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For the basal sand, the effective porosity is based on the saturation water content data of sand. The range provided is from 37% to 49% (Sharp-Hansen et al., 1990). A mean effective porosity value of 43% was selected for the baseline model.

The average horizontal velocity within the Basal Sand is estimated to be 0.49 ft/day (i.e., $v_{in} = Ki/n_e = (0.000675 \text{ cm/sec} \cdot 0.011) / 0.43 = 0.000173 \text{ cm/sec} \cdot 0.0328 \text{ ft/cm} \cdot 86400 \text{ sec/day} = 0.49 \text{ ft/day}$).

Additional information can be found in response to 1.7.10 above.

- 2.3.4** The laboratory used during the time of groundwater sampling must be identified and it must be shown that the lab was using SW-846, incorporated by reference in Section 845.150, methods for the analysis.

Response

The Hydrogeologic Report, Groundwater Monitoring Program and Statistical Procedures has been updated to include the requested information and is provided in Appendix C of Attachment A. This updated program is intended to replace the program proposed in the original operating permit application. The updated program provides recalculated background concentrations, the laboratory analytical reports, statistical method and addition of groundwater monitoring wells.

- 2.3.5** The permit application states that there is no evidence of subsidence, altered groundwater flow patterns, bedrock fracturing from the underground mining that underlies Dallman Ash Pond. However, the Agency is unaware of any data substantiating this claim, Attachment 2 provides an engineering report on the proposed modifications to an existing embankment at Lakeside Ash Pond. Additionally, the underground mine is only mentioned in the Hydrogeologic Report. There is no previous monitoring of potential subsidence with any instrumentation or data presented exhibiting that the total overburden load once Dallman Ash Pond is closed with a final cover will not exceed the maximum load that can be supported by the bedrock. Evidence to prove that the Dallman Ash Pond is not at risk to subsidence or settlement must be provided.

Response

CWLP has completed a comprehensive geotechnical investigation and has prepared location restriction documentation for 35 Ill Adm. Code 845.340 Unstable Areas and Floodplains that addresses the underground mine in the area of Dallman Ash Pond, which is provided as Appendix A of Attachment A.

- 2.3.6** The permit application states that the Lakeside Ash Pond base is at 535-feet asml and the Dallman Ash Pond base is at 533-feet asml. The FEMA flood insurance map indicates that flood zone AE encompasses the entirety of the Lakeside Ash Pond and the Dallman Ash Pond and is at an elevation of 546-feet asml and 545-feet asml, respectively. The permit application must provide the following:
- o Boring logs or survey reports that verify the total depths of the ponds,
 - o Regular, temporal, or seasonal changes to the groundwater levels in relation to

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surface water levels in Lake Springfield,

- o Events that would cause the flood plain to be inundated with flood waters, and
- o Yearly minimums and maximums for groundwater elevations at the Lakeside Ash Pond and the Dallman Ash Pond.

Response

As stated in the response to Comment 1.1.2, the FEMA flood insurance map is highly inaccurate. Any conclusions drawn based on the FEMA flood insurance map are suspect.

As part of the recent geotechnical investigations, CWLP advanced four borings in Lakeside Ash Pond and four borings in Dallman Ash Pond to confirm the bottom elevations of each impoundment. Borings L1, L3, L4 and L5 were advanced in Lakeside Ash pond where silty/clay materials were encountered at 534.5 feet msl, 530.5 feet msl, 553.0 feet msl and 530.0 feet msl, respectively. Borings D1, D2, D3 and D4 were advanced in Dalman Ash Pond where silty/clay materials were encountered at 526.0 feet msl, 523.0 feet msl, 526.0 feet msl and 529.5 feet msl respectively. A map depicting these locations and boring logs for these borings are provided in Appendix C of Attachment A.

Although monthly monitoring of groundwater elevations has been conducted since April 2021 per 35 Ill. Adm. Code 845.650(b)(2) and (3), the simultaneous recording of Sugar Creek did not begin until January 2023. Lake Springfield and Clarification Pond elevations were not collected until May 2023. Other historical elevations are available in the Annual Consolidated Reports for 2021 and 2022. Data for 2023 is provided below. It must be noted that the water levels within the impoundments may be below ground surface elevations of areas within the impoundments; i.e. the water levels are below grade. The Lakeside Ash Pond has been dry since October 2023. Available data for groundwater and surface water elevations for 2023 are as follows:

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Unit	27-Jan-23	16-Feb-23	29-Mar-23	12-Apr-23	30-May-23	15-Jun-23	6-Jul-23	31-Aug-23	16-Sep-23	26-Oct-23	27-Nov-23	27-Dec-23
Lakeside Ash Pond	562.04	562	562.14	562.52	562.1	561.98	561.96	562.03	560.77	NM	NM	NM
Dallman Ash Pond	550.65	550.52	550.6	550.3	550.14	549.49	550.6	549.82	550.94	550.3	550.09	550.6
Sugar Creek	NM	NM	NM	NM	521.25	520.31	521.88	520.2	520.21	520.33	520.31	520.33
Lake Springfield	NM	NM	NM	NM	560.28	560.08	560.33	559.93	558.97	558.58	558.43	558.92
Clarification Pond	NM	NM	NM	NM	548.66	547.97	548.46	548.74	549.33	548.51	547.08	547.93
RW3	528.52	529.21	529.86	529.68	529.24	528.22	527.43	527.35	526.66	526.63	526.8	527.46
AP-1	525.48	526.15	526.63	525.45	525.28	524.31	525.18	524.24	523.88	523.95	524.16	524.64
AP-2	529.2	528.85	529.51	528.86	527.99	527.32	527.53	527.77	527.08	527.4	527.64	528.71
AP-3	525.93	526.31	526.52	525.77	525.74	525.33	524.69	524.41	525.24	525.31	525.31	525.81
AP-4	549.23	550.01	549.88	546.14	547.03	546.83	546.71	546.17	545.25	544.87	544.95	545.18
AP-5	569.03	568.43	570.86	570.85	570.33	569	569.82	568.88	566.63	565.73	565.16	566.1
AP-6	529.87	530	530.71	529.03	528.71	527.58	526.98	526.95	526.24	526.4	526.32	526.93
AP-7	NM	525.54	528.75	527.43	527.71	527.71	526.57	526.15	525.75	525.44	525.33	525.56
AP-8	532	532	533.21	535.95	535.38	533.99	533.56	533.4	532.42	532.23	532.77	533.72
AP-9	NM	529.27	529.34	525.07	524.94	523.74	524.72	523.61	523.19	523.33	523.65	524.48
AP-10	NM	534.82	535.01	534.45	533.74	532.44	532.54	532.29	531.29	530.93	531.67	532.67
AP-11	NM	524.49	525.4	523.9	524.29	522.77	523.39	522.69	522.27	522.14	522.82	522.98
AP-12	NM	524.49	526.14	525.64	525.68	523.58	523.97	522.66	522.42	522.16	522.72	523.03
AP-13	NM	523.3	529.36	528.09	527.28	524.67	524.43	523.52	522.53	522.12	522.68	523.02
AP-14	NM	538.58	538.23	537.2	537.66	537.23	538.12	537.57	536.41	535.88	536.52	537.56

The surface water level information along with the potentiometric surface data will be submitted to the Illinois EPA in the annual reports.

- 2.3.7** The hydrogeologic site characterization must address compliance with Sections 845.620(b)(2), 845.620(b)(6), 845.620(b)(1), 845.620(b)(13), 845.620(b)(15), and 845.620(b)(18) to demonstrate that floodplain inundation will not result in a release of CCR to Sugar Creek or other surface water bodies, public lands, or private lands.

Response

CWLP believes it has generally complied with the cited provisions. Based on the wording, it appears Illinois EPA means inundation of the floodplain as a result of surface water overbank flooding of Sugar Creek or other adjacent surface water bodies and the resultant impact of such flooding on the existing in-place CCR and the potential for redistribution of the CCR within the floodplain. The comment implies that floodplain inundation will occur.

As stated above, the FEMA Flood Insurance map is in error. While FEMA map shows there is inundation during the 100-year storm event, the topographic information used in derivation of the

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flood elevations was highly inaccurate. There is no surface water inundation. In addition, CWLP updated its inflow design report in the 2023 Annual Consolidated Report to demonstrate that the ash ponds are designed and operated to contain a 1,000 year storm (previous demonstrations studied a 100 year storm). Attachment 5 of the 2023 Annual Consolidated Report also provides the Engineer Certification for the updated Inflow Design Flood Control System Plan.

To comply with the application requirements of 35 Ill. Adm. Code 845.220(a)(7)(A), the Hydrogeology Report must be amended as follows for the Agency to continue its review:

- 2.3.8** The climate aspects of the site including any seasonal fluctuations that would affect the sampling procedures or the characterization of the groundwater must be provided in accordance with Section 845.620(b)(2).

Response

The local weather conditions and climate patterns specific to the location includes temperature, precipitation, humidity, wind patterns. The seasonal fluctuations of these climate characteristics are summarized on <https://www.weather.gov/ilx/spi-climate>. The only weather conditions which impact sampling procedures and groundwater sampling are freezing conditions and flooding conditions.

Seasonal fluctuations of the potentiometric surfaces as well as surface water body elevations were addressed in response to Comment 1.7.15 above. The hydrogeologic setting and potential migration pathways were discussed in detail in the Hydrogeologic Report, Groundwater Monitoring Program and Statistical Procedures provided in Appendix C to Attachment A of this document. The monitor wells are appropriately located to account for any seasonal variations.

- 2.3.9** Identify any potential migration pathways near both impoundments that could leak CCR into surface water, community wells, or private wells in accordance with Section 845.620(b)(11).

Response

Potential migration pathways are limited to the occurrence of seeps, and or the migration through the uppermost aquifer in the event of vertical seepage from the CCR surface impoundments. The two surface water intakes were identified in Section 3.3.1 of the hydrogeologic report are upgradient and disassociated with the surface impoundments. No community water supply wells or private potable water wells were identified within 2,500 feet of the impoundments.

Attachment 12 of the February 1, 2022 Closure Construction Permit Application characterizes impacts from the seepage of leachate to downgradient receptors. As characterized in Attachment 12, there are no receptors within the Sugar Creek basin within 3,400 feet of the CCR surface impoundments. Closure in place with a final cover system does not pose a risk to human health or the environment. The groundwater contaminant transport model demonstrates that concentrations detected above groundwater protection standards (GWPSs) will be limited in extent.

Such evaluation can be complex; however, this specific issue was addressed in the December 2014