BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:	**)**	
	)	
	)	
STANDARDS FOR THE DISPOSAL OF	**)**	**R20-19**
COAL COMBUSTION RESIDUALS	**)**	**(Rulemaking – Land)**
IN SURFACE IMPOUNDMENTS:	**)**	
PROPOSED NEW 35 ILL. ADM. CODE 845	**)**	

NOTICE OF FILING

To: ALL PARTIES ON THE ATTACHED SERVICE LIST

PLEASE TAKE NOTICE that I have today filed with the Office of the Clerk of the Pollution Control Board **Dynegy's Index of Exhibits and Second Hearing Exhibits**, copies of which are herewith served upon you.

Respectfully submitted,

/s/ Ryan C. Granholm
Ryan C. Granholm

Dated: September 28, 2020

SCHIFF HARDIN LLP
Joshua R. More
Stephen J. Bonebrake
Ryan C. Granholm
233 South Wacker Drive,
Suite 7100
Chicago, Illinois 60606
(312) 258-5633
rgranholm@schiffhardin.com

GIBSON, DUNN & CRUTCHER LLP
Michael L. Raiff
2001 Ross Avenue, Suite 2100
Dallas, TX 75201-6912
(214) 698-3350
mraiff@gibsondunn.com

Attorneys for Dynegy

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PROPOSED NEW 35 ILL. ADM. CODE 845	**)**	

Dynegy's Index of Exhibits

A. Prefiled Slides of Dr. Lisa Bradley

B. Prefiled Slides of Dr. Melinda Hahn

C. Prefiled Slides Dr. Rudolph Bonaparte

D. Prefiled Slides of David Hagen

E. Prefiled Slides of Andrew Bittner

F. Prefiled Slides of Mark Rokoff

Respectfully submitted,

/s/ Joshua R. More
Joshua R. More

Dated: September 28, 2020

SCHIFF HARDIN LLP
Joshua R. More
Stephen J. Bonebrake
Ryan C. Granholm
233 South Wacker Drive,
Suite 7100
Chicago, Illinois 60606
(312) 258-5500
jmore@schiffhardin.com

GIBSON, DUNN & CRUTCHER LLP
Michael L. Raiff
2001 Ross Avenue, Suite 2100
Dallas, TX 75201-6912
(214) 698-3350
mraiff@gibsondunn.com

Attorneys for Dynegy

Exhibit A

Proposed Illinois Administrative Code
Title 35, Subtitle G, Chapter I, Subchapter j, Part 845

Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments

Summary of Pre-filed Testimony
Lisa JN Bradley, Ph.D., DABT; Principal Toxicologist

Qualifications and Experience

Education

- Doctorate of Philosophy, Toxicology, Massachusetts Institute of Technology, 1991
- Bachelors of Science, Zoology and Chemistry, Summa Cum Laude, University of Idaho, 1983

Employment

- Haley & Aldrich, Inc. (6 years); AECOM (23 years)
  - Principal Toxicologist and Risk Assessor
  - Toxicology, risk assessment, site investigation

Expertise

- Broad spectrum of environmental programs
  - CERCLA, RCRA, state programs
  - CCR Rule (Part 257): conceptual site models, groundwater monitoring, risk assessment
- Over 15 years of experience evaluating CCR
  - Development of conceptual site models to evaluate potential exposure
  - Environmental testing to support risk assessment
  - Communications

Lisa JN Bradley, Ph.D., DABT
CCR Expert Witness

Certification

- Diplomate of the American Board of Toxicology

Summary of Opinions

- Opinion 1: CCR is neither hazardous nor toxic, therefore, proposed Part 845 appropriately regulates CCR as a solid waste.
- Opinion 2: Proposed Part 845 is patterned on the federal CCR Rule that is conservative and overly protective, thus, proposed Part 845 is also conservative and overly protective.
- Opinion 3: A single exceedance of a groundwater protection standard during groundwater monitoring should not result in the initiation of corrective action.
- Opinion 4: Proposed Section 845.700(g)(1)(B) and (g)(5) – Category 2 – should be revised to clarify that Category 2 applies only when conditions in (g)(5) pose an imminent threat.
- Opinion 5: CCR units that are capped or otherwise maintained, and units that receive only de minimis amounts of CCR do not present a risk warranting regulation. Imposing requirements upon such units under Part 845 goes beyond the federal CCR rule and is unnecessary and unsupported.
- Opinion 6: OSHA regulations are applicable to work conducted under the proposed Part 845 and are effective for worker and community protection.

HALEY ALDRICH

Opinion 2: Proposed Part 845 is patterned on the federal CCR Rule that is conservative and overly protective, thus, proposed Part 845 is also conservative and overly protective.

Opinion 2: Proposed Part 845 is patterned on the federal CCR Rule that is conservative and overly protective, thus, proposed Part 845 is also conservative and overly protective.

- The federal CCR Rule was based on a national human health and ecological risk assessment of CCR disposal units that identified only one scenario as a risk driver – the 90th %ile risks for drinking water ingestion of arsenic, lithium, and molybdenum for a surface impoundment – however the regulation went beyond that single scenario and the few constituents identified as warranting regulation to regulate a broader range of disposal practices.

- The CCR Risk Assessment was Comprehensive
  - The risk assessment evaluated the full range of potential exposures to CCR at a surface impoundment: air-borne dust, dust dispersion and deposition onto surrounding land, ingestion of food impacted by that deposition, leaching to groundwater with subsequent migration and impact on a drinking water well, evaluation of surface water and sediment in a nearby water body, and ecological receptors exposed directly to wastewater in an impoundment.

- The CCR Risk Assessment was Conservative
  - The federal CCR Rule is protective and very conservative because it was intended to apply to all CCR units in the U.S. without the benefit of regulatory oversight and, therefore, it was designed to mitigate risks associated with all potential settings, i.e., it is protective of the worst-case scenario.
  - One of the conservative assumptions made by USEPA in its risk assessment is that all populations downgradient of a CCR management unit use groundwater, and specifically, shallow groundwater, as a source of drinking water. "EPA acknowledges that there may be a large percentage of the population that does not rely on groundwater as a source of potable water; however, the aim of the risk assessment is to estimate the magnitude of potential risk to the exposed population."

Opinion 3: A single exceedance of a groundwater protection standard during groundwater monitoring should not result in the initiation of corrective action.

Opinion 3: A single exceedance of a groundwater protection standard during groundwater monitoring should not result in the initiation of corrective action.

Proposed Section 845.650 d) states:

"If one or more constituents are **detected, and confirmed by an immediate resample**, in exceedance of the groundwater protection standards in Section 845.600 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 operating record…"

IEPA requires the use of statistics to define background in Section 845.610(b)(3)(B): "evaluate the groundwater monitoring data for **statistically significant levels over background levels** for the constituents listed in Section 845.600 after each sampling event"

The testimony of Lynn Dunaway, IEPA, explains in detail why statistics are important for comparing to background, but does not apply that same logic to the comparison to groundwater protection standards.

The federal CCR Rule states at §257.96(g):

"If one or more constituents in appendix IV to this part are detected at **statistically significant levels** above the groundwater protection standard established under paragraph (h) of this section in any sampling event, the owner or operator must prepare a notification identifying the constituents in appendix IV to this part that have exceeded the groundwater protection standard…"

The Board's regulations governing landfills uses a statistical approach the same as in the federal CCR Rule.

35 Ill. Adm. Code 811.318(b)(5) ("An observed statistically significant increase above the applicable groundwater quality standards of Section 811.320 in a well located at or beyond the compliance boundary shall constitute a violation.") See also, 35 Ill. Adm. Code 811.320(a)(2) and 35 Ill. Adm. Code 812.317.

Opinion 4: Proposed Part 845 closure prioritization Category 2 should be revised to address only conditions that could pose an imminent threat.

Opinion 4: Proposed Section 845.700(g)(1)(B) and (g)(5) – Category 2 – should be revised to clarify that Category 2 applies only when conditions in (g)(5) pose an imminent threat.

Proposed Prioritization Category – 845.700(g)(1)(B)

Category 2 includes CCR surface impoundments that are an imminent threat to human health or the environment as determined by the Agency pursuant to subsection (g)(5).

Category 2 - 845.700(g)(5)

A. Units that fail to achieve minimum safety factors

B. Units that do not comply with location restrictions

C. Units where owner has been "enjoined"

D. Units with an off-site exceedance of a GWPS

E. Units where an emergency condition exists

One off-site exceedance in and of itself does not pose an imminent threat – there must be other circumstances that accompany an exceedance for an imminent threat to exist; similarly, if a CCR impoundment does not meet a location restriction, that in and of itself does not pose an imminent threat – other factors must be taken into consideration for an imminent threat to exist.

Thus, Category 2 should only apply to these units if there are other conditions that pose an imminent threat.

In proposed Part 845, neither Item (B), location restrictions, nor Item (D), exceedance of a groundwater protection standard moving off-site, pose an imminent threat

Location Restrictions

- USEPA defines location restrictions as those necessary "**to ensure that there will be no reasonable probability of adverse effects on health or the environment**"
- This does not equate with an imminent threat to human health or the environment

Units with an off-site exceedance of a GWPS

- Category 1 addresses the imminent threat of units that have impacted an existing potable water supply or a setback to a potable water supply
- An off-site exceedance of a GWPS does not mean that a potable water supply or its setback is necessarily threatened – there may be no downgradient potable water supply or it may be distant from the unit

HALEY ALDRICH

Opinion 5: CCR units that are capped or otherwise maintained, and units that receive only de minimis amounts of CCR do not present a risk warranting regulation. Imposing requirements upon such units under Part 845 goes beyond the federal CCR rule and is unnecessary and unsupported.

Opinion 5: CCR units that are capped or otherwise maintained, and units that receive only de minimis amounts of CCR do not present a risk warranting regulation. Imposing requirements upon such units under Part 845 goes beyond the federal CCR rule and is unnecessary and unsupported.

Capped or Otherwise Maintained

- The April 17, 2015 CCR Rule defined "inactive surface impoundments" as those that still contained CCR and liquids as of October 15, 2015 but that ceased receiving waste after that date. Thus, units that did not contain both water and CCR as of that date are not "inactive surface impoundments" and are not subject to the requirements under that rule.
- USEPA's position on what constitutes a regulated "inactive surface impoundment" is consistent with its CCR Risk Assessment, which established that a significant amount of CCR with liquids creating a hydraulic head produced the risk scenario warranting regulation.
- "EPA did not propose to require 'closed' surface impoundments to 'reclose'…. Accordingly, the final rule does not impose any requirements on any CCR surface impoundments that have in fact 'closed' before the rule's effective date—i.e., those that no longer contain water and can no longer impound liquid."
- Thus, such units should not be regulated under Part 845.

De Minimis Amounts of CCR

- "EPA reviewed the risk assessment and the damage cases to determine the characteristics of the surface impoundments that are the source of the risks the rule seeks to address. Specifically, these are units that contain a large amount of CCR managed with water, under a hydraulic head that promotes the rapid leaching of contaminants…"
- USEPA identified examples of ponds that would be excluded as de minimis ponds, such as "cooling" water and "process" water ponds.
- USEPA implemented its de minimis exclusion in the rule language: "EPA has therefore revised the definition to provide that a CCR surface impoundment as defined in this rule must meet three criteria: (1) The unit is a natural topographic depression, manmade excavation or diked area; (2) the unit is designed to hold an accumulation of CCR and liquid; and (3) the unit treats, stores or disposes of CCR."
- USEPA concluded "that units containing only truly ''de minimis'' levels of CCR are unlikely to present the significant risks this rule is intended to address."


HALEY
ALDRICH

Exhibit B

PROPOSED ILLINOIS ADMINISTRATIVE CODE
TITLE 35, SUBTITLE G, CHAPTER I, SUBCHAPTER J, PART 845

DRINKING WATER WELL SURVEY NEAR ILLINOIS COAL-FIRED POWER PLANTS

Summary of Pre-Filed Testimony

Melinda Hahn, PhD, Senior Manager

RAMBOLL Bright ideas. Sustainable change.

MELINDA HAHN, PHD QUALIFICATIONS

Education

- B.S. in Physics, University of Texas at Austin, 1990
- B.S. in Mathematics, University of Texas at Austin, 1990
- Ph.D. in Environmental Engineering, The Johns Hopkins University, 1995

Experience and Expertise

- 25 years in Environmental Consulting and Project Management
  - Site Investigation
  - Contaminant Fate and Transport, including Groundwater Flow and Contaminant Migration Modeling
  - Contaminant Fingerprinting
  - Site Remediation
  - Sectors: Energy, Manufacturing, Mining and Mineral Processing, Wood Treatment, Dry Cleaning

RAMBOLL

ANALYSIS AND OPINIONS

- Ramboll completed a survey of public and private water wells and water supplies around 23 coal-fired power plant properties with coal ash impoundments in Illinois
- Ramboll did not identify drinking water wells or intakes downgradient from these sites at risk of exceedance of Illinois Class I Groundwater Quality Standards (or federal Safe Drinking Water Act MCLs)
- This finding is consistent with the conclusion of the Illinois Groundwater Protection Program's Biennial reports regarding drinking water wells near power plant sites
- This finding is not consistent with the environmental NGO's Cap and Run Report which alleges "widespread", "severe" and "unsafe" groundwater conditions at power plant sites

RAMBOLL

GROUNDWATER WELL AND WATER SUPPLY SURVEY

- Searched within 2,500 ft of sites:
  - Private wells
  - Semi-private wells
  - Non-community water supply wells and surface water intakes
- Searched within 1 mile of sites:
  - Community water supply wells and surface water intakes
- Search radii based on owned property boundaries
- Desktop survey of IEPA, ISWS, and USEPA databases

WATER WELL SURVEY EXAMPLE

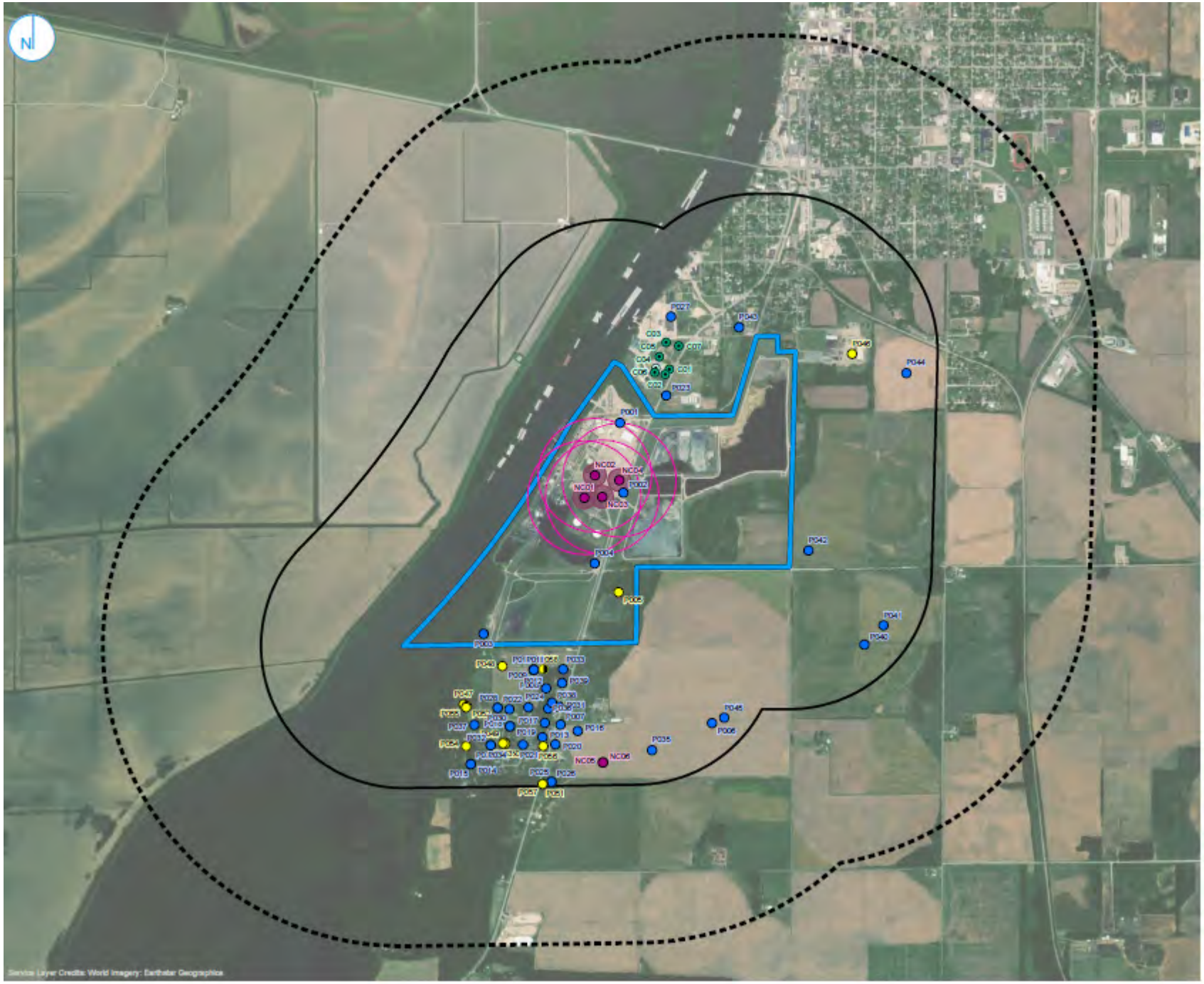
HAVANA

Boundaries

- Owned Property, Search Site, and Plant Boundary
- 2,500-Foot Search Radius
- 1-Mile Search Radius

Receptors

- ISWS Well
- ISWS Well *(Sealed)*
- Private and Semi-Private Well
- Non-CWS Well
- Non-CWS Well Minimum Setback Zone
- Non-CWS Well Phase I WHPA
- CWS Well
- CWS Well *(Inactive)*



RAMBOLL

GROUNDWATER WELL AND SUPPLY SURVEY

- Determined apparent directions of groundwater flow from:
  - Topographic maps
  - Presence of surface water
  - Site-specific reports
- Identified wells/intakes within search radii potentially downgradient, if any
- Further evaluated for risk of Class I GWS exceedance using:
  - Well type/use and status (monitoring, geotechnical, dry, active, abandoned, install date)
  - Well depth, location, and location accuracy
  - Groundwater quality data for the site
- Conclusion: the survey did not identify wells or intakes at risk of impact above Class I GQS from coal ash constituents

RAMBOLL

CONCLUSION COMPARED TO THE 2012 IL GPPB REPORT

- The current survey provided an update to the well survey completed as part of the Illinois Groundwater Protection Program 2012 report which found no drinking water wells in downgradient positions threatened by coal-fired power plant sites
- The current survey identified only 18 additional private or semi-private wells within the search radii installed after 2010.
- Of these, only one was identified as potentially downgradient from an owned site property boundary
- This well is not, however, located potentially downgradient from the operational portion of the site
- The current survey results are consistent with the 2012 IL GPPB report

RAMBOLL

CONCLUSION COMPARED TO THE CAP AND RUN REPORT

- The Cap and Run Report suggests that drinking water supplies are threatened and that groundwater conditions are “severe” and “unsafe” at coal-fired power plant sites
- No risk assessments were performed as part of the Cap and Run Report, or this well survey
- An “unsafe” condition requires:
  - a completed exposure pathway, and
  - exceedance of MCL or IL GQS
- This survey did not identify the presence of public or private water supplies/intakes at risk of exceeding MCLs/IL GQS from coal ash at coal-fired power plant sites

RAMBOLL

Exhibit C

Proposed Illinois Administrative Code
Title 35, Subtitle G, Chapter I, Subchapter j, Part 845

Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments

Summary of Pre-filed Testimony
Rudolph Bonaparte, PhD, P.E., NAE
Senior Principal, Chairman of the Board

Geosyntec consultants

Qualifications and Experience

Geosyntec consultants

Education

- Ph.D., Civil Engineering, University of California, Berkeley (1981)
- M.S., Civil Engineering, University of California, Berkeley (1978)
- B.S., Civil Engineering, University of Texas, Austin (1977)

Employment

- Geosyntec Consultants, Inc.
  - Chairman and Senior Principal (34 years)

Expertise and Experience

- Registered Professional Engineer in Illinois and 17 other states
- Design, construction, closure, and/or performance assessment of more than 100 RCRA/State-led solid, hazardous, industrial (including CCR), and low-level radioactive waste landfills and surface impoundments.
- Lead co-author of five UPEPA technical resource and guidance documents on waste containment system design, construction, and performance
- Permitting, design, closure, and/or evaluation of CCR landfills and surface impoundments in six states.

Summary of Opinions

Geosyntec consultants

Summary of Opinions

Geosyntec consultants

Closure and Cover System Requirements (Sections 845.740 and 845.750)

- **Opinion 1:** Closure in place and closure by removal have both been successfully used for CCR impoundment closures; Proposed Part 845 provides protective performance standards for both.
- **Opinion 2**: Modern final cover system technology is well-established through extensive research and thousands of applications around the U.S. These systems can be designed and constructed to be reliable and durable and to achieve the performance standards of Section 845.750(a).
- **Opinion 3:** I suggest that Part 845 prescribe a minimum allowed thickness for the compacted-earth low permeability layers (LPL) of 18 inches (as opposed to the currently proposed 36-inch thickness). This is consistent with the Federal CCR Rule. An LPL with this thickness can achieve Section 845.750 performance standards on a site-specific basis. Where needed based on site conditions, a thicker LPL will be specified by the Qualified Professional Engineer designing the closure.

Summary of Opinions

Geosyntec consultants

Closure and Cover System Requirements (Sections 845.740 and 845.750) (continued)

- **Opinion 4:** I suggest that Part 845 prescribe a minimum allowable final protective layer (FPL) thickness of 18 inches (as opposed to the currently proposed 36-inch thickness) when the underlying LPL is a geomembrane. This thickness is adequate to protect the geomembrane while achieving the performance standards of Section 845.750 on a site-specific basis.
- **Opinion 5:** At sites where Section 845.750 performance standards can be met with LPL and FPL thicknesses less than the minimums currently prescribed in Part 845 (36 inches), use of the currently prescribed thicknesses will result in a considerably higher closure cost compared to the cost when using the minimum layer thicknesses I have proposed.
- **Opinion 6:** My recommendations regarding LPL and FPL thicknesses are consistent with and in some instances more stringent than final cover systems previously approved by IEPA and more stringent than the prescriptive minimums of the Federal CCR Rule.

Summary of Opinions

Geosyntec consultants

Slope Limitations When Consolidating CCR (Section 845.750(d))

- **Opinion 7:** When CCR is used for purposes of grading and contouring in preparation for closure in place, Section 845.750(d) should allow the final cover system to be constructed at a slope steeper than 5% (which is the currently proposed maximum, unless IEPA determines a steeper slope is necessary). A steeper final cover slope will typically achieve applicable design criteria. In some cases, this will enable on-site consolidation of CCR, thereby reducing the CCR impoundment closure footprint and the size of the area requiring post-closure monitoring and maintenance.

Summary of Opinions

Factors to Consider When Conducting a Closure Alternatives Analysis (Section 845.710)

- **Opinion 8:** I recommend that three factors, cost of closure, worker safety, and greenhouse gas emission/climate change impacts, be added to the current list of factors to be evaluated as part of the closure alternatives analysis of Section 845.710.
- **Opinion 9:** Including the cost of closure in the closure alternatives analysis better enables the owner or operator to propose, and IEPA to approve, a closure alternative that not only satisfies the performance standards of Section 845.750 but also is cost effective.

Summary of Opinions

Geosyntec consultants

Assessment, Inspection, and Reporting Requirements (Part 845 Subpart D: Design Criteria and Subpart E: Operating Criteria)

- **Opinion 10:** Section 845.540(b) seems unclear as to whether annual inspections by a Qualified Professional Engineer are required only during the operating period of a CCR surface impoundment or also during the post-closure care period. In my opinion, they are not needed during these latter periods. I suggest that Section 845.540(b) be clarified in this regard.
- **Opinion 11**: Part 845 requires that Hazard Potential Classification Assessments (845.440), Structural Stability Assessments (845.450), and Safety Factor Assessments (845.460) be conducted annually. This frequency is excessive, and five times the frequency of the Federal CCR Rule – which is the frequency I recommend. I also recommend that these sections be clarified to clearly state that the assessments are not required during the closure and post-closure care periods.
- **Opinion 12:** Section 845.740(b) requires that groundwater monitoring be conducted at least quarterly during the active life and post-closure care period. Consistent with the Federal CCR Rule, I suggest that Part 845 allow an alternative monitoring frequency based on the results of a technical demonstration (using existing site groundwater monitoring data) showing that criteria for accepting an alternative monitoring frequency (to be added to Part 845) are satisfied.

Additional Rationale for Select Opinions

Geosyntec consultants

Opinion 3 – Cover System Requirements (LPL)

Geosyntec consultants

I suggest that Part 845 prescribe a minimum allowed thickness for the compacted-earth low permeability layer (LPL) of 18 inches (as opposed to the currently proposed 36-inch thickness). This is consistent with the Federal CCR Rule. An LPL with this thickness can achieve Section 845.750 performance standards on a site-specific basis. Where needed based on site conditions, a thicker LPL will be specified by the Qualified Professional Engineer designing the closure.

Opinion 3 – Additional Rationale

- Section 845.750(c)(1) prescribes a minimum LPL thickness of 36 inches (unless an owner or operator demonstrates equivalent or superior performance for a thinner layer). For some sites, this thickness is more than needed to meet Part 845 performance standards and more than required by the Federal CCR Rule.
- The currently proposed 36-inch thickness appears to be modeled on the requirements of Illinois Part 811 for MSW landfills. MSW landfills contain compressible waste that biodegrades and undergoes large post-closure settlements. In contrast, a CCR surface impoundment undergoes much less post-closure settlement (few % post-closure settlement for CCR compared to 15-20% for MSW). Consequently, the low permeability layer for a CCR surface impoundment doesn't need to be as thick as that for an MSW landfill because the layer doesn't undergo the same level of settlement-induced distortion and movement as does the MSW landfill layer.
- At some sites, an 18-inch thick LPL can be as effective as a 36-inch thick LPL in meeting the performance standards of Section 845.750. An 18-inch thick minimum LPL thickness is also consistent with the minimum prescribed thickness of the Federal CCR Rule.

Opinion 4 – Final Cover System (FPL)

I suggest that Part 845 prescribe a minimum allowable final protective layer (FPL) thickness of 18 inches (as opposed to the currently proposed 36-inch thickness) when the underlying LPL is a geomembrane. This thickness is adequate to protect the geomembrane while achieving the performance standards of Section 845.750 on a site-specific basis.

Opinion 4 – Additional Rationale

Geosyntec consultants

- Section 845.750 indicates that the FPL must be thick enough to protect the LPL from freeze-thaw and root penetration damage. However, studies by USEPA and others have shown that geomembranes are not adversely affected by freeze-thaw cycles and are not subject to root penetration.
- Moreover, if the cover system is maintained with shallow rooted plants (e.g., grass), as is often the case, the root zone for the most part will not even extend to the bottom an 18-inch thick FPL.
- For these reasons, a prescribed minimum FPL thickness of 18-inches is appropriate when a geomembrane is used as the LPL of a final cover system. I note too that this suggested thickness is greater than the prescribed minimum thickness of the Federal CCR Rule.

Opinion 7 – CCR for Grading and Contouring

Geosyntec consultants

When CCR is used for purposes of grading and contouring in preparation for closure in place, Section 845.750(d) should allow the final cover system to be constructed at a slope steeper than 5% (which is the currently proposed maximum, unless IEPA determines a steeper slope is necessary). A steeper final cover slope will typically achieve applicable design criteria. In some cases, this will enable on-site consolidation of CCR, thereby reducing the CCR impoundment closure footprint and the size of the area requiring post-closure monitoring and maintenance.

Opinion 7 – Additional Rationale

- Placing CCR for contouring and grading (for final cover systems) at slopes steeper than 5% is entirely technically and practically feasible and will not diminish the ability of the overlying final cover system to meet Section 845.750 performance standards on a site-specific basis.
- Numerous final cover systems of th type required by Section 845.750 have been successfully constructed and maintained at slopes steeper than 5% - in Illinois and around the country.
- In fact, most MSW and CCR landfill units are constructed with final cover slopes in the range of 25% (4H:1V) to 33% (3H:1V).
- There are no real environmental concerns with consolidating CCR at a slope steeper than 5%. Consolidated CCR would be dewatered prior to or during relocation, it would be placed above the existing CCR only after the existing CCR had undergone drainage and stabilization, and it would be covered with a final cover system.
- This approach is consistent with USEPA's proposed changes to the Federal CCR Rule (Federal Register, Vol. 85, No. 42, p. 12,456-12,478, March 3, 2020).

Exhibit D

Proposed Illinois Administrative Code
Title 35, Subtitle G, Chapter I, Subchapter j, Part 845

Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments

Summary of Pre-filed Testimony
David J. Hagen, Senior Vice President and Principal Consultant

HALEY ALDRICH

Qualifications and Experience

David J. Hagen
CCR Expert Witness

Education

- Masters of Science, Geology, Oklahoma State, 1986
- Bachelors of Science, Biology, Baldwin-Wallace College, 1981

Employment

- Haley & Aldrich, Inc. (34 years)
  - Senior Vice President and Principal Consultant
  - Environmental Remediation: site investigations, feasibility studies, remedial design and remedial construction

Expertise

- Broad spectrum of environmental programs
  - CERCLA
  - Solid Waste: landfill siting, design, closure design and construction
  - RCRA: Closures including land-based units and site-wide RCRA Corrective Action
  - CCR Rule (Part 257): Groundwater monitoring system design, statistical analysis, groundwater exceedance determinations (detection and assessment), corrective measures assessments
- Groundwater modeling used in remedy decision-making
  - Determination of compliance with Groundwater Protection Standards
  - Comparison of potential remedies using evaluation criteria specified in the rules

HALEY ALDRICH

Summary of Opinions

Summary of Opinions

- Opinion: Site-specific conditions should dictate selection of appropriate closure and groundwater corrective measures ("remedy") for a surface impoundment.
- Opinion: One important remedy component available for use is Monitored Natural Attenuation (MNA).
- Opinion: Removal is not always necessary when CCR material is below the groundwater table or situated within a floodplain.
- Opinion: Removal will not always result in achieving the groundwater protection standards earlier.
- Opinion: Closure in place (CIP) of surface impoundments coupled with MNA or groundwater extraction has been effective at controlling and mitigating groundwater contamination in Illinois.

HALEY ALDRICH

Summary of Opinions

- Opinion: The purpose of Part 845 is to perform CCR surface impoundment specific evaluations and determine whether a CCR surface impoundment is impacting groundwater, then address those impacts through closure and groundwater corrective measures.
- Opinion: The requirement to perform quarterly groundwater monitoring should allow for monitoring frequency adjustments over the post-closure care period depending on site specific conditions.
- Opinion: The frequency of groundwater level monitoring does not need to be undertaken more frequently than the sampling of the analytes.
- Opinion: Statistical methods consistent with the Unified Guidance Documents should be used to determine an exceedance of a groundwater protection standard (GWPS).

HALEY ALDRICH

Summary of Opinions

- Opinion: The timeframes to remedy groundwater, regardless of the remedies being evaluated, is most often long, spanning decades; therefore, it is inappropriate to require corrective measures and post closure care to be completed within 30 prescribed years.
- Opinion: Appropriate cap and cover configuration including cap permeability and thickness is dependent on site-specific conditions.
- Opinion: The proposed Part 845 as written does not provide sufficient time to complete a Closure Construction Permit Application (CCPA).
- Opinion: The proposed Part 845 does not account for site-specific conditions in the development of the CCPA.

HALEY ALDRICH

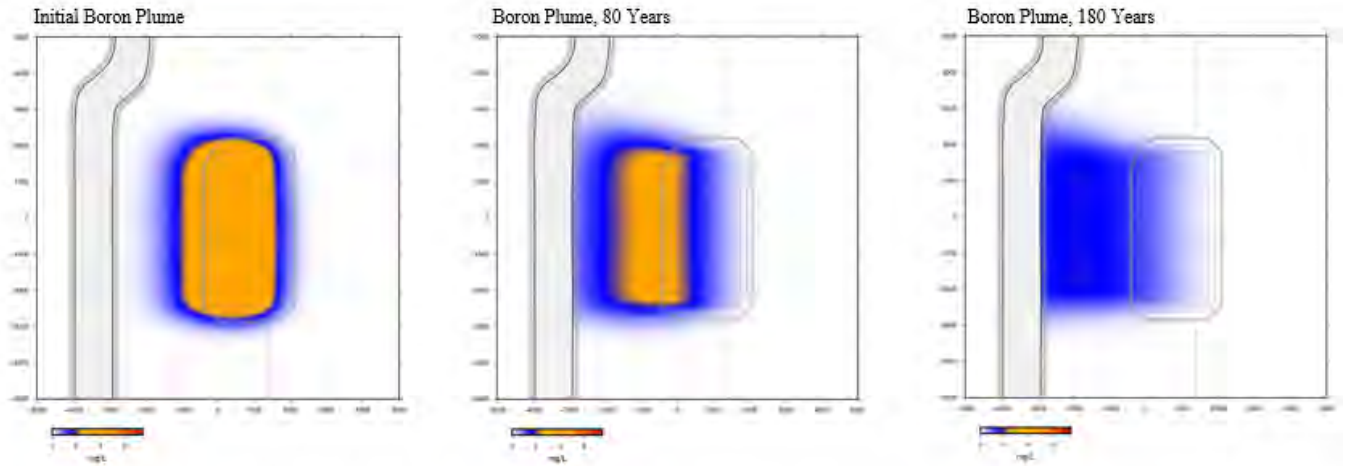
Opinion: Removal is not always necessary when CCR Material is below the groundwater table or situated within a floodplain.

HALEY ALDRICH

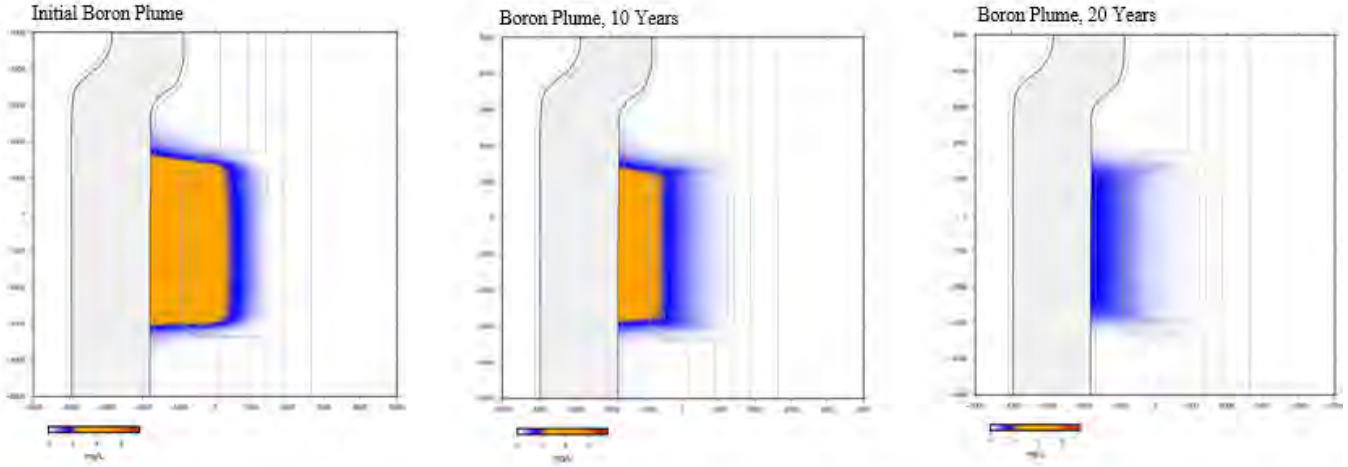
Opinion: Removal is not always necessary when CCR material is below the groundwater table or situated within a floodplain.

Purpose of Opinion: Respond to Mark Hutson's recommendation that closure by removal be mandated under certain circumstances.

- Utilized groundwater models for two sites - Sites 1 and 2, both with CCR below the groundwater table.
  - Site 1: Low K alluvium, low groundwater gradient
  - Site 2: High K alluvium, high groundwater gradient in a relatively thin aquifer, CCR located below the groundwater table.
- Boron was selected as the CCR modeled constituent – commonly found at many CCR impoundment sites, consistent with other parts of my testimony (common constituent in several Illinois impoundments), and stable geochemistry across many different sites.
- Model results indicate that compliance with GWPS for boron was attained over time with time being highly dependent on site-specific conditions.



Site 1 Model (lower permeability aquifer material with ash submerged below the water table for CIP), CIP with geomembrane cap. For lower permeability sites, the CIP with MNA and CBR with MNA take considerable time to meet the GWPS.



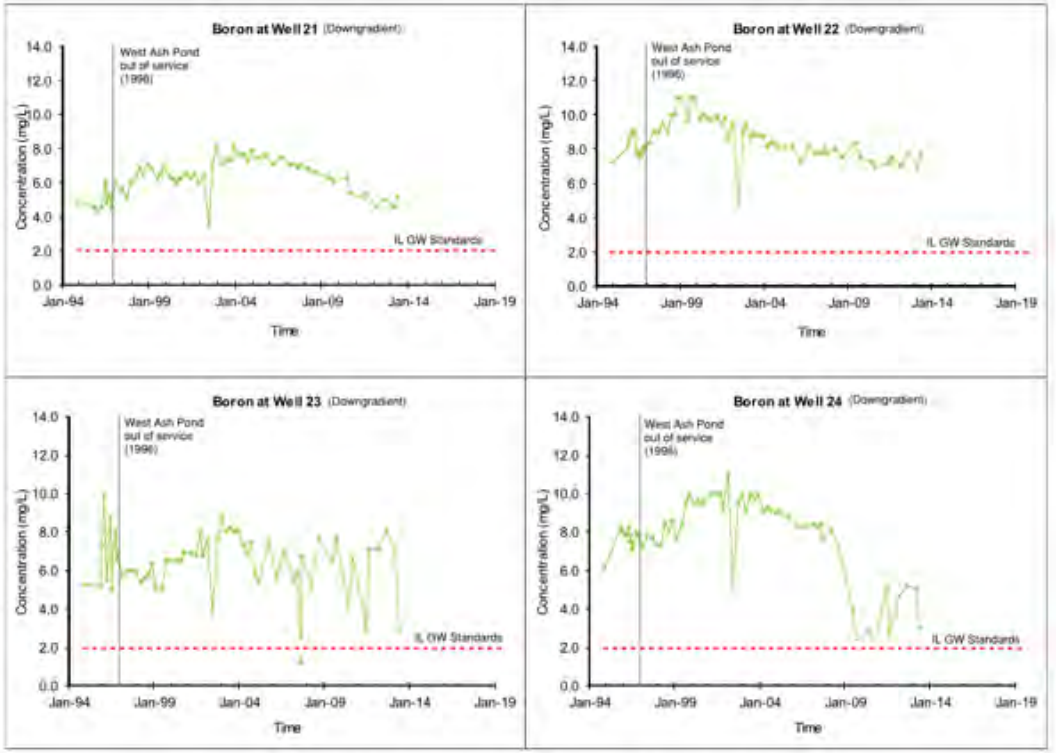
Site 2 Model (higher permeability aquifer material with ash (below the water table)), CIP with geomembrane cap. For higher permeability sites, the CIP with MNA and CBR with MNA remedy alternatives take considerably less time to meet the GWPS than the lower permeability setting.

Opinion: Removal is not always necessary when CCR material is below the groundwater table or situated within a floodplain (continued).

- Model results are consistent with the data from the Hennepin West Ponds 1 and 3 closure where ash is below the water table and boron concentrations after closure exhibits a declining trend.

Hennepin West, Pond No. 1 and Pond No. 3

Figure adopted from Closure Alternatives Evaluation West Ash Pond System (Natural Resource Technology (NRT), (24 July 2014). Background information adopted from Closure and Post-Closure Plan Old West Ash Pond Old West Polishing Pond (Geosyntec, 20 December 2017) and Groundwater Management Zone, Application Revision (NRT 18 May 2018).



Graphs adopted and annotated from Closure Alternatives Evaluation West Ash Pond System (NRT, 24 July 2014).

Result: Modeled remedies are able to achieve GWPS over time and can be protective of human health and the environment. The remedies across all sites met the "must" requirements (threshold criteria) found in Part 845.670(d) and 845.710(g).

Opinion: Appropriate cap and cover configuration including cap permeability and thickness is dependent on site-specific conditions.

HALEY ALDRICH

Opinion: Appropriate cap and cover configuration including cap permeability and thickness is dependent on site-specific conditions.

Purpose of Opinion: Provide additional context related to the Bonaparte testimony on cap and cover thickness

- Conducted HELP models to estimate percolation (infiltration) using the cap and cover system (Scenario CSL-1 and GM-1) proposed by IEPA and the cap and cover system proposed by Bonaparte (CSL-2 and GM-2).

Compacted Soil Layer Scenario

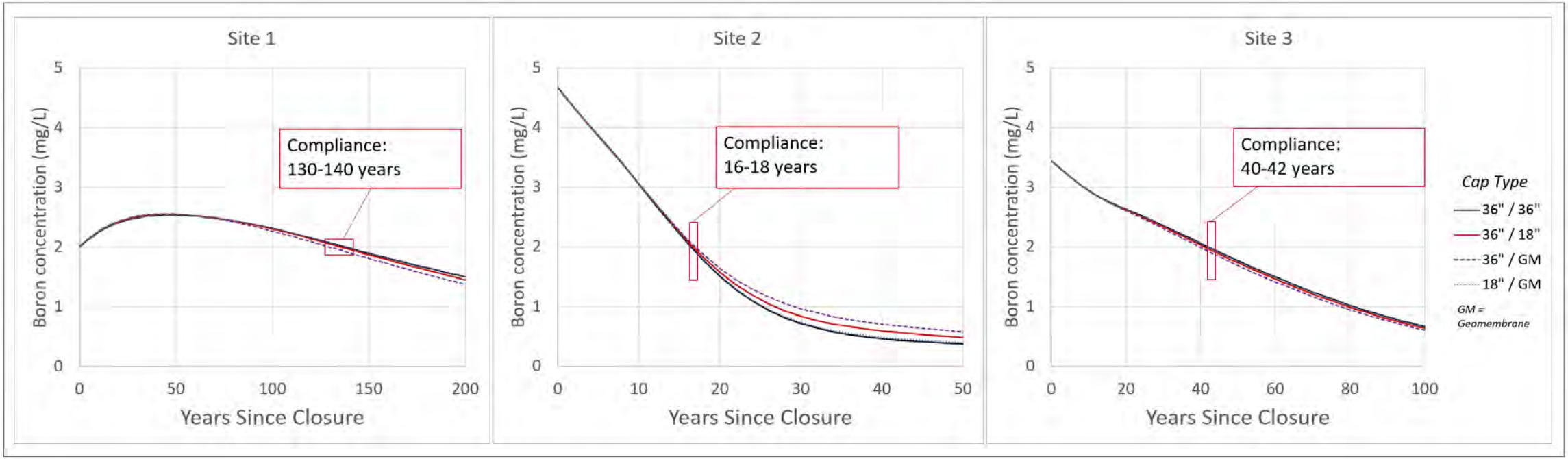
Model Run	Layer Description	Average Annual Percolation (in./yr.)	% Percolation Prevented
Scenario CSL-1 Part 845 Cap and Cover	36-in. Protective Soil Layer 36-in. Compacted Soil Layer	2.35	92.80%
Scenario CSL-2 Bonaparte Alternative	36-in. Protective Soil Layer 18-in. Compacted Soil Layer	3.44	89.40%

Geomembrane Scenario

Model Run	Layer Description	Average Annual Percolation (in./yr.)	% Percolation Prevented
Scenario GM-1 Part 845 Cap and Cover	36-in. Protective Soil Layer HDPE Geomembrane	4.84	85.20%
Scenario GM-2 Bonaparte Alternative	18-in. Protective Soil Layer HDPE Geomembrane	2.56	92.10%

HALEY ALDRICH

Opinion: Appropriate cap and cover configuration including cap permeability and thickness is dependent on site-specific conditions (continued).



Result: Using the Sites from my testimony and the infiltration values from the HELP model, there would be little measurable effect on the time to reach the GWPS for boron relative to the cap and cover system proposed by Bonaparte and the proposed Part 845 cap and cover configurations.


HALEY
ALDRICH

Exhibit E

GRADIENT

Testimony of Andrew Bittner, P.E. Regarding Proposed Part 845: Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments

Andrew Bittner, P.E.

September 29 – October 1, 2020

Expert Testimony of Andrew Bittner, P.E., Principal at Gradient (Boston, MA)

>22 years of professional experience

Licensed Professional Engineer

M.Eng in Environmental Engineering and Water Resources from MIT

B.S.E. in Environmental Engineering from University of Michigan

B.S. in Physics from University of Michigan

Consulted and testified regarding a variety of projects related to:

- the fate and transport of constituents in the environment;
- hydrogeology;
- groundwater and surface water modeling;
- site characterization; and
- remediation system design.

Worked on and been involved with projects at approximately 60 CCR SIs

Published and presented on a variety of topics, including:

- groundwater and surface water fate and transport modeling of coal ash constituents;
- closure assessments of former coal-fired power plants;
- mass flux and mass discharge of constituents in groundwater;
- remedial system optimization; and
- the impact of environmental regulations in the United States and abroad.

Summary of Opinions

1. Part 845.710 adequately ensures the protection of human health and the environment
   - Criteria that "trigger" a specific closure approach are unnecessary
   - Worker safety and cost are factors that should be explicitly included in a closure alternatives assessment
2. Closure by removal (CBR) is not always more protective than closure in place (CIP)
3. Consolidating CCRs consistent with 750(d) does not create unacceptable risks and has many benefits
4. Background groundwater monitoring requirements should be specific to each SI and groundwater monitoring should be limited to CCR-related constituents
5. No timeframe limits should be prescribed for completing groundwater corrective action

1) Part 845.710 adequately ensures the protection of human health and the environment.

- Part 845 closure alternatives analysis requirements will ensure the protection of human health and the environment
- The Part 845.710 closure alternatives analysis factors are consistent with RCRA and CERCLA and have been determined by US EPA to be protective of human health and the environment
- The performance standards in Part 845.710 are capable of evaluating closures at all SIs, including SIs with intersecting groundwater conditions, located in floodplains, etc.

Part 845.710 – Closure Alternatives for CCR SIs	RCRA Part 258 Subpart E – Selection of Remedy for Municipal Solid Waste Landfills (40 CFR 258.57)	CERCLA – Selection of Remedy (40 CFR 300.430(e)(9)(iii))	Federal CCR Rule (RCRA Part 257 Subpart D) – Selection of Remedy (40 CFR 257.97)
Long- and short-term effectiveness and protectiveness (845.710(b)(1))	Long- and short-term effectiveness and protectiveness (258.57(c)(1))	Overall protection of human health and the environment (300.430(e)(9)(iii)(A))	Long- and short-term effectiveness and protectiveness (257.97(c)(1))
Magnitude of risk reduction (845.710(b)(1)(A)	Magnitude of risk reduction (258.57(c)(1)(i))	Reduction of toxicity, mobility, or volume (300.430(e)(9)(iii)(D))	Magnitude of risk reduction (257.97(c)(1)(i))
Magnitude of residual risk from CCR releases (845.710(b)(1)(B)	Magnitude of residual risks from releases (258.57(c)(1)(ii))	Magnitude of residual risk remaining (300.430(e)(9)(iii)(C)(1))	Magnitude of residual risk from CCR releases (257.97(c)(1)(ii))
Long-term O&M (845.710(b)(1)(C)	Long-term O&M (258.57(c)(1)(iii))	Annual and net present value of O&M costs (300.430(e)(9)(iii)(G)(2-3))	Long-term O&M (257.97(c)(1)(iii))
Short-term risks to community or environment during implementation (845.710(b)(1)(D)	Short-term risks to community or environment during implementation (258.57(c)(1)(iv))	Short-term risks to community or environment during implementation (300.430(e)(9)(iii)(E)(1-3))	Short-term risks to community or environment during implementation (257.97(c)(1)(iv))
Time until closure, post-closure, and groundwater monitoring complete (845.710(b)(1)(E)	Time until full protection achieved (258.57(c)(1)(v))	Time until protection is achieved (300.430(e)(9)(iii)(E)(4))	Time until full protection achieved (257.97(c)(1)(v))
Magnitude of residual risk from exposure to remaining wastes (845.710(b)(1)(F)	Potential for exposure to remaining wastes (258.57(c)(1)(vi))	Type and quantity of residuals that will remain (300.430(e)(9)(iii)(D)(5))	Magnitude of residual risk from exposure to remaining wastes (257.97(c)(1)(vi))
Long-term reliability of controls (845.710(b)(1)(G)	Long-term reliability of controls (258.57(c)(1)(vii))	Long-term reliability of controls (300.430(e)(9)(iii)(C)(2))	Long-term reliability of controls (257.97(c)(1)(vii))
Potential need for future corrective action (845.710(b)(1)(H)	Potential need for remedy replacement (258.57(c)(1)(viii))	Potential need for remedy replacement (300.430(e)(9)(iii)(C)(2))	Potential need for remedy replacement (257.97(c)(1)(viii))
Effectiveness of controlling future releases (845.710(b)(2))	Effectiveness of controlling future releases (258.57(c)(2))	Degree to which residuals remain hazardous, accounting for mobility (300.430(e)(9)(iii)(C)(1))	Effectiveness of controlling future releases (257.97(c)(2))
Implementability (845.710(b)(3))	Implementability (258.57(c)(3))	Implementability (300.430(e)(9)(iii)(F))	Implementability (257.97(c)(3))
Community acceptance (845.710(b)(4))	Community acceptance 258.57(c)(5)	Community acceptance (300.430(e)(9)(iii)(I))	Community acceptance (257.97(c)(4))

1) Worker safety should be explicitly required in the closure alternatives analysis.

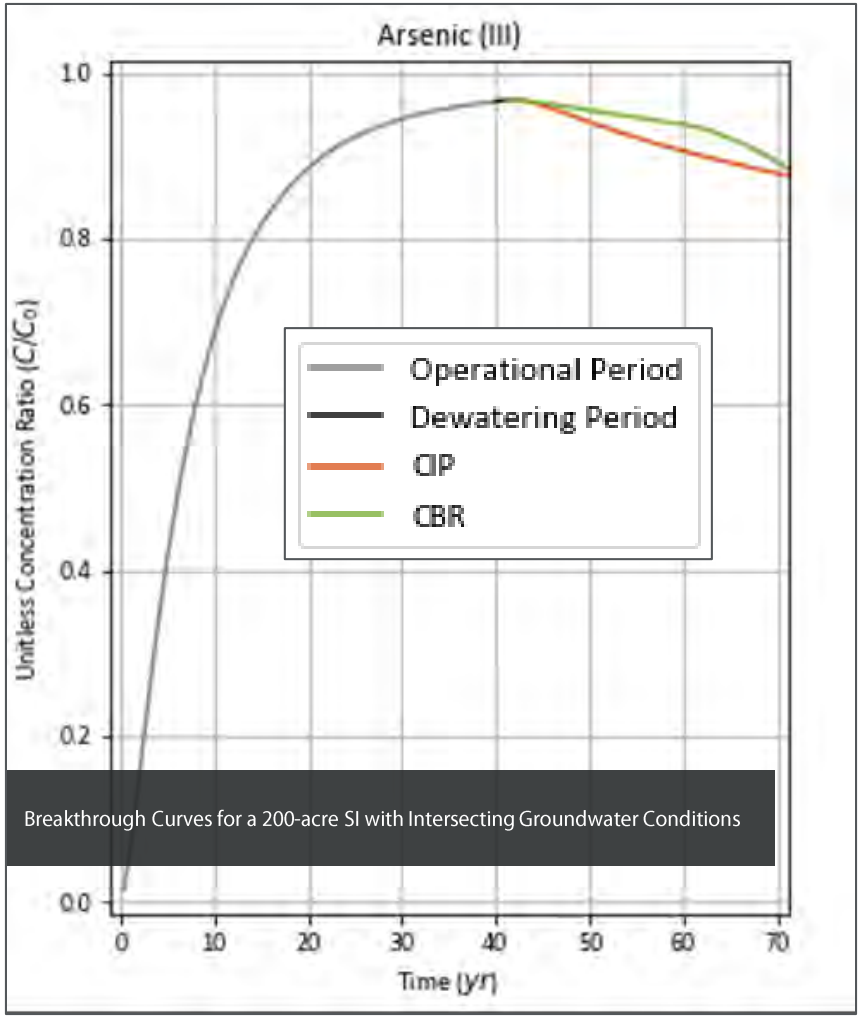
- Because workers that implement a selected closure alternative are part of the community, evaluations of worker safety are already implicitly included in Part 845.710(b)(1)(D) as part of the evaluations of short-term impacts to the community
- Both RCRA and the Illinois Municipal Solid Waste Landfill regulations *explicitly* require the consideration of worker safety as part of corrective action remedy assessment, specifying the evaluation of "[s]hort-term risks that might be posed to the community, **workers**, or the environment during implementation of such a remedy, including potential threats to human health and the environment associated with excavation, transportation, and redisposal or containment"
- CERCLA similarly specifies worker risk as one of the key components of short-term effectiveness, stating "[t]he short-term impacts of alternatives shall be assessed considering the following: (*1*) Short-term risks that might be posed to the community during implementation of an alternative; (*2*) **Potential impacts on workers during remedial action** and the effectiveness and reliability of protective measures…"
- Part 845.710(b)(1)(D) should specify worker safety as an explicit component of short-term effectiveness that must be considered during CCR SI closure alternatives analyses

1) Cost should be explicitly required in the closure alternatives analysis.

- Because cost is a key component of the "ease or difficulty of implementing a potential closure method" (Part 845.710(b)(3)), it is already implicitly included as a closure alternatives analysis performance metric in Part 845.710
- Both federal and Illinois regulations evaluate cost in remedial decision-making
  - CERCLA states that: "The costs of construction and any long-term costs to operate and maintain the alternatives shall be considered. Costs that are grossly excessive compared to the overall effectiveness of alternatives may be considered as one of several factors used to eliminate alternatives. Alternatives providing effectiveness and implementability similar to that of another alternative by employing a similar method of treatment or engineering control, but at greater cost, may be eliminated. "
  - RCRA and the Illinois Administrative Code also require the consideration of cost during corrective measures assessments for municipal solid waste landfill units: "The assessment shall include an analysis of …The costs of remedy implementation…"
- To be consistent with existing regulations, and to be efficient in the allocation of resources while ensuring protectiveness, cost should be explicitly listed in the Part 845.710 criteria

2) Closure by removal is not always more protective than closure in place.

- In the Federal CCR Rule, US EPA notes that "both methods of closure [CIP and CBR]… can be equally protective, provided they are conducted properly"
- Which closure alternative is sufficiently protective of groundwater quality depends on site and environmental conditions
  - Modeling of SIs using reasonable assumptions shows that CIP can be more protective of groundwater quality than CBR, even for sites with intersecting groundwater conditions



Breakthrough Curves for a 200-acre SI with Intersecting Groundwater Conditions

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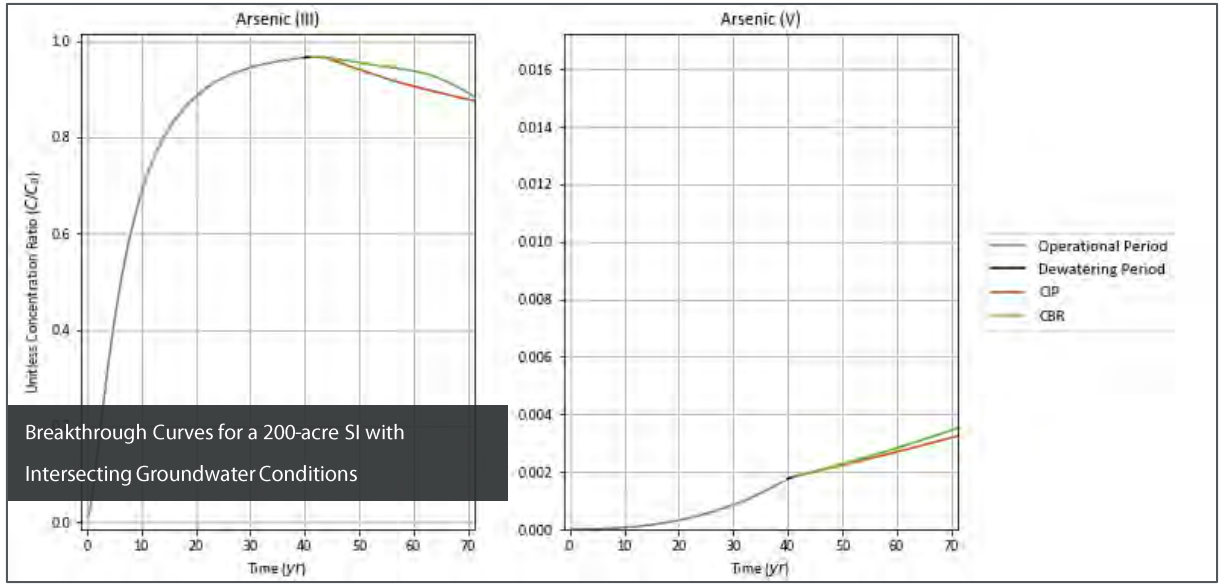
2) Closure by removal is not always more protective than closure in place.

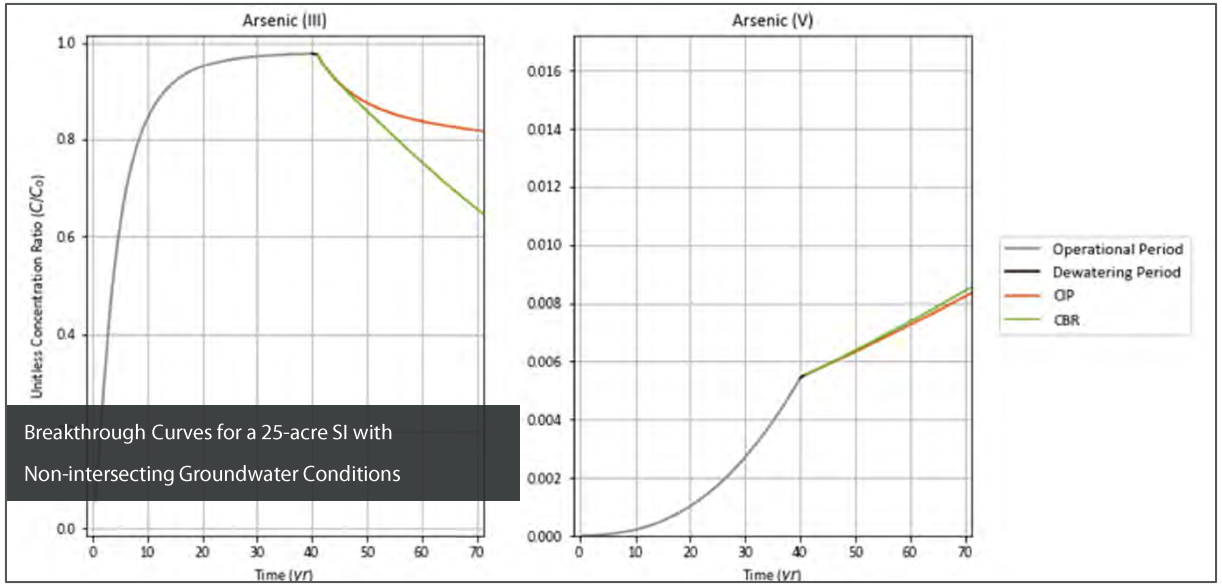
- Modeling for two hypothetical SIs shows that CIP and CBR provide similar levels of protectiveness for groundwater
- CBR provides greater levels of protectiveness for As(III) for the smaller (25 acre) SI; CIP, however, provides greater levels of protectiveness for As(III) for the larger (200 acre) SI. For the slower-moving As(V), CIP is more protective than CBR for both SI scenarios

Scenario	30-year TWA Concentration (C/C_o)			
	CIP		CBR	
	As(III)	As(V)	As(III)	As(V)
25-acre SI; Non-intersecting Groundwater Conditions	0.87	0.0068	0.81	0.0069
200-acre SI; Intersecting Groundwater Conditions	0.92	0.0025	0.94	0.0026

Shaded cells indicate which closure option for a given scenario is more protective of groundwater.



Breakthrough Curves for a 200-acre SI with Intersecting Groundwater Conditions



Breakthrough Curves for a 25-acre SI with Non-intersecting Groundwater Conditions

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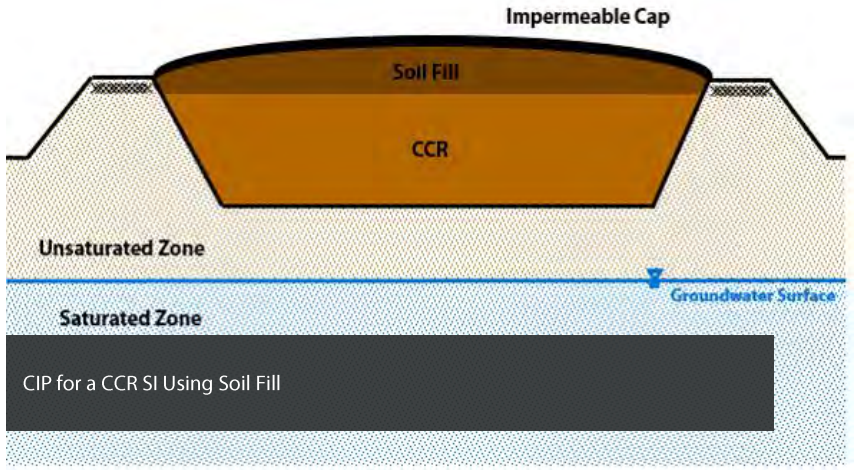
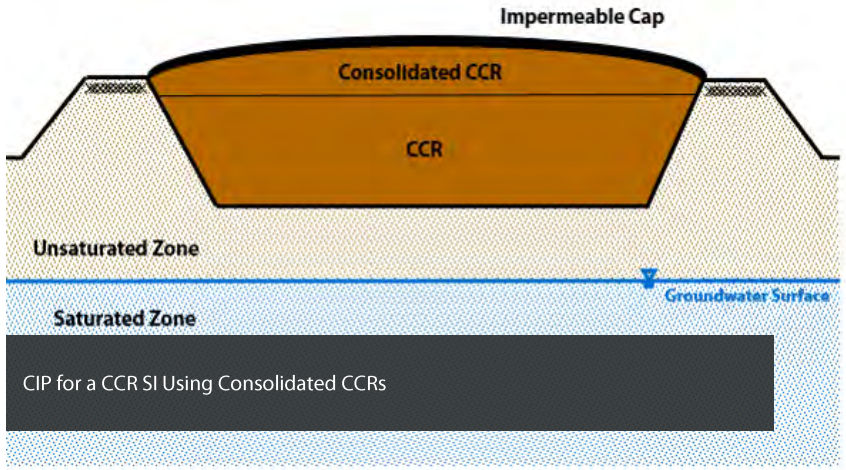
3) Consolidating CCRs Consistent with 750(d) does not create unacceptable risks and has many benefits.

- US EPA cites many benefits of CCR consolidation, including
  - a reduced footprint where CCRs are located at a site,
  - the elimination of long-term threats to groundwater and surface water from CCR SIs serving as the source of the consolidated CCRs, and
  - the ability to allow owners and operators to focus "long-term monitoring, care and cleanup obligations on a single unit rather than multiple units"
- CCR consolidation does not alter or affect the ability to achieve closure performance criteria, which ensure that selected SI closures are designed to minimize the risk of potential impacts related to CCRs and to be protective of human health and the environment
- On-site CCR consolidation in an existing SI that increases the height of CCRs above the water table will not increase the hydraulic flux that migrates through the cap; the consolidation of CCRs thus has no meaningful impact on the time required to achieve GWPSs





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Questions?

Andrew Bittner, P.E.
abittner@gradientcorp.com

Exhibit F

AECOM Imagine it. Delivered.

Proposed Illinois Administrative Code
Title 35, Subtitle G, Chapter I, Subchapter j, Part 845

Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments

Summary of Pre-filed Testimony
Mark D. Rokoff, PE

Qualifications and Experience

Mark Rokoff
CCR Expert Witness

Education

- Masters of Science, Civil Engineering (Geotechnical Engineering), Case Western Reserve University, 1999
- Bachelors of Science, Civil Engineering (Structural Engineering), Case Western Reserve University, 1997
- Registered Professional Engineer

Employment

- AECOM (20+ years)
  - Senior Vice President, Environment
  - Market Sector Director, Energy
  - Coal Ash Management, National Practice Lead

Expertise

- Subject Matter Expert (SME): CCR management, design, compliance, permitting, etc.
- Conducts regulatory reviews, evaluation of best practices, and strategic planning
- Frequent expert and conference speaker on CCR management

Summary of Opinions and Background of Testimony

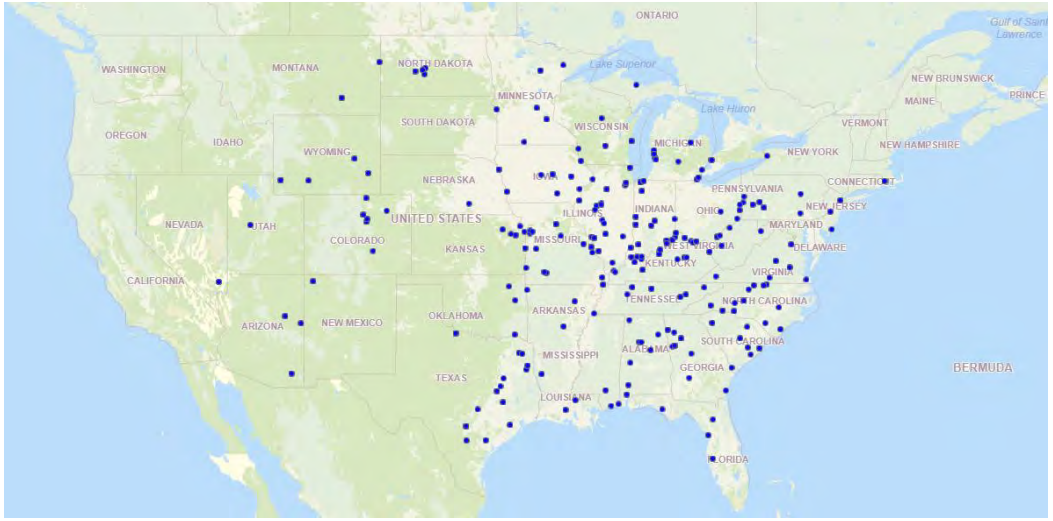
Background of Testimony

- Aggregated data based primarily on publicly available data sources required under the Federal CCR Rule
- Focuses on those factors and considerations affecting and influencing the method of closure
- Surface impoundments are more concentrated in the Midwest and Southeast
- These regions have historically been primary locations of coal generating stations

Surface Impoundment Closure Units and Characteristics

Total CCR Surface Impoundments	503
Approximate Total CCR Volume (CY)	973,825,000
Approximate Total Final Cover Area (Acres)	22,590

Map of Surface Impoundments in the US



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Summary of Opinions

Opinion 1: Closure in Place is Common

- Dominant method of closure in industry today and is not an outlier
- As shown in table below, closure in place is owners/operator's preferred method
- Table evaluates three primary metrics of surface impoundments
  - Count (or number of ponds)
  - Area (or final cover)
  - Volume (or volume of CCR within pond)

	Count (units)	Area (acres)	Volume (CY)
Closure in Place	51%	76%	83%
Closure by Removal	47%	24%	17%

% of US Surface Impoundments based on Count, Area and Volume

Opinion 2: Size (Surface Area and Volume) Influences Closure Method

- Surface impoundment size (surface area and volume) is primary driver in closure decision-making
- As pond size increases, so does likelihood that surface impoundment will close in place
- Unless there is an external factor driving the closure decision, mid-sized and large ponds typically close in place

Opinion 3: Trigger Mechanisms Do Not Influence Closure Method

- Federal CCR Rules define certain conditions under which a surface impoundment would be required to close as "triggers" for closure. These include:
  - End of unit life
  - Safety factor assessment
  - Groundwater impacts
  - Location restrictions (uppermost aquifer separation, wetlands, fault areas, seismic impact zones, and unstable areas)
- No observable trend with different triggers leading to one closure method being used over another
- Closure in place widely adopted and suitable means of closure regardless of the "closure trigger" causing closure

Summary of Opinions

Opinion 4: External Factors Significantly Influence Closure Method

- Opportunity for regulated utility to apply for rate recovery significantly impacts chosen closure method
- Closure by removal rarely selected when there is no ability to recover costs
- Only 1% of CCR material associated with non-regulated generators expected to close by removal
- External factors, such as the opportunity to beneficially use the ash, also impacts the closure method selection

Opinion 5: The Proposed Illinois Rule is More Stringent than the Federal Rule

- Closure alternatives evaluation in Part 845.710 applies standards not included in the Federal CCR Rule
- Part 845 could constrain closure decision outcomes
- Part 845 as interpreted by IEPA potentially regulate a significantly larger number of surface impoundments than regulated under the Federal CCR Rule

Opinion 6: The Timelines Proposed are Inadequate and Potentially Unattainable

- Construction permit application timeline in Section 845.700 of IEPA's proposal
- Could potentially lead to either inadequate or potentially unattainable closure design timelines

Opinion 1
Closure in Place is Common

Opinion 1: Closure in Place is Common

Closure in place considered an "equally protective" closure method when implemented properly and compliant with the Federal CCR Rule closure standards.

- USEPA considers closure in-place to be "equally protective" to closure by removal
- A review of the information on the CCR websites confirms that closure in place is the most commonly selected method

CCR Unit Closures by Impoundment Count

- 51% of surface impoundments (by count) are being closed in place

CCR Unit Closures by Impoundment Surface Area

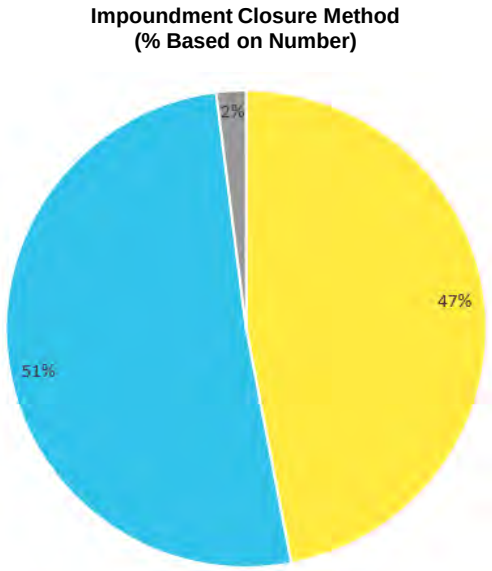
- 76% of cumulative surface area for all the regulated surface impoundments are being closed in place
- Conclusion supports the trend that larger surface impoundments are typically closed in place, while smaller impoundments are the ones favored for closure by removal

CCR Unit Closures by Impoundment Volume

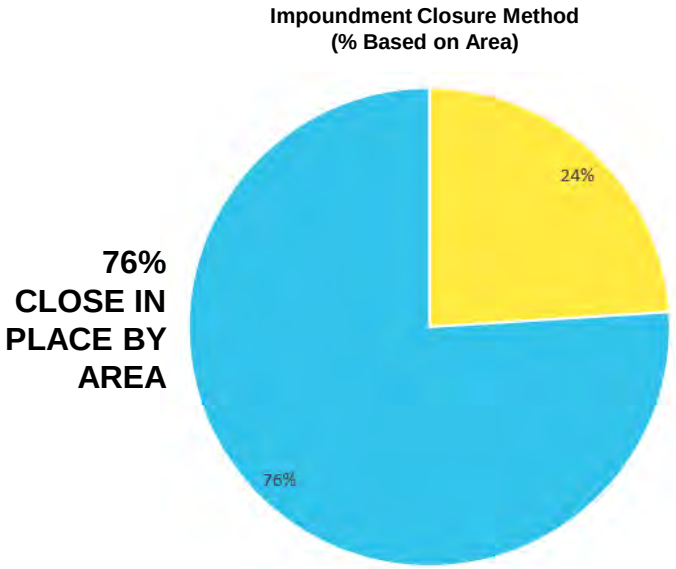
- 83% of aggregate volume for all regulated surface impoundments are being closed in place
- Volume of CCR best representation to consider the true influence of size on selection of closure method

CCR Unit Closures by Impoundment Count

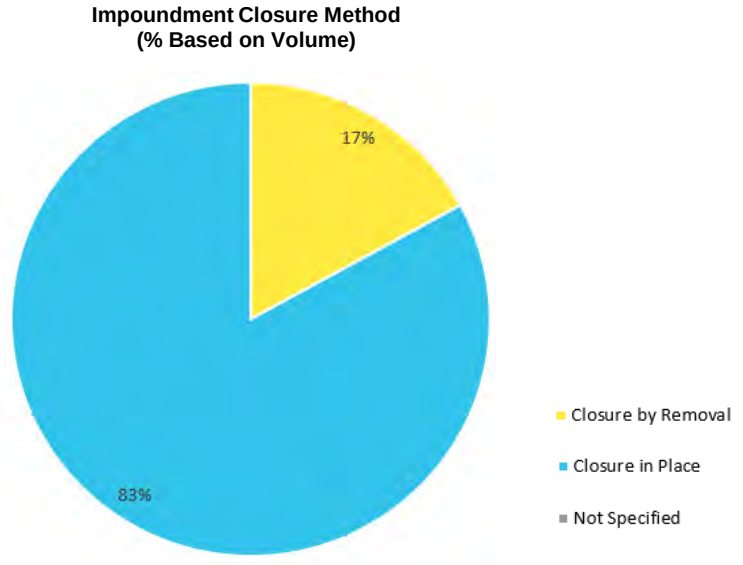
51% CLOSE IN PLACE BY COUNT



76% CLOSE IN PLACE BY AREA



83% CLOSE IN PLACE BY VOLUME



Opinion 2

Size (Surface Area and Volume) Influences Closure Method

Opinion 2: Size Influences Closure Method

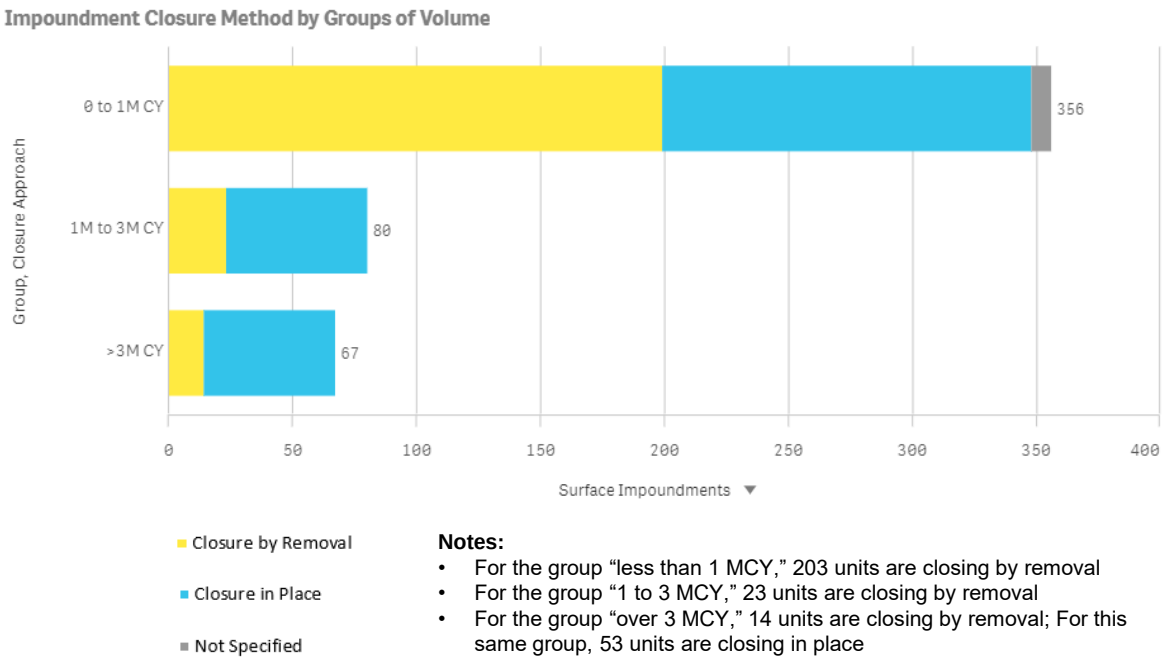
Unit size or volume, by far, tends to be the most significant driver of closure method decisions

- Smaller ponds more likely to close via closure by removal
- As pond size increases, so does likelihood pond will close in place

The very small numbers of large volume CCR units closing by removal are consistent with the factors associated with implementation of these projects

- CCR removal from large ponds are significant projects/can take many years to implement
- Implementation of large excavation projects create other environmental problems, safety challenges, and community impacts
- Unless there is an external factor driving closure decision, most mid-size and large volume ponds close in place
- The ability for cost recovery is a significant factor for these larger units deciding to close by removal

Closure Method per CCR Surface Impoundment Count in the US by Unit Size



Notes:

- For the group “less than 1 MCY,” 203 units are closing by removal
- For the group “1 to 3 MCY,” 23 units are closing by removal
- For the group “over 3 MCY,” 14 units are closing by removal; For this same group, 53 units are closing in place

Opinion 4

Outside Factors (e.g., Rate Recovery, Beneficial Use) are a Significant Driver for Closure Approach

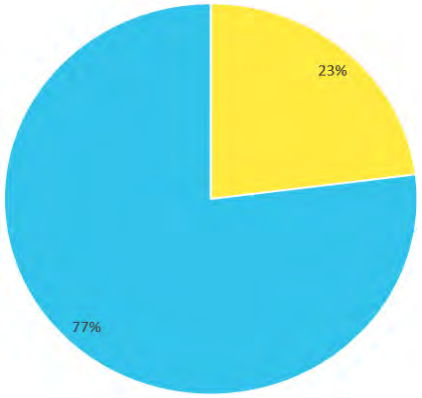
Opinion 4: External Factors Influence Closure Method

- Rate recovery is a significant factor driving final closure decisions (rate recovery is the ability to recover capital costs from retail customers)
- Illinois is a deregulated electricity market; therefore, there is no rate recovery
- Closure by removal is significantly higher in states with regulated electricity markets rather than in states with deregulated electricity markets (based on percent volume)
- Closure by removal rarely selected if no ability to recover costs
- Closure by removal rarely selected at non-regulated sites
- Opportunity for beneficial use also influences the closure approach decision

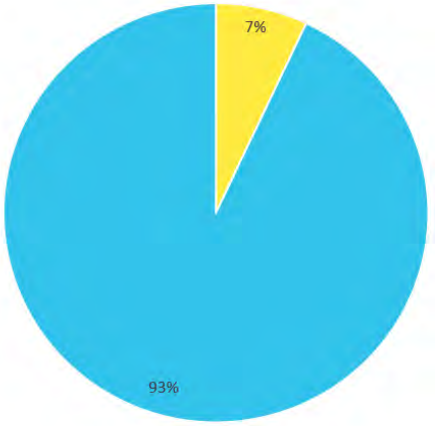
BY STATE

77% CLOSE IN PLACE BY VOLUME

Impoundment Closure Method in Regulated States
(% Based on Volume)



Impoundment Closure Method in Deregulated States
(% Based on Volume)

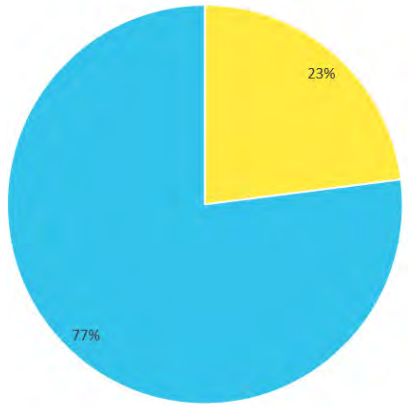


93% CLOSE IN PLACE BY VOLUME

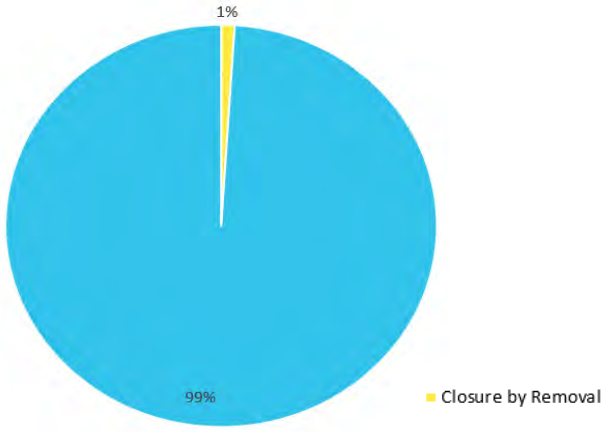
BY SITE

77% CLOSE IN PLACE BY VOLUME

Impoundment Closure Method in Regulated Sites
(% Based on Volume)



Impoundment Closure Method in Non-Regulated Sites
(% Based on Volume)

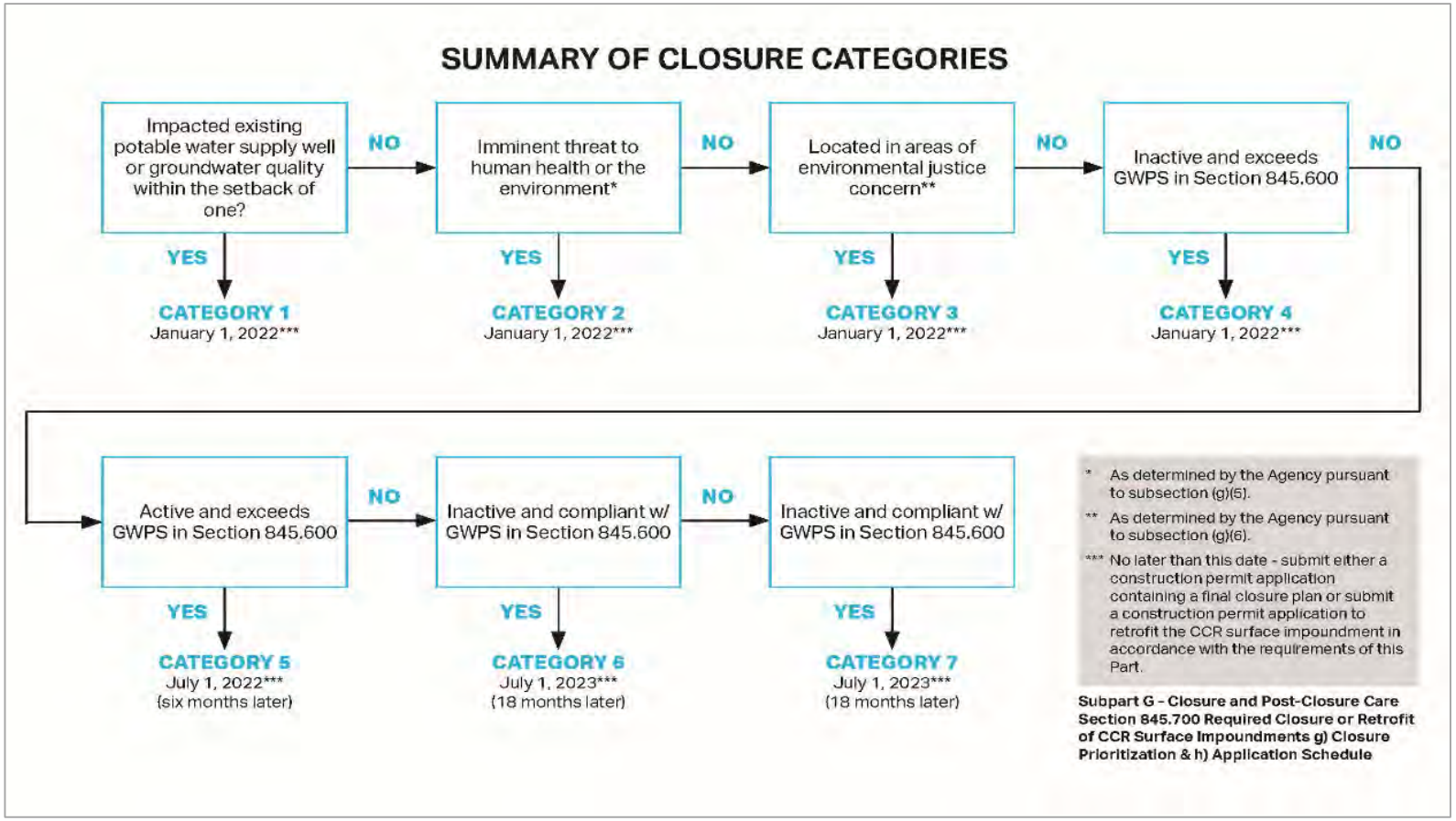


99% CLOSE IN PLACE BY VOLUME

Opinion 6

The Timelines Proposed Are Inadequate and Potentially Unattainable

Opinion 6: Proposed Timelines Are Inadequate



- Proposed Part 845 provides a process for closure/permit application development and submittal
- Completing the process outlined in Part 845 to select a closure approach within 9 months could be potentially unattainable for a number of sites
- Identification of viable alternatives, conceptual design of these alternatives, and modelling of these alternatives is an iterative, data-intensive, and time-consuming process
  - In many cases, this process could involve the collection of additional data to address gaps in understanding
  - This design process for a complex site commonly takes one to two years

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CERTIFICATE OF SERVICE

I, the undersigned, certify that on this 28th day of September, 2020, I have served electronically the attached **Dynegy's Index of Exhibits and Second Hearing Exhibits**, upon the individuals on the attached service list. I further certify that my email address is rgranholm@schiffhardin.com; the number of pages in the email transmission is 86; and the email transmission took place today before 5:00 p.m.

Respectfully submitted,

/s/ Ryan C. Granholm
Ryan C. Granholm

SCHIFF HARDIN LLP
Joshua R. More
Stephen J. Bonebrake
Ryan C. Granholm
233 South Wacker Drive,
Suite 7100
Chicago, Illinois 60606
(312) 258-5633
rgranholm@schiffhardin.com

GIBSON, DUNN & CRUTCHER LLP
Michael L. Raiff
2001 Ross Avenue, Suite 2100
Dallas, TX 75201-6912
(214) 698-3350
mraiff@gibsondunn.com

Attorneys for Dynegy

SERVICE LIST	
Vanessa Horton, Hearing Officer Vanessa.Horton@illinois.gov Don Brown, Assistant Clerk Don.brown@illinois.gov Illinois Pollution Control Board James R. Thompson Center Suite 11-500 100 West Randolph Chicago, Illinois 60601	Rex L. Gradeless Rex.Gradeless@illinois.gov Stephanie N. Diers Stefanie.Diers@illinois.gov Christine M. Zeivel Christine.Zeivel@illinois.gov Illinois Environmental Protection Agency 1021 N. Grand Ave., East, P.O. Box 19276 Springfield, Illinois 62794-9276
Virginia I. Yang - Deputy Counsel virginia.yang@illinois.gov Nick San Diego - Staff Attorney nick.sandiego@illinois.gov Robert G. Mool bob.mool@illinois.gov Paul Mauer - Senior Dam Safety Eng. Paul.Mauer@illinois.gov Renee Snow - General Counsel renee.snow@illinois.gov Illinois Department of Natural Resources One Natural Resources Way Springfield, IL 62702-1271	Matthew J. Dunn mdunn@atg.state.il.us Stephen Sylvester ssylvester@atg.state.il.us Andrew Armstrong aarmstrong@atg.state.il.us Kathryn A. Pamenter KPamenter@atg.state.il.us 69 West Washington Street, Suite 1800 Chicago, IL 60602
Deborah Williams Deborah.Williams@cwlp.com City of Springfield Office of Utilities 800 E. Monroe, 4th Floor Municipal Building East Springfield, IL 62757-0001	Kim Knowles Kknowles@prairierivers.org Andrew Rehn Arehn@prairierivers.org 1902 Fox Dr., Ste. 6 Champaign, IL 61820
Jennifer Cassel jcassel@earthjustice.org Thomas Cmar tcmar@earthjustice.org Mychal Ozaeta mozaeta@earthjustice.org Melissa Legge mlegge@earthjustice.org Earthjustice 311 South Wacker Drive, Suite 1400 Chicago, IL 60606	Jeffrey Hammons JHammons@elpc.org Kiana Courtney KCourtney@elpc.org Environmental Law & Policy Center 35 E. Wacker Dr., Suite 1600 Chicago, Illinois 60601

Faith Bugel fbugel@gmail.com 1004 Mohawk Wilmette, IL 60091	Michael Smallwood Msmallwood@ameren.com 1901 Choteau Ave. St. Louis, MO 63103
Mark A. Bilut Mbilut@mwe.com McDermott, Will & Emery 227 W. Monroe Street Chicago, IL 60606-5096	Abel Russ aruss@environmentalintegrity.org Environmental Integrity Project 1000 Vermont, Ave NW, Ste. 1100 Washington, DC 20005
Susan M. Franzetti Sf@nijmanfranzetti.com Kristen Laughridge Gale kg@nijmanfranzetti.com Vincent R. Angermeier va@nijmanfranzetti.com Nijman Franzetti LLP 10 S. Lasalle St., Ste. 3600 Chicago, IL 60603	Alec M Davis adavis@ierg.org Kelly Thompson kthompson@ierg.org Illinois Environmental Regulatory Group 215 E. Adams St. Springfield, IL 62701
Jennifer M. Martin Jennifer.martin@heplerbroom.com Melissa Brown Melissa.brown@heplerbroom.com Heplerbroom, LLC 4340 Acer Grove Drive Springfield, Illinois 62711	Cynthia Skrukrud Cynthia.Skrukrud@sierraclub.org Jack Darin Jack.Darin@sierraclub.org Christine Nannicelli christine.nannicelli@sierraclub.org Sierra Club 70 E. Lake Street, Ste. 1500 Chicago, IL 60601-7447
Amy Antoniolli aantoniolli@schiffhardin.com Schiff Hardin, LLP 233 S. Wacker Dr., Ste. 7100 Chicago, IL 60606-6473	Walter Stone Water.stone@nrgenergy.com 8301 Professional Place, Suite 230 Landover, MD 20785
Alisha Anker aanker@ppi.coop Prairie Power Inc. 3130 Pleasant Runn Springfield, IL 62711	Chris Newman newman.christopherm@epa.gov U.S. EPA, Region 5 77 West Jackson Blvd. Chicago, IL 60604-3590

Keith Harley kharley@kentlaw.iit.edu Daryl Grable dgrable@clclaw.org Chicago Legal Clinic, Inc. 211 W. Wacker Dr. Ste. 750 Chicago, IL 60606	Claire Manning cmanning@bhslaw.com Anthony Shuering aschuering@bhslaw.com Brown, Hay & Stephens, LLP 205 S. Fifth Street, Suite 1000 P.O. Box 2459 Springfield, IL 62705-2459