BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:	)
	)
STANDARDS FOR THE DISPOSAL OF	) R 20-19
COAL COMBUSTION RESIDUALS IN	) (Rulemaking – Land)
SURFACE IMPOUNDMENTS: PROPOSED	)
NEW 35 ILL. ADM. CODE 845	)
	)

NOTICE OF FILING

PLEASE TAKE NOTICE that I have filed today with the Illinois Pollution Control Board the attached **PREFILED QUESTIONS OF ELPC, PRAIRIE RIVERS NETWORK, AND SIERRA CLUB TO ANDREW BITTNER,** copies of which are attached hereto and herewith served upon you.

Dated: September 10, 2020

Respectfully submitted,

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PREFILED QUESTIONS OF ELPC, PRAIRIE RIVERS NETWORK, AND SIERRA CLUB TO ANDREW BITTNER

Municipal Solid Waste Landfills

1. Have you reviewed whether the statutory provision authorizing the development of standards for municipal solid waste landfills is different from the provision that authorized the federal CCR rule? If so, please explain your findings.

2. Are the constituents found in CCR surface impoundments the same as those found in municipal solid waste landfills?

    a. If there are differences in the constituents in CCR surface impoundments versus municipal solid waste landfills, what are those differences?

    b. Are there differences in how long the contaminants from municipal solid waste landfills can persist in the environment, as compared to contaminants that leach from CCR? If so, please note those differences.

3. Have you evaluated whether municipal solid waste landfills are typically located in a same type of location, i.e., adjacent to a surface water body, as CCR surface impoundments?

    a. If so, what have you found?

4. Do municipal solid waste landfills impound water?

Viable alternatives

5. What is a "viable" closure alternative?

6. Does the phrase "to the maximum extent feasible" require comparing feasible alternatives?

7. Would moving CCR to an onsite landfill reduce the need for transportation of coal ash as compared to moving CCR offsite?

8. What is the difference between evaluating whether constructing an onsite landfill is possible and evaluating whether constructing an onsite landfill is viable?

Intersecting groundwater

9. On page 9 of your testimony, you state that surface impoundments with intersecting groundwater are "often of particular concern due to the potential for CCR constituent mass to continue leaching into groundwater even after closure is completed."

    a. In what circumstances can CCR constituent mass continue leaching into groundwater after closure is completed?

    b. Does the rise and fall of the groundwater table affect the potential for CCR constituent mass to continue leaching into groundwater even after closure is completed? If so, please describe how.

    c. Does the rise and fall of adjacent surface water affect the potential for CCR constituent mass to continue leaching into groundwater even after closure is completed? If so, please describe how.

    d. Does settling or shifting of the subsurface affect the potential for CCR constituent mass to continue leaching into groundwater even after closure is completed? If so, please describe how.

    e. Can actions at nearby offsite locations affect the potential for CCR constituent mass to continue leaching into groundwater even after closure is completed? If so, please describe how.

    f. Can deterioration of the cap in a cap-in-place closure affect the potential for CCR constituent mass to continue leaching into groundwater even after closure is completed? If so, please describe how.

Floodplains

10. On page 10 of your testimony, you state that surface impoundments "constructed in floodplains are another scenario of concern due to the potential contact of surface water and CCR in some circumstances."

    a. In what circumstances can contact of surface water and CCR occur when a surface impoundment is located in a floodplain?

    b. Can floods affect the elevation of adjacent groundwater?

c. Can floods affect the direction of flow of groundwater adjacent to the flooded surface water body?

d. Do floods pose a risk of release of CCR or CCR contaminants into ground or surface waters? Please explain.

e. Do you know if rising or receding floodwaters can affect the stability of berms of surface impoundments located in the floodplain? If so, how? Please explain.

f. What other structural damage may a closed impoundment located in the floodplain be susceptible to in the event of a flood?

Assessments

11. Does an assessment stop an eroding riverbank or an earthquake?

12. Does an assessment stop a sudden collapse of an impoundment or the subsurface underlying it?

Costs

13. Please explain the basis for the statement on page 12 of your testimony that "cost is a key component of the 'ease or difficulty of implementing a potential closure method.'"

14. Can the word "difficulty" encompass physical or technical challenges, rather than cost considerations?

15. Can the word "ease" address physical or technical limitations, or lack thereof, of an endeavor, rather than cost considerations?

16. What types of options or methods would not be considered for closure if costs were listed as criteria in Section 845.710(b)?

17. 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 the Resource Conservation and Recovery Act?

    a. 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 Section 4005(a) of the Resource Conservation and Recovery Act, 42 U.S.C. § 6945(a)? If not, please explain in detail the basis for your answer.

b. Does the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), which you cite on pages 12-13 of your prefiled testimony, incorporate different standards concerning consideration of cost than 42 U.S.C. § 6945(a) of the Resource Conservation and Recovery Act? If not, please explain in detail the basis for your answer.

18. Please provide the basis for your statement on page 13 of your testimony that "Regulations that pertain to municipal solid waste landfills and certain non-municipal non-hazardous waste disposal facilities…are the regulations upon which the Federal CCR Rule is based…."

Closure methods

19. In what circumstances is closure of an impoundment by removal more protective of health and the environment than closure by cap in place? Please describe.

20. On page 15 of your testimony, you note that "a combination of [Closure in Place] and a vertical barrier wall may be necessary to be protective of human health and the environment." Please describe a vertical barrier wall and explain what it does.

21. Why would a vertical barrier wall, in combination with closure in place, be necessary to protect human health and the environment?

22. Do vertical barrier walls need to be operated or maintained to continue functioning as intended? If so, please describe.

23. Do such vertical barrier walls need to be inspected?

24. If a vertical barrier wall is not properly operated, maintained, or inspected, how may such failure to properly operate, maintain, or inspect the vertical barrier wall affect its performance?

25. Do such vertical barrier walls involve components that at times need to be replaced?

26. If vertical barrier walls involve components that at times need to be replaced, how may the performance of the wall be affected if such components are not timely replaced, or not replaced at all?

27. Would it be prudent to put in place a vertical barrier wall without anticipating the need for operation, maintenance, inspection, and/or replacement of certain components of that wall?

US EPA Risk Assessment

28. On page 16 of your testimony, you cite to statements in US EPA's 2014 Risk Assessment stating that "releases from surface impoundments [to groundwater] drop dramatically

after closure, even with waste in place" and that closure by removal "has a negligible effect on modeled risks." (US EPA, 2014, pp. 5-28 – 5-29). Do you know what model US EPA relied on in coming to those findings? Was it the EPACMTP model?

29. Did the model used by US EPA in coming to those findings simulate scenarios where CCR is disposed within an underlying aquifer? Please provide the basis for your answer.

30. Did the model used by US EPA in coming to those findings simulate groundwater flow through fractured rock? Please provide the basis for your answer.

31. Does CCR mineralogy and leachate chemistry evolve over time, as leaching continues? If your answer is no, please explain.

32. Did the model used by US EPA in coming to those findings simulate more than a single leachate composition from an operating or closed impoundment? Please provide the basis for your answer.

33. Did the model used by US EPA in coming to those findings assume that there is no net addition of ash into the impoundment over its operating life? Please provide the basis for your answer.

34. Did the model used by US EPA take into account climate data that is more recent than 1990? Please provide the basis for your answer.

35. Did the model used by US EPA take into account the potential effects of climate change, such as changes in rainfall, temperature, or episodic rainfall events? Please provide the basis for your answer.

36. Can CCR be highly alkaline and create pH plumes downgradient of the CCR impoundment?

37. Did the model used by US EPA in coming to those findings simulate scenarios where CCR leachate changes the chemistry of the aquifer receiving the leachate? Please provide the basis for your answer.

38. Did the model used by US EPA in coming to those findings simulate variable oxidation/reduction potential (Eh) conditions in either leachate or leachate-impacted groundwater? Please provide the basis for your answer.

39. Did the model used by US EPA in coming to those findings evaluate the effect of contaminant-plume mobilization of non-waste related metals from the aquifer due to altered aquifer water quality? Please provide the basis for your answer.

40. Did the model used by US EPA in coming to those findings consider either the pre-existing occupation of adsorption sites in the aquifer by naturally occurring metals or

competition for remaining sites by multiple contaminants migrating from the waste disposal area? Please provide the basis for your answer.

41. Do you agree with US EPA's statement that "an operating time of 75 years for impoundments is not enough to deplete the entire constituent mass present in CCR waste" (EPA 2014 Risk Assessment at 5-28)? Please explain your answer.

42. What is the "incomplete[] elimination of the flux of constituents to groundwater," which, on page 16 of your testimony, you state sometimes occurs with closure in place?

Closure in place

43. Please explain the basis for your statement on page 16 of your testimony that closure in place "tends to be more protective in lower-conductivity aquifers."

44. Over what time horizon is closure in place "more protective" in lower-conductivity aquifers? Please provide the basis for your statement.

45. Have you evaluated when the peak contaminant concentrations in CCR leachate occur in low-conductivity aquifers? If so, please describe the results of that evaluation.

46. Are you aware of studies evaluating when the peak contaminant concentration in CCR leachate occurs in low-conductivity aquifers? If so, what do they find?

47. Have you evaluated the impacts of climate change on leaching from closed-in-place CCR surface impoundments in lower-conductivity aquifers? If so, please describe the results of that evaluation.

48. Please explain the basis for the statement on page 16 of your testimony that closure in place "tends to be more protective for compounds that sorb more strongly to soil and are transported more slowly."

49. Over what time horizon is closure in place "more protective" for CCR compounds that sorb more strongly to soil and are transported more slowly? Please provide the basis for your statement.

50. Have you evaluated when the peak contaminant concentrations in CCR leachate occur for compounds that sorb more strongly to soil and are transported more slowly? If so, please describe the results of that evaluation.

51. Are you aware of studies evaluating when the peak contaminant concentration in CCR leachate occur for compounds that sorb more strongly to soil and are transported more slowly? If so, what do they find?

52. Have you evaluated the impacts of climate change on leaching from closed-in-place CCR surface impoundments in lower-conductivity aquifers? If so, please describe the results of that evaluation.

53. Please explain the basis for your statement on page 16 of your testimony that closure in place "tends to be more protective for larger impoundments…."

54. Over what time horizon is closure in place "more protective" for larger CCR impoundments?

55. What size is a "larger" CCR impoundment?

Groundwater Model

56. On page 17 of your testimony you state that the hypothetical impoundments you assumed for these models were "square SIs," but were of much different area: the large hypothetical impoundment is 200 acres, while the smaller impoundment is 25 acres. On Figures 4.1 and 4.2, the impoundments appear to occupy the same width and depth.

    a. Are figures 4.1 and 4.2 an accurate depiction of what you modeled – including that both modeled impoundments have the same width and depth?

    b. If so, given the differences in area covered by the impoundments, must one impoundment be far longer than the other to encompass 400 acres while the other covers only 25 acres?

    c. Did you model the larger impoundment as a long rectangle and the other, smaller impoundment as a square?

57. Does the model you used model coal ash in contact with groundwater as a continued source of groundwater contamination?

58. Is it appropriate to model coal ash in contact with groundwater as a continued source of groundwater contamination? Please explain your answer.

59. Does your groundwater model show that either alternative modeled achieves the groundwater protection standards?

60. Why did you limit your model to a 30 year timeframe?

61. If the model had extended out further than 30 years, would that have changed the concentrations achieved by the different closure methods in your hypothetical scenarios?

62. Why did you choose not to model additional scenarios, including where the smaller impoundment is in contact with groundwater and the larger impoundment is not?

63. Why did you model hypothetical impoundments rather than modeling real life site conditions?

64. Do contaminants in addition to – or other than – arsenic often leach from a CCR impoundment?

65. Can arsenic react differently in groundwater than other common CCR constituents?

66. Does arsenic travel through groundwater at the same speed as other common CCR constituents?

67. Would including multiple common CCR constituents in your modeling provide a more realistic view of the impacts of different closure methods on groundwater contamination?

68. On page 17 of your testimony, you state that the hydraulic conductivity in the aquifer underlying the hypothetical surface impoundment "was set to 5×10^{-3}" (cm/s). Is the hydraulic conductivity in the subsurface below actual impoundments variable?

69. Did you evaluate whether the hydraulic conductivity you set for the hypothetical aquifers below the hypothetical impoundments is found in aquifers underlying impoundments in Illinois?

70. Does your model of the removal scenario assume that the CCR liquid slurry source stops being added to the impoundment one year before removal of ash begins, but no other dewatering occurs prior to or during removal? If not, please explain your answer.

71. At actual impoundments, does active dewatering of the impoundment – not just ceasing to sluice new slurry into the impoundment – take place before removal of ash begins? Please explain your answer.

72. Does active dewatering (i.e., pumping out water from the impoundment) result in a different hydraulic head in the impoundment, as opposed to just ceasing to sluice new slurry into the impoundment?

73. Does active dewatering result in a different flux of contaminants into the groundwater as compared to just ceasing to sluice new slurry into the impoundment?

74. Did the model you used in the removal scenario account for changes in hydraulic head in the impoundment during the removal process?

75. Did the model you used in the removal scenarios account for increase and decrease in flux of contaminants to groundwater over time?

76. Did the modeling you used in both hypothetical scenarios account for changes in leachate concentration over time?

77. Did the modeling you used in both hypothetical scenarios account for reversals in direction of groundwater flow?

78. Did the modeling you used in both hypothetical scenarios account for variation in groundwater elevation, groundwater flow rates, elevation of adjacent surface waters, or precipitation?

79. Did the modeling you used in both hypothetical scenarios account for future changes in severity or frequency of storms and floods associated with climate change?

80. Why did you assume 10-cubic-yard trucks for removal of CCR?

81. There are trucks that hold more than 10 cubic yards, correct?

82. Are you aware of whether trucks that hold more than 10 cubic yards have been used in removal of CCR?

83. Are you aware of any technical reason why a truck that holds more than 10 cubic yards could not be used in removal of CCR?

84. What is the basis for the assumption in your model, noted on page 18 of your testimony, that the trucks make 100 roundtrips per day?

85. Why did you choose to model only transport by trucks, and not by rail or barge or a combination of truck, rail, and/or barge?

86. Have you reviewed the duration from commencement to completion of removal of CCR from impoundments where removal has already been completed? If so, please comment on that duration.

87. Have you reviewed the methods by which CCR was transported at locations where removal has been completed or is underway? If so, please comment on those methods.

Worker protections and climate change

88. Fugitive dust can be reduced by implementing dust controls, correct?

89. Do robust dust controls help reduce exposure to fugitive dust?

90. Does monitoring of fugitive dust help identify when control measures are not adequately controlling such dust?

91. Have you evaluated what protections for workers proposed Part 845 requires?

92. Are you familiar with low-sulfur diesel or diesel particulate filters?

93. Do you know whether low-sulfur diesel or diesel particulate filters can be used in construction equipment, such as excavators? If so, can they? If your answer is no, please explain.

94. Are you familiar with low-NOx engines?

    a. If so, could low-NOx engines be used to reduce NOx emissions from construction equipment used for CCR removal? If your answer is no, please explain.

    b. If so, could low-NOx engines be used to reduce NOx emissions from trucks transporting CCR onsite or offsite? If your answer is no, please explain.

95. Have you evaluated whether electric equipment – including electric construction equipment or electric trucks – can be used in CCR removal?

96. Have you evaluated whether CCR can be transported by rail or barge, rather than truck?

97. 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, together with their climate impacts, assist Illinois EPA and the public in accounting for risks in evaluating closure and corrective action alternatives? Please provide the basis for your answer.

Vermilion

98. What is the basis for your assumption that 10 cubic yard trucks and 15 cubic yard trucks would be used in CCR removal at the Vermilion site? (p. 23)

99. What is the basis for your assumption of 60 trucks making one round trip per day to transport ash from the site?

100. What is the basis for your assumption that removal would only occur during a 5-day work week?

101. In your experience, does construction work at CCR impoundments sometimes take place on weekends?

102. Have you evaluated other disposal options other than Republic Services Brickyard Disposal landfill in Batestown, Illinois, and Republic Services Illinois Landfill in Rossville, Illinois, for disposal of the CCR from the Vermilion site?

    a. If so, what are they?

    b. If not, why not?

103. Have you reviewed the mandates for transporting CCR, including manifests and the transportation plan, under Part 845.740?

104. In addition to the mandates for transportation in proposed Part 845.740(c), do you have an opinion about additional protections that should be included to limit potential safety risks for communities?

105. If there are multiple sources of CCR at a site, is it possible to determine from which source a given molecule of a CCR contaminant originated? If yes, please explain your answer.

106. Do you agree that determining whether groundwater has been impacted by any source of pollution requires knowing the background concentrations of constituents in groundwater at the site that has not been affected by any source of contamination?

107. Does manganese leach from CCR? If no, please provide the basis for your answer.

108. Does iron leach from CCR? If no, please provide the basis for your answer.

109. Does vanadium leach from CCR? If no, please provide the basis for your answer.

110. Do caps over closed surface impoundments need to be maintained? Please explain your answer.

111. If so, if that maintenance is not provided, how may that affect the functionality of the cap?

112. Should caps over closed surface impoundments be inspected?

113. If so, if such inspections do not take place or take place too infrequently, how may that affect the functionality of the cap?

114. Can changes in environmental conditions – including but not limited to increased severity and frequency of storms or floods, or increased drought – affect the functionality of a cap? Please explain your answer.

115. Would it be prudent to close an impoundment in place with a cap without anticipating the need for future maintenance and inspection of the cap to maintain its functionality?

116. Capped impoundments are expected to settle over time, correct?

117. Are there circumstances in which CCR in an unlined impoundment can migrate below the original bottom elevation of the impoundment?

118. Does the elevation of the water table in Illinois vary seasonally?

119. Have you studied changes in the water table underlying impoundments over time? If so, please explain your findings.

120. Have you evaluated whether climate change has affected or is affecting the elevation of the groundwater table at CCR impoundments? If so, please explain your findings.

121. In what circumstances could on-site consolidation of CCRs result in an increase of CCR constituent mass migrating to the underlying aquifer?

122. If groundwater rises into consolidated ash, would the re-wetting of that ash raise the risk of CCR constituent leaching more than the wetting of clean fill?

123. By using CCR instead of clean soil to fill the impoundment for purposes of covering it, would you expose a greater area and volume of CCR to precipitation than if soil were placed over drained CCR? If not, please explain your answer.

124. Is uncovered, exposed CCR more likely to create fugitive CCR dust than CCR covered by clean soil? If not, please explain your answer.

125. Should any CCR impoundment be permitted, in your opinion, to receive additional CCR?

    a. If not, in what circumstances should a CCR surface impoundment not be permitted to receive more CCR?

126. Would it be a lesser burden on an operator to move CCR to safe, lined landfill or other safe location once, than to run the risk of needing to move the CCR twice if it is determined that CCR must be removed from the impoundment into which it is placed?

127. On page 29 of your testimony, you state that "consolidation of CCRs will not increase the addition of CCR constituent mass to the aquifer." Does this statement assume a fully-functioning cap that has not deteriorated? Please explain your answer.

128. On page 30, n. 8 of your testimony, you state that "[i]f the consolidated CCRs were generated by the combustion of coal sourced from a different location or is a different type of CCR (i.e., bottom ash, fly ash, or flue-gas desulfurization waste) compared to the original impoundment CCRs, there may be differences in the associated leachate concentrations." What factors may affect the difference in leachate concentrations from different types of CCRs or CCR from different coals?

129. Could the mingling of coal ash from one impoundment with coal ash of a different type, or with different properties, from a separate impoundment accelerate leaching through both the original and consolidated ash? Please provide the basis for your answer.

130. On page 30, n. 8 of your testimony, you state that you "expect that in most cases, the chemical differences between the consolidated CCRs and the original impounded CCRs

to be minimal, because… the CCRs must have been generated at the same facility and are, thus, likely reflective of the same coal sources and the same types of CCRs." Is CCR generated at the same facility always from the same coal sources? If so, please provide the basis for your answer.

a. Have you done any research into whether Illinois coal plants sourced their coal from different locations, with different types of coal, over the many years they have been operating? If so, please explain your findings.

131. Does CCR disposed of in different impoundments at a site always contain the same type of CCR? If so, please provide the basis for your answer.

a. Have you done any research into whether Illinois coal plants disposed of, or dispose of, different types of CCR (fly ash versus bottom ash, for example) in different impoundments? If so, please describe that research and your findings.

132. Could concentrations of CCR pollutants in groundwater underlying or adjacent to an impoundment meet groundwater protection standards while active remediation, such as pump and treat or maintenance of certain groundwater gradients, is ongoing, but then exceed those standards after active remediation has ceased? Please explain your answer.

133. Could concentrations of CCR pollutants in groundwater underlying or adjacent to an impoundment meet groundwater protection standards while a cap is maintained and in good condition, but exceed groundwater standards if the cap degrades and allows increased precipitation to filter down into the CCR? Please explain your answer.

134. Could concentrations of CCR pollutants meet groundwater standards while a cap is intact but exceed groundwater standards if the cap is disturbed by an earthquake or flood? Please explain your answer.

135. Could concentrations of CCR pollutants meet groundwater standards for a period and then exceed groundwater standards after a disturbance to the subsurface, such as nearby blasting or fracturing? Please explain your answer.

136. Are there other circumstances in which concentrations of CCR pollutants could meet groundwater protection standards for a certain period but then exceed them? Please explain your answer.

Dated: September 10, 2020

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CERTIFICATE OF SERVICE

The undersigned, Jennifer Cassel, an attorney, certifies that I have served by email the Clerk and by email the individuals with email addresses named on the Service List provided on the Board's website, *available at* https://pcb.illinois.gov/Cases/GetCaseDetailsById?caseId=16858, a true and correct copy of the **PRE-FILED QUESTIONS OF ELPC, PRAIRIE RIVERS NETWORK, AND SIERRA CLUB TO ANDREW BITTNER**, before 5 p.m. Central Time on September 10, 2020. The number of pages in the email transmission is 21 pages.

Dated: September 10, 2020

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