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 electronically filed with the Office of the Clerk of the Illinois Pollution Control Board the attached **Prefiled Responses of Dr. Rudy Bonaparte**, copies of which are herewith served upon you.

/s/ Ryan C. Granholm
Ryan C. Granholm

Dated: September 24, 2020

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NOW COME Dynegy Midwest Generation, LLC, Electric Energy, Inc., Illinois Power Generating Company, Illinois Power Resources Generating, LLC, and Kincaid Generation, LLC, (collectively, "Dynegy"), by their attorneys, Schiff Hardin LLP, pursuant to the Hearing Officer's July 14, 2020 Order and submit the below responses.

Prefiled Responses of Dr. Rudy Bonaparte

Illinois Pollution Control Board:

27. On page 4, you state that annual inspections by a qualified professional engineer (PE) are unnecessary during the postclosure care period, but you recommend that annual qualified PE inspections can cease at the initiation of closure.

a. Please explain why annual inspection by PE is not needed during postclosure care period, especially if corrective action measures and groundwater monitoring are ongoing during postclosure.

RESPONSE: Inspection and maintenance of a closed CCR surface impoundment will occur during the post closure care period even without annual inspections by the qualified professional engineer; the requirements for such activities would be proposed by the owner or operator in the post closure care plan required by Section 845.780 and approved by IEPA. In addition to the inspection requirements that will be contained in the post-closure care plan, another section of Part 845, Section 845.540(a), requires inspections by a qualified person "at intervals not exceeding seven days and after each 25-year, 24-hour

storm event." This section further requires that qualified person inspections "must continue to the completion of closure by removal or the completion of post-closure care." Thus, there are two mechanisms in the rule for post closure inspections – the post-closure care plan inspections and the qualified person inspections. Further, I will note that the configuration of a closed CCR surface impoundment should not change from year to year during the post-closure care period. Closed facilities are more stable than they were during their operating life due to the removal of standing water, CCR dewatering, final grading and capping of the CCR, installation of the final stormwater management system, and other engineering measures that may be implemented at closure. Closed facilities are more like solid waste landfills than liquid-containing surface impoundments. For all the forgoing reasons, there is no need for the annual qualified professional engineer inspections required under Section 845.540(b) during the post-closure care period.

Furthermore, if corrective measures are required at a CCR surface impoundment, operation and maintenance (O&M) of those measures during the post-closure period would be addressed by, and conducted in accordance with, the O&M provisions of the corrective action plan required by Section 845.670. Similarly, the need for maintenance or repair of the groundwater monitoring system during the post-closure period would be identified and addressed as part of the approved groundwater monitoring program required by Section 845.650 and any corrective action groundwater monitoring required by Section 845.680. Thus, annual inspections during the post-closure care period by a qualified professional engineer are not needed to assure that corrective measures and groundwater monitoring are being implemented in accordance with the respective IEPA approved plans.

b. Also, comment on why recommend inspection by PE to cease at initiation of closure rather than the commencement of postclosure care period.

RESPONSE: **The actual closure of a CCR surface impoundment is conducted in accordance with a closure design developed by a qualified professional engineer and approved by IEPA. The professional engineer is responsible for the closure until its completion, so additional inspection requirements during closure are not needed and would be duplicative. Further, closure construction will be conducted in accordance with the Construction Quality Assurance (CQA) Program requirements of Section 845.290. The CQA program must be led by a CQA Officer (who is also a qualified professional engineer) and conducted in accordance with an IEPA-approved CQA Plan. For all these reasons, there is no need to require annual qualified professional engineer inspections during the time period in which the CCR surface impoundment is being closed.**

28. On page 4, you recommend that the rules allow the use alternative monitoring frequency "when a technical demonstration (certified by a qualified professional engineer and approved by IEPA) shows that the alternative frequency satisfies applicable performance criteria (to also be added to Part 845)." Please suggest potential performance standards that could be considered for allowing alternative monitoring frequency.

RESPONSE: **I propose the following language be added to 845.650:**

> **Any owner or operator conducting quarterly monitoring pursuant to Part 845.650(b)(1) may upon written approval from the Agency reduce the quarterly sampling to semi-annual sampling during the post-closure care period when:**
>
> > **a. No monitored chemical constituent is detectable in downgradient wells for at least four consecutive quarters;**
> >
> > **b. No monitored chemical constituent has a concentration that differs to a statistically significant degree from the concentration detected in upgradient wells for four consecutive quarters; or**
> >
> > **c. After a minimum of five years with a demonstration that semi-annual monitoring does not reduce the statistical power for determination of a statistically significant result at an appropriate confidence level for each monitored parameter.**

Illinois Environmental Protection Agency:

1. On Pages 3 and 4 of your testimony you discuss the lack of specificity regarding the requirements for inspections by a qualified professional engineer in Section 845.540(b) during post-closure care. Further, you opine that such inspections could cease at the initiation of closure, or alternately be completed every five years.

a. Does Section 22.59 of the Act require that Part 845 be at least as protective and comprehensive as Part 257?

RESPONSE: Yes, it does.

b. Does Part 257.83(b) require annual inspections by a qualified professional engineer for existing, new and lateral expansions of CCR surface impoundments?

RESPONSE: Part 257.83(b) is contained in the "OPERATING CRITERIA" section of the Federal CCR Rule. Given its placement in the rule, I interpret it as applying to operating CCR surface impoundments. By definition, a CCR surface impoundment in the post-closure care period is no longer operating. This interpretation is supported by Part 257.83(b)(2) which lists the required contents of the qualified professional engineer annual inspection reports. A review of these requirements shows that they are focused on operating a CCR impoundment (e.g., (2)(iii) "the approximate minimum, maximum, and present depth and elevation of impounded water and CCR since the previous inspection").

I further note that Part 257.104(d)(i) requires the post-closure care plan to contain: "A description of the [post-closure] monitoring and maintenance activities required in paragraph (b) of this section for the CCR unit, and the frequency at which these activities will be performed;" It is my experience that the post-closure care plan prepared under this section of Part 257 is the place where the owner or operator proposes a post-closure inspection frequency. The required process in Section 845.710 for establishing post-closure monitoring and maintenance requirements is consistent with this Federal CCR Rule requirement. Moreover, as described in response to Board question 27.a., Section 845.540(a) requires inspections by a qualified person "at intervals not exceeding seven days and after

each 25-year, 24-hour storm event" through the duration of the post-closure care period. Thus, Part 845 goes beyond the requirements of the Federal CCR Rule.

c. Does Part 257.83(b) require those annual inspections to ensure design, construction, operation and maintenance are consistent with generally recognized and accepted good engineering practices?

RESPONSE: Yes, however, given its placement in the rule, I interpret this provision to apply to an operating CCR surface impoundment. By definition, a CCR surface impoundment in the post-closure period is no longer operating.

d. Does post-closure care require maintenance?

RESPONSE: CCR surface impoundments that have been closed with a final cover system will require monitoring and likely maintenance during the post-closure care period. The Part 845 requirement for such monitoring and maintenance is addressed in Section 845.780 Post-Closure Care Requirements. As noted in response to Board question 27.a., Section 845.780(d)(1)(A) requires the owner or operator to propose a frequency for monitoring and maintenance of the closed CCR surface impoundment for the duration of the post-closure period. This is consistent with the Federal CCR Rule (40 CFR 257.104(d)). I interpret the maintenance requirement of Part 257.83(b) to apply during the operating life of the CCR surface impoundment, not the post closure care period.

e. Can Part 845 be at least as protective and comprehensive as Part 257 without following the same inspection schedule?

RESPONSE: Based on my foregoing responses and the fact that Part 845.780 mirrors Part 257.104(b) regarding post-closure monitoring and maintenance requirements, Part 845 is equally or more protective than Part 257 of the Federal CCR Rule with respect to post-closure monitoring and maintenance. Annual inspections during the post-closure care period by a qualified professional engineer are not needed to reach this standard.

City Water, Light & Power:

1. You provide testimony on page 18 comparing the costs and duration of closure by removal and closure in place. In the example, you indicate that closure by removal took 7 times as long as closure in place at a 60 acre site. Assuming this represents a 'medium-sized' impoundment, do you have an opinion of whether this ratio of 7 times as long would also apply at small and large impoundments?

RESPONSE: Without characterizing a 2,700,000 cubic yard CCR surface impoundment as being in any size category, the ratio of the time required for closure by removal versus closure in place would be site-specific and dependent on many factors. Thus, a generalized conclusion regarding the ratio of time for closure by removal versus closure in place cannot be made. This evaluation would need to be conducted on a site-specific basis.

2. It appears that the estimate of 140 months for closure by removal at this hypothetical site was based on a disposal limitation of 1,000 cubic yards per day. Was this disposal limitation intended to represent the total daily limit of the hypothetical landfill or a percentage of the landfill's total daily limit? Was it based on actual landfill daily limits in Illinois?

RESPONSE: The daily CCR disposal limitation used in my example is a representative value based on a limited survey of Illinois MSW landfill owners and operators. Some landfills would have a lower daily limit, others a higher one. The given value is a CCR disposal limit, not a total disposal limit for the landfill which would be higher because the landfill is accepting MSW and likely other waste streams. MSW landfills routinely limit their CCR daily disposal volume to only a portion of their total daily disposal volume.

3. In calculating a cost of $152 million for closure by removal for the hypothetical 60 acre impoundment site, did you include the cost of transportation? What assumption did you make regarding transportation costs for the 20 mile trip to the disposal site? Would those costs increase if sufficient landfill space within 20 miles was unavailable?

RESPONSE: Transportation costs are included in the cost estimate. The distance is the median for a representative set of Illinois CCR surface impoundments to the nearest MSW landfill. The estimate was made without any consideration of whether the closest

landfill would accept CCR for disposal. The transportation costs would increase if the one-way trip distance to the accepting landfill was greater than 20 miles.

4. In calculating a cost of $152 million for closure by removal for the hypothetical 60 acre impoundment site, you use an estimate of $29/ton as a landfill tipping fee. What did you base this estimate on?

RESPONSE: This cost estimate is based on a limited survey of MSW landfill owners or operators in Illinois. For example, personnel for the Brickyard Landfill provided a price range of $22 to $36 per ton.

5. Would you consider your cost assumptions to be conservative estimates?

RESPONSE: I consider these estimates to be in the range of conservative to representative for a closure by removal project involving off-site disposal at a commercial MSW landfill in Illinois. While I have attempted to develop a representative cost estimate, the travel distance of 20 miles may be too short in some cases because the nearest MSW landfill (which was used to estimate an average travel distance as noted above) may not accept CCR at all, or if they do accept it, not at the estimated disposal rate of 1,000 cubic yards per day.

a. Are there site specific conditions that could increase disposal costs beyond what you have estimated?

RESPONSE: There are site-specific conditions that could increase the cost of closure by removal above my representative value.

b. If so, what are some factors that might increase these estimates?

RESPONSE: There are a range of factors that could increase the cost of a closure by removal project. To offer just a few examples: (1) a volume of CCR requiring disposal that is larger than I used in my example; (2) inability to find adequate landfill daily disposal capacity at a rate of $29/ton; (3) transportation distances greater than 20 miles; (4) community ordinances limiting truck traffic on local roads thereby reducing the rate at

which CCR can be trucked off site; (5) CCR dewatering to make it ready for landfill disposal requires more time and effort than anticipated; and (6) slope stability issues associated with the excavation plans for removing the CCR from the impoundment requires slower excavation than anticipated or interim stability measures.

6. Are you aware of whether landfill operators have concerns about mixing CCR waste with putrescible waste? If so, what are those concerns?

RESPONSE: MSW landfill operators often have concerns that if they place too much CCR in their landfill it will create low permeability zones in the landfill that could impede leachate percolation to the bottom of the landfill and into the leachate collection and removal system. Likewise, there may be concerns that too much CCR will impede the flow of gas generated by the decomposing organic fraction of MSW to gas extraction wells. Another potential concern is that if the CCR is too wet, it could create a low strength zone in the landfill and concerns related to slope stability. Further, the chemistry of the leachate generated by an MSW landfill containing appreciable CCR may detrimentally affect leachate collection and treatment and landfill gas to energy systems.

7. Is it likely for a CCR impoundment owner to be able to demonstrate a low permeability layer of compacted earth of less than 36 inches will meet the performance standards in Section 845.750? What factors would a successful demonstration likely be based on?

RESPONSE: The likelihood that a CCR surface impoundment owner or operator can demonstrate that an earthen low permeability layer will meet the performance standards of Section 845.750 is, of course, site specific. In preparing my opinion, I did not survey all potential closure sites in Illinois to assess their likelihood of meeting the standards. Nonetheless, I am confident in saying that there are sites where it can be demonstrated that a CCR surface impoundment being closed in place meets the performance standards of Section 845.750 with an earthen low permeability layer less than 36 inches thick. This conclusion is based on my firm's experience working on CCR surface impoundment closures

in Illinois, plus my personal expertise and experience using available and generally accepted engineering analysis methods to address each of the performance standards contained in that section. These procedures are described in books, in USEPA guidance documents, and in numerous published technical papers. I also want to note that this demonstration process would be the same whether the earthen low permeability layer is 36 inches thick or less than 36 inches thick.

I would also like to use this question and response to clarify Opinions 3 and 4 of my pre-filed testimony where I characterize the prescribed thicknesses for the earthen low permeability layer and final protective layer, given in Sections 845.750(c) as minimums. My clarification is that these are minimums "unless the owner or operator demonstrates that another low permeability layer [or final protective layer] construction technique or material provides equivalent or superior performance." Thus, there may be cases where Part 845, as written, would allow for a low permeability layer or final protective layer that is thinner than the prescribed value. I note however, the performance threshold for gaining approval of such an alternative should not be that required for an MSW landfill as currently proposed in Section 845.750(c) (i.e., "equivalent or superior performance"), but instead a standard that takes into account the attributes of CCR surface impoundments relevant to the design of the final cover system (described in Opinions 3 and 4 of my pre-filed testimony) and the performance standards of Part 845.

<u>ELPC, Prairie Rivers Network, and Sierra Club</u>:

1. On page 1 of your prefiled testimony, with reference to closure by removal and closure by a final cover system, you state: "Both closure methods have been successfully used in the past in Illinois and other states."

a. Please explain in detail how you would define when a closure method has been used "successfully."

RESPONSE: A successful closure is one that has been designed and constructed in accordance with the permit requirements and recognized and generally accepted engineering practices, is functioning as anticipated in the design and permit, and complies with applicable post-closure care, groundwater monitoring, and any other regulatory requirements. Please note that impoundments that were closed prior to the development of any regulatory program can also be "successful." As USEPA notes in its preamble to the federal CCR Rule, an impoundment that was closed (i.e., is no longer capable of impounding water) prior to the effective date of the CCR Rule is not required to re-close (80 FR 21343).

b. Please identify all examples from Illinois of "successful" closure that you reference in your testimony.

RESPONSE: Three examples of facilities that I believe satisfy the foregoing definition of a successful CCR impoundment closure, based on information contained in the pre-filed testimony of David Hagen and a Geosyntec review of available IEPA information on each facility, are: (1) Havana Power Plant, South Ash Impoundment; (2) Hutsonville Power Plant, Pond D; and (3) Venice Power Plant, Ponds 2 and 3.

c. To be successful, must closure by a final cover system securely and permanently isolate coal ash from groundwater? Why or why not?

RESPONSE: No, for purposes of Part 845, closure would not require isolation from groundwater provided it satisfies the approved permit conditions and recognized and generally accepted engineering practices throughout the closure and post-closure periods. The need to isolate CCR from groundwater as a condition for achieving closure in place performance standards would be assessed on a site-specific basis. I note that the closure alternatives analysis provisions of Section 845.710 provides the framework for the owner or

operator to propose a closure method accounting for groundwater conditions at the project site.

d. To be successful, must closure by a final cover system securely and permanently isolate coal ash from the highest seasonal zone of saturation at a site? Why or why not?

RESPONSE: No. Please see my response to Question 1(c).

e. To be successful, must closure by a final cover system securely and permanently isolate coal ash from surface water, including probable maximum flooding events? Why or why not?

RESPONSE: In my experience, closures are always designed to isolate CCR from surface water, including from "probable maximum flooding events", through the use of the final cover system, perimeter dike, armoring, and other engineering measures as assessed necessary to meet the approved permit conditions and recognized and generally accepted engineering practices for the design life of the closure. I note that the closure alternatives analysis provisions of Section 845.710 provides the framework for the owner or operator to select a closure method accounting for project site conditions.

2. On page 1 of your prefiled testimony, you state that final cover systems "can be designed and constructed to be reliable and durable and too often achieve the performance standards of Section 845.750(a)."

a. Please explain in detail why you state that such systems can be designed and constructed so that they achieve performance standards "too often."

RESPONSE: Based on my 35 years of experience in engineering and evaluating the performance of cover systems, these systems are both reliable and durable when designed and constructed in accordance with recognized and generally accepted engineering practices. As I described in my pre-filed testimony (page 6), the ability of properly designed and constructed final cover systems to meet the performance standards of Section 845.750(a) based on site-specific conditions has been amply demonstrated through numerous technical publications, including USEPA guidance documents, and more than 35 years of industry

experience. At some sites, the final cover requirements of Section 845.750(c), coupled with the drainage and stabilization requirements of Section 845.750(b), will be sufficient to achieve the regulatory performance standards of Section 845.750(a). For other sites, it may be necessary to supplement these components with one or more additional engineering measures to achieve the performance standards. (Note, my original opinion in my pre-filed testimony should be corrected to state "to often" rather than "too often.")

b. Please explain in detail under what circumstances final cover systems are not "reliable and durable."

RESPONSE: A final cover system might not be reliable and durable if it is not designed and constructed in accordance with recognized and generally accepted engineering practices. I note, however, that this set of circumstances is relatively uncommon in my experience. The design of final cover systems is a relatively mature area of engineering practice. Engineering analysis and design procedures are established for every essential aspect of cover system design. These procedures are described in numerous technical publications and several USEPA guidance documents. Many practicing professional engineers have experience and expertise in designing final cover systems. Regulatory agency personnel, including those at IEPA, have experience in reviewing and evaluating cover system designs submitted by owners or operators. CQA procedures for cover systems and other engineering features often associated with closure in place projects are well developed and have been used for many years.

3. On page 1 of your prefiled testimony, you state that "[a]t site-specific locations where the final cover system alone (along with the drainage and stabilization requirements of Section 845.750(b)) will not meet a specific performance standard, the final cover system can often be supplemented with one or more additional engineering measures (selected by the qualified professional engineer preparing the closure design) to meet the performance standard."

a. Please identify the "additional engineering measures" you reference in the testimony.

RESPONSE: **As described on page 7 of my pre-filed testimony, these measures may include, as examples: erosion control measures; hydraulic energy dissipation structures; slope flattening and/or buttressing; slope armoring; dike raising; retaining walls; subsurface grouting; trench drains; subsurface hydraulic cutoff walls; and groundwater hydraulic capture systems.**

b. For each of the "additional engineering measures" identified in response to paragraph (a), please explain in detail the reasons why the measure may be needed to supplement the final cover system.

RESPONSE: **Each measure serves a different purpose. The purpose of each measure can be discerned in most cases from the name of the measure. Additional information on these engineering measures can be readily obtained from numerous technical publications and several USEPA guidance documents.**

c. For each of the "additional engineering measures" identified in response to paragraph (a), please identify the typical design lifespan of such measures.

RESPONSE: **There is no generic design life (in years) of any engineering measure. The design life of any measure should be evaluated on a project specific basis, and in accordance with recognized and generally accepted engineering practices.**

d. For each of the "additional engineering measures" identified in response to paragraph (a), please identify any ongoing operation, maintenance, and inspection needs associated with implementing the measure.

RESPONSE: **Other than groundwater hydraulic capture systems, all the other engineering measures I mention are passive and are not "operated." Operation of a groundwater hydraulic capture system would involve groundwater extraction pumps, instrumentation, and process controls. The normal maintenance requirements for the engineering measures I mention above are described in numerous technical publications and USEPA guidance documents.**

e. For each of the "additional engineering measures" identified in response to paragraph (a), please identify the typical annual operating, maintenance, and inspection costs associated with implementing the measure.

RESPONSE: In developing my opinion, I did not attempt to quantify the annual operating, maintenance, and inspection costs for each of these engineering measures. Information on typical O&M costs for the various measures can be obtained from the technical literature, contractor estimates, and/or project experience. As most of the measures are passive and don't require active operation (expect for groundwater extraction), inspection and maintenance costs are limited and would typically be only a small fraction of the overall closure project cost.

4. On page 2 of your prefiled testimony, you state that "[t]he qualified professional engineer responsible for designing the final cover system would select, and IEPA would require, final protection layer thicknesses larger than these [sic] prescribed minimum should site-specific conditions warrant such."

a. Please explain in detail what "site-specific conditions" you believe might require greater thicknesses in the final protection layer.

RESPONSE: An example of where the qualified professional engineer might specify a greater thickness of protective cover soil is if the revegetation plan included the planting of deep-rooted vegetation. Another example might be when an armoring layer is added to the cover to provide protection against runoff or flooding. A third example might be when a thicker layer is used in specified areas to improve slope stability or enable larger-size vehicles to drive on the cover. A final example is when the soils available to construct the final protective layer do not have the moisture retention characteristics to allow plants to withstand drought conditions.

b. Please explain in detail what you believe to be the appropriate design lifespan for a final cover system.

RESPONSE: The design life of a final cover system for the in-place closure of a CCR surface impoundment would be established on a site-specific basis by the qualified

professional engineer performing the closure design to meet both regulatory requirements and recognized and generally accepted engineering practices.

5. Please explain in detail the basis for the statement on page 8 of your prefiled testimony that "there is no need to have prescriptive minimum design requirements that are protective at every site."

RESPONSE: The rationale for this statement is as follows: If one develops prescriptive design requirements to be protective at the most difficult or critical site, it will be more protective than needed for other sites where, for example, a 36-inch think earthen low permeability layer is not needed to meet the performance standards of Section 845.750(a). The additional cost to the owner or operator to install low-permeability earth material not needed to meet the performance standards can be substantial as shown in Opinion #5 of my pre-filed testimony.

In response to this question, I also want to make reference to my response to City Water Light and Power's Question 7 of this document.

6. Should final cover systems be designed to ensure that they provide permanent protection against infiltration from above, into the underlying waste? Why or why not?

RESPONSE: The direct answer to the question is no. The concept of "permanent" is not one that is used in any facet of engineering of which I have knowledge. With respect to final cover systems, I am not aware of "permanency" being applicable under any RCRA or CERCLA regulation and it is not embodied in the concept of recognized and generally accepted engineering practice.

7. Should final cover systems be designed to ensure that they provide permanent protection against probable maximum floods? Why or why not?

RESPONSE: No. As I stated in my previous response, the concept of "permanent protection" is not applicable to the design of any engineering structure of which I have knowledge. Also, as stated in my response to Comment 1(e), I would expect the qualified

professional engineer designing an in-place closure of a CCR surface impoundment to include engineering components to isolate CCR from surface water.

8. Do you believe that it is appropriate to place additional coal combustion residuals into an unlined impoundment that is closing, for purposes of grading or contouring, when the base of the impoundment is within the highest seasonal zone of saturation? Why or why not?

RESPONSE: I believe it would be appropriate on a site-specific basis to place additional CCR for purposes of grading and contouring in an unlined impoundment that is undergoing closure in place even if the base of the impoundment is in contact with groundwater. The reason is that for some sites placement of additional CCR will not affect the ability of the closure to satisfy the performance standards of Section 845.750(a) and the placement of this additional material can be achieved following recognized and widely accepted engineering practices. I note that the design of a closure to include additional CCR for grading and contouring purposes will need to be conducted by a qualified professional engineer and reviewed and approved by IEPA as part of the closure permitting process.

I note that placement of grading and contouring fill can improve the performance of a final cover system by increasing cover grades to induce faster surface runoff, thus reducing the potential magnitude of any surface infiltration through the cover system.

9. Do you believe that it is appropriate to place additional coal combustion residuals into an unlined impoundment that is closing, for purposes of grading or contouring, when that impoundment is within a floodplain? Why or why not?

RESPONSE: I believe there are situations where it would be appropriate to place additional CCRs on top of CCR already in an unlined impoundment that is undergoing closure in place even if the base of the impoundment is within a floodplain. I would expect the qualified professional engineer designing an in-place closure of a CCR surface impoundment to include engineering components to isolate CCR from surface water for the design life of the closure.

10. On page 14 of your prefiled testimony, you state that "[f]inal cover systems of the type required by Section 845.750 have been successfully constructed and maintained at slopes of 33% (3H:1V) and 25% (4H:1V) for many years."

a. Please identify any final cover systems at sites in Illinois that meet the criteria specified above.

RESPONSE: In the preparation of my pre-filed testimony, I have not conducted a survey of every landfill or impoundment in Illinois to determine their cover system slopes. I know from general industry experience that the great majority of MSW landfills are designed with slopes in the specified range, so there are many in Illinois and hundreds of such facilities in the U.S. To name just a few in Illinois: (1) MIG/DeWane Landfill, Boone County (33% cover slope); (2) Winnebago Landfill Northern Unit, Winnebago County (33% cover slope); (3) Zion Landfill, Lake County (25% cover slope); (4) Orchard Hills Landfill, Ogle County (25% cover slope); and (5) DeKalb Landfill, DeKalb County (25% cover slope).

b. Please identify any final cover systems in the United States that meet the criteria specified above.

RESPONSE: In the preparation of my pre-filed testimony, I have not conducted a survey of every landfill or impoundment in the United States to determine their cover system slopes. I know from general industry experience and my personal experience that the great majority of MSW landfills are designed with slopes in the specified range, so there are hundreds of such facilities in the U.S. Most state MSW landfill regulations allow for final cover system slopes in this range, including Illinois.

11. On page 14 of your prefiled testimony, you state that "I have personally been the engineer-of-record for projects where the final cover system slopes for waste management facilities were in the aforementioned range and the performance criteria for the cover included managing run-off from design storms and limiting erosion." Please identify any such projects where you personally have been the engineer of record, including the location of the project, the company that owned the site, and the year of the project.

RESPONSE: I have worked on dozens of projects involving the engineering, CQA, and/or performance evaluation of final cover systems. I provide a few examples here to

illustrate my experience: (1) Charles City County Landfill, Virginia, Chambers Development of Virginia, Inc. (1990); (2) High Acres Landfill, Waste Management, Inc., Monroe County, New York (1992); (3) Tullytown Landfill, Waste Management, Inc., Bucks County, Pennsylvania (1993); (4) Millersville Landfill, Anne Arundel County, Maryland, Anne Arundel County (1993); (5) Pine View Sanitary Landfill, Walker County Disposal, Inc., Walker County, Alabama (1993); (6) Clinch River CCR Landfill Expansion, Appalachian Power Company, Carbo, Virginia (1993); (7) C&C Expanded Sanitary Landfill, Calhoun County, Michigan, BFI of Southeastern Michigan, Inc. (1994); (8) Arbor Hills West Expanded Sanitary Landfill, Washtenaw County, Michigan, Browning-Ferris Industries (1994); and (9)Wingate Road Superfund Site, Potentially Responsible Parties Group, Broward County, Florida.

12. In promulgating the CCR Rule in 2015, the United States Environmental Protection Agency made the following statement: "[O]verfills cannot be constructed unless the underlying foundation—i.e., the existing CCR surface impoundment has first been dewatered, capped, and completely closed. And because overfills are considered to be 'new CCR landfills,' the design and construction of such units must comply with the technical requirements that address foundation settlement, overall and side slope stability, side slope and subgrade reinforcement, and leachate collection and groundwater monitoring system requirements, which will all need to be evaluated independent of the underlying CCR unit to ensure that the overfill design is environmentally protective." 80 Fed. Reg. 21,302, 21,373 (Apr. 17, 2015).

a. Do you agree with this statement? If not, please explain in detail why not.

RESPONSE: The statement includes a combination of regulatory requirements and engineering criteria. The regulatory requirements need to be complied with, so it is not a matter for me to agree with them or not. I believe the engineering criteria (i.e., addressing foundation settlement and slope stability) are consistent with recognized and generally accepted engineering practices.

b. Would placement of additional CCR in an impoundment for purposes of grading and contouring, as described in your testimony, constitute an "overfill" as that term is used in the above statement? If not, please explain in detail why not.

RESPONSE: **No; placement of CCR as part of the in-place closure of a CCR surface impoundment would not constitute an overfill as defined in the preamble to the Federal CCR Rule. USEPA defines overfill as "Overfills are CCR landfills constructed over a closed CCR surface impoundment." (80 FR 21373) I am not aware of any other USEPA writing on this subject that would lead to a different definition of an overfill. For example, the following preamble excerpt supports the conclusion that USEPA does not categorize CCR used for contouring and grading for the in-place closure of a CCR surface impoundment as an overfill: "there can be benefits associated with closing units under the conditions of this proposal. For example, a facility could consolidate the CCR from one or more units into a single unit….Consolidating multiple units into a single unit would result in an overall smaller CCR unit footprint….there may be benefits to allowing an owner or operator to focus their long-term monitoring, care and cleanup obligations on a single unit rather than multiple units." (85 FR 12463)**

13. Have you evaluated what worker safety protections proposed Part 845 would require during closure of coal ash sites?

a. If no, then please explain in detail the basis for the statement on page 15 of your prefiled testimony that worker safety is an important factor that must be explicitly considered in the closure alternatives analysis under Section 845.710.

RESPONSE: **My pre-filed testimony does not offer an opinion as to the specific worker safety precautions that should be required for any given project. My opinion is focused on the appropriateness of adding worker health and safety to the factors to consider when conducting a closure alternatives analysis under Section 845.710. This is important for worker safety as a stand-alone principal and because workers are often drawn from the local community. Short term risks to the community is one of the factors to be considered under the closure alternatives analysis of Section 845.710. My proposal assures that one of the critical short-term potential risks is not over-looked by identifying worker safety as a discrete**

factor to be considered. I note the differences in risks to workers can be very different for different closure approaches and therefore should be assessed when evaluating closure alternatives.

b. If yes, is fugitive dust a major concern for worker safety during coal ash closure? Why or why not?

RESPONSE: Fugitive dust is a concern for worker safety during CCR surface impoundment closures. That is one of the reasons, for example, Section 845.710(c)(2) requires the owner or operator to develop and implement onsite dust controls when CCR surface impoundments are undergoing closure by removal.

c. Can fugitive dust be reduced by implementing dust controls?

RESPONSE: Yes.

d. Given the importance of worker safety to a closure alternatives analysis, as you note on page 15 of your prefiled testimony, should proposed Part 845 require increased fugitive dust controls during closure? Why or why not?

RESPONSE: No. Worker safety is adequately addressed by the existing proposed requirements of Part 845 and the various applicable OSHA requirements.

14. Would evaluation of different coal ash transportation options, including but not limited to rail, barge, truck size, truck trips, number of days and hours truck trips are taking place, and their climate impacts, assist Illinois EPA and the public in accounting for risks in evaluating closure and corrective action alternatives? Please explain in detail the basis for your answer.

RESPONSE: Most if not all the items mentioned in the comment would normally be evaluated as part of the closure alternatives analysis conducted Section 845.710. I have suggested in my pre-filed testimony that greenhouse gas emissions/climate change impacts be added as a factor to consider in a closure alternatives analysis. I note that while all these factors should be considered on a site-specific basis, some may be quickly screened out (e.g., if there is no nearby navigable waterway, there is no need to evaluate barge transport in detail) and there is no need to retain them through the entire alternatives analysis.

15. Are you aware that the Coal Ash Pollution Prevention Act requires that the Part 845 rules be at least as protective as federal regulations of coal combustion residuals promulgated by the United States Environmental Protection Agency under Subtitle D of the Resource Conservation and Recovery Act?

RESPONSE: See my Response to IEPA Question 1(a).

b. If yes, did the United States Court of Appeals for the District of Columbia Circuit hold in Utility Solid Waste Activities Group v. United States Environmental Protection Agency, 901 F.3d 414, 448-49 (D.C. Cir. 2018), that cost cannot be considered in establishing regulatory standards under Subtitle D of the Resource Conservation and Recovery Act? If not, please explain in detail the basis for your answer.

RESPONSE: I believe this question calls for a legal conclusion.

c. Does the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), which you cite on page 16 of your prefiled testimony, incorporate different standards concerning consideration of cost than Subtitle D of the Resource Conservation and Recovery Act? If not, please explain in detail the basis for your answer.

RESPONSE: I believe this question calls for a legal conclusion. I do note the following statement from USEPA "EPA did not propose to require clean closure nor to establish restrictions on the situations in which clean closure would be appropriate. As EPA acknowledged in the proposal, most facilities will likely not clean close their CCR units given the expense and difficulty of such an operation. Because clean closure is generally preferable from the standpoint of land re-use and redevelopment, EPA has explicitly identified this as an acceptable means of closing a CCR unit. However, both methods of closure (*i.e.*, clean closure and closure with waste in place) can be equally protective, provided they are conducted properly. Thus, consistent with the proposal, the final rule allows the owner or operator to determine whether clean closure or closure with the waste in place is appropriate for their particular unit."

CERTIFICATE OF SERVICE

I, the undersigned, certify that on this 24th day of September, 2020, I have electronically served the attached **Prefiled Responses of Dr. Rudy Bonaparte**, upon all parties 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 26; and the email transmission took place today before 5:00 p.m.

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