Annual CCR Landfill Inspection

Ottumwa-Midland Landfill
15300 130th Street
Ottumwa, Iowa 52501

Prepared for:

Interstate Power and Light Company
15300 130th Street
Ottumwa, Iowa 52501

SCS ENGINEERS

25222073.00 | December 19, 2022

2830 Dairy Drive
Madison, WI 53718-6751
608-224-2830

Table of Contents

Section Page

I:\25222073.00\Deliverables\2022 OML Fed Inspection_LF\221219_OML Annual CCR Landfill Inspection_Final.docx

[This page left blank intentionally]

PE CERTIFICATION

I, Eric J. Nelson, hereby certify that this Annual CCR Landfill Inspection Report meets the requirements of 40 CFR 257.84(b)(2), was prepared by me or under my direct supervision, and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

12/19/2022

(signature) (date)

Eric J. Nelson

(printed or typed name)

License number 23136

My license renewal date is December 31, 2022.

Pages or sheets covered by this seal:

Annual CCR Landfill Inspection, Ottumwa-Midland Landfill,

December 19, 2022

[This page left blank intentionally]

1.0 INTRODUCTION

1.1 PURPOSE

SCS Engineers (SCS) completed an annual inspection of the Interstate Power and Light Company (IPL) Ottumwa-Midland Landfill (OML) in Ottumwa, Iowa. The annual inspection was completed in accordance with the U.S. Environmental Protection Agency (U.S. EPA) Coal Combustion Residuals (CCR) rule, 40 CFR 257 Subpart D, in particular 257.84(b)(1). According to 40 CFR 257.84(b)(1), an annual inspection by a qualified professional engineer is required for all existing and new CCR landfills and any lateral expansion of a CCR landfill. The purpose of the annual inspection is to ensure that the design, construction, operation, and maintenance of the CCR unit is consistent with recognized and generally accepted good engineering standards. The inspection must, at a minimum, include:

- A review of available information regarding the status and condition of the CCR unit, including, but not limited to, files available in the operating record (e.g., the results of inspections by a qualified person, and results of previous annual inspections); and

- A visual inspection of the CCR unit to identify signs of distress or malfunction of the CCR unit.

This report has been prepared in accordance with 40 CFR 257.84(b)(2) to document the annual inspection.

1.2 BACKGROUND

The OML facility includes an active, existing CCR landfill, which consists of two phases, both constructed prior to the effective date of the CCR rule:

- OML Existing Landfill (original landfill footprint developed at OML in the 1990s).

- OML Expansion Phase 1 (first phase of a multi-phase expansion completed in September 2015).

The OML Existing Landfill and OML Expansion Phase 1 are one existing CCR landfill under the federal CCR Rule. The phases are used to describe the location of items observed during the inspection. The inspection requirements in 40 CFR 257.84(b)(1) apply to both phases.

At the time of the inspection, the CCR unit was active in various stages of development and used as described in the table below.

CCR Unit	CCR Rule Status	Basis for Status
OML including two phases: • Existing Landfill • Expansion Phase 1	Existing CCR Landfill, currently accepting CCR	OML received CCR before and after the effective date of the CCR Rule. Both phases of the landfill unit were constructed before the effective date of the CCR rule.

2.0 SUMMARY OF RESULTS AND RECOMMENDATIONS

SCS identified no deficiencies or releases during the annual inspection of the CCR unit at OML. Deficiencies and releases must be remedied by the owner or operator as soon as feasible, and the remedy documented.

SCS did identify conditions during the annual inspection that are not considered deficiencies but have the potential to become a deficiency if left unaddressed. Each condition and the recommendations provided by SCS to address them are summarized in the table below. These conditions, remedial recommendations, and activities completed or planned to remedy each item, as available from IPL, are described in further detail in Section 4.0.

Condition	Location/ Phase	Recommendation(s)	Report Section
Waste slope steeper than 3H:1V on south slope above fly ash disposal pit.	Expansion Phase 1	Fill or grade waste slope to 3H:1V. Monitor during 7-day inspections.	4.3.1
Very minor exposed soil areas without vegetation within intermediate soil cover.	Existing Landfill	Repair/restore as vegetation maintenance is completed or if CCR is exposed. Monitor during 7-day inspections.	4.3.4
OML staff identified low influent flows from the south storm water basin to the storm water/groundwater underdrain lift station in 2019. Staff suspect pipe between the storm water basin and lift station may be damaged. No noted change in valve vault. The pond level is low, exposing 4-5 feet of accumulated sediment in the southwest corner of the pond around the drop inlet.	Existing Landfill	OML staff investigated and repaired the drop inlet structure in the south storm water basin and the piping between the drop inlet and the lift station. OML staff report that influent flow from the basin to the lift station has been restored. Develop a regular maintenance schedule for sediment removal to prevent sediment accumulation that limits flow to lift station well.	4.4.2.2

Condition	Location/ Phase	Recommendation(s)	Report Section
Eroded liner ballast has exposed the contact water basin liner at the southeast corner and reduced the ballast thickness at the southern storm water culvert resulting in a risk of liner bubbles (aka "whales").	Contact water basin	Fill eroded areas with supplemental ballast material. Monitor during 7-day inspections.	4.4.2.1
System status screen is barely legible (apparently due to exposure to direct sunlight over time), making system monitoring difficult.	Expansion Phase 1	Replace system readout (see construction submittals for leachate collection system, EPG Companies (supplier) Job #14 11496).	4.4.2.1
Level sensor (transducer) is reading negative value, which may be due to dry conditions based on discussion with OML staff. Panel also shows a headwell sensor failure alarm during today's visit.	Expansion Phase 1	Have IPL electrician evaluate sensor/control panel and discuss sensor and recurring fault condition with EPG Companies (panel and leachate level measurement system manufacturer). https://www.epgco.com/aboutus/contact-us/ Monitor during 7-day inspections.	4.4.2.1
A number of stitched rain cover ballast material seams have started to separate, which may subject the rain cover material to uplift and potential damage.	Expansion Phase 1	Repair stitching or add supplemental sandbag ballast in lieu of stitching. Monitor during 7-day inspections.	4.4.2.1
Leachate removal and hauling records provided by IPL show the leachate flowmeter in the wetwell that handles leachate from both phases malfunctioned on or around 9/20/2022. No direct daily measurement of leachate flow from the Existing Landfill is possible.	Existing Landfill / Expansion Phase 1	Repair the leachate flow meter in the wetwell.	4.4.2.1

3.0 ANNUAL INSPECTION

Mr. Eric Nelson of SCS completed an annual inspection of the active CCR unit at OML on July 28, 2022. Mr. Nelson is a licensed professional engineer in Iowa and holds a Bachelor of Science degree in Geological Engineering. He has over 20 years of experience in the design, construction, and operation of solid waste disposal facilities. The scope of the annual inspection is described in Sections 3.1 and 3.2. The results of the annual inspection are discussed in Section 4.0.

3.1 OPERATING RECORD REVIEW

SCS reviewed the available information in the operating record for OML, in addition to the visual inspection discussed in Section 3.2. Information reviewed by SCS included operating record materials provided by IPL and the information posted on Alliant Energy's CCR Rule Compliance Data and Information website for the OML facility.

3.2 VISUAL INSPECTION

SCS completed a visual inspection of OML to identify signs of distress or malfunction of the CCR unit.

The visual inspection included observations of the following:

- CCR placement areas including active filling areas, intermediate cover areas, and exterior non-CCR berms or slopes.
- Leachate collection and removal system components including visible leachate drainage layer materials, leachate vaults, cleanouts, and the leachate storage lagoon.
- Contact water run-off management features including internal contact water drainage features and Temporary Contact Water Basin 1/2.
- Non-contact storm water run-on and run-off control features including swales and sedimentation basins located adjacent to active fill areas but outside the landfill limits.
- Groundwater underdrain system components including the visible underdrain discharge pipes.

4.0 INSPECTION RESULTS

The results of the annual inspection, along with a description of any deficiencies or releases identified during the visual inspection, are summarized in the following sections.

4.1 CHANGES IN GEOMETRY

No apparent changes in geometry were noted that would indicate distress or malfunction of the CCR unit at the facility since the previous annual inspection at OML, completed under 40 CFR 257.84(b)(1). All changes in geometry observed during the annual inspection were the result of planned CCR filling or intermediate soil cover placement activities.

At the time of the visual inspection, the Existing Landfill was covered with intermediate cover and no exposed CCR was observed.

At the time of the visual inspection, active CCR placement was evident in Expansion Phase 1. CCR placement has extended vertically and to the west since the previous inspection. The current lift of CCR is being placed from east to west. With the exception of the sump area at the west end, the temporary rain cover has been removed from the bottom of Phase 1 and the cell is actively being filled. The temporary rain cover remains in place on the interior west slope. Additional rain cover has been removed and CCR placed along the interior south slope of the lined area since the previous annual inspection. The temporary rain cover remains on the upper third to approximately half of the south slope. Nearly all of the temporary rain cover has been removed from the interior east slope and CCR has been placed.

4.2 CCR VOLUMES

The approximate volume of CCR contained in the CCR unit at the time of the inspection is summarized below. A description of how the estimate was developed and the sources used are also summarized below.

CCR Unit	Estimated Volume of CCR in Place	Basis for Estimate and Source
OML	1,176,285 cubic yards	Estimated volume based on existing in-place waste volume as of 6/9/2021 plus estimated waste disposed between 6/9/2021 and 8/10/2021 (date of previous inspection). In place volume as of 6/9/2021 is based on topographic survey. Waste disposed from 8/10/2021 to 7/28/2022 (51,467 tons) was estimated using actual disposal data provided by IPL and average daily disposal rates estimated using the data provided. This tonnage was converted to cubic yards (43,616 cubic yards), assuming an average unit weight for CCR of 1.18 tons/cy for the period of 8/10/2021 to 7/28/2022. Disposal records through 6/30/2022 were provided by IPL.

4.3 Appearance of Structural Weakness

The inspection included a review of the appearance of an actual or potential structural weakness of the CCR unit. The visual inspection included a review of CCR fill areas including the top slopes, internal side slopes, external side slopes, and internal ramps/haul roads for the presence of the following conditions:

- Signs of surface movement or instability:
  - Sloughing, slumping, or sliding.
  - Surface cracking.
  - Slopes in excess of 3 horizontal feet to 1 vertical foot (3H:1V).
  - Toe of slope bench movement.
  - Evidence of inadequate compaction of exposed CCR.
- Inappropriate vegetation growth.
- Animal burrows.
- Erosion damage.
- Unusual surface damage caused by vehicle traffic.

4.3.1 Signs of Surface Movement or Instability

A waste slope steeper than 3H:1V was observed on the south side of the fly ash disposal pit in Expansion Phase 1. SCS recommends filling or grading the waste slope to 3H:1V and monitoring during the 7-day inspections.

4.3.2 Inappropriate Vegetation Growth

No inappropriate vegetation growth was observed during the inspection.

4.3.3 Animal Burrows

No animal burrows were noted during the inspection of the CCR unit.

4.3.4 Erosion Damage

The following erosion damage was observed during the annual inspection.

- **Minor exposed soil areas without vegetation within the Existing Landfill intermediate cover** materials were noted at various locations during the inspection. Similar erosion was found in previous inspections and has been repaired. Erosion observations have improved since previous inspection observations. The improved vegetation maintenance completed by OML staff, with new mowing equipment described to SCS while on site in 2021, appears to have helped identify and address the intermediate cover erosion areas noted last year. The erosion is not currently considered an operating deficiency since it is unlikely to have a significant impact on the function of the CCR unit. The eroded areas should be monitored. If CCR becomes visible, the eroded areas should be filled with soil.

  Based on discussions with IPL staff, erosion maintenance in un-vegetated areas of the intermediate cover is managed on an as-needed basis. Erosion maintenance and vegetation restoration in vegetated areas of the intermediate cover are completed on a regular schedule with events in the spring and fall of each year. Per IPL, the erosion noted will be addressed during the next regularly scheduled maintenance event.

Based on the current inspection, the conditions noted are not considered an operating deficiency since they are unlikely to have a significant impact on the function of the CCR unit. However, continued erosion may lead to an accumulation of sediment in surface water and contact water management features on the interim cover or within the landfill. The accumulation of sediment reduces flow capacity, which can lead to the uncontrolled discharge of water, further erosion, a discharge of CCR, and CCR or interim cover instability. Observation of these areas and ongoing regular maintenance is recommended to ensure that the conditions observed during the visual inspection, or similar future conditions, are addressed and do not lead to a discharge of CCR or have an impact on the overall stability of the CCR unit.

No other erosion damage was noted during the inspection.

4.3.5 Unusual Surface Damaged Caused by Vehicle Traffic

No unusual surface damage caused by vehicle traffic was noted during the inspection.

4.4 DISRUPTIVE CONDITIONS

4.4.1 Existing Disruptive Conditions

4.4.1.1 Current Inspection

No existing conditions that were disrupting the operation and safety of the CCR unit were noted during the annual inspection.

4.4.1.2 Previous Inspection

No existing conditions that were disrupting the operation and safety of the CCR unit were noted during the previous inspection.

4.4.2 Potentially Disruptive Conditions

4.4.2.1 Current Inspection

The following potentially disruptive conditions were observed during the annual inspection.

- **Eroded liner ballast.** SCS observed erosion in the contact water basin liner ballast at the storm water inlet culvert and the southeast corner of the basin. Erosion of the ballast has exposed the contact water basin liner at the southeast corner and reduced the ballast thickness at the southern storm water culvert resulting in a risk of liner bubbles (aka "whales"). It is recommended that eroded areas be filled with supplemental ballast material and be monitored during the 7-day inspections.

- **Leachate Collection System status screen is barely legible.** The system status screen in the leachate collection system vault control panel at Expansion Phase 1 is barely legible, apparently due to exposure to direct sunlight over time. This is making system monitoring difficult. It is recommended that the system readout be replaced (component information is available in construction submittals for leachate collection system, EPG Companies (supplier) Job #14 11496).

- **Negative leachate head readings.** SCS observed the level sensor (transducer) was reading negative values at the Expansion Phase 1 – leachate headwell. This may be the result of dry conditions. The leachate monitoring system control panel was displaying a headwell sensor failure message at the time of the inspection. It is recommended OML staff have an IPL electrician evaluate the sensor/control panel and discuss sensor and recurring fault condition with EPG Companies (panel and leachate level measurement system manufacturer: https://www.epgco.com/aboutus/contact-us/). SCS also recommends monitoring during the 7-day inspections.

- **Stitched rain cover ballast material seam separation.** A number of stitched rain cover ballast material seams have started to separate at various locations on the rain cover ballast in Expansion Phase 1. This may subject the rain cover material to uplift and potential damage. It is recommended that the stitching is repaired or supplemental sandbag ballast is added in lieu of stitching and that the rain cover ballast material seams be monitored during the 7-day inspections.

- **Leachate flowmeter malfunction.** Based on leachate removal and hauling records provided by IPL, the leachate flowmeter in the wetwell that manages leachate flows from both phases of the landfill malfunctioned on or around 9/20/2022. This flowmeter measures the volume of leachate pumped from the wetwell, which includes leachate from both the Existing Landfill and Expansion Phase 1, to the leachate storage lagoon where it is stored until it is loaded and trucked off-site for treatment. No direct daily measurement of leachate flow from the Existing Landfill is possible without this flowmeter. Leachate flow from Phase 1 is recorded with a separate flowmeter that is operational. The volume of leachate that is hauled off-site for treatment is also monitored and recorded separately. It is still possible to estimate the flow of leachate from the Existing Landfill using available flowmeter data from Phase 1 and the volume of leachate hauled off-site for treatment. However, it is recommended that the flowmeter for the combined leachate wetwell be repaired.

4.4.2.2 Previous Inspection

The following potentially disruptive conditions were observed during the previous inspection.

- **Low influent flow from south storm water basin**. OML staff identified low influent flows from the Existing Landfill south storm water basin to the storm water/groundwater underdrain lift station. Staff suspect the pipe between the storm water basin and lift station may be damaged. Since this piping is located near leachate and groundwater underdrain piping from the existing landfill, there is concern that this piping is also impacted. At the time of inspection, OML staff were not able to assess leachate flows from the Existing Landfill due to an inoperable leachate flow meter. It was recommended that IPL staff complete the following remedial actions:

  – Verify storm water intake in pond is clean/clear, providing unobstructed flow.

  – Repair leachate flow meter in lift station to allow measurement of leachate collected from existing landfill. (Note: the leachate flow meter was repaired as described in the 2021 inspection report).

  – Camera inspect leachate and groundwater underdrain piping via the cleanouts located at the lift station.

  On July 28, 2022, SCS observed conditions at the south storm water basin. The water level in the basin was low, exposing 4 to 5 feet of accumulated sediment in the southwest corner of the pond around the drop inlet. During the inspection, SCS, IPL, and OML staff discussed how to develop access to remove accumulated sediment and repair/replace drop inlet, evaluate the piping between the drop inlet and the wet well during maintenance/repair of the drop inlet, and develop a regular maintenance schedule for sediment removal to prevent sediment accumulation that limits flow to wet well.

  Based on correspondence with IPL staff on August 9, 2022, OML staff removed accumulated sediment from the area around the drop inlet to expose the drop inlet for inspection and repair. OML staff identified that the fittings connecting the drop inlet and piping to the lift station were degraded, allowing sediment to block the drain line. Accumulated sediment that was blocking flow to the drop inlet and the piping between the drop inlet and the valve vault between the basin and the lift station was removed.

The piping between the drop inlet and valve vault was camera inspected and no integrity concerns were identified. The drop inlet was reinstalled with new connecting fittings, and the storm water valve vault and lift station were operating as intended after the repairs.

- Storm Water Valve Vault. During the previous annual inspection SCS observed the top of the vault located south of the Existing Landfill and the storm water basin was 2 to 3 degrees off level, which could be an indication of settlement of the valve vault structure. The settling of the vault could damage the piping. SCS observed no change in the valve vault during the current inspection. It is recommended OML staff continue to monitor the vault level annually (minimum) to identify additional movement/settlement that may cause damage to the valve and piping.

- Surface cracking in berms. SCS observed surface cracking in the berms that border the Expansion Phase 1 temporary contact water basin. This apparent desiccation cracking has been observed during past annual inspections and was not observed during the 2022 annual inspection. The cracks are monitored by IPL and backfilled on an as-needed basis.

4.5 OTHER CHANGES SINCE PREVIOUS ANNUAL INSPECTION

No changes to site conditions that appear to have the potential to affect the stability or operation of the facility were noted during the inspection of OML.

5.0 FUTURE INSPECTIONS

5.1 EXISTING CCR LANDFILL

As stated in 40 CFR 257.84(b)(4), the owner or operator of the CCR unit must conduct the inspection required by paragraphs (b)(1) and (2) of this section on an annual basis. The date of completing the inspection report is the basis for establishing the deadline to complete the next subsequent inspection. Any required inspection may be conducted prior to the required deadline, provided the owner or operator places the completed inspection report into the facility's operating record within a reasonable amount of time. In all cases, the deadline for completing subsequent inspection reports is based on the date of completing the previous inspection report. The owner or operator has completed an inspection when the inspection report has been placed in the facility's operating record.

The next annual inspection of OML must be completed within 1 year of the placement of this inspection report in the operating record for the facility.

5.2 NEW CCR LANDFILLS AND LATERAL EXPANSIONS

As discussed above, the CCR unit at the OML facility is considered an existing CCR unit. The initial annual inspection for CCR units constructed in the future must be completed within 14 months of the initial receipt of CCR in the module per 40 CFR 257.84(b)(3)(ii).