance at end of DY	ACP Balance at Start of DY	ACP Drawdown for DG REC Payments and Balancing the RPS Budget
20-21	219,051,474	163,896,888	382,948,362	169,748,749	65,717,801	9,260,174	244,726,724	138,221,638	69,849,386	2,408,621
21-22	-	162,481,896	162,481,896	165,908,335	12,622,973	19,168,154	197,699,461	(35,217,565)	67,440,765	37,491,117
22-23	-	161,388,494	161,388,494	157,004,075	2,840,265	9,103,384	168,947,724	(7,559,230)	29,949,648	7,559,230
23-24	-	160,410,485	160,410,485	154,103,738	6,436,512	9,046,311	169,586,562	(9,176,077)	22,390,417	9,176,077
24-25	-	159,996,203	159,996,203	123,925,002	5,726,446	9,013,364	138,664,812	21,331,390	13,214,341	-
25-26	-	159,390,859	159,390,859	59,845,351	4,306,314	18,988,813	83,140,478	76,250,380	13,214,341	-

Table 3-17: MidAmerican RPS Budget ($)

DY	Accumulated RPS Funds at Start of DY	Annual RPS Collection	Total Available	REC Spend Already Under Contract	Anticipated Approved REC Spend[245]	Set Asides[246]	Total Expenditures	Remaining RPS Funds Balance at end of DY	ACP Balance at Start of DY	ACP Drawdown for DG REC Payments and Balancing the RPS Budget
20-21	871,608	642,599	1,514,207	209,070	215,021	36,307	460,398	1,053,809	13,556	-
21-22	-	643,640	643,640	266,077	98,361	35,946	400,385	243,255	13,556	-
22-23	-	644,774	644,774	192,976	73,796	35,692	302,464	342,310	13,556	-
23-24	-	645,963	645,963	192,976	87,896	35,468	316,340	329,623	13,556	-
24-25	-	647,135	647,135	167,836	69,447	35,339	272,622	374,513	13,556	-
25-26	-	648,338	648,338	117,555	32,549	35,243	185,347	462,991	13,556	-

[243] Includes the balance of approved ABP Procurement, and the planned Fall 2020 or Spring 2021 Utility-Scale Wind Procurement.

[244] See Table 3-18.

[245] Includes the balance of approved ABP Procurement, and the planned Fall 2019 or Spring 2021 Utility-Scale Wind Procurement.

[246] See Table 3-18.

Table 3-18: Statewide RPS Budget Set Asides ($)

Delivery Year	Illinois Solar for All	Job Training (ComEd Budget)	Administrative Expenses (0.65% of Annual RPS Budget)	Total Set Asides
2020-2021	11,393,604	-	1,481,169	12,874,773
2021-2022	11,280,383	10,000,000	1,466,450	22,746,833
2022-2023	11,200,692	-	1,456,090	12,656,782
2023-2024	11,130,470	-	1,446,961	12,577,431
2024-2025	11,089,932	-	1,441,691	12,531,623
2025-2026	11,059,725	10,000,000	1,437,764	22,497,489

Table 3-19. Statewide RPS Budget ($)

DY	Accumulated RPS Funds at Start of DY	Annual RPS Collection	Total Available	REC Spend Already Under Contract	Anticipated Approved REC Spend[247]	Set Asides[248]	Total Expenditures	Remaining RPS Funds Balance at end of DY*	ACP Balance at Start of DY	ACP Drawdown for DG REC Payments and Balancing the RPS Budget
20-21	313,271,128	227,872,083	541,143,212	235,703,054	96,493,994	12,874,773	345,071,821	196,071,391	107,436,624	3,342,472
21-22	-	225,607,664	225,607,664	232,119,979	19,021,956	22,746,833	273,888,768	(48,281,104)	104,094,152	51,664,635
22-23	-	224,013,835	224,013,835	219,702,175	4,721,516	12,656,782	237,080,473	(13,066,639)	52,429,517	13,786,404
23-24	-	222,609,397	222,609,397	215,360,838	9,721,516	12,577,431	237,659,785	(15,050,388)	38,643,113	15,732,086
24-25	-	221,798,645	221,798,645	172,652,636	8,541,137	12,531,623	193,725,397	28,073,248	22,911,027	-
25-26	-	221,194,504	221,194,504	81,815,053	6,180,379	22,497,489	110,492,922	110,701,582	22,911,027	-

3.18. Summary of REC Procurement Targets and RPS Budgets

The aggregation of REC Targets and RPS Budgets at a statewide level provides an important tool for planning and implementing the various procurements and programs under this Revised Plan. The table below presents a snapshot summary of the REC Gap to be procured and the Available Net RPS Budget under procurements approved through the Initial Plan, two essential factors to achieve the RPS Goals set forth by the Act.

[247] Includes the balance of approved ABP Procurement, and the planned Fall 2019 or Spring 2021 Utility-Scale Wind Procurement.

[248] See Table 3-18.

Table 3-20: Statewide REC Gap and Available RPS Budget

Delivery Year	REC Gap	RPS Funds Balance at end of DY estimated ($)[249]	Potential Refund to Customers ($)
2020-2021	16,254,463	196,071,391	196,071,391
2021-2022	13,989,716	(48,281,104)	243,255
2022-2023	15,652,895	(13,066,639)	342,310
2023-2024	16,289,969	(15,050,388)	329,623
2024-2025	17,982,514	28,073,248	28,073,248
2025-2026	19,687,400	110,701,582	110,701,582

3.19. Alternative Compliance Payment Funds Held by the Utilities

As of October 21, 2019, Ameren Illinois held $14,876,594 and ComEd held $29,622,496 of alternative compliance payments collected from retail customers that take service under electric utilities' hourly pricing tariff or tariffs ("HACP"). These funds are presently in part committed to fund the REC purchases from the 2015 through 2017 Distributed Generation procurements the Agency conducted for the utilities, which featured five-year REC delivery contracts with payment upon delivery (and not prepayment).[250] As of April 10, 2020, the remaining balance of uncommitted hourly alternative compliance payments—those not set aside to fund the Distributed Generation procurements—is $11,524,170 for Ameren Illinois, and $22,773,129 for ComEd.

Also, as of April 10, 2020, Ameren Illinois held $23,519,406, ComEd held $42,394,083, and MidAmerican held $13,556 of alternative compliance payment funds collected from ARES since June 1, 2017 ("ARES ACP")[251] as shown in Table 3-22.

The Tables below summarize the balances of these Alternative Compliance Payments.

Table 3-21: Expected Balance of HACP as of May 31, 2020 ($)

Ameren	ComEd	MidAmerican
14,054,276	27,455,302	-

[249] Does not include ARES ACP funds collected by the utilities, or uncommitted Hourly ACP funds.

[250] 2016 and 2017 Distributed Generation procurements for MidAmerican were funded out of MidAmerican's Renewable Energy Resources budget, as MidAmerican does not have any Hourly Alternative Compliance Payments.

[251] Section 16-115D of the PUA provides that while "[t]hrough May 31, 2017, all alternative compliance payments by alternative retail electric suppliers shall be deposited in the Illinois Power Agency Renewable Energy Resources Fund," "beginning with the delivery year commencing June 1, 2017, all alternative compliance payments by alternative retail electric suppliers shall be remitted to the applicable electric utility" and not deposited into the RERF. (220 ILCS 5/16-115D(d)(4), (4.5).) See also 83 Ill Adm. Code Part 455. ComEd's balance reflects interest earned on the ARES ACP funds held by ComEd, while Ameren Illinois' and MidAmerican's do not.

Table 3-22: Available ACPs ($)

ACP	Ameren	ComEd	MidAmerican	All Utilities
Uncommitted HACP	11,524,170	22,773,129	-	34,297,300
ARES ACP	23,519,406	42,394,083	13,556	65,927,046
Total Available ACPs	35,043,576	65,167,213	13,556	100,224,345

In its filed Initial Plan, the IPA proposed to set aside the uncommitted balance of the Hourly ACP funds, as well as the ARES ACP funds collected by the utilities (a total of approximately $100,000,000 as of April, 2020) for use at a later date in the event of a shortfall in the Available RPS Budgets, contemplating that the uncommitted funds could also be a source of the available funds used to help support the Illinois Solar for All Program. In its Order approving the Initial Plan, while the Commission agreed with the IPA that "spending ACP funds on RECs in the first four delivery years, while funds collected pursuant to Section 16-108(k) are unspent and refunded, would be contrary to the statutory intent of increasing the amount of renewable energy resources procured," the Commission ultimately found that "the best use of these funds is to provide funding for new wind and new solar" and thus ACP funds should be used to fund "an additional forward procurement," with funding for that procurement "prioritized such that any funds collected pursuant to Section 16-108(k) should be used prior to the ACP funds."[252] However, unlike the Adjustable Block Program, those procurements feature RECs paid upon delivery: meaning that such ACPs may not begin being spent until 2022 (when new utility scale projects begin REC deliveries) and could be tied up through 2037, frozen through being committed to funding those contract obligations when more urgent priorities exist which ACPs could help address.

In this Revised Plan, the Agency proposed to revise how the utility-held ACPs should be utilized. With the end of the rollover period rapidly approaching, the Agency is facing a potentially significant funding bottleneck starting in the 2021-2022 delivery year as unspent funds are returned to customers and RPS budgets begin being calculated only based on annual collections. Despite the Commission's conclusion in Docket No. 17-0838 seeking to utilize ACPs for additional Forward Procurements,[253] the Agency requires more flexibility in its use of ACPs given the significant expected expenditures in coming years needed to fulfill the prepayment requirements of Adjustable Block Program contracts.

Additionally, Sections 3.20 and 3.21 below provide a discussion of how uncertainty about project energization timelines and annual load variations, respectively, create budget uncertainty. This uncertainty has been further exacerbated by updated utility load forecasts received for the Revised Plan that indicate lower expected loads, and thus reduced RPS budget collections from customers than the Agency had previously expected. These factors create both additional uncertainty about annual RPS budget obligations and an increased likelihood that expenditures will outpace collections in certain future years.

[252] Docket No. 17-0838, Final Order dated April 3, 2018 at 8.

[253] The additional forward procurements authorized in the Initial Plan are estimated to require $35 million a year in funding assuming all projects are successfully energized.

Consequently, for this Revised Plan, the Agency proposed that the utility-held ACPs should be used in each delivery year after the use of funds collected pursuant to Section 16-108(k) for both Forward Procurements and the Adjustable Block Program, providing the Agency with a reserve balance of funds through which it can cover expenditures in excess of Section 16-108(k) collections. This approach may be necessary to avoid the potential curtailment of contracts in at least the 2021-2022 delivery year and possibly the two years directly thereafter, during which the Available Net RPS Budget is annually projected (as shown in Table 3-20) to be negative, meaning that absent this change to the use of utility-held ACPs, contractual expenditures would need to be pulled back (under curtailment clauses in the REC contracts) from what is now committed in order to bring the Available Net RPS Budget for the delivery year to zero. Having this additional flexibility with the use of utility-held ACPs will help mitigate these challenges.

As this issue was uncontested in Docket No. 19-0995 approving the Plan, the Agency understands the Commission to have adopted the Revised Plan's proposal for how to better utilize utility-held ACPs.

3.20. Budget Uncertainty Due to Unknowns in Project Energization Timelines[254]

One challenge the Agency has faced in understanding pending budget impacts is that project energization and REC deliveries—and thus resultant budget impacts[255]—are not scheduled to begin at a fixed point. Instead, supported projects may become energized at any point over a period of time, whether immediately upon program application, closer to the contractual deadline for first deliveries, or later still due to extensions. This creates challenges into budget visibility in part because Adjustable Block Program projects carry large budget impacts upon energization (20% of contract value for distributed generation above 10 kW up to 2,000 kW ("Large DG") and for community solar; 100% of contract value for distribution generation up to 10 kW ("Small DG")), and because the ability to roll over prior years' collections sunsets with the conclusion of the 2020-21 delivery year. Assuming a project becomes energized during the 2021-22 delivery year (or even just that its first payment would occur in that year) carries very different budget consequences than if that project becomes energized in 2019-20, as in the latter scenario, previously collected Renewable Resources Budget funds could help meet first year payment obligations—including the large payment due upon energization.

Because the Agency cannot have certainty about when funds for specific projects will begin to be spent, this dynamic has proven to be a significant challenge in modeling budgets for future delivery years. For example, Table 3-23 compares three different energization scenarios for projects from the Adjustable Block Program. Each column outlines the share of all projects across Blocks 1-4 that would be energized in the first year after the execution of ABP REC contracts began in spring 2019, the share energized in the second year, and the share energized in the third year.[256]

As shown below, the differences between the first and the third year in the "slow" and the "fast" energization scenarios are significant. It would be prudent to maintain RPS funds in reserve to absorb

[254] This section is unchanged from the Revised Plan filed for ICC approval on October 21, 2019. See Section 3.20.1 for a discussion on how the assumption contained here could change, and the impact of those changes, due to the COVID-19 pandemic.

[255] Under the Renewable Resources Budget reconciliation regime created by Section 16-108(k) of the PUA, the four-year reconciliation following the 2020-2021 delivery year, and the annual reconciliations after that, are based on *cash* accounting, i.e. actual cash inflows and outflows during a given delivery year.

[256] For Table 3-23, Year 1 is delivery year 2019-2020, Year 2 is delivery year 2020-2021, and Year 3 is delivery year 2021-2022.

the budget impact associated with this uncertainty. As indicated in Section 3.18, the IPA proposes additional flexibility with the use of utility-held ACPs to help mitigate budget uncertainty—although a statutory change allowing for extension of the 4-year rollover period would be more helpful still.

Table 3-23: Payments to Adjustable Block Projects under Various Energization Schedules

Delivery Year	Slow Energization 10% Year 1 40% Year 2 50% Year 3 [$ MM]	Fast Energization 50% Year 1 40% Year 2 10% Year 3 [$ MM]	Assumed Energization 25% Year 1 53% Year 2 22% Year 3 [$ MM]
2019-2020	41.8	208.9	104.4
2020-2021	184.6	254.7	289.1
2021-2022	296.5	199.5	199.5
2022-2023	175.2	175.2	175.2
2023-2024	175.2	175.2	175.2
2024-2025	157.7	87.6	131.4
2025-2026	87.6	17.5	43.8

These payment projections make the conservative (for planning purposes) assumption that community solar projects are fully subscribed and have at least 75% small subscribers (by capacity). Subscriber levels will not be finalized until one year after each project is energized. If subscription levels (particularly for small subscribers) are ultimately lower, payments would be lower.

3.20.1. Increased Budget Uncertainty Created by COVID-19 Related Delays in Project Completion

The three energization models described above were developed as illustrative examples in the Fall of 2019, and the tables contained in Section 3.17.1 reflect the Agency's best available estimate of energization rates at that time. With the onset of the COVID-19 pandemic, the Agency is reconsidering expected energization rates. As of the publication of the final Revised Plan on April 20, 2020, the length of time for which COVID-19 will disrupt the development and energization of Adjustable Block Program projects is unknown.

Table 3-24 contains illustrative example scenarios of how project energization delays would impact the amount of funds refunded to customers after the end of the four-year rollover period in 2021 (see Section 2.3.4 for further discussion) as well as the impact on the use of utility-held ACPs (see Section

3.19).[257] As the extent of delays is better understood, the Agency will provide updated estimates on the Renewable Resources page on the IPA website (www.illinois.gov/ipa). Furthermore, the COVID-19 pandemic is expected to reduce energy consumption; as RPS funds are collected from retail customers on a volumetric basis, this may impact the total amount of RPS funding potentially available to support the programs and procurements discussed in this Plan. As any impacts on collections are unknowable at this early stage, Table 3-24 does not reflect any revisions to expected RPS fund collection compared to the utility load forecasts used to develop the Revised Plan in the fall of 2019.

Scenario One is for reference—a base case, of sorts—as it is the energization rates assumed by the Agency in the fall of 2019.

Scenario Two is the Agency's fall 2019 slow energization rate example from Table 3-23, which pushed 50% of payments for Adjustable Block Program project energizations (either the initial 20% payment for the Large DG and Community Solar categories, or the full payment for the Small DG category) to the delivery year after the rollover ends (the 2021-2022 delivery year). While this scenario was developed prior to the onset of the COVID-19 pandemic, it may be a reasonable model for project development delays. In this scenario, the amount of rollover funds refunded to customers increases significantly, all of the utility-held ACPs are expended in the 2021-2022 delivery year, and there is a significant budget shortfall that could curtail payments.

While Scenario Two assumes all projects will be energized by the end of the 2021-2022 delivery year, Scenario Three illustrates the impact of even further delays with some projects not energized until the 2022-2023 delivery year (and also adjusts from Scenario Two to reflect actual energization rates to date that were not available in fall 2019). This scenario has an even larger amount of funds refunded to customers, but utility-held ACPs are not fully expended until the 2022-2023 delivery year. The subsequent budget shortfall is lower than in Scenario Two.

Scenarios Four and Five illustrate the impact of a legislative change to the rollover provision by extending the time before the rollover ends by two years. This legislative change would allow additional time for accumulated funds to be spent and open the possibility that both those rolled-over funds and the utility-held ACPs could be used to support additional procurements and ABP blocks as described in Section 3.22.

[257] These examples also assume that no additional blocks of capacity are opened for the Adjustable Block Program other than those identified in this Revised Plan and that the only utility-scale procurement conducted in 2020 or 2021 is the wind procurement described in Section 5.9.2

Table 3-24: Potential COVID-19 Impacts on Energization, Rollover Refund and Utility-held ACPs

Scenario 1: Adopted Energization (from Table 3-23 and used in Tables 3-15 to 17 and 3-18)			
	Small DG	**Large DG**	**CS**
2019-2020	**25%**	**25%**	**25%**
2020-2021	**65%**	**50%**	**50%**
2021-2022	**10%**	**25%**	**25%**
Refund after rollover period ends			$ 196,071,391
ACP drawdown			$ 81,183,125
Remaining ACPs			$ 22,911,027
Scenario 2: Slow Energization Assumption (from Table 3-23)			
	Small DG	**Large DG**	**CS**
2019-2020	**10%**	**10%**	**10%**
2020-2021	**40%**	**40%**	**40%**
2021-2022	**50%**	**50%**	**50%**
Refund after rollover period ends			$ 364,074,899
ACP drawdown (100% of ACPs)			$ 104,094,152
Budget Shortfall			$ 76,572,805
Scenario 3: Slow Energization extending to 2022-2023 due to COVID-19			
	Small DG	**Large DG**	**CS**
2019-2020	**20%**	**15%**	**0%**
2020-2021	**25%**	**30%**	**20%**
2021-2022	**30%**	**30%**	**50%**
2022-2023	**25%**	**25%**	**30%**
Refund after rollover period ends			$ 419,995,338
ACP drawdown (100% of ACPs)			$ 104,094,152
Budget Shortfall			$ 44,594,464
Scenario 4: **Slow Energization Assumption (from Table 3-23), 2-year extension of rollover**			
	Small DG	**Large DG**	**CS**
2019-2020	**10%**	**10%**	**10%**
2020-2021	**40%**	**40%**	**40%**
2021-2022	**50%**	**50%**	**50%**
Refund after rollover period ends			$ 204,466,233
ACP drawdown			$ 20,570,987
Remaining ACPs			$ 83,523,165
Scenario 5: Slow Energization extending to 2022-2023 due to COVID-19, 2-year extension of rollover			
	Small DG	**Large DG**	**CS**
2019-2020	**20%**	**15%**	**0%**
2020-2021	**25%**	**30%**	**20%**
2021-2022	**30%**	**30%**	**50%**
2022-2023	**25%**	**25%**	**30%**
Refund after rollover period ends			$ 297,147,900
ACP drawdown			$ 25,317,113
Remaining ACPs			$ 78,777,039

3.21. Budget Uncertainty Due to Annual Load Variations

The annual RPS Budget used in this Revised Plan is a function of the base-case load forecasts provided by the utilities and each utility's cost cap. These load forecasts are driven by a number of factors, which include but are not limited to weather, economics, demographics, assumed demand response and energy efficiency. Changes to any of the assumptions will result in actual load deviating from forecasted load. Examples include changes in weather patterns, changes in energy efficiency adoption rates, and changes to economic conditions. In practice, the annual RPS Budget for a delivery year will depend on the actual reference year load for each utility, which will likely deviate from the forecasted loads provided by the utilities—although in which direction that deviation will occur is impossible to know until that delivery year.

To see how deviations from the Base Case load forecasts may affect available RPS budgets, the IPA conducted a comparative analysis of the RPS Budget based on the Base Case, High Case, and Low Case. Load forecast data for Ameren Illinois and ComEd were used for this analysis. The RPS Budget for each utility, for each load case, is based on the product of the Applicable Load for a given year and the cost cap rate shown in Table 3-4.[258] For each utility, the impact of the High Case and Low Case is the difference between the RPS budget for each case and the RPS Budget for the Base Case. The total is the sum of the differences for these utilities. The results are presented in Table 3-25.

Table 3-25: Effect on RPS Budget of Annual Load Variations to the Utilities' Load Forecast

Delivery Year	Base Case Load Forecast [MWh]	Low Load Forecast [MWh]	Low Load Effect on RPS Budget [$]	High Load Forecast [MWh]	High Load Effect on RPS Budget [$]
2020-2021	121,719,53	117,961,970	(6,896,275)	125,477,105	6,896,275
2021-2022	120,500,468	115,506,875	(9,237,310)	125,532,061	9,309,194
2022-2023	119,644,656	113,438,510	(11,532,775)	125,966,802	11,752,212
2023-2024	118,890,802	111,502,236	(13,770,990)	126,511,368	14,209,864
2024-2025	118,451,550	109,894,401	(15,982,928)	127,392,698	16,709,341

As shown in Table 3-25 above, the impact of the low load forecast on the RPS Budget ranges from a reduction compared to the base case RPS Budgets of approximately $7 million in delivery year 2020-2021 to a reduction of approximately $16 million in delivery year 2024-2025. Alternatively, the impact of the high load forecast on the RPS Budget ranges from an increase compared to the base case RPS Budgets of approximately $7 million in delivery year 2020-2021 to an increase of approximately $17 million in delivery year 2024-2025.

As discussed in Sections 3.17.1 and 3.20.1, the forecasts (and thus annual RPS budgets) described in this section were developed prior to the onset of the COVID-19 pandemic. The Agency will receive updated load forecasts from the utilities in July 2020 as part of the Agency's annual electricity procurement planning process and those load forecasts will be used by the Agency to assess the ongoing impact on RPS collections on available budgets and

[258] The load data for the Base Case, High Case, and Low Case for Ameren and ComEd was provided by the utilities as part of their data submissions for this Revised Plan.

the ability of the Agency to consider additional procurements or opening of Adjustable Block Program Blocks in the future as discussed in Section 3.22 below.

Because of the budget risk associated with load variability, the IPA recommends a cautious approach to making financial commitments such as the forward procurement of RECs and the expansion of ABP. The Agency notes that the scale of load forecast uncertainty increases the further out the forecasts are made, which is logical because factors such as economic indicators and climate/weather are compounded and inherently difficult to predict. That increasing uncertainty underscores the need for caution as the Agency considers the impact of procurements and programs on future year budgets.

3.22. Impact of RPS Budget on Procurement and Program Activities

As described in Section 3.16, the Agency's current projection of forecast Section 16-108(k) collections, accounting for the sunsetting in mid-2021 of the ability to roll over past collections to pay for future contractual deliveries, and supplemented by utility-held ACPs, is barely sufficient to cover expected expenses in each delivery year (starting with 2021-2022) stemming from the programs and procurements authorized under the Initial Plan.

However, multiple factors could result in additional funding becoming available, including one or more of the following: First, future changes in utility load forecasts could demonstrate greater than expected retail sales of electricity, thus resulting in additional RPS budget funds. Second, community solar projects could seek reduced levels of small subscribers than presently expected, thus resulting in lower REC prices applicable to those systems. Third, some community solar projects could achieve less than complete subscribership of their physical capacity. Fourth, projects presently under contract could fail to be developed, freeing up additional budget capacity.[259] And fifth, legislative changes (short of an overhaul that would fundamentally rewrite the entire paradigm through which this Revised Plan is being developed) could extend the budget rollover's sunset period, thus freeing up funds collected under Section 16-108(k) tariffs but not spent by May 31, 2021 for future REC procurement rather than having those funds refunded to ratepayers.

The Agency is committed to biannually reviewing updated utility load forecast information and new/existing contract obligation/payment information to determine expected RPS budget availability, and will publish the resulting updated budget forecasts on its website. These budget analyses will provide the grounds for undertaking the procurement activity outlined below, and, starting with the 2021-2022 delivery year, the Agency will in all cases seek to have under contract projects with likely annual expenditures equaling no more than 95% of expected available funds for any given delivery year to guard against the potential curtailment of existing contracts.

Should funding become available, for this Revised Plan the Commission has ordered the Agency to utilize the following contingency approach addressing which programs and procurements it will prioritize supporting beyond those authorized by the Initial Plan.[260] That approach is as follows:

[259] Reductions in payment obligations to a community solar or a Large DG project within the ABP would have a ripple effect across the projected RPS expenditures in each of five sequential delivery years, due to the statutory payment schedule that compensates such a project for its RECs ratably over four years (further refined as seventeen quarterly payments by the initial ABP REC Contract). For example, a project that is expected to receive its first REC payment in September 2020, within the 2020-2021 delivery year, would receive its final payment in September 2024, within the 2024-2025 delivery year.

[260] See Docket 19-0995, Final Order dated February 18, 2020 at 19-20.

First, the Agency shall conduct a competitive procurement for up to 500,000 RECs delivered annually from utility-scale solar and/or wind projects.[261]

Second, should the additional/unexpected funding become available after a utility-scale procurement event noted above, the Agency would next look to conduct an additional brownfield site photovoltaic project competitive procurement ("brownfield procurement") with a target quantity of 50,000 RECs delivered annually. The Commission agreed that this is a prudent manner by which to provide ongoing support for a market segment that was offered robust narrative support in the declaratory passages of Public Act 99-0906, but with a relatively small minimum target (only 2% of new photovoltaic project RECs).[262]

Third, should funding be available after the above-mentioned procurement events, the Agency will open additional blocks of capacity for the Adjustable Block Program to accommodate whatever funds are available, up to the number of RECs needed to reach a total of 1,500,000 annually delivered RECs from the Adjustable Block Program (the 2025 Delivery Year target quantity found in Section 1-75(c)(1)(C) of the Act, as it is 50% of 3,000,000 annual REC deliveries).[263] The Commission agreed that smaller block sizes than those specified in Section 6.3.1 may be advisable and deferred to the IPA's determination at the time the opportunity presents.[264] Under the Commission's Order, the Agency shall not procure more than the 2025 Delivery Year Adjustable Block Program statutory target of 1.5 million RECs delivered annually under this contingency plan.[265]

Notwithstanding the revised contingency plan described above, pursuant to the Commission's Final Order in Docket No. 19-0995 approving this Revised Plan, the Agency must ensure that a minimum of 1,000,000 RECs delivered annually from the Adjustable Block Program be maintained at all times.

[261] Id. at 20.

[262] Id.

[263] Id.

[264] Id.

[265] Id.

4. Renewable Energy Credit Eligibility

To be eligible for use in compliance with the Illinois RPS, RECs are required to meet a variety of eligibility requirements. First, the RECs are to be sourced from generating technologies permitted in the definition of "renewable energy resources" contained in Section 1-10 of the Act.[266] Second, Subsections (I) and (J) of Section 1-75(c)(1) create additional eligibility criteria. Subsection (I) contains locational eligibility criteria, while subsection (J) contains criteria related to how a facility that generates RECs recovers its costs. This Chapter discusses how the Agency interprets and implements the requirements of Subsections (I) and (J).

4.1. Adjacent State Requirement

Section 1-75(c)(1)(I) of the Act contains a locational eligibility requirement for the Illinois RPS. Enacted through P.A. 99-0906, this requirement replaced the prior locational standard under which renewable energy resources could come from Illinois and adjoining states, and if not available, then they could come from elsewhere.[267] By contrast, Section 1-75(c)(1)(I) now requires qualifying renewable energy credits can be generated by facilities located in Illinois, and *may* be sourced from facilities in adjacent[268] states—but *only* if these facilities can meet public interest criteria spelled out in the law. While not explicitly stated in the statute, the Agency understands that the consideration of the public interest criteria for adjacent states means that renewable energy credits from states that are not adjacent to Illinois (or from other countries) will not be eligible for the Illinois RPS.

The public interest criteria that the Agency considers include:

1. Minimizing sulfur dioxide, nitrogen oxide, particulate matter and other pollution that adversely affects public health in this State
2. Increasing fuel and resource diversity in this State
3. Enhancing the reliability and resiliency of the electricity distribution system in this State
4. Meeting goals to limit carbon dioxide emissions under federal or state law
5. Contributing to a cleaner and healthier environment for the citizens of this State

The Act specifies that the Agency "may qualify renewable energy credits from facilities located in states adjacent to Illinois if the generator demonstrates *and* the Agency determines that the operation of such facility or facilities will help promote the State's interest in the health, safety, and welfare of its residents based on the public interest criteria described above."[269]

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[266] That definition is:"'[r]enewable energy resources' includes energy and its associated renewable energy credit or renewable energy credits from wind, solar thermal energy, photovoltaic cells and panels, biodiesel, anaerobic digestion, crops and untreated and unadulterated organic waste biomass, tree waste, and hydropower that does not involve new construction or significant expansion of hydropower dams. For purposes of this Act, landfill gas produced in the State is considered a renewable energy resource. `Renewable energy resources' does not include the incineration or burning of tires, garbage, general household, institutional, and commercial waste, industrial lunchroom or office waste, landscape waste other than tree waste, railroad crossties, utility poles, or construction or demolition debris, other than untreated and unadulterated waste wood." (20 ILCS 3855/1-10). Note that Public Act 99-0906 removed "other alternative sources of environmentally preferable energy" from this definition.

[267] Former 20 ILCS 3855/1-75(c)(3), repealed June 1, 2017.

[268] For the purpose of assessing eligibility for compliance with the Illinois RPS, the Agency defines only states that have a common border as states adjacent to Illinois: Wisconsin, Iowa, Missouri, Kentucky, Indiana, and Michigan. Michigan is considered adjacent due to the border between Illinois and Michigan that exists in Lake Michigan. This is consistent with how other State Agencies interpret the federal Coastal Zone Management Act. See, for example, https://www.dnr.illinois.gov/cmp/documents/3_boundary.pdf.

[269] 20 ILCS 3855/1-75(c)(1)(I) (emphasis added).

To do so, and to "ensure that the public interest criteria are applied to the procurement and given full effect," the Plan "shall describe in detail how each public interest factor shall be considered and weighted for facilities located in states adjacent to Illinois." This Chapter provides that description.

In originally developing a methodology for considering and weighting these public interest criteria, the Agency faced certain challenges. The complex nature of an interconnected electric power grid and associated system operations (i.e., generation dispatch for economics and reliability), and how pollution flows across states, all prevented the Agency from simply quantifying and scoring facility eligibility requests using easily obtainable data. While predictions can be simulated, there is not one clear, unassailable way to determine how a renewable energy facility in an adjacent state will meet the public interest criteria.

In its Initial Plan, the Agency developed what it believes are reasonable proxies for each criterion.[270] In the Final Order approving the Initial Plan on April 3, 2018 in Docket No. 17-0838, the Commission found the Agency's methodology and assumptions for considering the eligibility of RECs sourced from adjacent states to be reasonable. That approach, described in more detail below, is generally unchanged in this Revised Plan.

While based conceptually on the same approach used for the Agency's Zero Emission Standard ("ZES") Plan, the basis for determining compliance with the pollution and emissions public interest criteria in this Revised Plan is focused on the displacement of potential new non-renewable gas-fired generation by renewable generation that could be eligible to supply RECs to meet the Illinois RPS requirements. Among the differences from the ZES Plan scoring approach are that renewable generating facilities are likely to be intermittent rather than baseload (a defining characteristic of zero emission facilities), typically impact generation on the margin of the dispatch order and are generally smaller in size relative to the ZES replacement generation.

To assess whether a renewable generating facility located in an adjacent state is eligible to participate in the IPA's REC procurements to meet the Illinois RPS, the Agency assigns a maximum of 20 points to each of the five public interest criteria, as described below, for a total of 100 possible points.

For a renewable energy generating facility in an adjacent state to have its RECs considered eligible for the Illinois RPS, the adjacent state facility needs to demonstrate that it can achieve a total score of at least 60 points for the Agency to approve that request. The IPA believes that this score threshold – previously affirmed by the ICC in Docket No. 17-0838,[271] and one which requires a better than average score demonstrating benefits to the health, safety, and welfare of Illinois residents, but yet not too onerous to prohibit any adjacent state participation – provides a balanced approach to ensuring that adjacent state facilities indeed provide sufficient benefits consistent with the law's directive.

For this Revised Plan, the Agency has reviewed and analyzed not only this scoring threshold, but also the methodology for the consideration of adjacent state facilities. After review and analysis, this

[270] The Agency also developed a similar set of criteria for use in its Zero Emission Standard Procurement Plan ("ZES Plan") developed pursuant to Section 1-75(d-5) of the Act, which was approved by the Commission on September 11, 2017 in Docket No. 17-0333. That ZES Plan includes consideration of how to minimize sulfur dioxide, nitrogen oxide, and particulate matter emissions that would result from the potential closure of zero emission facilities (i.e., nuclear plants located in PJM or MISO).

[271] In its Order approving the Plan, the Commission approved of this 60 point scoring threshold, finding that "the IPA's general methodology is a reasonable implementation of PA 99-0906 and a basic passing score of 60 points is an appropriate threshold." Docket No. 17-0838, Final Order dated April 3, 2018 at 20.

scoring threshold and methodology (described further below) remains the same as presented in the Initial Plan. As this scoring threshold and methodology was uncontested in the Commission's approval of the Plan in Docket No. 19-0995, the IPA understands it to be again adopted.

The Agency also notes that there are two wind facilities in adjacent states that were the recipients of contracts from the 2010 Long-Term Renewable Resources Procurement. One in Iowa has a contract with Ameren, while one in Indiana has a contract with ComEd. As these facilities were granted contracts at a time that Illinois law viewed them as providing sufficient benefits to Illinois residents for their renewable energy resources to be used to meet the Illinois RPS, the Agency considers these two facilities to be grandfathered into this requirement.

4.1.1. Public Interest Criteria

1. Minimizing sulfur dioxide, nitrogen oxide, particulate matter and other pollution that adversely affects public health in this State

In the Zero Emission Standard Procurement Plan, the Agency developed a scoring methodology for sulfur dioxide, nitrogen oxide, and particulate matter that considered the likely location of replacement generation compared to a bidding zero emission facility that could be at risk of ceasing operation. That methodology calculated, for any given zero emission facility, the percentage of the replacement generation that would occur in various states, an emissions factor related to each of those states based on its existing coal and gas generation, and an adjustment factor that recognized the frequency of prevailing winds and the distance from Illinois that could predict the amount of pollution that would impact the residents (and thus public health) of Illinois.

For the purposes of its Initial Plan (and maintained in this Revised Plan) and the consideration of this criterion, the Agency refined and simplified the methodological approach utilized in the ZES Plan. Under the ZES Plan, emissions are associated with replacement of generation that can be located anywhere in PJM or MISO; for the purposes of this Revised Plan, the Agency considers that a renewable energy facility would displace the emissions of a typical new natural gas-fired combined-cycle generation facility.

In the ZES Plan, the Agency weighted replacement generation across multiple states, in recognition that replacement generation for a large Zero Emission Facility would likely come from multiple sources (replacement generation would be a combination of changed dispatch of existing generation units as well as the potential development of new generating units). [272] The Agency simplified the weighting for this criterion to focus on comparing emissions from renewable generation to the emissions from a new natural gas-fired combined-cycle generating facility. This assumption reflects the fact that recent and anticipated additions to the resource mix in PJM and MISO will be predominantly natural gas, wind or solar[273] and natural gas is increasingly the fuel on the margin for both PJM and MISO, and thus more appropriate for comparison than, say, a baseload coal facility.[274]

[272] Specifically, 33% of the replacement generation was assumed to be in the bidding zero emission facility's own state, and the remaining 67% of replacement generation was assumed to occur across the relevant RTO, allocated by states based on each state's share of RTO-wide generation. ZES Plan, July 31, 2017, https://www.icc.illinois.gov/downloads/public/edocket/451223.pdf, at 37.

[273] U.S. FERC, Office of Energy Enforcement, Division of Market Oversight, "State of the Markets Report 2018." Item No.: A-3, April 18, 2019, p. 17. In the March 2017 report, "PJM's Evolving Resource Mix and System Reliability" (http://www.pjm.com/~/media/library/reports-notices/special-reports/20170330-pjms-evolving-resource-mix-and-system-reliability.ashx), PJM states that from 2010 to 2016, natural gas and renewable made up 87 percent of new megawatts placed in service.

[274] See: MISO Market and Operations Analytics, MISO 2018-2019 Winter Assessment Report, April 2019; MISO 2018 Summer Assessment Report, September 2018. Potomac Economics, "2017 State of the Market Report for the MISO Electricity Markets, Analytic Appendix"

As discussed below, this comparison is a relevant factor in the evaluation criteria for renewable technologies that involve combustion (thus not including wind, solar, or hydro).

The emissions comparison includes sulfur dioxide (SO_2) and nitrogen oxide (NO_x) as proxies for all emissions because higher emissions of SO_2 and NO_x are generally correlated with higher emissions of PM, especially with regard to facilities that involve the combustion of solid fuels. SO_2 and NO_x are primary emission sources for the formation of $PM_{2.5}$ in ambient air away from the immediate emissions source. Larger PM (PM_{10}) is deposited nearer the source, while secondary $PM_{2.5}$ increases based on the formation of sulfates and nitrates from the SO_2 and NO_x in the atmosphere as the pollutants move away from the primary source.[275] The following table shows SO_2, NO_x, and CO_2 emissions rates of new natural gas-fired generation based upon 2016 data from the U.S. Energy Information Agency ("EIA").[276]

Table 4-1: Natural Gas-Fired Combined-Cycle Generation Emissions Rates

Pollutant	Pounds/MWh
SO_2	0.007
NO_X	0.05
CO_2	772

The score is calculated by multiplying an emissions factor for the renewable resource facility (scaled from 0 to 1) by a wind duration/direction factor (scaled from 0 to 1) and then by 20 points to determine the number of points awarded for this criterion.

The emissions factor is calculated by taking one minus: the sum of the eligible renewable resource's SO_2 and NO_x emissions in pounds/MWh divided by the sum of the SO_2 and NO_x emissions from a new natural gas-fired combined-cycle generation facility in pounds/MWh.

The emissions factor for renewable energy generating facilities such as wind, solar, or hydro, which do not emit SO_2, NO_x, or Particulate Matter, would be 1.0 because those facilities would have zero in the numerator of the part of the equation that is subtracted from one.

For other renewable generating technologies, the Agency notes that those technologies eligible for the Illinois RPS include a combination of technologies that rely on combustion of a fuel source including biodiesel, anaerobic digestion (which presumably would create a biogas that is then burned), biomass, and tree waste; and other technologies that do not involve combustion (e.g., wind, solar thermal, photovoltaic, and hydro power).[277] Renewable generation technologies that involve combustion to generate electricity generate sulfur dioxide, nitrogen oxides, particulate matter, and CO_2, among other things. To assess the emissions impact of renewable resource technologies that involve combustion, the emissions from these facilities are compared to the emissions from a new

June 2018, https://www.potomaceconomics.com/wp-content/uploads/2018/06/2017-SOM_Report_Final_Rev.pdf; Monitoring Analytics, LLC, "Q1 2019 State of the Market Report for PJM," May 9, 2019, http://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2017.shtml.

[275] U.S. EPA, "Particulate Matter Emissions," Report on the Environment, http://www.epa.gov/roe.

[276] Emissions rates for a natural gas turbine operating in combined cycle with a heat rate of 6,600 Btu/kWh are shown in Table 2-5 of the November 2016 U.S. EIA Report "Capital Cost Estimates for Utility Scale Electricity Generating Plants." The CO_2 emissions in pounds per MMBtu are 117 for CO2, 0.001 for SO_2, and for NOx 0.0075; which at the heat rate of 6,600 Btu/kWh, are 772 pounds per MWh of CO_2, 0.007 pounds per MWh of SO_2, and 0.05 pounds per MWh of NOx. See: https://www.eia.gov/analysis/studies/powerplants/capitalcost. Typical emissions rates have not changed since 2016.

[277] While landfill gas produced in Illinois is eligible, it is not relevant to this discussion of facilities located in adjacent states.

natural gas-fired combined-cycle facility. To the extent that the technologies that involve combustion generate SO_2 and NO_x emissions, and the emissions in pounds/MWh are lower than the emissions from a new gas-fired facility, then the calculation for the renewable energy facility would result in the facility receiving some points for this criterion based upon the formula listed below that also accounts for wind duration/direction (as would be the case for technologies with no emissions such as wind or solar for which the points would only be based on the wind duration/direction and not discounted by emissions rate). On the other hand, if the emissions are equal to or greater, on a pounds/MWh basis, than from a new natural gas-fired facility, then the calculation would result in the facility receiving zero points for this criterion. This reflects that an emissions rate that is greater than that for a natural gas-fired combined-cycle facility does not have a positive impact on the environment and public health.

The Zero Emission Standard Plan included consideration of wind direction and duration as well as the distance from Illinois to modify the emissions criteria scoring. In scoring the emissions related public interest criterion for this Revised Plan, the Agency simplified the wind duration/direction approach that was utilized in the Zero Emission Standard Plan. Since the renewable generating facilities supplying RECs from outside of Illinois must be located in the states adjacent to Illinois (as opposed to anywhere within PJM and MISO under the Zero Emission Standard), the distance of the emission source from Illinois is less important and is considered in the approach adopted for this Revised Plan.

The following table provides the wind duration/direction factors for each adjacent state.

Table 4-2: Wind Duration/Direction Factors

Adjacent State	Wind Direction Sectors	Wind Direction and Duration Factor[278]
Indiana	SSE, SE, ESE, E, NNE, NE, ENE	0.256
Kentucky	S, SSE, SE	0.201
Missouri	W, WSW, SW, SSW, S	0.439
Iowa	W, WNW, NW, NNW	0.269
Wisconsin	N, NNW	0.096
Michigan	NE, NNE	0.088

The wind duration factor is based on the percentage of the time the wind blows into Illinois from 16 directional sectors that form all of the directions in 360 degrees around Illinois. The wind direction and duration factors were developed based on 21 years of consistent climatological data. On average this data is relatively stable over time, although at some point in the future climate change could impact the data underlying the determination of these factors. For example, the wind blowing from Indiana would encompass seven directional sectors from which the wind blows on average 25.6 percent of the time. Thus, for example, a solar facility located in Indiana would receive 1 x 0.256 x 20 or 5.1 points. The following equation shows how this score is obtained (with the caveat that the minimum possible score is zero and cannot be a negative score):[279]

[278] Total factors exceed 1.0 because there may be more than one state represented in a given wind direction sector.

[279] See Docket No. 17-0838, Final Order dated April 3, 2018 at 21.

Figure 4-1: Pollution Score Calculation

$$Score = \left(1 - \frac{\sum_{renewableresource} SO_2 \text{ and } NO_x \left(\frac{lbs}{MWh} \right)}{\sum_{gasresource} SO_2 \text{ and } NO_x \left(\frac{lbs}{MWh} \right)} \right) \times Wind \ \ Duration \ / Direction \ \ Factor \times 20$$

The Agency's review of the scoring methodology for this criterion showed that the assumptions and analytical approach remain valid for this Revised Plan. In particular, the wind duration/direction factors were developed based on 21 years of consistent data reported by the Illinois State Water Survey, Water and Atmospheric Resource Monitoring Program from 17 reporting stations located around the state for the years 1996 through 2016.

2. Increasing fuel and resource diversity in this State

Fuel and resource diversity generally refers to the use of a balanced group of generating facilities and technologies which results in reducing the risk that a specific technology could adversely impact overall system reliability. For example, PJM defines fuel diversity as: utilizing multiple resource types to meet demand such that a sufficiently diversified system is expected to provide the flexibility and adaptability to: "1) mitigate risk associated with equipment design issues or common modes of failure in similar resource types, 2) address fuel price volatility and fuel supply disruptions, and 3) reliably mitigate instabilities caused by weather and other unforeseen system shocks."[280] In effect, fuel and resource diversity can act as a hedge to help ensure a stable and reliable supply of electricity.

Any generation source that promotes more reliance on generation sources other than coal and nuclear, which in 2018 had generation shares of 31.8% and 52.2% of Illinois' total generation respectively,[281] would contribute to increasing fuel and resource diversity in Illinois. By this measure, any of the eligible renewable energy resource generating technologies would contribute to diversity in Illinois. However, if these facilities were located outside of Illinois, in the adjacent states, the full impact on the State's fuel and resource diversity would depend on whether the electricity generated by these facilities could actually be available to Illinois end-users.

Given that renewable generation accounts for only a relatively small fraction of the resource mix in Illinois (7.1% of total generation in 2018), an increase of renewable generation in the region may, in theory, increase the fuel and resource diversity of Illinois. However, the Agency notes that Illinois is a net exporter of electricity, so the impact on fuel and resource diversity in Illinois may be limited for facilities located in adjacent states. While Illinois is a net exporter of electricity, that does not mean that there is no impact on Illinois from electricity generated in adjacent states, because on an hour-to-hour basis electricity may flow into, or out of, Illinois. To the extent that any electricity generated outside of Illinois but consumed in the state is generated by resources other than coal or nuclear, this generation is assumed to add to the fuel and resource diversity in Illinois.

[280] PJM, "PJM's Evolving Resource Mix and System Reliability," March 2017, available at: http://www.pjm.com/~/media/library/reports-notices/special-reports/20170330-pjms-evolving-resource-mix-and-system-reliability.ashx.

[281] U.S. EIA, Electric Power Monthly with data for December 2018, February 2019. The Agency notes that the share of coal declined from 38% and share of nuclear increased from 50.2% as reported in the Initial Plan. This is a net decline in the percentage of generation that comes from coal and nuclear (88.2% to 84%), which indicates that the fuel and resource diversity of the state has increased slightly.

In addressing this issue for facilities located in the adjacent states, the Agency uses the location of the renewable resource facility relative to Illinois as the basis for modifying the fuel and resource diversity score. A distance factor is calculated for each facility.[282] The distance factor is based on the distance from the facility to Morris, Illinois (which is the city closest to the population weighted geographic center of Illinois,[283] and thus can serve as a reasonable proxy for the load-weighted center of the state). The factor is calculated as 1 minus the ratio of (i) the distance from the facility to Morris and (ii) 470 miles, which is roughly the furthest point in an adjacent state from Morris. Consistent with the Commission's Order in Docket No. 17-0838, the center point of the City of Morris is used for this calculation.[284] That factor is multiplied by the maximum possible 20 points to provide the score for this criterion for potentially eligible renewable resource facilities located in adjacent states. The fuel and resource diversity score formula is shown in Figure 4-2.

Additionally, consistent with the Commission's Order in Docket No. 17-0838 and the approach taken with respect to the third criterion below, a facility "that is not connected to either PJM or MISO" will receive a Fuel and Resource Diversity Score of zero.[285] Adjacent state generation facilities "within a transmission control area that have a transmission usage agreement with PJM or MISO" may still receive non-zero scores under Criteria 2 and 3, however.[286]

Figure 4-2: Fuel and Resource Diversity Score

$$Score = (1\ if\ in\ PJM/MISO, else\ 0\ )x\left(1 - \frac{Distance\ from\ facility\ to\ Morris,\ \ IL\ (miles)}{470\ miles}\right)x\ 20$$

3. Enhancing the reliability and resiliency of the electricity distribution system in this State.

While this criterion references the "electricity distribution system" and that term is generally understood to mean the local distribution system that serves homes and businesses and not the transmission grid that transports power over longer distances (and across state lines), the Agency was originally concerned that, read literally, there would be no direct way for a facility in an adjacent state to meet this criterion because a facility in an adjacent state would have (at best) only an incidental impact on the distribution system (or more accurately systems, each operated by a different utility) within Illinois. With that in mind, the Agency has come to interpret this criterion more liberally and instead considers the impact on the grid more generally, as distribution service is ultimately supported by the reliability of transmission service. The scoring for this public interest criterion involves a threshold and, based on the assumption that generating facilities located closer to Illinois would have a more beneficial impact on the State's distribution system reliability and

[282] Because wind farms cover a large geographic area, a wind farm's distance would be based on the geographic center of the area containing turbines that are part of that wind farm.

[283] Based on the 2010 Census. See: https://www2.census.gov/geo/docs/reference/cenpop2010/CenPop2010_Mean_ST.txt.

[284] See Docket No. 17-0838, Final Order dated April 3, 2018 at 21.

[285] Id. The Commission also offered that "if a facility is not connected to PJM or MISO, it should not be allowed to participate in Illinois' RPS procurement;" the Agency believes that because such a facility would score 0 out of 20 points on Criteria 2 and 3 and given the 60 point threshold, an adjacent state facility not connected to PJM or MISO would effectively be eliminated from consideration and no further scoring adjustments must be taken to give effect to the Commission's intent.

[286] Id.

resiliency, a distance factor. The criterion can be understood to refer to the transmission systems operated by PJM and MISO. To the extent that a facility in an adjacent state is not interconnected to the PJM or MISO grid (for example, in the portions of Iowa and Missouri that are part of the Southwest Power Pool("SPP")), those facilities would not score any points for this criterion. Otherwise, a facility in an adjacent state that is in either of the PJM or MISO control areas (or "within a transmission control area that has a transmission usage agreement with PJM or MISO") would be eligible to receive points. To obtain the distance factor, the Agency uses an approach that considers proximity to Illinois and thus an increased likelihood that electricity produced will provide increased system reliability and resilience.

The scoring for this public interest criterion involves the same distance factor as is applied to the fuel and resource diversity scoring; the formula for determining this factor is shown in Figure 4-3. The Agency's review of the scoring methodology and assumptions for criteria 2 and 3 confirms that distance is the factor which can be effectively incorporated into a simplified approach to determine the relative contributions of RECs from adjacent state renewable resources to meeting these public interest criteria.

Figure 4-3: Reliability and Resiliency Score

$$Score = (1 \text{ if in PJM/MISO; else } 0) \times \left(1 - \frac{\text{Distance from facility to Morris, IL (miles)}}{470 \text{ miles}}\right) \times 20$$

4. Meeting goals to limit carbon dioxide emissions under federal or State law

At the federal level, on June 19 2019, the U.S. EPA issued the Affordable Clean Energy Rule (ACE) as the replacement for the Clean Power Plan. The ACE focuses on heat rate improvement at individual coal-fired power plants as a means to reduce CO_2 emissions by improving plant operating efficiency. ACE does not contain specific CO_2 emissions limits; instead, ACE provides guidelines for states to follow in limiting CO_2 emissions.[287]

At the state level, Illinois does not have a specific law that limits carbon dioxide emissions. However, there are multiple provisions of Illinois law, such as the Zero Emission Standard and the Renewable Energy Portfolio Standard, that recognize the value of minimizing carbon dioxide emissions even if those provisions do not create explicit limits. To recognize the value in reducing carbon dioxide emissions, the Agency determines the score for each renewable resource facility by adjusting the 20 points available for this criterion by a factor which reflects the ratio of the CO_2 emissions from the renewable resource to the CO_2 emissions from a new natural gas-fired combined cycle generating facility, 772 pounds of CO_2 per MWh, as shown in Table 4-1 above. This is done by using the formula applied to the first emissions criterion except that the inputs are pounds of CO_2 emitted per MWh. The factor applied to the 20 points available for this public interest criterion is calculated as follows:

[287] https://www.epa.gov/stationary-sources-air-pollution/electric-utility-generating-units-repealing-clean-power-plan.

Figure 4-4: CO_2 Score Calculation

$$Score = \left(1 - \frac{CO_{2\ \text{renewable resource}} \left(\frac{\text{lbs}}{\text{MWh}} \right)}{CO_{2\ \text{gas resource}} \left(\frac{\text{lbs}}{\text{MWh}} \right)} \right) \times 20$$

Renewable generating facilities that do not emit any CO_2 receive the full 20 points, while renewable generating facilities that emit CO_2 receive points based on the factor multiplied by the 20 points. Because CO_2 emissions are generally considered to be a global problem (in that CO_2 emissions anywhere on the planet contribute to global warming, which then affects the health and welfare of the citizens of Illinois), wind direction, duration, and distance from Illinois's load-weighted center are not relevant for the scoring of this criterion and therefore are not included in the calculation.[288] Comparing the CO_2 emissions from each renewable resource to the emissions from the most likely alternative generation, usually a gas-fired combined-cycle plant, remains a practical means for determining the score for this criterion.

5. Contributing to a cleaner and healthier environment for the citizens of this State

This criterion is arguably the most subjective in nature, and presents unique challenges given that the Agency strives to use objective approaches to the greatest extent possible when considering the public interest criteria. The Agency believes that renewable resources inherently contribute to a cleaner and healthier environment generally (with the caveat related to emissions from renewable resources that involve combustion, discussed above) because they reduce the reliance on fossil fuels and have no safety issues associated with the containment and disposal of radioactive materials that result from nuclear generation. Under this Revised Plan, the points awarded for this public interest criterion are the average of the points awarded under the first and fourth public interest criteria described above. This approach takes into account the emissions from renewable resource facilities that involve combustion and, subsequently, emissions, which would not contribute to a cleaner and healthier environment for the citizens of Illinois.

4.1.2. Application Process

The eligibility of RECs from renewable energy generating facilities located in states adjacent to Illinois is not automatically granted, because the Act requires that approval comes only after "the generator demonstrates and the Agency determines" that the facility's operation meets the public interest criteria discussed above.[289] That determination requires an active request (demonstration) by an interested generator. Renewable generating facilities in adjacent states may apply to the Agency for consideration for eligibility for the RPS.[290]

[288] The Agency notes that the Zero Emission Standard Plan contains a different scoring methodology for CO_2 emissions, but that methodology is based upon the impacts of replacement generation and the consideration related to "minimizing carbon dioxide emissions that result from electricity consumed in Illinois" (20 ILCS 3855/1-75(d-5)(1)(C)), which is not the same standard as under consideration in qualifying adjacent-state facilities for the RPS.

[289] 20 ILCS 3855/1-75(c)(1)(I).

[290] An exception is made for the out-of-state facilities that have LTPPA contracts with the utilities. As discussed in Section 4.1, those facilities will be grandfathered into this consideration and will remain eligible to provide RECs for compliance with the Illinois RPS.

Shortly after the approval of its Initial Plan, the Agency developed an application form (in the form of an Excel spreadsheet) for use by owners/agents of adjacent-state facilities that wish to have RECs from those projects considered to be eligible for the Illinois RPS.[291] The information to be entered into the application form includes the generating technology (including information on emissions rates if the technology involves combustion), state where the generator is located, distance from the geographical center of Morris, IL, the Regional Transmission Organization ("RTO") where the facility is or planned to be interconnected (e.g., PJM, MISO, SPP), and the tracking system ID (for existing facilities). The application form will automatically calculate the score for the facility. In addition, the generator will also have to include information related to the provision limiting the recovery of costs in rates described in the next Section. The Agency will review and, as necessary, update the data used in the eligibility calculations on a bi-annual basis in conjunction with the Plan update to use the most recent available inputs (and has done so for this Revised Plan, determining that no changes are needed), but a facility's determination of eligibility will be based on the data available at the time of the request for determination (in other words, a facility would not risk having its eligibility revoked at a later date if the inputs changed after the initial eligibility determination is made by the Agency).

The Agency will review applications to verify the information submitted (e.g., confirming the distance inputs), and if the facility has a score equal to or greater than 60 points (and meets the cost recovery requirement found in Section 1-75(c)(1)(J) of the Act, discussed further below), the Agency will approve the facility as eligible to produce renewable energy credits for compliance with the Illinois RPS. The Agency will inform the applicable tracking system (GATS or M-RETS) that the facility should be coded as Illinois RPS eligible.

In the case of a new adjacent-state facility that is not yet operational (and thus also not registered in GATS or M-RETS), an owner may submit a request for determination of eligibility based upon the planned design of the facility. If the Agency determines that the planned facility does meet the public interest criteria, then it will grant a pre-approval of the eligibility. It will be the responsibility of the facility owner to notify the IPA and the tracking system once the facility is operational to request being coded as eligible for the Illinois RPS in the applicable tracking system. The Agency will review final system information to verify consistency with the information submitted for the pre-approval.

4.2. Cost Recovery Requirement

Section 1-75(c)(1)(J) of the Act contains the following provision:

> *In order to promote the competitive development of renewable energy resources in furtherance of the State's interest in the health, safety, and welfare of its residents, renewable energy credits shall not be eligible to be counted toward the renewable energy requirements of this subsection (c) if they are sourced from a generating unit whose costs were being recovered through rates regulated by this State or any other state or states on or after January 1, 2017.*

[291] Available at: https://www2.illinois.gov/sites/ipa/Documents/2018ProcurementPlan/IL-RPS-Adjacent-State-Facility-Determination-of-Eligibility-20180404.xls.

Generally speaking, the Agency understands that facilities owned by a rural electric cooperative or a municipal utility are not impacted by this criterion (as in Illinois, those entities' rates are not regulated by this *state* or any other), although the Agency notes that there are certain adjacent states which regulate some rural electric cooperative and municipal utility rates. Therefore, the Agency will not be issuing a blanket approval under this provision of facilities owned by rural electric cooperatives or municipal utilities service territories in adjacent states; rather, as those facilities request eligibility, their rate recovery status will be reviewed.

The Agency also understands that this provision was primarily intended to ensure that facilities owned by a vertically integrated utility, for which REC revenues may be incidental to building and financing the facility (as that facility's costs could be recovered from ratepayers in that other state, potentially resulting in a credit or discount to those ratepayers for any REC revenues—effectively causing Illinois ratepayers to cross-subsidize those in vertically integrated states) would not be eligible. Another situation that has been brought to the Agency's attention concerns a proposed project to be developed by an Illinois non-electric utility (a gas or water utility, for instance) featuring delivery service rates that are regulated by the Illinois Commerce Commission with cost recovery then sought over the cost of the renewable energy generating facility. Regardless of whatever may have been the primary purpose informing Section 1-75(c)(1)(J)'s enactment, this situation would seem to clearly fit Section 1-75(c)(1)(J)'s prohibition: the renewable generation facility's costs would be recovered through state-regulated rates. Consequently, the IPA understands such projects' RECs as being barred from participation in the Illinois RPS (including in, say, the Adjustable Block Program) insofar as rate recovery is sought for those projects.

On the other hand, the mere presence of a Power Purchase Agreement between a facility and a separate utility whose costs are recovered in regulated rates would not trigger these criteria (nor would participation in the IPA's energy procurement events, for which regulated utilities serve as contractual counterparties, or participation in a net metering or similar energy crediting program, which would serve to disqualify the very facilities that other portions of the Illinois RPS work to support). Likewise, the Agency believes that being a Qualifying Facility under the Public Utility Regulatory Policies Act ("PURPA")[292] (and also meeting the other aspects of the requirements of the Illinois RPS), would not be disqualifying because the Qualifying Facility does not directly recover its costs through rates; rather, it is compensated for its energy at the purchasing utility's avoided cost rate.

As described in Section 4.1.2, facilities located in adjacent states will proactively have to request eligibility for the utility RPS pursuant to the public interest criteria standard explained above. Those requests to meet the public interest criteria will also be required to include a notarized certification, and documentation, that the facility does not have its costs recovered through regulated rates. For a distributed generation facility, simple documentation of ownership will suffice. For larger facilities, the Agency has not utilized a firm standard of documentation, but believes there are multiple approaches that could be used by a requesting facility. These include, but are not limited to:

- For facilities tracked in M-RETS, documentation to support the status listed in the "Facility Ownership Type" field

[292] 16 U.S.C. §§ 796(17), 824a-3, 824i.

- A Market Based Rate authorization letter from the Federal Energy Regulatory Commission that demonstrates that the facility owner is not a utility with costs recovered through regulated rates
- Certification as a Qualifying Facility
- Use of information from other sources such as the S&P Global Intelligence Briefing Book, or the Platts UDI Directory of Electric Power Producers and Distributors

The Agency will review (in consultation with the ICC) information provided for a facility, and may, as needed, request additional information to verify a facility's status.

The Agency is not presently aware of any renewable facilities in Illinois that have their costs recovered through regulated rates.

In addition to the screening process described above, all contracts from IPA-administered REC procurements or programs utilized since the effective date of P.A. 99-0906 contain provisions to reflect this additional requirement of Section 1-75(c)(1)(J) (and will continue to do so going forward):

> *Each contract executed to purchase renewable energy credits under this subsection (c) shall provide for the contract's termination if the costs of the generating unit supplying the renewable energy credits subsequently begin to be recovered through rates regulated by this State or any other state or states; and each contract shall further provide that, in that event, the supplier of the credits must return 110% of all payments received under the contract. Amounts returned under the requirements of this subparagraph (J) shall be retained by the utility and all of these amounts shall be used for the procurement of additional renewable energy credits from new wind or new photovoltaic resources as defined in this subsection (c). The long-term plan shall provide that these renewable energy credits shall be procured in the next procurement event.*

The Agency notes that Section 1-75(c)(1)(J) also provides a limited exception to this provision for facilities that participate in the Illinois Solar for All Program outlined in Section 1-56 of the Act:

> *Notwithstanding the limitations of this subparagraph (J), renewable energy credits sourced from generating units that are constructed, purchased, owned, or leased by an electric utility as part of an approved project, program, or pilot under Section 1-56 of this Act shall be eligible to be counted toward the renewable energy requirements of this subsection (c), regardless of how the costs of these units are recovered.*

5. Competitive Procurement Schedule

As described throughout this Chapter, to help meet RPS goals outlined in Section 1-75(c) of the IPA Act, in this Revised Plan the IPA proposes to potentially conduct a variety of competitive procurements for RECs in calendar years 2020 and 2021. In combination with the programs described in Chapters 6, 7, and 8, as limited by the RPS budget caps, these competitive procurements would help make progress toward the RPS REC goals and targets outlined in Sections 1-75(c)(1)(B) and (C) as further discussed in Chapter 3. However, the ability to conduct the competitive procurements outlined in this Chapter depends on available funding—and as also outlined in Chapter 3, the Agency envisions significant funding constraints. As a consequence, this Chapter does not propose to automatically conduct any Competitive Procurements (outside of a utility-scale wind forward procurement intended to replace a prior procurement for which no bids were chosen), but rather to provide a framework for such procurements should they become feasible due to updated analysis of available funds (including the allocation of utility-held ACPs), or legislative changes to RPS funding sources (such as an extension of the four-year rollover period).

In the Initial Plan, this Chapter discussed two types of competitive procurements: Forward Procurements and Spot Procurements. The discussion further noted that pursuant to the Commission's Final Order in Docket No. 17-0838, the initial Plan no longer contained proposals for Spot Procurements in the 2017-2018 through 2019-2020 delivery years,[293] while Forward Procurement volumes were significantly increased through that Order (in both cases, compared to the Agency's proposed initial Plan filed for the Commission's approval in December 2017). As taken from the Initial Plan, the Agency uses the following definitions of these types of procurements:

- A **Forward Procurement** is a competitive procurement for RECs where the beginning delivery date is in a future delivery year and the delivery term is multiple years. Further, a Forward Procurement is for unit-specific RECs. Forward Procurements include those specifically outlined in the Act (e.g., a Subsequent Forward Procurement) and additional Forward Procurements proposed by the IPA as part of this Revised Plan. Unless specified otherwise in this Chapter, Forward Procurements will, to the extent practicable, follow the model used for the Initial Forward Procurement including:
    - 15-year REC-only contracts
    - Price per REC fixed over the term of the contract, no price escalation
    - Ability to bank RECs
    - Credit requirements and instruments

- A **Spot Procurement** is a competitive procurement for RECs for either the prior, current, or the prompt delivery year goals. The delivery term of a Spot Procurement is one delivery year. While the IPA does not believe the PUA or IPA Act requires that spot procurement proposals track exactly on the requirements of Section 16-111.5, the Agency proposes that should any spot procurements be authorized and subsequently conducted, to the extent practicable, they would follow the model the IPA has used for past similar REC procurements including:
    - Fixed price per REC
    - RECs must be from applicable delivery year

[293] See Docket No. 17-0838, Final Order dated April 3, 2018 at 40-44.

- Credit requirements and instruments

In this Revised Plan, the Agency is only proposing potential Forward Procurements.

5.1. Statutory Requirements

Section 16-111.5(b)(5)(ii)(B)(aa) of the PUA requires that this Plan:

> *"Identify the procurement programs and competitive procurement events consistent with the applicable requirements of the Illinois Power Agency Act and shall be designed to achieve the goals set forth in subsection (c) of Section 1-75 of that Act."*

The "competitive procurement events" contemplated by the IPA are discussed in this Chapter, while the "procurement programs" are discussed in Chapters 6, 7 and 8. Also specifically addressed in this chapter is the following additional provision (bb) of that subsection of the Act regarding REC procurements subsequent to the Initial Forward Procurement:

> *"Include a schedule for procurements for renewable energy credits from utility-scale wind projects, utility-scale solar projects, and brownfield site photovoltaic projects consistent with subparagraph (G) of paragraph (1) of subsection (c) of Section 1-75 of the Illinois Power Agency Act."*

Section 16-111.5(b)(5)(iii) further states that,

> *"For those renewable energy credits subject to procurement through a competitive bid process under the plan or under the initial forward procurements for wind and solar resources described in subparagraph (G) of paragraph (1) of subsection (c) of Section 1-75 of the Illinois Power Agency Act, the Agency shall follow the procurement process specified in the provisions relating to electricity procurement in subsections (e) through (i) of this Section."*

While it is unclear whether procurements such as those proposed in this Chapter are *required* to be conducted as "a competitive bid process," the Agency has achieved generally positive results in past experience with its competitive bid process (including the Initial Forward Procurements and competitive procurements conducted pursuant to the Initial Plan). Thus, outside of the programs it proposes in later Chapters—some of which statutorily require a different structure—it sees no need to deviate from this approach. Section 5.3 discusses the Agency's competitive procurement process specified in Section 16-111.5(e) through (i) in more detail, and specifically how this process will be applied to the competitive procurements proposed in this Revised Plan.[294]

[294] The provisions related to this Plan contained in Section 16-111.5 of the PUA and Section 1-75(c)(1) of the Act generally refer to "competitive procurement processes" or "competitive procurement events" while in this one instance there is reference to "a competitive bid process" that shall follow the procurement process contained in Section 16-111.5. However, that provision only applies to the Initial Forward Procurement. Nonetheless, while the Agency may have the discretion to conduct other competitive procurement processes through procedures other than those envisioned by Section 16-111.5 (e.g., rather than a sealed bidding with pay-as-bid settlement, offering a standard offer price, or perhaps a single clearing price), at this time the Agency believes that all the competitive procurements it administers should follow the framework set up by Section 16-111.5.

5.2. Background on past REC Procurements conducted by the IPA

In the years 2009 through 2016, with the exceptions of 2013 and 2014,[295] the IPA held procurements for renewable energy resources to meet the RPS requirements of the utilities' eligible retail customers. These procurements were conducted through a competitive procurement process.

While changes to Section 1-75(c) of the IPA Act through P.A. 99-0906 significantly increased the volume of RECs to be procured by the Agency, the Agency has a long track record of procuring renewable energy resources, predominantly RECs.[296]

Prior to Public Act 99-0906, the Agency's past competitive procurements for renewable energy resources are listed below (with the quantities of RECs procured listed in some cases):[297]

- Spot Procurements for one-year delivery of RECs
    - 2009 REC procurements for Ameren Illinois and ComEd (720,000 RECs for Ameren Illinois, 1,564,360 RECs for ComEd)
    - 2010 REC procurements for Ameren Illinois and ComEd (860,860 RECs and 1,887,014 RECs for Ameren Illinois and ComEd, respectively)
    - 2011 REC procurements for Ameren Illinois and ComEd (952,145 and 2,117,054 RECs)
    - 2012 REC procurements for Ameren Illinois and ComEd (523,376 RECs and 1,335,673 RECs)
    - 2015 SREC procurements for Ameren Illinois and ComEd (30,212 SRECs and 49,770 SRECs)
    - 2016 SREC procurements for Ameren Illinois and ComEd (33,271 SRECs and 67,952 SRECs)
    - 2016 REC procurement for MidAmerican

- Procurements for multiple delivery years of RECs
    - 2010 Long-term procurements for Ameren Illinois and ComEd (20 year contracts, bundled RECs and energy, 600,000 RECs per year and 1,261,725 RECs per year, respectively)
    - 2012 "Rate Stability" procurement for Ameren Illinois and ComEd (contracts for four years and seven months) (2,053,837 RECs over the delivery term, and 2,737,110 RECs over the delivery term, respectively)
    - 2015 Supplemental Photovoltaic procurements using the RERF (5 year contracts, with provision to allow time for identification of under 25 kW systems) (21,436 SRECs per year)

[295] In the Agency's 2013 Procurement Plan, due to a decline of eligible retail customers' load served by the utilities, mainly attributable to municipal aggregation, the Agency determined, and the Commission agreed, that no new procurements of renewable energy resources (or for that matter energy) were required. See Order, Docket No. 12-0544, December 19, 2012, at 109-110.

[296] Section 1-75(c) of the Act prior to the changes enacted through Public Act 99-0906 focused on the procurement of "renewable energy resources." The revisions to the Section contained in Public Act 99-0906 focus the Long-Term Renewable Resources Procurement Plan on specifically acquiring "renewable energy credits" from programs and competitive procurements.

[297] Announcements of these procurements that contain additional information can be found at: https://www.illinois.gov/sites/ipa/Pages/Prior_Approved_Plans.aspx. Certain REC volume information has been redacted to maintain required confidentiality in accordance with 220 ILCS 5/16-111.5(h). Please note that because initial delivery timelines vary, the "per year" numbers may not be 100% accurate for a specific calendar period.

- 2015 Distributed Generation procurement for Ameren Illinois and ComEd (5 year contracts)
- 2016 Supplemental Photovoltaic procurement using the RERF (5 year contracts, with provision to allow time for identification of under 25 kW systems) (18,354 SRECs per year)
- 2016 Distributed Generation procurement for Ameren Illinois and ComEd and MidAmerican (5 year contracts)
- 2017 Distributed Generation procurements (5 year contracts, also include provision to allow time for identification of under 25 kW systems) (19,025 SRECs per year procured in Spring 2017, 8,153 SRECs per year procured in Fall 2017)

With the enactment of Public Act 99-0906, the Agency began conducting procurements to meet the RPS requirements of *all* retail customers. The first such procurements were the Initial Forward Procurements, conducted prior to the finalization of the Initial Plan. After the Initial Plan's approval, the Agency conducted a series of procurements conducted under the Commission's authority granted through its Order in Docket No. 17-0838. Those procurements are listed below:

- 2017 and 2018 Initial Forward Procurements (15 year contracts for new utility-scale wind and new utility-scale solar, 965,000 Wind RECs and 1,000,000 Solar RECs per year procured)
- October 2018 First Subsequent Forward Procurement (15 year contracts for new utility-scale wind, 1,979,753 RECs procured)
- November 2018 Photovoltaic Forward Procurement (15 year contracts for new utility-scale solar, 2,000,000 RECs)
- July 2019 Brownfield Site Forward Procurement (15 year contracts, quantity not released due to only two projects selected)
- Second Subsequent Forward Procurement (15-year contracts for new utility scale wind). No bids were accepted;
- Community Renewable Generation Procurement (15-year contracts for non-PV renewable technologies). No bids were accepted;
- Low-income Community Solar Pilot Project Procurement (15-year contracts; conducted pursuant to Section 1-56(b)(2)(D) of the Act)

5.3. The Agency's Competitive Procurement Approach

Based on previous REC procurement experience, the Agency has a solid foundation to build upon for conducting the potential additional competitive procurements proposed in this Revised Plan. The Agency believes that no significant modifications to the procurement approach itself are needed.

The procurement approach the Agency has used for prior REC procurements, including the Initial Forward Procurements and the forward procurements conducted under the Initial Plan, stems from the approach laid out in Section 16-111.5 of the Public Utilities Act for "standard wholesale product" (i.e., block energy, capacity, etc.) procurements. It includes the following key provisions:

- Standard contracts and credit provisions
- Sealed bids with pay-as-bid settlement

- Use of confidential benchmarks to eliminate bids not consistent with the market
- Bid selection based on price
- No post-bid negotiations
- Procurement Administrator evaluates bids and provides confidential recommendation to the Commission for approval
- Procurement Administrator provide bidder interface including training
- Uniform/standardized bid forms
- Uniform/standardized/harmonized credit requirements
- Procurement Monitor involvement

These provisions define a procurement process that has multiple stages.

- The Procurement Administrator develops draft contracts in consultation with the utilities, the Agency, the Procurement Monitor,[298] and ICC Staff.[299]
- Draft contracts are released for public comment.
- The Procurement Administrator, the Agency, the utilities, ICC Staff and the Procurement Monitor review all comments received on the draft contract and revise the contract as needed.[300]
- Typically, the Procurement Administrator holds an informational webcast upon release of the final contracts and RFP rules.
- Submission of Proposals is in two parts:
    - Part 1 for pre-qualification – allows bidders to provide basic information, and agree to the terms of the contract and the RFP rules.
    - Part 2 for registration of bidders – allows bidders to update information, make additional certifications including regarding confidentiality of bidding information, and post bid assurance collateral.
- Bids – on the bid date, bidders submit bids using a standardized bid form.
- Evaluation of Bids – the Procurement Administrator evaluates bids based on price, procurement objectives and priorities; identifies the winning bids; prepares a recommendation for the Commission. The Procurement Monitor observes the bidding and evaluation process and makes its own recommendation.[301]
- Commission decision – After review of the Procurement Administrator's and Procurement Monitor's reports and recommendations, the Commission renders a decision on the results of the procurement event.[302]
- Release of procurement results – The Procurement Administrator releases the results of the procurement event; confidential information is protected.[303]

[298] The Procurement Monitor is an independent consultant that works on behalf of the Commission to oversee all aspects of the procurement process. 220 ILCS 5/16-111.5(c)(2).

[299] The Agency expects that the contract will generally be based on a modified ABA-EMA-ACORE REC Purchase & Sale Agreement, although as discussed further in this Chapter, it recommends a change in approach from prior REC contracts utilized by the Agency (with those prior contracts containing separate modifications to an attached standard agreement).

[300] If agreement between the Procurement Administrator and the utilities is not reached on the terms and provisions of the contracts, any disputes are resolved by the Commission. (See 220 ILCS 5/16-111.5(e)(2)).

[301] See 220 ILCS 5/16-111.5(f).

[302] See id.

[303] See 220 ILCS 5/16-111.5(h).

- Contract execution with the utilities – Within three business days of Commission approval of the procurement results, utilities and winning bidders sign binding contractual arrangements using the standard form contracts.[304]

Unless specifically noted in the following sections, the IPA proposes that the competitive procurements for RECs described in this Revised Plan follow these past practices that have been refined over the past ten years.

5.3.1. Contracts

For the competitive procurements conducted pursuant to the Initial Plan (as well as the Initial Forward Procurements), the Agency updated its REC contract used in previous competitive procurements for renewable energy credits (other than the Supplemental Photovoltaic Procurements, which featured the Agency as a counterparty rather than the utilities and followed a simplified structure). This update made changes to ensure that the contract was compliant with new requirements found in P.A. 99-0906, but otherwise followed the standard format of a Cover Sheet, Revisions to the Master REC Agreement, and the Master REC Agreement itself.

The Agency is concerned that this contract structure may be confusing and overly complex: with three separate documents, each of which may address the same universe of contract terms, a party reviewing the contract may not fully understand which terms are applicable or may require sophisticated counsel to work through inherent contradictions. The Agency thus believes the development of a new, cleaner, more straightforward REC delivery contract is warranted.

Because the potential procurements outlined in this Chapter are not time sensitive, the Agency believes it can conduct a more thorough contract development process providing more time for stakeholder input during calendar year 2020. As discussed in Section 6.7, the Agency proposes a similar update to contracts for the Adjustable Block Program which currently feature the same structure as the contracts used for competitive procurements. The Agency proposes that the new contract that is developed through that process should be considered as the starting point for a new contract for any competitive procurements that are held. The Agency would provide stakeholders the opportunity to provide written comments on a proposed competitive procurement contact prior to the start of any competitive procurement process. While the Agency believes the final decision on the contract should continue to reflect the past practice of the consensus of the Agency, the ICC Staff, the Procurement Administrator, the Procurement Monitor, and the utilities, this process will help to ensure that resulting contracts properly balance the needs and concerns of both the buyers (utilities) and sellers (developers of renewable energy resources that bid into procurements) under the resulting contracts.

Additionally, this Revised Plan received authority from Commission, similar to the discussion in Section 6.15.1, to allow the Seller to provide notification to the Buyer, the Agency, and the Commission that it is exercising its option to allow for a system's removal from the contract, with forfeiture of associated Performance Assurance, because the Approved Vendor no longer wishes to develop that system.[305] This approach would allow both parties to step away from unwanted contractual obligations and ease the Agency's RPS planning process.

[304] See 220 ILCS 5/16-111.5(g).

[305] See Docket No. 19-0995, Final Order dated February 18, 2020 at 80.

5.4. REC Eligibility

As discussed in Chapter 4, P.A. 99-0906 place two conditions on RECs that are eligible to be used for RPS compliance that narrowed the pool of RECs eligible for Illinois RPS compliance. First is a locational standard that allows for RECs from facilities located in Illinois to meet the Illinois RPS, and also from facilities located in adjacent states only if those facilities meet the public interest criteria set out in Section 1-75(c)(1)(I). By implication, RECs from states further afield than the states adjacent to Illinois do not qualify for the Illinois RPS. Second, P.A. 99-0906 introduced a new standard related to how generating units recover their costs. This standard not only prohibits the use of RECs from generating units that do not recover their costs through state-regulated rates, but also assesses penalties for RECs from systems later found to be non-compliant.[306]

These eligibility requirements require competitive procurements conducted by the IPA to feature additional steps to verify that RECs being procured (and, in most cases, the underlying generating facilities from which they are being procured) are indeed eligible for the Illinois RPS. For Forward Procurements, additional review is now required during the bidder registration process to allow the Procurement Administrator and the Agency to verify information about proposed facilities and if facilities located in the states adjacent to Illinois meet the public interest criteria (for example, see Chapter 4 for more information on how facilities would request this determination). As the Agency is not proposing Spot Procurements through this Revised Plan, the question of how to screen facility for Spot Procurements is not addressed herein, but the Agency notes that screening RECs from Spot Procurements would raise perhaps more complex issues than with Forward Procurements given the non-source-specific nature of those procurement events and the potential participation by aggregators or other third-parties who may have acquired those RECs through prior transactions.

5.5. Credit Requirements

To ensure that RECs under contract to satisfy a compliance requirement are indeed delivered, the Agency proposes to continue requiring collateral with contracts, with the collateral amount established as a function of contract value. While specific collateral levels are not proposed as part of this Revised Plan (and are generally determined through the contract development process), the Agency believes that the level of collateral must be low enough to encourage participation and high enough to discourage suppliers from voluntarily defaulting on contracts for economic reasons. Further, the IPA proposes a strict requirement that suppliers and associated facilities who voluntarily default on contracts for economic reasons (such as choosing to sell the RECs elsewhere after making the commitment to sell them to an Illinois utility) or misrepresent their eligibility to participate in a procurement event will be barred from participation in future IPA procurements.

Similar to the discussion in Sections 6.15.1 and 8.12.1, any forfeiture of collateral by a project under a competitively procured REC contract with a utility will be considered to be returned to the Renewable Resources Budget, and any forfeiture of collateral by a project under a competitively procured REC contract with the Agency (namely, the Low-Income Community Solar Pilot Projects) will be deposited into the RERF.

[306] See 20 ILCS 3855/1-75(c)(1)(J). Note that Section 1-75(c)(1)(I) references "facility" and "facilities" for the geographic standard, while Section 1-75(c)(1)(J) references "generating unit" for the cost recovery standard. Section 1-10 of the IPA Act does not specifically define "generating unit" but does define a facility as, "an electric generating unit or a co-generating unit that produces electricity along with related equipment necessary to connect the facility to an electric transmission or distribution system." The Agency understands these terms to be generally interchangeable.

5.6. Benchmarks

Prior to the revisions to the RPS contained in Public Act 99-0906, benchmarks used for renewable energy resources procurements (i.e., confidential price levels above which no bids would be accepted) were developed pursuant to a statutory provision requiring that the price paid for renewable energy resources being procured "not exceed benchmarks based on market prices for renewable energy resources in the region," and required that such benchmarks "be developed by the procurement administrator, in consultation with the Commission staff, Agency staff, and the procurement monitor" and "subject to Commission review and approval."[307]

For the procurements to be conducted under the revised Section 1-75(c) , the concept of being "cost-effective" for the competitive procurement of RECs was revised. Specifically, through changes by P.A. 99-0906, "cost-effective" now means that the prices for RECs

> *do not exceed benchmarks based on market prices for like products in the region. For purposes of this subsection (c), "like products" means contracts for renewable energy credits from the same or substantially similar technology, same or substantially similar vintage (new or existing), the same or substantially similar quantity, and the same or substantially similar contract length and structure. Benchmarks shall be developed by the procurement administrator, in consultation with the Commission staff, Agency staff, and the procurement monitor and shall be subject to Commission review and approval. If price benchmarks for like products in the region are not available, the procurement administrator shall establish price benchmarks based on publicly available data on regional technology costs and expected current and future regional energy prices.*[308]

Due to the sensitive nature of the benchmark development process and how the release of information related to the level of the benchmark could impact bidder behavior in competitive procurements, additional information will not be provided regarding the process for developing the benchmark or any range of potential benchmark prices.

These benchmarks are not to be used to curtail or otherwise reduce contractual obligations entered into by or through the Agency prior to June 1, 2017.[309]

5.7. Procurements for RECs from New Projects vs. RECs to Meet Annual Goals

Section 1-75(c)(1)(F) creates a prioritization order for REC procurements, to the extent that the "budget" of utility-collected funds, pursuant to Sections 1-75(c)(1)(E) and 1-75(c)(6) of the Act and Section 16-108(k) of the Public Utilities Act, becomes a binding constraint:

1. RECs under existing contractual obligations;
2. RECs procured through funding for the Illinois Solar for All Program;

[307] 20 ILCS 3855/1-75(c)(1) repealed effective June 1, 2017.

[308] 20 ILCS 3855/1-75(c)(1)(D).

[309] Id.

3. RECs necessary to comply with the new wind and new photovoltaic procurement requirements described in items (i) through (iii) of subparagraph (C) of this paragraph (1) [of Section 1-75 of the IPA Act];[310]
4. RECs necessary to meet the remaining requirements of this subsection (c).

Chapter 3 describes a substantial gap between the quantity of RECs needed to meet annual percentage RPS goals and the RECs under contract from and pending prior procurements. The Agency has satisfied the utility-scale new wind and photovoltaic requirements through the 2025-2026 delivery year via RECs under contract from prior procurements, but believes that additional new generation is necessary to work toward ensuring that any percentage-based goals could eventually be achieved. Taking into consideration the REC procurement priorities discussed above, an in attempt to meet both quantitative targets and to help grow the pool of RECs eligible to meet the Illinois RPS's annually climbing percentage-based goals, the Agency will seek to meet the remaining requirements of Section 1-75(c) (which the IPA understands to refer primarily, if not exclusively, to the percentage-based goals found in Section 1-75(c)(1)(B)) through Forward Procurements to the extent budgets allow.[311]

5.8. Procurements Conducted Under the Initial Plan

In the Initial Plan, the Agency proposed a series of procurements as described in Table 5-1 below. As of the release of this Revised Plan, the First Subsequent Forward Procurement (wind), the Brownfield Site Forward Procurement, and the Photovoltaic Forward Procurements have all been conducted.

The original Brownfield Site Forward Procurement was conducted in the fall of 2018 and did not feature any winning projects. In February of 2019, the Agency sought feedback[312] from stakeholders and then petitioned the Commission to reopen Docket No. 17-0838 seeking clarification for the authority to reconduct the procurement with certain modifications. Following the Commission's approval of that request, the second Brownfield Site Forward Procurement was then conducted in spring/early summer 2019 with the Commission approving the results on August 1, 2019. While the specific quantity procurement in the brownfield site procurement was not disclosed given that only two bidders were successful,[313] the procurement did exceed the statutory target of 40,000 RECs annually by the 2020-2021 delivery year (although such RECs could begin being delivered after that date under the procurement's contracts).

The Second Subsequent Forward Procurement (new utility-scale wind), Community Renewable Generation Forward Procurement (non-photovoltaic), and the Low-income Community Solar Pilot Project Procurement (part of Illinois Solar for All) were all conducted in the Fall of 2019. Both the

[310] The provisions are for 2,000,000 RECs annually from each technology by the end of the 2020-2021 delivery year, 3,000,000 RECs annually from each technology by the end of the 2025-2026 delivery year, and 4,000,000 RECs annually from each technology by the end of the 2030-2031 delivery year.

[311] In the Initial Plan originally filed with the Commission, the Agency also proposed "spot procurements" to meet the annual RPS percentage goals found in Section 1-75(c)(1)(B) of the Act. However, in its Order approving the Plan, citing "the serious risk Spot Procurements can pose to the budget which may prevent the IPA from meeting its statutory long-term new build requirements," the Commission granted "various parties' requests to cancel the Spot Procurements." Thus, the final Initial Plan did not contain Spot Procurements, and given the budget constraints outlined in Chapter 4, the Agency is not proposing Spot Procurements in this Revised Plan.

[312] See https://www2.illinois.gov/sites/ipa/Documents/2019ProcurementPlan/Brownfield-Site-Procurement-Questions-5-Feb-2019-1.pdf.

[313] By releasing quantity information in a procurement with two winning bidders, each bidder would be able to determine the quantity of the other's selected bid, and thus determine that other bidder's bid price.

Second Subsequent Forward Procurement and the Community Renewable Generation Forward Procurement did not produce any winning projects. Following stakeholders' comments on the potential barriers to participation in utility-scale procurements, and consistent with the Commission's Order in Docket No. 19-0995,[314] the Agency is planning to conduct a procurement of RECs from new utility-scale wind projects in the Fall of 2020 or the Spring of 2021.[315]

With the completion of these and other prior procurements, the quantitative new wind and new utility-scale photovoltaic REC targets[316] for the 2020-2021 delivery year and the 2025-2026 delivery year will have been met.

Table 5-1: Forward Procurements Summary[317]

Procurement	Technology	Procurement Date	Delivery Start	Annual REC Target	Annual RECs Procured	Annual Spend $
First Subsequent Forward	Wind (utility-scale)	Fall 2018	2021-2022	2 million	1.98 million[318]	6.41 million
Brownfield Site Forward[319]	Photovoltaic (brownfield site)	Fall 2018 /Summer 2019[320]	2021-2022	0.08 million	Quantity not disclosed	Not disclosed
Photovoltaic Forward	Photovoltaic (utility-scale)	Fall 2018	2021-2022	2 million	2 million	9.28 million
Second Subsequent Forward	Wind (utility-scale)	Fall 2019	2021-2022	1 million	0	0
Community Renewable Generation Program Forward	Any non-photovoltaic (with subscribers)	Fall 2019	2021-2022	0.05 million	0	0
Low-Income Community Solar Pilot Project[321]	Photovoltaic (with community participation / subscribers)	Fall 2019	2021-2022	Set on a $20 million budget	Quantity not disclosed	Not disclosed
Utility-scale Wind Forward Procurement	Wind (utility-scale)	Fall 2020 or Spring 2021	2023-2024	1 million	TBD	TBD

[314] See Docket No. 19-0995, Final Order dated February 18, 2020 at 17-18.

[315] See Section 5.9.2 for additional information.

[316] See 20 ILCS 3855/1-75(c)(1)(C)(i) and (ii).

[317] 15-year REC delivery term from new generating facilities.

[318] As allowed under the procurement rules, the marginal bidder declined an award of 0.02 million RECs which would have represented a very small portion of their RECs bid and thus was not economically feasible.

[319] The procurement had only two winning bidders therefore certain information is not disclosed per previous Commission Orders in order to maintain bidder confidentiality. By releasing quantity information in a procurement with two winning bidders, each bidder would be able to determine the quantity of the other's selected bid, and thus determine that other bidder's bid price

[320] When originally conducted in 2018, the Brownfield Site Forward Procurement did not procure any RECs and a procurement was conducted a second time in the Summer of 2019.

[321] The procurement had only two winning bidders therefore certain information is not disclosed per previous Commission Orders in order to maintain bidder confidentiality. By releasing quantity information in a procurement with two winning bidders, each bidder would be able to determine the quantity of the other's selected bid, and thus determine that other bidder's bid price

5.9. Competitive Procurements

While the statutory new wind and new utility-scale solar REC targets for 2020-2021 and 2025-2026 have been met through procurements conducted to date (or, in the case of wind, are targeted to soon be met and exceeded through a scheduled procurement), there could be value found in additional competitive procurements for at least two reasons. First, while enough RECs to meet these targets have been procured and thus are under contract to date, procurement does not ensure that selected projects will be completed and begin to deliver RECs. Therefore, as discussed further below, the Agency proposes a process for considering holding Contingency Procurements if necessary. Second, to help make progress toward the annual percentage of load goals of the RPS, the Agency proposes a structure for potential additional Forward Procurements[322] should ongoing analysis and review of available RPS budgets (or future legislative changes that change the rate cap, extend the budgetary roll-over period under Section 16-108(k) of the PUA, etc., assuming such future new law still maintains the authority of this Revised Plan) suggest that there are sufficient funds that become available in future years to conduct those procurements. However, as discussed in Section 3.22, the Agency proposes in this Revised Plan to first prioritize opening additional blocks of capacity for the Adjustable Block Program over conducting additional competitive procurements.

5.9.1. Contingency Procurements

Contingency procurements may be necessary under two circumstances.

The first circumstance would be if the Agency receives notice that projects selected in previously conducted procurements will not be completed and thus the RECs expected from them will no longer be part of the RPS portfolio. If the reduced quantities are significant enough, this could result in the statutory 2020-2021 and/or the 2025-2026 REC targets for new wind, or new solar not being met.[323] In this circumstance, the Agency believes conducting an additional procurement (or if applicable and the timing allows for it, an adjustment to the REC quantities for any procurements conducted pursuant to Section 5.9.2) could be warranted, subject to a review of any budgetary limitations. However, as shown in Table 5-2, those previously conducted procurements put the RPS portfolio well ahead of those targets so this situation would only occur in very unlikely scenarios of many projects failing to be completed.

[322] The Agency is definitively planning to hold a second Low-Income Community Solar Pilot Projects competitive procurement (which is funded solely from the RERF) in the 2020-2021 or 2021-2022 program years of ILSFA, as discussed further in Section 8.6.4.

[323] Overall targets for RECs from new solar projects are the same as for new wind; however, 50% of those RECs must come from the Adjustable Block Program, 2% from brownfield site solar (which could also be considered utility-scale if over 2 MW in size), and 40% from utility-scale solar (with 8% not specifically described). Therefore, this Section only considers utility-scale solar, and not other types of solar.

Table 5-2: New Wind and New Utility-Scale Solar RECs Procured and Targets

	New Wind	New Utility-Scale Solar[324]
Cumulative Annual RECs Procured[325]	**3.945 million**	**3 million**
2020-2021 Target	2 million	0.8 million
2025-2026 Target	3 million	1.2 million
2030-2031 Target	4 million	1.6 million

The second circumstance would be if a new procurement conducted pursuant to Section 5.9.2 failed to meet its REC target. In this case, the failure to procure RECs would not necessarily impact statutory REC targets, but rather would just contribute to increasing the shortfall in meeting the annual percentage-based REC goals. Prior to considering conducting another procurement, the Agency will assess why the targets were not met and request stakeholder feedback on any changes to the procurement that would increase the likelihood that a procurement held again would be more likely to be successful. Part of that assessment will be an evaluation of the shortfall and if it were large enough to warrant another procurement (e.g., a shortfall of 10,000 RECs out of a 1 million annual REC target would be offered different consideration than a shortfall of 800,000 RECs).

Prior to conducting any Contingency Procurement, the Agency will consult with ICC Staff. The Agency will not seek formal Commission approval for conducting a Contingency Procurement, and will conduct such procurements based on the factors outlined above through the Commission's approval of this Revised Plan.

5.9.2. Forward Procurements

At the time this Revised Plan was filed, the Agency noted that one of the remaining activities approved in the Initial Plan included the Second Subsequent Forward Procurement of 1,000,000 RECs annually from new utility-scale wind projects. The results of that procurement were rejected by the Commission on October 30, 2019, and no projects were selected. Accordingly, during the process for Commission approval of this Plan, the Agency proposed that it conduct a utility-scale wind procurement in 2020 or 2021 to complete procurement of the 1,000,000 RECs that had been expected from the Fall 2019 utility-scale wind procurement. The Agency noted that the procurement is not depended upon the identification of additional funds, as the IPA previously factored into its Plan that 1,000,000 RECs annually would have been procured.[326] The Commission approved the Agency's proposal to allocate funds previously budgeted for the rejected Fall 2019 procurement towards a future utility-scale wind REC procurement.[327] Pursuant to the Commission's direction, the

[324] 40% of overall new solar target.

[325] Assumes that the 2019 Second Subsequent Forward Procurement for RECs from utility-scale wind projects meets its goal of 1 million RECs delivered annually and that projects selected from the Initial Forward Procurements and the Forward Procurements already conducted are successfully completed and begin REC deliveries.

[326] See Docket No. 19-0995, Final Order dated February 18, 2020 at 15.

[327] Id. at 17.

next utility-scale wind REC procurement will occur no later than May 31, 2021.[328] In March 2020, the Agency began planning this procurement through the solicitation of stakeholder feedback.[329]

Given the funding limitations described in Chapter 3, with the exception of the procurement of 1,000,000 utility-scale wind RECs discussed above, Forward Procurements for RECs from new utility-scale wind[330] or utility-scale solar projects will not be automatically conducted. Rather, on a biannual basis each spring and fall, the Agency will review available RPS budgets to determine if procurements can be conducted. Should available budgets (after the prioritization described in Section 3.22) allow for Forward Procurements to be conducted, the Agency will post to its website an announcement of the procurement(s) that includes an analysis of the available funding and the REC targets.

In general, the Agency recommends continuing the requirement from procurements conducted pursuant to the Initial Plan that REC deliveries begin within three years of the procurement event. However, the Agency does recognize that there are a variety of factors that can lead to project delays, including the RTO interconnection process, so the Agency will continue to include extension provisions in contracts.

5.9.3. Brownfield Site Photovoltaic

In the Initial Plan, the Agency proposed a procurement for RECs from brownfield site photovoltaic projects and included a target of 80,000 RECs delivered annually. As discussed above in Section 5.8, the procurement was initially held in the fall of 2018 in conjunction with the Photovoltaic Forward Procurement and did not successfully procure any RECs. The Agency subsequently issued a request for comments from stakeholders to gain a better understanding of factors that may have contributed to the lack of success of the procurement, and filed a motion with the Commission in March of 2019 for a clarification to provide the authorization to conduct another procurement. The Commission granted that motion on April 26, 2019.

The Agency made certain adjustments to the procurement guidelines (notably around acceptable age of documentation of eligibility) and conducted another procurement on July 26, 2019. On August 1, 2019, the Commission approved the results, which resulted in exceeding the upcoming statutory target of 40,000 RECs delivered annually by 2020-2021.

As discussed in Section 3.22, if funds are available and additional Adjustable Block Program procurement quantities are satisfied, the Agency would conduct a procurement for 50,000 RECs delivered annually from Brownfield Site Photovoltaic Projects.

[328] Id. at 18. Additionally, if a new REC Contract is not in place as discussed in Section 5.3.1 of this Plan by May 31, 2021, the latest version of the utility-scale REC contract will form the basis for the 2021 contract, subject to minor modification where warranted.

[329] See: https://www2.illinois.gov/sites/ipa/Pages/wind-comments-2020.aspx for the Agency's request for feedback and responses received.

[330] For the purposes of Forward Procurements, the Agency understands that to be considered a "new wind project," a facility must be energized within three years of the Commission's approval of the procurement results. In addition, the Agency notes that it would generally not consider a repowered wind farm a "new wind project" for purposes of Section 1-75(c)(1)(C) of the IPA Act. Providing an incentive for existing generation to simply repower for increased efficiency would be inconsistent with statutory directives encouraging the development of "new" projects to "to diversify Illinois electricity supply, avoid and reduce pollution, reduce peak demand, and enhance public health and well-being of Illinois residents" (20 ILCS 3855/1-75(1-5)(6)), as the incremental benefits offered to Illinois residents by a repowered project would be significantly less than those offered by an entirely new facility.

5.9.4. Other Renewables Forward Procurement

As contemplated by the Initial Plan (see Section 5.8.3 of the Initial Plan), in June of 2019 the Agency issued a Request for Information to gauge developer and other stakeholder interest in a forward procurement for RECs from new renewable energy resources that are not wind or photovoltaic. The Agency received a very limited response to the Request for Information (only receiving responses from MidAmerican Energy and the Union of Concerned Scientists).[331] Those comments only provided limited information on a few potential projects under development in Iowa (but did not address if they have their costs recovered in rates regulated by a state, which would make them ineligible[332]), did not provide any insight into the economics or cost effectiveness of such a procurement, and raised a number of potential concerns related to the environmental impacts of biomass energy projects.

Based on the comments received, and with the concurrence of ICC Staff as described in the Initial Plan, the Agency does not recommend conducting a Forward Procurement for RECs from renewable energy resources that are not wind or photovoltaic. In Docket No. 19-0995 approving this Revised Plan, no party sought for such a procurement to be conducted.

5.9.5. Community Renewable Generation Program

In the Initial Plan, the Agency proposed a Community Renewable Generation Program Forward Procurement (see Section 5.8.4 of the Initial Plan). This procurement was designed to recognize that while Section 1-75(c)(1)(N) of the IPA Act required the creation of a community renewable generation program, the law provided firm guidance only on how to procure RECs from community solar projects (through the Adjustable Block Program), with other renewable generating technologies unaddressed. The Community Renewable Generation Program Forward Procurement would then create an opportunity for non-photovoltaic community generation projects to be developed. The procurement was conducted in December 2019 and did not yield any selected bids.

While the Agency appreciates the potential opportunities for additional community renewable generation procurements to expand the range and diversity of renewable energy resources in Illinois, due to the current budget constraints, the Agency does not propose another non-photovoltaic community renewable generation procurement in this Revised Plan. In Docket No. 19-0995 approving this Revised Plan, no party sought for an additional community renewable generation procurement to be conducted.

5.10. Wind/Solar Matching Requirement

As discussed in Section 2.4.5, Section 1-75(c)(1)(G)(iv) of the IPA Act requires that the projected amount of RECs procured (annually) from new wind projects not exceed the projected amount of RECs procured from new photovoltaic projects by more than 200,000 RECs, and that should this occur the Agency adjust the procurement plan accordingly.

The new photovoltaic project REC quantities presently under contract include RECs procured through the Adjustable Block Program and the Illinois Solar for All Program. As of the release of this Revised Plan (inclusive of expected volumes to be procured in the remaining 2019 procurements and the full allocation of the Adjustable Block Program RECs), it appears that new photovoltaic RECs procured exceed new wind RECs procured as shown in Table 5-1. Absent a significant fall off of RECs

[331] See: https://www2.illinois.gov/sites/ipa/Pages/Draft-Long-Term-Renewable-Resources-Procurement-Plan-Comments-2019.aspx.

[332] See 20 ILCS 3855/1-75(c)(1)(J).

procured due to projects not being completed and energized, it appears that this matching requirement may not be a significant concern in the near future.

Table 5-3: New Wind/Solar RECs Procured[333]

Delivery Year	All Solar RECs	All Wind RECs	Solar In Excess of Wind
2020-2021	1,851,074	1,395,000	456,074
2021-2022	4,169,771	2,944,753	1,225,018
2022-2023	4,169,719	2,944,753	1,224,966
2023-2024	4,169,668	3,944,753	224,915
2024-2025	4,169,616	3,944,753	224,863
2025-2026	4,169,565	3,944,753	224,812
2026-2027	4,169,514	3,944,753	224,761
2027-2028	4,169,463	3,944,753	224,710
2028-2029	4,169,413	3,944,753	224,660
2029-2030	4,169,363	3,944,753	224,610
2030-2031	4,169,313	3,944,753	224,560
2031-2032	4,169,263	3,944,753	224,510

Nevertheless, to keep this matching requirement from being exceeded, the Agency will assess the balance between RECs procured from new wind and new photovoltaics prior to proposing any Contingency or Forward Procurements. Should this assessment demonstrate the need to increase photovoltaic procurement quantities or reduce wind procurement quantities, the matching requirement would serve as the basis for adjusting REC procurement volumes, and such volumes would be adjusted to bring RECs under contract in line with the requirements of Section 1-75(c)(1)(G)(iv) of the Act.

5.11. Procurements after 2021

This Revised Plan covers the Agency's potential proposed procurements for calendar years 2020 and 2021. Absent legislative changes to available budgets (or other changes to the structure of the Renewable Portfolio Standard), it appears highly unlikely that even expanded REC targets for Forward Procurements will reach the annual percentage-based REC goals of the RPS for the time being. As described in Section 3.18, as initial payments for RECs from the Adjustable Block Program (that is, payments for projects in the blocks authorized by the Initial Plan) are completed in 2023 and 2024, the available annual RPS budget should begin to expand, which could allow for an increase in the scale of future Forward Procurements. However, that budget availability may be constrained by the requirement to meet future REC targets for the Adjustable Block Program.

Procurements to be conducted after 2021 will be considered in the next Plan update scheduled for release in the summer of 2021.

[333] This table assumes that the 1,000,000 REC target from the Second Subsequent Procurement for Wind RECs is fully met.

6. Adjustable Block Program

6.1. Background

Sections 1-75(c)(1)(K) and (L) of the IPA Act, as amended by Public Act 99-0906, required the Agency to establish an Adjustable Block Program for the procurement of RECs from new photovoltaic distributed generation systems and from new photovoltaic community renewable generation projects (colloquially known as "community solar"). The Adjustable Block Program stands in contrast to the competitive procurements described in Chapter 5 in that it features administratively determined prices for RECs and is open on an ongoing basis, rather than featuring discrete procurement events with competitively set, pay-as-bid prices.

Prior to the adoption of the Adjustable Block Program model, the development of new photovoltaic distributed generation in Illinois had been supported in other ways. From 1999 to 2015, the Department of Commerce and Economic Opportunity ("DCEO") offered rebates for photovoltaic projects; these rebates covered up to 25%-30% of the project cost and supported over 1,100 solar PV projects with a total capacity of 13 MW.[334] The DCEO rebates were available once per year and the available budget was quickly allocated, leading to uncertainty for installers about whether their projects would or would not receive a rebate in any given year. No funds have been appropriated for the rebate program in recent years.

Additionally, the IPA conducted Supplemental Photovoltaic Procurements in 2015 and 2016 under authority granted by Section 1-56(i) of the IPA Act, and the Agency proposed and conducted Distributed Generation procurements for the utilities from 2015 through 2017 (although these procurements for the utilities were not limited to photovoltaic systems or to new systems) to meet a statutory DG procurement target in the pre-P.A. 99-0906 RPS. The previous procurements administered by the IPA featured competitive bidding for projects, and each winning bidder received a contract through which RECs actually delivered were paid for at the bidder's bid price. While this approach created the market efficiency inherent in competitive bidding processes, installers of projects found it difficult to sell projects when the potential REC revenue would not be known until a bid was accepted (or alternatively there would be no REC revenue if a bid was not accepted). To mitigate that challenge, the Agency allowed bidders to bid on forecasted blocks of RECs for systems below 25 kW and give developers time to identify projects using a known REC price.

The Adjustable Block Program is intended to address these issues by featuring an approach that is continuously open, rather than relying on specific procurement events (or rebate application windows), features a clear set of prices, and can tap into a much larger budget. The program also expands this model to accommodate community solar so that homes and businesses that cannot place solar on their property can nonetheless participate in, and benefit from, direct access to renewable energy.

However, as discussed elsewhere in this chapter, while the continuously open model is currently effective for distributed generation projects, funding limitations (as discussed in Chapter 3) have created a long waitlist for community solar projects under the implementation of the Initial Plan. Additionally, once the blocks authorized by the Initial Plan and the Agency's allocation of

[334] See Renewable Energy, Energy Efficiency, and Coal Resources Development Law of 1997, 20 ILCS 687/6-1 *et seq.*; also see https://www.illinois.gov/dceo/AboutDCEO/ReportsRequiredByStatute/2013%20RERP%20Annual%20Report.pdf, https://energy.gov/savings/renewable-energy-resources-trust-fund.

discretionary capacity stemming from the Commission's Order approving that Plan are filled, waitlists may be needed for distributed generation projects if funding is not available for new blocks to open. Section 3.22 discusses how the Agency will review budget availability and under what circumstances new blocks could be opened.

6.2. Lessons From Other Jurisdictions

Illinois is far from being the first to adopt an approach of administratively-determined incentives or a block program to manage growth of the photovoltaic industry. Experience from other markets can inform best practices for setting prices and program design. Solar photovoltaic power has been a rapidly developing technology in recent years, with rapid price declines and industry growth. This dynamic environment has made it challenging for policymakers to design incentives that ensure healthy growth, without costing taxpayers and ratepayers too much or causing unsustainable "boom and bust" cycles that harm the industry and consumers.

To inform the program design of the Adjustable Block Program as described in the Initial Plan, the Agency's review and analysis of other programs included relevant experiences from Germany, Spain, California, and particularly Massachusetts and New York.[335]

While the New York and Massachusetts programs are both based on a declining block structure, and pay incentives on a first-come, first-served basis, key design aspects vary. The NY SUN program has 3 regions (Long Island, Con Edison, and Upstate) each with a distinct number of blocks, block sizes and block prices. Incentives are paid in dollars per Watt (capacity), declining differently for each region and sector, except for the residential sector where prices decrease by $0.10/W across all regions. Like the Illinois Adjustable Block Program, NY SUN pays small systems at the time of energization, whereas commercial projects receive a partial payment upfront with the remainder paid in installments over subsequent years.

The Massachusetts SMART program, which began accepting applications on November 26, 2018, is a 1,600 MW declining block incentive program that provides fixed Base Compensation Rates to qualified generation units.[336] To be eligible, generation units must be interconnected by one of three investor owned utility companies in Massachusetts. Capacity available in each utility's service territory was determined by multiplying 1,600 MW by each distribution company's percentage share of total statewide distribution load in 2016. Initial Base Compensation Rates were established using the results of a competitive procurement for larger projects (> 1 MW) and were announced on January 11, 2018. Incentive levels decline by prescribed amounts over up to eight blocks per EDC territory.

Following the first Capacity Block, SMART program Base Compensation Rates decline by 4% per Capacity Block. Under the SMART program, if a utility is eligible to have fewer Capacity Blocks and elects to do so, it may also establish a steeper rate of decline for Base Compensation Rates, and that rate shall yield an overall rate of decline as if the utility had elected to have eight Capacity Blocks.[337]

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[335] A summary of those other programs is available in Appendix C of the Initial Plan available at: https://www2.illinois.gov/sites/ipa/Documents/2018ProcurementPlan/LTRRPP-Filed-Appendix-C-Review-Other-Programs.pdf.

[336] See: http://masmartsolar.com/.

[337] For example, Fitchburg Gas & Electric d/b/a Unitil elected to have four Capacity Blocks with an 8.8% decline in Base Compensation Rates per Capacity Block.

For three of the five utilities, available blocks for large (over 25 kW) projects are already filled and projects are being accepted for a waitlist.[338]

6.2.1. Managing Initial Demand

Some incentive programs have encountered problems dealing with a large quantity of applications coming in very quickly upon the application window opening. California's Self Generation Incentive Program ("SGIP") is a prime example. In 2016, $40 million of SGIP funding was made available. Applicants filed 658 reservation requests totaling $181 million in requested incentives in the first 10 minutes following program opening.[339] Some applicants were found to be deploying questionable strategies to get their application earlier in line, including filing applications from within the same server network as the application recipient. One vendor volunteered to give up half of its rewarded incentives to avoid litigation. As a result, the California PUC reformed the program to add a number of protections against awards being monopolized by early applicants:[340]

- Replacing the first-come, first-served system with a lottery in which projects having additional greenhouse gas/grid benefits are assigned priority;
- Making all of the incentive money available on a continuous basis in a declining incentive "step" structure, akin to the California Solar Initiative; and
- Restricting each project developer to a cap of 20 percent of the incentive budget, rather than the previous 40 percent cap that applied to equipment manufacturers

In developing the structure of the Adjustable Block Program, the Agency took into account its review of the experiences of other jurisdictions, what it learned from previous procurements it has administered, and the feedback it received from stakeholders. For issues that are not expressly addressed in the Act, the Agency made policy decisions to implement the program that it believed will result in a cost effective and successful program, with those decisions then vetted through the Commission's Plan approval process in Docket No. 17-0838. In some cases, opposing or variant positions taken by other litigants were ultimately agreed to by the Agency or otherwise adopted in the Commission's Order.

6.3. Block Structure

The core of the Adjustable Block Program is the concept of a "block." The program delineates incentives for various categories of eligible projects using blocks of generation capacity at certain prices per REC levels. The blocks are intended to create a progression from one price level to another based on the response of the market. A strong response from the market will result in a rapid progression to a lower price level, for example, while a weak response could elicit an increase in incentives if it is determined to be necessary. Figures 6-1 and 6-2 in Section 6.4 provide an illustration of how the blocks adjust by price.

Progression from one level to another is triggered by a certain volume of deployment, not by a time-based deadline. This deployment-based design is intended to act as a safety valve in case incentives

[338] See: https://masmartsolareversource.powerclerk.com/MvcAccount/Login.

[339] Eric Wesoff, Greentech Media, "Update: Stem's Response to the California SGIP Subsidy Award Process Imbroglio," May 16, 2016. https://www.greentechmedia.com/articles/read/Update-Stems-Response-to-the-California-SGIP-Subsidy-Award-Process-Imbrog.

[340] Eric Wesoff, Greentech Media, "California PUC Proposes Long-Overdue Reform on SGIP Subsidy," May 23, 2016. https://www.greentechmedia.com/articles/read/california-puc-proposes-long-overdue-reform-on-sgip-subsidy.

are set at too high a level, which has been a problem in previous attempts at administratively-determined prices. It can also provide long term certainty by giving an indication of future prices and quantities to all potential market participants.

The initial target for the Adjustable Block Program is to have 1,000,000 RECs delivered annually by the end of the 2020-2021 delivery year (i.e., May 31, 2021).[341] Using a capacity factor of 17%[342], this would result in approximately 666 MW of new photovoltaic generation. This amount is not a cap; if funding is available, there would be no barrier to going beyond that level to begin to work toward the statutory goal of an additional 500,000 RECs delivered annually by the end of the 2025-2026 delivery year. However, as discussed in Chapter 3, funding is a barrier for the next several years, and the Agency does not expect to be able to open additional blocks of capacity until those funding limitations (including the use of utility-held ACPs) are resolved. As discussed in Section 3.22, the Agency may have the opportunity to open new blocks of capacity for the Adjustable Block Program if funding is identified.

In order to achieve 1,000,000 RECs delivered annually by May 31, 2021, the Initial Plan featured a block structure that allocated three blocks per category to meet the statutory target for this program (i.e., 1 million RECs per year by the end of the 2020-2021 delivery year), and included a provision to allocate discretionary capacity (as discussed below) to categories through the opening of a Block 4 for each category determined to warrant additional capacity.

To encourage simplicity, the Agency allocates incentives into two groups by service territory/geographic category, based upon load forecasts contained in Chapter 3.[343]

- **Group A:** for projects located in the service territories of Ameren Illinois, MidAmerican, Mt. Carmel Public Utility, and rural electric cooperatives and municipal utilities located in MISO.
- **Group B:** for projects located in the service territories of ComEd, and rural electric cooperatives and municipal utilities located in PJM.

Incentive levels vary by group and are based upon the project's location. While the Program Administrator will strive to allocate REC delivery contracts with the electric utility in whose service territory the project is located (where applicable, as the IPA lacks authority to procure REC contracts on behalf of municipal utilities or rural electric cooperatives), in order to allocate RECs proportionately among Ameren Illinois, ComEd, and MidAmerican to meet their RPS obligations, that will not always be possible.

The Agency also considered creating an additional group or groups for MidAmerican, Mt. Carmel Public Utility, rural electric cooperatives, and municipal utilities. However, given their small share of the load in Illinois, the resulting group or groups would be quite small. By consolidating them into the larger groups, block sizes are more administratively manageable, and prices are more transparent and easily understood. The assignment to Groups of projects in the service territories of

[341] See Chapter 3 for more discussion of this requirement.

[342] This figure used in the Initial Plan was an assumed first-year capacity factor (relative to AC-rated nameplate capacity) for a fixed-mount photovoltaic system prior to any degradation over time.

[343] The combined allocation for Ameren Illinois and MidAmerican would be 29.66% and the allocation for ComEd would be 70.34%. For simplicity, these have been rounded to 30% and 70% for determining the size of blocks for Group A and Group B, respectively.

Mt. Carmel Public Utility, MidAmerican, rural electric cooperatives and municipal utilities is intended to approximately match those smaller entities to a larger utility with comparable electric rates.

Within each group, the blocks were divided by the allocations specified in Section 1-75(c)(1)(K) of the Act:

- 25% for systems up to 10 kW;
- 25% for systems greater than 10 kW and up to 2,000 kW;
- 25% for photovoltaic community renewable generation; and
- 25% to be allocated by the Agency.

Consistent with the Commission's Order in Docket No. 17-0838, the 25% left to the Agency's discretion was be held in reserve, with a reduction in the originally-proposed size of Block 3 used to account for that reduced capacity.[344] The Agency subsequently allocated that 25% of capacity to create new Block 4s for certain categories on April 3, 2019.[345]

For systems in the Large DG and Community Solar categories, the use of adjustments (as discussed below in Section 6.5) are used to differentiate the price for RECs from different sized systems.[346]

Projects that participate in the Illinois Solar for All Program (as described in Chapter 8) generally follow the program terms and conditions of the Adjustable Block Program, but apply separately to that program, and are not considered part of these Groups and categories for the purpose of filling the capacity of each Block. Illinois Solar for All projects are also be subject to additional terms and conditions, as well as a different contractual process.

6.3.1. Block Sizes

In the Initial Plan, the Agency originally proposed a block size structure of blocks of 22 MW for Group A categories, and 52 MW for Group B projects. Pursuant to the Commission's Order in Docket No. 17-0838, Block 3 for each Group/category combination was subsequently reduced to 5.5 and 13 MW respectively to allow the Agency to subsequently allocate discretionary capacity. As shown in Table 6-1, the Agency allocated that discretionary capacity through the opening of Block 4 for the Large DG and community solar categories (91.5 MW for Group A – Large DG, 33 MW for Group B – Large DG, 12 MW for Group A – Community Solar, and 30 MW for Group B – Community Solar).

[344] See Docket No. 17-0838, Final Order dated April 3, 2018 at 60. That the discretionary capacity is taken only from the third block is evident from the Order's statement that it "adopts the proposal of the Joint Solar Parties to hold 25% of the Adjustable Block Program capacity by megawatt in reserve," as this detail was present in the Joint Solar Parties' proposal, as well as the Order's statement that capacity would be reserved "as outlined in the IPA's BOE."

[345] See: http://illinoisabp.com/wp-content/uploads/2019/04/Discretionary-Capacity-Rationale-4.3.19.pdf.

[346] The Agency also considered subdividing those categories into smaller blocks; ultimately, the Agency was not originally convinced that such an approach would be more efficient or a better way to match prices to demand from the market, although it recognizes the resultant imbalance in system sizes across community solar applications (where the vast majority of applications are systems at or near the maximum size despite more lucrative REC prices for smaller community solar projects).

Table 6-1: Initial Plan Block Volumes (MW)

Block Group	Block Category	Block 1	Block 2	Block 3	Block 4
Group A Ameren Illinois, MidAmerican, Mt. Carmel, Rural Electric Cooperatives and Municipal Utilities located in MISO)	Small	22	22	5.5	0
	Large	22	22	5.5	91.5
	Community Solar	22	22	5.5	12
Group B (ComEd, and Rural Electric Cooperatives and Municipal Utilities located in PJM)	Small	52	52	13	0
	Large	52	52	13	33
	Community Solar	52	52	13	30
Total		222	222	55.5	166.5

As of April 20, 2020, Block 2 remains open for both Small DG categories. The Community Solar and Large DG blocks are filled and subject to a waitlist as discussed in Section 6.3.3 below. Under this Revised Plan, those blocks will continue to stay open (or become open) until filled at the size and structure outlined above.

Prior to opening any new blocks beyond those outlined above (which will likely require identification of additional funding through changes in utility load forecasts, clarification of the use of utility-held ACPs, or legislative changes to the RPS funding structure), the Agency will seek stakeholder comment on whether the block size should be adjusted from the original block sizes (22 MW for Group A, 52 MW for Group B). One goal of that block size adjustment would be to allow for the opening of smaller blocks if only limited funding is identified. The 25% discretionary capacity allocation among project types contemplated by Section 1-75(c)(1)(K)(iv) of the IPA Act will be determined by the Agency shortly prior to opening a new block, based on program performance, market developments, and stakeholder feedback.

6.3.2. Transition between Blocks

When a block's capacity is filled, subject to budget availability, the next block for that category (with a different price) would open at a price expected to be 4% lower than the previous block. For this Revised Plan, the Agency proposes that Small DG Blocks 1 and 2 will be held open for 7 calendar days (rather than the 14 days contained in the Initial Plan) after the block volume is filled (with block volume defined by a measurement of a project being submitted to the program through the payment of the application fee). For the closing of the Small DG Blocks 1 or 2 (should they remain open after the approval of the Revised Plan), the capacity of the next block will be adjusted down to account for any capacity submitted during that 7 day period.[347] The Agency will announce when a block has been

[347] Group B Small DG Block 1 reached its capacity on February 7, 2020 (prior to the approval of the Revised Plan) and closed on February 21, 2020 per the Initial Plan's 14-day soft close provision. Group A Small DG Block 1 reach its capacity on March 24, 2020 and closed on March 31, 2020 per the Revised Plan's 7-day soft close provision.

filled and when the closing date will be. For the Small DG categories, opening of new blocks other than Blocks 2 and 3 (that is, those blocks previously authorized through the Initial Plan) will not be automatic because it will be subject to the identification of available funding.

For Small DG Blocks 3 and Large DG Blocks 4, blocks will close when the block volume is filled, and any projects submitted after that time will be put on a first-come/first-served waitlist for the Group/category, pending the analysis of available funds and the verification of eligibility of projects that applied to the program prior to them.[348]

Subject to the conditions outlined above, a project will receive the price of the block that is open at the time the Part I project application is submitted. If a block closes while a project application is being reviewed and the project is not accepted, the capacity associated with that rejected project will be assigned to the next block.

As discussed further in Section 6.15.3 below, should a system in a given block fail to be developed and withdraw from the Program, that system's portion of the block will be forfeited. The volume associated with the forfeited system will be added to the block that is currently open (or, if no block is currently open, the most recently closed block) at the price for that block.

The public will be notified of the availability of capacity in each block via an online dashboard, as discussed in more detail in Section 6.10.

6.3.3. Managing Waitlists

6.3.3.1. Community Solar

When the Adjustable Block Program opened for project applications in early 2019, 919 community solar projects (representing 1,777 MW of capacity) applied during the initial 14 day application window. After the lotteries held on April 10, 2019, 34 projects in Group A and 78 projects in Group B were selected for contracts representing 215 MW of new community solar capacity in Illinois, 452 community solar projects in Group A (representing 859 MW of capacity) and 355 community solar projects in Group B (representing 703 MW of capacity) were placed on waitlists. Until any changes are made through the Commission's approval of this Revised Plan, projects will be accepted off the waitlist at Block 4 pricing when previously selected projects withdraw from the program (for example, due to high interconnection costs) based on the ordinal numbers allocated to each project in that lottery, and subject to available program capacity created by the withdrawn projects. As of the release of this Revised Plan, one project in Group A and three projects in Group B have been selected off the community solar waitlists.

During both the in-person and written stakeholder comment processes preceding the development of this Revised Plan, the Agency sought feedback on how best to manage this waitlist going forward. The simplest and most straightforward approach would be to simply maintain the existing waitlists and accept projects in that order off as additional capacity becomes available. However, this approach would not recognize the potential for the Agency to consider additional criteria for community solar projects that could help increase the diversity of projects being developed, nor would it address any potential qualitative differences between applicant projects.

[348] Group B Large DG Block 4 closed on March 4, 2020 and Group A Large DG Block 4 closed on March 5, 2020.

An alternative approach was proposed by several parties in their comments;[349] under this proposal, the waitlist would be eliminated, and projects would be ordered by the date of their original Interconnection Agreement (or, for projects in ComEd service territory, when those projects would have received their original Interconnection Agreement but for the waiver granted in Docket No. 18-1583 were they not originally able to obtain an agreement). As the Agency understands this proposal, projects would also be required to provide significant collateral if they had dropped out of the interconnection queue while on the waitlist and were to then seek to re-apply. The rationale provided for this approach is that, in other jurisdictions, this original interconnection agreement date is used as an indicator of project maturity, as it is the date after which the developer would have to post a deposit with the utility. In doing so, the developer presumably would have completed other due diligence and would have the confidence in making that deposit. The proposed approach did not address how to select between projects that have the same date on their Interconnection Agreement.

In theory, favoring more mature or serious projects is an appealing way to distinguish between hundreds and hundreds of applicant projects. But in practice, the obvious shortcomings of this approach are at least two-fold: first, in Illinois, there is no indication that the ability to have achieved an earlier interconnection agreement actually correlates to having a more mature (or possibly even more viable) project. The Agency's project application process required the proof of site control, the presence of a signed interconnection agreement, and the acquisition of all non-ministerial permits; there is no reason to believe (and indeed, none was alleged in comments) that projects which would have obtained an interconnection agreement earlier took additional project maturity steps beyond this threshold. Stated differently, this original interconnection agreement date is alleged in comments to be a useful proxy for project maturity, but on closer examination, it would not necessarily lead to favoring not more mature projects, but just favoring earlier-applying projects.

Second, there may be no inherently good reason to provide more favorable treatment to earlier-applying projects. P.A. 99-0906 was signed into law on December 7, 2016, became effective on June 1, 2017, and the IPA's Initial Plan—which provided visibility into many key requirements—was not approved by the Commission until April 3, 2018. Some developers may have begun started securing sites and seeking interconnection agreements upon the legislation's enactment (or before), while others may have waited until more details of the program were proposed or approved. As the earliest-applying projects may have in some ways been the most speculative of all (as they would have applied for interconnection with the least visibility into program requirements), does it make public policy sense to reward the earliest-applying projects?

For these reasons, it appears that this proposed approach may simply serve to disadvantage developers who did not rush to submit interconnection agreements—perhaps because there was no indication to those developers that they needed to do so—and does not appear to support the stated aim of promoting more mature and/or higher quality projects.

A third approach—or, at the very least, an additional set of considerations—was provided in comments by ELPC and Vote Solar.[350] While these entities recommended maintaining the existing waitlist for selected projects that drop out (i.e., backfilling already-allocated capacity), they raised

[349] Comments are available at: https://www2.illinois.gov/sites/ipa/Pages/Draft-Long-Term-Renewable-Resources-Procurement-Plan-Comments-2019.aspx. In particular, see the comments of the Joint Solar Parties, which are also referenced by several other commenters.

[350] See https://www2.illinois.gov/sites/ipa/Documents/Plan%20Comments%202019/ELPC_VS%20-%20IPA%20Comment%20Response%20July%202019.pdf.

concerns about the lack of urban vs. rural geographic diversity of community solar projects and the lack of projects driven by or located in specific communities.[351] As an alternative, these groups suggest creating a new pathway for projects that would increase the diversity of types and locations of projects—if new funding became available to open new blocks of community solar capacity, rather than utilizing the waitlist, a new application process would allow new projects to be considered (potentially along with waitlisted projects that contributed to increased project diversity). Among the potential considerations suggested by ELPC and Vote Solar were projects in higher density areas, projects making commitments regarding the proximity of subscribers, distance from other community solar projects, and projects resulting from development activities of public entities or community-based organizations. These groups also suggested prioritization be given to projects that feature environmentally friendly development, such as pollinator friendly habitats.

Comments received on the draft Revised Plan[352] largely mirrored (with refinements) the post-workshop comments described above. Some parties suggested options to increase diversity/variety of projects (Ameresco, EDF, ELPLC/Vote Solar, NRDC). Other parties proposed various approaches to resort or eliminate the waitlist, typically emphasizing project maturity milestones (Joint Solar Parties, Summit Ridge, Cypress Creek, Sunrise Energy Ventures). Some parties specifically emphasized that waitlisted projects should be selected before new projects (Summit Ridge, Joint Solar Parties, Borrego, AES DE), and several urged substantial upfront deposits (Borrego, Cypress Creek, Joint Solar Parties). Other approaches included requiring maintaining developmental milestones (Community Energy Solar, Trajectory Energy), or allowing developers to reorder their waitlisted projects (ICC Staff). The Agency appreciates the additional consideration that parties put into further fleshing out their thoughts on the waitlist and the approach described below reflects the Agency's consideration of those comments.

While the Agency believes that the community solar projects selected to date do feature, in some ways, strong geographic diversity (in that at a state-wide level, the projects are well distributed), the vast majority of both applicant and selected projects are located in rural areas. While this phenomenon is largely the result of developers seeking project locations with low costs of site acquisition (which could translate into better subscription offers for customers), the unintended consequences of this approach are that a) projects are less likely to be located near subscribers living in urban or suburban areas, and b) geographic diversity among community solar projects has not been achieved across various community types. As community solar remains a fairly new concept in the landscape of renewable energy options for consumers, the Agency is interested in encouraging additional projects located closer to potential subscribers on the hope that some selected projects will offer additional intangible benefits associated with being located in closer proximity to many of the state's "communities."

To that end, as described below, if new blocks of capacity for community solar are opened (starting with Block 5), project selection for new blocks will combine opportunities for a) selecting currently waitlisted projects and b) selecting from new project applications intended to increase the diversity of areas hosting community solar projects, the business models of projects, and the size of projects.

[351] The Agency notes that the addresses of projects were released, but that there is not information available for each project on who chose to initiate it, or where the subscribers would be recruited from, so it is assumed that projects are not community-based.

[352] Comments are available at: https://www2.illinois.gov/sites/ipa/Pages/2020-Draft-LTRRPP-Comments.aspx.

This approach was approved by the Commission through its approval of this Revised Plan in Docket No. 19-0995.[353]

6.3.3.1.1. Waitlist for Replacing Lottery-Selected Projects

In this Revised Plan, to replace projects originally selected in the lottery should they withdraw from the program, or fail to become energized in a timely manner, the Agency will maintain the existing waitlist and continue to select projects in that ordinal ranking for replacing those original projects. Until the opening of a new Block 5, projects will be selected at Block 4 pricing, but with any small subscriber adder updated through this Plan applied to their pricing while still maintaining the small subscriber commitment made for the lottery.

In order for a project to remain on that waitlist, Approved Vendors will have to verify with the Program Administrator within 90 days of the approval of this Revised Plan that the project has maintained any applicable land use permits and site control (e.g., leases or lease options).

6.3.3.1.2. Approach to Opening New Community Solar Blocks

The remaining 50% of new block community solar capacity will be reserved for projects whose selection would be in part intended to increase the variety of community solar locations, models, and options in Illinois.

To implement this new approach, the Agency proposed the following:

- When funding becomes available to open Block 5 (or any subsequent block) for each Group, the Agency will announce the specific block opening date with at least 60 days' notice prior to that opening date.[354]
- The Agency will then accept new community solar project applications for 60 days after the opening date.[355]
- If verified new project applications received during the 60-day application window are less than the available capacity (i.e., 50% of the Block capacity), then the remaining capacity would be released for selecting additional projects off of the existing ordinal waitlist.
- If new project applications received during the 60-day application window exceed the available capacity, then project selection will be conducted by scoring projects in the following manner and accepting projects based on the highest scores:

    - Projects will first be sorted into four categories based on the development density of the townships in which they are located. [356] The highest density class would get 3 points, the next class 2 points, the third class 1 point, and the lowest density class 0 points.

[353] Docket No. 19-0995, Final Order dated February 18, 2020 at 44-46.

[354] Community solar project applications will continue to be accepted after the approval of this Revised Plan and prior to the opening of Block 5; they will be placed at the end of the current waitlist. Once the new block has opened, those projects may withdraw from the waitlist and reapply to be considered under the new project application criteria.

[355] A project currently on the existing ordinal waitlist may be withdrawn from that waitlist and resubmitted as a new project application (subject to payment of the application fee) to be considered for these new project selection criteria.

[356] For determining the development density category, the Agency proposes to adopt the methodology proposed by ELPC/Vote Solar in their comments on the draft Revised Plan, which sorts all the townships of Illinois into four classes. See: https://www2.illinois.gov/sites/ipa/Documents/Draft%20Revised%20Plan%20-%20Summer%202019/Comments%20to%20Draft%20Revised%20Plan/ELPC_Vote%20Solar%20Plan%20Comments.pdf.

- Projects developed in response to a site-specific RFP issued by a municipality or community group (issued prior to the announcement of the opening of the block) would be awarded 1 point.
- Projects that commit to only serve subscribers in the same township as the project would be awarded 1 point. If the township population is below 50,000, then subscribers could also be in adjacent townships to meet this commitment and receive this point. (REC payments will be adjusted to only account for subscriber meeting this commitment.)
- Projects under 100 kW (AC) in size would be awarded 2 points. Projects between 100 and 500 kW (AC) in size would be awarded 1 point. A project's size will be determined through including any actual or proposed co-located community solar projects in that size determination.
- Random selection will only be utilized as a tie-breaker for equally scored projects to fill available capacity, if any; however, should the capacity available be so small so as to only accommodate one or more projects below a certain size, then the Agency may only consider those projects small enough to not exceed that remaining capacity.

Projects not selected for an open block will be given the option to be considered for the next block that opens, but will not be given prioritization over new applications. Project scores and new waitlists specific to this scoring-based application pathway will be maintained to replace any capacity (at the applicable block REC price) that becomes available if selected projects withdraw or are not completed. This new waitlist would be treated separately from the original April 10, 2019 lottery waitlist. New project applications or replacement projects taken from this second, new waitlist must be equal in size to or smaller than the project being replaced.

In approving this proposal, the Commission determined that stakeholder feedback is a valuable tool to refine the scoring approach and best achieve the goals of increasing the variety of community solar locations, models and options in Illinois.[357] In accordance with the Commission's directive, the IPA will issue a request for written comments on: (1) the timeline for project application to, and any potential reallocation of refunds from, community solar projects selected through scoring; (2) whether minimum scores should be required for any individual or subset of attribute(s) for all scoring pathway applicants; (3) automatic triggers to lower attribute scores; (4) qualification requirements for individual attributes (e.g., should site-specific RFPs be required to have been issued prior to the announcement of the opening of the block); (5) number of points awarded; and (6) other attributes that should be considered in order to increase the variety of community solar locations, models, and options in Illinois, such as proposals to award points to non-greenfield projects.[358]

6.3.3.2. Distributed Generation

For the Small Distributed Generation categories, unlike with community solar and Large DG categories, as of April 20, 2020, Block 2 remains open and Block 3 is yet to open.

When available capacity in a Distributed Generation block is filled (and assuming new blocks are not opened), the Agency proposes to continue accepting project applications and place those projects on a waitlist for each Group/Category on a first come/first served basis, with newly opened space

[357] Docket No. 19-0995, Final Order dated February 18, 2020, at 46.

[358] Id.

created by earlier projects not being approved or withdrawing being filled from the top of the waitlist at Block 4 pricing. A project will be considered submitted when the application fee for the project is paid.[359] When new blocks of capacity are opened, projects on the waitlist at that time would then be placed into the next block or blocks of capacity in the waitlist order at the REC price applicable to that next block.

6.3.3.3. Assignment of Waitlist Projects

Projects may be selected off a waitlist in any given Group/category combination either when a new block of capacity is opened (and receive that block's REC price), or if previously selected and approved projects drop out of the program, thus freeing up program capacity (with the project selected from the waitlist receiving the most recently available REC price). While projects are on a waitlist and thus not yet under contract,[360] an Approved Vendor may assign that project to another Approved Vendor, or the project itself may be sold, without penalty or impacting the project's position on the waitlist but must promptly notify the Program Administrator[361] of that transfer and provide appropriate documentation.

6.4. REC Pricing Model

For the Initial Plan, the IPA adopted and modified the National Renewable Energy Laboratory's Cost of Renewable Energy Spreadsheet Tool ("CREST") to develop a model for calculating REC prices. CREST is an economic cash flow model that estimates the cost of energy in terms of cents per kilowatt hour associated with specific input assumptions regarding technology type, location, system capital and operating costs, expected production, project useful life, and various project financing variables. The model established initial pricing for each block, with prices then declining 4% for each subsequent block. That system of prices changing between blocks is now a mechanism for price discovery (at least for the Small DG category where future blocks of capacity have not yet opened).

Many stakeholders who provided comments in response to the Agency's Request for Comments issued after the June 20 and 26, 2019 workshops felt that the prices for the Distributed Generation categories were roughly in line with market expectations.[362] The Agency believes that keeping a clear set of prices for Distributed Generation provides an appropriate market signal. Thus, in this Revised Plan, for Distributed Generation, the IPA proposed to maintain the prices for open blocks and continue the 4% per block price decrease for any new blocks—including those authorized by the Initial Plan (i.e., Blocks 2 and 3 for Small DG) and any additional blocks authorized by this Revised Plan. However, the Agency does note that, as described in Section 6.8, there are upcoming factors that may require a future adjustment to REC prices.

For community solar, the decisions related to REC prices are more complex. The Joint Solar Parties noted in their comments[363] that in many cases, interconnection costs are higher than the input

[359] This approach is intended to be consistent with the approach contained in the ABP Guidebook as of October 2019. See pages 15-16 of the latest version (5/31/19) at: http://illinoisabp.com/wp-content/uploads/2019/05/Program-Guidebook-2019_05_31.pdf.

[360] The allowances in this sentence also apply to a non-waitlisted Part I applicant project that has not yet been selected by the Program Administrator for a REC contract.

[361] For this Chapter, all references to the Program Administrator refer to the Program Administrator for the Adjustable Block Program. Discussion of the Program Administrator for the Illinois Solar for All Program can be found in Chapter 8.

[362] See: https://www2.illinois.gov/sites/ipa/Pages/Draft-Long-Term-Renewable-Resources-Procurement-Plan-Comments-2019.aspx.

[363] See https://www2.illinois.gov/sites/ipa/Documents/Plan%20Comments%202019/JSP%20Draft%20Post-Workshop%20Comments.pdf at 6-8.

assumption used in the initial REC pricing model, resulting in the need for higher REC prices. Likewise, in some areas land costs are higher. While the Agency appreciates those concerns, ultimately the Agency needs to balance a REC price that will allow for successful project development (including subscriber acquisition and maintenance) with the need to utilize scarce RPS budgets efficiently and in a manner that will maximize the number of RECs procured. For these reasons, the Agency believes it is premature to raise REC prices.

Holding the line on REC prices for community solar projects will allow for some natural selection in that projects with high interconnection costs would not proceed (and the Agency has already recognized in current contracts an option for projects with high interconnection costs to exit the program, and would expect to maintain a similar policy in the future). Higher REC prices simply to pay unusually high interconnection costs to the utilities is not an efficient use of resources and does not pass that value onto subscribers. The Agency further notes that the Block 4 REC price for a 2 MW community solar project inclusive of the small subscriber adder is slightly lower than the under 10 kW DG REC price. While the Agency understands that one potential value of community solar is to allow households who cannot install solar to participate in a solar project, paying a significantly higher REC price for RECs associated with small subscribers compared to what would be paid if they were to install solar could create a perverse incentive for households who could install solar—and would unlock the benefits of having more nodal, modular projects located closer to load—instead subscribing to a community solar project.

For the draft Revised Plan, the Agency solicited comments on whether community solar REC prices should be decreased to help further ensure that any selected projects are the most efficient projects and offer the lowest possible budget impact. Based on the limited comments received, the Agency proposed that for any project selected off the waitlist to replace an already-selected projects, those newly-selected projects will receive Block 4 REC pricing. Should funding become available to open new blocks, Block 5 will open at 4% below Block 4 prices.[364] However, as discussed below in Section 6.5.3, the Agency is proposed a change to the small subscriber adder to eliminate the over 75% small subscriber REC Price Adjustment that will apply to any projects accepted into Block 5 and beyond, or any projects from the waitlist selected to replace an initial project selected in the lottery after the Commission approval of this Revised Plan.

In its Order approving the Revised Plan, the Commission also stated that "REC prices must be lower," although it neglected to adopt any specific proposal for how to lower such prices (and no methodology for lowering prices was introduced into the record). Instead, the Commission required that "workshops should be held and stakeholder input considered" regarding how REC prices could be lowered, with a need to be mindful that, going forward, "the IPA must recognize market signals rather than solely relying on its cost modeling approach" in determining REC prices. Any changes to REC prices resulting from that process preceding the next Plan update would be authorized under the IPA's Section 1-75(c)(1)(M) authority to make price modifications "that do not deviate from the Commission's approved value by more than 25%" without Commission review and approval.[365]

Table 6-2 contains the REC prices for the Adjustable Block Program, factoring in the size category adjustments described in Section 6.5.1. This Table shows the prices from the blocks defined in the

[364] In approving the Final Revised Plan, the Commission directed the Agency to consider utilizing its discretionary power to reduce prices up to 25% without Commission approval for Block 5, should funding become available for additional blocks.

[365] Docket No. 19-0995, Final Order dated February 18, 2020 at 46-47.

Initial Plan, the allocation of discretionary capacity to create Block 4s for Large DG and Community Solar, and indicative prices should additional blocks be opened during 2020 or 2021. Blocks that have been filled are indicated in grey.

Table 6-2: Block Group REC Prices ($/REC)[366]

Block Group	Block Category		Block 1	Block 2	Block 3	Block 4	Block 5 (if applicable)
Group A (Ameren Illinois, MidAmerican, Mt. Carmel, Rural Electric Cooperatives, and Municipal Utilities located in MISO)	Small	≤10 kW	$85.10	$81.70	$78.43	$75.29	$72.28
	Large	>10 - 25 kW	$78.70	$75.55	$72.53	$69.63	$66.84
		>25 - 100 kW	$64.41	$61.83	$59.36	$56.99	$54.71
		>100 - 200 kW	$52.54	$50.44	$48.42	$46.48	$44.62
		>200 - 500 kW	$46.85	$44.98	$43.18	$41.45	$39.79
		>500 - 2,000 kW	$43.42	$41.68	$40.02	$38.42	$36.88
	Community Solar	≤10 kW	$96.12	$92.28	$88.58	$85.04	$81.64
		>10 - 25 kW	$87.07	$83.59	$80.24	$77.03	$73.95
		>25 - 100 kW	$70.95	$68.11	$65.39	$62.77	$60.26
		>100 - 200 kW	$60.47	$58.05	$55.73	$53.50	$51.36
		>200 - 500 kW	$55.46	$53.24	$51.11	$49.07	$47.10
		>500 - 2,000 kW	$52.28	$50.19	$48.18	$46.25	$44.40
		Co-located systems exceeding 2 MW in aggregate size	$47.03	$45.15	$43.34	$41.61	$39.94
Group B (ComEd, and Rural Electric Cooperatives and Municipal Utilities located in PJM)	Small	≤10 kW	$72.97	$70.05	$67.25	$64.56	$61.98
	Large	>10 - 25 kW	$73.23	$70.30	$67.49	$64.79	$62.20
		>25 - 100 kW	$65.61	$62.99	$60.47	$58.05	$55.73
		>100 - 200 kW	$53.75	$51.60	$49.54	$47.56	$45.66
		>200 - 500 kW	$48.07	$46.15	$44.30	$42.53	$40.83
		>500 - 2,000 kW	$44.64	$42.85	$41.14	$39.49	$37.91
	Community Solar	≤10 kW	$91.89	$88.21	$84.69	$81.30	$78.05
		>10 - 25 kW	$82.82	$79.51	$76.33	$73.28	$70.35
		>25 - 100 kW	$66.65	$63.98	$61.42	$58.96	$56.60
		>100 - 200 kW	$56.12	$53.88	$51.72	$49.65	$47.67
		>200 - 500 kW	$51.09	$49.05	$47.08	$45.20	$43.39
		>500 - 2,000 kW	$47.88	$45.96	$44.13	$42.36	$40.67
		Co-located systems exceeding 2 MW in aggregate size	$42.59	$40.89	$39.25	$37.68	$36.17

As demonstrated in the table above, after Block 1, prices decline by 4% with each transition between blocks. The Agency will monitor performance during the initial Blocks and may elect to modify the price change between blocks based upon the speed that each Block is filled. The process for making changes is described in Section 6.8.

[366] In the "Large" and "Community Solar" categories the prices listed include the Size Category Adjustments described in Section 6.5.1.

6.5. Adjustments and Adders

The following set of adjustments and adders are intended to adjust the base REC price to meet specific additional purposes. These include adjusting for system size, adjusting for the additional costs of small subscribers to community solar, and potentially accounting for the changes to net metering, smart inverter rebates and federal tax credits. Greater detail on issues in the REC pricing model can be found in Appendix D of the Initial Plan.

While the Act seeks to encourage projects "in diverse locations…not concentrated in a few geographic areas,"[367] at this time the Agency is not proposing any specific geographic REC price adders for distributed generation projects. The Agency believes that the split of the blocks between utility service territories adequately addresses geographic diversity, and initial DG project applications indicate that projects are well distributed across the state.

The Agency observes that while projects are spread across the state at a high level, community solar projects are predominantly located in rural areas that are not likely to be close to subscribers. As discussed in Section 0, the Agency sought stakeholder feedback on the draft Revised Plan on how to manage the community solar waitlists, and this Revised Plan filed for Commission approval presents a proposal for reserving a portion of new blocks of community solar capacity for projects intended to increase geographic diversity (and, specifically, address the imbalance between rural projects and urban/suburban projects). .

6.5.1. Size Category Adjustments

The Agency proposed a set of adjustments based on project size for projects greater than 10 kW and up to 2,000 kW. As there are significant economies of scale for larger systems compared to smaller systems, the Agency believes that setting a single REC price for all projects in this range will either over-incentivize large projects or under-incentivize small projects. Having a diversity of project sizes is important for creating a healthy and diverse distributed solar market, with robust opportunities for participation by all customers. These adjustments reflect REC pricing to reasonably match system sizes.

These adjustments will only be available for systems over 10 kW in size in both the Large DG and Community Solar categories and are reflected in the REC prices listed in Table 6-2. They do not constitute an additional adjustment to the prices listed in that Table. The Agency does not anticipate significant cost differences for systems within the "no more than 10 kW" category requiring similar price adjustments.

[367] 20 ILCS 3855/1-75(c)(1)(K).

Table 6-3: Size Category Adjustments

Size	$/REC	
	Group A	Group B
Over 10 kW to 25 kW	$35.28	$28.59
Over 25 kW to 100 kW	$20.99	$20.97
Over 100 kW to 200 kW	$9.12	$9.11
Over 200 kW to 500 kW	$3.43	$3.43
Over 500 kW to 2,000 kW	No adjustment	No adjustment

These adjustments were calculated using the REC pricing model described in Section 6.4 with the system costs based on a typical sized system for each size category. While the adjustments were calculated using the REC Pricing Model as described above, the Agency notes that the resulting higher REC prices for smaller systems could lead to more systems being developed, which may help encourage the geographic diversity of the system locations.

6.5.2. Co-location of Distributed Generation Systems

For purposes of Adjustable Block Program categories and applicable REC prices, the total capacity of distributed generation systems energized after June 1, 2017 on a single parcel that participate in the Adjustable Block Program will be considered a single system.[368] (For example, three 100 kW systems at a single parcel will be considered a 300 kW system.) If a system at a single parcel is subsequently expanded, the Agency reserves the right to revise the incentive amounts paid for the subsequent system(s), and to set the incentives based on the total expanded system size rather than just treat the expansion as a separate system. For the purpose of establishing a revised incentive level under these circumstances, the systems' location would be considered at the parcel level. Exceptions will be made if it can be demonstrated that two projects on one parcel have separate, non-affiliated owners and serve to offset the load of separate, non-affiliated entities on a parcel.

Additional discussion of co-location of community solar projects, including the approach to co-location of community solar projects adopted in the Commission's Final Order in Docket No. 17-0838, is included in Section 7.3. For the purposes of consideration of co-location, distributed generation systems and community solar projects would be considered separately and would not impact the size calculation applicable to each other. Furthermore, the Agency's co-location determinations only apply to projects participating in the Adjustable Block Program and not projects installed outside of the Program (e.g., through previously conducted Agency procurements, receiving DCEO rebates, or developed without incentives).

[368] Any system developed under this program would require a separate GATS or M-RETS ID from any system developed through a different program (e.g., the Supplemental Photovoltaic Procurement or the Utility DG procurements) or without programmatic support. This would allow for a clear demarcation between systems and their associated RECs.

6.5.3. Community Solar

Community solar projects may face additional costs and feature reduced eligibility for direct energy-related revenues than distributed generation systems. On the revenue side, subscribers to such projects are eligible only for energy-only net metering,[369] while on the cost side, there is the cost of acquiring, maintaining, and managing subscribers. The prices for community solar RECs shown in Table 6-2 reflect those differences. The REC prices for these projects also include the Size Category Adjustments discussed above in Table 6-3.

To ensure that the benefits of solar energy are widely shared by Illinois residents, the Adjustable Block Program offers an additional incentive for community solar projects with a higher level of small subscribers (residential and small commercial customers with subscriptions below 25 kW). To account for additional costs related to small subscribers, the following schedule of adders will be available to community solar projects that have minimum levels of small subscribers; these adders would be added to the REC prices shown in Table 6-2. For more discussion of issues related to small subscribers, see Section 7.6.2. For this Revised Plan, the Agency proposes to consolidate the categories of adders to eliminate the higher adder for over 75% small subscribers.[370] This change is to recognize that the desire to achieve at least 25% small subscriber participation in community solar (as discussed in Section 7.6.1) has been more than met by the community solar projects accepted to date and that the adders may be over-incentivizing small subscriber participation to the detriment of participation of larger subscribers while creating outsized impacts on available funding. This change would apply to any new projects selected after the approval of this Revised Plan including both waitlist projects selected to replace projects initially selected in the lottery that withdraw or are not completed, or projects selected in new blocks of capacity. The elimination of the 75% of greater small subscriber adder will not retroactively apply to any projects approved by the Commission prior to the approval of this Revised Plan.[371]

Table 6-4: Community Solar Adders

Adder	$/REC	
	Group A	Group B
Less than 25% small subscriber	No adder	No adder
25% or greater small subscriber and less than 50% small subscriber	$11.17	$10.88
50% or greater small subscriber	$22.34	$21.77

[369] 220 ILCS 5/16-107.5(*l*)(2). The IPA also notes that in ICC Docket No. 17-0350, the proceeding to approve ComEd's proposed community solar net metering tariff pursuant to Section 16-107.5(*l*-5) of the PUA, several parties argued that volumetric transmission charges should be part of the net metering supply credit granted to community solar projects, while ComEd argued that transmission charges should be excluded. The Commission's September 27, 2017 Order in this matter determined (page 15) that the transmission services charge should be excluded from the community solar net metering credit.

[370] The Initial Plan included a "Greater than 75% small subscriber" adder of $33.51 for Group A and $32.65 for Group B.

[371] This proposal was uncontested in Docket No. 19-0995, and thus adopted through approval of this Plan.

These Adders reflect an analysis of community solar subscription costs contained in the Initial Plan. The Agency notes that a recent GTM Research report[372] contained estimates of subscriber acquisition costs that ranged from $0.06 to $0.25 per Watt and ongoing subscriber management (including billing and replacing subscribers) of $0.12 to $0.35 per Watt. The low end of the combined costs from those estimates would be $0.18 per Watt and the high end $0.60 per Watt. Translating those costs to the REC output over 15 years of a typical 2 MW community solar project (with a 22% AC capacity factor), those ranges would imply additional subscriber-related costs of $6.85 to $22.83 per REC, which indicates that the current small subscriber adders may be too high, especially if the prior adder for systems with greater than 75% small subscriber participation were to be maintained.

The small subscriber adders will be determined on the percentage of the total energy output of the project subscribed to by small subscribers, and not the number of small subscribers. As described in more detail in Sections 6.15.3 and 6.17, a community solar project will have to demonstrate a level of small subscribers at the time of energization to receive an adder initially, and will have to maintain the small subscriber subscription levels or face having to pay penalties to remove the added value of the adders if the level is not maintained.

At this time, the Agency is not proposing an adder that would distinguish between "developer-driven" projects and "community-led" projects. Such a distinction may be difficult to make in practice, may invite opportunities for abuse, and may create additional complexities to program administration. The Agency believes the combination of the Size Category Adjustment, which would provide benefits to smaller projects, plus the option of participating in the Illinois Solar for All low-income community solar sub-program, adequately addresses the needs of those types of projects. For more details on this determination, see Section 7.5.

6.5.4. Adders to Adjust for Changing System Revenue

As discussed in Section 6.8.1 below, the Agency anticipates that as net metering caps are met, smart inverter rebates are adjusted or created, and Federal tax incentives decrease, the revenue a system would receive from other sources will decline. Not accounting for that in REC prices could make a system that would have been economically viable no longer viable after those decreases.

The Agency did not propose specific adders to address these challenges in this Revised Plan, but notes that Section 1-75(c)(1)(M) of the Act provides that "[p]rogram modifications to any price, capacity block, or other program element that do not deviate from the Commission's approved value by more than 25% shall take effect immediately and are not subject to Commission review and approval," allowing the Agency to make small adjustments to REC prices to account for certain challenges.[373] If necessary, the Agency will use this authority to propose adders or adjustments to account for these changes following the process described in Section 6.8, or utilize the Commission approval process for revising its Plan for any larger changes.

[372] The Vision for U.S. Community Solar: A Roadmap to 2030. GTM Research, July 2018.

[373] The Agency's June 4, 2018 published prices (which mirror those included in this Revised Plan) in its Compliance Filing reflect the "Commission's approved value" for purposes of subsequent adjustments made by the IPA under this authority. See Docket No. 17-0838, Final Order dated April 3, 2018 at 73-74.

6.6. Payment Terms

The Act provides a clear schedule of payments for RECs for projects. Section 1-75(c)(1)(L) specifies the following schedule.

- For systems up to 10 kW, "the renewable energy credit purchase price shall be paid in full by the contracting utilities at the time that the facility producing the renewable energy credits is interconnected at the distribution system level of the utility and energized."
- For distributed generation systems greater than 10 kW and up to 2,000 kW and community renewable solar projects, "20 percent of the renewable energy credit purchase price shall be paid by the contracting utilities at the time that the facility producing the renewable energy credits is interconnected at the distribution system level of the utility and energized. The remaining portion shall be paid ratably over the subsequent 4-year period."

The Agency proposes that the standard for being "energized" as used above must include the completion of the interconnection approval by the local utility and the registration of the system in GATS or M-RETS so that generation data can be tracked and RECs created.[374] In addition, as discussed in Section 6.15.4, to avoid a system being completed but RECs not created and delivered, before a system can be considered "energized" so as to initiate the processing of an invoice for REC delivery contract payments, automatic assignment of RECs to the applicable utility will need to be initiated. The Agency believes that by ensuring proper registration in the tracking system up front, future administrative challenges can be minimized.

For systems over 10 kW and community solar projects, it is not clear from the law how exactly the "subsequent 4-year period" would be calculated, and whether the frequency of payments should be annually, quarterly, or monthly. The Agency proposed in the Initial Plan that after the first payment of 20%, the balance of payments be made on a quarterly basis over the following 16 quarters. For example, if the first payment is made on September 30, 2019 (upon interconnection and energization), assuming continued compliance with contractual requirements, the next payments would occur approximately on December 31, 2019, March 31, 2020, etc., with the final payment on approximately September 30, 2023—resulting in 17 total payments that bookend a four-year period of time. Payment amounts occur on a set schedule and may be adjusted to reflect changes in REC quantities (per Section 6.16.2), or community solar subscription levels (per Section 6.15.4). Based on feedback received to date, the Agency does not believe that a change to the basic quarterly payment schedule is warranted. However, the Agency recommends that as part of the contract update process, new contracts allow for three separate quarterly delivery schedules to reduce the lag time between a project being approved for payment and the first (or only) payment being received.[375]

[374] This proposed standard is only intended to relate to the contractual payment terms for the Program. Section 1-75(c)(1)(K) specifies that, "[o]nly projects energized on or after June 1, 2017 shall be eligible for the Adjustable Block program." The Agency views this to mean that a project must be interconnected to the applicable utility after June 1, 2017 and that the registration date of the system in GATS or M-RETS does not impact that determination. The added contractual standard is meant to ensure that energized systems will produce the RECs that they are receiving upfront payments for.

[375] For example, a project approved for payment in January would be on a quarterly schedule of payments occurring in February, May, August, and November; a project approved for payment in February would be on a quarterly schedule of payments occurring in March, June, September, and December; and a project approved for payment in March would be on a quarterly schedule of payments occurring in April, July, October, and January.

Section 1-75(c)(1)(L) also requires that:

> *(vi) If, at any time, approved applications for the Adjustable Block program exceed funds collected by the electric utility or would cause the Agency to exceed the limitation described in subparagraph (E) of this paragraph (1) on the amount of renewable energy resources that may be procured, then the Agency shall consider future uncommitted funds to be reserved for these contracts on a first-come, first-served basis, with the delivery of renewable energy credits required beginning at the time that the reserved funds become available.*

The Agency will continue to carefully monitor project application approvals and available budgets. As described further in Chapter 3, the Agency does anticipate that obligations could exceed collections starting at the conclusion of the budget rollover period in mid-2021, but that this issue can be temporarily addressed through previously collected Alternative Compliance Payments presently held in reserve. Nevertheless, the Agency will not recommend Commission approval of contracts for specific projects if it determines that this provision may be invoked and contract obligations cannot be met through expected funds.

Additional provisions of Section 1-75(c)(1)(L) require that:

- *"The electric utility shall receive and retire all renewable energy credits generated by the project for the first 15 years of operation."*
- *"Each contract shall include provisions to ensure the delivery of the renewable energy credits for the full term of the contract."*

These provisions are discussed further in Section 6.16.

6.7. Contracts

The Agency notes that while payments will be made according to the terms described in Section 6.6, the Adjustable Block Program and its REC delivery contracts will feature ongoing performance requirements to ensure that RECs are delivered across the 15-year term of the contracts, especially after payments have been made. Section 6.16 describes in more detail how those performance requirements will be implemented.

The Agency, in consultation with its Program Administrator and/or its Procurement Administrator, developed a standard REC delivery contract between the utilities and Approved Vendors much as its Procurement Administrator had done for the competitive procurement processes. This included the opportunity for interested parties to comment on the contract. Ultimately the contract, reflecting the consensus of the Agency, the utilities, and Commission Staff, was published in January 2019, just prior to the opening of the Adjustable Block Program for project applications. The standard REC delivery contract, once finalized, was not subject to further negotiation for each project or batch accepted into the Program.

For this Revised Plan, the Agency proposes a substantial refresh of the standard delivery contract based upon lessons learned from the execution and early administration of the initial contracts. The January 2019 standard contract has proved to be complex and in cases inflexible in ways that may not benefit the Program.

The Agency plans to conduct stakeholder workshops in early 2020 to review the contract structure for the Adjustable Block Program, the Illinois Solar for All Program, and competitive procurements (see Section 5.3.1).[376] Key issues to be considered include, but are not limited to:

- Shortening and simplifying the REC Contract (and, if possible, synthesizing the contract into a single set of terms and conditions)
- Clarifying contract default versus system default versus penalties
- Clarifying Product Orders, Master Contracts, and Portfolio-level responsibilities
- Termination for convenience (subject to applicable penalties)
- Measurement of community solar subscription levels
- Mechanism of collateral holdbacks[377]
- Incorporation of Acknowledgement of Assignment forms
- Removal of a project from the contract[378]
- Adoption of a measure providing for mediation by the IPA between utilities and Approved Vendors in certain REC Contract disputes[379]

Based on the workshops, the Agency will work with the Program Administrator, Procurement Administrator, ICC Staff, and the utilities to develop a draft of updated standard contract and will provide stakeholders opportunities to comment on the updated contract prior to its finalization. Approved Vendors may withdraw projects submitted to the Program prior to the date the updated contract is finalized that are not yet ICC-approved with no penalty.

Assuming that the contract structure will be altered as a result of the above-mentioned stakeholder workshops and subsequent feedback process, the Agency recommends that projects approved by the Commission after the contract finalization date would use the new contract, regardless of application date. The Adjustable Block Program will also provide an "off-ramp" option offered for any already applied projects that were expecting to be subject to the original contract and could now be non-financeable (or otherwise unable to be developed) under the updated contract.

Contracts or individual batches (but not individual projects that form a subset of a batch) will be assignable. The assignee must agree to, and abide by, the applicable terms and conditions required of an Approved Vendor (or a Single Project Approved Vendor in the case of the assignment of a single project from a contract). Consistent with the Commission's Order in Docket No. 17-0838, the assignor and the assignee will be required to notify the contracting utility of any assignment, and provide the utility with all pertinent financial, settlement and contact information.[380] The assignor may be required to pay a fee to the contracting utility. The Agency and its Program Administrator will endeavor to cooperate with the assignor, assignee, and utility in generating required documents and updating Program records to accommodate the assignment.

[376] This process began on April 9, 2020 with the release of a request for stakeholder feedback. See: https://www2.illinois.gov/sites/ipa/Documents/ABP%20REC%20Contract%20Update%202020/IL%20ABP%20REC%20Contract%20Request%20for%20Comments%209%20APR%202020.pdf.

[377] This topic is discussed further in Section 6.14.6.

[378] These topics are based on feedback provided by the Parties on July 22, 2019 to the Agency's Request for Comments issued after workshops held on June 20 and June 26, 2019.

[379] See Docket No. 19-0995, Final Order dated February 18, 2020 at 49.

[380] See Docket No. 17-0838, Final Order dated April 3, 2018 at 74.

6.8. Adjustments to Blocks and Prices

The Act contains two provisions that allow the Agency to review and adjust block quantities, sizes, and prices. The provisions are contained in Section 1-75(c)(1)(K):

> *"The Agency may periodically review its prior decisions establishing the number of blocks, the amount of generation capacity in each block, and the purchase price for each block, and may propose, on an expedited basis, changes to these previously set values, including but not limited to redistributing these amounts and the available funds as necessary and appropriate, subject to Commission approval as part of the periodic plan revision process described in Section 16-111.5 of the Public Utilities Act."*

And in Section 1-75(c)(1)(M):

> *"If necessary, the Agency may make prospective administrative adjustments to the Adjustable Block program design, such as redistributing available funds or making adjustments to purchase prices as necessary to achieve the goals of this subsection (c). Program modifications to any price, capacity block, or other program element that do not deviate from the Commission's approved value by more than 25% shall take effect immediately and are not subject to Commission review and approval. Program modifications to any price, capacity block, or other program element that deviate more than 25% from the Commission's approved value must be approved by the Commission as a long-term plan amendment under Section 16-111.5 of the Public Utilities Act. The Agency shall consider stakeholder feedback when making adjustments to the Adjustable Block design and shall notify stakeholders in advance of any planned changes."*

In essence, changes of less than 25% to the prices and other program components indicated in the Agency's Commission-approved REC prices can be made by the Agency without seeking review and approval from the Commission, while larger changes will require that review and approval as part of the Agency's regular annual procurement planning process.

The Agency is aware of at least four key events that could significantly impact solar project costs and potentially warrant a new look at REC pricing. First, upon a utility reaching its net metering cap (see Section 6.8.1 for more discussion), net metering for new enrollments by distributed generation systems will change from full retail net metering to energy-only net metering. Second, upon the net metering cap being met, the distributed generation rebate for smart inverters will change from $250/kW DC (for non-residential customers and community renewable participants) to a rebate based upon the locational value of the system to the grid, while a new distributed generation rebate will be created for residential customers. Third, the Federal Solar Investment Tax Credit is presently scheduled to step down from 30% to 26% for projects that start construction in 2020, and then to 22% in 2021; it is scheduled to be eliminated for residential projects after that time and be reduced to 10% for other projects. And fourth, U.S. President Donald Trump exercised his power under the federal Trade Act to impose import tariffs on crystalline solar photovoltaic panels and modules in January 2018, following an unfair trade practices proceeding at the United States International Trade Commission ("ITC"); these import tariffs are scheduled to step down in February 2020 and again in February 2021 before ending in February 2022.[381] While the IPA's REC Pricing Model has

[381] United States International Trade Commission, Investigation No. TA-201-75, Crystalline Silicon Photovoltaic Cells, https://www.usitc.gov/investigations/title_7/2017/crystalline_silicon_photovoltaic_cells_whether_or/safeguard.htm.

incorporated the projected market effect of those import restrictions,[382] there could be further changes to federal trade policy in this area.

Each of these changes would impact the value proposition for developing a project and could require an adjustment in REC prices to keep project development viable. The Agency will notify stakeholders and provide opportunities for feedback for changes to reflect these circumstances, or others that may arise that would also require changes to be made.

In addition to these factors, and in keeping with the adjustable nature of the Adjustable Block Program, the Agency recognizes that despite its best efforts to set REC (and adder) prices at "just right" levels, it is possible that factors that impact prices may need to be updated to reflect changing market dynamics. In response to very low or very high demand for the program, the Agency may adjust REC and adder prices, block sizes, and other variables as needed to maintain a vigorous and healthy market for distributed solar and to reach programmatic goals. The Agency will monitor program activity and consider such change if it determines they are warranted.[383]

In this Revised Plan, the Agency did not propose any REC price adjustments to the REC prices shown in Table 6-2, or to the 4% rate of change between blocks going forward. While the uptake of the Small DG category has been slow to date, there is anecdotal evidence[384] that it is increasing rapidly and that DG prices are generally in line with market expectations. When the Agency becomes aware of a situation that would require a change to block quantities, size, price, or other factors, including, but not limited to, the situations described herein, the Agency will post an announcement to its website regarding the proposed changes and will hold either a stakeholder meeting, or an online webinar to provide an opportunity for stakeholder input, and will proceed mindful of the need for incorporating market feedback into REC prices as outlined by the Commission in its Final Order in Docket No. 19-0995.[385] Stakeholders will also be invited to submit written comments on the proposed material changes which will be posted to the Agency's website. The Agency will consider feedback it receives prior to finalizing changes it makes that are less than 25% and do not require Commission review and approval, and will likewise consider that feedback in filings made before the Commission to update the Adjustable Block Program.

6.8.1. Net Metering Cap Adjustment

Under Section 16-107.5(j) of the PUA, net energy metering is generally credited at a value that accounts for the value of energy and delivery until net metering accounts for 5% of the total peak demand of each electricity provider's eligible customers. At that time, net metering for any new installations will be for energy only.[386]

When the net metering caps are met, the Agency will review the performance of the program and make price and policy adjustments needed to achieve compliance with RPS goals. As noted above, the Agency will be able to make adjustments to offset the impact of the changes in net metering revenue if those changes would result in less than a 25% change in the price of RECs. If the necessary

[382] See Docket No. 17-0838, IPA REC Pricing Model Update of February 27, 2018, at 1-2.

[383] The Agency is surveying project developers at the Part II application stage for the actual cost of various system development and installation components.

[384] See e.g., "More ComEd Customers Going Solar." Retrieved from https://finance.yahoo.com/news/more-comed-customers-going-solar-155500794.html, July 18, 2019.

[385] See Docket No. 19-0995, Final Order dated February 18, 2020 at 46-47.

[386] 220 ILCS 5/16-107.5(j), (n).

change in price is greater than 25%, then the Agency will seek Commission review and approval of a revised schedule of REC prices as outlined in Sections 1-75(c)(1)(K) and (M) of the Act.

In a data request response dated June 2019, ComEd advised the Agency that it expects to reach the 3% net metering enrollment level referenced in Section 16-107.6(e) of the PUA (discussed in Section 6.8.2 below) during the 2020-2021 delivery year, although it did not indicate an expected timeline for reaching the 5% level referenced in Section 16-107.5(j).[387] Ameren Illinois declined to estimate the timeline for either the 3% or 5% thresholds, citing a lack of data; however, on April 2, 2020, as this Final Revised Plan was being prepared for filing with the Commission, Ameren Illinois informed the Commission that its total generating capacity for net metering customers has reached 3%, and it anticipates the total will likely exceed 5% by the end of 2020. MidAmerican estimated that the 5% level would be met in 2027.

6.8.2. Smart Inverter Rebate

Under Section 16-107.6(e) of the PUA, when a utility's net metering customers reach total generating capacity equaling 3% of the utility's total peak demand supplied during the previous year, the Commission will initiate an investigation to adjust the smart inverter rebate from $250/kW DC (for non-residential customers and community renewable participants) to a new value or values (potentially varying based on location), and to establish a smart inverter rebate value or values (again, potentially locationally-based) for residential customers. Once the resulting rebate values are approved by the Commission, they will take effect when the load of net metering customers for that utility reaches 5% of the total peak demand supplied by the utility during the previous year.

As discussed above in Section 6.8.1, it is currently not clear when the 5% level will be reached or whether changes to the inverter rebate will have been approved by the Commission at that time. Therefore, the Agency is not presently proposing a specific REC price adder to adjust for the change to the inverter rebate (which could also be an increase in the rebate level for some projects, thus not requiring any new adders). The Agency will participate in each utility's investigation proceeding and will consider proposing price adjustments to DG REC prices, if needed, as those investigations proceed. The adoption of any new REC prices will either follow the process outlined in Section 6.8 or be proposed as part of a Plan update.

6.8.3. Federal Solar Investment Tax Credit Adjustment

The U.S. Congress has set a schedule for a decline and partial phase out of federal tax credits for solar photovoltaics.[388] Projects that start construction in 2017, 2018, and 2019 will receive a 30% Investment Tax Credit; projects that start construction in 2020 and 2021 will receive 26% and 22%, respectively; for construction starts after that, the credit will drop permanently to 10% for commercial projects and 0% for residential projects.[389] After 2015 legislation, project owners who start construction before 2022 may claim the applicable credit once construction begins, as long as the project is operational by the end of 2023.

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[387] In fact, ComEd indicated that the timeline for reaching the 5% level would depend on the Agency's allocation of Adjustable Block Program blocks beyond those authorized in the Initial Plan.

[388] Consolidated Appropriations Act of 2016, Public Law 114-113, December 18, 2015, at § 303 (modifying 26 U.S.C. § 48(a)); see also https://energy.gov/savings/business-energy-investment-tax-credit-itc, https://www.seia.org/research-resources/impacts-solar-investment-tax-credit-extension.

[389] 26 U.S.C. §§ 48(a)(2)(A), (a)(3)(A)(i), (a)(6)(A).

Additionally, federal tax legislation[390] passed by the United States Congress and signed by the President in December 2017 introduced a provision called the Base Erosion and Anti-Abuse Tax.[391] As discussed in more detail in Section 6.8.3 of the Initial Plan, this provision is widely thought to diminish the value of the Investment Tax Credit for solar generation for many "tax equity" investors, which are often parts of large multinationals.

The phase-out of the federal Investment Tax Credit, and any possible legislative change to that schedule, will affect project economics for distributed solar in Illinois. Like other anticipated changes, the Agency will review the performance of the Program and make price and policy adjustments needed to achieve compliance with RPS goals. For example, the Agency could adjust prices to reflect the change in the federal Investment Tax Credit from 30% to 26%. This adjustment will probably not be larger than 25% and thus would not require Commission review and approval. The Agency notes that advocates are presently making efforts to extend the federal Investment Tax Credit.[392]

6.8.4. Tariffs on Foreign Photovoltaic Modules and Cells

As discussed extensively in Section 6.8.4 of the Initial Plan, U.S. President Donald Trump issued a Proclamation on January 23, 2018 imposing certain import restrictions, pursuant to his authority under Section 203(a) of the Trade Act, 19 U.S.C. § 2253(a), following a petition brought at the U.S. ITC by certain American solar component manufacturers alleging that imports were entering the United States in such increased quantities as to be a substantial cause of serious injury, or the threat thereof, to the domestic industry.[393] The tariffs are set to last for 4 years, starting February 7, 2018. For solar cells, following the first 2,500 MW of imports in any year, the duty rate will be 30% in the first year, then 25% in the second year, then 20%, then 15%. For solar modules, the same annual duty rates apply, without any exemption.

Accordingly, the Agency included a modification to the REC Pricing Model related to the projected market effect of these new import restrictions in its February 27, 2018 REC Pricing Model Update.[394] The Commission approved that aspect, *inter alia*, of the February 27, 2018 REC Pricing Model Update.[395] The Agency filed its "final" REC prices (i.e., the "Commission's approved values" for purposes of any Section 1-75(c)(1)(M) adjustments) as a compliance filing with the Illinois Commerce Commission on June 4, 2018, reflecting these and other adjustments.

However, these tariffs have been challenged or may be limited in certain ways. Pursuant to the President's January 23, 2018 Proclamation, the United States Trade Representative accepted requests for exclusions of particular products during March and April of 2018;[396] one result of that

[390] See Pub. Law 115-97 (Dec. 22, 2017), https://www.congress.gov/115/bills/hr1/BILLS-115hr1enr.pdf.

[391] Id. at § 14401 (adding new 26 U.S.C. § 59A).

[392] See e.g., "5-year ITC extension introduced in U.S. House, Senate." PV Magazine. Accessed from https://pv-magazine-usa.com/2019/07/25/breaking-5-year-itc-extension-introduced-in-u-s-house-senate/(July 25, 2019).

[393] See https://ustr.gov/about-us/policy-offices/press-office/press-releases/2018/january/president-trump-approves-relief-us (January 22, 2018); https://www.whitehouse.gov/presidential-actions/presidential-proclamation-facilitate-positive-adjustment-competition-imports-certain-crystalline-silicon-photovoltaic-cells (January 23, 2018); https://www.gpo.gov/fdsys/pkg/FR-2018-01-25/pdf/2018-01592.pdf (January 25, 2018).

[394] Docket No. 17-0838, IPA REC Pricing Model Update, February 27, 2018, at 2.

[395] Order, Docket No. 17-0838, April 3, 2018, at 74.

[396] https://www.regulations.gov/document?D=USTR-2018-0001-0001; https://www.regulations.gov/docketBrowser?rpp=25&so=DESC&sb=commentDueDate&po=0&dct=PS&D=USTR-2018-0001.

process was an exclusion for bifacial solar panels, announced by the Office of the U.S. Trade Representative in June 2019.[397] The bifacial panel exclusion was then *reversed* in a decision by the Office of the U.S. Trade Representative in October 2019,[398] with that decision then blocked by the U.S. Court of International Trade in December 2019,[399] and withdrawn by the U.S. Trade Representative in April 2020.[400] The Agency will continue to monitor these developments and, if any significant changes to solar component import restrictions occur, consider making commensurate changes to the final REC Pricing Model pursuant to its authority under Section 1-75(c)(1)(M) of the IPA Act.

6.9. Approved Vendors

Participation in the Adjustable Block Program takes place through, and is conditional upon, the Approved Vendor process developed by the Agency and implemented by the Program Administrator. The Approved Vendor model was originally based upon the experiences the Agency gained through the development and implementation of the Supplemental Photovoltaic Procurement, as well as observations of programs in other states. While arguably there could be more flexibility available to consumers through a program under which any entity may receive a contract, by having Approved Vendors—i.e., ensuring that any entity receiving a REC delivery contract is registered with and vetted by the Agency, and has met conditions predicate—the Agency is better able to monitor compliance with program terms and conditions, ensure the accuracy and quality of information submitted, and reduce the administrative burden on the contractual counterparties.

This model thus benefits consumers because they will be able to verify that an entity that proposes to develop a photovoltaic system for them (or sell them a subscription to a community solar project) is a legitimate entity participating in the Program. It is important for the Agency to have the ability to monitor the program and ensure high quality performance by the Approved Vendors; an Approved Vendor that fails to live up to the requirements of the Adjustable Block Program could have a significant negative impact on the entire renewable energy market in Illinois that would extend beyond just its own actions. Additionally, as discussed in more detail in Chapter 8, registration as an Adjustable Block Program Approved Vendor is a prerequisite to becoming an Illinois Solar for All Approved Vendor, and the loss or suspension of Approved Vendor status under the Adjustable Block Program would result in an Approved Vendor's status under the Illinois Solar for All Program to also being terminated or suspended.

The Agency does not restrict Approved Vendor participation by entity type; as such, Approved Vendors could include a company that specializes in the aggregation and management of RECs; a for-profit developer or installer of photovoltaic systems; a municipality; or a non-profit serving a specific sector of the community, among others.

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[397] See 84 FR 27684, June 13, 2019, https://www.federalregister.gov/documents/2019/06/13/2019-12476/exclusion-of-particular-products-from-the-solar-products-safeguard-measure; see also 83 FR 47393, September 19, 2018, https://www.federalregister.gov/documents/2018/09/19/2018-20342/exclusion-of-particular-products-from-the-solar-products-safeguard-measure.

[398] See https://ustr.gov/sites/default/files/enforcement/201Investigations/Withdrawal_of_Bifacial_Solar_Panels_Exclusion_to_the_Solar_Products_Safeguard_Measure.pdf.

[399] See https://www.cit.uscourts.gov/sites/cit/files/19-153.pdf

[400] See https://www.federalregister.gov/documents/2020/04/17/2020-08189/determination-on-the-exclusion-of-bifacial-solar-panels-from-the-safeguard-measure-on-solar-products.

Approved Vendors serve as the contractual counterparty with the utility, and thus are the entity that receives payments from the utility for REC deliveries as contract obligations are met.[401] Approved Vendors are therefore responsible for submitting necessary paperwork (project applications, status updates, quarterly and annual reports) to the Program Administrator (as the responsible party for the information contained in that paperwork), maintaining collateral requirements (and paying any contractual clawback not covered by posted collateral), and providing ongoing information and reporting. As such, the Approved Vendors must coordinate downstream information from installers/developers as well as individual system owners (who may well provide required information through the installer/developer).

The Agency does not require a specific delegation of duties between the Approved Vendor, sales generating firms, installer/developer, and system owner; rather, it believes that the market is better suited to allow a variety of business arrangements to develop. The key consideration is that the Approved Vendor is ultimately responsible for the fulfillment of contractual obligations, including any obligations delegated to subcontractors, in a manner consistent with the requirements of this Revised Plan and of the Approved Vendor's contract with the counterparty utility. As discussed in Section 6.9.1, the Agency proposes now requiring that designees be registered with the program. While this does not change the responsibilities of the Approved Vendor, or the potential for an Approved Vendor to be held accountable for the conduct of its designee, the Agency believes that this step will provide additional information and transparency to consumers and to the marketplace generally.

Approved Vendors must agree to the following terms:

- Participate in registration and complete any training developed by the Agency
- Abide by these ongoing Program terms and conditions
- Provide information to the Agency on the Approved Vendor's organizational history, capacity, financial information, regulatory status in Illinois and other states (including current complaints or other actions against the Vendor or prior complaints within the past five years), etc.
- Be registered to do business in Illinois
- Disclose to the Agency names and other information on installers and projects, while otherwise maintaining confidentiality of information
- Document that all installers and other subcontractors comply with applicable local, state, and federal laws and regulations, including for example, maintaining Distributed Generation Installer Certification
- Provide samples of any marketing materials or content used by the Approved Vendor, and/or their subcontractors/installers, designees, agents, and affiliates, to the Agency for review, as requested.[402]
- Agree to make changes to marketing materials as instructed by the Agency.[403]

[401][401] The Agency imposes no requirement as to how the Approved Vendor shall share the REC payments with the installer, host, and other project parties.

[402] This requirement applies to, at minimum, printed materials, advertising through television and radio, websites (including affiliate websites), web ads, marketing via email or social media, telemarketing scripts, and leads purchased through lead-generation vendors.

[403] This requirement is not meant to impede the ability to market to customers, but rather to ensure that any types of marketing are not deceptive, confusing, or misleading. Likewise, the Agency is concerned about misrepresentations that could be made about the relationship between an Approved Vendor (or the subcontractors/installers) and the Agency or program.

- Register and maintain such registration in GATS or M-RETS and demonstrate the ability to manage project application and REC management functions in the applicable tracking system
- Pay applicable application fees
- Comply with all terms of contracts with utilities under the Program
- Submit Annual Reports on a timely basis

Approved Vendors must renew their approval once a year. Failure by an Approved Vendor to follow the requirements of the Adjustable Block Program, as determined by the Agency and/or its Program Administrator, could result in the entity having the suspension of or losing its status as an Approved Vendor and thus losing the ability to bring new projects into the Programs. Losing that status would not relieve an Approved Vendor of its obligations to ensure that RECs from its projects that have been energized continue to be delivered to the applicable utility; failure to meet those contractual obligations could result in having the vendor's credit collateral drawn upon. (See Section 6.16 for more discussion of contractual obligations.)

The Agency recognizes that there may be certain projects where the Approved Vendor model may not be completely appropriate, and therefore allows an Approved Vendor who has only one project to apply under a more limited set of requirements as a Single Project Approved Vendor. Specifically, this designation may apply to a project that is owned by that Single Project Approved Vendor (as opposed to a situation where the Approved Vendor is an intermediary between the system developer and/or owner and the contracting utility). In this situation, the following provisions related to Approved Vendors do not apply:

- Provide samples of any marketing materials or content used by the Approved Vendor, and/or their subcontractors/installers and affiliates, to the Agency for review, as requested.
- Agree to make changes to marketing materials as instructed by the Agency.

In addition, the consumer protection requirements found Section 6.13 would not apply to the Single Project Approved Vendor, but if the project is a community solar system, all applicable community solar consumer protection requirements related to subscribers would apply (including those concerning marketing materials referenced above).

Single Project Approved Vendors will need to request that status prior to submitting the system's Part I application, and the Program Administrator and Agency will review requests to ensure that this process is not used to avoid the more general requirements of this program through the establishment of nominally separate entities. The minimum size for a project submitted by a Single Project Approved Vendor is 100 kW.

The Agency also encourages the hiring of graduates of job training programs (as described in Section 8.10) to work on installations of projects supported by the Adjustable Block Program and the Program Administrator currently requests Approved Vendors to report on the planned usage of job training program graduates as part of the project application process, and will also include reporting on hiring as part of the annual reports submitted by each Approved Vendor. As more trainees become available, the Program Administrator will provide additional information to Approved Vendors to support this goal.

6.9.1. Approved Vendor Designees

Since launching the Adjustable Block Program, the Agency has become aware of instances of violation of program guidelines by Approved Vendor designees that may have been committed without the knowledge or control of the underlying Approved Vendor. For this Revised Plan, the Agency proposes to create a new requirement for Approved Vendor designees. This requirement is that designees must register with the program and be listed on the program websites (both www.illinoisabp.com and www.illinoisshines.com) along with the Approved Vendor(s) with whom they are working. Registration will also require the assent of the Approved Vendor(s), and can be withdrawn by an Approved Vendor working with the designee at its discretion, or by the IPA or Program Administrator if the designee is found to have violated program guidelines and is suspended or has its registration terminated.

As used herein, by "designee," the Agency is referring to third-party (i.e., non-Approved Vendor) entities that have direct interaction with end-use customers. This includes installers, marketing firms, lead generators, and sales organizations. The Agency reserves the right to add additional categories as needed.

Registration shall encompass the designee's provision of contact information, acknowledgment of the business relationship with the Approved Vendor, and identification of the categories of the consumer-facing services provided. Additionally, a designee is responsible for acknowledging that they will comply with all Program requirements applicable to installers or marketing agents, as applicable. Failure by a designee to comply with applicable requirements could subject the designee to suspension or termination from registration. If the designee ignores a suspension (or termination) decision made by the Program Administrator and continues its market activity nonetheless, any Approved Vendor that works with the designee during that period will be subject to discipline. Likewise, Approved Vendors found to be working with entities engaged in the proscribed activities that fail to register will be subject to discipline. Pursuant to the Commission's Order in 19-0995, Approved Vendors and their designees shall have 45 days of lead time for compliance once these requirements are implemented.[404]

The purpose of this new requirement is to increase transparency for the program. Potential customers will be able to verify that a company that reaches out to them is actually a program participant registered with the Program (and likewise be able to review if they are listed on the complaint or disciplinary databases). While the Agency had anticipated that smaller installers would work with Approved Vendors that are aggregators, over the first nine months of the program it has become clear that sales and marketing of solar includes a variety of different types of organizations and that this variance can create market confusion.

Approved Vendors will be responsible for ensuring that their designees register with the program, and Approved Vendors who fail to do so may be subject to disciplinary actions. This includes designees of designees. For example, for an Approved Vendor who has an installer as a designee, and that installer hires a lead generation firm to assist in marketing, the Approved Vendor will be responsible for ensuring that the lead generation firm (in addition to the installer) registers with the program. One possible benefit to Approved Vendors through this system will be that they will know what downstream firms are working with their direct designees, and they may be able to better

[404] See Docket No. 19-0995, Final Order dated February 18, 2020 at 56.

monitor those firms' behavior (as the Approved Vendor will ultimately be responsible with conformance with program guidelines).

6.10. Program Administrator

Section 1-75(c)(1)(M) of the Act authorizes the Agency to "retain one or more experts or expert consulting firms to develop, administer, implement, operate, and evaluate the Adjustable Block program." The Agency issued a Request for Qualifications to start the process of selecting a Program Administrator for the Adjustable Block Program on January 18, 2018.[405] The Request for Qualifications was a means to select qualified bidders who were then invited to respond to a Request for Proposals.[406] Responses to the Request for Proposals were received on April 13, 2018.[407] The Program Administrator selection process is expressly exempted from the Illinois Procurement Code.[408]

After the evaluation of proposals received and consultation with the Staff of the Illinois Commerce Commission, the Agency selected InClime, Inc. ("InClime") to serve as the Program Administrator for the Adjustable Block Program. The Illinois Commerce Commission formally approved the execution of a contract between the IPA and InClime at its July 12, 2018 Regular Open Meeting.

The Program Administrator runs the day to day operations of the Adjustable Block Program. This includes, but is not limited to:

- Assisting the Agency with Approved Vendor registration and training
- Developing a Program Manual
- Establishing an online portal for Approved Vendors to submit projects (and providing technical support to Approved Vendors) and collecting application fees
- Maintaining an online dashboard to show block status
- Reviewing and approving submitted projects
- Preparing contracts for Commission review and utility execution
- Ongoing monitoring of project development status
- Verifying completion of projects and the processing of approvals for payments, as well as conducting on-site inspections for quality assurance purposes
- Reviewing Annual Reports submitted by Approved Vendors
- Providing information for the public including developing a Program brand, and maintaining an online list of Approved Vendors and educational materials related to distributed generation and community solar
- Assisting in workforce development efforts to the extent feasible

The Program Administrator is authorized to charge fees to Approved Vendors as described in Section 6.14.4 for processing applications. The Program Administrator operates under a contract with the Agency and may also be reimbursed directly by the utilities for a portion of the cost of the services

[405] The Request for Qualifications was posted to the Agency's website, www.illinois.gov/IPA.

[406] This process generally follows the process contained in Section 1-75(a)(1) to (5) that the Agency has used to select its Procurement Administrator and Procurement Planning Consultant.

[407] The Agency also issued a separate Request for Qualifications/Request for Proposals for a dedicated Program Administrator or Administrators for the Illinois Solar for All Program.

[408] 20 ILCS 3855/1-75(C)(1)(M).

provided to them including, but not limited to, the preparation of contracts and review of Annual Reports.

Program Administrator costs, other than those covered by fees collected directly by the Program Administrator from Approved Vendors, are considered part of the administrative costs discussed in Section 3.17. The Program Administrator may not be an Approved Vendor.

6.11. Program Launch

Starting in September 2018, the Program Administrator began releasing draft program documents for stakeholder review and comments and held workshops in October and November of 2018. Input from stakeholders received through both those workshops and written comments was used to inform the development of final program materials. Key documents developed include:

- Approved Vendor Registration Requirements (released October 30, 2018)[409]
- Lottery Procedures (released November 28, 2018)[410]
- Distributed Generation Brochure and Disclosure Forms (released December 27, 2018)[411]
- Program Guidebook (released December 31, 2018, with subsequent revisions released)[412]
- Standard REC Contract (released January 28, 2019)[413]
- Community Solar Disclosure Forms (released January 31, 2019)[414]
- Distributed Generation and Community Solar Marketing Guidelines (released January, 31, 2019)[415]
- Community Solar Brochure (released February 20, 2019)[416]

Approved Vendor registration opened on November 1, 2018 and the Adjustable Block Program officially started taking project applications on January 30, 2019. Since then, and as of April 10, 2020, Approved Vendors (the direct participants serving as counterparties to Illinois utilities under REC contracts, as discussed in Section 6.9) have submitted applications for 16,487 projects. Those applications have resulted in 602.3 MW of capacity allocated with 75.3 MW of project capacity still available in the Small DG category (blocks 2 and 3). The Community Solar and Large DG categories have waitlists.

Table 6-5 presents a snap-shot of select program statistics as of April 10, 2020.[417]

[409] See: http://illinoisabp.com/wp-content/uploads/2018/10/Final-Approved-Vendor-Requirements-10.30.18.pdf.

[410] See: http://illinoisabp.com/block-1-lottery.

[411] See: http://illinoisabp.com/marketing-guidelines-marketing-materials-stakeholder-process.

[412] See: http://illinoisabp.com/program-guidebook.

[413] See: http://illinoisabp.com/rec-contract.

[414] See: http://illinoisabp.com/marketing-guidelines-marketing-materials-stakeholder-process.

[415] Id.

[416] Id.

[417] For additional information on REC quantities procured and budgetary commitments, see Chapter 3.

Table 6-5: Adjustable Block Projects as of April 10, 2020

Project Type	Project Applications	MW
ICC Approved[418]		
Small DG	9,548	69.9
Large DG	2,065	274.3
Community Solar	110	212.3
Total	11,723	556.4
Applications Currently Being Reviewed/Processed[419]		
Small DG	2,919	21.3
Large DG		
Community Solar		
Waitlists[420]		
Large DG	132	7.0
Community Solar	798	1,561.7
Remaining Available Capacity[421]		
Small DG		75.3
Large DG		None
Community Solar		None
Overall Program Capacity[422]		
Small DG		166.5
Large DG		296.9
Community Solar		214.3
Total		677.6

6.12. Project Requirements

Projects that are eligible for the Adjustable Block Program will have to meet, at minimum, two sets of requirements. The first relates to the technical aspects of the system itself, and the second to the customer (and additionally to subscribers, in the case of community solar). The purpose of the first set of requirements is to ensure that high-quality systems are installed that will be capable of generating the expected quantity of RECs over the 15-year duration of the contracts. The purpose of the second set of requirements is to ensure consumer protections.

[418] This reflects projects that successfully applied to the Program and have been included in batches of projects approved by the ICC (see Section 6.14.6). It will be updated for the Revised Plan to be filed for Commission approval to reflect projects that have been removed from the program due to failure to execute contracts/product orders or to provide collateral.

[419] This reflects projects that have applied to the program and are still in various stages of eligibility review and thus have not yet been included in batches of projects submitted to the ICC for approval. It does not include projects that applied and were found to be ineligible or withdrawn by the Approved Vendor.

[420] See Section 6.3.3.1 for a discussion of the community solar waitlists.

[421] This reflects capacity available for project applications. While this capacity will decline as new project applications are received, it may also be adjusted upwards if projects that have applied are not found to be eligible, or if ICC approved projects are subsequently removed from the program.

[422] Overall program capacity slightly exceeds the planned 666 MW of capacity due to the policy of accepting the final project in a block. For example, if a block had 22 MW of capacity and up to the final project used up 21 MW and the final project was 2 MW in size, the final block size would be 23 MW. The Overall program capacity can also change when a project in a block is withdrawn and subsequently replaced with another one, or more projects, from the waitlist with slightly larger capacity.

6.12.1. Technical System Requirements

In this Section, the Agency outlines what technical information will have to be submitted for each project. These standards apply for both distributed generation and community solar projects. The application process is described in more detail in Section 6.14.

The technical system requirements are as follows:

- Information about the system location, and size, including but not limited to
  - A description of the technical specifications of the main system components including the make and model, manufacturer, number (quantity) of panels, of panels and inverters and meters, array location (roof or ground mount), tilt, orientation
  - Site map or other project details
- Proof of site control and/or host acknowledgement
- Project-specific estimate of REC production during the 15-year delivery term using PV Watts or a similar tool
- For systems over 25 kW, an Interconnection Agreement signed by both the interconnecting utility and the interconnecting customer[423]
- For ground mounted systems over 250 kW a land use permit, when applicable from the Authority Having Jurisdiction ("AHJ") over the project. In the event a land use permit is not applicable, written confirmation from the AHJ that no permit is required must be provided.
- For systems that include a battery, a detailed schematic showing that either only solar generated power can be used to charge the battery or that the battery's output does not run through the meter used to measure solar output.

In the Initial Plan the Agency required that, "[f]or systems over 25 kW, evidence of having obtained all non-ministerial permits that, according to the commercially reasonable investigation of the Approved Vendor, are necessary to the project at the time of application to the Adjustable Block program." While the Agency is no longer requiring this provision in the Revised Plan (other than as specified above for land use permits), failure to obtain permits is a developer risk and one which the Agency believes likely would not allow for the invoking of force majeure provisions applicable to failing to meet contractual obligations.

For systems that have been energized prior to application, the following information will also be required:

- GATS or M-RETS unit ID[424]
- Certificate of Completion of Interconnection
- Photographic documentation of the installation

The Agency recognizes that there may be special situations where some portion of these documents may not be available (for example, some rural electric cooperatives and municipal utilities may not

[423] While the Adjustable Block Program provides for separate categories for systems up to 10 kW, and greater than 10 kW and up to 2,000 kW, for the purposes of the requirements related to each project, the Agency has determined that 25 kW is an appropriate breakpoint between different levels for certain requirements. While most residential systems are below 10 kW, the Agency observed from its Supplemental Photovoltaic Procurements that there can be larger residential systems, particularly in rural areas. 25 kW is a common breakpoint used in programs in other states and is thus adopted by the Agency for these requirements.

[424] GATS or M-RETS registration must be complete and unit ID verifiable through GATS or M-RETS public reports.

have standardized interconnection documents). The Agency will be willing to consider alternative documentation to demonstrate completion of interconnection in those situations.

6.12.2. Metering Requirements

In developing metering standards for the Supplemental Photovoltaic Procurements that took place in 2015 and 2016, the Agency developed a metering standard[425] that included:

- Systems registered in M-RETS must utilize an ANSI C.12 certified revenue quality meter.
- Systems over 25 kW registered in GATS must utilize a new meter that meets ANSI C.12 standards.
- Systems over 10 kW and less than 25 kW in size registered with GATS must utilize a meter that meets ANSI C.12 standards. Meters that are refurbished (and certified by the meter supplier) are allowed.
- Systems of 10 kW in size and below registered with GATS must utilize either a meter that is accurate to +/- 5% (including refurbished and certified meters), or an inverter that is specified by the manufacturer to be accurate to +/-5%. The inverter must be UL-certified and must include either a digital or web-based output display.

The Agency did not allow production estimates. A production estimate consists of GATS automatically generating RECs for a system based on the system size and engineering modeling of expected kilowatt hour generation. Production estimates do not require the system owner (or aggregator) to provide ongoing data to GATS.

In responses to the Agency's Request for Comments, several commenters suggested allowing production estimates for smaller systems. While several states do allow production estimates for smaller systems, because production estimates do not require any actual data being transmitted to the tracking system to verify production, production estimates could be problematic as there would be no way to verify the system's ongoing operation. By contrast, a meter read (from either a meter, or an inverter output) only needs to be submitted once per year to GATS.

Given the upfront payments for RECs paired with the 15-year requirement for RECs to be delivered, the Agency believes that receiving actual data on system performance is essential to ensuring the integrity of the RPS, and having meter reads as infrequent as annually (although they could be as frequently as monthly) appropriately balances the need for accurate data and the compliance burdens on the system operators. Therefore, in the Initial Plan required metered output for the generation of RECs, although the use of inverter readings for systems up to 10 kW were continued to be allowed.[426] In other words, the metering standard developed for the Supplemental Photovoltaic Procurement was the metering standard for the Adjustable Block Program, with the caveat that meter reads were only required on an annual basis. The Agency understands that as of January 1, 2020, M-RETS will no longer require an ANSI C.12 certified revenue quality meter, so the standards previously applicable for projects registered in GATS will now also be applicable to projects registered in M-RETS.

[425] See: https://www.illinois.gov/sites/ipa/Documents/IPA-metering-accuracy-standard-5-14-15.pdf.

[426] The Agency notes that while using an inverter rather than a meter may save on installation costs, if the inverter were to suffer a system failure and lose data, no RECs could be created. A meter may be a more reliable way to ensure REC creation.

Additionally, in Docket No. 17-0838, questions were raised regarding the applicability of these metering standards to DC-based technologies. In its Order approving the Plan, the Commission sought for the IPA to "ensure that its Plan does not inadvertently prohibit participation from systems that do not convert the DC electricity produced to AC electricity," with any resulting resolution to be presented to the Commission "before or in the 2019 Plan update." The IPA thus endeavored to work with stakeholders on solutions for facilitating permissible participation in the Adjustable Block Program from DC-based systems.[427]

During the more than twelve months since that Order, the Agency has communicated regularly and deliberately with industry stakeholders who are seeking to coordinate and obtain ANSI approval of a new DC metering standard. However, the Agency understands that this standard has not been finalized as of October 2019.[428] The Agency also received no comments on the topic of DC metering in response to its public request for comments dated July 3, 2019 regarding the revisions to this Plan. Thus, the Agency believes it would be premature at this time to incorporate a DC metering standard into the Adjustable Block Program (or, by implication, the Illinois Solar for All Program), but will continue its dialogue with industry professionals to understand the development of DC metering. The Agency intends to revisit this issue in the next Plan update in 2021.

6.13. Customer Information Requirements/Consumer Protections

In addition to the information about the technical system information described in Section 6.12.1, for distributed generation projects Approved Vendors are required to submit information to the Agency regarding the customer hosting the system and ensure that certain standardized information about the program was provided to that customer.

The purpose of requiring this information is to ensure consumer protections. Installing a photovoltaic system is a significant financial commitment on behalf of that system's host (and potential owner) and a system that has been sold (or leased) to a customer using incorrect, inaccurate, or deceptive information could put the financial security of Illinois residents or businesses at risk and poison the ongoing viability of the solar market in Illinois. In addition, a project that successfully applies to this program stands to receive a financial benefit from the program in the form of a REC delivery contract and by extension from the ratepayers who fund it. Requiring clear and consistent information on the relationship between the end customer, the installer/developer, and the Approved Vendor is critical to ensuring that the fiscal risks and controls of this Program are properly and prudently managed.

These requirements are Program terms and conditions for participation in a state-administered incentive program that provides the opportunity for additional project revenue through REC delivery contracts. In developing these requirements, the Agency recognizes that it is not a regulatory agency and does not have jurisdiction over all distributed generation installations or community solar projects across the state. It can, however, create common sense provisions to ensure that entities developing projects seeking to participate in this program are held to high standards for consumer protection, and enforce those provisions through suspending non-compliant entities from further participation in this state-administered incentive Program. Ultimately, the Adjustable Block Program is a ratepayer funded program intended to benefit the state's residents through enhanced ability to

[427] Order, Docket No. 17-0838, April 3, 2018, at 78-79.

[428] The Agency understands from industry representatives that a draft standard has been developed for consideration by the relevant ANSI committee.

participate in the clean energy economy, and in the Agency's view, it is essential to ensure that this Program produces not only project development, but also a transparent, positive experience for system hosts and subscribers.

The information that must be provided to all customers (and such provision documented to the Agency) includes:

- **Contracts:** A copy of the contract for the lease, sale, or financing arrangement of the distributed generation installation. A list of required contract terms (and, in limited cases, specific contract requirements) has been developed by the Agency in conjunction with its Program Administrator, and has been provided to Approved Vendors.[429] At a minimum, Approved Vendors may also use model leases and model financing instruments provided by the Solar Energy Industries Association ("SEIA"),[430] or other contracts that meet requirements provided by the Agency. While the Agency will not require that a specific contract form be utilized or require the submittal and approval of all contracts, it retains the right to request copies of contracts from Approved Vendors and develop new requirements for contracts, as well as to advise Approved Vendors that contract terms must be altered as a requirement of continued program participation should the Agency discover unreasonable contract terms.
- **Disclosure Form:** The Agency, in conjunction with its Program Administrator, has developed standard Disclosure Forms to be completed and provided to each program participant prior to contract execution.[431] For distributed generation projects, the form includes standard information on the system equipment and components, warranty, installer, and lease or financing structure. The form includes a standardized estimate of the price and performance of the system as installed, including anticipated first year production, expected annual system production decreases, expected overall percentage degradation over the life of the system, a standard forecast for retail electricity prices, a net cash flow analysis, and an internal rate of return of each project. The form also includes a disclosure that cash flows may change if the utility's net metering tariffs or distributed generation rebates change prior to the completion of the system (e.g., the changes that occur when net metering enrollment reaches 5%). The Agency provides standard electricity prices (and other inputs) to be used for these estimates as to allow equivalent comparisons between different offers. For community solar subscribers, the form includes similar applicable provisions as well as conform to the provisions listed in Section 7.6.2.[432] In its Order approving this Revised Plan, the Commission provided analysis reinforcing the requirement that every individual subscriber to a

[429] See http://illinoisabp.com/wp-content/uploads/2019/01/dg-contract-requirements-2019_01_23.pdf.

[430] Solar Energy Industries Association, "Model Leases and PPAs," https://www.seia.org/research-resources/model-leases-and-ppas.

[431] See http://illinoisabp.com/marketing-guidelines-marketing-materials-stakeholder-process.

[432] In the responses to the Request for Comments that the Agency issued in June, 2017, several commenters suggested that the Agency consider adopting the standard disclosure forms developed by the SEIA earlier in 2017 (see: https://www.seia.org/research-resources/solar-transaction-disclosures). While there may be aspects of those forms that are worth considering, the Agency is concerned that they do not fully capture the information the Agency believes that potential program participants need to have, in particular, standardized comparisons of energy costs. Therefore, the Agency instead developed its own disclosure forms that capture aspects of the SEIA disclosure forms, best practices from other states, as well as addressing the need to standardize energy cost comparisons.

For a general discussion of challenges related to the marketing of solar and consumer protection policies, see Barbara R. Alexander and Janee Briesemeister, "Solar Power on the Roof and in the Neighborhood: Recommendations for Consumer Protection Policies," March 2016 (http://utilityproject.org/wp-content/uploads/2016/03/Solar-Power-Consumer-Protection-Report-March-2016.pdf), in particular, Appendix B.

community solar project participating in the Adjustable Block Program or ILSFA must receive and execute an individualized standard disclosure form.[433]

- **Brochure:** The Agency requires Approved Vendors to distribute a brochure to program participants prior to the execution of the contract with the program participant. This consumer protection brochure is available in either print or electronic form, and has been prepared by the Program Administrator and approved by the Agency.[434] The brochure informs consumers of their rights, procedures for filing complaints, and point to more information on the Program website. The Agency has prepared the brochure in English and Spanish and will consider creating versions in other languages should sufficient demand exist.

Rather than including these materials with this draft Revised Plan for filing with the Commission (and thus seeking Commission approval of the specific forms), the Agency sought to seek authority from the Commission for the ability to later develop (or modify) its program-related forms and documents, while reserving the ability to draft actual program-related forms and guidelines independent of that approval proceeding.

Approved Vendors must also agree to provide sales and marketing information, including contract prices and sales volumes, to the Agency on a confidential basis. The Agency will use this information for internal purposes to track market progress.

Additionally, the IPA has developed both its Initial Plan and this Revised Plan mindful of the state's experience with the retail energy supply market and the marketing and sale of energy-related products. As such, it seeks to tap into the experience and institutional knowledge reflected in the state's conditions applicable to alternative retail electric suppliers. While the Agency recognizes that Approved Vendors will not necessarily be Alternative Retail Electric Suppliers, and thus as Approved Vendors are not governed as a matter of law by the Commission's Rules applicable to ARES, it believes that the Commission's Title 83, Part 412 rules provide a workable blueprint for expectations of Approved Vendors. Thus, as a condition of ongoing approval, for distributed generation systems or community solar subscription shares below 25 kW in size,[435] Approved Vendors are and have been expected to comply with marketing standards generally equivalent to the following sections of Commission-approved rules for marketing practices by alternative retail electric suppliers. (83 Ill. Adm. Code Part 412, Subpart B):

- 412.105(a)-(c)
- 412.110 (a)-(i)
- 412.120
- 412.130
- 412.140 (a)-(b), (d)
- 412.150

[433] See Docket No. 19-0995, Final Order dated February 18, 2020 at 7. In the event that the Commission or another authoritative adjudicatory body determines that an opt-out municipal aggregation may legally include community solar subscription aggregation for a project participating in the Adjustable Block Program or ILSFA, individually executed standard disclosure forms are still required for each individual subscriber.

[434] See http://illinoisabp.com/marketing-guidelines-marketing-materials-stakeholder-process.

[435] In its filed version of the Initial Plan, the Agency originally proposed that these requirements apply to systems below 100 kW in size. However, in its Order approving the Initial Plan, the Commission adopted a proposal of the Joint Solar Parties that compliance with standards equivalent to the Part 412 rules be limited only to systems or subscriptions below 25 kW in size. See Docket No. 17-0838, Final Order dated April 3, 2018 at 108.

- 412.160 (a)-(b), (d)
- 412.170
- 412. 180
- 412.210 (applicable only to community solar)
- 412.240 (applicable only to community solar)

The Agency is also aware that changes to requirements applicable to ARES have been made through Public Act 101-0590. The IPA will endeavor to update its marketing guidelines[436] and certain other program requirements in line with the new requirements applicable to alternative retail electric suppliers where applicable. As just one example, the revised marketing guidelines should likely require community solar subscription agreements to clearly disclose any terms of automatic contract renewal.[437] The Agency thus proposes that a new draft of its marketing guidelines (and other documents, where necessary) be published for stakeholder feedback within 45 days of the Commission's approval of this Revised Plan and finalized within 90 days of that approval date.[438]

The Part 412 section list above is not an exhaustive guide of all conditions that the Agency may place upon Approved Vendors, and key items referenced elsewhere in Part 412 (including disclosure forms, contract assignability, and green marketing) are addressed separately in this Revised Plan to the extent applicable to Approved Vendors.

Consistent with the Commission's Order in Docket No. 17-0838, the IPA "fully develop[ed] its procurement terms and conditions after the Commission's approval of the Plan and selection of the Program Administrator." To this end, the IPA and its Program Administrator held a series of stakeholder feedback sessions and solicited written stakeholder feedback before producing its Brochure, Disclosure Form, Contract Requirements, Guidelines for Marketing Material and Marketing Behavior, and Program Guidebook.

After deliberation, the Agency has decided not to seek Commission approval of these specific documents through approval of this Revised Plan. The Agency believes that the ability to adjust such documents, and the requirements embodied within them, based on market experience without further Commission approval outweighs the certainty associated with having an administrative order from a quasi-adjudicatory body affirming the specific contents contained therein. Instead, the Agency seeks that the Commission, through its Order approving the Revised Plan, instead affirm the following:

- The Agency maintains flexibility to adjust its program requirements, and the documents and forms through which they are expressed, without further Commission approval as warranted;
- Any significant adjustments to those requirements should be preceded by a process to receive stakeholder feedback;
- The principle that Approved Vendors may be held accountable for the conduct of their agents, subcontractors, or designees under the Agency's marketing guidelines and other program requirements is a reasonable requirement consistent with a) the Commission's

[436] See http://illinoisabp.com/marketing-guidelines-marketing-materials-stakeholder-process.

[437] For the analogue in Public Act 101-0590 (http://www.ilga.gov/legislation/publicacts/101/PDF/101-0590.pdf), see Section 10 of the Act at pages 86-89 (creating new Section 2EE(c)(7) of the Consumer Fraud and Deceptive Business Practices Act, 815 ILCS 505).

[438] This process of seeking stakeholder feedback has been initiated as of the publishing of this Final Revised Plan; see: http://illinoisabp.com/2020/04/03/request-for-comments-draft-marketing-guidelines-and-community-solar-disclosure-form/.

determination in Docket No. 17-0838 and b) the Agency's statutory authority to develop terms, conditions, and requirements applicable to the programs it implements.

6.13.1. Systems Energized Prior to Finalization of Consumer Protection Requirements

Additionally, as was also raised during the Docket No. 17-0838 proceeding, these consumer protection requirements are intended to apply to all Approved Vendors submitting projects into the Adjustable Block Program—but, as Section 1-75(c)(1)(K) of the Act envisions participation from "projects energized on or after June 1, 2017," some projects submitted into the Adjustable Block Program may have involved marketing, sales, disclosures, contracts, and other arrangements completed prior to the full development and finalization of the Initial Plan's consumer protection requirements.

By this time, the Agency assumes that all such systems have likely applied to the Adjustable Block Program. But it cannot be certain, and for such systems, the Commission's Order in Docket No. 17-0838 requires the following for consumer protection:

1. A signed contract amendment, that brings the contract or subscription agreement into full compliance with the minimum contract requirements from the Plan;
2. The disclosure form, signed by the customer post-contract execution; and
3. Proof that the brochure was provided to the customer.[439]

Failure to meet these requirements by the time the system is submitted to the IPA will result in rejection of the related system from the Adjustable Block program.

Approved Vendors can attest via a declaration form in the application process if their customers are not responsive to good faith attempts to contact or for customers that refuse to sign an amended contract or disclosure form. The Agency has also included guidance in consumer protection documents for the customer allowing that customer to contact the program administrator or the IPA for additional information, to ask questions, or to submit concerns or a complaint. The IPA and its Program Administrator retain the ability to exclude projects that in their determination represent deceptive marketing or bad faith business practices through complaints or other information brought to their attention (whether or not customers have signed contract amendments or disclosure forms), and will continue to "monitor, to the extent possible, potential Approved Vendors' conduct to ensure good-faith attempts of compliance with the spirit of pending consumer protection requirements."[440]

Consistent with the Commission's Order, this streamlined compliance path applies only to those projects energized between June 1, 2017 and before the IPA's consumer protections provisions were finalized on January 31, 2019.[441]

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[439] These requirements stem from the Joint Solar Parties' Response in Docket No. 17-0838, at p. 7, and were adopted by the Commission on p. 108 of its Order in Docket No. 17-0838 ("The Commission agrees with various parties that projects that have energized since June 1, 2017 should be eligible to participate in the Adjustable Block Program. The Commission finds that the proposal presented by the Joint Solar Parties in their Response (JSP Resp. at 7) as modified by the AG's Reply (AG Rep. at 2-3) provides an appropriately tailored pathway for the projects to participate.").

[440] See Docket No. 17-0838, AG Reply at 2-3; Docket No. 17-0838, Final Order dated April 3, 2018 at 107.

[441] Docket No. 17-0838, Final Order dated April 3, 2018 at 107.

6.13.2. Community Solar

For community solar projects, the Approved Vendor must submit the Technical System Requirements information and, if not a copy of the contract between the project developer and the Approved Vendor (if they are separate entities), basic information concerning the underlying project (owner, size, location and interconnection date at a minimum, to be provided as part of the Adjustable Block application forms).[442] The Agency reserves the right to request additional information about the project structure and financing in order to review project feasibility and contractual arrangements that could jeopardize consumer protections. There are additional program terms and conditions related to subscribers of community renewable generation projects (both community solar and those that use other technologies) that are discussed in Section 7.6.2.

Community solar projects are not required to demonstrate that they have acquired subscribers as part of their initial application. However, as described in Section 6.15.4, by the time that such systems are energized, minimum subscriber requirements must be met to be eligible for payment for RECs.

The Agency will use the subscriber mix to determine what adder, if any, will be given to the system, but the final adder (if any) used will depend on the subscription level demonstrated once the system is energized.

6.13.3. Monitoring of Consumer Complaints

The Program Administrator will provide consumer protection materials on a program website and through printed materials, and has developed its customer-facing IllinoisShines.com website and program branding in part to accomplish this end. It plans to continue to modify and improve that the IllinoisShines.com site, and the Agency received useful feedback during the stakeholder comment process preceding the Revised Plan's development as to what new content could prove most helpful.

The Program Administrator provides a toll-free consumer protection telephone hotline and web-based complaint forms, and the Program Administrator will receive, respond to, and document complaints about marketing practices, sales practices, installations, and other aspects of solar marketing.

If warranted, the Program Administrator will refer complaints to the Agency and to appropriate state and federal agencies, including the Consumer Protection Division of the Illinois Attorney General's Office, or the Illinois Commerce Commission (e.g., for failure of installers to maintain their status as Certified Distributed Generation Installers). To the extent feasible, the Agency will work with its Program Administrator to maintain a public database of complaints (with any confidential or particularly sensitive information redacted from public entries), as well as a database of any disciplinary determinations issued (including the written notices and explanations of discipline) due to a violation of Program requirements. The Agency has already begun a stakeholder comment process in September 2019 to refine what information on complaints should be published.[443] Approved Vendors found by the Agency to have violated consumer protection standards or related Program requirements may be subject to suspension or revocation of their Approved Vendor status by the Agency, and if in violation of local, state, or federal law, also potential civil or criminal penalties from other relevant authorities.

[442] See id at 107-108.

[443] See http://illinoisabp.com/consumer-complaints.

The Agency will provide an annual written report to the Commission documenting the frequency and nature of complaints, and any enforcement actions taken. The first such report, covering calendar year 2019, was provided to the Commission through a filing in Docket No. 17-0838 on March 2, 2020.

6.13.4 Disciplinary Determinations

The Adjustable Block Program (and the Illinois Solar for All Program, for which the revised Plan's Consumer Protection requirements also apply) are ultimately state-administered incentive programs leveraging state- or utility-collected funds to provide additional incentives for photovoltaic project development. These programs do not constitute the solar project development market generally; an Approved Vendor, agent, or designee could simply choose to operate outside of the Agency's published marketing guidelines and consumer protection requirements should it choose not to avail itself of these additional incentive funding opportunities.

Consequently, the Agency views its disciplinary determinations as simply determining eligibility for state-administered incentives. No conduct is being restricted through the suspension or revocation of Approved Vendor status generally; all that is being restricted is the ability for an Approved Vendor to avail itself of additional incentive funding.

Nevertheless, the Agency appreciates that certain procedural safeguards should accompany its disciplinary determinations. Thus, through this revised Plan, the Agency proposes minimum procedural requirements applicable to such determinations. Specifically, mirroring and expanding on the process found in the Agency's Guidebook, the Agency proposes that Approved Vendors, designees, agents, or other third parties potentially subject to Program discipline for a violation of the Agency's Marketing Guidelines or Consumer Protection requirements generally be afforded the following:

- A 45-day lead time will be provided to Approved Vendors and designees in order to prepare for and implement general changes to consumer protection requirements. Unless otherwise specified, the lead time granted will not prohibit Approved Vendors and designees from taking earlier steps towards compliance. In situations where the IPA determines that emergency adoption of a new or modified consumer protection is necessary, no lead time will apply; however, the Agency commits to enforce any such requirements with an eye toward the practical challenges inherent in immediate implementation.[444]
- In the event that the Program Administrator identifies that it believes an Approved Vendor, designee, or other party is not acting, or has not acted, in compliance with Program requirements in connection with the Program, the Program Administrator will notify the Approved Vendor through an e-mail that:
  - Outlines the problematic behavior;
  - Explains how the behavior is non-compliant with program requirements; and
  - Requests more information about the issue.
- No disciplinary determination (such as the suspension or revocation of the ability to participate as or on behalf of an Approved Vendor) will be made by the Agency's Program Administrator without the allegedly offending party having the opportunity to offer a written or oral explanation of the problematic behavior for review and analysis by the Program Administrator;

[444] See Docket No. 19-0995, Final Order dated February 18, 2020 at 56, 62. For an example of emergency adoption of a consumer protection, see: http://illinoisabp.com/2020/03/20/ipa-covid-19-announcement/.

- All disciplinary determinations made by the Program Administrator will be communicated through a written explanation of the determination featuring at least the following:
  - A brief explanation of the infractions for which the Approved Vendor and/or Designee is being suspended;
  - A timeline of communications between the offending entity and the Program Administrator;
  - Specific reference to which specific Program requirement(s)/guideline(s) the offending entity violated;
  - An explanation of any suspension, including what specific conduct is no longer permitted in connection with the Program through the length of the suspension;
  - An explanation for how to appeal that disciplinary determination to the Agency and the deadline for submission applicable to any appeal.
- The IPA will endeavor to address any appeals of disciplinary determinations within two weeks of receiving an appeal (although the need to receive additional documents or information may lengthen that timeline).
- Any appeal determination made by the IPA will include, at minimum, a clear statement of the Agency's decision, the consequences of that decision, and a supporting explanation as to why that decision was made.

While the Agency understands that certain parties have offered comments seeking additional process and even more formalized requirements, the Agency believes additional process beyond the steps set forth above may not be warranted (and, if warranted, is best introduced through a broader update to the Agency's marketing guidelines).[445] Again, any party found in violation of the Program requirements is not barred from operating in the solar market in Illinois generally; it just may not participate in transactions benefitting from additional incentive payments provided through or by the Agency.

6.14. Application Process

The following section outlines the process and procedure that Approved Vendors will use to submit projects to the Program Administrator for review and approval, as well as how projects, once approved, will be placed into contracts with the utilities.

6.14.1. Batches

Under the Initial Plan Approved Vendors were required to submit projects bundled into batches. For this Revised Plan, the Agency proposes a simplification of the batch process. For a new Approved Vendor, there will still be the requirement for a submittal of a first batch of at least 100 kW of projects, and that 75% of the capacity of that batch must be verified to be approved. Approved Vendors will be allowed to select which batches approved systems are placed into, so that they can better manage their financing portfolios.[446] Once systems' Part I applications are verified, and before they are sent to the Commission for approval, an Approved Vendor will be consulted and given the opportunity to specify how its verified systems are batched, so long as those batches of verified systems are at least 100 kW in size.

[445] The Commission affirmed the adequacy of this process in approving the Plan. See Docket No. 19-0995, Final Order dated February 18, 2020 at 57, 62.

[446] See Docket No. 19-0995, Final Order dated February 18, 2020 at 75.

For established Approved Vendors that have had a contract approved by the Commission and do not desire to assemble batches into portfolios in this way, projects may be submitted on a rolling basis, and as projects are verified, the Program Administrator will place them into new batches that will result in a contract and/or new confirmations with one utility.

Utilities may use one master agreement with multiple confirmations (one confirmation per batch) from an Approved Vendor, rather than having multiple contracts with the same vendor.[447] The systems within the batch/confirmation will be listed on a schedule (or product order) attached to the contract and may not be substituted once approved.

A batch may contain projects in different groups/blocks (and thus with different prices) and with different adders. The price for the RECs for each system will be based on the price available within the applicable block on the date of the submittal. The failure of any system to be developed (and thus the forfeiture of any collateral associated with that specific system) will not impact any of the other systems on the same schedule, although the Agency will monitor system failure rates across Approved Vendors. Approved Vendors with high failure rates may be required to provide additional information to the Agency for subsequent applications.

The Program Administrator will determine which utility will serve as the counterparty for each contract. While a batch may contain projects in multiple utility service territories, the Program Administrator will strive to assign contracts to the utility where the bulk of the projects are located, but may not always be able to do so because the Program Administrator will also consider how assigning contracts to each utility will allow each utility to meet its pro-rata share of the RPS REC targets. The REC price for each system will be based on the applicable Group for that system's physical location, and not based on the identity of the counterparty utility to that contract.

After a batch of projects is determined by the Procurement Administrator, the number of RECs to be delivered annually and payment amount(s) for the batch will be provided to the utility by the Program Administrator for purposes of contract/confirmation preparation (i.e., the utilities will track the RECs by batch rather than by individual unit). Utilities will send a report of RECs delivered by batch semi-annually to the Program Administrator.[448]

6.14.2. Systems below 25 kW

In responses to the Request for Comments that the Agency issued in June 2017, several commenters recommended that systems under 25 kW only be submitted once they are completed and energized, to minimize administrative burdens and avoid project attrition. While the Agency is sympathetic to those ideas, this Revised Plan does not adopt that recommendation for several reasons. It may be difficult, or impossible, to have appropriate consumer protections if the Agency sees information about a system only after it is completed. Preventing problematic behavior (such as deceptive information about system costs and payback times) should be done prior to the homeowner or business paying for the system; that would not be the case if systems apply after being energized.

To be clear, there is nothing that would prevent an Approved Vendor from submitting a new system that has already been energized (for example, systems energized after June 1, 2017 but prior to the launch of the program), but the Approved Vendor will have to assume the risk that the system may

[447] See Docket No. 17-0838, Final Order dated April 3, 2018 at 109.

[448] See id.

not meet the required terms and conditions and could be rejected and thus not be included in a contract for the purchase of the system's RECs. A system that is rejected could be resubmitted at a later date if the deficiencies are cured, but the Agency cautions that some deficiencies may be difficult or impossible to cure (particularly when related to ensuring consumer protections from the beginning of the project's life).[449]

6.14.3. Application Fee

For each project, there will be a non-refundable application fee paid to the Program Administrator or the Agency of $10 per kW, not to exceed $5,000 per project. This fee will be used to offset the administrative costs of running the program and will decrease the administrative fees that would otherwise be taken from the utility RPS budgets.

6.14.4. Project Review

The Program Administrator will review the projects and, as needed, request additional information from the Approved Vendor in order to verify the submitted information and approve the project. An Approved Vendor will be given up to two weeks to cure deficiencies in an application. If deficiencies cannot be cured, the project application will be withdrawn. If the Approved Vendor can subsequently address the deficiencies, the Approved Vendor can resubmit the project (with a new application fee).

For an initial 100 kW batch, if, after any attempts to cure deficiencies have been made, projects representing at least 75% of the capacity of the batch are reviewed and approved by the Program Administrator, that batch will included in a contract presented to the Commission for approval. For established Approved Vendors, on a rolling basis in anticipation of the next scheduled Commission meeting, the Program Administrator will place verified projects for each Approved Vendor into batches for assignment to a counterparty utility, and prepare the confirmation information (and, in that case, master agreement information, if it is the Approved Vendor's first batch) or the contract information related to that batch.[450]

The Program Administrator will then submit the contract information for the batch to the Commission for approval. The Program Administrator will simultaneously forward the contract information to the applicable utility.[451]

An Approved Vendor that repeatedly submits deficient or noncompliant project applications may be subject to having its Approved Vendor status reviewed, and possibly suspended or terminated.

6.14.5. Converting System Size into REC Quantities

For each system that is approved, a 15-year REC payment amount and obligation level will be calculated for that system, and that payment amount will be included in the contract. Approved Vendors will have the option of using a PVWatts calculated capacity factor (stated relative to a system's nameplate capacity in AC rating) automatically computed by the application platform, or proposing an alternative capacity factor based upon an analysis conducted using an equivalent tool. Alternative capacity factors may be proposed as part of each system's application and will be subject to review and approval by the Program Administrator. Systems using bifacial panels must submit an

[449] See Section 6.13 above for further discussion of consumer protections applicable to systems energized after June 1, 2017 but before consumer protection requirements are finalized.

[450] See Docket No. 17-0838, Final Order dated April 3, 2018 at 115-116.

[451] See id.

alternative capacity factor subject to review and approval by the Program Administrator. All capacity factors submitted must be for a system's first year; as stated in Section 6.16.1 below, annual REC delivery commitments will incorporate a 0.5% per year degradation factor.

6.14.6. Batch Contract Approval

The Commission meets approximately every two weeks. The Program Administrator will strive to efficiently process approved projects and assign them to batches for submittal to the Commission. The Agency understands that Commission practice is that items for consideration by the Commission must be submitted to be placed on its open meeting agenda at least 8 business days prior to each meeting.

When the Program Administrator submits contract information to the Commission for approval, that submittal will include the Program Administrator's recommendation for approval of the batch, with a summary of factors relevant to Plan compliance. (Projects that are not approved by the Program Administrator are not submitted to the Commission.) This process is similar to that required for approval of contracts under annual electricity procurement plans pursuant to Section 16-111.5(f) of the PUA, or contracts under the Supplemental Photovoltaic Procurement Plan pursuant to Section 1-56(i)(5) of the Act.[452]

Pursuant to the Initial Plan, the Agency worked with Commission Staff to develop a Staff Report that includes the standards that the Commissions should use in considering the approval of contracts and product orders within the ABP and ILSFA.[453] The Commission approved the recommendations contained in the Staff Report on December 19, 2018. Once this Revised Plan is approved by the Commission, the Agency and Commission Staff will review and update that Staff Report if necessary.

Once a batch is approved by the Commission, the applicable utility will execute the REC contract and/or product order, as applicable. The Approved Vendor will then be required to sign the contract / product order within seven business days of receiving it from the utility.[454] Failure to sign the contract / product order may subject the Approved Vendor to discipline under the Program. Additionally, when a product order is not executed by the Approved Vendor within the seven business days after receipt, the constituent projects will be considered removed from the Program, with the option to re-apply later, subject to payment of a new application fee and available open block capacity (and subject to the applicant's Approved Vendor status not having been revoked due to the product order's non-execution). A collateral requirement to be held by the utility equal to 5% of the total contract value will be required in the form of either cash or a letter of credit with the utility within 30 business days of Commission approval of the contract.

For this Revised Plan, the Agency recommended and the Commission approved a clarification to the collateral withholding process to be reflected in the updated REC contract (as discussed in Section 6.7). In cases where collateral was posted through a letter of credit, the Approved Vendor may choose for the utility to withhold the collateral amount for each system from the last (or only, if a distributed

[452] See Docket No. 17-0838, Final Order dated April 3, 2018 at 115-116.

[453] See: https://www.icc.illinois.gov/downloads/public/edocket/490368.pdf.

[454] See id.

generation system of 10 kW or smaller in size) REC payment in exchange for a release/reduction of the letter of credit.[455]

In the Initial Plan, the Agency provided an option to allow an Approved Vendor to be able to forgo posting collateral for a system that was already energized and instead have that collateral withheld from the REC payment. The intent of that provision was to allow systems that had been developed prior to the program launch to have a simplified process, recognizing of those systems' absence of development risk. However, the Agency has observed that this process has had an unintended consequence of encouraging some Approved Vendors to submit projects only after their energization as a way of avoiding any collateral obligation. If the project does not apply until after it is built, enforcing and ensuring consumer protections (and other program requirements) becomes more challenging. Ultimately, consumers are better served if their project can be reviewed and approved by the program (and then submitted to the ICC for approval) prior to being built. For this reason, the Agency will require upfront collateral in all cases, including for energized systems.

Approved Vendors do not have the option to decline to post collateral within 30 business days once they have signed the contract. Failure to post collateral by the 30-business day deadline will violate the REC contract and may result in an Approved Vendor being suspended from further participation in the Program.

6.15. Project Development Timeline and Extensions

6.15.1. Development Time Allowed

Once a contract for a batch has been executed by the Approved Vendor and the utility, the next step is for projects not yet developed to be developed and energized. These timelines are based upon the contract execution date so that any delays in processing and approving an application will not reduce the time available for development.

- Distributed generation projects will be given one year to be developed and energized.
- Community solar projects will be given 18 months to be developed, energized, and demonstrate that they have sufficient subscribers.

A project that is not completed in the time allowed (plus any extensions granted) will be removed from the contract, and the REC volume associated with the project will be eliminated from the contract. The Approved Vendor will also forfeit the posted collateral associated with the project. Any forfeiture of collateral by the Approved Vendor under the REC contract will be considered to be returned to the utility's available Renewable Resources Budget. As described in Section 6.3.3, that newly open REC volume will become available to other projects, subject to budget availability.

A project that is not completed in time and is removed from the contract may be subsequently re-submitted by an Approved Vendor, but will be treated like any other new system being submitted.

[455] This provision would not apply to cash collateral for the following reason. If a project had a total REC value of $100, $5 of collateral would be due. To swap the 5% collateral for a withheld payment, $100 in total payments ($95 of REC payments plus a return of $5 collateral) would need to be made, leaving a balance held by the utility of $5, the same as before. On the other hand, if the collateral were a letter of credit, then a payment of $95 would eliminate the need for the Approved Vendor to maintain the letter of credit (or portion thereof) for the remaining life of the contract.

Since the development of the January 2019 REC delivery contract and the subsequent execution of that contract in connection with projects, one circumstance not adequately addressed through that contract may deserve Commission attention. In some instances, the developer of an Adjustable Block Program project may learn that development of the project is no longer feasible—whether due to financing falling through, the system host no longer wanting to move forward with the project, or myriad other circumstances. Presently, such a system could not be removed from the contract until contract requirements related to a Seller meeting the system's energization deadline were not timely met, a contract violation which may not occur until over one year from the point at time in which the Seller learns that development is no longer feasible. Thus, through this revised Plan, the Agency sought Commission permission to allow the Seller to provide notification to the Buyer, the Agency, and the Commission that it is exercising its option allowing for a system's removal from the contract because the Approved Vendor no longer wish to develop that system. Under these circumstances, the Seller would forfeit the posted Performance Assurance applicable to the system. Doing so would allow the contract parties (the utility Buyer and Approved Vendor Seller) to no longer maintain a contractual obligation when performance is no longer intended, while also providing clarity to the Agency and its Program Administrator about the availability of new Program capacity through removal of a project from a REC contract. This proposal was approved by the Commission; under the Commission's Order, the Agency will have responsibility for developing the specific forms and procedures to effectuate this option for Sellers.[456]

6.15.2. Extensions

Extensions will be granted for the following circumstances.

- An indefinite extension will be granted if a system is electrically complete (ready to start generation) but the utility has not approved the interconnection. The Approved Vendor must document that the interconnection approval request was made to the utility within 30 days of the system being electrically complete, yet not processed and approved.
- A 6-month extension will be granted for documented legal delays, including permitting delays.
- A 6-month extension will be granted upon payment of a refundable $25/kW extension fee, for distributed generation systems, and up to two 6 month extensions for community solar projects (the second extension is only for achieving the required subscriber rate, not for project completion and energization, and will require an additional refundable $25/kW fee). The extension fee(s) is payable to the contracting utility, and would be refunded as part of the first (or only for systems up to 10 kW) REC payment.
- The Agency may also, but is not required to, approve additional extensions for demonstration of good cause.

6.15.3. Project Completion and Energization

The Approved Vendor will provide the Program Administrator with a status update on each project under development but not yet energized at least every six months and will inform the Agency of any significant changes to the system.[457] For community solar projects, the update will include an update

[456] See Docket No. 19-0995, Final Order dated February 18, 2020 at 80.

[457] For systems under 25 kW, that status update is only be required for a system where there is a change in status (e.g., a project being completed, or canceled).

on the status of acquiring subscribers. The Agency and Program Administrator will provide a standardized form (including standard status categories to simplify reporting) for this purpose.

Once a project is energized, the following information will be required from the Approved Vendor in order for the Program Administrator to approve the final project and authorize the start of payment for RECs.

- Final system size
- Final system specific capacity factor and 15-year REC production estimate
- GATS or M-RETS unit ID[458]
- Certificate of Completion of Interconnection or comparable documentation[459, 460]
- Photographic documentation of the installation
- Disclosure of any changes to the system technical specifications that occurred between the initial application and the completion of the project
- Identity of the installer (must be a Qualified Person under Part 468 of the ICC's Rules)

Additional requirements may be published by the Program Administrator if the Agency determines that such requirements are warranted, and the Program Administrator may reference other sources (such as public databases) to determine the accuracy of any submissions.

If the final system size is larger than the proposed system size such that it would cause the system to change from the up to 10 kW to the over-10 kW category, the payment terms will be adjusted from the full payment on energization to 20% on energization and the balance over the next four years. The price per REC will also be changed to the applicable REC price for the over 10 kW category in effect at the time when the system is energized.

For systems over 10 kW, any adders received will be based on the final system size if that final system size would cause the adders to decrease. A system that is developed at a size smaller than the original application will not be eligible for additional adders.

The quantity of RECs used for payment calculations is based on the lesser of the RECs calculated based on the proposed (Part I) system size and capacity factor, and the RECs calculated based on the final (Part II) system size and capacity factor. The final capacity factor can be adjusted down from the initial capacity factor but cannot be increased from the original capacity factor, including changes in capacity factor due to switches between tracking technology, non-tracking and tracking systems, and bifacial vs standard module use. In this way, a system that is built smaller than planned will not benefit from excess REC payments that could result from purposefully submitting the project at a larger size than really intended. On the opposite side, if a project's final system size is significantly larger than the planned system size, an increase in the payment due could present unexpected budget management challenges. An Approved Vendor has the option of canceling and resubmitting a system if the final size is larger than the proposed system to align the REC quantities or if it desires to have the system change from a distributed generation project to a community solar project, or vice versa. However, that resubmittal would be at the price of the block open at the time, and not at the time of

[458] GATS or M-RETS registration must be complete and unit ID verifiable through GATS or M-RETS public reports.

[459] Comparable documentation would only apply for a rural electric cooperative or municipal utility that does not provide a Certificate of Completion of Interconnection.

[460] Per Section 1-75(c)(1)(K) of the IPA Act, the date of final interconnection approval must be no earlier than June 1, 2017.

the original submittal. Because the Program Administrator will need to review the system design (because of the change in system size), a new application fee will be required. If a project is resubmitted, the collateral associated with the original system may be applied to the resubmitted system, if approved.

The Agency emphasizes that, while the Approved Vendor is the entity that receives REC payments, the terms of sharing that REC payment value with customers (completely, partially, or not at all; immediately or over time; directly or indirectly) or obligations associated with a system's performance assurance payment are left to a customer and Approved Vendor (or customer and designee) to work out between themselves prior to executing an agreement.

The Agency reserves the right to request more information on an installation, and/or conduct on-site inspections/audits of projects to verify the quality of the installation and conformance with the project information submitted to the Agency. Projects found not to conform with applicable installation standards and requirements, or projects found not to be consistent with information provided to the Agency will be subject to removal from the program if the deficiencies cannot be remedied. Likewise, Approved Vendors who repeatedly submit projects featuring application errors or inconsistencies with Program requirements may be subject to suspension or termination of their Approved Vendor status.

6.15.4. Additional Requirements for Community Solar Projects

A community solar project will have to demonstrate that it has met a minimum subscription level to be considered energized and eligible to receive payment for RECs. At least 50% of the capacity of the project must be subscribed at the time of energization in order to receive payment for RECs, and that payment will be based upon calculating the number of RECs that correspond with the amount of the project's capacity that has been initially subscribed. The Approved Vendor will report subscription levels on a quarterly basis during the first year. The calculation of the number of RECs for payment will be updated after one year of operation (based on the final quarterly report of that first year) to allow for the acquisition of additional subscribers. A community solar project may request one additional extension (with a refundable extension payment as provided for in Section 6.15.2) to its energized date if it needs additional time to acquire subscribers.

To the extent that an Approved Vendor demonstrates additional subscriptions or updated subscription mixes that would entitle the Approved Vendor to a greater payment, the contract will require that the second payment reflect the increased value for quarters where the additional subscriptions or updated subscription mix entitled the Approved Vendor to additional revenue. If subscriber levels (or mixes) change in such a manner that contract value is reduced, the additional payments would also be adjusted downwards accordingly.[461]

The calculation of the maximum number of RECs due payment will be determined by the project's subscription level after one year of operation (and will be subject to the maintenance of subscription levels as described in Section 6.17). For example, if a project is expected to produce 1,000 REC/year and after one year of operation is 95% subscribed (on a project capacity basis), then the annual REC production value used for the contract payment level would be 950 RECs. Under the REC delivery contract, the Approved Vendor would then be obligated to deliver to the utility 95% of the RECs

[461] See Docket No. 17-0838, Final Order dated April 3, 2018 at 118.

produced by that system each year. The ownership (and any subsequent transfer or sale) of the remaining 5% of RECs would be outside of the contract.

The adders for small subscriber participation (i.e., for a minimum of 25%, 50%, or 75% of energy being subscribed) will only be added (on a prorated basis) to the REC price if the project demonstrates that level of participation for the subscribed amount at the time of energization. If the subscription level has not been met by the time of energization, the adder will be held back from the initial payment and the system will have to wait until it has been in operation for one quarter to demonstrate that it has begun to meet the small subscriber participation level to begin to receive this adder. If the small subscriber subscription rate is met, then the full value of the adder will be added pro-rata to the remaining payments.

Ongoing requirements for overall subscription levels and small subscriber participation are discussed further in Section 6.16.

6.15.5. REC Delivery

Once a system is energized, it will be required to begin REC delivery. For systems larger than 5 kW, the first REC must be delivered within 90 days of when the system is energized and registered in GATS or M-RETS. For systems smaller than 5 kW, 180 days will be allowed. The 15-year delivery term will begin in the month following the first REC delivery and will last 180 months.

Approved Vendors will be required to set up an irrevocable Standing Order for the transfer of RECs from the system to the utility.[462] As the Agency understands that automatic transfers can only be terminated with the consent of both parties, this will reduce the risk to the utility that the RECs could be sold to another party after the utility has paid for them.

As part of the Annual Report discussed in Section 6.17, the Approved Vendor will report on any systems that have not delivered a first REC, and report on any systems that have not delivered RECs for more than a year from their previous delivery. The report will also detail what corrective actions will be taken to ensure future deliveries. In the event of failure to remedy non-delivery of RECs, the utility may draw on the collateral it holds from the Approved Vendor.

6.16. Ongoing Performance Requirements

A significant challenge for the Adjustable Block Program is that the payment for RECs is front loaded; all RECs are paid for on energization for systems up to 10 kW, and all payments for systems over 10 kW will be made within the first four years of energization. Yet the contracts for REC delivery have a 15-year obligation for the RECs to be delivered. This creates a situation in which, absent any additional measures, the buyer (the utility) will be unable to use the typical contractual tool of withholding payments for the item not yet received to ensure REC delivery. Fortunately, the Act anticipated this issue and requires that "[e]ach contract shall include provisions to ensure the delivery of the renewable energy credits for the full term of the contract."[463]

[462] See Section 10.2 of the GATS Operating Rules available at https://www.pjm-eis.com/~/media/pjm-eis/documents/gats-operating-rules.ashx.

[463] 20 ILCS 3855/1-75(c)(1)(L)(iv).

The Agency will utilize the approach described below to ensure REC delivery over the full term of the contracts. This approach will also ensure proper matching of adders for photovoltaic community renewable generation projects at different levels of residential subscription levels.

REC delivery obligations will be managed at a portfolio level. As projects are completed and become energized, each Approved Vendor will therefore have a portfolio of systems with REC delivery obligations from the various contracts that it has with each utility. The obligation to ensure REC delivery will be at the contract level rather than the individual project level. In this way, the natural variation that some systems will produce more RECs than forecast and others fewer RECs will reduce the risk of contract default, compared to project-level contracts, and allow for some ease in contract administration.

6.16.1. Credit Requirements

An Approved Vendor is required to post collateral equivalent to 5% of the total contract value within 30 business days of when each Batch's contract (or product order) is approved. As described in Section 6.14.6, if the collateral was provided in the form of a Letter of Credit, then the Approved Vendor may choose for the utility to withhold the collateral amount for each system from the last REC payment for the system (or only REC payment for small systems) in exchange for not needing to maintain the collateral in the form of the Letter of Credit.. In this situation, the collateral would be reduced as described below, and fully returned at the end of the contract (net any amounts that were drawn to meet contractual obligations). As systems are energized, this collateral amount (or deferred payment) will be maintained through the life of the contract. This requirement will be maintained at the portfolio level, not the individual contract or system level.

By maintaining collateral requirements at the portfolio level, Approved Vendors can better manage the risk that some systems may underperform (or have other problems) while others may overperform. This allows the collateral level to be lower than it would be if maintained at the system level.

The Agency wishes to emphasize that this Plan does not prescribe the source of funds for collateral, whether it be an Approved Vendor's cash on hand, bank borrowings, the project owner's funds, customer-provided funds, a letter of credit, or some other source.

Nonetheless, an Approved Vendor will be responsible for delivering RECs each year under its contracts (subject to the reduction options described in the following Section). On an annual basis, failure to deliver RECs for the previous year will result in the utility drawing on the collateral to be compensated for the undelivered RECs from that year that already received payment. After any such drawing, the Approved Vendor will need to restore its collateral level to bring it back up to the 5% of remaining value of the portfolio within 90 days. If the amount of collateral held for an Approved Vendor is insufficient to compensate the utility, the Approved Vendor will be required to pay the utility for the balance of the value of the undelivered RECs from that previous year. Failure to make payment and/or maintain the collateral requirement may result in the Approved Vendor's suspension from participating in the Program.

Additionally, the Agency understands and appreciates that the natural degradation of photovoltaic system's productive capacity will likely result in reduced delivery quantities in the later years of a system's performance under a REC delivery contract. Annual contractual REC delivery volumes will

thus be decline by 0.5% each year, which the Agency believes should help ensure that collateral is not unfairly drawn upon due to reduced system performance.[464]

Reconciliation of REC deliveries and collateral requirements will be conducted on an annual basis based on the Annual Reports filed by the Approved Vendors as described in Section 6.17.

6.16.2. Options to Reduce REC Delivery Obligations

Section 1-75(c)(1)(L) of the IPA Act provides that "[t]he electric utility shall receive and retire all renewable energy credits generated by the project for the first 15 years of operation."[465] The capacity factor as described in Section 6.14.5 will be used to calculate the number of expected RECs each system generates, and thus the overall payment for that system. If a system produces more RECs than expected from that calculation, then no adjustment would be made to payments or to the statutorily mandated 15-year REC delivery term. However, if the system produces fewer than the expected number of RECs, then the following conditions would apply.

The Agency expects each Approved Vendor to take the steps necessary to ensure that projects contained within its portfolio meet all expected REC deliveries. This may include working with system owners to ensure that ongoing maintenance and repairs of systems occurs as well as to ensure that meter/inverter data is properly transferred to GATS or M-RETS for the creation of RECs. Furthermore, Approved Vendors will be responsible for ensuring the ongoing transfer of RECs to the applicable utility. However, because weather and other factors may impact annual production values, REC delivery performance will be evaluated on a three-year rolling-average basis, although any overproduction may be carried forward (or "banked") for performance evaluation and collateral purposes into future contract years without expiration.[466] However, a project or portfolio is not entitled to additional compensation if a carryforward remains as project-specific contracts expire.[467]

There are circumstances where a system may not be able to deliver the RECs it was expected to produce; the Agency believes that reasonable accommodations should be made for these situations that appropriately balance the requirements for the utilities to comply with RPS targets and their expectation to receive RECs for which payment has already been made while acknowledging that unexpected situations may arise at no fault of the Approved Vendor.

In force majeure type circumstances (including, but not limited to, physical damage to the system from fires, tornados, etc.) the Approved Vendor may request to have a delivery obligation suspended, reduced, or eliminated without penalty.[468] Approval of the recognition of a force majeure event requires consensus between the Agency and the applicable utility. Curtailments by either the utility (including those through a smart inverter) or the RTO that result in reduced REC production would allow for reduced REC delivery obligations.

In the case of reductions or eliminations of delivery obligations, the Approved Vendor must demonstrate what measures have been taken that do not adequately cure the situation (such as filing and receiving an insurance claim that is inadequate to restore the system to operation). For the

[464] See Docket No. 17-0838, Final Order dated April 3, 2018 at 129.

[465] 20 ILCS 3855/1-75(c)(1)(L)(ii).

[466] All RECs must be delivered to the counterparty in the delivery year when produced, regardless of any overproduction under the contract. See Docket No. 17-0838, Final Order dated April 3, 2018 at 129.

[467] See Docket No. 17-0838, Final Order dated April 3, 2018 at 129.

[468] Specific circumstances that constitute force majeure have been outlined and memorialized through the contract development process.

suspension of delivery obligations, the Approved Vendor must demonstrate that reasonable measures are being taken to have a timely restoration of production. Approved suspension of delivery obligations will serve to change the end date for the 15-year REC delivery timeline to reflect the time the delivery obligations were suspended.

An Approved Vendor may also determine that a system is not performing at the level expected in the absence of force majeure circumstances. In this circumstance, the Approved Vendor may request to have the delivery obligation related to that system within its portfolio reduced in exchange for the return to the utility of a payment adjustment to account for all undelivered RECs at the original delivery level as of the time of the request.

6.17. Annual Report

On an annual basis, each Approved Vendor is required submit an Annual Report of the contracts and systems in its portfolio.[469] The Annual Report serves as the basis for verifying that RECs from projects are being delivered to the applicable utility, and, absent corrective actions taken by the Approved Vendor, will be used to determine what actions should be taken by the utilities to enforce the contractual requirements that RECs are delivered, including, but not limited to, drawing on collateral. Additionally, the Annual Report will be used by the Agency to consider the ongoing eligibility of an Approved Vendor to continue participation in the program.

For distributed generation systems, the report will include information on:

- RECs delivered by each of the systems in the portfolio
- Status of all systems that have been approved, but not yet energized, including any extensions requested and granted
- Energized systems that have not delivered RECs in the year
- Balance of collateral held by each utility
- A summary of requests for REC obligations reductions due to force majeure events
- A summary of requests for REC obligations, suspensions, reductions, or eliminations due to force majeure events
- Information on consumer complaints received
- Other information related to ongoing program participation, including use of graduates of job training programs and other information related to increasing the diversity of the solar workforce[470]

For community solar projects, the report will also include:

- Percentage of each system subscribed on a capacity basis
- The number and type of subscribers (e.g., residential, small commercial, large commercial/industrial), including capacity allocated to each type
- Subscriber turn-over rates

[469] Approved Vendors may request confidential treatment of the Annual Report. However, aggregated information from Annual Reports may be publicly disclosed by the Agency to the extent that it does not disclose Approved Vendor-specific confidential information.

[470] As discussed in the Commission's Order approving the Revised Plan, this requirement was added in order to learn from and celebrate how the increase in solar development in Illinois is improving diversity in the state's renewable energy workforce. The IPA commits to seeking stakeholder feedback on how this information should be reported and commits to gathering this information for informational purposes only. See Docket No. 19-0995, Final Order dated February 18, 2020 at 87.

The Agency will review the annual reports to assess compliance with the requirements of the Adjustable Block Program and, if there are shortfalls of REC deliveries or subscription levels for photovoltaic community renewable generation projects, will coordinate with the applicable utility on what remedies should be taken, including drawing on collateral.[471] For this process and those described in the next two paragraphs, the performance evaluation and collateral draw methodologies have been specified in the standard REC delivery contract.

For community solar projects, subscription levels must be maintained to remain eligible for REC payments. If the annual report shows that subscriber levels on a rolling average basis have fallen below the subscribership level that the project contractually committed to, then if REC payments are still due, those payments will be reduced as described earlier in this chapter; if all payments have been made, then the Agency will work with the applicable utility on what remedies should be taken including drawing on collateral. If a project's subscribership falls below 50% for a given delivery year, no payment would be owed to the project for that delivery year, and a payment reduction or collateral draw would result (although the project could regain 50% subscribership the following year and qualify for payment in relation to that year).

A similar review will be conducted for projects that have received a small subscriber participation adder but do not maintain sufficient levels of small subscriber participation. If small subscriber participation levels are not maintained and there are remaining REC payments due, those payments will be reduced (to either the actual small subscriber adder category that has been maintained, or to remove the adder altogether if the level falls below 25%). If all payments have been made, then the Agency will work with the applicable utility on what remedies should be taken including drawing on collateral.

Approved Vendors will be given 90 days to cure any deficiencies found by the Agency and/or utilities.

[471] The Agency will request on a semi-annual basis a report from each utility on RECs delivered by contract.

7. Community Renewable Generation Projects

Community Renewable Generation is still a relatively new concept in Illinois. It is intended to allow consumers to participate in renewable energy generation even if they are unable to have an on-site system at their home or business, and to offer a more direct connection to the benefits of renewable energy than signing up for a renewable energy retail supply offer from an Alternative Retail Electric Supplier (where information about the specific sources, costs, and benefits of the renewable energy and the underlying generating system(s) may not be readily available).

Community, or "shared," renewable energy is growing nationally, most often in conjunction with solar power. The Solar Energy Industries Association reports that nearly 1,400 MW of community solar had been developed through 2018.[472]

Many policy issues that have been debated in other states are resolved in Illinois through the Act itself, including elements of project size, ownership structures, and the number and type of subscribers. In addition to explaining those aspects of Illinois law, in this Chapter, the Agency outlines the terms and conditions for the Community Renewable Generation Program that are not prescribed by the Act.

7.1. Statutory Overview

The Act contains several key provisions designed to make community renewable generation economically viable and practical in Illinois. These provisions create a program, provide it with important structure, and increase the benefits to participants through changes to net metering and bill crediting and the ability to monetize the value of RECs from the systems.

Section 1-10 contains several key definitions:

> *"Community renewable generation project" means an electric generating facility that:*
>
> *(1) is powered by wind, solar thermal energy, photovoltaic cells or panels, biodiesel, crops and untreated and unadulterated organic waste biomass, tree waste, and hydropower that does not involve new construction or significant expansion of hydropower dams;*
>
> *(2) is interconnected at the distribution system level of an electric utility as defined in this Section, a municipal utility as defined in this Section that owns or operates electric distribution facilities, a public utility as defined in Section 3-105 of the Public Utilities Act, or an electric cooperative, as defined in Section 3-119 of the Public Utilities Act;*
>
> *(3) credits the value of electricity generated by the facility to the subscribers of the facility; and*
>
> *(4) is limited in nameplate capacity to less than or equal to 2,000 kilowatts.*
>
> *[…]*
>
> *"Subscriber" means a person who (i) takes delivery service from an electric utility, and (ii) has a subscription of no less than 200 watts to a community renewable generation project that is located in the electric utility's service area. No subscriber's subscriptions*

[472] https://www.seia.org/initiatives/community-solar.

may total more than 40% of the nameplate capacity of an individual community renewable generation project. Entities that are affiliated by virtue of a common parent shall not represent multiple subscriptions that total more than 40% of the nameplate capacity of an individual community renewable generation project.

[…]

"Subscription" means an interest in a community renewable generation project expressed in kilowatts, which is sized primarily to offset part or all of the subscriber's electricity usage.

These three definitions create the core of the idea of community renewable generation, where subscribers pay for shares or some other "interest" in a centralized (but small) renewable power project, receiving bill credits in exchange. It can be seen as a way of giving customers choices about their electricity generation in a manner that can serve as an alternative to the options created by the establishment of retail choice through the Electric Service Customer Choice and Rate Relief Law of 1997.[473]

Section 1-75(c)(1)(N) creates the community renewable generation program:

(N) The long-term renewable resources procurement plan required by this subsection (c) shall include a community renewable generation program. The Agency shall establish the terms, conditions, and program requirements for community renewable generation projects with a goal to expand renewable energy generating facility access to a broader group of energy consumers, to ensure robust participation opportunities for residential and small commercial customers and those who cannot install renewable energy on their own properties. Any plan approved by the Commission shall allow subscriptions to community renewable generation projects to be portable and transferable. For purposes of this subparagraph (N), "portable" means that subscriptions may be retained by the subscriber even if the subscriber relocates or changes its address within the same utility service territory; and "transferable" means that a subscriber may assign or sell subscriptions to another person within the same utility service territory.

Electric utilities shall provide a monetary credit to a subscriber's subsequent bill for service for the proportional output of a community renewable generation project attributable to that subscriber as specified in Section 16-107.5 of the Public Utilities Act.

The Agency shall purchase renewable energy credits from subscribed shares of photovoltaic community renewable generation projects through the Adjustable Block program described in subparagraph (K) of this paragraph (1) or through the Illinois Solar for All Program described in Section 1-56 of this Act. The electric utility shall purchase any unsubscribed energy from community renewable generation projects that are Qualifying Facilities ("QF") under the electric utility's tariff for purchasing the

[473] One aspect of the success of retail competition in Illinois has been municipal aggregation programs whereby a municipality negotiates an electric supply offer from an ARES on an opt-out basis for eligible retail customers. The Agency understands that those customers who participate in a municipal aggregation program remain individual customers and thus would be considered individually for the purposes of the 40% cap on individual subscriptions. The aggregator would not be considered a subscriber to a community renewable generation project.

> *output from QFs under Public Utilities Regulatory Policies Act of 1978. The owners of and any subscribers to a community renewable generation project shall not be considered public utilities or alternative retail electricity suppliers under the Public Utilities Act solely as a result of their interest in or subscription to a community renewable generation project and shall not be required to become an alternative retail electric supplier by participating in a community renewable generation project with a public utility.*

This Chapter describes the "terms, conditions, and program requirements" applicable to projects participating in an IPA program featuring community renewable generation project participation and how RECs produced by that facility are purchased. Certain other aspects of the Program requirements are administered by the applicable utility, and the Agency will coordinate with those entities to ensure compliance with the Act.

While the Act defines community renewable energy as including solar, wind, biomass, and other renewable sources, it creates an Adjustable Block Program only for photovoltaic generation, directing the Agency to "purchase renewable energy credits from subscribed shares" of community solar projects.[474] By procuring their RECs, the Agency is able to offer an additional financial incentive for customers choosing community solar.

Subscribers capture the value of their community energy subscription in the form of a "monetary credit" applied to the subscriber's subsequent utility bill for service, in proportion to the net output of their subscription to the project. The determination of that subscriber utility bill credit is not the subject of this Plan, and is instead established through tariffs filed by the utilities with the Illinois Commerce Commission as discussed further below. Instead, the Agency's role is simply in the procurement of RECs—which helps support the development of new projects and should reduce the subscriber's subscription price. While subscribers may not (if their subscription does not take the form of equity in the project) necessarily directly receive revenue for the RECs procured for the utilities by the Agency, that revenue should factor into the economics faced by the project developer and impact the subscription offer made to subscribers.

The monetary credits for net energy production flow from provisions of the Public Utilities Act that expand the concept of net metering, which had previously been available for distributed generation, to become available for community renewable generation subscribers. The previous version of Section 16-107.5(*l*) of the Public Utilities Act before the enactment of Public Act 99-0906 provided that electric utilities merely "shall consider" whether to allow community-owned facilities or meter aggregation projects in a single building. The revised version of that Section adds the requirement to Section 16-107.5 that utilities *shall allow*[475] net metering for subscribers to "community renewable generation projects," as well as the other two types of community renewable projects.

The new law requires an "electricity provider" (meaning an electric utility or alternative retail electric supplier) to provide net metering credits for a community solar subscriber's share of a project's net electricity production at the subscriber's energy supply rate.[476]

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[474] As discussed elsewhere, the Agency understands "purchase" effectively to mean "procure" as used in this provision, as the Agency would not directly enter into contracts with renewable providers using non-RERF (or otherwise non-state-held) funds.

[475] 220 ILCS 5/16-107.5(l)(1).

[476] Community solar projects are to receive energy-only net metering credits starting from the enactment of Public Act 99-0906 on June 1, 2017 (or whenever each electricity provider implements the tariff or terms to do so following June 1, 2017), in contrast to other types of

Public Act 99-0906 also required that each electric utility file a community solar net metering tariff within 90 days after the new law's effective date of June 1, 2017. Each of ComEd, Ameren Illinois, and MidAmerican filed a proposed tariff during August of 2017, and the Commission approved all three tariffs on September 27, 2017.[477] These tariffs are discussed further in Section 7.7 of this Plan.

ComEd's tariff consisted of modifications to its Rider POGCS (Parallel Operation of Retail Customer Generating Facilities Community Supply), Rider POG (Parallel Operation of Retail Customer Generating Facilities), Rider PORCB (Purchase of Receivables with Consolidated Billing), and Rate RESS (Retail Electric Supply Service). Ameren's tariff consisted of a complete revision to its Rider NM (Net Metering) to now incorporate provisions governing community renewable net metering. MidAmerican's tariff created a new Rate NMS to embody its new community renewable net metering program.

7.2. Eligible Generating Technologies and Procurement/Program Eligibility

Community renewable generation projects that are photovoltaic will be eligible to participate in the Adjustable Block Program outlined in Chapter 6. Other types of community renewable generation projects (the listing for which can be found in the definition of "renewable energy resources" found in Section 1-10 of the IPA Act) were eligible to participate in the competitive procurement outlined in Chapter 5 of the Initial Plan. These options define the process by which a system would come under contract with a utility to sell its RECs, and each option features different payment terms. The Adjustable Block Program has front-loaded REC payments, while competitive procurements will pay for RECs as they are delivered. Other than these contractual differences, the Agency believes all community renewable generation projects (including those participating in the Adjustable Block Program) should be treated the same as to other terms and conditions that follow in this Chapter, unless specifically noted.

For non-photovoltaic community renewable generation projects, the price per REC they will be paid will be based upon the price of each winning bidder's bid in the competitive procurement and is not tied to any adders or requirements for residential subscription rates.

7.3. Co-location of Projects

Co-location is when multiple projects are located adjacent to each other, perhaps using the same grid interconnection. Co-located projects can be structured to maximize income from incentives, such as by dividing up a larger project into smaller pieces that qualify for higher incentives. Community Renewable Generation Projects are defined in the Act as being smaller than or equal to 2,000 kW, and for photovoltaic projects, the Adjustable Block Program includes adders for smaller projects. Co-location strategies could therefore result in the gaming of prices.

Minnesota offers two points of experience with the issue of co-location, for both community wind and community solar. Under both policies, larger projects were structured as a series of smaller projects to qualify for higher incentives, undermining the legislative intent of promoting distributed, community-owned projects. A 30 MW wind project, owned by 15 corporate entities with the same owners, was developed under the Minnesota Community-Based Energy Development (C-BED) tariff

distributed generation, which will continue to receive full retail rate net metering from June 1, 2017 until total net metering for that electricity provider reaches 5% of the electricity provider's peak demand, as discussed in Chapter 6.

[477] See ICC Docket No. 17-0350 (ComEd), ICC Docket No. 17-0368 (MidAmerican), and ICC tariff no. ERM 17-144 (Ameren Illinois).

program, which was intended to encourage community-owned wind projects of 2 MW or less. That program was reformed in 2003 to be more prescriptive, limiting ownership to Minnesota residents, with a single owner limited to a 15% share of a project.[478]

The more recent Minnesota Community Solar Gardens policy led to a similar problem. While the legislature capped project size at 1 MW, it did not address co-location issues. As a result, 15 co-located, aggregated projects were proposed between 10 and 20 MW, three between 20 and 30 MW, and two in the 30 to 50 MW range. One developer, Sunrise Energy Ventures, filed applications for 100 projects within the first hour of the program. When the state Public Utilities Commission ("PUC") imposed co-location caps of 5 MW for projects with filed applications and 1 MW for newly proposed projects, Sunrise appealed to the Minnesota Court of Appeals. The Court, however, affirmed the PUC's decision to implement caps.[479]

While co-location can undermine the concept of smaller and more geographically diffuse projects, it can also capture economies of scale from larger projects: large, available parcels with good interconnection points can be low-cost and efficient ways to develop large amounts of renewables quickly. Low development costs could help compensate for the higher marketing and customer acquisition costs of community renewable generation and provide greater benefits to low-income customers. Also, different owners might apply to develop completely distinct projects at different times, that just happen to be on adjacent parcels; restrictive rules would limit the development of especially attractive parcels of land.

7.3.1. Co-location Standard

In enacting Public Act 99-0906, the General Assembly expressly included a size limit for community renewable generation projects of 2,000 kW,[480] and the Agency does not believe it should ignore the intent of that size limit being included in the definition of community renewable generation projects. Additionally, as discussed in Section 6.5.1, the Agency seeks to avoid the situation in which multiple smaller projects are co-located in order to obtain the higher REC prices available to smaller systems.

To appropriately balance these competing issues, in recognition of a need to avoid problems of the types seen in Minnesota,[481] and generally consistent with the Commission's Order in Docket No. 17-0838,[482] the following policy is applicable to the co-location of Community Solar projects participating in the Adjustable Block Program:

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[478] Jessica A. Shoemaker and Christy Anderson Brekken, Farmers' Legal Action Group, *Community Wind: A Review of Select State and Federal Policy Incentives,* August 2006, http://www.flaginc.org/wp-content/uploads/2013/03/CommWindAug061.pdf.

[479] Mitchell Williams, Selig Gates & Woodyard PLLC, "Community Solar Gardens: Minnesota Appellate Court Allows Public Utility Commission to Implement Caps on Usage," Lexology, August 23, 2016. http://www.lexology.com/library/detail.aspx?g=c4690835-61c4-40cf-8105-0cc8d3229c77.

[480] See 20 ILCS 3855/1-10 ("'Community renewable generation project' means an electric generating facility that . . . is limited in nameplate capacity to less than or equal to 2,000 kilowatts.").

[481] These principles are derived from the definition adopted in Minnesota regarding co-location. See, Minnesota PUC, In the Matter of the Petition of Northern States Power Company, dba Xcel Energy, for Approval of Its Proposed Community Solar Garden Program. Order Adopting Partial Settlement As Modified. August 6, 2015. Docket No. E-002/M-13-867. https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId={43AC9E59-AD57-44FE-A57A-5F8A572D3C74}&documentTitle=20158-113077-01.

[482] See Docket No. 17-0838, Final Order dated April 3, 2018 at 131. The Agency's standard makes minor modifications which the Agency considers to be within the spirit of what was approved in that proceeding, as the Commission's Order – if read literally – would allow for the co-location of two 2 MW projects, but would prohibit the co-location of two 1.9 MW projects.

- No Approved Vendor may apply to the Adjustable Block Program for more than 4 MW of Community Solar projects on the same or contiguous parcels (with each "parcel" of land defined by the County the parcel is located in).[483]
- Co-located projects summing to more than 2 MW of Community Solar may be permissibly located in one of two ways:
    - Two projects of up to 2-MW in size on one parcel or contiguous parcels; or
    - An up to 2-MW project on each of two contiguous parcels.[484]
- A parcel of land may not have been divided into multiple parcels in the two years prior to the project application (for the Adjustable Block Program) or bid (for competitive procurements) in order to circumvent this policy. If a parcel has been divided within that time period, this requirement will apply to the boundaries of the larger parcel prior to its division.
- If there are multiple projects owned or developed by a single entity (or its affiliates) located on one parcel of land, or on contiguous parcels of land, any size-based adders will be based on the total size of the projects owned or developed on the contiguous parcels by that single entity or its affiliates. Furthermore, the total combined size of projects owned or developed by a single entity (or its affiliates) on contiguous parcels of land may not be more than 2 MW, or more than 4 MW if co-located consistent with the provisions outlined above.[485]
    - "Affiliate" means, with respect to any entity, any other entity that, directly, or indirectly through one or more intermediaries, controls, is controlled by, or is under common control with each other or a third entity. "Control" means the possession, directly or indirectly, of the power to direct the management and policies of an entity, whether through the ownership of voting securities, by contract, or otherwise. Affiliates may not have shared sales or revenue-sharing arrangements, or common debt and equity financing arrangements.
    - "Contiguous" means touching along a boundary or a point. For example, parcels touching along a boundary are contiguous, as are parcels that meet only at a corner. Parcels, however near to each other, that are separated by a third parcel and do not touch along a boundary or a point are not contiguous. Additionally, parcels that are separated by a public road, a railroad, or other right of way accessible at all times to the general public are not contiguous.
- Projects owned or developed by separate entities (meaning that that they are not affiliates) may be located on contiguous parcels. If there is a naturally good location from an interconnection standpoint, one owner should not be allowed to prevent another owner from developing a project in that location.
- Projects must have separate interconnection points.

Additionally, on May 2, 2018, the Commission entered an Amendatory Order in Docket No. 17-0838 authorizing the IPA to "investigate outside of this docket the probability of cost savings (if any) for co-located projects that puts their average costs below those modeled in the IPA's REC pricing model, and if warranted based on the results of that investigation, establish a tier in its REC pricing model applicable to co-located systems exceeding 2 MW in aggregate size."[486] The IPA's June 4, 2018 REC

[483] See id.

[484] See id.

[485] See id.

[486] Docket No. 17-0838, Amendatory Order dated May 2, 2018 at 1-2.

Compliance Filing containing updated REC values reflects the establishment of a REC pricing model tier applicable to co-located Community Solar systems exceeding 2 MW in aggregate size.

If a single project is developed and then a second, co-located project is developed on the same or a contiguous parcel at a later date, the approach above contemplates that these two projects will be considered co-located and co-located project prices will apply. To make this price adjustment the least administratively burdensome on all parties involved, the price adjustment for both projects will only be applied to the second project, with that project's REC price reflecting not only the co-located project price, but also an additional discount reflecting the differential between the first project's contract price and the applicable Block's co-located project price. This co-located pricing provision will only be applicable if the Commission's approval of the second project is within one year or less of the Commission approval date of the first project. If the first project has not yet commenced construction at the time of the second project's approval, then the co-located pricing provision will apply.

In the case that there are two co-located projects on a single parcel (or two contiguous parcels) owned by a single entity or represented by a single Approved Vendor, any sale of one project to a different owner or transfer of one project to a different Approved Vendor would not avoid the price adjustment that applies to co-located projects. In such a case, the second project's REC price would be adjusted to a price accounting for both co-located projects (i.e., below the listed co-located project price) in line with the description above. This restriction also applies to projects that are accepted off the waitlist that would render an already developed project into a co-located project.[487]

7.4. Eligibility of Projects Located in Rural Electric Cooperatives and Municipal Utilities

The definition of community renewable generation projects specifically mentions rural electric cooperatives and municipal utilities,[488] but does not explicitly include or exclude them from any program or procurement to be run by the Agency. Moreover, the definition includes the concept of that project having "subscribers," a term which in turn has a definition that defines such "subscribers" as "tak[ing] delivery service from an *electric utility*," which as defined in the IPA Act does not include cooperative and municipal utilities.[489] This results in ambiguity around whether a community renewable generation project can be located within the service territory of a rural electric cooperative or a municipal utility.

Ultimately, the Agency recognizes the General Assembly's choice expressly to include those entities in defining "community renewable generation projects"—a term only used in the IPA Act in

[487] The Commission affirmed the propriety of this approach through approving the Plan. See Docket No. 19-0995, Final Order dated February 18, 2020 at 95.

[488] See 20 ILCS 3855/1-10 ("'Community renewable generation project' means an electric generating facility that is . . . interconnected at the distribution system level of an electric utility as defined in this Section, a municipal utility as defined in this Section that owns or operates electric distribution facilities, a public utility as defined in Section 3-105 of the Public Utilities Act, or an electric cooperative, as defined in Section 3-119 of the Public Utilities Act").

[489] Specifically, Section 1-10 of the IPA Act defines an electric utility as having "the same definition as found in Section 16-102 of the Public Utilities Act," which is "a public utility, as defined in Section 3-105 of this Act, that has a franchise, license, permit or right to furnish or sell electricity to retail customers within a service area." 220 ILCS 5/16-102. Section 3-105 of the PUA in turn defines "public utility" to expressly *exclude* "public utilities that are owned and operated by any political subdivision, public institution of higher education or municipal corporation of this State, or public utilities that are owned by such political subdivision, public institution of higher education, or municipal corporation and operated by any of its lessees or operating agents" as well as "electric cooperatives as defined in Section 3-119" of the PUA. 220 ILCS 5/3-105.

connection with the Agency's community renewable generation program—and believes that community renewable generation projects (including community solar) located in these service territories should, if possible, be included in this Plan.

The status of community renewable generation projects and distributed renewable energy generation devices located in the service territories of rural electric cooperatives, municipal electric utilities, and Mt. Carmel Public Utility Company was a contested issue in Docket No. 17-0838, and the Commission's Final Order in that proceeding determined that the Agency's filed Plan was correct in authorizing the participation of these projects in the Adjustable Block Program, the Community Renewable Generation Program, and the Illinois Solar for All Program.[490] In June 2018, Commonwealth Edison Company filed a petition seeking review of that determination (i.e., an appeal) with the state's Second District Appellate Court, case number 2-18-0504. On May 2, 2019, the Appellate Court affirmed the ICC's decision in this regard. On July 11, 2019, ComEd filed a Petition for Leave to Appeal, no. 124898, with the Supreme Court of Illinois. It was denied on September 25, 2019, resolving this issue and clarifying that projects in the service territories of rural electric cooperatives, municipal electric utilities, and Mt. Carmel Public Utility Company, are indeed eligible to receive REC delivery contracts under the Adjustable Block Program.

As mentioned above, there are already at least three community solar offerings by or within rural electric cooperatives. Illinois' first community solar project was a 126 kW installation in Elizabeth, built by Jo Carroll Energy in December 2014.[491] That project allows Jo Carroll customers to buy individual panels in the 460-panel ground-mounted system, with the energy produced credited against their bills. Prairie Power sells kWh blocks of solar power to customers of its 10 distribution cooperatives through the Bright Options Solar program. The program is supplied by two 500 kW solar installations near Shelbyville and Astoria, both built in 2015.[492] Neither of these projects would be eligible to participate in the Adjustable Block Program because they were energized prior to June 1, 2017, but they indicate that rural electric cooperatives have thus far been the leaders in community solar in Illinois. Several proposed community solar projects that would be located within the Jo Carroll Energy service territory applied to the Adjustable Block Program, and one – the Apple Canyon Lake Solar Farm – was allocated a REC contract via the April 10, 2019 lottery.

The Agency proposes the following standard for allowing community renewable generation projects in the service territories of rural electric cooperatives and municipal utilities to participate in the Agency's programs or procurements; it is unchanged from the standard proposed in the Initial Plan, approved by the ICC in Docket No. 17-0838. This standard may require actions be taken by the rural electric cooperative or municipal utility. As entities not regulated by the state, they are free to choose whether to take these actions, but should they choose not to, then the residents and businesses within their service territories would not benefit from receiving revenue through these programs for its RECs, and thus the economics of such projects may not be as attractive to developers or subscribers.

The requirements for participation that the Agency recommends for a rural electric cooperative or municipal utility follow from those required in the Act for electric utilities:

[490] See Docket No. 17-0838, Final Order dated April 3, 2018 at 177-179.

[491] Jo Carroll Energy, https://jocarroll.com/content/south-view-solar-farm.

[492] Prairie Power, https://www.ppi.coop/brightoptions.

- Be capable of "credit[ing] the value of electricity generated by the facility to the subscribers of the facility."[493] This can be accomplished though offering "virtual net metering" substantially similar to the provisions contained in Section 16-107.5(l) of the Public Utilities Act.[494] The value of electricity credited must be at no lower than the subscriber's supply rate.[495]
- Provide a monetary credit to a subscriber's subsequent bill for service for the proportional output of a community renewable generation project attributable to that subscriber.[496]
- Purchase any unsubscribed energy from community renewable generation projects that are Qualifying Facilities ("QF") under the electric utility's tariff for purchasing the output from QFs under Public Utilities Regulatory Policies Act of 1978.[497]

Prior to a photovoltaic community renewable generation project applying for the Adjustable Block Program, or a community renewable generation project powered by other renewable technologies participating in the competitive procurement, the Approved Vendor shall obtain a certification addressed to the Agency that the rural electric cooperative or municipal utility has met these conditions from the subject cooperative or municipal utility. Absent this information, a project located in the service territory of that rural electric cooperative or municipal utility will not be allowed to participate. All other programmatic requirements for community renewable generation projects (e.g., size limits, co-location, consumer protections) would apply to projects located in rural electric cooperatives or municipal utility service territories. For the purposes of rural electric cooperatives, these requirements apply at the distribution cooperative level, rather than for generation and transmission cooperatives (which do not directly interact with retail customers).

7.5. Types of Community Renewable Generation Projects

Community Renewable Generation remains a new concept for Illinois, and it is still developing nationally. Practitioners are still developing the most viable business models, and new models are likely to emerge, both for-profit and non-profit. In some models, customers take ownership of a share of a community project, identifying specific solar panels. In others, the developer owns the project and sells subscriptions for a contractually obligated term, or an indefinite term that can be ended at will. The value of the generation can be conveyed to the customer by virtual net metering (as an energy credit), by a value-of-solar tariff, or as a premium purchase.

One issue that the Agency has considered is the extent to which projects will be proposed by commercial developers who then seek to identify subscribers, and by community-led projects where interested parties in a community come together to seek to develop a project. A church parish, for example, could put photovoltaic panels on the roof of the church, with subscriptions sold to parishioners. In theory, developer-led projects are likely to be larger and located where interconnection costs are minimized, while community-led projects like the church parish could be smaller and face the possibility of higher interconnection costs because the location is determined by community-focused interests rather than pure engineering considerations. But in practice, the

[493] See definition of "Community Renewable Generation Facility" in 20 ILCS 3855/1-10.

[494] See 220 ILCS 5/16-107.5(*l*).

[495] If the municipal utility or rural electric cooperative does not have unbundled rates (e.g., separate line items for delivery services and electricity supply) then the applicable municipal utility or rural electric cooperative must indicate the portion of the bundled rate that reasonably correlates to the cost of electricity supply service.

[496] See 20 ILCS 3855/1-75(c)(1)(N).

[497] See id.

wide range of interconnection cost estimates offered to the many large community solar projects that have applied to the Adjustable Block Program demonstrate that the drivers of interconnection costs are not the size of the system itself but rather the broader infrastructure the project is interconnecting to.

Properly defining what is truly a community-led project could be problematic and subject to gaming. It is possible, for example, that community groups will team with professional solar developers to realize their projects, with varying ownership structures. Given the long waitlist of community solar projects that have already applied to the Adjustable Block Program, most of which appear to be developer-driven, the Agency is not proposing any changes (such as a price adder) for community-led projects. As discussed in Section 6.3.3.1, the Agency sought feedback on how to manage that waitlist of community solar projects, and has proposed an approach for new blocks of community solar capacity that may encourage applications from more community-driven projects.

Certain community-led projects may instead apply to participate in, and be eligible for, a higher level of incentives through the Illinois Solar for All Program as described in Chapter 8. Developers of Community Solar projects that participate in that program are required to "identify its partnership with community stakeholders regarding the location, development, and participation in the project, provided that nothing shall preclude a project from including an anchor tenant that does not qualify as low-income. Incentives should also be offered to community solar projects that are 100% low-income subscriber owned, which includes low-income households, not-for-profit organizations, and affordable housing owners."[498]

7.6. Subscriber Requirements

With community renewable generation still an emerging concept, the level of consumer interest and the most viable business models remain to be determined. The Agency seeks to allow creativity and flexibility in developing projects while at the same time ensuring basic consumer protections.

7.6.1. Small Subscriber Participation

The Act requires that the Agency propose terms and conditions that "ensure robust participation opportunities for residential and small commercial customers and those who cannot install renewable energy on their own properties."[499] Collectively the Agency considers "residential and small commercial customers" to be "small subscribers" so long as their subscription size is below 25 kW. Perhaps notably, the above-quoted language of the Act refers to "robust participation **opportunities**"[500] for small customers—and does not mandate robust participation.

To date, as described in Section 6.5 and consistent with the Commission's Order in Docket No. 17-0838, the Agency has used adders in the Adjustable Block Program to recognize the value of small subscriber subscriptions. The Agency has found that this adder, along with the preference for a small subscriber commitment in the case of a lottery to select community solar projects upon the opening of the Adjustable Block Program (as described in Section 6.3.1),[501] have been effective mechanisms for ensuring robust participation opportunities for small subscribers. During the litigation of the

[498] 20 ILCS 3855/1-56(b)(2)(B).

[499] 20 ILCS 3855/1-75(c)(1)(N).

[500] Emphasis added.

[501] See also Docket No. 17-0838, Final Order dated April 3, 2018 at 144.

Initial Plan in Docket No. 17-0838, some stakeholders sought for 25% small customer participation to serve as a useful baseline for measuring small subscriber participation. 98.9% of community solar projects that applied to the program when it opened in early 2019 made a commitment to have *at least 50% small subscribers*, and the Agency is not aware of any evidence at this time that projects selected in the lottery will not fulfill those commitments.

Therefore, the Agency believes that the initial program design was successful in encouraging small subscriber participation, but cautions that almost all contracted community solar projects are still under development, and actual realized small subscriber subscription rates are unknown. For the purposes of this Revised Plan, the Agency is not proposing any changes to its small subscriber requirements (other than the changes to the small subscriber adder explained in Section 6.5.3), but will continue to monitor actual results of small subscriber acquisition by selected projects.

7.6.2. Marketing to Small Subscribers

Subscribing to a community renewable generation project is not the same as choosing to purchase or lease a system to be located on your own property. It does, however, bear similarities to signing up to take supply service from an Alternative Retail Electric Supplier. The Agency observes that the history of questionable marketing practices of some Alternative Retail Electric Suppliers gives reason to be concerned about the marketing of community renewable generation subscriptions.[502]

While competition in the natural gas and electricity markets has created many benefits for the residents and businesses of Illinois, those benefits have not been uniform, and in many instances, particularly in residential markets, the benefits have been non-existent; in fact, at times supply offers have been harmful to consumers. This Plan is not the place to have a full debate on acceptable marketing practices, but the Agency would like to highlight past practices that some alternative gas and electric suppliers have engaged in that cause concern for the Agency. These include improperly associating the supplier with the local utility or a government agency or program; implying that a customer must choose to enroll; inflating the price of green energy offers far beyond the actual incremental cost of procuring renewable resources; and targeting elderly, non-English speaking, and low-income customers who may have less access to quality information about energy prices.

The Agency recognizes that it may not be able to prohibit door to door, telemarketing, or online sales of community renewable generation subscriptions, but notes those marketing channels as ones of particular concern because of the information asymmetry between the salesperson and the consumer. The Agency believes an informed consumer is a wise consumer and strongly encourages marketing channels that respect the opportunity for consumers to have complete and accurate information about the decisions they may make regarding subscriptions, particularly those related to upfront payments, the net price of energy, and termination fees and conditions. The Agency and/or

[502] See, e.g., ICC Docket No. 14-0512, Consumer Services Division and Office of Retail Market Development Staff Report to the Commission dated August 20, 2014, https://www.icc.illinois.gov/downloads/public/edocket/384622.pdf (detailing misleading and noncompliant marketing tactics employed by one ARES); ICC Docket No. 15-0438, Consumer Services Division and Office of Retail Market Development Staff Report to the Commission dated July 20, 2015, https://www.icc.illinois.gov/docket/files.aspx?no=15-0438&docId=232481 (detailing several misleading telephone marketing tactics employed by a different ARES); ICC Docket No. 15-0512, First Notice Order, September 22, 2016, at 55 (expressly relying on information submitted with the ICC Staff Initial Comments dated November 5, 2015 (https://www.icc.illinois.gov/downloads/public/edocket/417068.pdf), which detailed trends in allegations of ARES wrongdoing including unauthorized switching, misrepresentation of the nature of the transaction, misrepresentation of identity of the ARES, misrepresentation of price or savings, failure to disclose cancellation fees or right to cancel, and more); ICC Docket No. 17-0273, Order, August 15, 2017, at 4-5 (denying a certificate of service authority to an ARES that, previously operating in Illinois under a prior corporate structure, had amassed numerous complaints related to sales and marketing).

its Program Administrators may conduct additional monitoring of Approved Vendors (and/or their partners/affiliates) that utilize door to door, telemarketing, and online sales, and reserves the right to request the Approved Vendor provide additional documentation of those marketing channels including, but not limited to, access to call center recordings for either sales or third-party verifications.

As discussed in Section 6.9.1, the Agency proposes to now require all in-person, phone, and online marketing / lead generation firms to register with the Adjustable Block Program, including disclosure by Approved Vendors of all such partners and their direct contact information prior to utilizing their services within the scope of the Adjustable Block Program.

As described in the Initial Plan, there are a number of state and federal consumer protection laws, regulations, and enforcement agencies that apply to all forms of marketing, including marketing of subscriptions to Community Renewable Generation Projects.[503]

Table 7-1: Federal Statutes that Apply to Community Solar

Statute	Topic
CAN-SPAM Act	Electronic marketing
Consumer Leasing Act	Leasing disclosures
Electronic Funds Transfer Act	Consumer rights in electronic fund transfers
Equal Credit Opportunity Act	Discrimination in credit transactions
Fair Credit Reporting Act	Collection and use of consumer information
Federal Trade Commission Act	Unfair and deceptive trade practices
Magnuson-Moss Warranty Act	Consumer product warranties
Right to Financial Privacy Act	Financial privacy from government intrusion
Truth in Lending Act	Lending disclosures and standardization
Telephone Consumer Protection Act	Telemarketing and automated telephone
Unfair Deceptive Practices Act (UDAAP)	Misleading financial products and services
Uniform Commercial Code	Sales and commercial transactions

Source: CESA, *Consumer Protection for Community Solar: A Guide for States*, 2017.

[503] Diana Chace and Nate Hausman, Clean Energy States Alliance, *Consumer Protection for Community Solar: A Guide for States*, June 8, 2017. http://cesa.org/resource-library/resource/consumer-protection-for-community-solar-a-guide-for-states.

Table 7-2: Illinois Statutes that Apply to Community Solar

Statute	Topic
Consumer Fraud and Deceptive Business Practices Act (815 ILCS 505)	Enrollment, marketing, billing, and collection by electric service providers
Electronic Mail Act (EMA) (815 ILCS 511)	Regulates e-mail solicitations
Telephone Solicitations Act (815 ILCS 413) and the Restricted Call Registry Act (815 ILCS 402)	Regulates telemarketing practices
Personal Information Protection Act (815 ILCS 530)	Requires companies that collect personal information to take reasonable measures to protect it and report unauthorized access to consumer's personal information.

These laws and regulations provide a starting point for protecting consumers, but their enforcement agencies typically only track and enforce violations if triggered by consumer complaints. In order to ensure that subscribers are well-informed and thus afforded adequate consumer protections, the Agency will require that all projects adhere to the following terms and conditions for subscriptions.

Drawing from the consumer protection guidelines for community solar adopted by the Maryland Public Service Commission, the Agency requires that Approved Vendors (or their subcontractors) seeking REC delivery contracts associated with Community Renewable Generation Facilities participating in the Adjustable Block Program or in Illinois Solar for All must include each of the following in any contracts entered into with subscribers:

(a) A plain language disclosure of the subscription, including:
  (i) The terms under which the pricing will be calculated over the life of the contract and a good faith estimate of the subscription price expressed as a monthly rate or on a per kilowatt-hour basis;
  (ii) Whether any charges may increase during the course of service, and, if so, how much advance notice is provided to the subscriber.
(b) Contract provisions regulating the disposition or transfer of a subscription;
(c) All nonrecurring (one-time) charges;
(d) All recurring (monthly, yearly) charges;
(e) A statement of contract duration, including the initial time period and any rollover provision;
(f) Terms and conditions for early termination, including:
  (i) Any penalties that the Project Developer may charge to the subscriber; and
  (ii) The process for unsubscribing and any associated costs.
(g) If a security deposit is required:
  (i) The amount of the security deposit;
  (ii) A description of when and under what circumstances the security deposit will be returned;
  (iii) A description of how the security deposit may be used; and
  (iv) A description of how the security deposit will be protected.

(h) A description of any fee or charge and the circumstances under which a customer may incur a fee or charge;
(i) A statement explaining any conditions under which the Project Developer may terminate the contract early, including:
(i) Circumstances under which early cancellation by the Project Developer may occur;
(ii) Manner in which the Project Developer shall notify the customer of the early cancellation of the contract;
(iii) Duration of the notice period before early cancellation; and
(iv) Remedies available to the customer if early cancellation occurs;
(j) A statement that the customer may terminate the contract early, including:
(i) Amount of any early cancellation fee;
(k) A statement describing contract renewal procedures, if any, including any automatic renewal provisions;
(l) A dispute procedure;
(m) The Agency's and Commission's phone number and Internet address;
(n) A billing procedure description;
(o) The data privacy policies of the Project Developer;
(p) A description of any compensation to be paid for underperformance;
(q) Evidence of insurance;
(r) A description of the project's long-term maintenance plan;
(s) Current production projections and a description of the methodology used to develop production projections;
(t) Contact information for the Project Developer for questions and complaints;
(u) A statement that the Project Developer does not make representations or warranties concerning the tax implications of any bill credits provided to the subscriber;
(v) The method of providing notice to the subscribers when the project is out of service for more than three business days, including notice of:
(i) The estimated duration of the outage; and
(ii) The estimated production that will be lost due to the outage.
(w) Any other terms and conditions of service.

The Agency may also develop additional conditions in the general course of developing program requirements, but will seek stakeholder feedback prior to doing so. As referenced above, the Agency and its Procurement Administrator have developed Standard Disclosure Forms for use in the marketing of community renewable generation project subscriptions, and the Agency has attempted to draw upon many of these same concepts in its Standard Disclosure Forms to ensure that key subscription terms are clearly disclosed to potential subscribers.

Additionally, the Agency notes that the Illinois General Assembly in its Spring 2019 legislative session passed Senate Bill 651 and the Illinois Governor then signed the bill into law on August 27, 2019.[504] The new act codifies certain ARES consumer protections around (among others) marketing conduct and automatic renewal already contained in Illinois Commerce Commission rules and introduces new consumer protections, including restrictions around enrolling low-income customers and a ban on termination fees for residential and small commercial customers.

[504] See 101st Illinois General Assembly, Public Act 101-0590, http://www.ilga.gov/legislation/publicacts/101/PDF/101-0590.pdf

The Agency is confident that the expressed will of the General Assembly supports the intent consistently expressed in the Initial Plan, in the early implementation of the Adjustable Block Program, and in this Revised Plan to hold community solar marketers to the highest standards of consumer protection. The Agency intends to update its Marketing Guidelines (and, potentially, other program documents and requirements) in light of Public Act 101-0590 and the specific issues which that legislation seeks to address. As described further in Section 6.13 above, the Agency proposes that a new draft of its marketing guidelines (and other documents, where necessary) be published for stakeholder feedback within 45 days of the Commission's approval of this Revised Plan and finalized within 90 days of that approval date.[505]

In addition, to ensure portability and transferability of subscription contracts, as required by Section 1-75(c)(1)(N) of the Act, any such contract should provide that the subscriber (i) may retain the subscription (or at least a downsized version of the subscription relative to the subscriber's new load) as long as the subscriber changes addresses for utility service within the same utility service territory, and (ii) may assign or sell the subscription to another person within the same utility service territory, without any fee owed to the subscription counterparty, subject to reasonable terms and conditions including matching the subscription size to the new subscriber's load. The Agency understands that the community renewable net metering tariffs for Ameren Illinois, ComEd, and MidAmerican approved by the Commission on September 27, 2017 are consistent with these principles. This is also consistent with guidance on this topic already published by the Program Administrator on the Program's consumer-facing website on October 3, 2019.[506]

7.6.3. Marketing Claims Related to the Ownership of RECs and Community Renewable Generation Subscriptions

The Agency's Adjustable Block Program for community solar, and the competitive procurement for other forms of community renewable generation, are both based on the core requirement that the value to the project developer (and in turn the ability to make a financially attractive offer to subscribers) is based upon the sale of the project's environmental attributes (in the form of RECs) from the project to a utility. Those RECs are then retired by the utility to meet the annual RPS goals of that utility, and the original REC holder's claims to those environmental attributes are effectively extinguished through that sale.

This raises the issue of what marketing claims may be made related to a subscription in a community renewable generation project receiving a REC contract (including community solar projects participating in the Adjustable Block Program), as such projects will have already contractually committed the sale of their environmental attributes to a third party. With the underlying "renewable" or "solar" element of that generation having been decoupled and sold to the utility, can it still be marketed as a "community solar" project? Moreover, can the subscriber make any claims for any commercial purpose about any "green" (or similar) aspect of his or her energy sourcing?

[505] The draft guidelines were released for stakeholder feedback on April 9, 2020. See: http://illinoisabp.com/2020/04/09/rec-contract-request-for-stakeholder-comments/.

[506] See http://illinoisshines.com/faq ("If I subscribe to a community solar project participating in the Adjustable Block Program, can I keep my subscription when I move? Can I transfer my subscription to someone else?").

Guidance from the Federal Trade Commission ("FTC") would appear to limit what claims can be made about energy sourced from projects whose RECs are transferred to another entity.[507] That guidance suggests that appropriate disclaimers about the fate of the RECs may satisfy rules against deceptive marketing. Yet, at some point, the issue begins to border on the absurd: a lengthy factual explanation of a community solar subscription and this Agency's various RPS programs would be permissible, but a shorthand description used to market that subscription may be legally problematic. These issues would also apply for the most part equally to installations of onsite photovoltaic generation at homes or commercial facilities; the customers whose load offsets the onsite installation would not be able to make any claims about using "green" or "clean" energy, and the marketers should similarly not market the installation opportunity as one to obtain "green" or "clean" power.

While the Agency recognizes that it is not the Federal Trade Commission (or the state's Office of Attorney General) and thus cannot provide reliable guidance on what marketing claims may be permissible, the Agency can play an important role in ensuring that any potential subscribers understand the value of a community solar subscription (or that any potential onsite hosts understand the value of an onsite installation)—even if more direct statements cannot be made about the environmental attributes of the underlying energy. To this end, the Agency has worked with its Adjustable Block Program Administrator on the development of a "brand" associated with Adjustable Block Program participation, "Illinois Shines." The Illinois Shines "brand," and associated content (including the public-facing web site http://illinoisshines.com) allows potential subscribers to a community solar project (or home and building owners seeking to install onsite solar) to understand that participation in such a project helps the state meet its renewable energy goals and may support the development of a new generating facility—but without risking the project developer itself making false or misleading claims about "renewable" or "clean" energy.

The Agency plans to continue to work closely with representatives of the solar industry, the state's Office of the Attorney General, the Staff of the Illinois Commerce Commission, and other parties in continuing to refine this approach and any associated content. This includes adding additional consumer-facing educational and informational content to the program website.

7.7. Utility Responsibilities

While the Agency, through the Adjustable Block Program and competitive procurements, will be responsible for the procurement of RECs from community renewable generation projects, it is not responsible for all aspects of a successful program. There are several additional key aspects of making community renewable generation projects successful that fall outside of the control of the Agency.

- The crediting of the value of energy through net metering
- Ensuring the portability and transferability of subscriptions within a utility service territory.

The Agency will work with system owners and developers as well as the utilities (and with rural electric cooperatives and municipal utilities should they choose to participate) to reflect these aspects in the terms, conditions, and operational aspects of the programs and procurements

[507] See 16 C.F.R. § 260.15(d), Example 5; see also U.S. EPA, "Making Environmental Claims," https://www.epa.gov/greenpower/making-environmental-claims; see also U.S. FTC letter dated February 5, 2015, https://www.ftc.gov/system/files/documents/public_statements/624571/150205gmpletter.pdf.

conducted by the Agency. The Agency will also coordinate with the utilities for the sharing of any pertinent data and information that each party collects and maintains regarding projects and subscriptions.

Public Act 99-0906 required each electric utility to file a tariff within 90 days after the Act's effective date, June 1, 2017, to implement net metering for community renewable projects.[508] A brief summary of those filings (and the resultant proceedings, where applicable) is outlined below.

ComEd's community renewable generation net metering tariff, Rider POGCS, was approved by the Commission in Docket No. 17-0350 on September 27, 2017. The Commission resolved a dispute between the Company and intervenors around indemnification by approving ComEd's proposal that both subscribers and the project itself will indemnify the Company against any liabilities relating to the reporting of a subscriber's share or a subscriber's interval usage data – and that ComEd will not have reciprocal indemnification obligations. The Commission indicated that existing regulations related to billing and meter usage data would be "more than sufficient to ensure that ComEd complies with its legal obligations."[509] The Commission rejected the proposal of certain intervenors that the net metering credit paid to community renewable generation projects include the volumetric transmission services charge, in addition to the supply charge (which includes an adjustment factor).

MidAmerican's community renewable generation net metering tariff, Rate NM, was approved by the Commission in Docket No. 17-0368 on September 27, 2017. The tariff stipulates that both subscribers and the project itself will indemnify the Company against any liabilities relating to the reporting of a subscriber's share or a subscriber's interval usage data. MidAmerican's tariff provides community renewable net metering credits at the "supply charge," plus certain adjustment factors.

Ameren Illinois proposed revisions to its existing net metering tariff, Rider NM, to include provisions for community renewable generation project net metering. The revisions were approved by the Commission on September 27, 2017. Ameren Illinois' revised tariff credits the energy service bills of subscribers to a community renewable generation project for net production at the "tariffed or contract rate for electricity supply as appropriate."

As discussed in Section 7.6.2, the Agency believes that the three approved tariffs will allow portability and transferability of subscriptions, as required by Section 1-75(c)(1)(N) of the Act.

[508] 220 ILCS 5/16-107.5(*l*), (*l*-5).

[509] Docket No. 17-0350, Final Order dated September 27, 2017 at 18.

8. Illinois Solar for All Program

8.1. Overview

The Illinois Solar for All Program was created through revisions to Section 1-56(b) of the IPA Act contained in Public Act 99-0906 to "include incentives for low-income distributed generation and community solar projects" with the following objectives:

> *"bring photovoltaics to low-income communities in this State in a manner that maximizes the development of new photovoltaic generating facilities, to create a long-term, low-income solar marketplace throughout this State, to integrate, through interaction with stakeholders, with existing energy efficiency initiatives, and to minimize administrative costs."*[510]

The Act creates four sub-programs within Illinois Solar for All, with incentives for each type of development:

(A) Low-income Distributed Generation, for on-site solar projects
(B) Low-Income Community Solar, for off-site solar projects
(C) Incentives for non-profits and public facilities to do on-site projects
(D) Low-Income Community Solar Pilot Projects, with distinct rules and incentives

The Agency is instructed to "include a description of its proposed approach to the design, administration, implementation and evaluation of the Illinois Solar for All Program" in this Plan. This Chapter fulfills that provision of the Act.

While the price of photovoltaics has declined dramatically over recent years, there can be significant upfront costs for the development of projects. The financial incentives offered through the Adjustable Block Program may not be sufficient for low-income households and communities to overcome the substantial barriers to participating in the growing solar energy market. The Illinois Solar for All Program is an alternative approach and program to help address this challenge.

8.2. Design Considerations

In developing the program, the Agency identified two key design elements for implementing the Illinois Solar for All Program that necessitated more focused discussion: the relationship to the Adjustable Block Program, and the creation of economic benefits for participants.

8.2.1. Relationship with the Adjustable Block Program

The goals of the Illinois Solar for All Program overlap with the goals of the Adjustable Block Program in that both promote distributed photovoltaic generation and community solar. The differences primarily involve the sectors that the programs serve, the structure of the incentives and program design, and the applicable funding sources.

As described in this Chapter, the Agency administers the Illinois Solar for All Program separately from the Adjustable Block Program, but it is built off of the program design of the Adjustable Block Program, with additional considerations specific to Illinois Solar for All. These include a different

[510] 20 ILCS 3855/1-56(b)(2).

level of incentives, additional requirements to be an Illinois Solar for All Approved Vendor, additional project application requirements, Illinois Solar for All specific contracts, and additional considerations to ensure community involvement, consumer protections, and eligibility. To the extent not specifically mentioned in this Chapter, the program design, terms, and conditions of the Adjustable Block Program also apply to the administration of, and REC delivery contracts executed under, the Illinois Solar for All Program.

The exception to this principle is the Low-Income Community Solar Pilot Project sub-program; this sub-program operates under an entirely different project selection structure (featuring a competitive procurement process), and as discussed in the Initial Plan, the Agency plans to fund this sub-program solely through the Renewable Energy Resources Fund.

8.2.2. Economic Benefits

The second consideration is the concept of "economic benefits" and how low-income participants can capture them. The Act stipulates that for the Illinois Solar for All Program, "[e]ach contract that provides for the installation of solar facilities shall provide that the solar facilities will produce energy and economic benefits, at a level determined by the Agency to be reasonable, for the participating low income customers."[511] In addition, contracts should "ensure [that] the wholesale market value of the energy is credited to participating low-income customers or organizations and to ensure tangible economic benefits flow directly to program participants, except in the case of low-income multi-family housing where the low-income customer does not directly pay for energy."[512]

A key barrier to low-income participation in renewable energy programs is lack of access to funds and financing to pay for the up-front costs of photovoltaic systems.

To create "tangible economic benefits" at a "reasonable" level, the Agency has determined that eligible residential participants in the Illinois Solar for All Program should not have to pay up-front costs for on-site distributed generation, or pay an up-front fee to subscribe to a community solar project.[513] Further, participation in the program should result in immediate, reliable reductions in energy costs for those residents or subscribers. Consistent with the Commission's Order in Docket No. 17-0838, this means that for projects that are financed or leased, any ongoing annual payments must be smaller than 50% of the annual first year estimated production and/or utility default service net metering value to be received by the customer.[514]

The Agency requires that Illinois Solar for All Approved Vendors verify that developers, installers, landlords, and other intermediaries ensure that the resulting value of the incentives offered by the program flow through to the people the program is meant to serve. However, the Agency notes that in order to avoid an overly complex administrative system, incentive levels will not be customized to each participant's specific economic circumstances.

As part of the evaluation of the Illinois Solar for All Program (see Section 8.17), the Agency will review the impact of the program on the energy costs of participants to assess how the benefits created by

[511] 20 ILCS 3855/1-56(b)(2).

[512] Id.

[513] As a clarification from the Initial Plan, in this Revised Plan the Agency does not propose that this requirement apply to multifamily buildings with more than five units, or to non-profit or public facilities.

[514] See Docket No. 17-0838, Final Order dated April 3, 2018 at 151. As required by the Commission's Order, this calculation must be "disclosed to the customer and reviewed and approved by the Agency."

the program reduces their energy burden. This evaluation will be used to inform any future modifications to the setting of incentive levels designed to create tangible economic benefits at a reasonable level for participants. At the time of the release of this Revised Plan, the program has only recently launched and there is insufficient information available to recommend a change in the incentive levels (i.e. the REC pricing structure and prices) from those contained in Chapter 8 of the Initial Plan.

For public and non-profit facilities that participate in the Illinois Solar for All Program, the Agency proposes to continue to utilize an approach in which the incentive level recognizes that these entities may not be able to capture the tax benefits that would be available to a comparable sized project participating in the Adjustable Block Program.[515] The higher REC price offered by the Illinois Solar for All Program can help overcome the financing barriers that certain non-profits and public facilities may face compared to private entities. The Agency observes that over 160 non-profit and public facility projects (totaling nearly 67 MW of capacity) have applied to the Adjustable Block Program, indicating that many such projects are viable at the REC prices offered by that program.

In light of this, for the Revised Plan, the Agency proposes, as discussed further in Section 8.6.3 below, that Approved Vendors submitting projects for non-profit or public facilities that *can* utilize the federal Investment Tax Credit under 26 U.S.C. § 48 will be required to demonstrate additional value to the project host.

Ensuring that "the wholesale market value of energy is credited to participating low-income customers" can be achieved through existing net metering provisions. Therefore, projects are required to participate in the applicable utility's or ARES's net metering program. This may prevent projects in the service territory of a municipal utility or rural electric cooperative that does not offer net metering from participating in the Illinois Solar for All Program. The Agency hopes that such municipal utilities and rural electric cooperatives strongly consider adopting net metering policies to bring the full value of solar to their residents and members.

Ensuring that tangible economic benefits flow directly to program participants can also be accomplished by providing documentation to the Agency that the project has no upfront cost to the residential participant, that the value of incentives are used by the project developer/installer to offset costs to the participant, and that there will not be ongoing costs or fees to the participant that exceed 50% of the value of energy produced. The resulting economic benefits to program participants will be accrued through the value they receive through net metering or avoided consumption from the energy the system produces. As described in Section 8.11, Illinois Solar for All Approved Vendors are required to document how they ensure that this goal is met. The case of low-income multi-family housing can be more complex and is discussed in more detail in Section 8.6.1.

It should be noted that these incentives are tied directly to creating economic benefits through lowered net energy costs and are calculated in that manner. As a result, there may be additional costs required to make a specific project viable (e.g., costs associated with roof repairs or wiring upgrades) that these incentives may not be able to address. Additional incentives to pay for those types of separate costs are not be available through the Illinois Solar for All Program, and the Agency encourages participants to explore alternative sources of funding as needed. The Agency and the Illinois Solar for All Program Administrator will work with Illinois Solar for All Approved Vendors to

[515] See Appendix E-5 to Initial Plan, available at https://www2.illinois.gov/sites/ipa/Documents/2018ProcurementPlan/AppendixE-5ILSolarAllNon-ProfitPublicFacilitiesPricingModel.xls, at "CREST Inputs" tab, cell G73.

facilitate informing and educating program participants about opportunities that may be available to them through utility-administered energy efficiency programs, weatherization assistance programs, lead abatement programs, and other forms of support. This includes the provision of a Program Resource Guide on those programs.[516]

Additionally, in order to facilitate the direct flow of tangible economic benefits to low-income residential participants, the Agency and its Illinois Solar for All Program Administrator will explore, and if deemed feasible and prudent, pursue the possibility of receiving guidance from the United Stated Department of Housing and Urban Development that would clarify the treatment of Illinois Solar for All benefits with regard to cost allowance-based low-income housing programs.

8.3. Program Launch

In implementing the various new programs and procurements mandated by Public Act 99-0906, the Agency had a large and varied set of new tasks to undertake. The Agency appreciates the strong interest in the Illinois Solar for All Program and desire to make the benefits of the Program available to low-income households and communities so that they can benefit from lower energy costs. The Illinois Solar for All Program as proposed mostly builds on the Adjustable Block Program described in Chapter 6; therefore, it was necessary to first have the Adjustable Block Program's design finalized and put into operation before the Illinois Solar for All Program was able to launch. Like with the Adjustable Block Program, while the Initial Plan and this Revised Plan detail many programmatic considerations, final program design including contracts, program manuals, etc. needed to be developed and finalized by the Agency and the Illinois Solar for All Program Administrator(s) prior to program launch.

In November 2018, the Agency and Program Administrator initiated a series of stakeholder engagement sessions to share draft program details with the public and invite written feedback, which was considered in planning the implementation of the Illinois Solar for All Program. Stakeholder feedback sessions were held on a number of topics, including Environmental Justice Communities, Job Training, Approved Vendor Registration, Grassroots Education, Third Party Program Evaluation, Consumer Protection, and Project and Participant Eligibility. These opportunities to engage the public helped ensure that the process of finalizing program protocols and requirements was transparent and responsive to input from stakeholders from the solar industry, environmental advocates, and low-income advocates.

The program began accepting applications for registration to become ILSFA Approved Vendors on February 19, 2019 and opened for project applications on May 15, 2019. Due to anticipated high pent-up interest in the program's incentives for new low-income solar installations, the program launch included an initial project application window for the 2018-2019 program year of 30 days for Low-Income Community Solar projects and 45 days for Low-Income Distributed Generation and Non-Profit/Public Facilities projects. 45 Low-Income Community Solar applications (totaling nearly 60 MW of capacity), 28 Non-Profit/Public Facilities applications (totaling over 3 MW of capacity), and 1 Low-Income Distributed Generation application (2 MW of capacity) applied during that initial window. The applications for Low-Income Community Solar and Non-Profit/Public Facility projects exceeded allocated sub-program budgets for the program year, while the Low-Income Distributed Generation sub-program featured application levels below the allocated sub-program budget. Five

[516] See: https://www.illinoissfa.com/app/uploads/2019/03/ILSFA-Program-Resources-Guide-v1-20190318.pdf.

Low-Income Community Solar projects (totaling 4 MW of capacity), and 7 Non-Profit/Public Facility projects (1.3 MW of capacity) were selected. The community solar projects were selected using the project selection protocol (as discussed further in Section 8.12.2) while all the eligible Non-Profit/Public Facility projects were selected (the volume of project applications in that sub-program dropped below the annual sub-program budget after some were deemed ineligible during review). The one distributed generation applicant project withdrew. In the latter two sub-programs, unused 2018-2019 sub-program budget was rolled over to the respective 2019-2020 sub-program budget.

For the 2019-2020 Program Year, 30 Low-Income Community Solar projects (54.5 MW), 20 Non-Profit/Public Facilities projects (2.7 MW), and 11 Low-Income Distributed Generation projects (2 MW) applied during the initial project application window. The eligible applications for Low-Income Community Solar projects exceeded the allocated sub-program budget for that program year, so the project selection protocol was executed for the Low-Income Community Solar sub-program. Four community solar projects were selected (totaling 4 MW of capacity). The applications for the Low-Income Distributed Generation and Non-Profit/Public Facilities sub-programs did not fill available sub-program budgets. The Non-Profit/Public Facilities sub-program reopened on October 25, 2019 for rolling project applications and closed on February 26, 2020 after 24 projects (totaling 2.8 MW of capacity) were approved for the program year. The Low-Income Distributed Generation sub-program reopened for rolling project applications on October 1, 2019, to continue until the sub-program budget is filled or until May 31, 2020. As of the filing of the Final Revised Plan for Commission approval, 10 low-income residential projects (totaling over 2 MW of capacity) have been selected for the Low-Income Distributed Generation sub-program.

8.4. Funding and Budget

The Illinois Solar for All Program is funded through three sources. First, the Renewable Energy Resources Fund pursuant to Section 1-56(b)(2) of the IPA Act; second, funds from the renewable energy resources budgets of the utilities pursuant to Section 1-75(c)(1)(O) of the IPA Act; and third, potential additional funds from the renewable resources budgets of the utilities pursuant to Section 16-108(k) of the Public Utilities Act.

8.4.1. Renewable Energy Resources Fund Funding Available

While Section 1-56(b)(2) envisions the Illinois Solar for All Program being funded primarily through the Renewable Energy Resources Fund, as of August 14, 2019, the balance of the Renewable Energy Resources Fund was $50,422,472 (not including $112.5 million that has been lent to the state's General Revenue Fund as discussed below), while existing commitments from the Fund for contracts from the Supplemental Photovoltaic Procurements total $13.9 million.[517] This implies $149.0 million of RERF funds are available for Illinois Solar for All. Prior to the 2018-2019 program year (i.e. at the outset of the Program), before the Agency had paid any administrative costs to its Program Administrator, $150.0 million of RERF funds were available for Illinois Solar for All; this is the figure the Agency will use in this Section in explaining sub-program allocations from the RERF.

Since the filing of this Revised Plan, two transfers of $10 million each were made to the General Revenue Fund. As with the prior-transferred amount, these transfers are still required to be repaid back into the RERF, and that funding remains available for supporting expenditures from the RERF.

[517] The commitments consist of REC delivery contracts previously entered into and are being paid, or will be paid, over a five-year REC delivery schedule (invoiced quarterly) depending on when individual systems under contract were completed and began REC deliveries.

As of April 19, 2020, given the prior transfers, these two new transfers, and continued payments for RECs from the RERF, the balance of the Renewable Energy Resources Fund is now $27,509,942.62.

Prior to the enactment of Public Act 99-0906, the Renewable Energy Resources Fund received Alternative Compliance Payments each fall from Alternative Retail Electric Suppliers as part of their RPS compliance obligations. Under the revisions to Section 16-115D of the PUA contained in Public Act 99-0906, those payments are no longer made to the Fund as of June 1, 2017; rather, they are now made to the utilities, and will be paid to the utilities through Fall 2019.[518] With those payments no longer being made into the RERF, there is no new revenue that will be deposited into the Fund.

The RERF's current low balance is due to the fact that on August 10, 2017, $150 million was transferred from the Renewable Energy Resources Fund to the General Revenue Fund pursuant to the borrowing provisions contained in Section 5h.5 of the State Finance Act.[519] $37.5 million was paid back into the RERF in April of 2019,[520] and the remainder of borrowed funds are required by law to be paid back to the Renewable Energy Resources Fund within four years (i.e., by August 10, 2021).[521] As described above, two additional transfers of $10 million were also made over the past months under this same authority.

Section 5h.5(b) contains a provision that when the RERF (or for that matter other state funds that had similar transfers),

> *ha[s] insufficient cash from which the State Comptroller may make expenditures properly supported by appropriations from the fund, then the State Treasurer and State Comptroller shall transfer from general funds to the fund only such amount as is immediately necessary to satisfy outstanding expenditure obligations on a timely basis.*

Likewise, that Section also provides for,

> *continuing authority for and direction to the State Treasurer and State Comptroller to reimburse the funds of origin from general funds by transferring to the funds of origin, at such times and in such amounts as directed by the Comptroller when necessary to support appropriated expenditures from the funds, an amount equal to that transferred from them plus any interest that would have accrued thereon had the transfer not occurred…*

Were the RERF balance insufficient for payments under any new contractual obligations, these provisions would allow the Agency to make expenditures from the RERF prior to the repayment of the transferred amount—i.e., to operate as though the RERF's balance were at its original amount, even if transferred funds have not yet been moved back into the RERF. In addition, the Agency understands that the State Comptroller will coordinate with the Agency to make sure that any appropriated expenditures that the Agency makes through new contractual commitments are

[518] See 220 ILCS 5/16-115D(i); after May 31, 2019, the ARES will no longer have any future Alternative Compliance Payment obligations, although "alternative retail electric suppliers and electric utilities operating outside their service territories shall be obligated to make all alternative compliance payments that they were obligated to pay for periods through and including May 31, 2019, but were not paid as of that date." Those payments are due to by September 1, 2019.

[519] 30 ILCS 105/5h.5(b);

[520] https://illinoiscomptroller.gov/financial-data/state-revenues/by-fund/?FundSel=0836&FundGrpSel=&FundCatSel=&FundTypeSel=&GroupBy=Agcy&FY=18&ShowMo=Yes&submitted.

[521] Section 5h.5 was initially created by Public Act 100-0023 and set the repayment time at two years. This was subsequently amended to four years by Public Act 101-0010.

honored by ensuring that the balance of the RERF is at all times sufficient to make timely payments on contracts. While the Agency understands that these transfers from the RERF have caused consternation, based on the assurances contained in the law, it does not believe that these transfers necessitate any adjustments to its proposed Solar for All program design, structure, and budget.

For the Low-Income Distributed Generation Initiative, the Low-Income Community Solar Project Initiative, and Incentives for Non-Profits and Public Facilities sub-programs the Agency plans to allocate up to $16.5 million per program year from the RERF for use for the Illinois Solar for All Program (the Low-Income Community Solar Pilot Projects sub-program is conducted through a different process that allocates funds to each procurement event rather than program year).[522] In this Revised Plan, the Agency clarifies that this allocation will be on an accrual basis, meaning that the amount allocated sets aside that much funding for selected applications during that program year, but are likely to actually be expended in future years in many cases due to the development timeline of photovoltaic projects (RECs are paid for upon energization). Unallocated RERF funds from any program year for a given sub-program would roll over and increase the balance available for the subsequent program year for that sub-program.

Table 8-1: RERF Funding for Solar for All[523]

Funding Source	Low-Income Distributed Generation Incentive	Low-Income Community Solar Project Initiative	Incentives for Non-Profits and Public Facilities	Low-Income Community Solar Pilot Projects
RERF Allocation Percent	22.5%	37.5%	15%	25%
Total RERF Allocation ($)	$33,750,000	$56,250,000	$22,500,000	$37,500,000
Previously allocated* for 2018-2019 Program Year	$4,500,000	$7,500,000	$3,000,000	($20 million allocated to 2019 procurement, balance for a 2020 or 2021 procurement)
Previously allocated* for 2019-2020 Program Year	$4,500,000	$7,500,000	$3,000,000	
Allocated* for 2020-2021 Program Year	$4,950,000	$8,250,000	$3,300,000	
Allocated* for 2021-2022 Program Year	$4,950,000	$8,250,000	$3,300,000	

* RERF funds not allocated within a sub-program for a program year will roll over to the next program year for that same sub-program.

Allocations are based on $150 million of the RERF available for Solar for All at the time of the Initial Plan development, and assume continuing level support from the RERF for the three non-pilot sub-programs in the 2022-2023, 2023-2024, and 2024-2025 program years (which, if fully allocated, would eventually deplete the RERF, leaving only utility-supplied funding available for program years after 2024-2025).

The funds allocated from the RERF are allocated according to the percentages specified in Section 1-56(b)(2) of the Act, namely 22.5% for the Low-Income Distributed Generation Incentive sub-

[522] As stated in Section 2.6.1, a program year for ILSFA corresponds to an energy delivery year and thus starts June 1 of each year. Therefore, a program year starts one month earlier than the state fiscal year, which begins July 1.

[523] The annual RERF sub-program budgets stated above are gross budgets *before* deducting administrative, evaluation, & grassroots education costs; the budgets actually available for REC incentives will be net of those costs.

program, 37.5% to the Low-Income Community Solar Project Initiative sub-program, 15% for the Incentives for non-profits and public facilities sub-program, and 25% for the Low-Income Community Solar Pilot Projects sub-program. While the Act includes an all-time cap of $50 million for the Low-Income Community Solar Pilot Projects, the 25% of available RERF funds is in fact closer to $37.5 million. As discussed further in Section 8.6.4, the Agency set a budget of $20 million for the first Low-Income Community Solar Pilot Project procurement held in December 2019; this budget is intended to cover the full 15-year value of contracts resulting from that procurement, although the contracts will be paid out continuously over time rather than upfront.

After accounting for all payments under the Supplemental Photovoltaic Procurement process pursuant to Section 1-56(i) of the IPA Act, as well as all payments under Illinois Solar for All contracts, whenever the balance of the RERF falls under $5,000, then the RERF shall be inoperative and any remaining funds shall be transferred to the Supplemental Low-Income Energy Assistance Fund for use in the Low-Income Home Energy Assistance Program, as authorized by the Energy Assistance Act.[524]

8.4.2. Utilities Annual Funding Available

Section 1-75(c)(1)(O) contains a provision that

> *The long-term renewable resources procurement plan shall allocate 5% of the funds available under the plan for the applicable delivery year, or $10,000,000 per delivery year, whichever is greater, to fund the programs, and the plan shall determine the amount of funding to be apportioned to the programs identified in subsection (b) of Section 1-56 of this Act; provided that for the delivery years beginning June 1, 2017, June 1, 2021, and June 1, 2025, the long-term renewable resources procurement plan shall allocate 10% of the funds available under the plan for the applicable delivery year, or $20,000,000 per delivery year, whichever is greater, and $10,000,000 of such funds in such year shall be used by an electric utility that serves more than 3,000,000 retail customers in the State to implement a Commission-approved plan under Section 16-108.12 of the Public Utilities Act.*

As discussed in Section 2.2.5.3, the Agency understands "funds available under the plan" in the above statutory provision to refer to funds collected by utilities through RPS riders under Section 1-75(c)(6) of the Act and Section 16-108(k) of the PUA. The following table lists projected amounts of utility funding that would be allocated to Illinois Solar for All based upon the load and budget forecasts contained in Chapter 3 for the Illinois Solar for All program years covered by this Revised Plan – namely, 2020-2021 and 2021-2022.

Table 8-2: Utility Funding

Delivery Year	Utility Renewable Energy Maximum Budgets	5% of Funds	Allocation to Illinois Solar for All
2020-2021	$227,872,083	$11,393,283	$11,393,283
2021-2022	$225,607,664	$11,280,062	$11,280,062

[524] 20 ILCS 3855/1-56(b-10).

These funds are supplied by each utility based on the allocation percentages contained in Section 3.1. These funds are not subject to the statutory percentage allocations for the funding from the RERF, specified in Section 1-56(b)(2). As discussed in Section 8.6.4, utility funding is not used for the Low-Income Community Solar Pilot Projects sub-program.

In this Revised Plan, the Agency proposes to continue the approach described in the Initial Plan that utility funding would be allocated to the three non-competitive sub-programs at a pro-rata level based on how the law allocates RERF funding to those three sub-programs (30% to the Low-Income Distributed Generation Initiative, 50% to the Low-Income Community Solar Project Initiative, and 20% to Incentives for Non-Profits and Public Facilities). As this allocation of utility funding to the sub-programs is not required by law, the Agency may adjust utility funding between those sub-programs on an as-needed basis during the program year if there are available funds in one sub-program and higher demand in another sub-program, with the exception that funds for the Distributed Generation sub-program will not be reallocated.[525]

For each of the three non-competitively procured sub-programs, approved project applications within a program year will be first funded by the utility funds, and then by the RERF funds. The reason for this approach is that utility funds shall be returned to ratepayers if not spent at the end of each program year starting with the reconciliation after 2020-2021,[526] while RERF funds are not subject to the same reconciliation and refund mechanism. Unallocated RERF funds within a sub-program from each program year would be rolled over to the following program year.

The funding for job training programs provided by ComEd (an electric utility that serves more than 3,000,000 retail customers) under Section 16-108.12 of the PUA is noted in the budget discussion in Chapter 3. As those funds are not directly part of the Illinois Solar for All Program as managed by the Agency, those funds are not included in this budget discussion. (The intersection between the Illinois Solar for All Program and the job training programs is discussed in Section 8.10.)

8.4.3. Section 16-108(k) Funding

Section 16-108(k) of the Public Utilities Act contemplates a possible situation in which the total amount of funds appropriated by the General Assembly from[527] the Renewable Energy Resources Fund during the period between June 1, 2017 and August 1, 2018 is less than $200,000,000, creating a "funding shortfall." This period encompasses part or all of three state Fiscal Years (running from July 1 of a given year to June 30 of the following year). If there is a funding shortfall, additional funding from the utilities could be available, as discussed below, and "may be used to fund the programs under subsection (b) of Section 1-56 of the Illinois Power Agency Act in the same proportion the

[525] See Section 8.6.1.1.

[526] See 220 ILCS 5/16-108(k).

[527] The sixth paragraph of the newly enacted Section 16-108(k) of the Public Utilities Act defines the "funding shortfall" based on amounts appropriated by the General Assembly ***to*** the Renewable Energy Resources Fund. However, the General Assembly has, in fact, never made an appropriation ***to*** the RERF. The General Assembly does, though, regularly make appropriations ***from*** the RERF. (See, e.g., Public Act 99-0524, enacted June 30, 2016, at Art. 24, § 10; Public Act 100-0021, enacted July 6, 2017, at Art. 45, § 10.) Thus, the IPA interprets the word "to" as a scrivener's error, intended to mean "from."

programs are funded under that subsection (b)" to provide additional support to Illinois Solar for All as part of a supplemental plan developed by the Agency.[528]

If this provision is interpreted to be based on the amounts appropriated for the whole of all three Fiscal Years covered (rather than a prorated amount of the appropriations for the first and last years, Fiscal Year 2017 and Fiscal Year 2019), then for each of the three fiscal years, the appropriation made totals $150 million for the relevant period.[529]

The Agency notes that an appropriation is merely authority to spend funds up to the appropriated amount for the purposes contained in an applicable Fiscal Year's appropriation bill. It may not correspond to the actual Fund balance or match actual expenditures made in that fiscal year.

In addition, this funding is only available if the funds collected from ratepayers by the utilities through their RPS riders exceed their expenditure to fund their purchases of RECs under the RPS during each of the 2017-2018, 2018-2019, and 2019-2020 delivery years, and half of each year's difference, if any, would be available to offset the shortfall. The Agency will ask each utility to provide an accounting of RPS collections and expenditures following the end of each of the three referenced delivery years. For the 2017-2018 delivery year, the total unspent RPS collections across the state's three large electric utilities were $102,229,434.[530] The Agency expects that there will be a similar excess for the 2018-2019 delivery year, given that no REC expenditures under the Initial Forward Procurements, the Adjustable Block Program, or Illinois Solar for All Program were made during 2018-2019, and also that the electric utilities' RPS rider collection levels grew relative to the 2017-2018 delivery year as the separate Section 16-115D's ARES compliance obligation continued to wind down, applying to 50% of ARES supplied retail load in 2017-2018 but then to only 25% in 2018-2019. In 2019-2020, the utilities' RPS collections will grow yet again due to the full phaseout of ARES compliance obligations, but REC expenditures under the Initial Plan's various procurement programs are beginning, so the expected balance of collections vs. expenditures is unclear.

If there is a funding shortfall and there are utility RPS rider overcollections during the 2017-2018, 2018-2019, and/or 2019-2020 delivery years that, in aggregate, do not exceed the funding shortfall, then Section 1-56(b)(7) provides that,

> *If additional funding for the programs described in this subsection (b) is available under subsection (k) of Section 16-108 of the Public Utilities Act, then the Agency shall submit a procurement plan to the Commission no later than September 1, 2018, that proposes how the Agency will procure programs on behalf of the applicable utility. After notice and hearing, the Commission shall approve, or approve with modification, the plan no later than November 1, 2018.*

The Agency developed and filed its Supplemental Funding Plan with the Commission on August 31, 2018.[531] That Plan concluded as follows regarding whether to use any funding shortfall to provide additional funding for the Illinois Solar for All Program:

[528] 220 ILCS 5/16-108(k).

[529] See id.

[530] See Docket No. 18-1457, Final Illinois Solar for all Supplemental Funding Plan, November 26, 2018, at 16.

[531] See https://www.icc.illinois.gov/docket/files.aspx?no=18-1457&docId=276329.

> Taking into account the status of the Illinois Solar for All Program, the statutory priority attached to ILSFA's annual RRB allocation, the legally-required availability of RERF funds previously transferred to general funds under Section 5h.5 of the State Finance Act, Section 1-56(h)'s requirement that the RERF "shall not be subject to sweeps, administrative charges, or chargebacks," and thus the expected availability of funding sufficient to satisfy the Solar for All annual budgets included in the Long-Term Plan, the IPA does not propose supplemental funding for Illinois Solar for All using the Section 16-108(k) supplemental funding mechanism.[532]

The Illinois Commerce Commission affirmed this determination in Docket No. 18-1457. The Supplemental Funding Plan did note, however, that the Agency would seek to work with stakeholders and potentially reopen that proceeding should a change in circumstances (namely, permanent depletion of the RERF's balance) necessitate funding the Illinois Solar for All Program using the 16-108(k) funding shortfall mechanism.[533]

8.4.4. Setting Budgets

The Agency has developed the Illinois Solar for All Program under the assumption that the funds available for the 2020-2021 and 2021-2022 delivery years will be funds from the RERF and the utility-supplied funds identified in Section 8.4.2. Table 8-3 provides a summary of the Illinois Solar for All funding.

Table 8-3: Total Illinois Solar for All Budgets[534]

Funding Source	Low-Income Distributed Generation Incentive	Low-Income Community Solar Project Initiative	Incentives for Non-Profits and Public Facilities	Low-Income Community Solar Pilot Projects
2020-2021 Program Year				$37,500,000 from RERF ($20 million allocated to 2019 procurement, balance for a 2020 or 2021 procurement)
RERF	$4,950,000	$8,250,000	$3,300,000	
Utility	$3,417,985	$5,696,642	$2,278,657	
Total ($27,893,284[535])	$8,367,985	$13,946,642	$5,578,657	
2021-2022 Program Year				
RERF	$4,950,000	$8,250,000	$3,300,000	
Utility	$3,384,018	$5,640,031	$2,256,012	
Total ($27,780,061)	$8,334,018	$13,890,031	$5,556,012	

8.4.5. Payment Structure

The Illinois Solar for All Program is structured so that the Agency "may pay for such renewable energy credits through an upfront payment per installed kilowatt of nameplate capacity paid once

[532] Final Illinois Solar for All Funding Shortfall Plan, dated November 26, 2018, at 30.

[533] See id. at 31.

[534] As noted above in Section 8.4.1, the RERF sub-program funding amounts are gross budgets before deduction of administrative costs. Additionally, there could be unused utility funds and/or RERF funds from the sub-program budgets for 2018-2019 and/or 2019-2020 that are rolled over to 2020-2021; the extent of allocation of 2018-2019 budgets for the three non-competitive sub-programs is not known at the time of publication of this Revised Plan.

[535] This annual total budget figure, and the one below for 2021-2022, are for the three non-competitive sub-programs.

the device is interconnected at the distribution system level of the utility and is energized."[536] Section 6.14.5 describes the options for the capacity factor used in the Adjustable Block Program to convert kilowatt size of a project to the number of RECs the system would be expected to generate over 15 years. Those same options apply to Illinois Solar for All, the price paid will be expressed on a dollar per REC basis, and payments will be based upon the 15-year expected REC production of the system. For example, as described in that section, using the standard capacity factor would mean that for each kW of capacity for a fixed-mount system, approximately 21 RECs would be generated over 15 years.

Payments for Illinois Solar for All incentives take the form of upfront payments upon energization of systems, with the similar conditions as the Adjustable Block Program that a system must also be registered in GATS or M-RETS to verify that it will produce RECs. However, as discussed in Section 8.6.4, the Agency proposes a different payment structure for Low-Income Community Solar Pilot Projects, which do not participate in the Adjustable Block Program.

REC delivery contracts are either with the Agency or an electric utility, depending on the funding source,[537] and will include the assignment of RECs from each system for 15 years. RECs from these contracts will be applied to the annual RPS goals of the utility to which the project is interconnected, but do not count toward each utility's new photovoltaic project targets.[538] Projects that receive a contract through Illinois Solar for All will not be eligible also to receive a contract through the Adjustable Block Program.[539]

Contracts with the Agency (that utilize funds from the RERF) will be standard contracts that include required state contract provisions—such as terms, conditions, and attachments—including a clause stating that payment is subject to appropriation. Contracts with the utilities may have similarities, but will vary given the different requirements applicable to each.[540] Similar to what was discussed in Section 6.7 regarding contracts for the Adjustable Block Program, the Agency published standard REC delivery contracts (one for the Agency as counterparty and one for a utility as counterparty) for Illinois Solar for All in May 2019; following the approval of this Revised Plan, the Agency will endeavor to also update the Illinois Solar for All REC contract structure along similar lines to the Section 6.7 discussion, including updates to the payment withholding in lieu of collateral option as discussed in Section 6.14.6.

The Act is silent on how to allocate RECs from projects located in the service territories of municipal utilities, rural electric cooperatives, or Mt. Carmel Public Utility. The Agency suggests that RECs from those projects procured through contracts with the Agency using the RERF would not be applied to the utility RPS goals, while any RECs procured through contracts with a utility would be applied to the RPS goals of the contracting utility.

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[536] 20 ILCS 3855/1-56(b)(3).

[537] See 20 ILCS 3855/1-56(b)(2) ("Contracts that will be paid with funds in the Illinois Power Agency Renewable Energy Resources Fund shall be executed by the Agency. Contracts that will be paid with funds collected by an electric utility shall be executed by the electric utility.")

[538] See id.

[539] Section 1-56(b)(3) of the IPA Act requires that for Illinois Solar for All contracts, "[t]he payment shall be in exchange for an assignment of all renewable energy credits generated by the system during the first 15 years of operation." Sections 1-75(c)(1)(L)(ii) and (iii) both contain provisions related to the various components of the Adjustable Block Program that, "[t]he electric utility shall receive and retire all renewable energy credits generated by the project for the first 15 years of operation." These two provisions from Section 1-56(b)(3) and Section 1-75(c)(1)(L) are mutually exclusive as only one REC can be produced, transferred, and retired for each MWh of generation.

[540] See Docket No. 17-0838, Final Order dated April 3, 2018 at 151-152.

8.5. Programs

Section 1-56(b)(2) outlines four sub-programs of the Illinois Solar for All Program:

1. Low-Income Distributed Generation Incentive
2. Low-Income Community Solar Project Initiative
3. Incentives for Non-Profits and Public Facilities
4. Low-Income Community Solar Pilot Projects

The first three of these sub-programs provide an incentive based on the price per REC from the Adjustable Block Program, with adjustments to that price as described below to account for the specific needs of the Illinois Solar for All Program. The fourth sub-program will be competitively procured based on the competitive procurement approach discussed in Chapter 5, and further below in Section 8.6.4.

In addition to those four components, a provision of the Act allows stakeholders to propose alternative programs,

> *"In the course of the Commission proceeding initiated to review and approve the plan, including the Illinois Solar for All Program proposed by the Agency, a party may propose an additional low-income solar or solar incentive program, or modifications to the programs proposed by the Agency, and the Commission may approve an additional program, or modifications to the Agency's proposed program, if the additional or modified program more effectively maximizes the benefits to low-income customers after taking into account all relevant factors, including, but not limited to, the extent to which a competitive market for low-income solar has developed."*[541]

Based on experience and best practices in other states and jurisdictions, the Agency is proposing program elements in Section 8.7 intended to increase the success of low-income solar deployment in Illinois. Those elements are intended to go beyond providing financial incentives to include providing guidance on project development for low-income customers, non-profits, and public sector customers. Additionally, the Agency will continue to monitor the treatment of multi-family buildings under the Low-Income Distributed Generation Incentive sub-program.[542]

Any changes (compared to the Initial Plan) to sub-program terms and conditions, and other general aspects of Illinois Solar for All, described subsequently in this Chapter 8 (as well as the budgetary discussion in Section 0 above) will be effective for the 2020-2021 and 2021-2022 program years and will not apply to the 2019-2020 program year which will still be underway at the time the Agency expects this Revised Plan to be approved by the Commission.

As listed in Table 8-3, approximately $27.9 million is expected to be available in program year 2020-2021 and $27.8 million in program year 2021-2022 for the non-competitively procured sub-programs. The utility-supplied funding will not be available for the Low-Income Community Solar Pilot Projects,[543] and the percentage funding allocations only apply to the funds from the Renewable Energy Resources Fund. The Agency proposes that the utility-supplied funding will be evenly

[541] 20 ILCS 3855/1-56(b)(4).

[542] See Docket No. 17-0838, Final Order dated April 3, 2018 at 153.

[543] See Section 8.6.4 for a discussion of funding sources for the Low-Income Community Solar Pilot Projects.

allocated to the other three programs at the same relative weightings, but will monitor activity and may shift the use of the utility funding between sub-programs as needed.

8.6. Setting Incentive Levels

The incentive levels described in the following Sections were derived by utilizing the REC prices for the Adjustable Block Program as described in Section 6.4 and adjusting those prices to meet the objectives of the Illinois Solar for All Program. These incentives will be offered through a 15-year REC delivery contract, either with the Agency for projects funded with the Renewable Energy Resources Fund, or a utility for projects funded through utility-supplied funds.

Incentive levels are expressed as REC prices, and will be set according to the same groups and categories as the Adjustable Block Program (Group A for projects located in Ameren Illinois, Mt. Carmel, MidAmerican, and rural electric cooperatives and municipal utilities located in MISO; Group B for projects located in ComEd, and rural electric cooperatives and municipal utilities located in PJM). Unlike the Adjustable Block Program, these incentives will initially not be adjusted upward or downward based upon blocks of capacity filling up. Rather, the Agency proposes to review and update the incentive levels on an annual program year basis. That update will include an adjustment to account for how the comparable Adjustable Block Program REC price for each Group and category has changed since the previous update (or original REC prices as determined in this Plan), allowing for the prices offered through Illinois Solar for All to track overall market conditions while continuing to be offered at a higher level than for the Adjustable Block Program.

For this Revised Plan, the Agency is not proposing any changes to REC prices because with Solar for All. Because the Program opened for project applications in May 2019, the Agency lacks sufficient market information to make confident market-based adjustments to REC prices.

For the Low-Income Distributed Generation Incentive sub-program, the Adjustable Block Program's REC prices were adjusted in the CREST model by setting the assumed debt financing of the project to 0%, and increasing the net metering benefit shared with participants from 20% to (i) 100% for residential participants in 1-4 unit buildings, and (ii) 50% for residential participants in larger buildings.[544] For the Low-Income Community Solar sub-program, those REC prices were adjusted by shortening the financing term to five years and lowering the debt financing to 35%. For the Incentives for Non-Profits and Public Facilities sub-program, REC prices were adjusted from the ABP DG pricing model by considering the project as a non-taxable entity; the up-to-10 kW size segment was assumed to be non-residential instead of residential; and the net metering benefit to be shared with participants was increased from 20% to 50%. The Agency believes these approaches represent reasonable proxies for the higher incentive level needed for Illinois Solar for All projects to overcome the financing barriers and other hurdles these project face.

8.6.1. Low-Income Distributed Generation Incentive

The Low-Income Distributed Generation Incentive sub-program is intended to provide funding for photovoltaic projects located on individual homes and multi-unit residential buildings. In addition to the requirements of the Adjustable Block Program, qualifying projects will be subject to the additional low-income consumer protections outlined in Section 8.14. As described in Section 8.15.4, 25% of available funding in this sub-program will be targeted to environmental justice communities.

[544] See Docket No. 17-0838, Final Order dated April 3, 2018 at 155; see also Appendices E-3-a and E-3-b.

In approving and modifying this Revised Plan, the Commission noted that multi-faceted challenges to participation in this sub-program must be addressed; the Agency will continue to work with the Environmental Law and Policy Center, the Natural Resources Defense Council, Vote Solar, and other interested parties to develop improvements to the sub-program.[545]

8.6.1.1. Eligibility

The Agency proposes to treat residential buildings with one to four units differently than residential buildings with five units or more. For single-family homes, households must verify that they are low-income; for two- to four-unit residential buildings, at least two of the households must be verified as low-income. For five-unit and larger residential buildings, either at least 50% of the tenants must be verified as low-income, or the building must be demonstrated to meet the definition of "affordable housing" contained in the Illinois Affordable Housing Act.[546] In addition to projects being eligible based on household income, projects developed on homes or buildings that qualify for US Department of Housing and Urban Development ("HUD") Project-Based Vouchers or Project-Based Rental Assistance (which are programs for housing units dedicated to low-income tenants) also qualify. The income qualification levels required for participation in these programs is lower than income requirements for the Illinois Solar for All program.

The project selection protocol[547] developed by the Program Administrator scores projects in a manner that will help to ensure a diversity of projects between 1-4 unit buildings and larger buildings. To further ensure that diversity of projects, 25% of the program year budget will be reserved for 1-4 unit building projects. At the end of each program year, unused funds in this reserved sub-category will rollover to unreserved funds for the following program year of Distributed Generation sub-program, in accordance with the Commission's order in approving and modifying this Revised Plan.[548]

8.6.1.2. Demonstrating Tangible Economic Benefits for Residents of Multifamily Buildings

Section 1-56(b)(2) requires that the Illinois Solar For All incentives deliver tangible economic benefits for eligible low-income customers, including those that live in multifamily buildings. Multifamily buildings can be either master metered or individually metered. For master-metered buildings, the economic benefits of installing a photovoltaic system will not directly impact the occupants of the building because they do not individually pay an electric bill to their electric utility; but instead the benefits accrue to the building owner/manager. Therefore, for master-metered building owners to be eligible for the Low-Income Distributed Generation Incentive sub-program, the building owner/manager will need to commit to passing along at least 50% of the energy savings from net metering to all the tenants, regardless of income level, through reduced (or not raised) rents, or by other means, and additionally communicate to residents those benefits and how they resulted

[545] See Docket No. 19-0995, Final Order dated February 18, 2020 at 101.

[546] See Section 8.13.1 for more information on income verification and Section 8.13.2 for more information on income eligibility (including a required commitment for owners of multifamily buildings).

[547] See: https://www.illinoissfa.com/app/uploads/2019/05/ILSFA-Project-Selection-Protocol.pdf for the 2018-2019 and 2019-2020 program year protocol. As stated in Section 8.6.2, an updated project selection protocol will be developed for program years 2020-2021 and 2021-2022.

[548] See Docket No. 19-0995, Final Order dated February 18, 2020 at 100-101.

from the installation of solar. The commitment should also include a description of how this will be accomplished.

For multifamily buildings that are not master metered, one challenge is that the photovoltaic system will most likely be connected to the main building account that serves common areas and building-wide load rather than to any individual unit's account. For these buildings, the owner/manager must either provide the same demonstration of passing along benefits to all tenants as for master-metered buildings, or in the alternative, must commit to offering all tenants the opportunity (at no additional upfront cost levied by the landlord) to participate in net metering pursuant to the provisions of Section 16-107.5(*l*)(1)(B) of the PUA, which allows for net metering of "individual units, apartments, or properties located in a single building that are owned or leased by multiple customers and collectively served by a common eligible renewable electrical generating facility."

8.6.1.3. Incentive Level

Table 8-4: Incentives for the Low-Income Distributed Generation Program, 1-4 unit buildings ($/REC)

System Size	Group A	Group B
≤10 kW	$143.09	$143.09
>10 - 25 kW	$127.55	$127.55
>25 - 100 kW	$103.28	$103.28
>100 - 200 kW	$90.40	$90.40
>200 - 500 kW	$84.41	$84.41
>500 – 2,000 kW	$80.69	$80.69

Table 8-5: Incentives for the Low-Income Distributed Generation Program, 5+ unit buildings ($/REC)

System Size	Group A	Group B
≤10 kW	$117.62	$118.20
>10 - 25 kW	$107.08	$107.65
>25 - 100 kW	$87.70	$88.28
>100 - 200 kW	$74.67	$75.26
>200 - 500 kW	$68.59	$69.19
>500 – 2,000 kW	$65.32	$65.92

These incentive payments are intended to be sufficient to provide tangible economic benefits to participants through enabling project developers to eliminate upfront costs to the participants for the installation of photovoltaic projects. The incentive will be a standard incentive expressed as a payment for the contractually obligated delivery of a renewable energy credit and not customized for each project.

Projects that participate in this incentive will also be subject to the provisions related to job training discussed in Section 8.9.

8.6.2. Low-Income Community Solar Project Initiative

This sub-program, or initiative, is intended to support participation in community solar by low-income subscribers. To qualify for this initiative, community solar projects must meet conditions beyond the requirements for community renewable generation projects outlined in the Act and beyond those applicable community solar projects that participate in the Adjustable Block Program. These include:

- *"Each project shall identify its partnership with community stakeholders regarding the location, development, and participation in the project, provided that nothing shall preclude a project from including an anchor tenant that does not qualify as low-income."*
- *"Incentives should also be offered to community solar projects that are 100% low-income subscriber owned, which includes low-income households, not-for-profit organizations, and affordable housing owners."*[549]

For the first provision, ILSFA Approved Vendors' project applications must include a description of a partnership with community stakeholders in the community where the project will be located applicable to that project. While the Act does not define the term "community stakeholders," the National Community–Based Organization Network (NCBON) defines a community-based organization as one in which:

- The majority of the governing body and staff consists of local residents,
- The main operating offices are in the community,
- Priority issue areas are identified and defined by residents,
- Solutions to address priority issues are developed with residents, and
- Program design, implementation, and evaluation components have residents intimately involved, in leadership positions.[550]

The Agency will consider entities that demonstrate that they meet this definition as being able to represent community stakeholders in a partnership. Furthermore, the Agency believes the intent of the Act was to create substantial partnerships, going beyond just holding a few community meetings. In addition to information regarding location, development and participation, these partnerships should include a description of how the partnership shows that it is responsive to the priorities and concerns of low-income members of the community.

[549] 20 ILCS 3855/1-56(b)(2)(B).

[550] National Community–Based Organization Network (NCBON), "What is a Community–Based Organization (CBO)?" https://sph.umich.edu/ncbon/whatis.html. Accessed September 2017.

The Agency proposes that a public entity may qualify as a community-based organization for this purpose, but only if the public entity meets the following requirements:

- The public entity must represent a municipality or county (or school district, park district, etc.) in a municipality or county in the bottom 25% of the state by population.
- The public entity must certify that no local community-based organizations exist that are capable of filling this role.
- The public entity must provide the same showing of robust community engagement as a non-public entity would be required to show.
- Public entities that have failed to act as community-based partners in a past project certification would be ineligible.

The public entity would be qualified as a "community-based organization" only in the context of one project application; the qualification would not be retained for a future project application (the public entity would need to demonstrate the same factors again). Finally, the public entity must provide ongoing reporting of its engagement approach, including public participation opportunities and disclosure of its approach to the project location selection (if applicable).

If the proposed project has an anchor tenant that does not qualify as a low-income residential household, the application should describe that anchor tenant in detail; the Illinois Solar for All incentive will be reduced to account for the share of the system subscribed by that tenant not receiving a low-income incentive. For this Revised Plan the Agency proposes that for any anchor tenant, that reduction would be achieved by pricing their share at the equivalent applicable Adjustable Block Program REC price (i.e., non-profit or public anchor tenants would no longer qualify for the higher ILSFA price). A project may only have one anchor tenant, and that anchor tenant must be identified at the time of application.

In order to encourage projects that have deep community connections, the Agency proposes that the separately-developed project selection protocol for the 2020-2021 and 2021-2022 program years (see Section 8.12.2) be updated to reflect the following prioritization in project selection:

- Projects for which the anchor tenant is a non-profit or public facility critical service provider and also the project host;
- Projects for which the anchor tenant is a non-profit or public facility that is not a critical service provider and is also the project host;
- Projects for which the anchor tenant is a non-profit or public facility critical service provider but not the project host;
- Projects for which the anchor tenant is a non-profit or public facility that is not a critical service provider but not the project host;
- Projects for which the anchor tenant is not a non-profit or public facility.

To qualify for any preference in project selection for a project with an anchor tenant, the anchor tenant subscription must be at least 10% of the project size (and, by law, may not be more than 40%).

Regarding projects "that are 100% low-income subscriber owned," the Agency assumes the Act intended the plain meaning of the word "ownership," and not that projects be merely 100% "subscribed" by low-income customers. For projects that can demonstrate that they are 100% owned by low-income subscribers (including not-for-profit organizations, and affordable housing owners),

the incentive level will be increased by $5/REC. To be eligible for this additional incentive, the Illinois Solar for All Approved Vendor will need to certify the intent for the project to be 100% low-income subscriber owned at the time of application, and if the project is not initially structured this way, the applicant will have up to six years after energization to complete the full transfer of ownership to the low-income subscribers. The price of the transfer must be provided at the time of application and will be subject to approval by the Agency. The application must also contain a commitment that the project remain 100% low-income subscriber owned after the transfer. The additional incentive will be paid only upon the Illinois Solar for All Approved Vendor providing documentation to the Agency that the project is 100% low-income subscriber owned. The Agency understands that 100% low-income subscriber owned projects may face challenges in arranging financing. However, as the Act clearly states "100% low-income subscriber owned," the Agency is not able to offer flexibility to allow other ownership models for this provision.

As described in Section 8.15.4, 25% of available funding in this sub-program will be targeted to environmental justice communities.

8.6.2.1. Incentive Level

Table 8-6: Incentives for Low-Income Community Solar Projects ($/REC)

System Size	Group A	Group B
≤10 kW	$121.99	$119.55
>10 - 25 kW	$111.98	$109.52
>25 - 100 kW	$93.32	$90.82
>100 - 200 kW	$80.72	$78.20
>200 - 500 kW	$74.78	$72.23
>500 – 2,000 kW	$71.29	$68.74
Co-located systems exceeding 2 MW in aggregate size	$64.88	$62.30

These incentives for Low-Income Community Solar Projects are for the portion of the project that is subscribed by low-income subscribers (which includes a non-profit or public facility anchor tenant). In order to receive the incentive at the time of energization, the Approved Vendor will have to verify the level of low-income subscribers to the Project as outlined in Section 8.13.1. The Agency notes that the Adjustable Block Program only requires 50% of subscribers (in kW volume) to be identified at the time of energization, and that small subscriber adders are granted only if the project meets the small subscriber level after one year of operation. This principle will apply to Low-Income Community Solar as well. Only 50% of the low-income subscribers will need to be identified by the time the project is energized to receive the incentive. However, the amount of incentive payment will be prorated to the anchor and low-income subscription levels at the time of energization. After one year, a payment adjustment shall potentially be made based upon the anchor and low-income subscription level achieved by that time.

To ensure ongoing subscription levels by low-income subscribers, the Approved Vendor will have to provide ongoing collateral for ten years equal to 5% of the remaining REC value and report annually on low-income subscription levels. If those levels are not maintained, then the collateral may be called upon to claw back the incentives to the level of low-income subscription.

Additionally, the "adders" for small subscriber participation, as defined and described in Section 6.5.3 above relating to community solar projects in the Adjustable Block Program, will also apply to the REC prices for participating projects in the Low-Income Community Solar Project Initiative sub-program.[551] Only residential low-income subscribers with subscription sizes below 25 kW will count as "small subscribers" for this purpose.

8.6.3. Incentives for Non-Profits and Public Facilities

Section 1-56(b)(2)(C) of the Act specifies that "non-profits and public facilities" are eligible to receive incentives for on-site photovoltaic generation. These incentives are designed to "support on-site photovoltaic distributed renewable energy generation devices to serve the load associated with not-for-profit customers and to support photovoltaic distributed renewable energy generation that uses photovoltaic technology to serve the load associated with public sector customers taking service at public buildings."[552] The Act does not specify what specific non-profit organizations or public sector customers may be eligible.

Given that the objective of the Illinois Solar for All Program is in part "to bring photovoltaics to low-income communities,"[553] it is reasonable to infer that only non-profits and public sector customers that in some manner serve low-income communities should be eligible. However, the Act could also be interpreted such that all non-profits and public facilities would be eligible to participate; this interpretation would be consistent with the General Assembly's findings that "the State should encourage the adoption and deployment of cost-effective distributed energy resource technologies and devices, such as photovoltaics, which can encourage private investment in renewable energy resources, stimulate economic growth, enhance the continued diversification of Illinois' energy resource mix, and protect the Illinois environment,"[554] which could involve a wider range of photovoltaic facilities that would be eligible for these incentives. Because current funding levels are such that only a few large projects might make up the whole of the Non-Profit/Public Facilities budget in a single program year, focusing available funds on low-income and environmental justice communities to align with the implied legislative objectives has been the Agency's approach.

To balance these objectives, initially Illinois Solar for All Approved Vendors will have to demonstrate that the project:

1. Documents that it meets the standards described in Section 8.11 related to projects having sufficient connection to, and input from, low-income community members;
2. Is sited within an environmental justice community[555] or low-income community;[556] **and**

[551] See Docket No. 17-0838, Final Order dated April 3, 2018 at 155.

[552] 20 ILCS 3855/1-56(b)(2)(C).

[553] 20 ILCS 3855/1-56(b)(2).

[554] Public Act 99-0906, Section 1(a)(1) ("Findings").

[555] As defined by the methodology outlined in Section 8.15.2 of this Revised Plan.

[556] A "low-income community" for this purpose is defined as a census tract where at least half of households are not exceeding 80% of AMI.

3. Serves the electricity load of a building that is occupied by an organization that is a critical service provider for the community (e.g., youth centers, hospitals, schools, homeless shelters, senior centers, community centers, places of worship, affordable housing providers including public housing sites).[557] For a public facility, the building must host a department/agency that is a critical service provider meeting this standard.
4. The Approved Vendor must either certify that the project's owner will not apply for the federal Investment Tax Credit in relation to the project installation, or if it will apply for the Investment Tax Credit, then the savings level for the participating host of the project must be 65% of energy value rather than 50%.

As described in Section 8.15.4, 25% of available funding in this sub-program will be targeted to environmental justice communities.

8.6.3.1. Incentive Level

Table 8-7: Incentives for Non-Profits and Public Facilities ($/REC)

System Size	Group A	Group B
≤10 kW	$155.87	$156.57
>10 - 25 kW	$142.55	$143.26
>25 - 100 kW	$118.57	$119.28
>100 - 200 kW	$102.83	$103.55
>200 - 500 kW	$95.61	$96.34
>500 - 2,000 kW	$91.31	$92.04

8.6.4. Low-Income Community Solar Pilot Projects

Low-Income Community Solar Pilot Projects will participate in the Illinois Solar for All Program in a manner that is different from projects that participate in the other portions of the Program.

Unlike those other programs, the Low-Income Community Solar Pilot Projects "shall be competitively bid by the Agency, subject to fair and equitable guidelines developed by the Agency."[558] This means that rather than applying to the Illinois Solar for All Program and receiving an administratively determined REC price, the incentive will be determined through a competitive bidding process as outlined in Chapter 5. The Agency has a well-established process for competitive procurements, and for this process, the Agency will leverage that experience.

In addition to the general provisions that the Agency uses for competitive procurements (e.g. sealed, pay-as-bid request for proposal process), the Agency also recommends that certain provisions

[557] If the building is not owned by the organization or public agency, then either a lease with at least five years remaining on it, or a commitment by the building owner to lease the facility to a critical service provider for at least five years must be provided.

[558] 20 ILCS 3855/1-56(b)(2)(D).

related to other community solar projects also apply to the pilot projects: including the eighteen-month window of time for project development, and project and customer information requirements.

The procurement for Low-Income Community Solar Pilot Projects will be bid on a $/REC basis, for contracts for 15 years of delivery of all RECs from the project to the Agency once the project is energized. The price paid will be based solely on the bid price and will not include any payment based on the Adjustable Block Program REC prices (or adders/adjustments). For this Revised Plan, the Agency proposes that payments for projects contracted through this sub-program via the second Pilot Projects procurement, to be held in 2020-2021 or 2021-2022, will be made over the 15 years of REC deliveries (rather than the first 10 years as provided in the Initial Plan for the first Pilot Projects procurement). To ensure that the procurement follows "fair and equitable guidelines," the Agency proposes that bids be evaluated only on the basis of price, as this is the most objective way to consider bid evaluation. While the Low-Income Community Solar Pilot Project procurement process requires additional considerations (described below), the Agency believes that those considerations are better applied as minimum criteria for determining eligibility to participate in the procurement rather than applied to the evaluation of competing bids (with the limited example provided below for why bids could be considered out of price order).

There are several considerations under Section 1-56(b)(2)(D) of the Act for how the competitive procurement is conducted that must be specifically considered and adapted for the Low-Income Community Solar Pilot Projects competitive procurement.

First, the Agency notes that the total funding over time for Low-Income Community Solar Pilot Projects cannot exceed $50,000,000, and that it cannot exceed $20,000,000 per project. However, as discussed in Section 8.4.1, only a maximum of $37.5 million is available from the RERF for this sub-program. Furthermore, projects are allowed to be larger than the 2,000 kW limit that otherwise applies for community renewable generation projects under net metering laws and tariffs.

Second, projects "must result in economic benefits for the members of the community in which the project will be located." The Agency believes that this provision can be met by requiring projects that wish to bid in the procurement adhere to the same provisions as the Low-Income Community Solar Projects in terms of partnerships with community stakeholders. Projects must also provide information about how they will comply with this provision through options such as providing commitments to local hiring and use of M/WBE contractors, describing impact on payments to community residents or community-based organizations as part of the project development process, and offering of subscriptions to community residents and community-based organizations (which will have to meet the same 50% savings requirement as the other Low-Income Community Solar sub-program). Failure to meet commitments made during the bidder/project registration phase of the procurement will be considered actions that would result in a default and cancellation of the contract.

Third, projects "must include a partnership with at least one community-based organization." Information on the partnership will be required to register during the initial bidder registration phase and projects that cannot demonstrate such a partnership will not be eligible to bid. As described in Section 8.6.2, the community-based organization(s) should be an existing non-profit (or in limited circumstances a government agency) organization that provides programs and services within the same defined community as where the proposed project will be located.

Fourth, funds "may not be distributed solely to a utility;" and fifth, "at least some funds under this subparagraph (D) must include a project partnership that includes community ownership by the

project subscribers." These two provisions create interesting challenges in the evaluation of bids. For example, if bids are received and only the highest priced bid includes "a project partnership that includes community ownership," (a distinct requirement around ownership that goes beyond the requirement that applies to all projects that they have a partnership with a community-based organization) but constitutes the only project able to be supported under the available budget, it would have to be selected. Similarly, to ensure that funds are not distributed solely to utilities, bids may need to be selected out of price order, otherwise, only a utility project would win.

Because utilities are potentially bidders in this procurement, contracts resulting from this procurement may only be entered into by the Agency and only use the Renewable Energy Resources Fund as a source of contract funding. While generally the Illinois Solar for All Program allows for contracts to be entered into either with the Agency (using the RERF) or with one of the utilities, it would be inappropriate for utilities potentially to enter into contracts with themselves, and furthermore, the procurement process could allow for them as the Buyer to receive confidential information from competing bidders (e.g., potential Sellers).

The Agency conducted a procurement for Low-Income Community Solar Pilot Projects in late 2019 with a budget of $20 million (which will cover the 15-year REC contract value of selected projects). The Agency will consider changes to the requirements for bidder participation based upon a review (including the opportunity for stakeholder input) of the results of that first procurement, and will hold another procurement for the remaining balance of funds in this sub-program (the total value across both procurements being approximately $37.5 million, as discussed in Section 8.4.1) during either the 2020-2021 or 2021-2022 program years.

8.7. Providing Guidance and Education

The Illinois Solar For All Program provides substantial financial incentives intended to enable low-income, non-profit, and public sector customers to share in the benefits of solar power. These customers are specifically identified in the legislation partly because they face additional hurdles in deploying solar, such as a lack of taxable income needed to monetize tax-based incentives, a lack of access to capital, or institutional barriers that limit deployment.

At the same time, such customers have access to a wide variety of non-energy programs and policies intended to promote economic development, provide affordable housing, and reduce the burdens of poverty. Programs from the U.S. Department of Housing and Urban Development, for example, provide financial assistance for housing and utility bills. Such programs are supporting solar deployment to reduce utility expenses for both residents and taxpayers.

Experience in other states has shown that there are many finance-related and other policies and programs at the federal, state, and local level that can be applied to low-income solar development. The Agency believes that the Illinois Solar For All Program would benefit from guidance and education provided to Illinois Solar for All Approved Vendors, community groups, public-sector customers, and others, in addition to the financial incentives described in other sections of the Plan. One vehicle for providing such guidance is the Program Administrator(s) that manages the Illinois Solar For All Program.

8.8. Illinois Solar for All Program Administrator

The Program Administrator for the Illinois Solar for All Program was selected via a two-part Request for Qualifications/Request for Proposals process conducted by the Agency in 2018, which culminated in Commission approval of the contract for Elevate Energy to serve as the ILSFA Program Administrator on September 14, 2018.

The Illinois Solar for All Program Administrator(s) will at minimum:

- Take applications and verify project eligibility in Illinois Solar for All and coordinate this information with the Adjustable Block Program Administrator (who will process the actual generation of contracts). This includes, but is not limited to, review of project technical specifications, income verification, review of community involvement in projects, review of job training coordination, and review of Illinois Solar for All consumer protections such as verification of ensuring tangible economic benefits flow to low income participants.

- Act as the centralized source for income verification and maintain database of program participants.

- Assist in the development of contracts, disclosure forms, and brochures for use by Illinois Solar for All Approved Vendors and their partner community-based organizations.

- Coordinate the distribution of funding for grassroots education efforts by community-based organizations. A priority for this funding will be to promote the availability of the Illinois Solar for All Program in Environmental Justice Communities to achieve the goal of 25% of the incentives being allocated to those communities.

- Facilitate Illinois Solar for All Approved Vendors meeting the additional requirements of the Illinois Solar for All Program. In particular, the Program Administrator acts as a liaison between Illinois Solar for All Approved Vendors participating in the programs and organizations providing job training. The Program Administrator shall also work to inform Illinois Solar for All Approved Vendors of energy efficiency, weatherization, lead abatement, and other program opportunities that could provide additional benefits to participants.

- Provide guidance and education to Illinois Solar for All Approved Vendors, community groups, local government agencies, and others on how to leverage other governmental policies to facilitate low-income solar projects and energy efficiency programs. Other relevant policies include affordable housing, economic development, public finance, and tax policies, at the federal, state, and local level. The Administrator will act as liaison with other governmental agencies that administer such programs to facilitate their use on solar development.

- Provide Program Manual and related materials for use by Illinois Solar for All Approved Vendors.

- Provide reports to the Agency and the Commission on a quarterly basis on the status of the Program including, but not limited to, number of applications received, number of

applications approved, number of projects completed, REC payments, payments for and status of grassroots education efforts (if applicable), and a summary of technical assistance provided.

8.9. Quality Assurance

Due to the higher incentive level that Illinois Solar for All projects will receive compared to those that participate in the Adjustable Block Program, as well as the additional vulnerabilities that program participants may face, it is especially important for the Agency to ensure that projects are properly installed and produce their expected amounts of energy. In conjunction with the Program Evaluator (as described in Section 8.17), the Illinois Solar for All Program Administrator has developed and implemented a process for quality assurance, including assessing 1) the suitability of sites for solar installation and/or the proper planning for mitigating site deficiencies before installation, 2) a thorough photo documentation of all projects while under construction, and 3) on-site inspection of a random sample of installations. If installations are found to have deficiencies or nonconformance with specifications from the application, the Illinois Solar for All Approved Vendor, at its own expense, will be responsible for any repairs, alterations, or additions to remedy the deficiencies. A deficient project may be removed from the Program if already contracted. Illinois Solar for All Approved Vendors who have a disproportionately high number of deficient systems may lose their eligibility to continue to participate in the Illinois Solar for All Program.

8.10. Coordination with Job Training Programs

Section 1-56(b)(2) of the Act contains two provisions that are designed to ensure that the job trainees supported by the ComEd job training programs[559] established under Section 16-108.12 of the Public Utilities Act participate in the installation of photovoltaic projects supported by the program. The first of these requirements is aspirational in nature, while the second is more specific.

The first provision is that "[p]rojects must include job training opportunities if available, and shall endeavor to coordinate with the job training programs described in paragraph (1) of subsection (a) of Section 16-108.12 of the Public Utilities Act."[560] This program is known as the "solar training pipeline program." Under this provision, ComEd is to spend $3,000,000 in each of 2017, 2021, and 2025 to train installers for the solar projects authorized and contemplated under the Solar for All program and other RPS programs. The job training program is to be "designed to ensure that entities that offer training are located in, and trainees are recruited from, the same communities that the program aims to serve and that the program provides trainees with the opportunity to obtain real-world experience."[561]

The availability of job training opportunities for Solar for All projects depends, in part, on the availability of graduates of the solar training pipeline program. ComEd's Request for Proposals from potential training providers was issued August 1, 2017 and remained open until September 30, 2017.[562] The RFP emphasizes the need for training providers to include trainee recruitment,

[559] ComEd's job training implementation plan was approved by the Commission on September 27, 2017 in Docket No. 17-0332.

[560] 20 ILCS 3855/1-56(b)(2).

[561] 220 ILCS 5/16-108.12(a)(1).

[562] See https://www.cct.org/what-we-offer/request-for-proposals-solar-job-training.

substantive solar industry training, and post-training opportunities.[563] Moreover, ComEd has committed "to coordinate with the Illinois Power Agency or its administrator of Illinois Solar for All."[564]

The second relevant provision is that, for the Low-income Distributed Generation sub-program, "[c]ompanies participating in this program that install solar panels shall commit to hiring job trainees for a portion of their low-income installations" and further that, "an administrator shall facilitate partnering the companies that install solar panels with entities that provide solar panel installation job training."[565]

The Act does not specify what is meant by "a portion" and also does not define who would qualify as a "job trainee" in contrast with the prior provision that specifically ties it to the solar training pipeline program. The Agency notes that Section 16-108.12 of the Public Utilities Act not only creates the solar training pipeline program described above but also creates a "craft apprenticeship program" and a set of six "multi-cultural jobs programs." The Agency infers that graduates of those programs could reasonably be considered "job trainees" for the purposes of the Low-income Distributed Generation Incentive sub-program within Illinois Solar for All.

ComEd stated in the ICC proceeding reviewing its Section 16-108.12 job training plan that it intends to implement the Solar Craft Apprenticeship Program in coordination with the International Brotherhood of Electrical Workers ("IBEW") Local 134, which will integrate solar training curricula into its existing electrical craft/trade/skill apprenticeship programs at 18 IBEW sites as well as certain community colleges and high schools.[566] According to the Plan submitted by ComEd in that proceeding, the Solar Craft Apprenticeship Program appears to include training locations located across the entire State, and not just in ComEd's service territory.[567] This program may be essential for ensuring the availability of job trainees across the State. In July 2019, ComEd released an annual report detailing the status of its job training programs under Section 16-108.12.[568]

To ensure that "a portion" of projects use job trainees, Illinois Solar for All Approved Vendors who participate in the Illinois Solar for All program should demonstrate that at least 33% of Low-Income Distributed Generation projects (on a rolling average basis) include the use of one or more job trainees from the solar training pipeline program, the craft apprenticeship program, or the multi-cultural jobs program. Furthermore, each Illinois Solar for All Approved Vendor will have to demonstrate that for its first year of participation, 10% of the hours worked on all projects will be by job trainees, and that amount would increase to 20% in their second year of participation, and 33% in the third year. This timeline for these increasing annual percentage requirements will start with the beginning of construction of the Approved Vendor's first project contracted under the Program.

[563] Docket No. 17-0332, ComEd Ex. 1.0 (http://www.icc.illinois.gov/downloads/public/edocket/451215.pdf) at 8. As described further at the webpages linked below, recipients of Multi-Cultural Jobs Program grants were announced in August 2017: https://www.comed.com/News/Pages/NewsReleases/2017_08_01.aspx and recipients of Solar Training Pipeline Program grants were announced in December 2017: https://www.comed.com/News/Pages/NewsReleases/2017_12_07.aspx.

[564] Docket No. 17-0332, ComEd/EDF/ELPC/LVEJO Joint Initial Comments at 5.

[565] 20 ILCS 3855/1-56(b)(2)(A).

[566] ICC Docket No. 17-0332, ComEd Ex. 1.0 at 12.

[567] Id. at 13.

[568] https://www.icc.illinois.gov/docket/files.aspx?no=17-0332&docId=288221.

Illinois Solar for All Approved Vendors will be required to document the use of job trainees, and to provide a summary of their work to the Program Administrator. Illinois Solar for All Approved Vendors may also request to use job trainees from other job training programs so long as they can demonstrate that completion of the job training program would lead to the trainee becoming a "Qualified Person" under the Part 468 Rule related to the certification of installers of photovoltaic systems (see Section 2.3.2.4 for additional discussion of these requirements). The Agency will consider requests for waivers of this requirement on a case-by-case basis if an Illinois Solar for All Approved Vendor can demonstrate that, despite diligent efforts at recruitment, job trainees are not available in the area where projects are being installed and this would prevent the project from being completed.

The Illinois Solar for All Program Administrator is coordinating with the entities providing job training to maintain a clearinghouse of information that Illinois Solar for All Approved Vendors can use to identify potential job training program graduates to hire.

The Agency and its Program Administrator(s) will not run the job training programs, and therefore, the Agency has limited ability to ensure the success of those programs in effectively training new workers. Rather, the Agency will seek to ensure that the Illinois Solar for All Program creates employment opportunities for those new workers.

8.11. Additional Requirements for Approved Vendors

Because the Illinois Solar for All Program (other than the Low-income Community Solar Pilot Projects) works similarly to the Adjustable Block Program, direct participants must first be approved as ABP Approved Vendors through the process outlined in Section 6.9. Approved Vendors who seek to submit projects into Illinois Solar for All will additionally have to register with the Illinois Solar for All Program and agree to additional terms and conditions to become an Illinois Solar for All Approved Vendor.[569] An Approved Vendor that does not achieve this status will not be eligible to submit projects. A list of Illinois Solar for All Approved Vendors is available on both the Adjustable Block Program website and Illinois Solar for All website.

The additional requirements for registering to be an Illinois Solar for All Approved Vendor include:

- Description of plans for community involvement in projects (where applicable)
- Plan for inclusion of job training opportunities
- For those indicating intention to submit projects that receive the Low-income Distributed Generation incentive sub-program, a commitment to hire job trainees for a portion of the projects as described in Section 8.10
- Coordination with the Program Administrator on income verification
- Agreement to allow the Program Administrator and Agency to review and approve marketing materials geared towards the Illinois Solar for All Program
- Agreement to ensure additional consumer protections as described in Section 8.14
- Demonstration that for low-income distributed generation and community solar projects that participants do not have any up-front payments.

[569] This includes the option to be an Illinois Solar for All Single Project Approved Vendor similar to the Adjustable Block Program Single Project Approved Vendor option. The minimum project size would be 50 kW.

The Act provides that "[p]riority shall be given to projects that demonstrate meaningful involvement of low-income community members in designing the initial proposals" and that "[a]cceptable proposals to implement projects must demonstrate the applicant's ability to conduct initial community outreach, education, and recruitment of low-income participants in the community."[570] For community solar projects, these requirements apply through the requirement to identify partnerships with community stakeholders. It is less clear how those provisions would apply directly to projects that participate in either the Low-Income Distributed Generation Incentive sub-program or the Incentives for Non-profits and Public Facilities sub-program.

To satisfy these provisions, the registration process for the Illinois Solar for All Program will require Illinois Solar for All Approved Vendors to demonstrate their capacities in this area. An Illinois Solar for All Approved Vendor will do so by satisfying all of the following requirements:

- Providing narrative summary of efforts taken prior to the application to conduct community outreach, education, and recruitment
- Listing community-based organizations the applicant has partnered with, including letters from those organizations to verify the partnerships
- Describing in detail ongoing plans for community outreach, education, and recruitment
- Describing staffing for dedicated outreach, education, and recruitment
- Describing plans for ensuring that tangible economic benefits flow to program participants
- Participating in training offered by the Program Administrator on guidelines for marketing, contracting, and standard disclosures for program participants

Failure to maintain a demonstrated commitment to these requirements may result in an Illinois Solar for All Approved Vendor being removed from participating in the Illinois Solar for All Program.

8.12. Application Process

8.12.1. Project Submissions and Batches

Except for Low-Income Community Solar Pilot Projects, the process for a project to be submitted to the Illinois Solar for All Program generally mirrors that for the Adjustable Block Program described in Section 6.14. Projects are submitted by Illinois Solar for All Approved Vendors through a similar process as the Adjustable Block Program but the initial minimum batch size is 50 kW. There is no application fee for Illinois Solar for All projects.

Applications will be submitted through the Illinois Solar for All project application portal and will provide the supplemental information required for those projects for Illinois Solar for All in addition to what would be required for an Adjustable Block Program project. If the supplemental information does not demonstrate that the project qualifies for participation in the Illinois Solar for All Program, the project may still be eligible to participate in the Adjustable Block Program through a separate application (including the payment of an application fee), although any such application would be subject to the availability of block capacity in the Adjustable Block Program. A project may not apply to the Illinois Solar for All Program if it is included in a batch of Adjustable Block Program projects that have been submitted to the Commission for approval (or subsequently approved). If a project applies to both programs, the Solar for All application will have to be withdrawn at the time the

[570] 20 ILCS 3855/1-56(b)(2).

Adjustable Block Program sends its approval recommendation to the Commission (and vice versa). Additionally, a project may not apply to two sub-programs of Illinois Solar for All within the same program year.

Like for the Adjustable Block Program, Illinois Solar for All projects will be bundled into one contract or confirmation for each approved batch. The Agency will request Commission approval for contracts that include additional Illinois Solar For All provisions. In this Revised Plan the Agency proposes that those contracts will be executed first with the utilities using the allocation from their Renewable Resources Budgets, and then by the Agency using funds from the Renewable Energy Resources Fund. This change from the order contained in the Initial Plan (which was to execute contracts with the Agency first) is to recognize that with the end of the rollover period for utility collected funds there is more urgency to allocated and spend those funds. For contracts allocated to a utility, the Program Administrator will strive to allocate contracts to each utility for projects in their service territory, and in a manner that will obligate funds at a level consistent with each utility's share of funds committed to Illinois Solar for All.

Like the Adjustable Block Program contract process described in 6.14.6, an Approved Vendor's failure to timely execute a product order will potentially subject that Approved Vendor to discipline, and the constituent projects will be considered removed from the Illinois Solar for All Program. Additionally, as discussed in Section 6.15.1 for the ABP, when an Approved Vendor's collateral is forfeited under its ILSFA REC contract (if the contract is with a utility), that collateral amount will be restored to the utility's Renewable Resources Budget, and if the contract is with the Agency, that collateral amount would be deposited into the Renewable Energy Resources Fund.

The process for posting collateral will mirror that for the Adjustable Block Program described in Sections 6.14.6 and 6.16.1. For a Low-Income Community Solar project that is not yet energized at the time of Commission approval, the contract value (for purposes of calculating the required collateral posting) will be based on an assumption that 100% of the project is subscribed by low-income residential households qualifying as "small subscribers."

For Low-Income Community Solar Pilot Projects, the application process will take place through registering for, then bidding in, the competitive procurement for those projects. Prior to accepting bids for the Low-Income Community Solar Pilot Project competitive procurement process, the Agency and its Illinois Solar for All Program Administrator will work with stakeholders to refine and finalize requirements for bidder participation.[571] The approval of contracts by the Commission will take the form of the Commission approving the results of the competitive procurement.

8.12.2. Project Selection for Sub-programs with High Demand

Projects for each sub-program (except for Low-Income Community Solar Pilot projects) must initially be submitted within pre-determined project submission windows for each program year. In the case that a sub-program has a large number of applications such that the funding required for all eligible applications received within the submission window exceeds that sub-program's total budget (including RERF funds and utility funds)[572] for that program year, the Agency will establish a protocol

[571] See Docket No. 17-0838, Final Order dated April 3, 2018 at 161.

[572] Note that sub-program budgets are adjusted to account for any funds not committed in the previous program year and rolled over (although utility budgets cannot be rolled over starting with the uncommitted 2020-2021 utility budget), administrative expenses, and grassroots education costs. Furthermore, the Agency may adjust allocations of utility-supplied funding if needed.

that provides a basis for scoring each individual project based on attributes that align with the goals of this Revised Plan and creates a ranking of projects based on these scores.[573] The highest scoring projects will be selected for funding first, where possible, ensuring funds prioritize projects that directly meet Plan objectives. One objective of this selection protocol will be to minimize the use of random tie-breaking as a means of selection.

Attributes that will receive higher scores include:

- Location with an Environmental Justice Community,
- Location within a low-income community (as defined above in Section 8.6.3),
- Projects developed by Approved Vendors that are women- or minority-owned businesses,[574] or
- Preferences for types of subscribers in Low-Income Community Solar projects, as outlined in Section 8.6.2;
- Other attributes that align with Plan priorities.

In addition, scoring will be weighted in such a way that helps to ensure a diversity of project development compared with all projects submitted for a given sub-program. For example, additional weighting might be given for:

- Geographic location,
- Project size, or
- Other such attributes that reflect a diversity of projects.

The project selection protocol should be executed in a way that ensure the goal of 25% of funds going to Environmental Justice communities is met whenever possible. As discussed in Section 8.15.4 below, the 25% allocation for projects located in Environmental Justice communities within each sub-program will be held open until the end of each program year.

After each program year's initial project submission window, if funds for a given sub-program remain available, project applications will be accepted and reviewed on a first-come/first-served basis for the remainder of the program year. If annually allocated RERF funds in a sub-program remain at the end of the program year, the unused funds will be rolled over to the next program year for that sub-program.

The 2019-2020 project selection process may result in a waitlist of unselected projects within one or more sub-programs for that program year. The Agency proposes through this Revised Plan that each 2019-2020 waitlist would not be used after May 31, 2020 and that the project selection protocol for the 2020-2021 and 2021-2022 program years will not give preference to projects that were on previous years' waiting lists.

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[573] This approach has been utilized for the 2018-2019 and 2019-2020 program years. See: https://www.illinoissfa.com/app/uploads/2019/05/ILSFA-Project-Selection-Protocol.pdf. The Agency expects that an update to the protocol will include additional granularity in scoring to minimize the likelihood of tied scores that would require random selection of projects.

[574] During the proceeding to approve this Revised Plan, the Agency recommended a workshop or public comment process to explore expanding this criterion beyond Approved Vendors to include contractors and subcontractors. The Commission agreed that such a process is appropriate. See Docket No. 19-0995, Final Order dated February 18, 2020 at 105.

8.13. Customer Eligibility

Customer eligibility for the Illinois Solar for All Program is partly defined in the Act. Further refinements are proposed in this section.

8.13.1. Income Guidelines

The Act states that for the Illinois Solar for All Program, "'low-income households' means persons and families whose income does not exceed 80% of area median income, adjusted for family size and revised every 5 years."[575]

The Agency proposes to use income eligibility guidelines from HUD. HUD bases its housing assistance programs, such as the Section 8 Housing Choice Voucher program on 80% of area median income, adjusted for family size.[576]

Because the Act does not define "area," the Agency is proposing to use HUD's definition of an area as a Metropolitan Statistical Area (MSA), a Fair Market Rate (FMR) Area, or a county not in an MSA or FMR. There are 20 MSAs and FMRs, and 62 other counties in Illinois.

Eligibility levels for Illinois Solar For All, based on 2017 HUD guidelines for every area and adjusted for family size, are presented in Appendix F. These guidelines will be updated in 2022.

For Fiscal Year 2017, the HUD eligibility income limits for Illinois as a whole are shown in the table below. For example, a family of four would be considered "low-income" if their household income were less than $59,300. (Actual eligibility depends on income for an area, rather than for the state as a whole.) HUD has other programs that use "very low" and "extremely low" income measures, at 50% and 30% of AMI that are provided here for reference. [577]

Table 8-8: HUD Income Limits

HUD State Income Limits: Illinois FY 2017								
Median family income (MFI) = $74,100								
Persons in household	1	2	3	4	5	6	7	8
30% of median ("extremely low income")	$15,550	$17,800	$20,000	$22,250	$24,000	$25,800	$27,550	$29,350
50% of median ("very low income")	$25,950	$29,650	$33,350	$37,050	$40,000	$43,000	$45,950	$48,900
80% of median ("low income")	**$41,500**	**$47,400**	**$53,350**	**$59,300**	**$64,000**	**$68,750**	**$73,500**	**$78,250**

It should be noted that other low-income energy programs, such as the Illinois Home Weatherization Assistance Program ("IHWAP") and the Low Income Home Energy Assistance Program ("LIHEAP")

[575] 20 ILCS 3855/1-56(b).

[576] HUD, FY 2017 Income Limits Documentation System at https://www.huduser.gov/portal/datasets/il.html.

[577] https://www.huduser.gov/portal/datasets/il/il17/State-Incomelimits-Report-FY17.pdf. For metropolitan area and county level income limits, see: https://www.hudexchange.info/resource/reportmanagement/published/HOME_IncomeLmts_State_IL_2017.pdf.

have eligibility guidelines that are updated each program year, based on the federal poverty level (not area income), with statewide values. Eligibility guidelines are set for households with income below 200% and 150% of the federal poverty level, depending on the program. Illinois eligibility guidelines are set by the Department of Commerce and Economic Opportunity and are shown in Table 8-9.[578]

Table 8-9: Eligibility Guidelines for LIHEAP and WAP in Illinois

	2017 Illinois LIHEAP eligibility			2018 IHWAP Income Eligibility Guidelines	
Household Size	30 Day Income	Annual income (150% of FPL)		State Funds (150% of FPL)	Federal Funds (200% of FPL)
1	$1,508	$18,090		$18,090	$24,120
2	$2,030	$24,360		$24,360	$32,480
3	$2,553	$30,630		$30,630	$40,840
4	$3,075	$36,900		$36,900	$49,200
5	$3,598	$43,170		$43,170	$57,560
6	$4,120	$49,440		$49,440	$65,920
7	$4,643	$55,710		$55,710	$74,280
8	$5,165	$61,980		$61,980	$82,640

In all regions of Illinois, 150% of the federal poverty level is lower than 80% of Adjusted Median Income ("AMI") for all household sizes. Thus, all households eligible for LIHEAP are also eligible for Illinois Solar For All. Households participating in IHWAP using state funds are also eligible, while those using Federally funded IHWAP (200% of FPL) may be eligible in some areas of the state and some household sizes, but not others. The tables in Appendix F compare HUD eligibility levels to LIHEAP and IHWAP income eligibility levels.

Another approach to identifying low-income customers, by geographic area rather than by individual household income, is to use HUD's "Qualified Census Tracts," which are used to define eligibility for the Low-Income Housing Tax Credit (LIHTC).[579] Qualified Census Tracts must have 50 percent of households with incomes below 60 percent of the Area Median Gross Income (AMGI) or have a poverty rate of 25 percent or more.

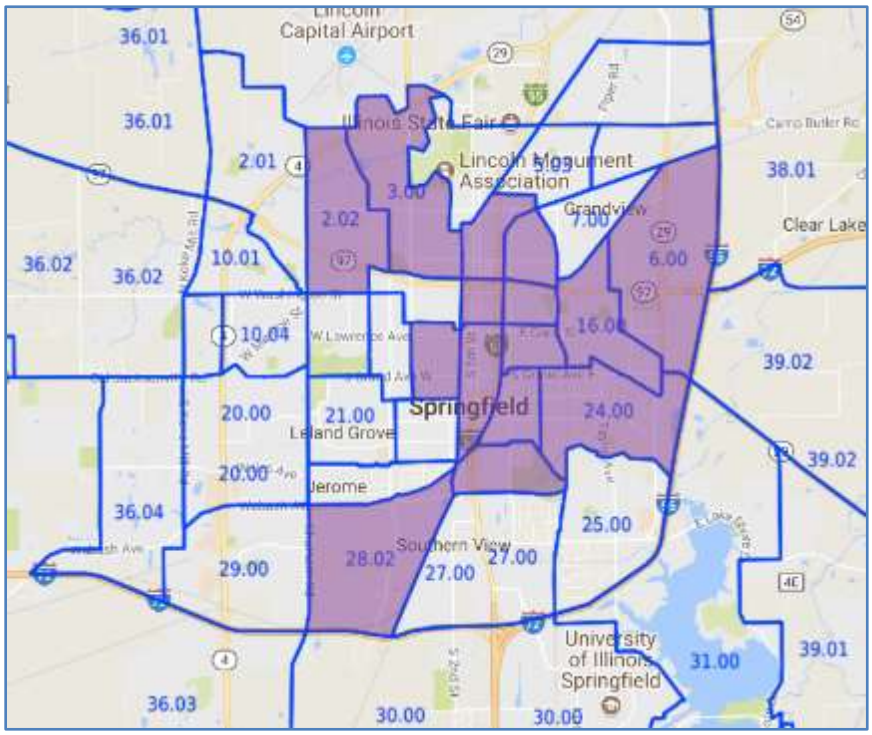
HUD has identified and mapped Qualified Census Tracts ("QCT") nationwide. Overall, there are 657 QCTs in metropolitan areas in Illinois and 49 in non-metropolitan areas (out of 3,123 total census tracts in Illinois). Cook County has the largest portion with 441. Springfield, which has 15 QCTs, is shown in Figure 8-1 as an example.

The Agency will use QCTs (along with subscriber affidavits) as a streamlined method for determining eligibility for low-income community solar subscribers, as discussed in the next section.

[578] Illinois Department of Commerce and Economic Opportunity, "Community Assistance, Energy Efficiency and Infrastructure," https://www.illinois.gov/dceo/CommunityServices/Pages/default.aspx. Accessed September 2017.

[579] HUD, "Qualified Census Tracts and Difficult Development Areas," web site accessed July 19, 2017. https://www.huduser.gov/portal/datasets/qct.html.

Figure 8-1: Springfield Qualified Census Tracts



Source: HUD, https://www.huduser.gov/portal/sadda/sadda_qct.html

8.13.2. Determining Income Eligibility

The Agency proposes several approaches to determining income eligibility for the Illinois Solar for All Program.

For projects that participate in the Low-income Distributed Generation Incentive Program sub-program, verification of income should be done at the household resident level. This can be done in several ways.[580]

For buildings with between one and four units, household income can be verified by one of the following means:

- Review of the most recent federal income tax returns
- Income verification through a third-party income verification system
- Verification of participation in another low-income energy program (such as LIHEAP or state-funded IHWAP), in HUD's housing assistance programs where the income eligibility standard is lower than 80% of AMI for that participant, or in other benefits programs where the income eligibility is lower than 80% of AMI.

[580] In response to concerns raised by various stakeholders in the process of approving this Revised Plan, the Commission determined that the Agency and the Program Administrator shall explore implementing a process to connect interested income-qualified customers with ILSFA Approved Vendors. The Agency will implement any such process in a competitively neutral fashion and strive to provide equal information and opportunities to all applicable ILSFA Approved Vendors. Additionally, the Agency will conduct a stakeholder feedback process to work through key implementation details prior to implementation of such a process. See Docket No. 19-0995, Final Order dated February 18, 2020 at 108.

Additionally, while the Agency generally expects the Approved Vendor to verify a potential low-income community subscriber's income through one of the methods described above, the Agency recognizes that some potential subscribers would prefer to have their income verified independently of their community solar subscription. In such cases, the potential subscriber may request income verification directly through the Program Administrator and, if approved, that verification would remain valid for six months. The Program Administrator would provide the potential subscriber with a verification letter that could be provided to the Approved Vendor.[581]

For two- to four-unit buildings, at least two of the households in the building must qualify. For a multi-family building (five or more units), either at least 50% of the households must qualify, or the building owner may demonstrate that the building meets the definition of "affordable housing" contained in the Illinois Affordable Housing Act, namely:

> *"Affordable housing' means residential housing that, so long as the same is occupied by low-income households or very low-income households, requires payment of monthly housing costs, including utilities other than telephone, of no more than 30% of the maximum allowable income as stated for such households as defined in this Section.*[582]

In addition, participation in energy efficiency programs that also have an income eligibility requirement that is equal to or less than 80% of AMI may also be considered a means of qualifying a multifamily building.

For residential buildings of two or more units, the building owner will be required to agree to maintain at least half the units as affordable housing for a period of ten years.

For low-income community solar projects, the Agency recognizes that transaction costs of proving income eligibility compared to the value of the incentive may be higher than for an installation of a project on-site, and therefore proposes a streamlined income verification approach:

- A subscriber can be verified as low-income via the same provisions used for the Low-Income Distributed Generation Incentive sub-program.
- A subscriber can be verified as low-income if they reside in a HUD Qualified Census Tract and also provide a signed affidavit that they meet the income qualification level.[583]

It is the responsibility of the Illinois Solar for All Approved Vendor to track subscribers and document income eligibility for community solar projects[584]. Approved Vendors will be required to report to the Agency on subscription rates once a year. Illinois Solar for All Approved Vendors will not be

[581] See Docket No. 19-0995, Final Order dated February 18, 2020 at 108.

[582] See 310 ILCS 65/3(e). Note that the definition of low-income household contained in that Act mirrors the definition used for Illinois Solar for All, and that very low-income households have an income standard that is even lower.

[583] The Agency will monitor the use of this provision and may consider modifying the consideration of eligible census tracts (for example to census tracts where at least 50% of households are below 80% of AMI) if the proposed use of the QCT approach appears to be a barrier to facilitating subscription verification.

[584] While generally the Agency would expect the Approved Vendor to verify a potential low-income community solar subscriber's income through one of the methods described in this Revised Plan, the Agency recognizes that some potential subscribers would prefer to have their income verified independently of their community solar subscription. In such cases, a potential subscriber may request income verification directly through the Program Administrator, and if approved, that verification would remain valid for six months. The Program Administrator would provide the potential subscriber with a verification letter that could be provided to the Approved Vendor.

required to verify that existing subscribers continue to meet the low-income eligibility requirements, but new subscribers over time will be required to meet those requirements.

8.14. Consumer Protections

The Agency believes that the Plan features a strong set of consumer protections as part of the Adjustable Block Program for both distributed generation and for community solar (see Sections 6.13 and 7.6.2). These protections will also apply to the Illinois Solar for All Program. But several factors lead the Agency to require additional consumer protections for the Illinois Solar for All Program. Thus, to be an Illinois Solar for All Approved Vendor for the Solar For All program, Illinois Solar for All Approved Vendors must agree to the following additional provisions for low-income customers.

- In order to "ensure tangible economic benefits flow directly to program participants," Illinois Solar for All Approved Vendors must also verify that for residential program participants there are no up-front payments for distributed generation projects, or up-front subscription fees for community solar projects. Illinois Solar for All Approved Vendors must also provide documentation to both the program participant(s), and to the Program Administrator explaining how the project or community solar subscription will result in a cash-flow positive experience for the participant(s) (including an estimate of the monthly savings) – and specifically, ensuring that the savings accruing to each participant, net of any ongoing participation fees, are at least 50% of the value produced by the solar system through avoided usage or net metering credits.[585]

- For distributed generation projects, a site suitability report is required to ensure that projects are being installed on properties that will not need substantial structural, roofing or electrical repairs. If repairs are needed, the Illinois Solar for All Approved Vendor must identify the plan for the repairs and how they will be paid for, ensuring that such costs do not place an unsustainable financial burden on the participant. While the site suitability report does not need to be completed prior to the program participant entering into a contract with the Illinois Solar for All Approved Vendor (or their sub-contracted installer), if the site suitability report indicates that the project is not viable, the contract must contain a no-cost cancellation provision.

- Contracts between Illinois Solar for All Approved Vendors (or their sub-contracted installers) and program participants for Low-Income Distributed Generation projects are required to offer clear disclosure of the costs seven calendar days before consummation of the transaction, and the right to cancel the transaction within seven calendar days after consummation. For contracts related to subscriptions to projects participating in the Low-Income Community Solar Project Initiative or the Low-Income Community Solar Pilot Procurement, that right to cancel the transaction would be within three calendar days after consummation.

- Financing amounts, terms, and conditions must be based on an assessment of the program participant's ability to repay the debt, as defined by Regulation Z, which is a federal rule that implements aspects of the Truth in Lending Act and the Dodd-Frank Act.[586]

[585] See Docket No. 17-0838, Final Order dated April 3, 2018 at 151.

[586] See Consumer Financial Protection Bureau, April 10, 2013. *Ability-to-Repay and Qualified Mortgage Rule, Small Entity Compliance Guide*, http://files.consumerfinance.gov/f/201304_cfpb_compliance-guide_atr-qm-rule.pdf. Under the regulation (12 C.F.R. § 1026.43, issued under authority of 15 U.S.C. § 1639c), creditors generally must consider eight underwriting factors: (1) current or reasonably expected

- For low-income customers, loans should not be secured by the program participant's home or home equity. While such unsecured loans may entail a higher interest rate, especially for customers with low credit scores or little credit history, they avoid the risk of liens and foreclosures for customers who default on their loans.[587]

- Contracts for financial products must offer terms that include forbearance. If a program participant can show good cause in a request for forbearance, financers must offer a) suspension of total payments for up to three months, b) a suspension of interest payments for up to six months, or c) a reduction in interest rates for up to twelve months. Missed revenues may be recovered later in the stage of the contract, but no interest may be applied.

- Contracts may not include prepayment penalties.

- Marketing and contractual materials must be in the language requested by the customer.

- Contracts must allow a grace period of at least seven calendar days after the customer payment due date before late fees are charged.

- All Illinois Solar for All contracts must include full system warranty, as well as operations and maintenance guarantees for the duration of the REC Contract or 15 years, at no additional cost to participants.

8.15. Environmental Justice Communities

The Act directs the Agency to define and provide special consideration to Environmental Justice Communities in implementing the Illinois Solar For All program. The Act sets as a goal that at least 25% of funds for the Low-Income Distributed Generation Incentive, the incentives for non-profit and public facilities, and Low-Income Community Solar projects sub-programs "be allocated to projects located in environmental justice communities."[588] (The provision does not apply to the Low-Income Community Solar Pilot Projects, which are competitively bid.)

The following sections include definitions of terms, a methodology for determining which Illinois communities should be considered Environmental Justice Communities, and how the Agency determined to implement the relevant provisions of the Act. In developing the Illinois Solar for All program participation requirements, the Agency committed to consulting with stakeholders and relevant state agencies, including the Illinois Commission on Environmental Justice and the Illinois Environmental Protection Agency ("IEPA"), to establish specific values and designate specific communities as Environmental Justice Communities; the results of that process are outlined within this section.

income or assets; (2) current employment status; (3) the monthly payment on the covered transaction; (4) the monthly payment on any simultaneous loan; (5) the monthly payment for mortgage-related obligations; (6) current debt obligations, alimony, and child support; (7) the monthly debt-to-income ratio or residual income; and (8) credit history.

[587] For example, the Illinois Energy Efficiency Loan Program offers unsecured loans at moderate interest rates through on-bill financing, but is only available for certain energy efficiency measures. See: http://programs.dsireusa.org/system/program/detail/5152.

[588] 20 ILCS 3855/1-56(b)(2)(A), (B), (C).

8.15.1. Definitions

The Act states that "the Agency shall define 'environmental justice community' as part of long-term renewable resources procurement plan development, to ensure, to the extent practicable, compatibility with other agencies' definitions and may, for guidance, look to the definitions used by federal, state, or local governments." The term "environmental justice" is not defined in the Act or in other Illinois statutes, but it is helpful to define "environmental justice" in order to define "environmental justice communities."

The Environmental Justice Act, the 1997 legislation that created the Illinois Commission on Environmental Justice (415 ILCS 155), found that:

> *(i) the principle of environmental justice requires that no segment of the population, regardless of race, national origin, age, or income, should bear disproportionately high or adverse effects of environmental pollution;*
> *(ii) certain communities in the State may suffer disproportionately from environmental hazards related to facilities with permits approved by the State; and*
> *(iii) these environmental hazards can cause long-term health effects.*[589]

The Illinois EPA defines the term "environmental justice " as follows:

> *"Environmental Justice" is based on the principle that all people should be protected from environmental pollution and have the right to a clean and healthy environment. Environmental justice is the protection of the health of the people of Illinois and its environment, equity in the administration of the State's environmental programs, and the provision of adequate opportunities for meaningful involvement of all people with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.*[590]

The Illinois EPA has also defined a "potential environmental justice community" based on demographic factors, but not environmental factors:

> *A "potential" EJ community is a community with a low-income and/or minority population greater than twice the statewide average. In addition, a community may be considered a potential EJ community if the low-income and/or minority population is less than twice the statewide average but greater than the statewide average and that has identified itself as an EJ community. If the low-income and/or minority population percentage is equal to or less than the statewide average, the community should not be considered a potential EJ community.* [591]

The United States Environmental Protection Agency defines an "overburdened community" under both social and environmental terms as:

> *Minority, low-income, tribal, or indigenous populations or geographic locations in the United States that potentially experience disproportionate environmental harms and risks. This disproportionality can be as a result of greater vulnerability to environmental*

[589] 415 ILCS 155/5.

[590] Illinois EPA web site, "Environmental Justice Policy," http://www.epa.illinois.gov/topics/environmental-justice/ej-policy/index. Accessed July 19, 2017.

[591] Id.

> *hazards, lack of opportunity for public participation, or other factors. Increased vulnerability may be attributable to an accumulation of negative or lack of positive environmental, health, economic, or social conditions within these populations or places. The term describes situations where multiple factors, including both environmental and socio-economic stressors, may act cumulatively to affect health and the environment and contribute to persistent environmental health disparities.* [592]

Both the IEPA and US EPA have developed analytical tools based on their definitions of EJ communities. The IEPA's EJ START is a Geographic Information Systems demographic screening tool developed by IEPA staff that identifies regions with high minority population and/or low-income population. IEPA also adds a one-mile buffer around each regulated facility as a simplified way to identify potential local environmental impacts. It draws from the Census Bureau's American Community Survey 5-year estimates (2011-2015) and is updated annually.

The US EPA tool is called EJ SCREEN.[593] It uses standard and nationally-consistent data to identify communities with greater risk of exposure to pollution based on 11 environmental indicators that measure potential exposure, hazard/risk and proximity, including traffic proximity, particulate matter, and proximity to superfund sites. These indicators are combined with demographic data from the Census Bureau, enabling users to identify areas with minority or low- income populations who also face potential pollution issues.

While these tools are useful, they do not holistically address all aspects of environmental justice. For example, EJ SCREEN evaluates individual environmental indicators but does not look at cumulative impacts.

The most rigorous tool for analyzing impacted communities is the California Communities Environmental Health Screening Tool (CalEnviroScreen) from the California Office of Environmental Health Hazard Assessment (OEHHA).[594] CalEnviroScreen compiles data on 12 indicators of pollution burden and 8 population characteristics collected at the Census tract level. It then weights certain factors to develop a score for each area. High scoring areas are then considered eligible for a number of state policies, including disposition of some of the revenues from the state cap-and-trade program created under Assembly Bill 32.

[592] US EPA, "EJ 2020 Glossary," https://www.epa.gov/environmentaljustice/ej-2020-glossary. Accessed July 19, 2017.

[593] See: https://ejscreen.epa.gov/.

[594] California Office of Environmental Health Hazard Assessment ("OEHHA"), *California Communities Environmental Health Screening Tool (CalEnviroScreen)*, https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-version-20.

Table 8-10: Summary of CalEnviroScreen 3.0 Identification Methodology

Pollution Burden	Population Characteristics
Exposures	***Sensitive populations***
Ozone Concentrations PM2.5 Concentrations Diesel PM Emissions Drinking Water Contaminants Pesticide Use Toxic Releases from Facilities Traffic Density	Asthma Emergency Department Visits Low Birth Weight Infants Cardiovascular disease (emergency department visits for heart attacks)
Environmental effects	***Socio-economic indicators****
Cleanup Sites Groundwater Threats Hazardous Waste Impaired Water Bodies Solid Waste Sites and Facilities	Educational Attainment Housing burdened low income households Linguistic Isolation Poverty Unemployment

Source: OEHHA. * California law prohibits the use of race as a factor in CalEnviroScreen.

The CalEnviroScreen approach is an attractive way to consider defining environmental justice communities but the Agency notes that the development of it was a multi-year, multi-million dollar undertaking. Therefore, the Agency will utilize a streamlined approach that takes the concept of CalEnviroScreen and simplifies it for use in Illinois through using readily available data from the U.S EPA's EJ SCREEN tool. CalEnviroScreen does not account for race in its calculations, but by using data from EJ SCREEN, the Agency will be able to do so.

8.15.2. Approach for Defining Environmental Justice Communities

The Agency determined which areas qualify as Environmental Justice Communities by analyzing data from Illinois census block groups[595] for the following environmental indicators, as described by the EJ SCREEN Tool:[596]

- National-Scale Air Toxics Assessment (NATA) air toxics cancer risk
- NATA respiratory hazard index
- NATA diesel PM
- Particulate matter
- Ozone
- Traffic proximity and volume
- Lead paint indicator
- Proximity to Risk Management Plan sites
- Proximity to Hazardous Waste Treatment, Storage and Disposal Facilities
- Proximity to National Priorities List sites

[595] There are approximately 10,000 census block groups in the state of Illinois.

[596] See https://www.epa.gov/ejscreen/overview-environmental-indicators-ejscreen.

- Wastewater Dischargers Indicator

The following demographic indicators are also used by EJ SCREEN and were incorporated into the Agency's methodology:[597]

- Percent Low-Income
- Percent Minority
- Less than high school education
- Linguistic isolation
- Individuals under age 5
- Individuals over age 64

The Agency considered including the following seven indicators that use data not contained in EJ SCREEN. These are not available at the same level of detail as the indicators using data from EJ SCREEN (more typically they have data at the zip code or county level), and would need to be translated to the block group level. Therefore, the Agency determined in the final methodology that these indicators would be too difficult to incorporate to provide meaningful impact on the evaluation criteria. Namely, these include the following demographic indicators for Sensitive Population Characteristics from the Illinois Department of Public Health:

- Asthma Emergency Department Visits
- Low Birth Weight Infants

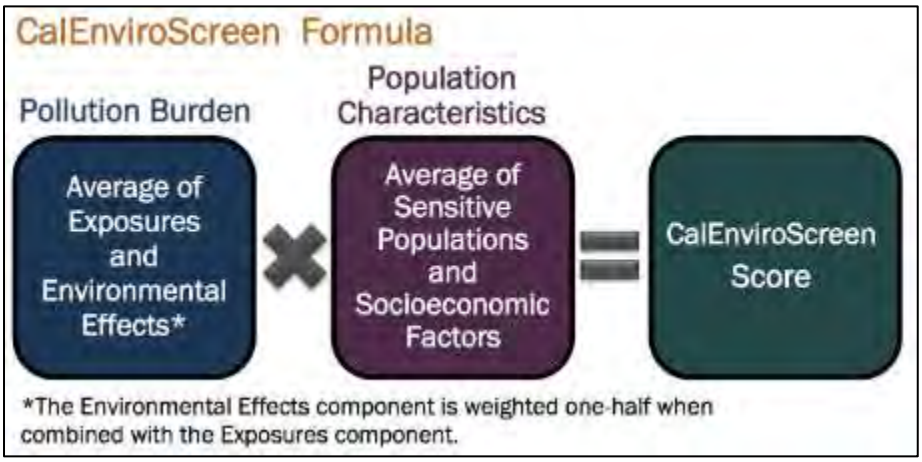
and the following environmental indicators from the Illinois Environmental Protection Agency:

- Drinking Water Watch
- Site remediation program
- Leaking Underground Storage Tank Incident Tracking
- State Response Action Program
- Solid Waste Facilities

Using the eleven environmental and six demographic factors listed at the top of this Section 8.15.2, the Agency then weighted each factor using an approach adapted from CalEnviroScreen: census block groups were ranked for each environmental and demographic indicator, a resulting percentile score determined for each census block group within each indicator, and the percentile scores averaged, resulting in an environmental score and a demographic score for each census block group. The two averages were then multiplied together to determine a single Environmental Justice score for each census block group.

[597] See https://www.epa.gov/ejscreen/overview-demographic-indicators-ejscreen.

Figure 8-2: CalEnviroScreen Formula



Source: OEHHA

Communities with scores in the top 25% of all census block groups statewide are defined as Environmental Justice Communities for the purpose of the Illinois Solar for All Program. This definition will be used to target grassroots education funding and incentives for the Low-income Distributed Generation, Non-profits/Public Facilities, and Low-income Community Solar sub-programs.

A community that is not in the top 25% of scores and thus is not initially defined as being an Environmental Justice Community may request consideration from the Agency to be included. The Agency will consider requests from community-based organizations, local units of government, or community residents for self-designation as an environmental justice community based on a consideration of demonstrated quantitative and qualitative environmental and/or socioeconomic factors that show a disproportionate burden and were not adequately captured in the screening defined above. A request for self-designation must be approved through an Environmental Justice Community Self-Designation Process[598] prior to any project application being submitted that seeks to utilize its location in an approved self-designated Environmental Justice Community as part of its project selection.

The Agency notes that this approach focuses on analysis of census block group-level data, and that communities are typically understood by their residents to be defined through geographic, cultural, and other factors that may, or may not, correspond to census block group boundaries. In addition, the US EPA cautions that data in the EJSCREEN tool is not always reliable at the block group level, and recommends that it may be necessary to aggregate up to larger geographic areas in a "buffer report."[599]

The Agency will therefore also consider reasonable adjustments to the borders of environmental justice communities from what is calculated through the census block group analysis, provided this does not create an unacceptable analytical burden.

[598] The initial Self-Designation Process developed by the Agency and Program Administrator can be found at https://www.illinoissfa.com/app/uploads/2019/05/042219EJ-Self-Designation-Process_Final.pdf. The Agency reserves the right to modify this process in the future based on program experience.

[599] EJSCREEN Technical Documentation, at https://www.epa.gov/ejscreen/technical-documentation-ejscreen.

8.15.3. Environmental Justice Community Designations

The Illinois Solar for All Program Administrator undertook the analysis described in Section 8.15.2 in early 2019 prior to the program launch, which included a workshop and an opportunity for written stakeholder comments. The resulting interactive map of Environmental Justice Communities, as well as information from that stakeholder process, is available at www.illinoissfa.com/environmental-justice-communities. The map of environmental justice communities will be updated on a semiannual basis to reflect any additional approved requests for self-designation.

8.15.4. Environmental Justice Communities 25% Goal

The Act states that "It is a goal of this program that a minimum of 25% of the incentives for this program be allocated to projects located within environmental justice communities."[600]

For the Low-Income Distributed Generation Incentive, the Low-Income Community Solar Project Initiative, and the Incentives for Non-profits and Public Facilities sub-programs, the Agency will reserve 25% of each sub-program's annual budget to support projects in environmental justice communities. If the 25% of funds in each sub-program are fully allocated to projects in environmental justice communities, then subsequent applicant projects in environmental justice communities would still be eligible using the general available budgets. The 25% reservation of funds for environmental justice communities will be held open within a sub-program until filled within a program year, then reset at the beginning of each new program year.

8.16. Program Changes

Several provisions in the Act anticipate the ability to revise and change program provisions. In addition to the provision described in Section 1-56(b)(4) of the Act that allows stakeholders to propose additional programs, an additional provision allows the Agency to reallocate funds between programs:

> *"The allocation of funds among subparagraphs (A), (B), or (C) of this paragraph (2) may be changed if the Agency or administrator, through delegated authority, determines incentives in subparagraphs (A), (B), or (C) of this paragraph (2) have not been adequately subscribed to fully utilize the Illinois Power Agency Renewable Energy Resources Fund. The determination shall include input through a stakeholder process."*[601]

With this Revised Plan, the Agency is not proposing a change in allocation of funds.

Likewise, the Agency has not proposed any adjustments to the programs pursuant to the following provision:

> *"Following the Commission's approval of the Illinois Solar for All Program, the Agency or a party may propose adjustments to the program terms, conditions, and requirements, including the price offered to new systems, to ensure the long-term viability and success of the program. The Commission shall review and approve any*

[600] 20 ILCS 3855/1-56(b)(2).

[601] 20 ILCS 3855/1-56(b)(2).

modifications to the program through the plan revision process described in Section 16-111.5 of the Public Utilities Act."[602]

8.17. Evaluation

Section 1-56(b)(6) requires that this Plan include an approach for independent evaluation of the Illinois Solar for All Program:

> *"At least every 2 years, the Agency shall select an independent evaluator to review and report on the Illinois Solar for All Program and the performance of the third-party program administrator of the Illinois Solar for All Program. The evaluation shall be based on objective criteria developed through a public stakeholder process. The process shall include feedback and participation from Illinois Solar for All Program stakeholders, including participants and organizations in environmental justice and historically underserved communities. The report shall include a summary of the evaluation of the Illinois Solar for All Program based on the stakeholder developed objective criteria. The report shall include the number of projects installed; the total installed capacity in kilowatts; the average cost per kilowatt of installed capacity to the extent reasonably obtainable by the Agency; the number of jobs or job opportunities created; economic, social, and environmental benefits created; and the total administrative costs expended by the Agency and program administrator to implement and evaluate the program."*

In January 2019, the Agency held a workshop and took stakeholder feedback to assist in the development of the scope and process for the evaluation.[603] The Agency then issued a Request for Qualifications/Request for Proposals to select an independent evaluator to conduct the evaluation.[604] This selection process is expressly exempted from the Illinois Procurement Code.[605] On August 7, 2019, the Commission approved the contract for the Agency's selected evaluator, APPRISE, Inc.

The Act calls for an evaluation "at least every 2 years," but the Agency notes that Illinois Solar For All did not launch for project applications until May 2019. Therefore, during its first months of work, the Evaluator conducted research and prepared a Phase I Evaluation Report that focused on the stakeholder outreach process, development of program materials and guidelines, initial Approved Vendor registration, initial project applications, and the development of Grassroots Education efforts. It is attached as Appendix G to this Revised Plan.

Recommendations from the Phase I Evaluation Report are summarized below. Generally, these recommendations do not require specific changes to this Revised Plan but rather can be considered and potentially implemented through the ongoing program administration.

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[602] 20 ILCS 3855/1-56(b)(4).

[603] See: https://www.illinoissfa.com/announcements/2019/01/written-comments-on-illinois-solar-for-all-third-party-program-evaluation/ and https://www.illinoissfa.com/announcements/2019/02/public-comments-on-third-party-evaluation/.

[604] See: https://www2.illinois.gov/sites/ipa/Documents/IPA%20-%20IlSfA%20-%20Program-Administrator%20-%2018-RFQ-02%20%28Released%2001182018%29.pdf and https://www2.illinois.gov/sites/ipa/Documents/2018ProcurementPlan/IPA-ABP-Program-Administrator-18-RFP-01-20180312.pdf.

[605] 20 ILCS 3855/1-56(f).

Recommendations

- Illinois Solar For All Program Design: Consider the Illinois Solar For All Program design a work in progress. Develop a comprehensive understanding of what is permitted to be changed without modifications to FEJA or the Long-Term Plan, and what changes require legislative or Long-Term Plan modifications. Be open to changes that are seen to be needed as the program evolves and additional data and information become available.

- Illinois Solar For All Program Materials and Website: Many stakeholders and Grassroots Educators commented that the Illinois Solar For All materials are too complex and the website needs to be streamlined and organized.

- Stakeholder Outreach: Several recommendations are made to increase the amount and diversity of participation in the stakeholder outreach process based on feedback from stakeholders and Grassroots Educators.

- Approved Vendors: Consider additional outreach and/or support to encourage Approved Vendor participation in all areas of the state, by MWBE, and by new and smaller businesses.

- Grassroots Education: In general, the Grassroots Educators have found a low level of awareness, a high level of interest, and skepticism about the Illinois Solar For All Program. They stated that customers have a low level of understanding of energy and solar energy. Potential participants do not believe that the program has no upfront costs, or that they will actually benefit from participation. Additionally, the organizations found confusion between the Illinois Solar For All Program and other solar programs. This indicates the importance of the Grassroots Education initiative, which should be continued and expanded.

- Participant Screening: Many low-income customers who are interested in participating in the Illinois Solar For All Program may have a roof that is not in the required condition for rooftop solar to be installed or other home issues that prevent participation. Grassroots Educators noted deferred maintenance issues and lack of solar readiness as a barrier.

- Energy Efficiency and Home Repairs: The Illinois Solar For All Program should aim to provide additional resources and information for Approved Vendors to work with potential low-income participants on energy efficiency and remediating homes so that they are solar-ready.

- Job Training: Consider whether support is needed for potential job trainees to help them overcome barriers to participation in the job training programs.

- Data Collection: The Program Administrator should provide specific information about its current plans for databasing household-level data for DG and community solar. There should then be an assessment of whether such data will be sufficient to meet FEJA mandates and IPA reporting goals, or whether additional data may need to be databased. While there is a critical need to protect participant privacy, many programs collect these data, and it is important to have the ability to document program participation characteristics and impacts. One stakeholder suggested that it may be preferable to have the Program

Administrator collect and process confidential household qualification data rather than the Approved Vendors.

The Evaluator will be embarking on the more detailed Phase II evaluation process starting in early 2020, which will include opportunities for additional stakeholder engagement and input on the full evaluation design.

8.18. Grassroots Education Funding

The Act also directs the Agency to "allocate up to 5% of the funds available under the Illinois Solar for All Program to community-based groups to assist in grassroots education." [606] For 2020-2021 and 2021-2022, the Agency interprets the "funds available under the [Program]" to be the annual contribution of approximately $11.7 million from the Renewable Resources Budget under Section 1-75(c)(1)(O) of the Act, plus $16.5 million allocated annually from the RERF for the three non-competitive sub-programs, plus $2.5 million allocated annually from the RERF for the Low-Income Community Solar Pilot Projects.[607] Therefore, the maximum available annual budget for grassroots education is $1.53 million for these two program years; the Agency reserves the right to allocate less than this amount.

For the purposes of grassroots education, community-based organizations must be registered non-profit entities, excluding trade or political non-profits. It is recognized that the definition of community-based organizations or non-profit is very broad and may include a variety of organization types. It is not required that non-profit organizations have federal 501(c)(3) status, and collaborative or fiscal sponsorship should be encouraged to ensure that very small, hyper-local organizations can participate. Qualified organizations should work within the communities in which they will be providing grassroots education. Grassroots educator entities will be chosen through competitive RFPs issued periodically and selected grassroots educators will be subcontractors of the ILSFA Program Administrator. Pursuant to the Initial Plan, the first selection of grassroots educators was made in June 2019.[608]

As noted in Section 8.8, grassroots education funding will be prioritized towards Environmental Justice Communities to help meet this goal. Up to 60% of the funding (or 3 percentage points of the 5%) will be used for this purpose. Grassroots education topics could include solar basics, program requirements, consumer protection, program benefits and opportunities, job training opportunities, environmental justice community issues, or community engagement, among many others. One objective of the grassroots education strategy will be to ensure that campaigns collectively reach a diversity of households and communities, topics, and geographies over time.

Non-profit organizations providing grassroots education to communities must ensure that outreach and education provided does not serve the interest of any Approved Vendor or other solar developer above any other. When grassroots education events are open to Approved Vendors, all Approved Vendors should have an equal opportunity to participate in a transparent manner. No organization

[606] 20 ILCS 3855/1-56(b)(3).

[607] While for three of the sub-programs there are defined program year funding levels available, that concept does not apply cleanly to the Low-Income Community Solar Pilot Project sub-program. For simplicity, the Agency is proposing to allocate the total available funding for that sub-program ($37.5 million) over 15 years, which is the length of time that projects from the sub-program would be delivering RECs to the Solar for All Program.

[608] See: https://www.illinoissfa.com/announcements/2019/06/announcing-grassroots-organizations.

providing grassroots education services should have a financial relationship with an ILSFA Approved Vendor at the time of performing those services, and any past relationships should be clearly disclosed when submitting proposals.

Exhibit 18

Illinois Solar For All

04.22.2019

Environmental Justice Community Self-Designation Process

Elevate Energy, in its capacity as Program Administrator, will convene an Environmental Justice ("EJ") Community Self-Designation Committee to evaluate self-designation proposals submitted via this process. The Committee will be comprised of 6-8 members (3-4 representatives from Elevate Energy, 1-2 from the IPA, and 2 Environmental Justice experts). The Committee will review proposals and make the final determination as to whether the community in question is designated as an Environmental Justice Community.

Designators responsible for facilitating their community's self-designation proposal will be asked to define their community based on relevant, localized geographic boundaries (e.g. streets, rural highways, county lines). However, the practical result of the self-designation process will be that additional Census Block Groups within that self-defined community receive the Environmental Justice Community designation. This level of granularity in the designation will enable the Program Administrator to ensure consistency in how it tracks and measures participation from these communities, as well as how Approved Vendors and potential participants are able to use tools (e.g. maps and address look-ups) to determine if they are located within a designated Environmental Justice Community.

In practice, the Designator will complete a two-part form to request that a community be designated as an EJ Community. The committee will then use a rubric to assess the quantitative and qualitative data submitted. This rubric mirrors the types of data that entered the original calculation for the EJ Score, covering four areas of environmental justice characteristics: Exposure Indicators, Environmental Effects Indicators, Sensitive Population Indicators, and Socioeconomic Factor Indicators. Within each of the four EJ areas, a score will be assigned based on the extent of burden experienced by the community (e.g. none, little, some, a great deal, most). The level of burden will be deemed higher if supporting documents indicate that:

Exposure Indicators- The exposure level is greater than deemed safe.
Environmental Effects- Proximity to environmental hazards is close.
Sensitive Population Indicators- The number, or percentage, of at-risk community members is high.
Socioeconomic Factor Indicators- The number, or percentage, of at-risk community members is high.

Communities must receive a minimum score of 45 (out of 60 possible points) and receive points from both components of the EJ Score (exposure and environmental,

sensitive and socioeconomic) to be designated as an EJ Community. The possible points are: 20 for Exposure Indicators; 10 for Environmental Effects Indicators; 15 for Sensitive Population Indicators; and 15 for Socioeconomic Factor Indicators. In addition to scores for the four EJ areas, an additional 10 points is available to communities who are directly adjacent to a calculated EJ block group. In scoring, the committee will give the application an integer score from 0 to 4 in each of the four environmental justice areas; these scores will then be translated to rubric points based on the relative weighting of each rubric area. (For example, if the committee assesses the information submitted to support the Exposure Indicators as a 2, that application will receive 50% of the 20 available points for Exposure Indicators, i.e. 10 points. If the application receives a score of 1 in the Sensitive Population area, it will receive 25% of the 15 available points for Sensitive Population, i.e. 3.75 points.)

Environmental Justice Rubric	**Points**						**Total**
Proximity to EJ Block Group	0/10	10 points= Adjacent to EJSCREEN Block Group 0 points= Not adjacent					
		No burden assessed	**Little burden assessed**	**Some burden**	**Much burden**	**Great deal of burden**	
		0	**1**	**2**	**3**	**4**	
Exposure Indicators: Based on measurements of different types of pollution that people may face.	20						
Environmental Effects Indicators: Base on the locations of toxic chemicals in or near communities.	10						
Subtotal							0
Sensitive Population Indicators: Measure the number of people in a community who may be more severely affected by pollutions because of their age or health.	15						
Socioeconomic Factor Indicators: Conditions that may increase people's stress or make healthy living difficult and cause them to be more sensitive to pollution's effects.	15						
Subtotal							0
Total							0

Applications will be reviewed every 14 days by the EJ Community Self-Designation Committee, starting April XX, and any response or request for more information will be communicated to the applicant within 4 business days. The Environmental Justice page on the ILSFA website will be updated with new EJ Community designations no later than one week after a decision has been made. The searchable map will be updated bimonthly for the first three months of a program year and then monthly thereafter.

Environmental Justice Self-Designation Form <to be web-based>

Part A: Basic Information

1. Name of Designator
2. Designator affiliation
3. Designator contact information
    a. Email
    b. Phone number
4. Additional organizations/individuals supporting Designator
    a. Letters of support from additional organizations or individuals may be provided, but are not required to complete the process
5. Name of community proposed for designation
6. Geographic limits of proposed community
    a. Street boundaries, rural highways, county lines, or similar
7. List the Census Block Groups within proposed community limits
    a. Use the Environmental Justice Map as a guide

Please provide a brief explanation of why you believe the territory you have identified is a cohesive community for the purposes of receiving an Environmental Justice Community designation under Illinois Solar for All. Your answer may draw from history, culture, economics, geography, or other considerations you deem relevant. (maximum 500 words)

Open text response

Part B: Quantitative & Qualitative Support

Please provide a narrative that includes supporting data to demonstrate a disproportionate environmental, health, or socioeconomic burden experienced by your community. We encourage you to provide both quantitative and qualitative support when possible. If you

would like confidential treatment of the information submitted, please indicate so in the narrative. (maximum 1,000 words plus attached documents)

Open text response & ability to add attachments.

Further Guidance on Supporting Data

Note that several factors, listed here, have already been accounted for through the initial Environmental Justice analysis; those 17 variables are taken from the U.S. EPA's EJSCREEN tool. The sample list of environmental indicators below is intended to be representative of the pollutant types that a community may face.

- Drinking Water Watch – identify elevated lead levels in community drinking water
- Site Remediation Program – determine whether participating sites exist within the community
- Leaking Underground Storage Tank Incident Tracking – view locations and statuses of any sites within the community
- State Response Action Program – view locations and statuses of all sites
- Solid Waste Facilities – identify facilities within the community
- Birth Characteristics – view county level statistics for low birthweight infants
- 500 Cities Asthma and COPD Prevalence – view health outcomes for selected Illinois cities
- HUD Rental and Housing Assistance Data – view data on assisted housing and subsidies
- CDC National Environmental Health Resources – browse major data systems where public health and environmental data is available
- Citizen Science - scientific work undertaken by the public, often in collaboration with professional scientists and scientific institutions

The IPA and the Illinois Solar for All Program Administrator recognize that all data points may not be available in all instances, nor does it always represent the full picture of a community's unique experiences that may qualify it as an Environmental Justice Community. To account for this, we have identified several qualitative factors that can be considered in this self-designation process.

For responses that cite a specific incident, please include the year in which the incident occurred, as well as an explanation of how your community was more greatly impacted than a comparable geography[1].

Qualitative indication of Environmental Justice Community designation need might include:

- Historical events (e.g. fire, housing crisis)
- Environmental disasters and/or severe weather events
- Plant (e.g. manufacturing, fossil generation) openings/closures/operations
- Economics (e.g. mass migrations, businesses closing, mortgage crisis)
- Community Toxicity & Poor Health (e.g. number of dialysis facilities, number of abandoned gas stations and/or homes, lead exposure in children)
- Resource Starvation (e.g. lack of access to fresh food, limited access to infrastructure, mass incarceration levels, criminal justice, access to affordable and public housing, and homelessness rates)

Additionally, the form that that quantitative or qualitative support can take is varied and may include items such as:

- Summary tables or values from an existing database
- Reports compiled through citizen science
- Expert testimony written specifically for the submission
    - For example, a local pediatrician who says that there is an unusually high number of respiratory illness
- News articles demonstrating common knowledge of a local problem
    - For example, https://stlrecord.com/stories/511445351-motion-for-21-5-million-settlement-against-monsanto-approved
- Evidence of community organizing around an issue through strikes, demonstrations, or other forms of public action

The examples provided are not meant to represent all possible forms of support in the self-designation submission, and designators are encouraged to include any quantitative or qualitative information that they feel is appropriate to the scoring rubric.

[1] Can be compared to the state as a whole, surrounding communities, metropolitan areas, or other geographies as deemed most appropriate for the scale of the incident.