Electronic Filing: Received, Clerk's Office 09/24/2020

The following are attachments to the prefiled answers of Ian Magruder and Scott M. Payne.

ATTACHMENT 4

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 North Grand Avenue East, P.O. Box 19276, Springfield, Illinois 62794-9276 • (217) 782-3397

JB Pritzker, Governor — John J. Kim, Acting Director

May 2, 2019

Phil Morris
Vistra Energy
1500 Eastport Plaza Drive
Collinsville, Illinois 62234

RE: Hennepin East Pond 2 and Addendum Closure/Post-Closure Plan

Dear Mr. Morris:

The Illinois Environmental Protection Agency (Agency) has reviewed the Closure and Post-Closure Care Plan, for the East Ash Pond 2 (Plan) dated February 23, 2018 and the Addendum to the Plan (Addendum), dated November 1, 2018, at the Vistra Energy (Formerly Dynegy) Hennepin Power Station. The following comments are provided for your consideration and appropriate action.

Comment 1
Plan and Addendum;
Section 2.1.2:
The referenced eight rounds of monitoring should have been completed, please provide the full set of updated results.

Comment 2
Plan and Addendum;
Section 2.2:
The monitoring wells listed in the table in this Section are acceptable for the groundwater monitoring system.

Comment 3
Plan and Addendum;
Section 3.2:
The Agency notes that USEPA has adopted numerical groundwater protection standards for Cobalt, Lithium and Molybdenum that may be more appropriate for comparison with background concentrations.

Comment 4
Plan;
Section 4.1, First Paragraph:
The text appears to contain a drafting error referencing West Ash Pond System monitoring wells. Please amend the text of the first paragraph of Section 4.1 in the Addendum to reflect the correct monitoring wells.

Comment 5
Plan and Addendum;
Section 4.1:
The Agency finds that the set of parameters listed in the table in this Section is adequate to characterize groundwater quality around East Ash Ponds 2 and 4.

Comment 6
Plan and Addendum;
Section 4.2:
The Agency finds that the sampling schedule listed in this Section is adequate for Agency monitoring and reporting. Please confirm that the proposed sampling schedule will not conflict with any monitoring requirements of 40 CFR, Part 257, as stated in the Addendum.

Comment 7
Plan and Addendum;
Section 4.7:
Please rephrase the introductory paragraph to be consistent with the proposed monitoring schedule, which varies in frequency.

Comment 8
Plan and Addendum;
Groundwater Monitoring Plan Table 2:
As noted in Comment 3, USEPA has adopted numerical groundwater protection standards for Cobalt, Lithium and Molybdenum that may be more appropriate for comparison with background concentrations.

Comment 9
Plan;
Groundwater Model Report, Section 1.2.4:
Please provide additional discussion of the probable impact that occasional inundation of ash during flood events will have on predicted Boron, Lithium and Molybdenum concentrations (also see Comment 11).

Comment 10
Plan;
Groundwater Model Report, Section 1.2.4:
Please compare the time required to meet groundwater protection concentrations for an enhanced cover scenario (i.e. two feet of compacted clay with a hydraulic conductivity of $1x10^{-7}$ cm/sec or less, or an equivalent synthetic cover) in addition to the Part 257 compliant cover and the baseline case provided.

Comment 11
Plan;
Groundwater Model Report, Section 2.4.2, River Sensitivity:
Documents indicate that the groundwater flow model and the transport model are sensitive to fluctuations in river stage. To simplify the model, river stage has been ignored. However, long term groundwater elevation monitoring shows that groundwater flow direction is affected by river stage. Please provide further explanation of any anticipated effect this model simplification may have on the long-term plume concentration and extent of Boron, Lithium and Molybdenum concentrations at the site.

Comment 12
Plan;
Groundwater Model Report, Section 3.2 and Figure 3-1; Calibration Flow and Transport Model Results:
The observed and modeled head elevations displayed in Figure 3-1, do not match well at many of the data points. Further, Section 3.2 does not include a description of the relative standard deviation given as a percentage of standard deviation to the data mean. Typically, this value should be less than 10%. Please refer to the Wood River Closure Plan. Part 2 Appendix D, Section 3.4 Calibration Flow and Transport Model Results, and Figure 3-6 as an example. An inadequately calibrated model may significantly impact predicted compliance with groundwater standards. Please provide documentation that the model submitted did meet the 10% calibration criteria, or rework the model to meet the 10% criteria, and rerun the predictive flow and transport modeling.

Comment 13
Summary Section 4:
Available monitoring results from monitoring conducted by Vistra during 2018 indicates that both Lithium and Molybdenum at statistically significant concentrations in some down gradient monitoring wells. Please provide an evaluation of the estimated time required to meet applicable groundwater protection concentrations for these constituents, including an enhanced cover scenario, in addition to the Part 257 compliant cover and the baseline case.

Comment 14
Plan;
Summary Section 4:
Please provide additional discussion of the anticipated impact that achieving groundwater standards will have on surface water quality. In that discussion please include Boron, Lithium and Molybdenum relative to surface water quality standards.

Comment 15
Summary Section Prediction Graphs:
Monitoring Well MW-45S is a down gradient compliance well. Please provide a Boron, Lithium and Molybdenum groundwater concentration prediction graphs for MW-45S.

Comment 16
Addendum;
Groundwater Management Zone, Appendix E:
The Groundwater Management Zone GMZ application in the Addendum supersedes the GMZ application contained in the Plan. The Agency finds that it is acceptable for the proposed (GMZ) to replace the existing GMZ upon approval of the Plan and Addendum.

Comment 17
Addendum;
Groundwater Management Zone, Appendix E, Part 1, Item 7a:
The answer to the question is marked "no", but a NPDES permit number is provided. Further the NPDES number does not appear to be associated with the Hennepin Station. Please correct theses apparent discrepancies.

Comment 18
Addendum;
Groundwater Management Zone, Appendix E, Part 1, Item 6:
The statement provided indicates that groundwater standards will be achieved within 20 years. However, the modeling provided in the Plan and referenced in Item 6 indicates compliance with groundwater standards two years after cover installation. Please confirm the applicable time and correct this apparent discrepancy.

Thank you for your attention to these matters. Should you have any questions or concerns, and wish to discuss the comments further, please contact Lynn Dunaway of my staff or me at (217) 782-1020 or the letterhead address.

Sincerely,

William E. Buscher

William E. Buscher, P.G.
Manager, Hydrogeology and Compliance Unit
Groundwater Section
Bureau of Water

CC Darin LeCrone
Records

ATTACHMENT 5

 W1550100002
O6L

Luminant

Phil Morris
Dynegy Operating Company
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1500 Eastport Plaza Drive
Collinsville, Illinois, 62234
o 618.343.7794
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Illinois Environmental Protection Agency
Bureau of Water
Groundwater Section
Hydrogeology and Compliance Unit
Indianapolis Regulatory Office
1021 North Grand Avenue East
Springfield, Illinois 62794-9276
ATTN: Mr. William Buscher, Manager

July 26, 2019

RE: Response to IEPA's May 2, 2019 Comment Letter on both the Closure / Post-Closure Plan for the Hennepin East Ash Pond No 2 and the Closure Plan Addendum Hennepin East Ash Pond 2

Mr. Buscher,

Dynegy Midwest Generation, LLC ("DMG") is pleased to submit our response to your May 2, 2019 comment letter on both the Closure / Post-Closure Plan for the Hennepin East Ash Pond No 2, (dated February 23, 2018), and the Closure Plan Addendum Hennepin East Ash Pond 2, which includes closure of Ash Pond 4, (dated November 1, 2018). Three hardcopies are enclosed.

If you have any questions or concerns, please contact me directly at phil.morris@vistraenergy.com or 618-343-7794.

Sincerely,
Dynegy Midwest Generation, LLC

Phil Morris
Senior Director – Environmental Compliance

Enclosures

 W1550100002
06L

OBG
Part of Ramboll

July 22, 2019

Phil Morris
Vistra Energy
1500 Eastport Plaza Drive
Collinsville, IL 62234-6135

RE: Response to IEPA Comments – Closure and Post-Closure Care Plan for the Hennepin East Ash Pond No. 2, and Closure Plan Addendum Hennepin East Ash Pond No. 2 which includes closure of Ash Pond No. 4

Dear Mr. Morris:

O'Brien & Gere Engineers, part of Ramboll (OBG) is providing this letter to Vistra Energy (Vistra) in response to comments received from the Illinois Environmental Protection Agency (IEPA) dated May 2, 2019 regarding *Closure and Post-Closure Care Plan for the Hennepin East Ash Pond No. 2* (Closure Plan; CEC, February, 2018) and *Closure Plan Addendum Hennepin East Ash Pond No. 2* (Closure Plan Addendum; OBG, October 2018) at Dynegy Midwest Generation, LLC Hennepin Power Station, in Hennepin, IL.

This Response to Comments will serve as Addendum 2 to the Closure Plan and Closure Plan Addendum dated February and October 2018, respectively. For ease of review, IEPA comments are presented below in italics, followed by responses. Supplemental information to support the responses, when required, is included. This document provides responses to all IEPA comments numbered 1 - 18.

Comment 1 - Section 2.1.2

The referenced eight rounds of monitoring should have been completed, please provide the full set of updated results.

Response: The results of the first eight rounds of monitoring are attached in Table 1 and Table 2.

Comment 2 - Section 2.2

The monitoring wells listed in the table in this Section are acceptable for the groundwater monitoring system.

Response: No response required.

Comment 3 - Section 3.2

The Agency notes that USEPA has adopted numerical groundwater protection standards for Cobalt, Lithium and Molybdenum that may be more appropriate for comparison with background concentrations.

Response: The USEPA adopted alternative risk-based groundwater protection standards for cobalt (6 micrograms per Liter [ug/L]), lithium (40 ug/L), and molybdenum (100 ug/L) that became effective on August 29, 2018, after submittal of the Closure Plan and during the preparation of the Closure Plan Addendum. As specified in 40 CFR Part 257 Subpart D (the CCR rule), concentrations detected in downgradient wells will be compared to either these standards or calculated background concentrations, whichever is higher. Tables 2 and 4, in the Groundwater Monitoring Plan have been updated consistent with the CCR rule to identify applicable groundwater standards. The revised Groundwater Monitoring Plan is included in Attachment 1.

Comment 4 - Section 4.1, First Paragraph

The text appears to contain a drafting error referencing West Ash Pond System monitoring wells. Please amend the text of the first paragraph of Section 4.1 in the Addendum to reflect the correct monitoring wells.

Response: This error was corrected and included in the Groundwater Monitoring Plan included as Appendix C of the Closure Plan Addendum submitted in October 2018. As stated in Section 5 of the Closure Plan Addendum, the October 2018 Groundwater Monitoring Plan replaced the previously submitted version. The Final Groundwater Monitoring Plan which incorporates changes requested in these comments is attached (Attachment 1).

Comment 5 - Section 4.1

The Agency finds that the set of parameters listed in the table in this Section is adequate to characterize groundwater quality around East Ash Ponds 2 and 4.

Response: No response required.

Comment 6 - Section 4.2

The Agency finds that the sampling schedule listed in this Section is adequate for Agency monitoring and reporting. Please confirm that the proposed sampling schedule will not conflict with any monitoring requirements of 40 CFR, Part 257, as stated in the Addendum.

Response: Additional statement(s) have been included in Section 4.2 of the revised Groundwater Monitoring Plan to indicate that changes in the frequency of monitoring and reporting approved by the Illinois EPA are applicable only to the Illinois EPA monitoring program and will not change the monitoring or reporting required under the federal CCR program.

Comment 7 - Section 4.7

Please rephrase the introductory paragraph to be consistent with the proposed monitoring schedule, which varies in frequency.

Response: The text has been modified to account for the variable frequency in monitoring.

Comment 8 - Groundwater Monitoring Plan Table 2

As noted in Comment 3, USEPA has adopted numerical groundwater protection standards for Cobalt, Lithium, and Molybdenum that may be more appropriate for comparison with background concentrations.

Response: The table has been revised, see also response to Comment 3.

Comment 9 - Groundwater Model Report, Section 1.2.4

Please provide additional discussion of the probable impact that occasional inundation of ash during flood events will have on predicted Boron, Lithium and Molybdenum concentrations (also see Comment 11).

Response: The occasional saturation of ash during flood events will not have significant effect on the predicted concentration of boron, lithium or molybdenum concentration. The flow and transport model was calibrated against long term observed groundwater elevations and boron concentrations in monitoring wells, using a river stage elevation of 444 ft. Although there were significant transient river flood events that caused short-term deviations in groundwater elevations and boron concentrations, overall the calibrated model accounts for the longer term baseflow conditions to the Illinois River that control the extent and concentration of the modeled plume. In several downgradient wells (Figure 1: wells 3R, 5R, and 6), there are over 20 years of data which includes multiple years when flood conditions were present on the Illinois River. During these short-term events, surface water and/or groundwater likely came into contact with the base of ash in some areas; however, these events do not result in deviations from the model simulated trends, which match the long-term baseflow conditions to the Illinois River. Observed concentrations at 5R tend to lag behind predicted concentrations as compared to the other downgradient wells 06 and 03R (Figure 1); however, the observed concentrations are decreasing over time to match long-term predictions. Wells 10, 12, and 13 also have over 20 years of data with observed and predicted concentrations matching very well.

The relationship between groundwater elevation and concentration has further been evaluated by comparing observed groundwater concentration to observed groundwater elevations in Figure 1. Trend lines and coefficient of determination values (R^2) have also been provided. The correlation coefficients range from 0.043 to 0.18 for wells with 10 or more data points. Well 45S has a correlation coefficient of 0.65 with seven data points and boron concentrations are below the applicable groundwater standard. The low correlation coefficients in observed data indicate that the boron concentration is not strongly related to higher or lower groundwater elevations. Flooding (and short-term groundwater elevation increases) may occasionally coincide with increases in boron concentration; however, they do not correlate on a regular basis, nor do they cause deviations from long-term concentration trends as discussed above.

Boron was modeled because it is a primary indicator of coal ash leachate, exceeds the applicable groundwater quality standard (2 mg/L), is mobile in groundwater, and is more representative of coal ash leachate than sulfate, which may originate from other anthropogenic or natural sources. Boron is more mobile in groundwater than lithium and molybdenum; therefore, the extent of boron in groundwater is expected to be greater than the extent of lithium or molybdenum. The site-specific relationships between boron, lithium, and molybdenum presented in response to Comment 13 (below) confirm that boron is an appropriate surrogate for lithium and molybdenum in groundwater attributable to coal ash. The occasional saturation of ash during flood events will not have significant effect on the predicted concentration of boron; which also applies to reductions in lithium and molybdenum concentrations with strong correlations to boron.

Comment 10 - Groundwater Model Report, Section 1.2.4

Please compare the time required to meet groundwater protection concentrations for an enhanced cover scenario (i.e. two feet of compacted clay with a hydraulic conductivity of 1 x10^{-7} cm/sec or less, or an equivalent synthetic cover) in addition to the Part 257 compliant cover and the baseline case provided.

Response: The final cover system for Hennepin East Ash Ponds No. 2 and No. 4, as detailed in the closure and post-closure care plan and addendum, will have a compacted soil barrier layer that is a minimum of 18 inches of earthen material with a maximum permeability of $1x10^{-5}$ centimeters per second (cm/sec) and a vegetative layer that is a minimum of 6 inches of earthen material capable of sustaining native plant growth. The final cover system achieves the requirements of the low permeability layer to limit accumulation of water in the ponds, meets the requirements in 40 CFR 257.102(d), and modeling of that cover shows that the reduced mass flux is expected to be protective of groundwater.

As requested in Comment 10, an enhanced cover scenario has been simulated to compare the time required to meet groundwater protection standards versus the planned cover system. The original prediction model was modified to predict groundwater concentrations for a cover comprised of 2-ft (24 inches) compacted clay with a hydraulic conductivity of $1x10^{-7}$ cm/s, overlain with 6-in soil. The infiltration rate was calculated as 1.9 in/yr using the HELP Model, about one third of the 5.9 in/yr calculated for the original clay cover. As shown in Figure 2, the enhanced clay cover results in additional reductions in predicted boron concentrations at downgradient wells 03R, 06, 18S, 18D and 45S relative to the original clay cover. However, the differences are negligible in either magnitude or time to reach the groundwater quality standard (2 mg/L). Well 18S is the location with the greatest observable differences. Under both capping scenarios boron concentrations drop below the groundwater quality standard before the first simulated timestep which occurs 200 days after placement of the cap. The predicted boron concentration at 200 days is 1.87 mg/L for the original clay cover compared with 1.39 mg/L for the enhanced cover. The predicted boron concentrations decrease to approximately 1.5 mg/L when they stabilize in the prediction of the original clay cover compared with 0.88 mg/L for the enhanced cover.

The modeling indicates an enhanced cover will not significantly improve performance over the original planned cover system as put forth in the closure and post-closure care plan and addendum for East Ash Ponds No. 2 and No. 4. Time required to meet groundwater protection concentrations between the original modeled cover versus the enhanced cover is negligible at all monitoring wells. The difference in overall reduction of boron concentrations (both short and long term) between the original modeled cover versus the enhanced cover is negligible at all monitoring wells other than well 18S, which had a boron reduction difference of 0.62 mg/L long term, but still 0.5 mg/L below the groundwater quality standard.

Comment 11 - Groundwater Model Report, Section 2.4.2, River Sensitivity

Documents indicate that the groundwater flow model and the transport model are sensitive to fluctuations in river stage. To simplify the model, river stage has been ignored. However, long term groundwater elevation monitoring shows that groundwater flow direction is affected by river stage. Please provide further explanation of any anticipated effect this model simplification may have on the long-term plume concentration and extent of Boron, Lithium and Molybdenum concentrations at the site.

Response: River stage is variable, but on a relatively short timeframe (days to weeks) relative to the long term steady state flow of groundwater via baseflow to the Illinois River. Relative to the long-term timeline of the model (25 years), the transient effects of short periods of high river stage on groundwater elevations and quality do not significantly impact the extent or concentrations of the modeled boron plume (and similarly lithium and molybdenum, see response to Comments 9 and 13). The flow and transport model was calibrated against long-term observed groundwater elevations and boron concentrations in monitoring wells, using a river stage near the mean observed elevation 444 ft. Although there were significant transient river flood events that caused short-term deviations in groundwater elevations and boron concentrations, overall the calibrated model accounts for the longer term baseflow conditions to the Illinois River that control the extent and concentration of the modeled plume. It is therefore appropriate to use a static river stage for modeling the groundwater system.

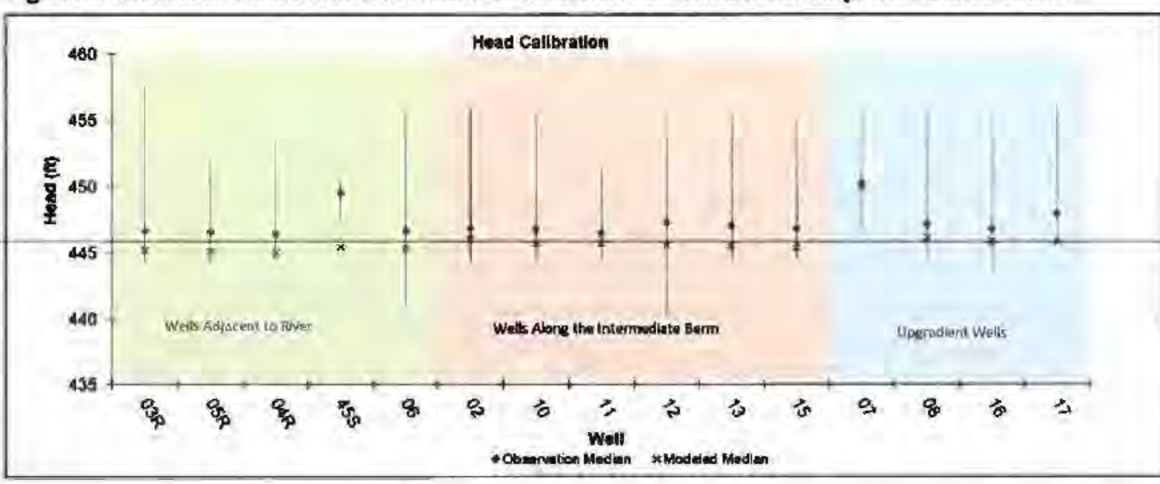
Comment 12 - Groundwater Model Report, Section 3.2 and Figure 3-1; Calibration Flow and Transport Model Results

The observed and modeled head elevations displayed in Figure 3-1, do not match well at many of the data points. Further, Section 3.2 does not include a description of the relative standard deviation given as a percentage of standard deviation to the data mean. Typically, this value should be less than 10%. Please refer to the Wood River Closure Plan. Part 2 Appendix D, Section 3.4 Calibration Flow and Transport Model Results, and Figure 3-6 as an example. An inadequately calibrated model may significantly impact predicted compliance with groundwater standards. Please provide documentation that the model submitted did meet the 10% calibration criteria, or rework the model to meet the 10% criteria, and rerun the predictive flow and transport modeling.

Response: Similar to the Wood River Closure Plan, this groundwater model has been calibrated in multiple stages to match longer term baseflow observations of groundwater head and concentration trends collected that control the extent and concentration of the plume over many years. Both models started with a steady state model calibrated to observed head and concentration values. The current Hennepin model was initially calibrated and discussed in the Groundwater Impact Assessment (NRT, 2010) which started with a steady state model calibrated to head and concentration conditions measured in September 1995 when Ash Pond No. 2 was in service. Heads were calibrated within 1.5 feet of observed values (Figure 3A), the standard deviation over the range of observed heads was 17.7% and the calibration residuals are near the 1 to 1 line with good scatter on the observed versus residual graph (Figure 3B). The model was also verified by changing recharge rates to simulate dewatering of Pond 2 and the addition of the primary and secondary ponds. Results of the verification show the model was adequate to reproduce changes in observed concentrations resulting from changes in land use/recharge. The 10% criteria referenced in this comment is an indicator of how well modeled and observed values correlate within the model domain; however, it is not a requirement that a model meet this statistical benchmark to adequately simulate flow and transport. No steady state models have been calibrated since the modeling was completed for the Groundwater Impact Assessment. However, the following analysis and additional model verification, provided below, documents how the current model calibration continues to be appropriate for predictive modeling.

Median modeled heads match median observed heads: Figure A below plots the range (maximum and minimum) of head observed for a distribution of wells that is representative of the monitoring network with the median observation value and the modeled value illustrated for comparison. Median modeled heads were calculated from the model results generated after dewatering of Pond 2 (1997 through 2019). This period is representative of long-term groundwater flow conditions during the bulk of the observed data collected. The predicted heads fell in the range of monitoring data at these wells with the exception of well 45S which is lower than the range. The median head at 45S is 449.5 and is the second highest value at the site; only well 07 at the upgradient edge of the monitoring network has a higher median head value. During individual sampling events the heads at 45S are consistent with neighboring wells, indicating the higher median observed value is due to the limited amount of monitoring data available for this newer well which hasn't captured a representative range of periodic high and low head fluctuations observed at other wells. Well 06 (located near well 45S) has more observations and is more consistent with other wells (Figure A below). The predicted heads were all lower than their corresponding observed medians at each well, indicating the model generally under-predicts median head values. The average difference between the observed median and the modeled head for these wells is approximately 1.4 feet. The average range in head (maximum – minimum observed) is approximately 10.6 feet at each well. The average difference in head (1.4 feet) over the average range in head (10.6 feet) is 13.2%. When the observations from 45S are removed, the average difference in head reduces to 1.2 feet while the average range in head increases to 11.2 feet; resulting in a value of 10.7%. The difference in head compared to the range of values at these wells approaches the recommended value of 10% or less; and, demonstrates how the modeled heads are representative of long-term (median) flow conditions discharging to the Illinois River.

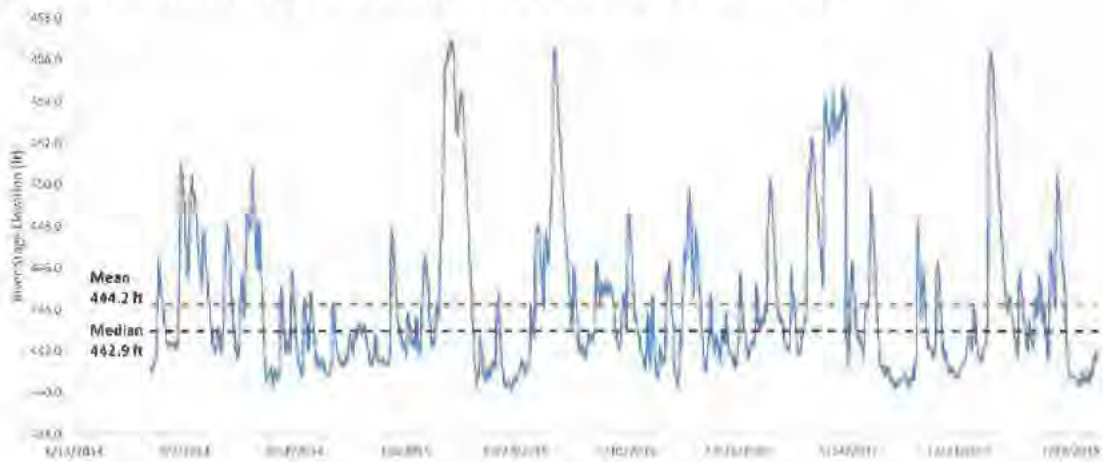
Figure A. Observed vs Modeled Median Groundwater Elevations for Representative Wells



Due to the lack of representative data collected from well 45S, this well was removed from further calibration evaluations involving the median of observed values. Well 06 is more representative of heads in this portion of the site.

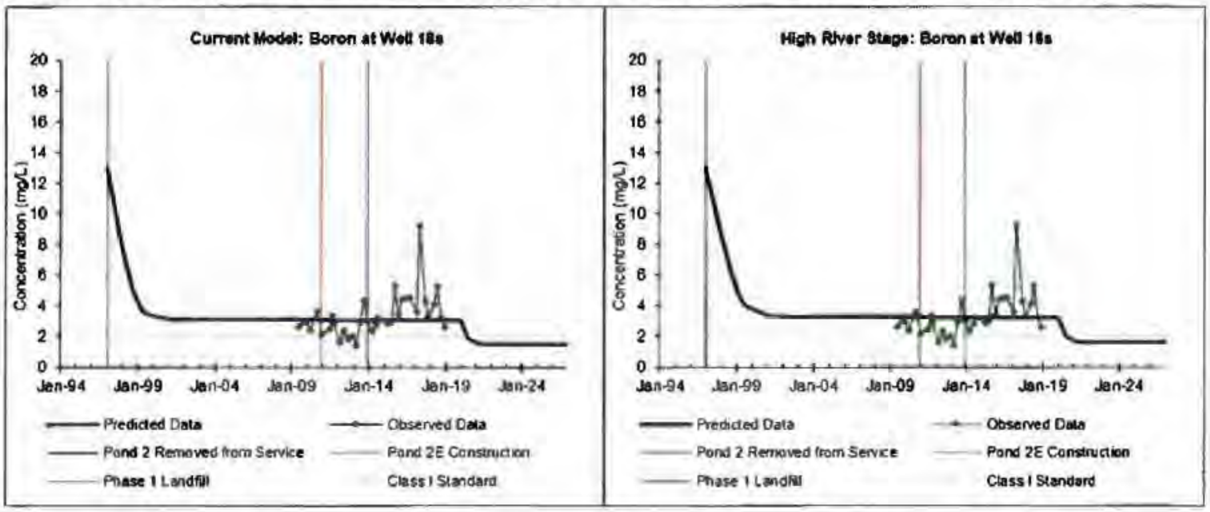
Model verification using median observed heads: The median observed head values were placed in the transient model as calibration targets during a timestep in 2008 (the mid-point between the range of modeled values used to calculate the model median). The median observed river elevation (442.9 feet) calculated from Illinois River stage data collected at the Hennepin plant between 2014 and 2018 (Figure B below) was also placed in the model as a calibration target. The residuals presented on Figure 4A illustrate how the model generally under-predicts (blue numbers are low compared to the target value) the observed median values with residuals ranging from -1.19 to 3.06 feet. The upgradient edge of the well network (well 07) has the lowest residual of 0.12 and the downgradient end of the model slightly over-predicts (red number) the median elevation of the Illinois River with a residual of -1.19. The standard deviation over the range of values is 13.2% in this simulation as compared to the recommended 10%. This is a very good result considering these are median values and further supports how well the model simulates long-term conditions. The calibration residuals clustered below the 1 to 1 line of the Observed vs Computed Target Values graph and the cluster of residuals on the Observed vs Residuals graph (Figure 4B) is consistent with the generally under-predicted heads.

Figure B. Illinois River Stage Elevations (January 2014 to September 2018)



Model verification with increased river stage: The same verification model was run a second time keeping all inputs the same except for the head used for the Illinois River. The head of the river was increased from 444 feet to 446 feet. The residuals shown on Figure 5A illustrate a more mixed combination of over-predicted and under-predicted values with residuals ranging from -3.18 to 1.12 feet. In this simulation most of the wells are over-predicted with the highest residuals occurring at the upgradient (07) and downgradient (river) ends of the model. The standard deviation over the range is 12.7% in this simulation as compared to the recommended 10%. The observed versus computed target head values are close to and equally distributed about the 1 to 1 line on Figure 5B and the calibration residuals are clustered close to (i.e. -1.0 to +1.0) the zero residual horizontal line on Figure 5B, consistent with the slightly improved calibration statistic and more over-predicted heads as compared to the initial verification model with the lower river elevation (Figure 4B). This verification model did not result in significant changes in predicted boron concentrations as compared to the current model (Figure C below). The concentration at well 18S is predicted to stabilize below the Class I standard at 1.5 mg/L in the current model versus a stabilized concentration of 1.6 mg/L in the high river stage verification model.

Figure C. Predicted Concentrations in the Current Model and Model with Increased River Stage



The modeled groundwater flow matches long-term groundwater flow and discharge to the Illinois River. The verification model indicates median heads are very well calibrated at the upgradient edge of the monitoring well network (07) and the downgradient edge of the model domain (the Illinois River), which closely matches observed mean river elevation. Verification model residuals are, on average, within 1.5 feet and result in a standard deviation over the range of 13.2%, which is a very good result considering it uses median values; and, further supports how well the model simulates long-term conditions. Short-term changes in groundwater elevation have been demonstrated not to have significant effect on concentration trends (Comment 9 above). Concentration versus time graphs demonstrate the model accurately simulates changes in observed concentrations resulting from changes in land use/recharge; and, observed long-term concentration trends. The results of the high river stage verification modeling indicate an alternative calibration with slightly over-prediction of heads does not result in significant changes in predicted concentrations.

The 10% criteria is an indicator of how well modeled and observed values correlate within the model domain; however, it is not a requirement that a model meet this statistical benchmark to adequately simulate flow and transport. The residuals of the verification model approach the recommended 10%, indicating the model deviations remain small compared to the range of heads observed at the site; and, the model is appropriate for prediction modeling in its current form. Additional calibration beyond river elevation inputs would be required to whittle down the calibration statistics from 13.2% to 10% to meet the recommended criteria. This level of effort is not necessary given the model's proven ability to simulate observed changes in concentration.

As a reminder, the groundwater monitoring plan will monitor natural attenuation of contaminants after construction and evaluate groundwater quality to demonstrate compliance with the groundwater quality standards for Class I: Potable Resource Groundwater as well as USEPA MCLs or background exceedances, as appropriate. If a statistically significant increasing trend is observed to continue over a period of two or more years in groundwater sampled at the well network, and a subsequent hydrogeologic site investigation demonstrates that such exceedances are due to a release from Ash Pond No. 2 and 4 and corrective actions are appropriate to mitigate such releases, a corrective action plan will be proposed as a modification to the post-closure care plan..

Comment 13 - Summary Section 4

Available monitoring results from monitoring conducted by Vistra during 2018 indicates that both Lithium and Molybdenum at statistically significant concentrations in some down gradient monitoring wells. Please provide an evaluation of the estimated time required to meet applicable groundwater protection concentrations for these constituents, including an enhanced cover scenario, in addition to the Part 257 compliant cover and the baseline case.

<u>Response:</u> The concentration of lithium exceeds the applicable (see Comment 3 and updated Groundwater Monitoring Plan Table 2) USEPA risk based standard (0.04 mg/L) in well 18S, and molybdenum concentrations are above the applicable standard (0.1 mg/L) in wells 18S and 3R. The transport and fate of lithium in the groundwater is expected to be similar to boron since both are mobile in groundwater and relatively unaffected by sorption to organic matter or iron hydroxides in the aquifer. Molybdenum has the potential to be sorbed onto iron hydroxides or organic matter in the aquifer materials depending on the geochemical conditions. The potential for sorption may increase the length of time required for molybdenum to reach applicable groundwater quality standards (IEPA or USEPA), as molybdenum will desorb from the aquifer materials while concentrations decline.

Comparisons of the molybdenum and lithium concentrations to boron (Figures D through F below) indicate that these compounds are relatively well correlated at downgradient wells of interest 18S, 3R, and 45S. Boron and lithium have a strong linear correlation coefficient (R^2) of 0.94 (Figure D). Boron and molybdenum have a good linear correlation coefficient of 0.72 (Figure E); and, molybdenum shows a stronger exponential correlation coefficient of 0.94 with boron (Figure F), likely due to sorption of molybdenum on aquifer materials as discussed above. Based on the data collected and the existing strong linear or exponential correlations, concentrations of lithium and molybdenum are expected to decrease at similar rates to those of boron as predicted in the computer model.

Figure D. Boron vs Lithium

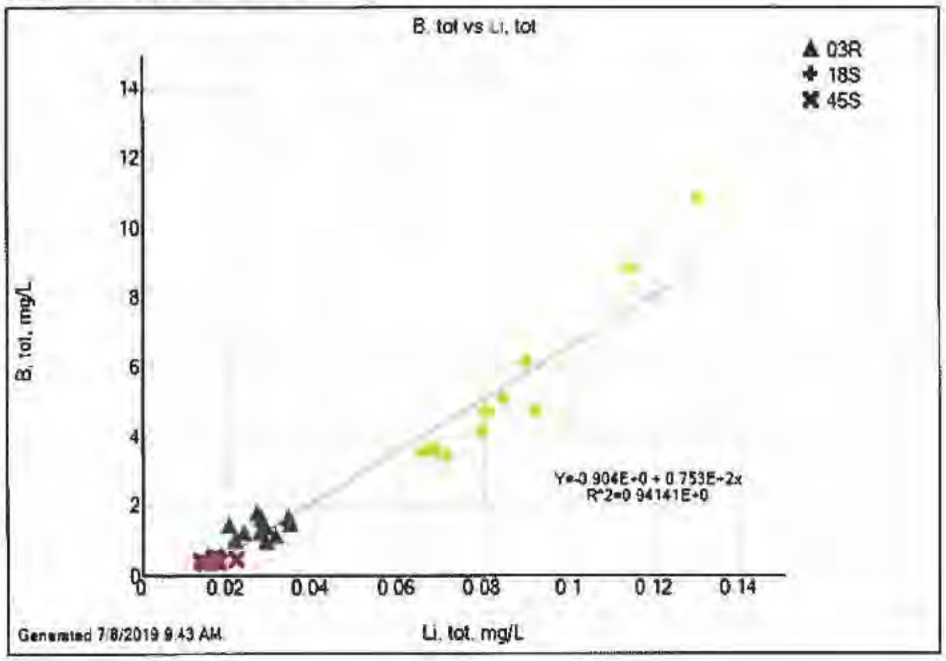


Figure E. Boron vs Molybdenum

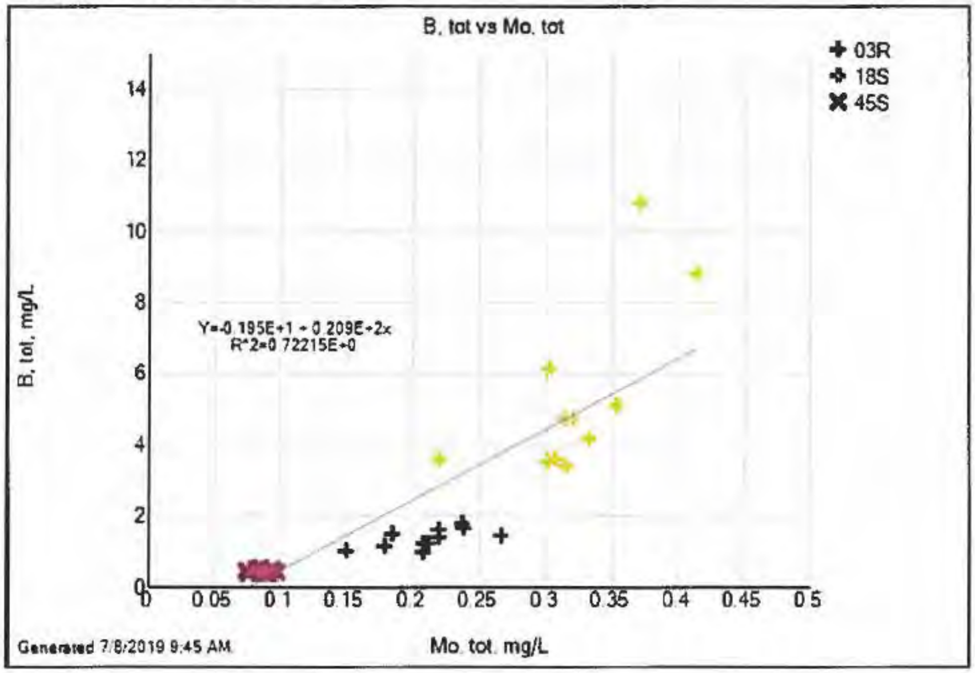
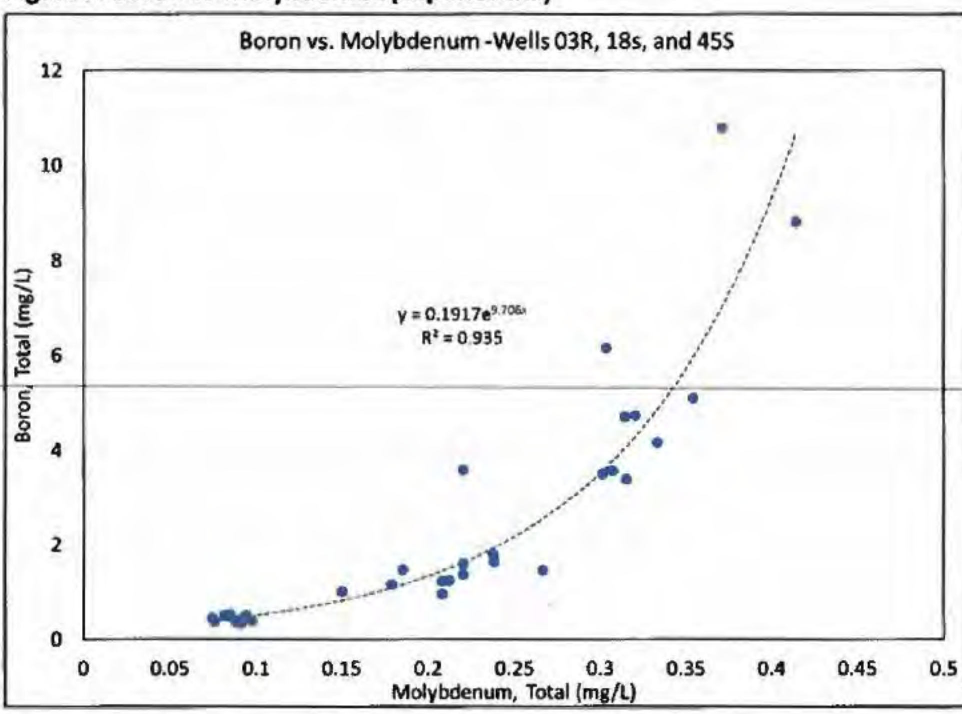


Figure F. Boron vs Molybdenum (Exponential)



Review of the correlation coefficients at the individual wells (Table A below) indicates the correlations with boron are stronger at well 18S where the concentrations of boron exceed the applicable groundwater standard (i.e., the correlations are stronger in the modeled and observed boron plume). There is almost no linear correlation at well 45S where there have not been any exceedances of boron, lithium, or molybdenum. The strong correlations associated with the boron plume indicate boron is an acceptable surrogate for lithium and molybdenum and concentrations of lithium and molybdenum are expected to decrease along with model predicted boron concentrations.

Table A. Summary of Linear Correlation Coefficients

Linear Correlation (R^2)	Combined Wells 18S, 3R, and 45S	Well 18S	Well 3R	Well 45S
B vs Li	0.94	0.95	0.06	0.07
B vs Mo	0.72	0.49	0.39	0.02

Comment 14 - Summary Section 4

Please provide additional discussion of the anticipated impact that achieving groundwater standards will have on surface water quality. In that discussion please include Boron, Lithium and Molybdenum relative to surface water quality standards.

Response: Currently there are no significant impacts to the Illinois River and the increase in concentration attributed to East Ash Pond No. 2 and 4 is less than the laboratory detection limit for all three parameters (boron, lithium, and molybdenum, see calculations in Attachment 2). Achieving groundwater standards for boron will reduce concentrations of lithium and molybdenum discharging to the river and have a beneficial impact on the Illinois River.

Comment 15 - Summary Section Prediction Graphs

Monitoring Well MW-45S is a down gradient compliance well. Please provide a Boron, Lithium and Molybdenum groundwater concentration prediction graphs for MW-45S.

Response: A boron groundwater concentration prediction graph for well 45S has been provided on Figure 1D. As shown, the concentrations predicted in 45S are approximately 1 mg/L, while the observed concentrations range from 0.328 to 0.544 mg/L. Both observed and predicted concentrations are below the applicable groundwater quality standard (2 mg/L). Observed concentrations of molybdenum (0.0741 to 0.0972 mg/L) and lithium (0.0137 to 0.0223 mg/L) at 45S also do not exceed the applicable groundwater standards (Mo 0.1 mg/L, and Li 0.04 mg/L); and, they correlate well with boron (see response to Comment 13). With boron as a surrogate and the lack of exceedances at well 45S, additional modeling of lithium and molybdenum is not necessary to generate additional prediction graphs.

Comment 16 - Groundwater Management Zone, Appendix E

The Groundwater Management Zone GMZ application in the Addendum supersedes the GMZ application contained in the Plan. The Agency finds that it is acceptable for the proposed (GMZ) to replace the existing GMZ upon approval of the Plan and Addendum.

Response: No response required.

Comment 17 - Groundwater Management Zone, Appendix E, Part 1, Item 7a

The answer to the question is marked "no", but a NPDES permit number is provided. Further the NPDES number does not appear to be associated with the Hennepin Station. Please correct theses apparent discrepancies.

Response: This discrepancy has been corrected and the applicable Generator ID number has been provided in a new GMZ form included in Attachment 3.

Comment 18 - Groundwater Management Zone, Appendix E, Part 1, Item 6

The statement provided indicates that groundwater standards will be achieved within 20 years. However, the modeling provided in the Plan and referenced in Item 6 indicates compliance with groundwater standards two years after cover installation. Please confirm the applicable time and correct this apparent discrepancy.

Response: This discrepancy in Part III, Item 6 has been corrected and a new GMZ form has been included in Attachment 3.

Very truly yours,
O'BRIEN & GERE ENGINEERS, INC.

Brian G. Hennings
Senior Hydrogeologist

Nicole M. Pagano, PE, PG
Senior Managing Engineer

LICENSED PROFESSIONAL GEOLOGIST
NICOLE M PAGANO
196-000750
ILLINOIS

TABLES

Table 1 Appendix III Analytical Results
Table 2 Appendix IV Analytical Results

FIGURES

Figure 1A to 1F Comparison of Observed and Modeled Concentrations, Observed and Modeled Heads, and Observed Concentration versus Observed Head by Well Location
Figure 2A to 2C Boron Prediction Concentration of Original Clay Cover (Capped) and Enhanced Clay Cover (Enhanced Capped)
Figure 3A Comparison between Observed and Modeled Heads (1995)
Figure 3B Model Calibration Results (1995)
Figure 4A Comparison between Observed and Modeled Median Heads
Figure 4B Verification Model Residuals Using Median Elevation Targets
Figure 5A Comparison between Observed and Modeled Median Heads with Increased River Elevation
Figure 5B Verification Model Residuals Using Median Elevation Targets with Increased River Elevation

ATTACHMENTS

Attachment 1 Groundwater Monitoring Plan
Attachment 2 Groundwater Discharge Calculations
Attachment 3 Groundwater Management Zone Application

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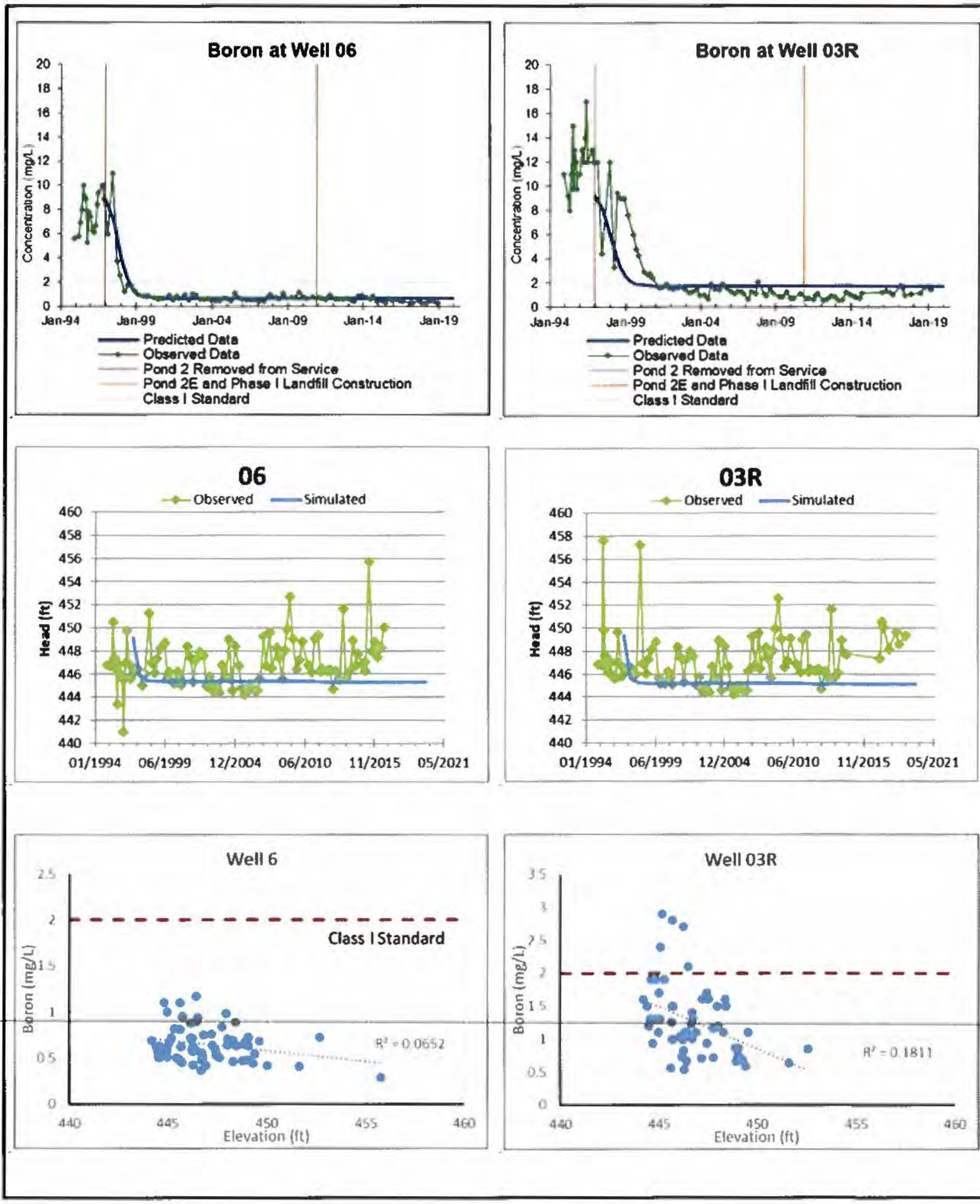
FIGURE NO. 1A



COMPARISON OF OBSERVED AND MODELED CONCENTRATIONS, OBSERVED AND MODELED HEADS, AND OBSERVED CONCENTRATION VERSUS OBSERVED HEAD BY WELL LOCATION

RESPONSE TO IEPA COMMENTS
EAST ASH POND NO. 2
DYNEGY MIDWEST GENERATION, LLC
HENNEPIN POWER STATION, HENNEPIN, ILLINOIS

OBG
Part of Ramboll

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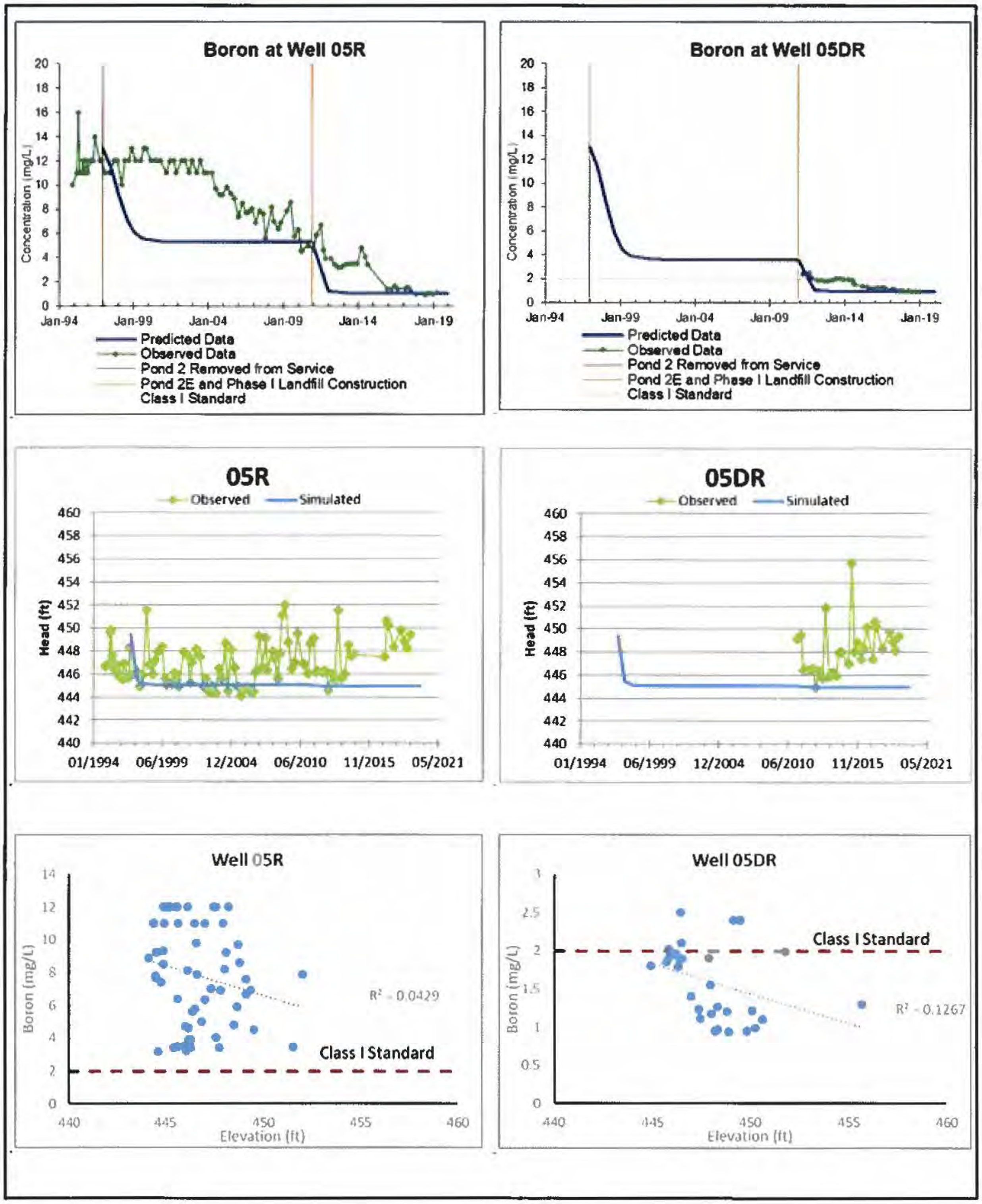
FIGURE NO. 1B



COMPARISON OF OBSERVED AND MODELED CONCENTRATIONS, OBSERVED AND MODELED HEADS, AND OBSERVED CONCENTRATION VERSUS OBSERVED HEAD BY WELL LOCATION

RESPONSE TO IEPA COMMENTS
EAST ASH POND NO. 2
DYNEGY MIDWEST GENERATION, LLC
HENNEPIN POWER STATION, HENNEPIN, ILLINOIS

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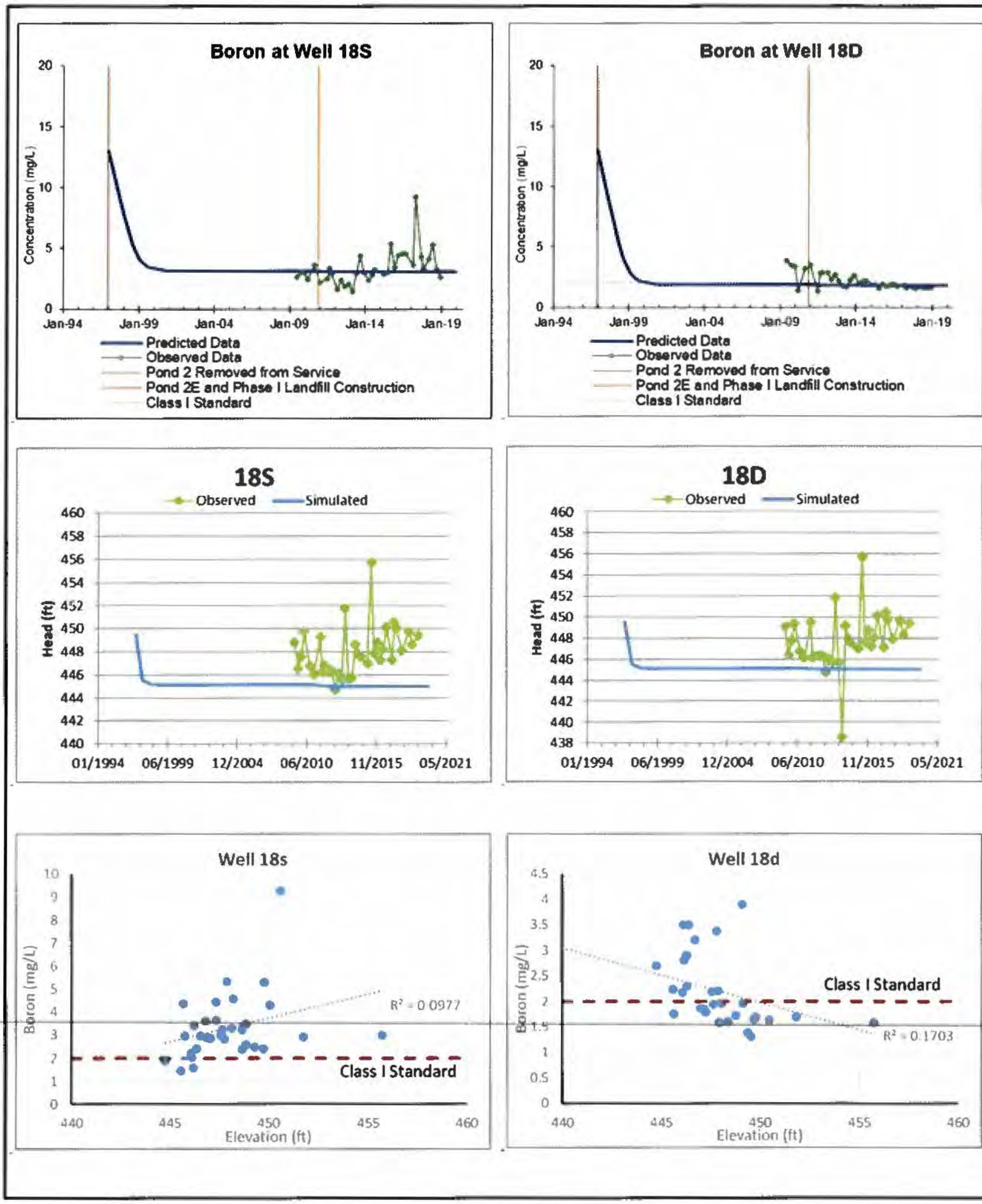
FIGURE NO. 1C



COMPARISON OF OBSERVED AND MODELED CONCENTRATIONS, OBSERVED AND MODELED HEADS, AND OBSERVED CONCENTRATION VERSUS OBSERVED HEAD BY WELL LOCATION

RESPONSE TO IEPA COMMENTS
EAST ASH POND NO. 2
DYNEGY MIDWEST GENERATION, LLC
HENNEPIN POWER STATION, HENNEPIN, ILLINOIS

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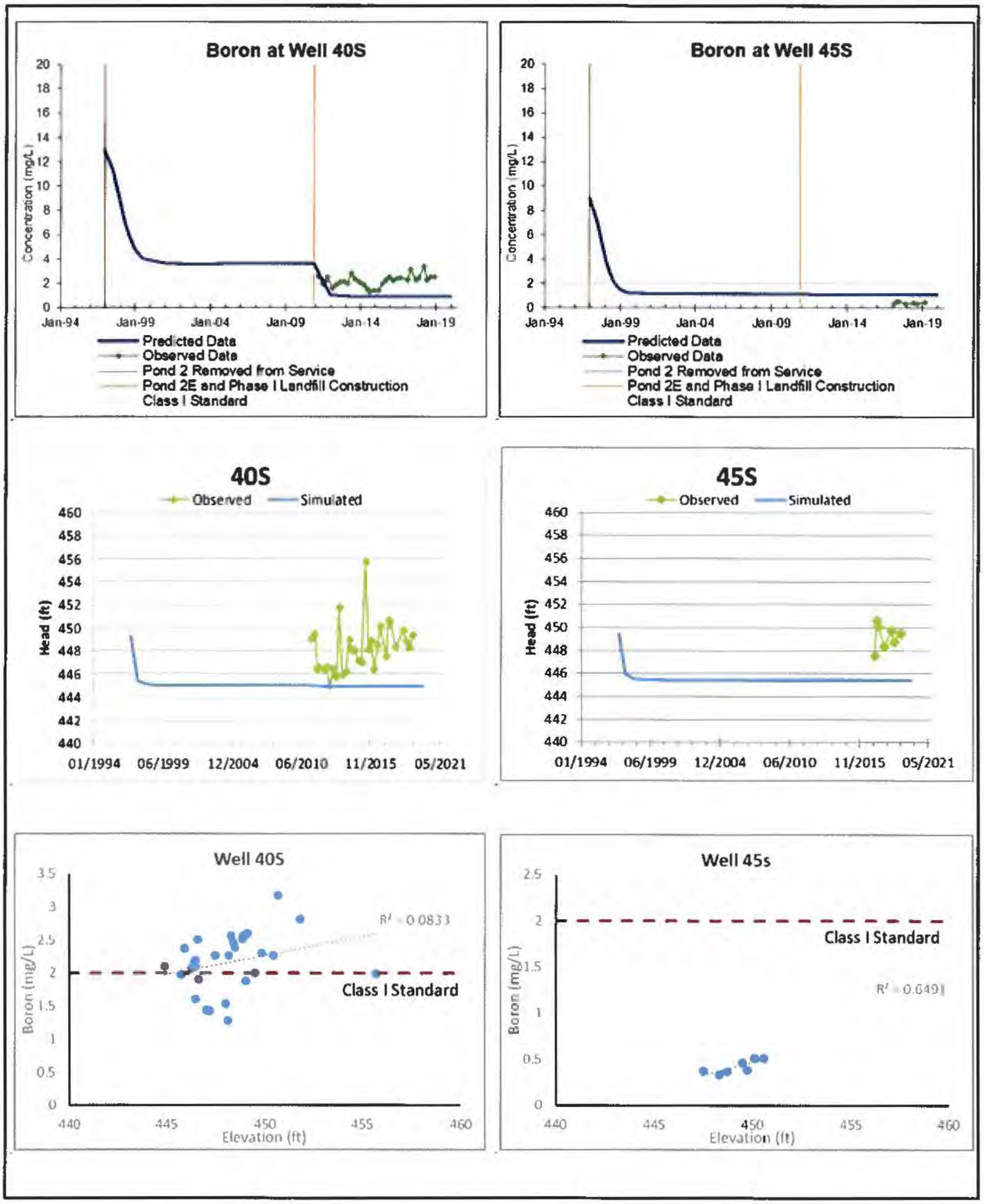
FIGURE NO. 1D



COMPARISON OF OBSERVED AND MODELED CONCENTRATIONS, OBSERVED AND MODELED HEADS, AND OBSERVED CONCENTRATION VERSUS OBSERVED HEAD BY WELL LOCATION

RESPONSE TO IEPA COMMENTS
EAST ASH POND NO. 2
DYNEGY MIDWEST GENERATION, LLC
HENNEPIN POWER STATION, HENNEPIN, ILLINOIS

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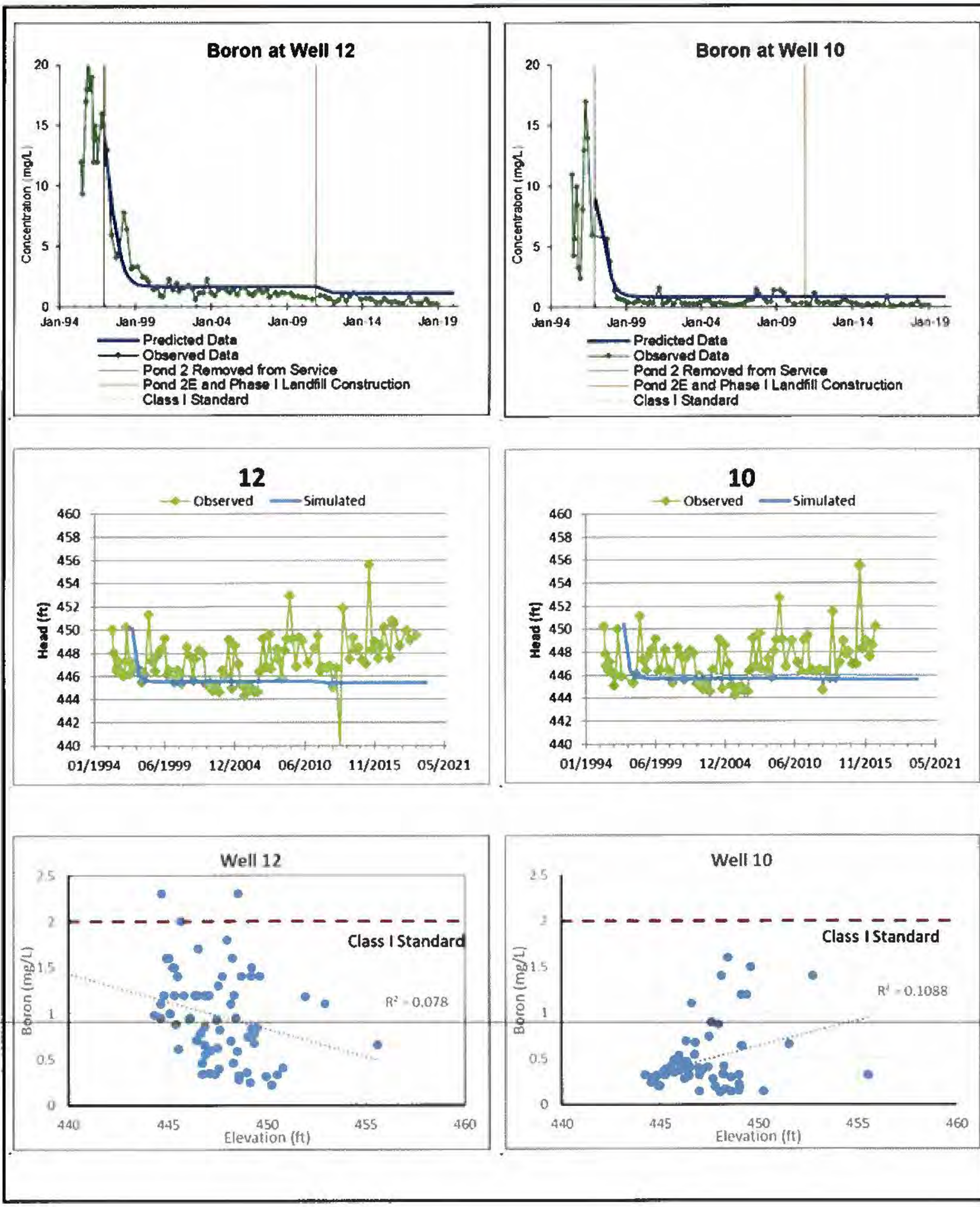
FIGURE NO. 1E



COMPARISON OF OBSERVED AND MODELED CONCENTRATIONS, OBSERVED AND MODELED HEADS, AND OBSERVED CONCENTRATION VERSUS OBSERVED HEAD BY WELL LOCATION

RESPONSE TO IEPA COMMENTS
EAST ASH POND NO. 2
DYNEGY MIDWEST GENERATION, LLC
HENNEPIN POWER STATION, HENNEPIN, ILLINOIS

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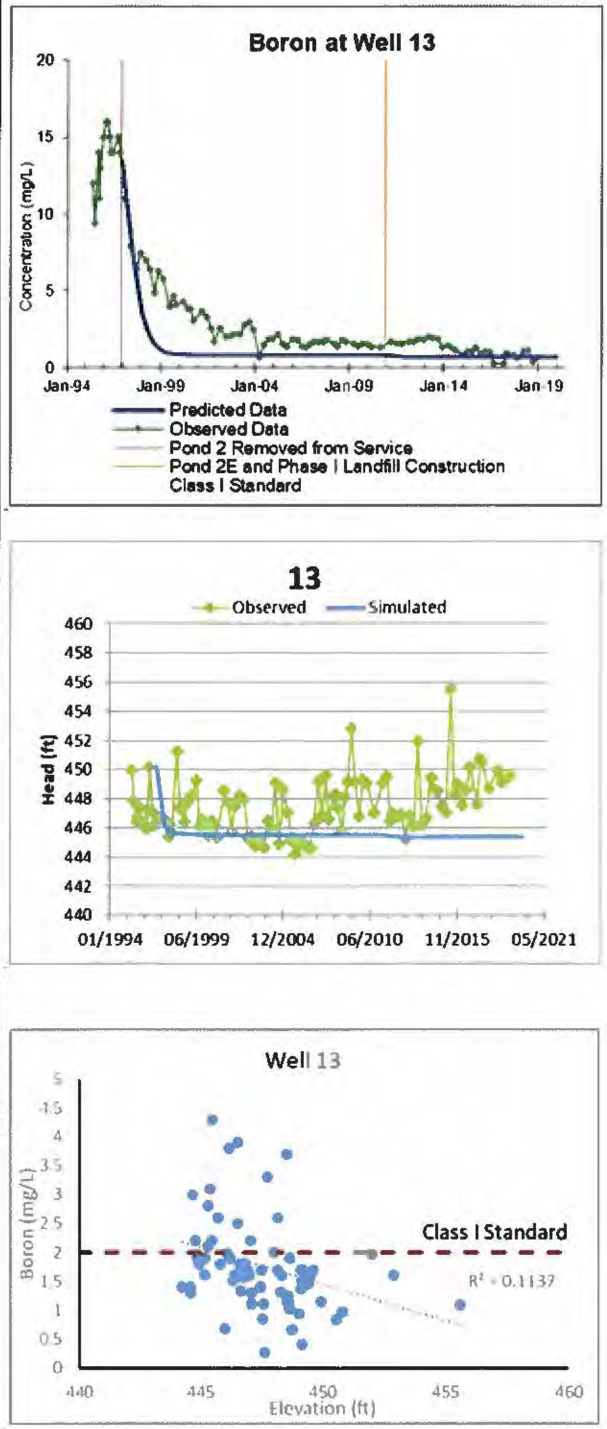
FIGURE NO. 1F



COMPARISON OF OBSERVED AND MODELED CONCENTRATIONS, OBSERVED AND MODELED HEADS, AND OBSERVED CONCENTRATION VERSUS OBSERVED HEAD BY WELL LOCATION

RESPONSE TO IEPA COMMENTS
EAST ASH POND NO. 2
DYNEGY MIDWEST GENERATION, LLC
HENNEPIN POWER STATION, HENNEPIN, ILLINOIS

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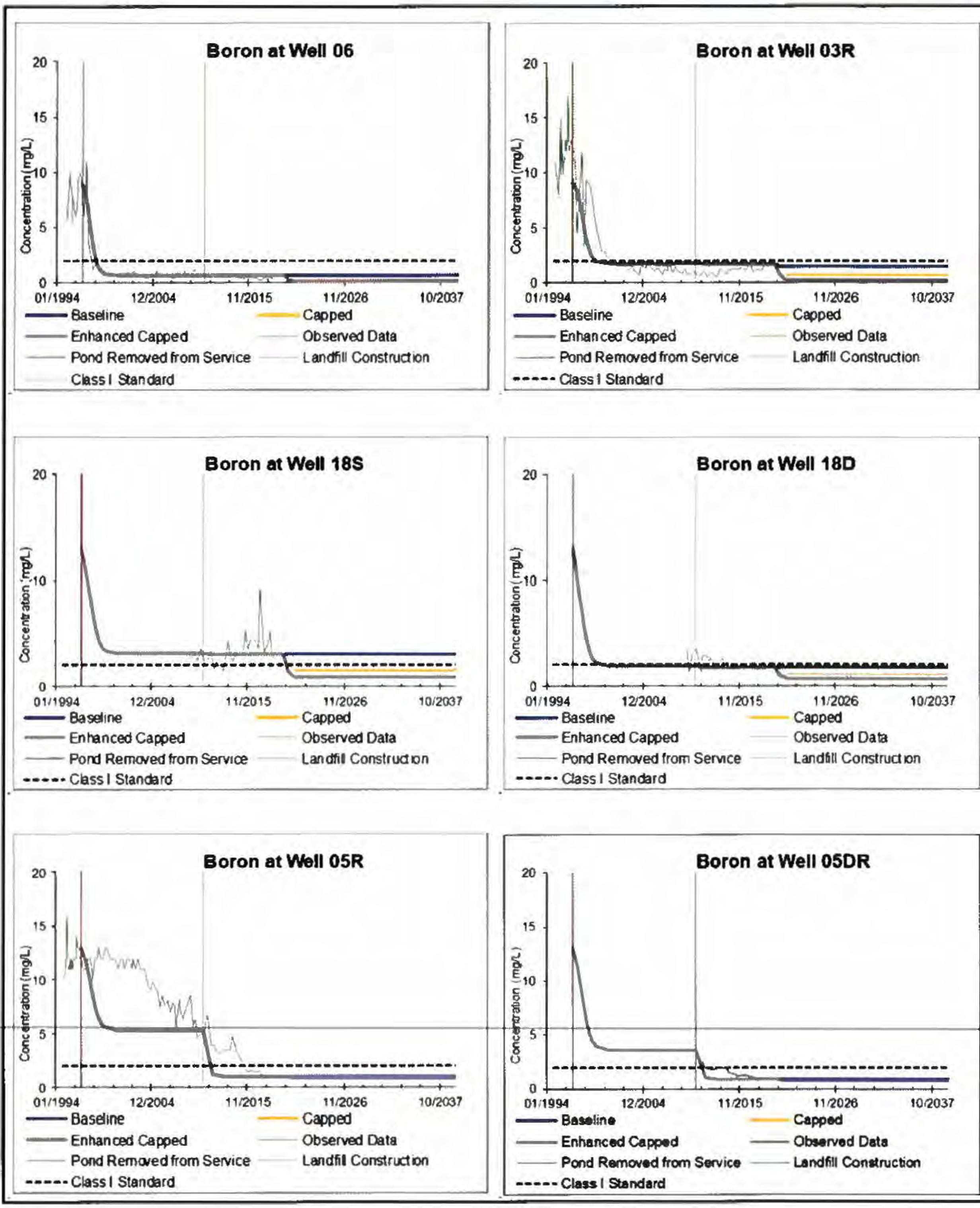
FIGURE NO. 2A



BORON PREDICTION CONCENTRATION OF ORIGINAL CLAY COVER (CAPPED) AND ENHANCED CLAY COVER (ENHANCED CAPPED)

RESPONSE TO IEPA COMMENTS
EAST ASH POND NO. 2
DYNEGY MIDWEST GENERATION, LLC
HENNEPIN POWER STATION, HENNEPIN, ILLINOIS

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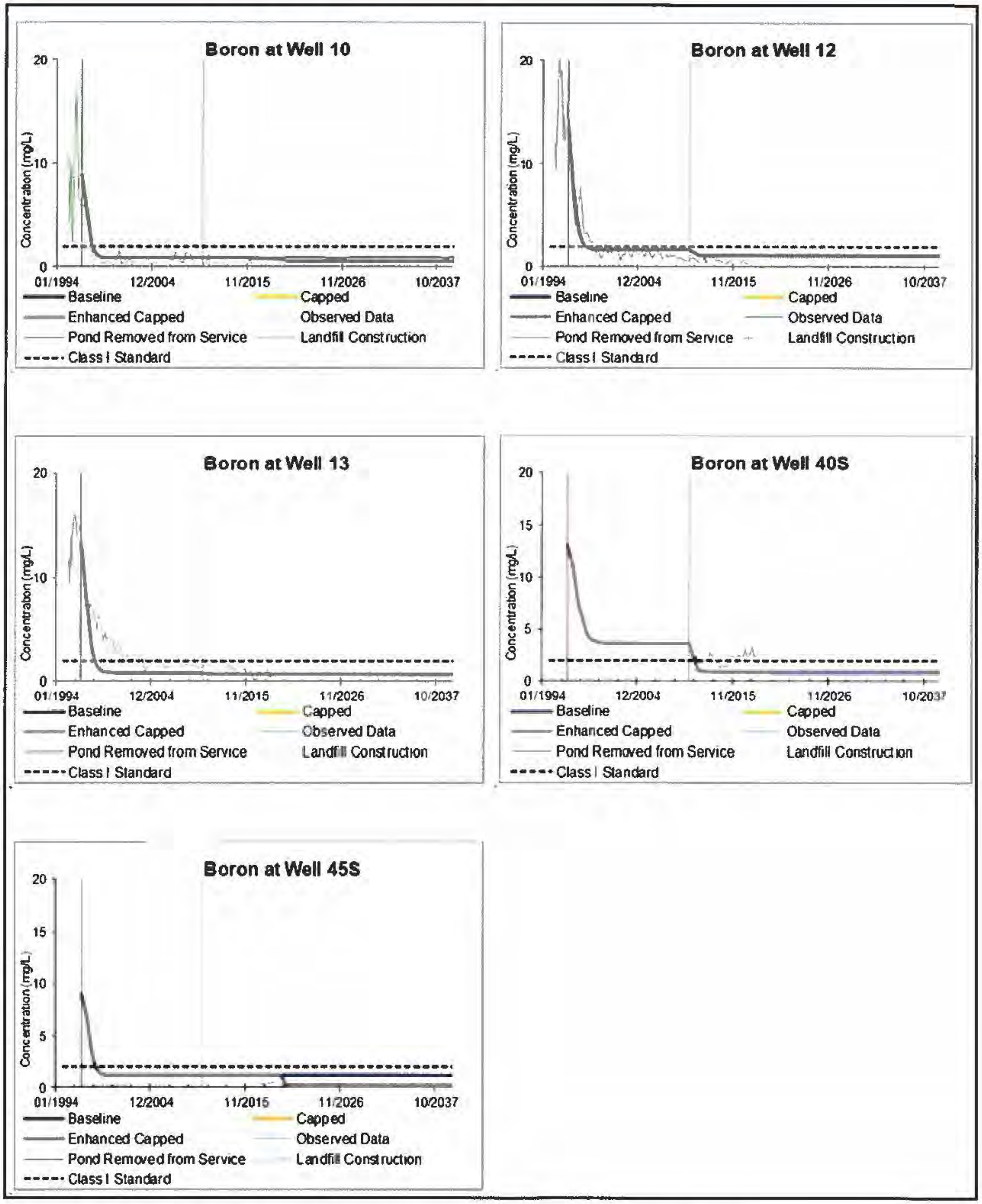
FIGURE NO. 2B



BORON PREDICTION CONCENTRATION OF ORIGINAL CLAY COVER (CAPPED) AND ENHANCED CLAY COVER (ENHANCED CAPPED)

RESPONSE TO IEPA COMMENTS
EAST ASH POND NO. 2
DYNEGY MIDWEST GENERATION, LLC
HENNEPIN POWER STATION, HENNEPIN, ILLINOIS

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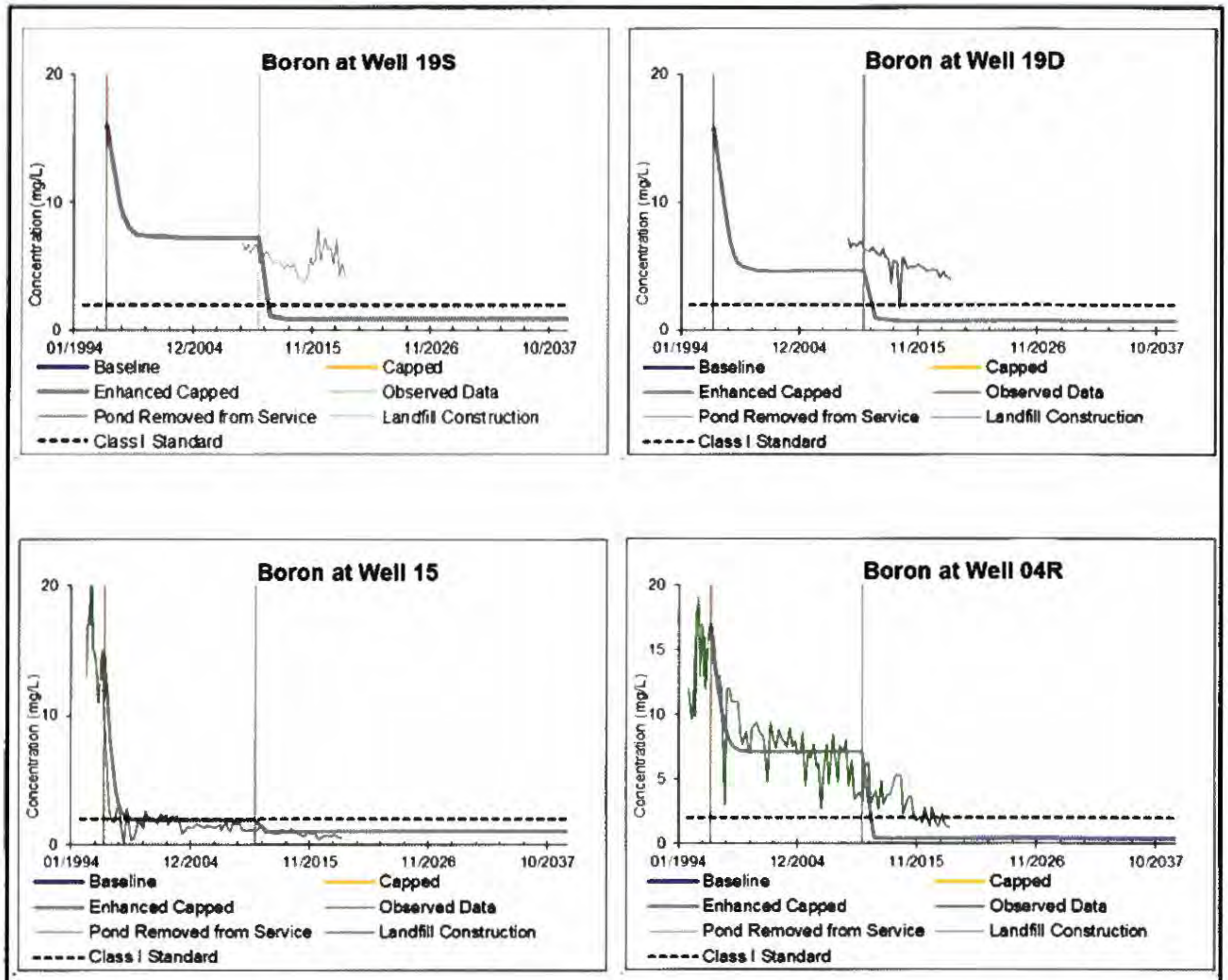
FIGURE NO. 2C



BORON PREDICTION CONCENTRATION OF ORIGINAL CLAY COVER (CAPPED) AND ENHANCED CLAY COVER (ENHANCED CAPPED)

RESPONSE TO IEPA COMMENTS
EAST ASH POND NO. 2
DYNEGY MIDWEST GENERATION, LLC
HENNEPIN POWER STATION, HENNEPIN, ILLINOIS

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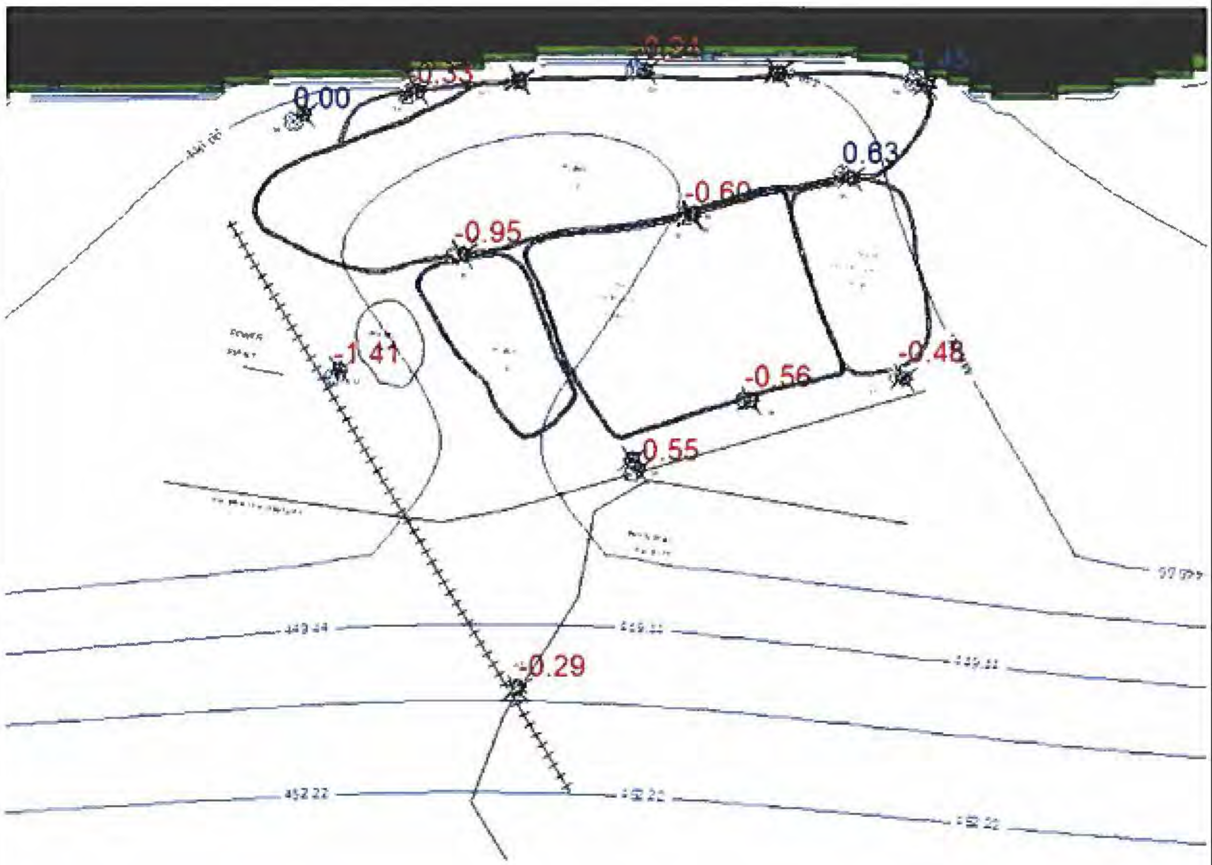

COMPARISON BETWEEN OBSERVED AND MODELED HEADS (1995)

RESPONSE TO IEPA COMMENTS
EAST ASH POND NO. 2
DYNEGY MIDWEST GENERATION, LLC
HENNEPIN POWER STATION, HENNEPIN, ILLINOIS

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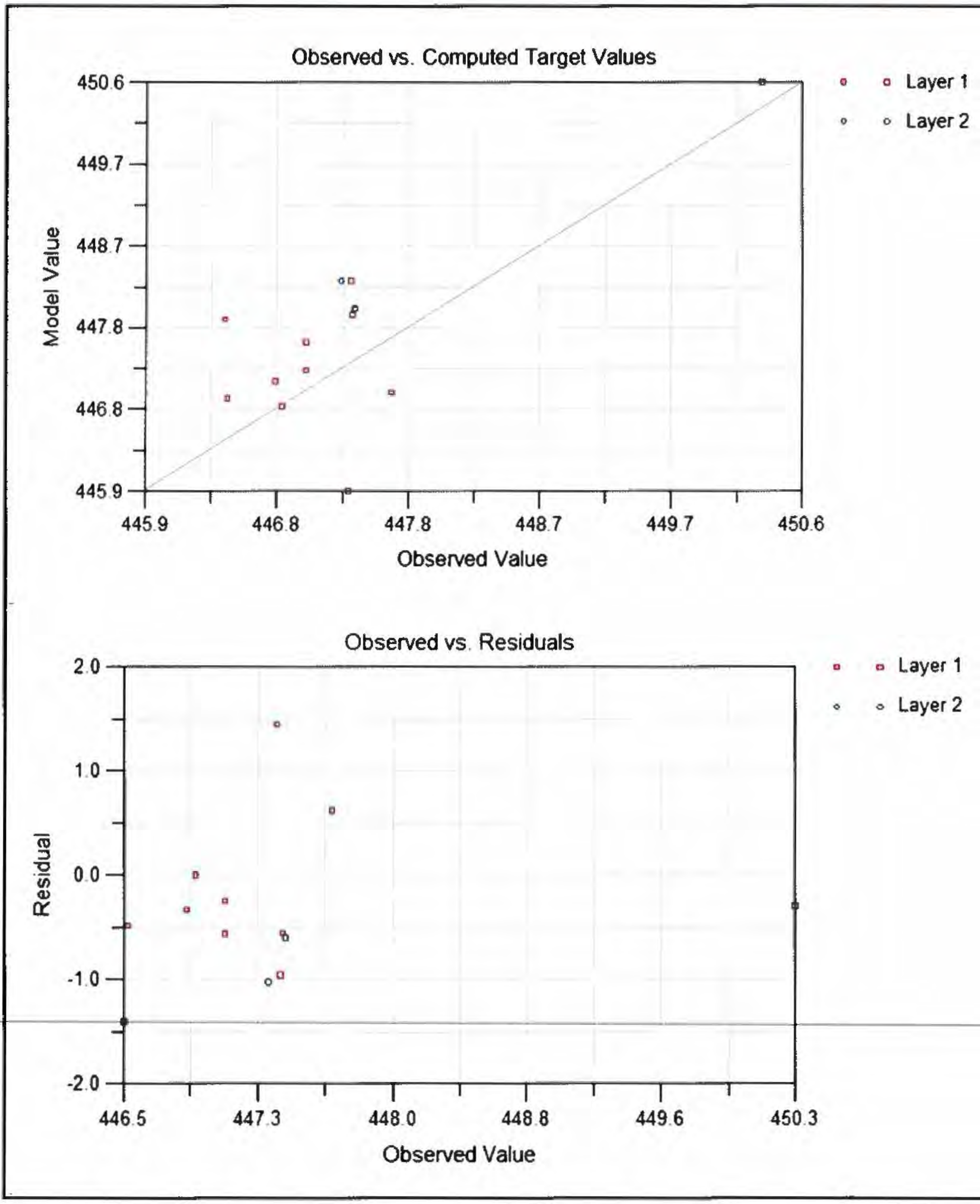
FIGURE NO. 3B



MODEL CALIBRATION RESULTS (1995)

RESPONSE TO IEPA COMMENTS
EAST ASH POND NO. 2
DYNEGY MIDWEST GENERATION, LLC
HENNEPIN POWER STATION, HENNEPIN, ILLINOIS

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FIGURE NO. 4A

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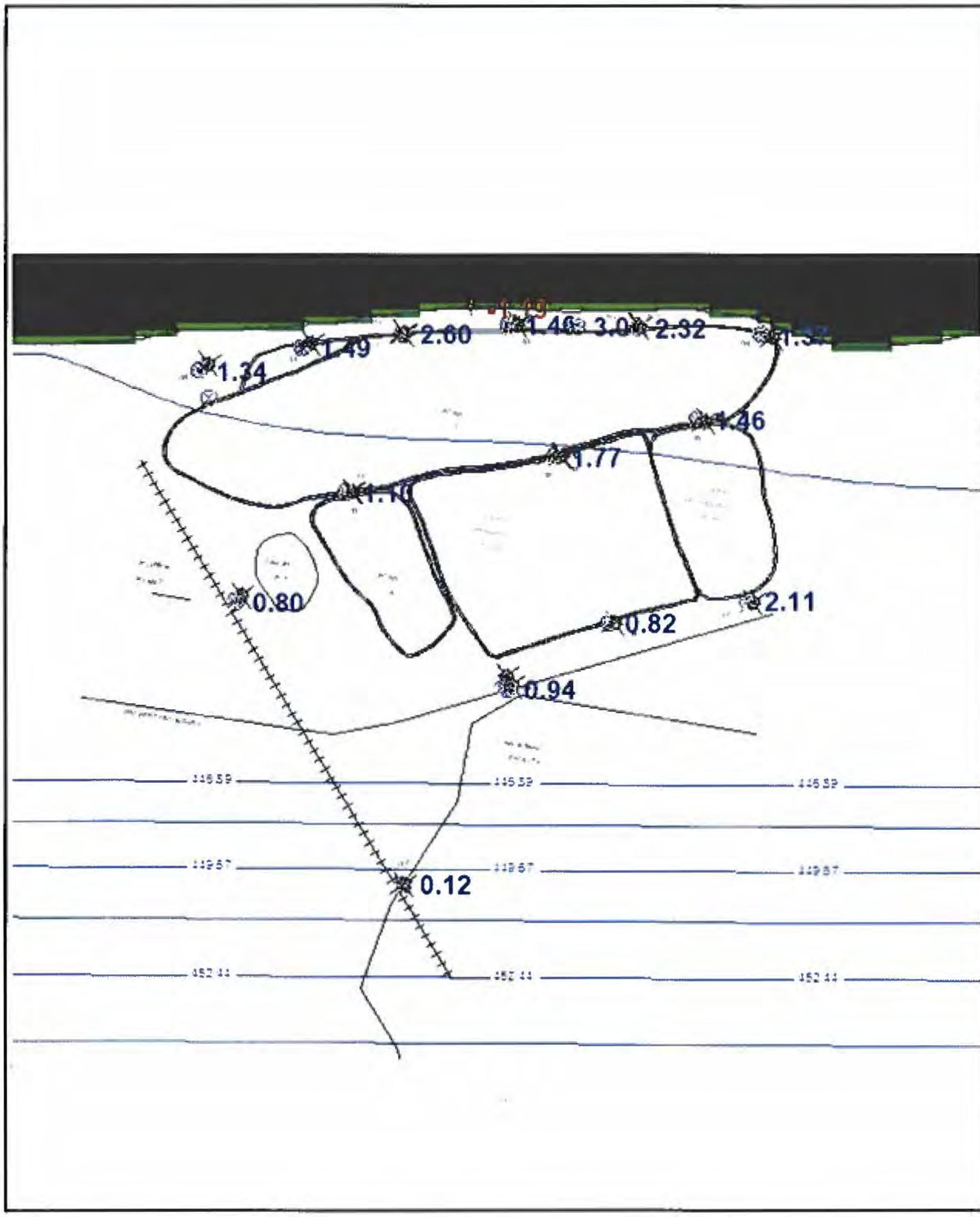

COMPARISON BETWEEN OBSERVED
AND MODELED MEDIAN HEADS

RESPONSE TO IEPA COMMENTS
EAST ASH POND NO. 2
DYNEGY MIDWEST GENERATION, LLC
HENNEPIN POWER STATION, HENNEPIN, ILLINOIS

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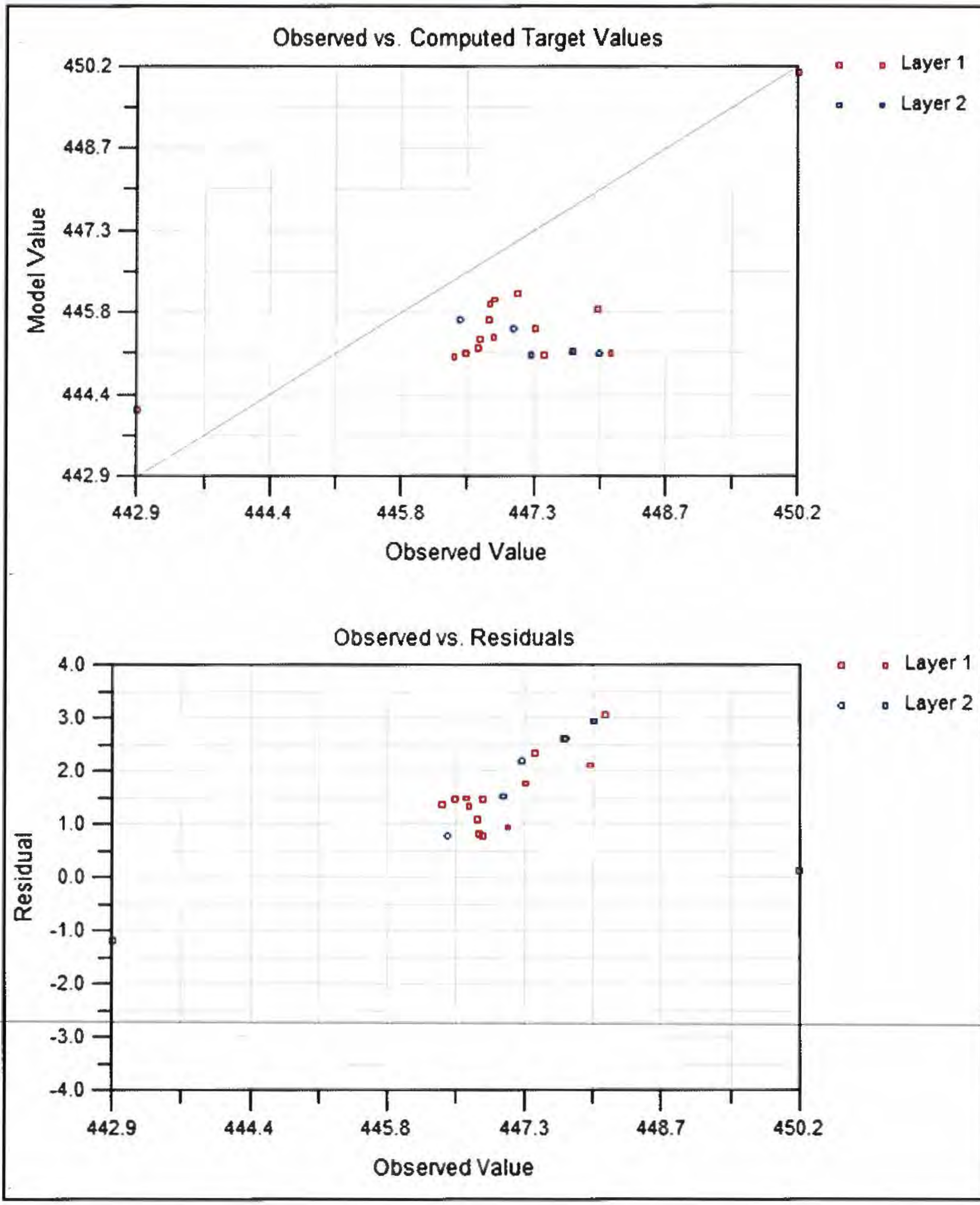
FIGURE NO. 4B



VERIFICATION MODEL RESIDUALS USING MEDIAN ELEVATION TARGETS

RESPONSE TO IEPA COMMENTS
EAST ASH POND NO. 2
DYNEGY MIDWEST GENERATION, LLC
HENNEPIN POWER STATION, HENNEPIN, ILLINOIS

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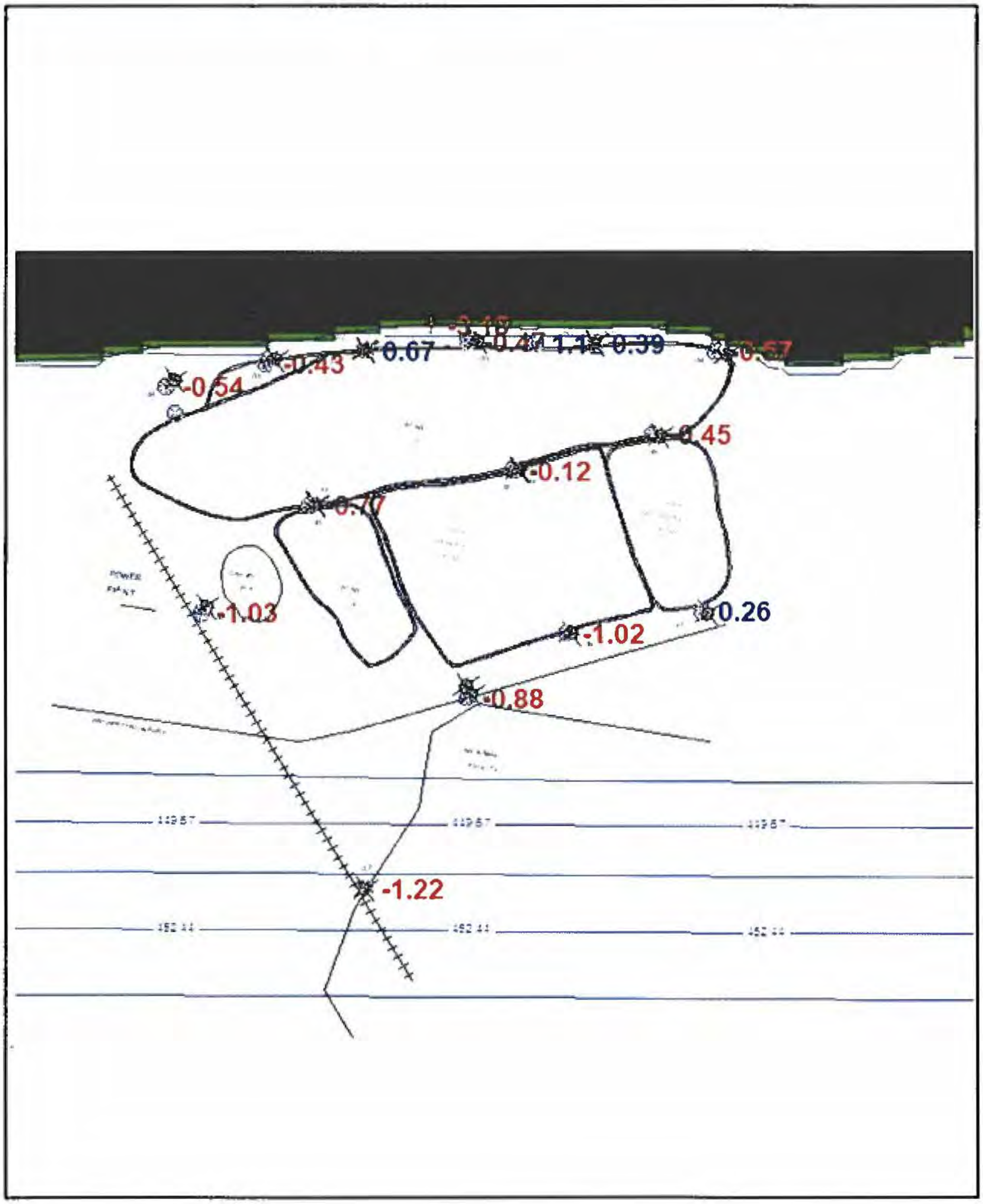

COMPARISON BETWEEN OBSERVED AND MODELED
MEDIAN HEADS WITH INCREASED RIVER ELEVATION

RESPONSE TO IEPA COMMENTS
EAST ASH POND NO. 2
DYNEGY MIDWEST GENERATION, LLC
HENNEPIN POWER STATION, HENNEPIN, ILLINOIS

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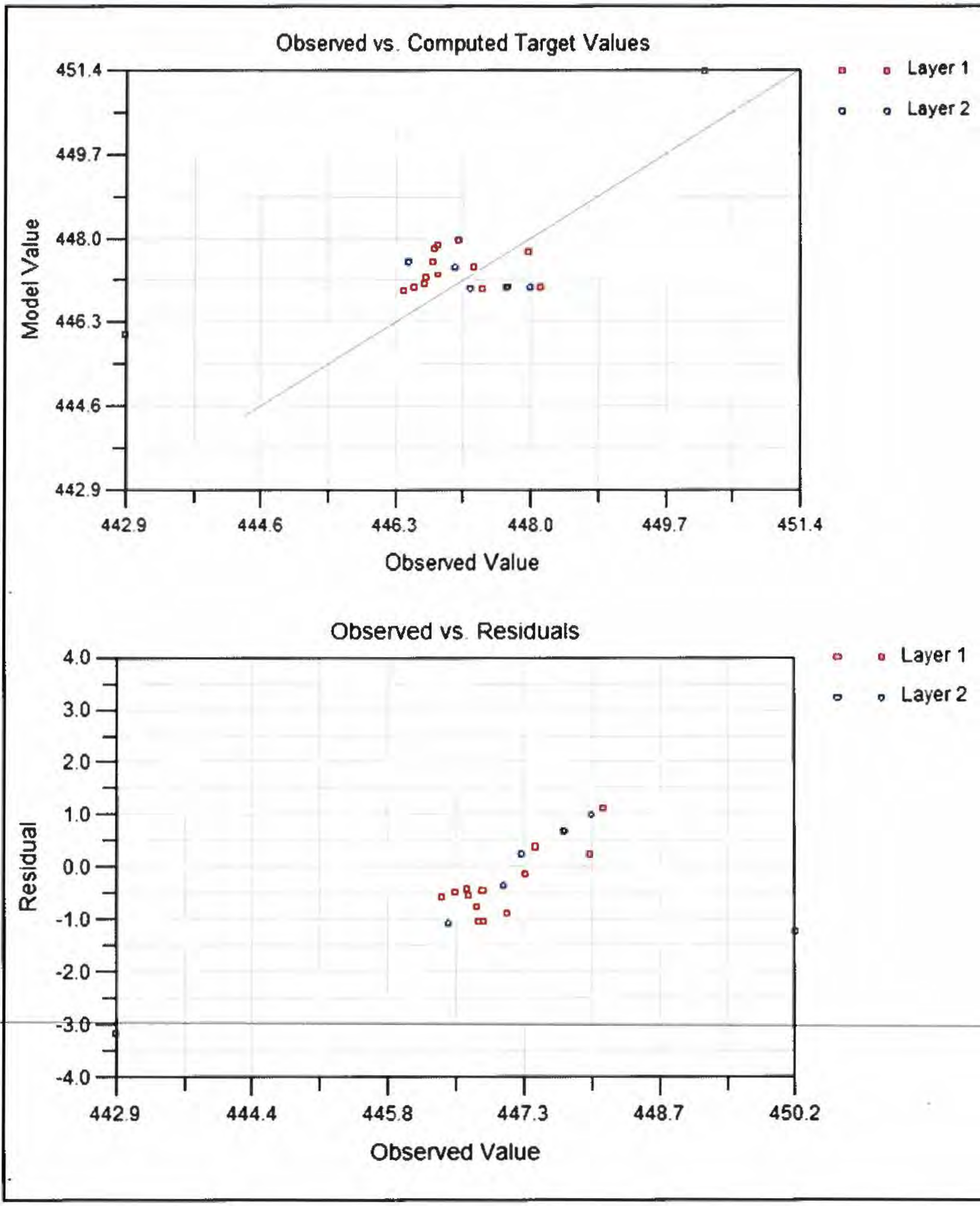
FIGURE NO. 5B



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VERIFICATION MODEL RESIDUALS USING MEDIAN ELEVATION TARGETS WITH INCREASED RIVER ELEVATION

RESPONSE TO IEPA COMMENTS
EAST ASH POND NO. 2
DYNEGY MIDWEST GENERATION, LLC
HENNEPIN POWER STATION, HENNEPIN, ILLINOIS

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ATTACHMENT 6

OBG

Closure Plan Addendum

Hennepin East Ash Pond No.2
Hennepin, Illinois

Dynegy Midwest Generation, LLC

FINAL
October 25, 2018

OCTOBER 25, 2018 | FINAL | PROJECT #67938

Closure Plan Addendum

Hennepin East Ash Pond No. 2
Hennepin, Illinois

Prepared for:

Dynegy Midwest Generation, LLC
1500 Eastport Plaza Drive
Collinsville, IL 62234

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ACRONYMS AND ABBREVIATIONS

ASTM	American Society for Testing and Materials
bgs	below ground surface
CCR	coal combustion residual
CFR	Code of Federal Regulations
cm/s	centimeters per second
CEC	Civil & Environmental Consultants, Inc.
CWS	Community Water Supply
DMG	Dynegy Midwest Generation, Inc.
EPA	Environmental Protection Agency
FEMA	Federal Emergency Management Agency
ft	feet
ft/ft	feet per feet
ft MSL	feet above Mean Sea Level
gal/day	gallons per day
IAC	Illinois Administrative Code
IDNR	Illinois Department of Natural Resources
IEPA	Illinois Environmental Protection Agency
ISGS	Illinois State Geological Survey
ISWS	Illinois State Water Survey
MDL	method detection limit
mg/L	milligram per liter
NPDES	National Pollutant Discharge Elimination System
NRT	Natural Resource Technology, Inc. (NRT, an OBG Company)
OBG	O'Brien & Gere Engineers, Inc.
PCP	Pentachlorophenol
PWS	Public Water Supply
SVOC	Semivolatile Organic Compound
S.U.	Standard Units
TDS	total dissolved solids
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
WHPA	Wellhead Protection Area
WMA	Wildlife Management Area

1 INTRODUCTION

1.1 OVERVIEW

This Closure Plan Addendum was prepared by O'Brien and Gere Engineers, Inc. (OBG) and Civil & Environmental Consultants, Inc. (CEC) to supplement the *Closure and Post-Closure Care Plan for Hennepin East Ash Pond No. 2* (Closure Plan; CEC, 2018) which is located at the Hennepin Power Station, Hennepin, Illinois (Figure 1) and owned by Dynegy Midwest Generation, LLC (DMG). The Closure Plan was submitted to the Illinois Environmental Protection Agency (IEPA) in February 2018; comments and approval of the Closure Plan are pending. This Addendum includes a closure and post closure care plan for Ash Pond No. 4to supplement the Closure Plan prepared for Ash Pond No. 2 located within the East Ash Pond System and does not apply to any of the other impoundments present at the Hennepin Power Station.

The purpose of this Addendum is to supplement the Closure Plan with information specific to the closure of Ash Pond No. 4 and to demonstrate that the closure of the ash pond by constructing a cover system will provide further benefit to groundwater conditions at the Hennepin Power Station. As discussed in subsequent sections of this Addendum, the existing conditions (i.e. subsurface materials and groundwater) at Ash Pond No. 4 are analogous to those observed at Ash Pond No. 2 and were incorporated into the analysis and modeling detailed in the Closure Plan. However, reporting focused on the closure of Ash Pond No. 2; this document augments the Closure Plan with discussion of Ash Pond No. 4.

As part of the Closure Plan, the groundwater flow and transport model was updated to evaluate the effect of the ash pond closure (Ash Pond No. 2) on groundwater quality and to predict the fate and transport of CCR leachate components. Modeling was also conducted to enable estimation of the time required for hydrostatic equilibrium of groundwater to be achieved beneath Ash Pond No. 2. Existing, uncovered, conditions at Ash Pond No. 4 were incorporated into these models. Closure of Ash Pond No. 4 by cover system construction does not adversely impact the results of the models, but as described herein will provide further benefit to groundwater quality in addition to that observed in the modeling predictions for closure of Ash Pond No. 2.

1.2 SITE LOCATION AND BACKGROUND

Ash Pond No. 4 is located in the northeast quarter of Section 26, Township 33 North, Range 2 West, Putnam County, Illinois and approximately 3 miles north-northeast of the Village of Hennepin. Existing ash impoundments border Ash Pond No. 4 to the east (Primary East Ash Pond) and north (Ash Pond No. 2). The impoundments are situated less than 200 feet south of the Illinois River and approximately one mile east of the Big Bend, where the river shifts course from predominantly west to predominantly south. Surrounding areas include industrial properties to the east and south of the impoundments, agricultural land to the southwest, and the Hennepin Power Station to the west (Figure 1). Ash Pond No. 4 is immediately upgradient of Ash Pond No. 2 and separated by less than 50 feet of berm fill and/or native materials.

1.3 SITE HISTORY

Ash Pond No. 2 and No. 4 were originally included in the Consent Decree 89-CH-5 (dated March 2, 1989) which required closure of the Hennepin East Ash Pond System, which at that time included Ash Pond No. 2 and Ash Pond No. 4, and the subsequent Order Modifying Consent Decree (dated January 3, 1996) which allowed for the establishment of the current Groundwater Management Zone (which included Ash Pond No. 4). Following the order dated January 3, 1996, a plan for progressive covering of Ash Pond No. 2 was submitted to the IEPA in the Modified Closure Work Plan dated November 10, 2009, and approved March 3, 2010. The Modified Closure Work Plan allowed existing Ash Pond No. 2 and No. 4 to remain uncovered but not receive ash. The existing ash ponds were to remain uncovered so that Dynegy could mine bottom ash and fly ash from these ponds for reuse. This Closure Plan Addendum addresses the closure of Ash Pond No. 4 in conjunction with Ash Pond No. 2 because these units have been regulated in the previous Consent Decree, subsequent Order Modifying Consent Decree, and the Modified Closure Work Plan.

A detailed summary of the history and CCR units at the Hennepin Power Station was included in Appendix A of the Closure Plan (CEC, 2018), Hydrogeologic Site Characterization Report (NRT, an OBG Company, 2017a). A brief summary of CCR units is as follows:

Ash Pond No. 4 (Pond 4): A former unlined impoundment, now dry, is classified as a non-CCR Rule pond (capped or otherwise maintained). Based on review of aerial photographs and other site information, ash was placed in a former sand and gravel quarry between 1978 and 1984.

A Modified Closure Work Plan submitted and approved in 2010 indicated Ash Pond No. 4 would remain uncovered until such time that ash was no longer being mined for reuse. Given market conditions and the pending closure of Ash Pond No. 2, this Closure Plan Addendum is being submitted to close Ash Pond No. 4 in conjunction with Ash Pond No. 2 as specified in the Modified Closure Work Plan.

Ash Pond No. 2 (East Ash Pond No. 2): Used to store and dispose fly ash, bottom ash, and other non-CCR waste streams, including coal pile runoff. The pond received material from 1958 to 1996. The pond, currently encompassing approximately 18 acres, is unlined with a variable but lowermost bottom elevation of 451 feet.

The Modified Closure Work Plan Indicated Ash Pond No. 2 would be closed by capping as future landfill phases were constructed. The proposed Landfill Phases II, III and IV are not planned for construction above Ash Pond No. 2 at this time, which resulted in the submittal of the Closure Plan (CEC, 2018).

East Ash Pond (Primary Pond): Used to store and dispose bottom ash, fly ash, and other non-CCR waste and to clarify process water prior to discharge in accordance with the station's National Pollutant Discharge Elimination System (NPDES) permit. This pond remains in service for the treatment of bottom ash transport waters, miscellaneous low volume wastewater streams, and unsold fly ash.

Polishing Pond (Secondary Pond): Constructed in 1995 with a 48-inch thick compacted clay liner having a vertical hydraulic conductivity of 1×10^{-7} cm/sec.

Leachate Pond (Pond 2 East): A 25.5-acre-foot pond constructed with a composite liner consisting of 60-mil HDPE overlying two feet of compacted clay with a vertical hydraulic conductivity of 1×10^{-7} cm/sec. Construction was completed December 2010.

2 CLOSURE AND POST-CLOSURE CARE PLAN

2.1 DESCRIPTION OF PROPOSED CLOSURE ACTIVITIES

Closure of Ash Pond No. 4 will be completed no later than November 18, 2020. Closure construction activities will include, but are not limited to, regrading the existing CCR within Ash Pond No. 4 to achieve acceptable grades for closure and constructing a cover system. Although not required, based on the non-CCR Rule capped and otherwise maintained designation of the pond, the final covers system will be constructed to meet the intent of the CCR Rule. The final cover system will meet the intent of the applicable design requirements of the CCR Rule, including establishment of a vegetative cover to minimize long-term erosion. No free water is present within Ash Pond No. 4, therefore no “unwatering” (removal of free water) is required prior to the relocation and grading of CCR and fill materials. No “dewaters” or standard ash waters are expected to be generated. Soil from the adjacent west berm will be used to supplement the fill volume in order to reach final grades in preparation for the final cover system.

Permit Drawings 1-8, included in Appendix A of this Addendum, provide the proposed cover design. Drawing 4 presents the Top of CCR Grading Plan and Drawing 5 presents the cut/fill isopach thickness and volumes. Drawing 6 presents the Top of Final Cover System Grading Plan. Drawings 7 and 8 present cross sections showing existing grades, proposed grades and other site features.

The stormwater from Ash Pond No. 4 currently drains to the adjacent former sand and gravel pit to the west with no discharge. The stormwater runoff from the final cover system will be managed as sheet flow and continue to drain to the former sand and gravel pit to the west. No NPDES permitted outfalls are associated with Ash Pond. No. 4. Drawing 6 provides the erosion and sediment control measures.

Test pits were excavated along the perimeter and center of Ash Pond No. 4. Test pits TP-1 through TP-23 were located approximately 100 feet on center around the perimeter to identify the interface of the native soil with CCR materials at the ground surface for the purpose of determining the lateral extent of CCR material and TP-24 and TP-25 were excavated to observe conditions of the CCR within the ash pond. The Ash Pond No. 4 Test Pit Report is provided in Appendix B.

2.2 ENGINEERING PLANS AND SPECIFICATIONS FOR THE PROPOSED CLOSURE ACTIVITIES

The engineering plans and design specifications for the final cover system and closure activities will meet the intent of the CCR Rule for closure by leaving CCR in place and in general accordance with those prepared for Ash Pond No. 2.

2.2.1 Final Cover System

The final cover system will be constructed within the limits of Ash Pond No. 4 after regrading activities have been completed. The final cover system design will meet the intent of the CCR Rule such that the permeability shall be less than or equal to the permeability of the existing bottom liner or subsoils present below the CCR material, or a permeability no greater than $1x10^{-5}$ cm/sec, whichever is less. The requirement for the final cover system to be less permeable than the bottom layer allows water in the pore space of the CCR to drain into the foundation soils and not accumulate in the closed CCR impoundments. Ash Pond No. 4 is unlined and the subsoils are similar to subsoils below East Ash Pond No. 2 having a geometric mean permeability of 5.6×10^{-2} cm/sec based on field hydraulic conductivity tests performed on the underlying sand and gravel units. The final cover for the Ash Pond No. 4 will have a compacted soil barrier layer that is a minimum of 18 inches of earthen material with a maximum permeability of $1x10^{-5}$ cm/sec and a vegetative layer that is a minimum of 6 inches of earthen material capable of sustaining native plant growth. The final cover system achieves the requirements of the low permeability layer to limit accumulation of water in the CCR impoundment and meets the requirements in 40 CFR 257.102(d). Details of the final cover system are on Drawing 6.

2.2.2 Final Slope Design

The final cover will have a slope of 2% draining from the east to the west, and will convey stormwater runoff as sheet flow to the adjacent former sand and gravel pit to the west.

Grading plans for the Top of CCR and Top of Final Cover are provided on Drawings 4 and 6. The key design elements, including cover permeability and final cover slopes, will control the post-closure infiltration into the CCR material left in-place and preclude the probability of future impoundment of water at the unit.

2.2.3 Summary of Stability and Settlement Evaluations

The stability analysis evaluates an east-west section of Ash Pond No. 4 which includes the slope between the impoundment and the former sand and gravel pit to the west. The settlement analysis evaluated the lateral extent of the Ash Pond No. 4 and final cover system. The stability and settlement analysis incorporated the same soil and CCR strength and consolidation results used for the East Ash Pond No. 2 stability and settlement analysis since the in-situ soils and CCR materials can be assumed to be generally the same based on the proximity of the impoundment to each other and the CCR materials being generated from the same site. The parameters are presented in Appendix F of the Closure Plan (CEC, 2018). Appendix F-1 (Closure Plan, CEC 2018) includes a summary of geotechnical data including a test boring location plan, and relevant test boring logs and laboratory testing results. The analyses presented in Appendix C of this Addendum include slope stability and settlement. Based on the results of these analyses and similar conditions to Ash Pond No. 2, the proposed final cover system for Ash Pond No. 4 will be stable and will allow for positive drainage after settlement has occurred.

2.3 PROPOSED TIMELINE FOR IMPLEMENTATION AND COMPLETION OF PROPOSED CLOSURE ACTIVITIES

Closure of Ash Pond No. 4 will be completed no later than November 18, 2020. Closure may commence following IEPA approval of this closure plan and in receipt of applicable permits for closure construction activities. Closure activities began in 2018. The construction schedule includes time for planning and permitting and for construction activities such as: mobilization of contractors and setup of construction support facilities, installation of stormwater management system, site maintenance during construction activities, and seasonal shutdowns and demobilization of contractors and construction support personnel.

Estimated timing for major activity phases during each remaining year are as follows:

2018 through 2020

- Begin construction activities including regrading the existing CCR
- Complete construction of stormwater management system
- Complete construction of final cover system
- Establish final cover vegetation
- Perform regulatory compliance follow-up with state agency

2.4 DESCRIPTION OF THE CONSTRUCTION QUALITY ASSURANCE PROGRAM FOR PROPOSED CLOSURE ACTIVITIES

The Construction Quality Assurance (CQA) Plan describes the CQA program for the closure of Ash Pond No. 4. The CQA Plan contains procedures for inspecting, monitoring, testing, and sampling to confirm compliance with the project plans and specifications. The final cover system for Ash Pond No. 4 is identical to the final cover system for East Ash Pond No. 2, therefore, the site-specific CQA Plan presented in Appendix G of the Closure Plan (CEC, 2018) will be maintained for the Ash Pond No. 4 closure construction.

Key elements of the CQA Plan include:

- Establishment of several key project personnel roles and responsibilities, including a CQA consultant to serve as an on-site representative, to perform field tests and provide written documentation that the final cover system is constructed in accordance with the applicable plans and specifications. The CQA consultant team will include a CQA Officer who is an Illinois-licensed Professional Engineer and who will supervise inspections and testing, certify on-site activities, and review and approve weekly construction reports.
- Regularly scheduled safety and construction progress meetings.
- Standards and inspection and testing procedures for the following materials: final cover soils, aggregates, geosynthetics, concrete and grout.
- Specifications for surveying to document that thickness and grade tolerances of construction components are in accordance with plans and specifications.
- Compilation of project documentation including plans, specifications, schedules, and inspection and testing logs in weekly summary reports certified by the CQA Officer. Additional progress reports at regular intervals are detailed in the CQA Plan.

2.5 PROFESSIONAL CERTIFICATION AND SEAL

CCR Unit: Dynegy Midwest Generation, LLC; Hennepin Power Station; Ash Pond No. 4

I, Dean Jones, PE, being a Registered Professional Engineer in good standing in the State of Illinois, do hereby certify, to the best of my knowledge, information, and belief, that the information contained in Sections 2.1-2.4, and Appendices A, B, and C of this Closure Plan Addendum dated October 25, 2018 has been prepared in accordance with the accepted practice of engineering.

Maurice Dean Jones Jr.
PRINTED NAME

October 24, 2018
DATE

PROFESSIONAL SEAL

2.6 POST-CLOSURE CARE PLAN

Following closure of Ash Pond No. 4, post-closure care will be performed according to the Closure Plan (CEC, 2018) and this Addendum. The closed impoundment will be monitored and maintained for a post-closure period that is anticipated to continue for 30 years. The post-closure period may extend beyond 30 years if additional groundwater monitoring is required to assess groundwater quality as compared to background levels.

2.6.1 Description of Post-Closure Care Activities

Throughout the post-closure care period, periodic (typically annual) visual inspections of the final cover system for evidence of settlement, subsidence, erosion, or other damage that may affect the integrity of the final cover system will be performed. Noted damage will be repaired to maintain the effectiveness of the final cover system. Repair activities may include, but are not limited to replacing cover soil and repairing areas that have been eroded, filling in depressions with soil, and reseeding areas of failed vegetation.

Groundwater samples will be collected and analyzed for inorganic chemical parameters that are indicator constituents for CCR leachate. In addition, each groundwater sampling event will measure field parameters and groundwater levels. The proposed groundwater monitoring plan, provided as Appendix D of this Addendum, will monitor and evaluate groundwater quality to demonstrate compliance with the Class I groundwater quality standards.

The end of the post-closure period will be documented in accordance with the CCR Rule, although not required for Ash Pond No. 4. Post-closure documentation will be maintained for at least five years.

2.6.2 Description of the Planned Use of the Property during the Post-Closure Care Period

Following closure, a notation will be recorded on the deed to the property or on some instrument that is normally examined during a title search to identify that the land has been used as a CCR impoundment. The notation will provide notice that use of the land is restricted to activities that will not disturb the integrity of the final cover system or groundwater monitoring system.

Activity on and around the final cover for the closed impoundment will include ongoing post-closure inspection, maintenance and monitoring activities. Planned post-closure use of the property will not disturb or damage the integrity of the final cover system or groundwater monitoring system.

2.6.3 Stormwater Management

The key design elements of the stormwater management system, including cover permeability, final cover slope and drainage by sheet flow will minimize post-closure infiltration of liquids into the CCR left in-place and will preclude the probability of future impoundment of water at the impoundment. Erosion and sediment control measures will be integrated with regrading the CCR surface and placement of the final cover system to promote positive surface drainage and minimize erosion.

Stormwater from the final cover system will drain as sheet flow to the former sand and gravel pit to the west. No additional stormwater control measures are required for Ash Pond No. 4.

2.6.4 Professional Certification and Seal

CCR Unit: Dynegy Midwest Generation, LLC; Hennepin Power Station; Ash Pond No. 4

I, Dean Jones, PE, being a Registered Professional Engineer in good standing in the State of Illinois, do hereby certify, to the best of my knowledge, information, and belief, that the information contained in this Post-Closure Care Plan (Section 2.6 of this Closure Plan Addendum) dated October 25, 2018 has been prepared in accordance with the accepted practice of engineering.

Maurice Dean Jones, Jr.
PRINTED NAME

October 25, 2018
DATE

PROFESSIONAL SEAL

3 HYDROGEOLOGIC CHARACTERIZATION

The proximity of Ash Pond No. 4 to Ash Pond No. 2 results in consistent hydrogeologic conditions in the area of both ponds. Therefore, existing conditions beneath Ash Pond No. 4 are summarized in this section. In addition, much of the analysis completed during the evaluation for closure of Ash Pond No. 2 is applicable to the closure evaluation for Ash Pond No. 4. Where appropriate information is referenced to the Closure Plan (CEC, 2018) or included in this Closure Plan Addendum.

3.1 BEDROCK – REGIONAL AND LOCAL

Details on the occurrence and characteristics of bedrock were provided in the Closure Plan (CEC, 2018). A brief description of bedrock in the area near Ash Pond No. 4 is as follows:

- Bedrock below Ash Pond is composed of the Pennsylvanian-age Carbondale Formation which defines the base of the unlithified deposits (and uppermost aquifer) underlying the East Ash Pond System and is regarded as the first confining unit beneath the uppermost aquifer. Water-bearing openings are extremely variable from place to place and are best developed near the surface in thin limestones and sandstones, when present within the predominantly shale formation.
- Water well logs at the power plant indicate shale bedrock at an elevation of roughly 350. Near the Hennepin Power Station, the Pennsylvanian rock has an estimated thickness of approximately 300 to 400 feet.

3.2 UNLITHIFIED DEPOSITS – SITE SPECIFIC

A detailed description of the unlithified deposits was included in the Closure Plan (CEC, 2018), a summary and details specific to unlithified deposits below Ash Pond No. 4 is included below. The stratigraphy within and immediately surrounding the Site consists of fill, unlithified river alluvium, and Pleistocene-age glacial outwash deposits overlying Pennsylvanian-age shale bedrock. Surficial soils encountered at most boring locations at the site are coal ash fill and man-made berms constructed of a variety of locally available materials, primarily sand, gravel, and coal ash.

Ash Pond No. 4 has a surface elevation ranging from 480-485 feet. Test pits completed in August 2018, as documented in Appendix C, defined the lateral extent of ash in Ash Pond No. 4 and indicated that ash (mostly bottom ash) is present at a depth of 20 feet. Geologic cross-sections across of the study area are shown on Figure 2. Ash Pond No. 4 is located over the original upper terrace adjacent to the Illinois River. The original lower terrace which lies between Ash Pond No. 4 and the Illinois River and includes Ash Pond No. 2 is approximately 10 to 20 feet above normal river level of 441 feet (see Figure 2; Cross-section D-D').

There are two hydrogeologic units present at the site: alluvium and Henry Formation sands and gravels. The river is immediately adjacent to the lower terrace, east of the site, and there is minimal alluvium between Ash Pond No. 2 and the river. Ash Pond No. 4 lies adjacent (west) to Ash Pond No. 2 and approximately 850 feet from the Illinois River. The highly permeable Henry Formation sands and gravels are the Uppermost Aquifer and are present in the upper and lower terraces, and fill the valley beneath the alluvium. The sand and gravels of the two terraces are indistinguishable, consisting of a heterogeneous mixture of silty-sandy gravel, with cobble zones and with boulders up to several feet in diameter. The Henry formation is more than 100 feet thick in the river valley and at least 130 feet thick on the upper terrace. This uppermost aquifer extends about 7,000 feet upgradient from the site to the south where clay-rich glacial till is encountered.

3.3 SUMMARY OF GROUNDWATER CONDITIONS

3.3.1 Groundwater Flow

Under normal conditions at the Site, groundwater flows from south to north discharging into the Illinois River as shown on Figure 3. River stage during high precipitation and/or flood events seasonally rises above adjacent groundwater elevations and groundwater gradients will temporarily reverse in response to the river and results in the river temporarily recharging the aquifer.

Horizontal hydraulic gradients are moderate (0.002 to 0.004) south of Ash Pond No. 4, the East Ash Pond and Polishing Pond. The horizontal gradient becomes virtually flat beneath Ash Pond No. 4, the East Ash Pond and Polishing Pond as well as Ash Pond No. 2 and steepens near the river. The flattening of the horizontal gradient is attributed to the highly permeable sand and gravel that runs continuously along the terraces adjacent to the Illinois River.

Vertical hydraulic gradients calculated at nested well locations in upgradient well nest 08/08D were consistently flat or moderately upward at about 0.01. Historical gradients measured in well nest 10/11 are variable, but generally flat to slightly upward. Well nests adjacent to the river (18S/18D and 19S/19D) were inconsistent (0.01 downward to 0.007 upward) and showed no correlation with the Illinois River recharging the aquifer or receiving groundwater discharge. Based on these observations and the physical characteristics of the uppermost aquifer, vertical groundwater gradients do not appreciably affect the horizontal migration of dissolved constituents.

Per Illinois Administrative Code (IAC) Title 35, Section 620.210, groundwater within the Uppermost Aquifer at the East Ash Pond System (including Ash Pond No. 4) meets the definition of a Class I, Potable Resource Groundwater based on the following criteria:

- Groundwater in the uppermost aquifer extends 10 feet or more below the land surface
- Hydraulic conductivity exceeds the 1 x 10^{-4} cm/s criterion (see Table 4, Closure Plan (CEC, 2018))

3.3.2 Summary of Pre-Closure Groundwater Conditions

Groundwater samples collected quarterly for CCR indicators indicate that there are no exceedances of Class I Groundwater Standards directly downgradient of Ash Pond No. 4 (wells, 10/11), which indicates that the ash pond does not significantly impact groundwater in its existing uncovered condition. However, as discussed in the Closure Plan (CEC, 2018) for Ash Pond No. 2, parameters have been detected at concentrations exceeding the Class I groundwater quality standards including boron, iron, manganese, nitrate, and pH in the four monitoring wells downgradient from East Ash Pond No. 2. The exceedances of Class I groundwater quality standards for iron, manganese, nitrate, and pH are attributable to either naturally occurring geochemical variability or non-CCR sources, as demonstrated by analytical data obtained from background groundwater samples from upgradient wells. The only Class I exceedances attributable to East Ash Pond No. 2 and potentially Ash Pond No. 4 are for the principal CCR indicator parameter boron.

3.4 SURFACE WATER HYDROLOGY

As discussed in the Closure Plan (CEC, 2018), the predominant surface water body in the region is the Illinois River and associated lowland backwater lakes. The Illinois River is located directly adjacent to and down-gradient from the East Ash Pond System. A United States Geological Survey (USGS) stream gage (#05558300) for the Illinois River at Henry, Illinois is located 15 river miles south (downstream) of the Hennepin Power Station. The gage height of 15 feet, representing approximate base flow, occurs at elevation of about 441. These elevations appear to be within about 1 foot of the elevations taken at the Hennepin Power Station crib house.

Calculations completed and provided in the Closure Plan (CEC, 2018) indicate that groundwater discharge and associated boron concentrations from Ash Pond No. 2, (which by default includes upgradient Ash Pond No. 4) do not significantly impact water quality in the Illinois River.

3.5 WATER WELL SURVEY

A comprehensive water well survey was conducted by Natural Resource Technology, Inc. (NRT) and Kelron (2009a) for a 2,500-foot radius around the entire Hennepin Power Station property boundary, inclusive of the East Ash Pond System was included in the Closure Plan (CEC, 2018). Results identified nine wells located outside of the Hennepin Power Station property boundary within 2,500 feet of the East Ash Pond System.

Within the plant property boundary, there are four wells owned by DMG, all of which are non-potable and non-contact industrial wells. One well is used exclusively for irrigation of the coal pile.

Kelron/NRT (2009b) performed an assessment of the potential for impact to water supply wells identified in the water well survey within 2,500 of the Hennepin Power Station property boundary. The assessment concluded there are no existing off-site water wells, potable or non-potable, that are likely to be impacted by groundwater from the HPS property.

4 GROUNDWATER FLOW AND TRANSPORT MODEL

4.1 INTRODUCTION

The entire East Ash Pond System was included in groundwater flow and transport models completed for the closure of Ash Pond No. 2, as presented in detail in Appendix D (Groundwater Model Report) of the Closure Plan (CEC, 2018). The model inputs used for recharge through the ash units were determined using the Hydrologic Evaluation of Landfill Performance (HELP) model, and this modeling was documented in Appendix C (Hydrostatic Modeling Report) of the Closure Plan (CEC, 2018). The groundwater model included the known uncovered conditions at Ash Pond No. 4, and well 10 immediately downgradient of Ash Pond No. 4 was included as a calibration target for the model. The proposed closure scenario for Ash Pond No. 4 (capping in place), was not included in the prediction modeling, but the results indicated that concentrations complied with groundwater quality standards downgradient of Ash Pond No. 4 and Ash Pond No. 2 in 2 years. Based on these results, leachate from Ash Pond No. 4 does not significantly contribute to groundwater impacts (concentrations in well 10 also support this conclusion). Therefore, revision to the model is not needed because capping of Ash Pond No. 4 will not significantly alter the timeframe to reach standards, and will improve groundwater quality related to Ash Pond No. 4.

This section contains a summary of the groundwater flow and transport model and the specific information used as input to represent Ash Pond No. 4 in the model.

4.2 CONCEPTUAL MODEL

The primary direction of groundwater flow is north, discharging into the Illinois River, a regional groundwater sink. There are three sources of water: natural recharge within the model domain, leachate seepage from the East Ash Pond System, and groundwater flow from the south. Due to the presence of clay-rich glacial till to the south, groundwater flow from the south primarily originates as recharge on the sand and gravel deposits.

Ash Ponds No. 2 and No. 4 are underlain by a highly permeable sand and gravel aquifer (Henry Formation). Leachate released from the ponds infiltrates vertically to the sand and gravel, and then flows horizontally with groundwater toward the north and the Illinois River.

Ash fill is modeled as unsaturated throughout the modeling duration to capture the pond condition during normal flow conditions. Boron was modeled because it is a primary indicator of coal ash leachate, exceeds the Groundwater Class I standard (2 mg/L), is mobile in groundwater, and is more representative of coal ash leachate than sulfate, which may originate from other anthropogenic or natural sources. The boron mass is discharged at the model representation of the Illinois River. The conceptual transport model assumes that boron concentration in leachate does not vary as a function of time, although the volume of leachate decreases over time as a function of pond dewatering and capping.

4.3 MODEL RESULTS

The model set-up and inputs were discussed in detail in the Closure Plan (CEC, 2018). Ash Pond No. 4 was included in the model in its known condition. Without the proposed capping of Ash Pond No. 4 (specified in this Addendum), recharge through ash would contribute to the existing boron concentrations and groundwater impacts observed in monitoring wells downgradient of Ash Ponds No. 2 and No. 4.

4.3.1 Calibration Flow and Transport Results

Results of the MODFLOW/MT3DMS modeling are summarized below. A CD containing the model files was included in the Closure Plan (CEC, 2018).

Modeled versus observed groundwater heads for the period 1996 through 2016 at Site wells 02, 03R, 04R, 05R, 06, 07, 08, **10**, **11**, 12, 13, 15, 16, 17, 18S, 18D, 19S, 19D, and 40S fall within the range of observed values. The hydraulic model was calibrated based on the comparison between simulated and monitoring data collected throughout the entire simulation period (~20 years) instead of a single point. The consistency between modeled and observed heads indicated that the model provides a reasonable simulation of the effects of the East Ash Pond System on groundwater flow.

The simulated boron concentrations generally match the observed concentrations as outlined in Appendix D of the Closure Plan (CEC, 2018). The model successfully simulated the decreasing trends of boron concentrations after Ash Pond No. 2 was removed from service, and captured the boron levels at wells surrounding Ash Pond No. 2 and Ash Pond No. 4, including 06, 03R, 18S/18D, 05R/05DR, **10**, 12, 13 and 40S (Figure 4). The agreement between modeled and predicted concentrations demonstrates the validity of the transport model for prediction of contaminant transport in groundwater at the East Ash Pond System.

4.3.2 Model Prediction

As stated in the previous sections, the prediction model was extended 20 years following the cap completion (2018 to 2038) to evaluate boron concentrations in groundwater under a baseline (no action) scenario and the closure configuration (capping of East Ash Pond No. 2, no cap on Ash Pond No. 4). The short duration was chosen because the time was sufficient to show the effect of the capping system. The predicted boron concentrations under the two scenarios are compared in Figure 5. As stated previously, capping of Ash Pond No. 4 was not included in the modeling, however, results indicated significant improvement in groundwater quality, and it is expected that the proposed closure for Ash Pond No. 4 will further positively impact groundwater quality.

4.3.2.1 Baseline

As further detailed in Appendix D of the Closure Plan (CEC, 2018), under the baseline scenario, it was assumed that no action was taken to cover or remove existing ash in Ash Pond No. 2 and No. 4. Both hydraulic head and boron concentrations were predicted to remain stable and the boron concentration at well 18S remains at a constant level above the Illinois Class I groundwater protection standard (2 mg/L) during the modeled duration. The predicted boron plume, where it exceeds the Illinois Class I groundwater protection standard, remains 20 years after cap completion. The boron plume is predicted to extend north beneath the Illinois River in the proximity of well 18S. No further reduction is expected with time.

4.3.2.2 Capping Scenario

As further detailed in the Closure Plan (CEC, 2018), under the capping scenario, it was assumed that all of Ash Pond No. 2 to the west of the current Landfill (i.e., Phase I) would be capped in place with a clay cover that is predicted to yield a percolation rate of 5.9 inch/yr (Appendix C, Closure Plan (CEC, 2018). Ash Pond No. 4 was assumed to have no cap, however completing closure of Ash Pond No. 4 as proposed in this Addendum will provide additional benefit and will not increase the amount of time to reach groundwater standards.

Comparing the baseline to the capping option, reduction in boron concentrations is predicted in monitoring wells downgradient of Ash Pond No. 2 and Ash Pond No. 4 (Figure 5). Well 18S would reach a boron concentration of 1.5 mg/L, which is less than the Class I Standard of 2 mg/L, in two years following cap completion at Ash Pond No. 2. Only a minimal drop in hydraulic head is observed at monitoring wells after the cap is in place because the decreased percolation rate within the capped impoundment is not significant relative to precipitation over the entire model domain. It is not expected that additional capping of Ash Pond No. 4 will reduce hydraulic heads because the footprint of the capped area of Ash Pond No. 4 is relatively small (5 ac. vs. 18 ac. In Ash Pond No. 2).

As shown in Figure 6 (2-year plume) and Figure 7 (20-year plume), the footprint of the plume under the capping scenario diminished and groundwater impacts beneath Ash Pond No. 2 and downgradient of Ash Pond No. 4 are attenuated within two years, while the plume in the baseline scenario remains unchanged through Year 20. Groundwater protection standards are predicted to be met in monitoring wells downgradient of Ash Pond No. 2 and No. 4 within two years after capping of Ash Pond No.2. Capping of Ash Pond No. 4 will offer improvement to this condition.

4.4 SUMMARY OF MODELED POST-CLOSURE GROUNDWATER CONDITIONS

As summarized in 4.3.2.2, the footprint of the plume under the Ash Pond No. 2 capping scenario was reduced and groundwater impacts downgradient of Ash Pond No. 2 and by default, downgradient of Ash Pond No. 4 are attenuated (below 2mg/L) within two years without capping of Ash Pond No. 4, while the plume in the baseline scenario remains unchanged through Year 20. Groundwater protection standards, specifically boron concentrations, are predicted to be met in monitoring wells downgradient of Ash Pond No. 2 and No. 4 within two years following completion of capping activities. The proposed capping of Ash Pond No. 4 provides only improvement to the modeled conditions.

5 GROUNDWATER MONITORING PLAN

A Groundwater Monitoring Plan for Ash Pond No. 2 was submitted as Appendix B of the Closure Plan (CEC, 2018). Ash Pond No. 4, because it is immediately upgradient, and hydrogeologic conditions are almost identical to Ash Pond No. 2, will utilize the same monitoring plan proposed for Ash Pond No. 2. Based on comments received from IEPA on the ***Closure and Post-Closure Care Plan for the Hennepin Old West Ash Pond System at Hennepin Power Station*** (Geosyntec, 2017), the Groundwater Monitoring Plan has been updated to include calculation of the background statistics. The updated Groundwater Monitoring Plan is included in Appendix C of the Addendum. This Plan replaces the Monitoring Plan that was included in the Closure Plan (CEC, 2018) and upon approval of the Closure Plan and this Addendum will become the monitoring program for both Ash Ponds No. 2 and No. 4.

6 GROUNDWATER MANAGEMENT ZONE APPLICATION

As indicated in this Addendum, Ash Pond No. 2 and No. 4 were originally incorporated into a Groundwater Management Zone following the Order Modifying Consent Decree dated January 3, 1996. The Groundwater Management Zone (GMZ) Application submitted as Appendix E of the Closure Plan (CEC, 2018) included the extents of the GMZ originally approved with the Modified Closure Work Plan and therefore included Ash Pond No. 4. However, only references to Ash Pond No. 2 were included in the GMZ Application Form submitted with the Closure Plan (CEC, 2018). An updated application form and figures for the GMZ is included in Appendix E of this Addendum to include references to Ash Pond No. 4, where appropriate.

7 LICENSESED PROFESSIONAL ACKNOWLEDGEMENTS

The geological work within this Addendum, excluding Section 2 and Appendices A, B, and C, has been prepared under my personal supervision and has been prepared and administered in accordance with the standards of reasonable professional skill and diligence.

Stuart J. Cravens, PG Technical Director - Hydrogeology O'Brien and Gere Engineers, Inc. 2422 E. Washington Street, Suite 104 Bloomington, Illinois 61704 217-390-1503 Registration No. 196000108	Seal:  Expires: 03/31/2019
Signature	October 25, 2018 Date

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