

Annual CCR Landfill Inspection

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

Prepared for:

Interstate Power and Light Company
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SCS ENGINEERS

25221073.00 | December 20, 2021

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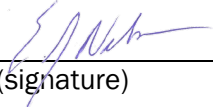
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PE CERTIFICATION

	<p>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.</p>
	<div style="display: flex; justify-content: space-between;"> <div style="text-align: center;">  (signature) </div> <div style="text-align: center;"> 12/20/2021 (date) </div> </div>
	<p style="text-align: center;">Eric J. Nelson (printed or typed name)</p>
	<p>License number <u> 23136 </u></p> <p>My license renewal date is December 31, 2022.</p>
	<p>Pages or sheets covered by this seal:</p> <p>Annual CCR Landfill Inspection, Ottumwa-Midland Landfill,</p>
	<p>December 20, 2021</p>

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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 1990's).
- OML Expansion Phase 1 (first phase of a multi-phase expansion completed in September 2015).

These phases were previously described as separate existing CCR landfills, although they are contiguous and are managed as a single landfill by the facility and by the Iowa Department of Natural Resources. IPL recently clarified that the OML Existing Landfill and OML Expansion Phase 1 are one existing CCR landfill under the federal CCR Rule, and this report reflects IPL's clarification.

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 the existing (active) CCR unit.

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

CCR Unit	CCR Rule Status	Basis for Status
OML including two phases: <ul style="list-style-type: none">• Existing Landfill• Expansion Phase 1	Existing, 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
Woody vegetation present in the northeast corner	Expansion Phase 1	Spot removal or mowing of woody vegetation. Monitor during 7-day inspections.	4.3.2
Animal burrow intermediate cover material on the south slope	Existing Landfill	Backfill with soil/bentonite mix or per existing burrow backfill protocol. Monitor during 7-day inspections	4.3.3
Rill and minor gully erosion of intermediate soil cover	Existing Landfill	Monitor intermediate cover during 7-day inspections and repair/restore if CCR is exposed.	4.3.4
Erosion of bottom ash ramp	Expansion Phase 1	Monitor during 7-day inspections and repair if ponding of leachate/contact water occurs, signaling obstruction of contact water flow or leachate collection.	4.3.4
<p>OML staff identified low influent flows from the south storm water basin to the storm water/groundwater underdrain lift station from 2019 and 2020. Staff suspect pipe between the storm water basin and lift station may be damaged.</p> <p>The storm water valve vault top was measured to be 2 to 3 degrees off level, which could be an indication of settlement of the valve vault structure.</p>	Existing Landfill	<p>Camera inspect leachate and groundwater underdrain piping via the cleanouts located at the lift station.</p> <p>Record storm water/groundwater wet well pump runtime and start count (if equipped) at the beginning and end of each week's shift to evaluate changes in flow, which might indicate damage to piping.</p> <p>Measure degrees off level at storm water valve vault top during annual inspections (min.) to track change over time, if any, to evaluate potential settlement.</p>	4.4.2.1

Condition	Location/ Phase	Recommendation(s)	Report Section
Surface cracking in temporary contact water basin berms	Expansion Phase 1	Fill the cracks with sand/bentonite mixture and monitor during 7-day inspections. Consider placing geotextile and aggregate on areas used for ATV/UTV access where vegetation is not established.	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 August 10, 2021. Mr. Nelson is a licensed professional engineer in Iowa and holds a Bachelor's 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. 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 is actively being filled. All of the interior west slope and approximately the upper half of the interior east and south slopes of the lined area are still covered with a temporary rain cover, and no CCR has been placed in these areas.

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	1,132,669 cubic yards	Estimated volume based on existing in-place waste volume as of 5/23/2017 plus estimated waste disposed between 5/24/2017 and 8/10/2021. In place volume as of 5/23/2017 is based on topographic survey. Waste disposed from 5/24/2017 to 8/10/2021 (156,583 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 (159,203 cubic yards), assuming an average unit weight for CCR of 0.9 tons per cubic yard (tons/cy) for the period of May 24, 2017, through July 13, 2019; 1.0 tons/cy for July 13, 2019, through August 17, 2020; and 1.18 tons/cy for the period of August 18, 2020, to August 10, 2021. Disposal records through 5/31/2021 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 to 1 vertical (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

No signs of surface movement or instability were observed during the inspection.

4.3.2 Inappropriate Vegetation Growth

Woody vegetation was present in the northeast corner of Expansion Phase 1. This condition is not considered an operating deficiency, but SCS recommended woody vegetation be spot removed or mowed, and these areas monitored during the 7-day inspections for renewed growth.

Based on correspondence with IPL staff on September 27, 2021, the woody vegetation identified in the August 2021 inspection has been addressed.

4.3.3 Animal Burrows

An animal burrow was present in the intermediate cover material on the south slope of the Existing Landfill. This condition is not considered an operating deficiency, but SCS recommended backfilling with soil/bentonite mix or per existing burrow backfill protocol. The area should be monitored during the 7-day inspections.

Based on correspondence with IPL staff on September 27, 2021, the animal burrow identified in the August 2021 inspection has been addressed.

4.3.4 Erosion Damage

The following erosion damage was observed during the annual inspection.

- **Mild gully erosion of the Existing Landfill intermediate cover** materials was noted at various locations during the inspection. Similar erosion was also noted in the previous inspection and has been repaired between the annual inspections based on the presence of sparse vegetation and residual mulch and erosion mat materials. The erosion appears to be caused by areas of concentrated runoff from the intermediate cover. The runoff causing the erosion is controlled and directed to the storm water basin located to the south of the landfill. 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.

- **Erosion of the bottom ash access ramp to the Expansion Phase 1 active filling area** that was noted during previous inspection remains; however, no significant changes to the conditions in this area were noted during the current inspection. Bottom ash from the ramp has eroded into the area along the north side of the ramp and into the culvert that allows the free flow of contact water under the ramp in Expansion Phase 1. The condition is not prohibiting the proper management of contact water because a temporary rain cover is installed over the south end of the culvert, so the culvert serves no current function. Non-contact water generated in the temporary rain cover area is properly managed by facility staff by pumping it to the adjacent sedimentation basin to the north. This area should be monitored and repaired if ponding water occurs.

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, erosion and the resulting deposit of sediment in surface water and contact water management features have the potential to cause ponding of water that may result in a discharge of CCR or impact the overall stability of the CCR. 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.

- **Surface cracking in berms.** SCS observed surface cracking in the berms that border the Expansion Phase 1 temporary contact water basin. The cracks are visible in sparsely vegetated areas along the top of the berm, which is constructed of clay. The cracks

appear to be desiccation cracks. It is recommended that IPL staff fill the cracks with a sand/bentonite mixture as they are identified and monitor the cracks for changes during their 7-day inspections.

- **Storm Water Valve Vault.** SCS also 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. It is recommended OML staff continue to monitor the vault level annually (minimum), record storm water/groundwater wet well pump runtime at beginning and end of each week's shift to evaluate change in flow, and camera inspect piping during next scheduled leachate collection system jetting event.

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

Per IPL, the leachate flow meter has been repaired since the August 2020 inspection and the intake piping has been cleaned. IPL should attempt to camera inspect the leachate and groundwater underdrain piping via the cleanouts near the lift station at their next opportunity.

Current observations of the storm water valve vault that may be related to the issues identified by OML staff are discussed in **Section 4.4.2.1**.

- **Surface cracking in berms.** SCS observed surface cracking in the berms that border the Expansion Phase 1 temporary contact water basin and northern-most storm water sedimentation basin to the east. This apparent desiccation cracking has been observed regularly during annual inspections and is discussed in **Section 4.4.2.1**. The cracks are monitored by IPL and backfilled on an as-needed basis.
- **Negative leachate head readings.** SCS also observed the level sensor (transducer) was reading negative values at the Expansion Phase 1 – leachate headwell. The leachate monitoring system control panel was displaying a headwell sensor failure message at the time of the inspection. IPL has resolved the transducer issue and it was operating as intended during the August 2021 inspection.

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).