UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

VIA EMAIL
DELIVERY RECEIPT REQUESTED

Ex. 43

Patrick Becker
Environmental Health and Safety Manager
Regulatory Affairs
City Water, Light, and Power
801 E. Monroe, 4th Floor
Springfield, Illinois 62701
pj.becker@cwlp.com

Re: **Notice of Violations**
City Water, Light, and Power - Dallman and Lakeside Ash Ponds
Facility ID: ILD000665968

Dear Mr. Becker:

The purpose of this letter is to inform City Water, Light, and Power (CWLP) that the United States Environmental Protection Agency, Region V (EPA) has determined that CWLP is in violation of the requirements of 40 C.F.R. Part 257, Subpart D.

CWLP, as the owner and operator of Coal Combustion Residual (CCR) landfill and surface impoundment units at its facility located at 3100 Stevenson Drive, Springfield, Illinois (Facility), is subject to the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. § 6907, et seq., and the regulations promulgated thereunder, 40 C.F.R. Part 257, Subpart D – Standards for the Disposal of CCR in Landfills and Surface Impoundments.

Based on the EPA's review of the information available to it, including but not limited to, information posted by CWLP to its publicly accessible internet site entitled *CCR Rule Compliance Data and Information,* ("federal CCR website"); information submitted by CWLP on July 5, 2022, in response to EPA's May 2, 2022 and August 2, 2022, Requests for Information, and information gathered during the April 27, 2022, inspection of the Facility conducted by EPA and CTI & Associates, EPA has determined that CWLP has failed to comply with and is in violation of the requirements of 40 C.F.R. Part 257, Subpart D, as specifically alleged in Attachment A for the Dallman and Lakeside Ash Ponds.

According to Section 3008(a) of RCRA, EPA may issue an order assessing a civil penalty for any past or current violation, requiring compliance immediately or within a specified time period, or both. Although this letter is not such an order or a request for information under Section 3007 of RCRA, 42 U.S.C. § 6927, we request that you submit a response in writing to us no later than 45 days after receipt of this letter documenting the actions, if any, which you have taken or plan to

take to establish compliance with the requirements listed in Attachment A. You should submit your response to Andrea Dierich, at Dierich.andrea@epa.gov.

If you want to confer with us, you should contact Ms. Dierich within 10 calendar days after you receive this letter. Please be advised that this conference is not a settlement negotiation covered by Federal Rule of Evidence 408 and we may use any information you submit in support of an administrative, civil, or criminal action.

You should direct questions about this letter to Andrea Dierich, Dierich.andrea@epa.gov. Questions from legal counsel can be directed to Rich Clarizio, in EPA Region 5's Office of Regional Counsel, at (312) 886-0559 or Clarizio.Richard@epa.gov.

Sincerely,

MICHAEL HARRIS

Digitally signed by MICHAEL HARRIS
Date: 2023.10.04 13:27:43 -05'00'

Michael D. Harris
Division Director
Enforcement and Compliance Assurance Division

Attachments

cc: Paul Eisenbrandt, IEPA, (paul.eisenbrandt@illinois.gov)
Deborah Williams, CWLP (Deborah.williams@cwlp.com)

Attachment A
Notice of Violation
Lakeside and Dallman Ash Ponds
Closure and Corrective Measures Requirements

I. Background Information Closure Plans

City Water Light and Power (CWLP) proposes to close the Lakeside and Dallman Ash Ponds (also referred to as surface impoundments) by leaving coal combustion residue (CCR) wastes in place and placing a cover over those materials. Closure of the surface impoundments is a component of CWLP's proposed approach to meeting the groundwater protection standards (GWPS) and the corrective measures requirements of 40 C.F.R. § 257.90, *et seq.*

A. Summary of 2016 Closure Plan

The 2016 Closure Plan is posted on CWLP's federally required CCR website. Components of the closure plan consist of drainage and dewatering of the ash ponds, stabilization of CCR wastes, addition of fill and installation of a final cover system. CWLP indicates that free liquids will be removed from the ash ponds using the existing pumping structures which will direct the liquids to an existing clarification pond, located to the south of the Dallman Ash Pond. CWLP will then stabilize the CCR wastes within the impoundments by grading and compacting. Grading design plans and compaction specifications for CCR material stabilization are not included with the closure plan. CWLP indicates that these plans will be developed during the final engineering design and may include a minimum slope of one to two percent to promote surface drainage.

The plan states that structural fill may be added above the CCR material to provide sufficient slope for the final cover system. No further information is provided. The plan states that the preliminary design of the cover system will meet the requirements of 40 C.F.R. § 257.102(d)(3)(i). It states that a low permeability compacted soil layer of at least 18 inches with a maximum permeability of 1x10-5 cm/sec will be used. It states that an erosion layer of at least 6 inches of soil will be used. It estimates that the Lakeside Ash Pond will require a cover system of approximately 27.6 acres and the Dallman Ash Pond will require a cover system of approximately 34.5 acres. The plan does not contain any design plans, drawings or engineering reports.

The plan provides a general schedule spanning three seasons for completion of closure. In season 1, CWLP indicates that it will complete final engineering design; dewatering and removal of vegetation and initial grading and compaction of CCR materials. In season 2, CWLP will complete grading of CCR materials, add structural fill, as necessary, and construct the final cover system. In season 3, it will complete construction of the final cover system, if necessary. No other information is provided.

The plan states that closure is to commence no later than 30 days after the date on which the CCR unit receives the known final receipt of CCR or removes the final volume of CCR from the CCR unit for the purpose of beneficial use. If the final receipt of CCR is not known, then the closure process must still commence if the CCR unit has not received CCR material or has not had CCR material removed from it for a duration of two years, unless it can be demonstrated that the idle unit will resume to receive or remove CCR materials in the foreseeable future. There are no further details of the tasks involved or a schedule which includes dates for the initiation or completion of the closure activities contained in this plan. There is no update of this general statement to reflect changed conditions since 2016 such as CWLP's November 24, 2020, request for an alternate deadline for closure or its projected date of October 2023, for discontinued use of the impoundments.

B. Summary of 2022 Closure Plan

On July 5, 2022, CWLP provided EPA with a response (Response) to its May 4, 2022 request for information (RFI). CWLP's Response included a document entitled "Final Closure Plan for Coal Combustion Residual Surface Impoundments, February 2022" (2022 Closure Plan). CWLP stated that this document is the most recent version of the 2016 Closure Plan. This document was submitted to Illinois EPA as Attachment 13 to CWLP's February 1, 2022 Closure Construction Permit Application (CCPA) and is posted on CWLP's Illinois CCR website. The document has not been, as of the date of this letter, posted on the federally required CCR website and CWLP has indicated in other portions of its Response that it considers this a draft document. Therefore, as of the date of this letter, the 2016 Plan, and two annual progress reports for alternative closure (CWLP 2022 & CWLP 2023), each a single page in length, are the only documents that CWLP has provided in an effort to comply with the federal CCR rules. Nonetheless, EPA reviewed the 2022 Closure Plan and related documents submitted with the CCPA to determine if it corrected any of the deficiencies identified with the 2016 Closure Plan. Except as noted below, CWLP did not. Therefore, the 2022 Closure Plan does not correct the deficiencies in the 2016 Closure Plan and any finalization of the 2022 Closure Plan will need to address the deficiencies noted below.

The 2022 Closure Plan is essentially the same as the 2016 Closure Plan, except that the 2022 Closure Plan contains sections on final grading design and stormwater management not contained in the 2016 Closure Plan; provides different details related to the final cover; projects an increase in the estimated acreage of the cover from 27 acres to 35 acres for the Lakeside Ash Pond; states that the units will stop receiving CCR and non-CCR wastes in "late 2023" and that CWLP will initiate closure after approval of the Closure Construction Permit Application (CCPA) from Illinois EPA.

With its CCPA, CWLP submitted additional information (for example, about design and construction of the cover) that was not included in the 2016 Closure Plan. This additional information includes more detail about the engineering of the final cover system. The CCPA also includes documents about groundwater modeling and construction plans. EPA reviewed this information as it pertained to the 2022 Closure Plan.

In the grading design section of the 2022 Closure Plan, CWLP states that generalized grading design plans have been developed. Attachment 8 contains grading plans and generalized cross-sections for the final covers. However, the 2022 Closure Plan states that these most likely will be amended during final engineering design. It states that the final top slopes will include a minimum slope of 3-5 percent to promote surface drainage and the structural fill may be added above the CCR material to provide sufficient slope for the final cover system. It also states that it may add CCR and non-CCR material during grading as part of its attempt to attain proper final elevations. Adding CCR material to the impoundments after the date when the unit is required to stop receiving CCR wastes would not comply with the federal rules, which require the units to stop receiving CCR materials after October 15, 2023.

In the stormwater management plan, CWLP indicates that the post-closure infiltration of liquids into the waste will be minimized by directing stormwater through a system of drainage ditches which will be built between the inner slope of the outer berms of the impoundments and the outer slope of the final cover. Stormwater will exit the ditches through culverts and letdowns built into the outer berms and discharged into Sugar Creek. However, any stormwater which occurs in active construction areas where CCR may be in contact with the stormwater will be directed to the impoundment areas.

CWLP states that the final grade of CCR material and any fill that is used will be covered by a 40-mil geomembrane layer, a geocomposite drainage layer and 36 inches of uncompacted soil. It states that the geosynthetic layer will have a hydraulic conductivity of 1 x 10-7 cm/sec. No further information about the cover design is provided in the 2022 Closure Plan.

II. Potential Violations

A. Violation Applicable to 2016 Closure Plan.[1]

1. 40 C.F.R. § 257.102(b) and (d) - Closure plan fails to provide sufficient information consistent with reasonably good engineering practice.

40 C.F.R. § 257.102(b) requires the written closure plan to "…describe the steps necessary to close the CCR unit at any point during the active life of the CCR unit c*onsistent with recognized and generally accepted good engineering practices*. The written closure plan must include, at a minimum, the information specified in paragraphs (b)(1)(i) through (vi) of this section." If a closure plan allows for leaving CCR in place, then it must also include a description of the final cover system and how it will meet the performance standards specified in 40 C.F.R. § 257.102(d). As set forth in section B, below, the 2016 Closure Plan does not adequately address the requirements of 40 C.F.R. § 257.102(b) and (d) consistent with recognized and generally accepted good engineering practices.

B. Analysis of the deficiencies in the 2016 Closure Plan.

[1] Unless corrected, this violation would be applicable to the 2022 Closure Plan, if and when CWLP finalizes it for purposes of compliance with the federal CCR regulations.

1. 40 C.F.R. § 257.102(d)(1)(i) - Continued infiltration and release of CCR, leachate or contaminated run-off to ground or surface waters.

40 C.F.R. § 257.102(d)(1)(i) requires the owner or operator to ensure that the CCR unit is closed in a manner that ensures that it will control, minimize or eliminate, *to the maximum extent feasible, post-closure infiltration of liquids* into the waste and *releases of CCR*, leachate, or contaminated run-off to the *ground* or surface waters or to the atmosphere. For the reasons presented below neither the 2016 nor the 2022 Closure Plans adequately address this requirement.

a. Infiltration of groundwater into the CCR wastes left in-situ.

CCR wastes will be left in both impoundments and in contact with the saturated zone of the site groundwater. With no liner beneath the impoundments and no barriers to groundwater flow there exists the potential for groundwater to flow horizontally through the units and the CCR wastes. This in turn has the potential to continue the release of liquids and CCR waste constituents into the groundwater as a continual source of contamination.

The surface impoundments are unlined and located over a vacated creek bed with fill underneath ranging from cohesive soils characterized as silty clays, to granular fill characterized as poorly graded silty to clayey sands. CWLP's "Liner Status Report for Coal Combustion Residuals Surface Impoundments" (Andrews 2016c) states that "no composite liner or alternative composite liner as specified in 40 C.F.R. §§ 257.70(b) or (c)(1), was used to line either ash pond" and that "while the vertical hydraulic conductivity is generally low, soils were not compacted beneath the impoundments except for sections where the dikes of the Dallman Ash Pond were built atop the existing creek bed." The "Report on Hydrogeologic Investigation for Flue Gas Desulfurization" (Patrick Engineering 1993) notes that "based on the materials encountered in the creek channel it is apparent that the creek abandonment was not performed in an engineered fashion. The fill materials consist of both cohesive and granular soils. The cohesive soils are characterized as silty clays to organic silty clays which contain varying quantities from fine to medium grained sand. Wood fragments and other organics were typically encountered…" CWLP's "Structural Stability Assessment for Coal Combustion Residuals Surface Impoundments" (Andrews Engineering, October 2016) states that "no as-built construction documentation is available for the Lakeside Ash Pond. No construction plans are available for the original construction of the Lakeside Ash Pond. [And that] no as-built construction documentation is available for the Dallman Ash Pond."

The potentiometric surfaces (groundwater elevations) along the perimeter of the impoundments are largely above the base elevations of the two ash ponds and with a direct hydraulic connection with the water table. The base elevation (bottom) of the Dallman surface impoundment is between 522 and 527 feet above mean sea level (AMSL). See the cross-section in Appendix A of the History of Construction Report (Andrews 2016), which shows the base at about 522-523' AMSL and the conceptual cross-section included with the contaminant transport model shows the base of Dallman at 527' AMSL. The base of the Lakeside Ash Pond is shown at

approximately 535' AMSL in the cross-sections originally provided in the Hansen report (extending the embankments in 1987) and attached to subsequent slope stability analyses.

The potentiometric surface is in the range of 550’ to 565’ AMSL with a steadily sloping potentiometric surface from the direction of Lake Springfield. For the Lakeside ash pond the water level in upgradient well AP-5 ranges from 563.34’ to 573.78’ AMSL. The closest upgradient well/piezometer to the Dallman Ash Pond is G110, located southeast of the Dallman Ash Pond and adjacent to the clarification pond. Here, groundwater elevations ranged from approximately 530’ to 533’AMSL in 2021, according to the potentiometric maps included with the 2021 Hydrogeologic Report (Andrews 2021c).

Lake Springfield bounds the Lakside Ash Pond and will likely be maintained at its current average lake level of approximately 560’ AMSL. The Dallman Ash Pond is directly downgradient of the clarification pond, and there is no indication in the closure documentation that the clarification pond will be drained. The continued effects of these bounding waterbodies will likely limit the effect that the proposed final cover system will have on groundwater elevation below the footprints of the Lakeside and Dallman Ash Ponds.

Although some mounding is apparent at the Dallman Ash Pond, the water table across much of both units is likely driven by the surface water elevation at the adjacent clarification pond. The closure plans and permit application documents do not confirm whether the clarification pond will be drained as part of a corrective action or closure process. In fact, the closure process notes in Section 2.1 that “free liquids will be removed from the ash ponds by utilizing existing pumping structures that will remove the liquids to an existing clarification pond” (Andrews 2016a); therefore, it may be assumed that the deeper layers of the Dallman Ash Pond materials are likely to remain saturated.

Boring logs from the Lakeside Ash Pond in an engineering report for proposed embankment modifications (Hanson 1987), which was submitted as Attachment 2 of the CCPA (Andrews 2022c) were reviewed. Borehole observations (Log B-1) indicate wet fly ash deposits approximately 20 feet above the Lakeside Ash Pond (535’ AMSL) and fill materials that were moist to wet, beginning at a depth of 5 feet below ground surface (bgs) and becoming wet at a depth of 14 feet bgs. The upper moist-to-wet interval corresponds to an elevation of 552.6’ AMSL. Borehole Log B-4, which was advanced through the west embankment of the Lakeside Ash Pond, indicated black fly ash from a depth of 15 feet to 17 feet bgs, sandwiched between layers of wet fill material. The top of this fly ash layer corresponds to an elevation of 553.3’ AMSL. Wet fly ash is approximately 8’ above the top of the base and 21’ below the normal pool elevation.

b. Continued infiltration of water through the cover.

As discussed more fully below, the proposed cover will reduce, but not eliminate, rainfall infiltration. The 2016 Closure Plan states that the two units will be capped with 18 inches of compacted clay with a hydraulic conductivity of 1x10-5 cm/s, meeting the infiltration requirements of 40 C.F.R. § 257.102(d)(3)(i). The 2022 CCPA shows a 40-mil-thick LLDPE liner overlain by

a geocomposite drainage layer 36 inches of soil that meets the minimum requirements of 40 C.F.R. § 257.102(d)(3)(i) (at least immediately following construction). In general, both of these proposed caps may meet the requirements of 40 C.F.R. § 257.102(d)(3), but the construction drawings and other information provided in the CCPA lack sufficient detail regarding the construction of a cap. In order to assess the future potential for releases from the units it is necessary to ascertain the contribution of liquids into the units. This should entail an examination of both the horizontal and lateral contributions of water into and through the units. Typically, this would include a determination or calculation of the amount of water that will infiltrate through the cover in addition to the amount of liquids moving laterally through the units. Finally, the cover does not appear to consider the possibility of a 1,000-year flood event. As discussed in the November 28, 2022, Notice of Violation, CWLP should have classified the impoundments as having a significant hazard potential which requires consideration of the 1,000-year flood event. It is not clear how the design of the cover would impact the cover design, infiltration of water into the units and releases of contaminated groundwater from the units.

2. 40 C.F.R. § 257.102(d)(1)(ii) - Impoundment of waters.

The owner or operator of a CCR unit "must ensure that, at a minimum, the CCR unit is closed in a manner that will preclude the probability of future impoundment of water, sediment, or slurry." The 2016 Closure Plan does not address how the cap will retard infiltration of precipitation into the capped CCR. It does not address how CWLP will prevent groundwater flow from impacting and flowing through the bases of the impoundment, which may be temporarily held within the unit. Therefore, CWLP has not adequately addressed this requirement.

3. 40 C.F.R. § 257.102(d)(1)(iii) – Prevention of sloughing or movement of the cover.

The owner or operator of a CCR unit must ensure that "at a minimum the CCR unit is closed in a manner that will include measures that provide for major slope stability to prevent sloughing or movement of the final cover system during the closure and post-closure care period."

CWLP has not provided sufficient information in either the 2016 or 2022 Closure Plans to demonstrate that there will not be sloughing or movement of the final cover system. Additionally, as discussed below, the available data from other sources not included in the Closure Plans is insufficient to support that there may not be sloughing or movement of the final cover system.

The following were reviewed: CWLP's structural stability analyses as documented in the structural stability assessment for CCR surface impoundments (Andrews 2016e and 2021f); the initial hazard potential assessment reports for CCR surface impoundments (Andrews 2016g and 2021d); and CTI and Associates, Inc. (CTI) "Final Structural Stability Assessment Review," September 2022. Based on a review of these documents there is insufficient information to document the structural stability of the dike berms or underlying soils of the surface impoundment. Furthermore, CWLP has not addressed the impact of a 1,000-year flood on the performance of the cover system. These factors could have an impact on the potential sloughing or movement of the cover. EPA identified issues related to the integrity of the berms and underlying soils in its November 28, 2022, NOV under EPA's analysis of the CWLPs Initial and Periodic Hazard Potential Classification (40 C.F.R. § 257.73(a)(2), Structural Stability Assessment (40 C.F.R. § 257.73(d) and Safety Factor

Assessment (40 C.F.R. § 257.73(e). The problems identified in that review, as they relate to the performance and reliability of a cover should be addressed. Some of the issues are as follows:

1. There is not sufficient documentation that the berms were adequately compacted. *See*, 40 C.F.R. § 257.73(d)(1)(iii) which requires that dikes must be "mechanically compacted to a density sufficient to withstand the range of loading conditions in the CCR unit." There are no field compaction or soil density-testing data provided regarding construction of the ash ponds' berms. Furthermore, sand layers may be present below the impoundments and may be subject to liquefaction (CTI 2022).

2. There is not sufficient documentation related to the structural strength of the soils beneath the surface impoundments. There are no as-built drawings for either impoundment. The CWLP history of construction report (Andrews 2016b) notes that both impoundments were constructed on top of a non-engineered filling-in of Sugar Creek and that neither impoundment was constructed with liners or engineered bases. However, the only structural stability analysis for the surface impoundments is based on data derived from borings associated with the study of the adjacent landfill. There is no documentation supporting how the borings at the landfill would be an adequate representation of conditions at the ash ponds/impoundments.

   1987 and 2010 boring data (Hanson 1987; Professional Services, Inc. [PSI] 2010) were used as inputs to the stability analysis. This approach is questionable since the soil strengths of the impoundment bases and berms are not well understood. Furthermore, the soil strengths and the effects of saturated CCRs are not well evaluated or documented.

3. There is inadequate information to document that the impoundments were constructed and maintained in a manner which ensures that they have "adequate slope protection to protect against surface erosion, wave action, and adverse effects of sudden drawdown." *See*, 40 C.F.R. § 257.73(d)(1)(ii)). The CWLP structural stability assessment (Andrews 2016e) does not address the effects on structural stability of the surface impoundments due to a sudden drawdown. The CTI report (CTI 2022) notes that, while unlikely, a sudden drawdown of Sugar Creek or the adjacent lake is a possibility, and a drawdown evaluation is necessary to fully evaluate whether the impoundments are structurally sound.

4. There is inadequate information to on the impact of the 1,000-year flood event on the integrity of the cover and its potential for sloughing.

4. 40 C.F.R. § 257.102(d)(1)(iv) - Minimize maintenance.

The owner or operator of a CCR unit must ensure that, at a minimum, the CCR unit is closed in a manner that will minimize the need for further maintenance of the CCR unit. In both the 2016 and 2022 Closure/Post-Closure Plans there is a general commitment to conduct maintenance for a period of thirty years in the form of regular visual inspections and repair of erosion. However, the plans do not address the impact of CCR waste that will be left in place in contact with groundwater; the continued infiltration of groundwater; nor the potential for slope stability concerns. Consequently, the plans provide insufficient documentation to predict the level of maintenance that will be required following installation of the proposed caps since the units may be subject to

significant erosion in the form of sloughing and/or leaving CCR waste in contact with groundwater. This may require continuous pumping or treatment to meet water quality standards. Therefore, it is difficult to assess if the closure plan "will minimize the need for further maintenance of the CCR unit."

5. 40 C.F.R. 257.102(b)(1)(vi), (d)(1)(v) and 102(f)(1) – Schedule for Implementation.

40 C.F.R. § 257.102(d)(1)(v) requires that when performing closure an owner or operator must ensure that it is to "be completed in the shortest amount of time consistent with recognized and generally accepted good engineering practices." 40 C.F.R. § 257.102(b)(1)(vi) requires a schedule for completing all activities necessary to satisfy the closure criteria in this section, including an estimate of the year in which all closure activities for the CCR unit will be completed. The schedule should provide sufficient information to describe the sequential steps that will be taken to close the CCR unit, including identification of major milestones such as coordinating with and obtaining necessary approvals and permits from other agencies, the dewatering and stabilization phases of CCR surface impoundment closure, or installation of the final cover system, and the estimated timeframes to complete each step or phase of CCR unit closure. 40 C.F.R. § 257.102(f)(1)(ii) requires completion of closure activities for existing and new CCR surface impoundments and any lateral expansion of a CCR surface impoundment, within five years of commencing closure activities.

The 2016 and 2022 Closure Plans do not indicate a date when CWLP will initiate closure. They state generally that CWLP will commence closure either when CWLP determines they will be inactive or within a certain amount of time after they receive the final volume of CCR waste. In the November 24, 2020 Request for Site-Specific Alternate Deadline to Initiate Closure, CWLP stated that initiation of closure could commence after it completed the retirement of Units 31-33 and relocation of CWLP drinking water purification plant lime sludge ponds, which were then located on the Lakeside Ash Pond. In Appendix B of the November 24, 2020 letter, CWLP estimated that the new lime pond start-up would be completed by October 13, 2023, implying that closure would commence at that time or shortly thereafter. The 2022 Closure Plan does not include this date as a possible start-up date but instead states that it estimates the date may be sometime in "late 2023."

Neither of the plans provide a schedule which identifies major milestones such as coordinating with and obtaining necessary approvals and permits from other agencies, the dewatering and stabilization phases of CCR surface impoundment closure, or installation of the final cover system nor the estimated timeframes to complete each step or phase of CCR unit closure.

Instead, they both contain the following generalized outline:

Season 1 – Initiation of the closure process, including:
- Final engineering design
- Dewatering of CCR materials
- Removal of existing vegetation
- Initial grading and compaction of CCR materials

Season 2 – Beginning one year after initiation of the closure process, and including:

- Completion of grading of CCR materials
- Addition and grading of structural fill, if necessary
- Construction of the final cover system

Season 3 – Beginning two years after initiation of the closure process:

- Complete construction of the final cover system, if necessary (Andrews 2022d)

Contrast this generalized schedule with the detailed schedule CWLP provided for design, construction and implementation of its lime sludge ponds and flue gas desulfurization (FGD) and wastewater treatment plant and landfill leachate project. *See*, Appendix A, November 24, 2020 letters. In summary, neither the 2016 or the 2022 Closure Plans contain detailed sequential steps or the information required by 40 C.F.R. § 257.102(b)(1)(vi). They do not provide sufficient information to determine if the closure will be completed within the time period required by 40 C.F.R. § 257.102(f)(1)(ii). Consequently, CWLP has not demonstrated that it will complete closure in the shortest amount of time as required by 40 C.F.R. § 257.102(d)(1)(v).

6. 40 C.F.R. § 257.102(d)(2)(i) - Elimination of free liquids.

40 C.F.R. § 257.102(d)(2)(i) states that, before a final cover system is placed, "free liquids must be eliminated by removing liquid wastes or solidifying the remaining wastes and waste residues." Free liquids are defined as liquids that readily separate from the solid portion of a waste under ambient temperature and pressure, regardless of whether the source of the liquids is from sluiced water or groundwater. *See*, 40 C.F.R. § 257.5. Section 2.1 of the 2016 Closure Plan states that "free liquids will be removed from the ash ponds by utilizing existing pumping structures that will remove liquids to an existing clarification pond." However, the plan lacks any details on the pumping structures or how CWLP will determine that free liquids have been removed from the impoundments. Also, proposed pumping is part of preconstruction dewatering, not a continuous hydraulic control measure. When dewatering ceases, regional groundwater will return and saturate CCR to the local water table elevation. Furthermore, the clarification pond borders the Dallman Ash Pond on the upgradient side. This waterbody represents a significant hydraulic head immediately adjacent to the Dallman Ash Pond and may sustain a higher water table, saturating additional CCR in the closed unit. CWLP has provided insufficient information to determine how free liquid elimination will be successful long-term.

7. 40 C.F.R. § 257.102(d)(2)(ii) - Waste Stabilization.

40 C.F.R. § 257.102(d)(2)(ii) states that, before a final cover system is placed, "remaining wastes must be stabilized sufficient to support the final cover system." The final closure plans state that "after free liquids and vegetation are removed from the ash ponds, CCR materials within the inactive ash ponds will be stabilized by grading and compacting to minimize the probability of future impoundment of water or sediment due to settlement." CWLP's closure plans do not address or demonstrate whether the CCR left in place will be stable in the long term. Typically recognized and generally accepted good engineering practices would include consideration of information regarding the depth of compaction, the compaction equipment proposed for use, geotechnical calculations, or geotechnical parameters to be tested. Because this information is not included in the plans they do not provide sufficient information to demonstrate compliance with 40 C.F.R. § 257.102(d)(2)(ii).

8. 40 C.F.R. § 257.102(d)(1) and (d)(3) - Final Cover System.

If CCR waste is left in the CCR unit then the owner or operator must meet the performance standards of 40 C.F.R. § 257.102(d)(1) and (d)(3). According to 40 C.F.R. § 257.102(d)(1) the owner of operator must, at a minimum, ensure the CCR unit is closed in a manner that will:

a. control, minimize or eliminate, to the maximum extent feasible, post-closure infiltration of liquids into the waste and releases of CCR, leachate, or contaminated run-off to the ground or surface waters or to the atmosphere;

b. Preclude the probability of future impoundment of water, sediment, or slurry;

c. Include measures that provide for major slope stability to prevent the sloughing or movement of the final cover system during the closure and post-closure care period;

d. Minimize the need for further maintenance of the CCR unit.

In addition, 40 C.F.R. § 257.102(d)(3)(i) requires that the final cover meets the following minimum performance standards:

- The permeability of the final cover system must be less than or equal to the permeability of any bottom-liner system or natural subsoils present or a permeability no greater than 1×10^{-5} centimeters per second (cm/s), whichever is less.
- The infiltration of liquids through the closed CCR unit must be minimized using an infiltration layer that contains a minimum of 18 inches of earthen material.
- The erosion of the final cover system must be minimized using an erosion layer that contains a minimum of 6 inches of earthen material that can sustain native plant growth.
- The disruption of the integrity of the final cover system must be minimized through a design that accommodates settling and subsidence.

The 2022 Closure Plan contains additional information on the final cover design and construction of the cover system which is not contained in the 2016 Closure Plan. This additional information, however, did not correct all problems with the 2016 Closure Plan. Consequently, unless otherwise noted, the deficiencies cited herein, are applicable to both the 2016 and the 2022 Closure Plans.

For both closure plans there is insufficient information provided to support that the proposed cover will meet the performance standards of 40 C.F.R. § 257.102(d). Construction details and supporting calculations are typically developed and included to ensure that the proposed cap is designed and constructed consistent with recognized and generally accepted good engineering practices. Without this information it is difficult to assess if the cover will meet the closure performance standards of 40 C.F.R. § 257.102(d) and consequently if the closure plan meets the requirements of 40 C.F.R. §§ 257.102(b) and (d). The following list identifies where supporting data or calculations are necessary to demonstrate the performance standards will be met:

- **Cap Profiles:** The closure plans state that additional fill and cap soil will be placed on both the Dallman and Lakeside Ash Ponds to provide a foundation layer for the cap and as part of the cap itself. This additional fill will create a surcharge load that could affect

slope stability. Previous slope stability evaluations prepared by CWLP did not account for this additional soil load. Consequently, data on cover material loads and stability calculations should be provided.

- **Slope Stability:** The geotechnical data used to prepare the slope stability calculations was limited (i.e., consisted of borings from the landfill and not from the berms for each impoundment) and therefore, may not be representative of the entire length of the berm. Slope stability calculations should be provided to demonstrate that the additional loading of site soil associated with placement of the final cover system will not reduce slope stability. Additionally, there is documented variability in berm construction (Hanson 1987), additional geotechnical borings along the berms should be advanced to ensure that geotechnical data are representative.

- **Cap Settlement and Drainage:** The additional fill placed on the Dallman and Lakeside Ash Ponds to construct the cap will cause consolidation of the underlying soils and the CCR wastes. Additional settlement of soil and CCR wastes may occur as pore water is squeezed from the CCR wastes. The proposed slopes for the caps are 3 percent to 5 percent, which exceeds the standard guidance for a Resource Conservation and Recovery Act (RCRA) cap of 2 percent to promote drainage and to reduce potential for infiltration. *See,* Technical Guidance for RCRA/CERCLA Final Covers. EPA 540-R-04-007 (EPA 2004). Additionally, settlement of the underlying soils could result in cover slopes below 2 percent. There should be calculations provided that address the potential settlement of CCR wastes and soils associated with final cover placement to show that the cover slopes will not be less than 2 percent after settlement.

- **Cap Vertical/Horizontal Design:** Cap plan view drawings and cross sections should show known vertical and horizontal extents of CCR wastes to demonstrate that the cap adequately covers the full extent of the area where CCR wastes were disposed. *See*, 40 C.F.R. § 257.102(b)(1)(iv). Additionally, issues related to the structural stability of the units need to be addressed.

- **Cap Topsoil Layer:** In the 2016 Closure Plan, the proposed cover does not include a topsoil layer necessary to support vegetation (only a 3-foot "general fill" layer is shown on Detail 1/8 of Sheet 8). Vegetated soil is necessary to reduce erosion of the freeze/thaw layer. A seeded erosion control blanket appears on Detail 5/8 of Sheet 8, but the drawings do not clarify where this erosion control blanket is to be installed. Regardless, germination rates and vegetative establishment increase with a 6-inch topsoil layer. In the 2022 Closure Plan, there is more detail regarding suitability of the general fill layer for supporting vegetation; that information should also appear on the construction drawings and in specifications to more clearly demonstrate that the proposed cover complies with the requirements of 40 C.F.R. § 257.102(d)(3)(i)(C).

- **Geocomposite Layer:** The 2022 Closure Plan identifies a geocomposite drainage layer for the cap. Good engineering practices would indicate that the design is based on calculations demonstrating that the geocomposite drainage layer can effectively transmit liquid off the geomembrane. Because no such calculations are provided and there is

insufficient supporting information to explain the geocomposite layer, the 2022 Closure Plan would not adequately demonstrate that it will meet the closure performance standards contained in 40 C.F.R. § 257.102(d).

- **Hydraulic Capacity to Drain Cover:** Proper drainage systems are an integral part of a cover system to ensure that the closure effort meets the performance standards. There are no calculations to demonstrate that the perimeter drainage ditches can provide the necessary hydraulic capacity to drain the covers and not contribute to slope instability during a storm event, including the 1,000-year storm event. This should be provided with slope specifications for the drainage ditches. Additionally, no size or slope is provided for the two drainage culverts on each pond (Detail 2/8 on Sheet 8). CWLP should provide complete calculations and culvert sizes and slopes for the drainage culverts. These construction details are needed to demonstrate that the proposed cap is designed and constructed such that it will meet the closure performance standards of 40 C.F.R. § 257.102(d).

- **Construction Specifications:** The 2016 Closure Plan does not include construction specifications. For the 2022 Closure Plan, CCPA Attachment 8, titled "Plans and Specifications and Construction Quality Assurance Plan," does not include construction specifications. Construction specifications detailing products to be used and means and methods of their installation and testing would typically be developed to ensure that the proposed cap is designed and constructed consistent with recognized and generally accepted good engineering practices. Without this information it is difficult to assess if either the 2016 or the 2022 cover will meet the closure performance standards of 40 C.F.R. § 257.102(d).

- **Geomembrane Construction Quality Assurance:** In CCPA Attachment 13, several geomembrane manufacturer tests and procedures are listed for factory testing of the linear low-density polyethylene (LLDPE) geomembrane; however, no field testing or inspection of the in-place geomembrane is listed in Table 3 ("General Quality Assurance"). There is some general language regarding geomembrane testing in Section 6.1.

  Geomembrane low-permeability performance depends on proper installation and field testing as well as observation of the installed membranes. This should include, at a minimum: (1) trial seams tested for peel strength and shear strength via ASTM International (ASTM) D 6392; (2) non-destructive field seam continuity testing via ASTM D 5641, *Standard Practice for Geomembrane Seam Evaluation by Vacuum Chamber*, or ASTM D 5820, *Standard Practice for Pressurized Air Channel Evaluation of Dual-Seamed Geomembranes*; (3) an organized, grid-based visual survey for geomembrane penetrations; (4) manufacturer requirements as needed to meet the manufacturer's warranty; and (5) a log to document where each test occurred. Including consideration of these steps for field testing or inspection of the in-place geomembrane is what is typically considered recognized and generally accepted good engineering practices. Without this information it is not clear that CWLP will be able to ensure that the cover is properly installed. If it is not properly installed the likelihood of its failure

is increased and the ability of the cover to meet the performance standards of 40 C.F.R. § 257.102(d) is compromised. The closure plan should be revised to include documentation of testing procedure references to demonstrate that the proposed cap will be designed and constructed in a manner which will meet the performance standards. There should also be an outline to a proposed testing plan for installation of the cap and post-installation testing. This plan should be in place prior installation of the cap.

9. 40 C.F.R. § 257.104(b)(1) - Final Cover Maintenance.

40 C.F.R. § 257.104(b)(1), "Post-Closure Care Requirements," states that following closure, the operator is responsible for "maintaining the integrity and effectiveness of the final cover system, including making repairs to the final cover as necessary to correct the effects of settlement, subsidence, erosion, or other events, and preventing run-on and run-off from eroding or otherwise damaging the final cover." Final cover maintenance will be dependent upon resolution of the issues identified in other portions of this document such as potential sloughing and instability due to adequacy of the berms and placement of the cover over CCR wastes that are in contact with the uppermost aquifer.

10. 40 C.F.R. § 257.104(b)(3) – Post Closure Groundwater Monitoring.

40 C.F.R. § 257.104(b)(3) states that "following closure of the CCR unit, the owner or operator must conduct post-closure care for the CCR unit, which must consist of maintaining the groundwater monitoring system and monitoring the groundwater in accordance with the requirements of 40 C.F.R. § 257.90 through § 257.98. CWLP's plan for post closure groundwater monitoring does not address the groundwater monitoring issues identified in other portions of this document and NOV 1 and will need to be adjusted to do so.

C. Comments on the technical adequacy of CWLP's groundwater modeling.

CWLP's justification for leaving CCR wastes in place and capping is based on a hydrogeologic evaluation provided in "Closure Alternative Assessment and Assessment of Corrective Measures" (CAA/ACM) (Andrews 2022b). This evaluation is provided in Attachment 2 to the "Closure Alternatives Assessment – Contaminant Transport Model." The attachment provides a conceptual model, including: (1) assumptions and results of a one-dimensional leaching model (Hydrologic Evaluation of Landfill Performance) (HELP) (EPA 1984a, 1984b) in Section 4.0; (2) a two-dimensional saturated zone fate-and-transport model (MIGRATE) in Section 5.0; and (3) a summary of the results of the MIGRATE model in Section 6.0. The model result is a simulated decrease in the concentration of boron to a value below the GWPS at an observation point representing Well AW-14, 13 years after the cap is installed. This result provides the rationale and demonstration that closure-in-place meets the 40 C.F.R. § 257.102(d) performance standards.

A review of the model report indicates that it does not address the potential for CCR waste to remain in contact with "free liquids" (that is, groundwater) after the cap is emplaced. The attached Appendix A provides a detailed evaluation of this issue; key points are summarized below:

- The HELP model simulates vertical flow through the lower cohesive deposit (LCD), the low-permeability layer directly below the base of the ash ponds. A second model (MIGRATE) models contaminant transport through the uppermost aquifer.

- The contaminant source resides at the boundary between the LCD and the uppermost aquifer, not within the uppermost aquifer. The source term is a "constant concentration" boundary condition. This is different from a mass flux.
- The hydraulic force driving contaminant concentrations through the uppermost aquifer appears to be derived entirely from vertical flow within the lower cohesive deposit.
- At time zero, this force is represented by a hydraulic head that HELP calculates from a saturation distribution (full saturation) and material properties specific to the LCD.
- The modeling report provides no indication of any additional hydraulic force being applied to contaminant transport in the saturated zone (that is, there is no indication of a boundary condition that allows flow into the uppermost aquifer through an upgradient boundary).
- Eight years after the cap is emplaced, the hydraulic head at the upper boundary of the uppermost aquifer has decreased from 24.8 feet to 1.44 inches.

- The "constant concentration" source term yields a near-zero mass flux into the uppermost aquifer eight years after the CCR is capped because the hydraulic force is nearly zero.

Based on the above, the models appear to be established with inputs that assume the source resides above, not within, the uppermost aquifer. The advective component of contaminant transport is driven exclusively by hydraulic forces originating in the low-permeability layer above the uppermost aquifer and is characterized by the material properties of the low-permeability unit rather than the properties of the uppermost aquifer.

D. Potential Violations Applicable to Corrective Measures and Remedy Selection.

1. 40 C.F.R. §§ 257.95(g), 96-97 and 107 - Completion of ACM and selection of remedy report and posting to federal CCR website.

CWLP's first assessment monitoring sampling event was on May 4, 2018. It reported arsenic at 0.0826 mg/L. CWLP completed a resample on July 9, 2018, per § 257.95(d)(1). It reported arsenic at 0.136 mg/L, which was above the established GWPS CWLP set at 0.0724 mg/L and therefore constituted a statistically significant level (SSL). *See*, 2018 SSI Notice and 2018 Annual Report. CWLP was required within 90 days to initiate an ACM or complete a demonstration that there was an alternate source (ASD). If a successful ASD was not made within 90 days of the initial detection, then CWLP was required to initiate the ACM.

CWLP chose to attempt to demonstrate that there was an alternate source. It was not successful. Taking into consideration the time allowed by the regulations and CWLP's decision to conduct an alternate source demonstration first and request a 60-day extension to complete its ACM, CWLP was required to complete the ACM on or around March 7, 2019, with the completed

ACM required to be posted on its federal CCR website on or around April 7, 2019. *See*, 40 §§ 257.105(h)(10); 257.107(d), (h)(8). The ACM was to address the performance, reliability, and ease of implementation and potential impact of appropriate remedies, the time required to complete the remedy and the institutional requirements, such as state or local permits or other environmental or public health requirements that may substantially affect the implementation of the remedy. *See* 40 C.F.R. § 257.96(c). The selected remedy must, among other things, attain the GWPS and remove from the environment as much of the contaminated material that was released from the CCR unit as is feasible. *See* 40 C.F.R. § 257.97(b).

To date, CWLP has not posted a completed ACM to its federal CCR website. Instead, in response to the 2018 sampling events, CWLP posted on its federal CCR website a two-page document entitled *Completion of Corrective Measures in Accordance with 40 C.F.R. § 257.96(a), July 2019* (2019 CMA Completion Notice), signed and dated June 26, 2019, by a professional engineer. It states that the long-term corrective measure would be either closure or retrofitting the surface impoundments and that it had not made a decision on either. Providing two divergent options is not a selection of a remedy. Further, the Notice did not explain how either of these remedies would address the requirements of 40 C.F.R.§ 257.96(c), which includes consideration of the performance, reliability, ease of implementation, and potential impacts; the time required to begin and complete the remedy; or the institutional requirements that may substantially affect implementation of the remedy(s). It did not discuss the measures it was going to take to remedy the groundwater contamination. It did not provide the evaluation of alternatives that is required by 40 C.F.R. § 257.97. In sum, the 2019 CMA Completion Notice is not an ACM nor a selection of remedy report in compliance with the federal CCR rules.

Sometime between August 1 and December 31, 2019, CWLP discontinued any further work on corrective measures pursuant to 40 C.F.R. § 257.96 relying on its August 1, 2019 semi-annual sampling of wells AP-1-5 and RW-3. *See*, 2019 Annual Report. CWLP asserted that since it met compliance with the GWPS, and no Appendix IV parameter exceeded the GWPSs (August 1, 2019) pursuant to 40 C.F.R. § 257.95(f) it could discontinue the CMA. *Id.* CWLP stated:

> *"A statistically significant increase (SSI) is only concluded if both samples, in a series of two, exceeds the calculated upper prediction limit (UPL) or background and maximum concentration level (MCL). See, 2020 Annual Report, responses 3a and 4a."*

It is unclear what is meant by "in a series of two." CWLP has not posted any additional sampling results or events beyond the semi-annual sampling completed in compliance with 40 C.F.R. § 257.95. Utilizing this assumption, there is no regulatory support for the discontinuation of the ACM and therefore is not an appropriate justification for CWLP's failure to initiate or complete an ACM. CWLP must revise its procedures accordingly and complete the ACM.

Although CWLP initiated and completed a CMA for Illinois in 2021, CWLP stated that this CMA was for compliance with 35 I.A.C. 845, not 40 C.F.R. §§ 257.95 - .96 *See*, 2021 Annual Report and CWLP's July 5, 2022 Response to EPA's May 4, 2022 Request for Information (RFI 1 Response), question 9; RFI 1 Response, questions 9-11 and CWLP's January 13, 2023 Response to EPA's November 18, 2022 Notice of Potential Violations (NOV 1 Response), p. 6. In both its response to RFI 1 and NOV 1, CWLP makes it clear that the Illinois ACM submitted

as part of its February 1, 2022 CCPA is draft, subject to revision, and will not be considered for placement on the federal CCR website until after Illinois EPA acts on its CCPA. Furthermore, CWLP admitted that the federal corrective measures assessment was not completed and would not be completed until after Illinois EPA approves of its construction permit application, which was due to Illinois in February of 2022. CWLP response to question 4d. The federal CCR rules do not allow a facility to avoid completing and posting a CMA or selecting a remedy and developing a remedy report for these reasons.

2. 40 C.F.R. § 257.97(a) and (b) and 107(d) and (h)(9) - Selection of remedy and posting of remedy selection report.

Pursuant to 40 C.F.R. § 257.97(a), the owner or operator must, as soon as feasible, select a remedy that, at a minimum, meets the standards listed in 40 C.F.R. § 257.97(b). Those standards require the remedy to be protective of human health and the environment, attain the groundwater protection standard; control the source(s) of releases so as to reduce or eliminate, to the maximum extent feasible, further releases of constituents in appendix IV to this part into the environment; remove from the environment as much of the contaminated material that was released from the CCR unit as is feasible, taking into account factors such as avoiding inappropriate disturbance of sensitive ecosystems; and comply with standards for management of wastes as specified in § 257.98(d). The owner or operator must specify as part of the selected remedy a schedule(s) for implementing and completing remedial activities. *See*, 40 C.F.R. C.F.R.§ 257.97(d). It must address the evaluation criteria in 40 C.F.R. § 257.97(c).

Upon selection of a remedy, the owner or operator must prepare a final report describing the selected remedy and how it meets the standards specified in 40 C.F.R. § 257.97(b). *See*, 40 C.F.R. § 257.97(a). The owner or operator must obtain a certification from a qualified professional engineer that the remedy selected meets the requirements of 40 C.F.R. § 257.97. The owner or operator must also prepare a semiannual report describing the progress in selecting and designing the remedy. The owner or operator must include in the annual report information on whether a remedy was selected pursuant to 40 C.F.R. § 257.97 during the current annual reporting period, and if so, the date of remedy selection. *See*, 40 C.F.R. § 257.90(e)(6)(v). The owner or operator must also include in the annual report the date when the public meeting was held for the assessment of corrective measures for the CCR unit. *See*, 40 C.F.R. 90(e)(6)(iv)(C) (C). The owner or operator must place the remedy selection report in its operating record and on the federal CCR website. *See*, 40 C.F.R. § 257.105(h)(2) and107(d) and (h)(9).

CWLP was required to complete its ACM for the arsenic above the GWPS on or about March 7, 2019, and post it to its federal CCR website on or about April 7, 2019. Consequently, as soon as feasible, after completion of the ACM (March 7, 2019), CWLP should have selected a remedy and completed a remedy selection report and posted it to its federal CCR website.

On or about June 26, 2019, a QPE certified in a one-page document that the long-term corrective measures for the surface impoundments would consist of closure and/or retrofitting the surface impoundments. *See*, 2019 CMA Completion Notice. This is not a selection of a remedy report. It does not provide the information required by the regulations. The QPE stated that CWLP had not decided which of these measures it would implement but that CWLP initiated the alternate

closure requirements of 40 C.F.R. § 257.103(a)(1) and would update the status of the surface impoundments in the May 2020 annual progress report. The alternate closure requirements do not modify the requirements for completing an ACM and selecting a remedy. Additionally, there is no information consistent with 40 C.F.R. §§ 257.96 and .97 on how CWLP would address the contaminated groundwater or its schedule for implementation of either closure or retrofitting the surface impoundments. No selection of remedy report has been posted to its federal CCR website.

In its July 5, 2022 Response to EPA's May 4, 2022 Request for Information, CWLP responded that it had "selected permanent closure of the impoundments as the remedy to the requirements of 40 C.F.R. § 257.97." *See*, RFI 1 Response, question 11. It did not provide an ACM or selection of remedy report to EPA at that time. It did not identify the date when it selected this remedy. It did not indicate a date that it provided public notice of this remedy. None of this information is posted on CWLP's federal CCR website.

In summary, CWLP over time has provided conflicting information as to whether it selected a remedy; what the remedy was or even if a remedy was required. What is clear is that CWLP has not posted on its federal CCR website a remedy selection report almost four years after (March 7, 2019) it was required to complete one "as soon as feasible."

3. 40 C.F.R. § 257.95(g)(1) and (3) – Notification of SSLs, characterization of nature and extent of releases, ACM and Selection of Remedy.

40 C.F.R. § 257.95(g) requires the owner/operator to prepare a notification of appendix IV constituents that have exceeded the GWPS. This is required to be done for ***each sampling event whenever there is a new appendix IV constituent found at a monitoring well at an SSL above the GWPS.*** Additionally, the occurrences of a new appendix IV constituent triggers the requirements for characterization of the nature and extent of releases in 40 C.F.R. § 257.95(g)(1) (e.g. an ACM and remedy selection report) and commensurate posting requirements on the federally required CCR website related to those newly detected constituents as required by 40 C.F.R. §§ 257.95(g)(3); 257.96(a) and (c); 257.97(a); and 257.107. The ACM must be initiated, completed, and posted to the federally required CCR website unless a timely and successful ASD is completed and posted to the CCR website. The data that is collected as part of the ACM must comply with 40 C.F.R. §§ 257.95(g) and 257.96. It should provide information on the nature and estimated quantity of material released, including specific information on the constituents listed in appendix IV and the levels at which they are present in the material released. The selection of remedy report similarly is to comply with 40 C.F.R. § 257.97.

There are two additional potential violations. First, CWLP has not examined corrective measures nor potential remedies for all appendix IV constituents detected above the GWPS. To date, CWLP has only given notice of an SSL above the GWPS for arsenic at RW-3. However, CWLP has identified additional appendix IV constituents above the GWPS at various wells during other samplings events (Andrews 2021c - Table 2, Andrews 2022a, Andrews 2023). Additionally, CWLP has not established background correctly for the appendix IV constituents. Without background correctly calculated the applicable GWPS are the concentrations specified in 40 C.F.R. § 257.95(h)(1) and (2) and CWLP must install additional wells and address in the ACM all concentrations of appendix IV constituents above an SSL at these concentrations.

Second, CWLP inaccurately and prematurely "exited" the ACM/remedy selection process in 2019 for arsenic. CWLP's documents have asserted that since the July 2019 sampling event was below the GWPS, CWLP was able to discontinue its ACM and selection of remedy obligation. *See*, 2019 Annual Report wherein CWLP references 40 C.F.R. § 257.95(f) for its assessment of corrective measures. Further, CWLP stated:

> *"However, the assessment of corrective measures ceased as the following sampling event demonstrated compliance with the groundwater protection standard. See, 2019 Annual Report, response 4.b."*

An owner or operator is not released from the ACM requirements unless a successful ASD is completed in a timely manner and in accordance with the rules.

4. 40 C.F.R. § 257.90(e)(5) and 95(g)(3)(ii), 107(d) and (h)(1) - Failure to timely complete ASDs and properly document them on CWLP's federally required CCR website.

If a company elects to conduct an ASD, then the ASD must be completed within 90 days of a detection of an SSL of an appendix IV constituent. *See* 40 C.F.R. § 257.95(g)(3)(ii). Any such demonstration must be supported by a report that includes the factual or evidentiary basis for any conclusions and must be certified to be accurate by a qualified professional engineer. The owner or operator must also include the demonstration in the annual groundwater monitoring and corrective action report along with the certification by a qualified professional engineer. The annual groundwater monitoring and corrective action report is required to be posted to a facility's federal CCR website. *See* 40 C.F.R. §§ 257.90(e)(5); 257.107(d) and (h)(1).

CWLP has twice indicated that it attempted as ASD related to the cause of the arsenic concentrations at an SSL above the GWPS at RW-3. Both times CWLP failed to complete the ASD within ninety days. CWLP's first ASD was the result of the May 4, 2018 initial sampling event and the July 9, 2018 resampling event (ASD 1). CWLP's second ASD was the result of the February 28, 2020 sampling event (ASD 2). CWLP provided notice of an SSI in July of 2018. Since that time, CWLP has not posted anything until May 2023. *See* 2023 Notification of SSLs. This posting is based on the January 2023 groundwater sampling event.

From the available information, it appears that CWLP did not commence work on ASD 1 until sometime between September or October of 2018 when it conducted on-site sampling. *See* 2018 Annual Report. It did not commence work on ASD 2 until November 2020 with the installation of dedicated low-flow pumps to reduce possible turbidity in the samples. CWLP indicated that it would not complete ASD 2 until after it collected its 2021 samples. This is well after the May 28, 2020 deadline for completing ASD 2.

CWLP was required to complete ASD 1 on or about October 8, 2018, 90 days after the July 9, 2018 sampling event and ASD 2 by May 28, 2020, 90 days after February 28, 2020 sampling event. There is no documentation of a successfully completed ASD. Thus, CWLP was required to comply with the regulatory requirements of 40 C.F.R. §§ 257.95 to 257.98. Finally, EPA does

not believe that it was appropriate to conduct ASD 2, which is for the same constituent (arsenic) at the same well (RW-3) and was the subject of the previously unsuccessful ASD 1. By the time it was conducting ASD 2, CWLP should have completed its ACM for arsenic (June 7, 2019) and selected a remedy for the arsenic SSLs, which have been consistently found at RW-3.

5. 40 C.F.R. § 257.90(e) - Failure to properly document on its federal CCR website a 60-day extension for completion of an ACM.

An owner or operator is required to initiate an ACM within 90 days of finding that any constituent listed in Appendix IV has been detected at an SSL exceeding the GWPS. If an ASD is unsuccessful or unfinished, the facility is required to initiate and complete an ACM. On or around October 7, 2018, CWLP was required to complete ASD 1. If unsuccessful or unfinished, CWLP was required to immediately enter initiation of ACM per 40 C.F.R. § 257.95(g)(4). It had 90 days (January 7, 2019) to complete the ACM. *See* 40 C.F.R. § 257.96(a). The 90-day deadline to complete the ACM may be extended for no longer than 60 days (March 7, 2019), if the owner or operator obtains a certification from a qualified professional engineer that demonstrates the need for additional time to complete the assessment of corrective measures due to site-specific conditions or circumstances. *Id*. The owner or operator must also include the demonstration in the annual groundwater monitoring and corrective action report required by 40 C.F.R § 257.90(e), in addition to the certification by a qualified professional engineer. *Id.*

CWLP elected to avail itself of the 60-day extension to complete the ACM that was required to be completed by January 7, 2019. *See Assessment of Corrective Measures Extension in Accordance with 40 C.F.R. § 257.96(a)*, May 2019 (2019 Extension Notice), which was signed by a professional engineer on April 29, 2019. This extension would provide CWLP until around March 7, 2019 to complete the ACM. The 2019 Extension Notice was executed past the alloted time provided by the regulations. Additionally, CWLP was required to include in its 2019 Annual Report the demonstration of the need for the extension and the professional engineer certification of the need for additional time. CWLP did not include that information with its 2019 or any subsequent Annual Report.

APPENDIX A

REVIEW OF HYDROGEOLOGIC RATIONALE TO SUPPORT SELECTED ALTERNATIVE

The groundwater modeling information included in "Closure Alternative Assessment and Assessment of Corrective Measures" (Andrews 2022) was reviewed. CWLP uses the modeling evaluation to predict that closure in place (capping the Lakeside and Dallman ash ponds and removal of free liquids will result in compliance with the Groundwater Protection Standard (GWPS) within 13 years following installation of a final cover system.

The model evaluation does not provide a reliable, conservative prediction of the future effects of the closure-in-place alternative because the modeling approach does not consider the likelihood that some portion of the source material will remain saturated after closure-in-place.

The model report is not very detailed, so it is difficult to assess whether the issues noted below represent potential deficiencies in the conceptual or mathematical models or simply omissions in the model report. A number of deficiencies associated with documentation or implementation of the model were identified. The principal issues identified relate to the model evaluation's finding that the GWPS will be met in 13 years are: (1) the model evaluation does not simulate a scenario where CCR waste is in contact with the uppermost aquifer, and (2) the model evaluation does not appear to adequately characterize conditions in the uppermost aquifer. As documented in Section 2 of the CWLP report, CCR waste should be expected to remain saturated due to communication with groundwater and infiltration anticipated from the reservoir and the Clarification Pond.

The model evaluation first applies the HELP water balance model to assess the vertical seepage rate for a 30-year period following installation of a final cover system. It then applies the MIGRATE model to assess contaminant transport, using the Darcy flow rates and hydraulic head output from the HELP model in lieu of applying flow parameters representative of the uppermost aquifer to characterize saturated zone flow.

The model evaluation applies the source term (the contaminant concentrations) at the boundary between the lower cohesive deposit (LCD) and the uppermost aquifer. The HELP model output is used to simulate the effects of the vertical flow of water through the LCD. At the start of the simulation, the LCD is fully saturated, but free water is assumed to drain from the LCD following installation of the final cover. As a result, water flow across the boundary between the LCD and uppermost aquifer diminishes to near-zero over time. However, the cap will only restrict vertical flow from the LCD; horizontal flow from the upgradient portion of the uppermost aquifer would still continue in the actual real-world setting.

The contaminant transport model includes a "constant concentration" boundary condition to the upper boundary of the saturated zone model (MIGRATE). If there is little to no flow of water across the boundary, there will be little to no mass crossing the boundary, regardless of the concentration. The force which drives groundwater flow through the boundary is the hydraulic head at the boundary, which is the key output from the HELP model. As the model report states, on page 11:

> "Based on the HELP model results, the liquid head is estimated to average approximately 297 inches (24.8 feet) in year 1, and reduces to an average of 1.44 inches by year 8. The vertical seepage rates calculated by the HELP model were used to determine the vertical Darcy velocities specified in the MIGRATE model."

The "vertical Darcy velocity" represents water flow across the boundary (how many liters of water cross the boundary per unit of time). Multiplying this term by the "constant source" concentration" (in milligrams per liter) will yield the mass (milligrams per unit of time) entering the model.

The MIGRATE model used for the contaminant transport analysis is set up such that the contaminant source will largely cease because the final cover is assumed to eliminate virtually all water flow through the upper layer of the model within 8 years. Because contaminant concentrations are applied at the interface between the two layers as a flux (contaminant mass multiplied by water flow), a near-elimination of water flow will result in a near-elimination of contaminant flux. As a result, the source of contamination is greatly diminished by year 8 of the modeling exercise even though the lower portion of the CCR unit is likely to remain saturated, thus actually providing an ongoing source far into the future.

Furthermore, it is unclear whether the model allows flow through an upgradient boundary across the uppermost aquifer. A 2D contaminant transport model typically requires specification of an upgradient and downgradient boundary head and the flow properties (hydraulic conductivity and effective porosity) of the aquifer medium in order to calculate the advection term.

The only boundary conditions discussed in Section 5 (Mathematical Model) are the upper constant source boundary and a lower boundary that is referred to as an "aquifer" boundary, but which has a description that is difficult to understand because it seems to refer to the upper aquifer boundary:

> "the "aquifer" bottom boundary option is applicable where the bottom layer (that is, the lower cohesive deposit) is underlain by a permeable base stratum (that is, the uppermost aquifer)"

Regardless, a discussion of an upgradient lateral boundary was not found in the report, nor was a discussion of a hydraulic gradient or a hydraulic boundary head being applied to the uppermost aquifer. Also, no discussion was found regarding any flow property (hydraulic conductivity or effective porosity) that was applied to the uppermost aquifer (discussion only addresses the low-permeability layer that was simulated using the HELP model). Apparently, the Darcy flux output from the HELP model drives flow through the uppermost aquifer without being affected in any way by the actual material properties of the uppermost aquifer. In summary, the model report does not discuss (1) flow to the uppermost aquifer other than that which drains vertically from the low-permeability layer above the aquifer (that is, horizontal flow into the model within the uppermost aquifer is not addressed); or (2) any properties of the uppermost aquifer that would be expected to govern flow through the uppermost aquifer.

In summary, there is no source term within the MIGRATE model. All of the mass in the model comes from the upper boundary. The source term will be effectively desaturated by the placement of the cover over the Lakeside and Dallman units. This configuration ignores the likely future condition that the lower portion of the unlined units will remain saturated and groundwater flow through CCR waste will continue.

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