

2020 Landfill CCR Inspection Report

Entergy Independence Plant
Class 3N Landfill
Newark, Arkansas

Permit No. 0200-S3N-R2
AFIN: 32-00042

January 2021
Project No. 35207215

Prepared for:
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Terracon

Environmental



Facilities



Geotechnical



Materials

PROFESSIONAL ENGINEER'S CERTIFICATION

This report on the annual engineering inspection of the Entergy Independence Plant Class 3N Landfill and supporting documentation was prepared under the direction and supervision of a qualified, State of Arkansas-registered Professional Engineer. Mr. David McCormick, PE, of Terracon Consultants, Inc. (Terracon), was responsible for the overall preparation of this report. The report has been prepared to fulfill the requirements of §257.84(b). Based on the inspection of the landfill facility and review of available landfill documents the design, construction, operation, and maintenance of the landfill is consistent with recognized and generally accepted good engineering standards.



1.15.21

David C. McCormick, P.E.
Arkansas Professional Engineer No. 9199

Date



Expires 12.31.21

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1.0 INTRODUCTION

1.1 Purpose of Report

The purpose of this report is to document the annual inspection of the Entergy Independence Plant Landfill facility in accordance with 40 CFR §257, *Subpart D - Disposal of Coal Combustion Residuals From Electric Utilities* (the CCR Rule). In particular, the report has been prepared to comply with §257.84(b), which requires an inspection to be conducted by a qualified professional engineer to ensure that the design, construction, operation, and maintenance of the landfill is consistent with recognized and generally accepted good engineering standards.

The report includes:

- Information on the current layout of the landfill,
- Waste volume estimates for the amount of waste contained in the landfill and remaining disposal capacity, and
- An assessment of the landfill including structural integrity and overall operations with respect to the CCR Rule and the facility permit requirements.

1.2 Independence Power Plant Information

The plant is located on approximately 1,850 acres about 2-½ miles southeast of Newark in Independence County, Arkansas as shown on **FIGURE 1** (all figures are included in **APPENDIX A**). The site is characterized by minimal topographic relief and is situated within the White River floodplain.

The plant has been in operation since 1983 and has historically generated electricity through the combustion of Powder River Basin (PRB) (Wyoming) sub-bituminous coal. The ash, a coal combustion by-product (or residue) (CCR), is generally segregated into two categories, “fly” and “bottom” ash.

Approximately 80% of the ash produced is classified as fly ash that is derived from the boiler exhaust gas and collected in electrostatic precipitators. The fly ash is composed of very fine particles similar to glass and has the consistency of a powder. Collected fly ash is blown to silos for short-term storage. A subcategory of the fly ash is known as economizer ash. This material is the coarsest fraction of the fly ash that drops out before the electrostatic precipitators, and represents approximately 2% of the fly ash production.

The bottom ash is composed of angular, glassy particles with a porous surface texture and has the consistency of coarse sand. The bottom ash is sluiced principally to dewatering hoppers for removal of water, and solids management leading to beneficial reuse or placement in the landfill.

Historically, approximately 60 to 70% of the two types of ash have been marketed regionally to construction-related industries. The remaining amount of ash has been placed in the onsite Landfill for disposal.

1.3 Permit History

In October 1982, Arkansas Power & Light Company (AP&L) was granted a permit (#200-S) from the Arkansas Department of Pollution Control and Ecology, now the Arkansas Department of Energy & Environment Division of Environmental Quality (DEQ), to construct and operate a solid waste disposal facility at the plant. Entergy Arkansas, Inc. (now known as Entergy Arkansas, LLC) became AP&L's successor in interest in April 1996. The permit was modified in 2002 to update the landfill to comply with Arkansas Pollution Control and Ecology Commission (APC&EC) Rule No. 22 (Solid Waste Management Code) design and operational standards for Class 4 (inert waste) Landfills. The current facility permit (0200-S3N-R2) was issued in December 2014 and includes design and operational modifications to the landfill facility to comply with Rule No. 22 requirements for Class 3N (Industrial) Landfills.

2.0 LANDFILL LAYOUT

2.1 Existing Conditions of Landfill

The permitted landfill area consists of approximately 335 acres and is located in the northeastern portion of the plant site as shown on **FIGURE 2**. The Landfill was designed to be developed in three phases, of which only Phases 1 and 2 are currently permitted. The current layout of the Landfill includes a total of 22 disposal cells and has a permitted waste capacity of approximately 13,000,000 cubic yards (cy). Waste Cells 1 through 15 have been constructed and Waste Cells 12, 13, 14, and 15 comprise the active disposal area of the Landfill having received CCR materials after October 19, 2015.

Construction of the disposal cells has followed the numerical sequence of the cell numbers with all design, construction, operation and maintenance in compliance with the requirements of APC&EC Rule 22. Waste Cells 1 through 11 were constructed, operated and closed prior to the effective date of the CCR Rule and are not covered by the requirements of the Rule. Waste Cells 12 through 15 are existing landfill CCR units and are operated in accordance with requirements of the CCR Rule.

Table 2.1 presents a summary of the existing CCR Unit disposal cells that have been constructed at the Independence Landfill.

Table 2.1. Construction Summary of Independence Plant Class 3N Landfill

Cell Number	Year Built	Bottom Liner System	Year Closed	Final Cover System	Status
12	Pre-1996	Original permit	N/A	N/A	Open and active disposal area
13	Pre-1996	Original permit	N/A	N/A	Open and active disposal area
14	2000;2006	Original permit; 2002 permit	N/A	N/A	Open and active disposal area
15	2011	Current permit	N/A	N/A	Open and active disposal area

2.2 Changes Made to Landfill Configuration During Reporting Period

During the reporting period, no changes were made to the landfill configuration. Waste Cells 12 through 15 are open and are actively receiving waste. No cells were opened, and no cells were closed during the reporting period.

The landfill manager that works for the contracted landfill management company, Charah Solutions, Inc. (Charah), reported improvements made during the year to the leachate collection system and repairs to slopes exhibiting rills and gullies. Charah continues to make improvements to the landfill area.

3.0 WASTE VOLUME CALCULATIONS

The landfill facility has been surveyed annually since 1996. Each year's survey is compared to the previous year to compute the amount of CCR disposed. The current survey is also compared to the DEQ permitted top of waste elevations to determine remaining capacity, or airspace. Additionally, the current survey is compared to an estimated "operational" top of waste to determine the remaining operational capacity. The operational top of waste is the maximum disposal elevation that can be achieved within the open cells while maintaining the required 4:1 exterior and 3:1 interior slopes along with a top width sufficient for disposal activities. If additional operational capacity is needed, construction of an adjacent disposal cell will be required.

Disposal rates for the facility are calculated using the average of the disposal rates from the five most recent years. Disposal rates depend upon CCR production at the plant and sales of the ash. These can vary significantly year to year based upon the current economic climate, weather, and how much the plant is operational.

During the reporting period, there were four waste cells (Waste Cells 12 through 15) open at the site. These areas are shown on **FIGURE 2**.

Digital terrain modeling techniques were used to determine volumes of ash disposed during the current reporting period. Surface models were originally created for the Landfill's surface from aerial photography taken in June 1996 and for the originally permitted proposed final surfaces. The surface models were updated in 1997 through 2015 based on field and/or aerial survey data. For this report, the active areas were surveyed on December 9, 2020. The surface generated from the current survey was compared to the December 17, 2019, survey surface model utilizing AutoCAD Civil 3D software to estimate volume changes that have occurred over the reporting period. **Table 3.1** summarizes volume changes for the current reporting period and estimated remaining capacity by waste cell.

Table 3.1 Summary of waste volume calculations.

Cell Number	Status	Area (ac)	DEQ Permitted Waste Capacity (cy)	2020 Volume Placed* (cy)	Total Volume Placed (cy)	Operational Remaining Disposal Capacity (cy)	Operational Remaining Life (years)
Cell 12	Active	5.7	434,800	12,510	304,300	75,600	0.97
Cell 13	Active	5.7	372,300	27,470	328,750	43,550	0.56
Cell 14	Active	15.0	807,400	(2,040)	657,300	133,800	1.72
Cell 15	Active	18.2	1,258,100	(89,430)	610,560	540,340	6.94
Totals		44.6	2,872,600	(51,490)	1,900,910	793,290	10.19

* Volume cut or filled during the 12-month period between December 2019 and December 2020.

Based upon the digital terrain model, the net volume of material in Waste Cells 12 through 15 during the reporting period was calculated to be approximately 51,490 cubic yards (cy) removed from the Waste Cells. The quantity of ash placed this reporting period is significantly lower than the previous year and the 5-year average due to the facility selling material. Final permitted contours are shown in **FIGURE 3**. Based upon a 5-year historical annual average disposal rate of approximately 77,900 cy of material, there are about 10.19 years of capacity left in Waste Cells 12 through 15. This time frame is affected by the market for ash material and may be shorter or longer depending on market conditions. Also, the time may be affected by additional cleaning of the recycle ponds.

4.0 ASSESSMENT OF LANDFILL FACILITY

This section of the report provides a summary of the inspection of the Entergy Independence Plant Class 3N Landfill facility that was conducted on December 9, 2020. Charah has been the landfill's operations contractor during 2020. The assessment included an interview with Charah and Entergy personnel, review of weekly inspection reports of the facility, review of documents pertaining to the operation and compliance of the landfill, and an on-site inspection of the landfill facility. Photographs of the site inspection are included in **APPENDIX B**.

4.1 General Operations

In general, the final and interim slopes of the active waste cells appeared to be stable. The side-slopes of the landfill are generally at the required 4:1 external and 3:1 interior slope requirements. No tension cracks, seeps, or other features that indicate a potential slope failure were observed during the site inspection. In addition, no active seeps were noted.

The general operations of the landfill facility are being done in a safe manner and the overall maintenance of the facility is in good condition.

4.2 Landfill Cover System

None of the active Waste Cells, 12 through 15, are partially closed or have interim cover.

4.3 Leachate Collection System

As required by APC&EC Rule 22, Cell 15 is constructed with a leachate collection system. The system consists of a six-inch diameter high-density polyethylene (HDPE) perforated pipe installed in the center of Waste Cell 15. The pipe drains to a washed gravel-filled sump located on the toe of the eastern slope of the cell. The sump was working during the visit and the levels were less than 12-inches over the liner system. From the sump, leachate is pumped via a dual-contained HDPE pipeline (4" diameter/8" diameter) to the discharge point at the plant's Surge Pond south of the landfill in accordance with the facility's current National Pollutant Discharge Elimination System (NPDES) Permit. Maintenance repairs were made to the leachate pumps in July 2020. Overall, the leachate collection system appeared to be in good working order (See Photo 3).

4.4 Stormwater Control System

No issues were found with the Stormwater control system during the inspection. In accordance with the facility's Operation Plan required by the current Class 3N solid waste permit, Charah conducts periodic inspections of the condition of the system and makes appropriate repairs as

needed. Charah conducted the appropriate inspections and any necessary repairs during the reporting period.

Temporary berms are used down gradient of the active area to help minimize the potential for sediment transport from the area. Perimeter ditches and drainage conveyances are used to direct stormwater around the landfill area. Culverts are installed at the southwest corner of the Landfill to allow drainage beneath the perimeter access road.

All stormwater runoff from the permitted landfill area is ultimately discharged to the plant's Surge Pond. Water from the Surge Pond is pumped to sedimentation basins that are part of the plant's wastewater treatment system. After treatment in the sedimentation basins, the water is either used as cooling water in the plant or discharged to the White River. Discharges to the White River are permitted under NPDES Permit No. AR0037451. Runoff from the Landfill is a listed source for this NPDES permit.

4.5 Facility Roads

The facility roads were well maintained at the time of the inspection. The disposal access road to the active cells is paved, and it was in excellent condition at the time of the inspection. The perimeter access road has an all-weather surface coarse and was in good condition.

4.6 Fugitive Dust Control

In accordance with the facility's CCR Fugitive Dust Control Plan, Charah routinely sprays the working face and haul roads using water trucks to control dust from the fly ash. Fly ash is deposited in the landfill by belly-dumping from the bottom of the tanker trucks in order to minimize the material drop distance. Bottom ash, in a moist condition, is hauled to the landfill using dump trucks. Economizer ash is loaded to covered dump truck prior to transfer to the landfill. A windsock is used to visually gauge wind direction and intensity. Water is applied, when necessary, for dust suppression on roads and the landfill using a water truck. The landfill access roads have enforced posted speed limit of 25 mph. Within the landfill boundary, a 5 mph speed limit is enforced. During the inspection, minimal fugitive dust was observed.

APPENDIX A
Figures



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Project Mngr:	TLB	Project No.	026-001-35207215
Drawn By:	TLB	Scale:	AS SHOWN
Checked By:	DCM	File No.	001
Approved By:	DCM	Date:	12/15/2020

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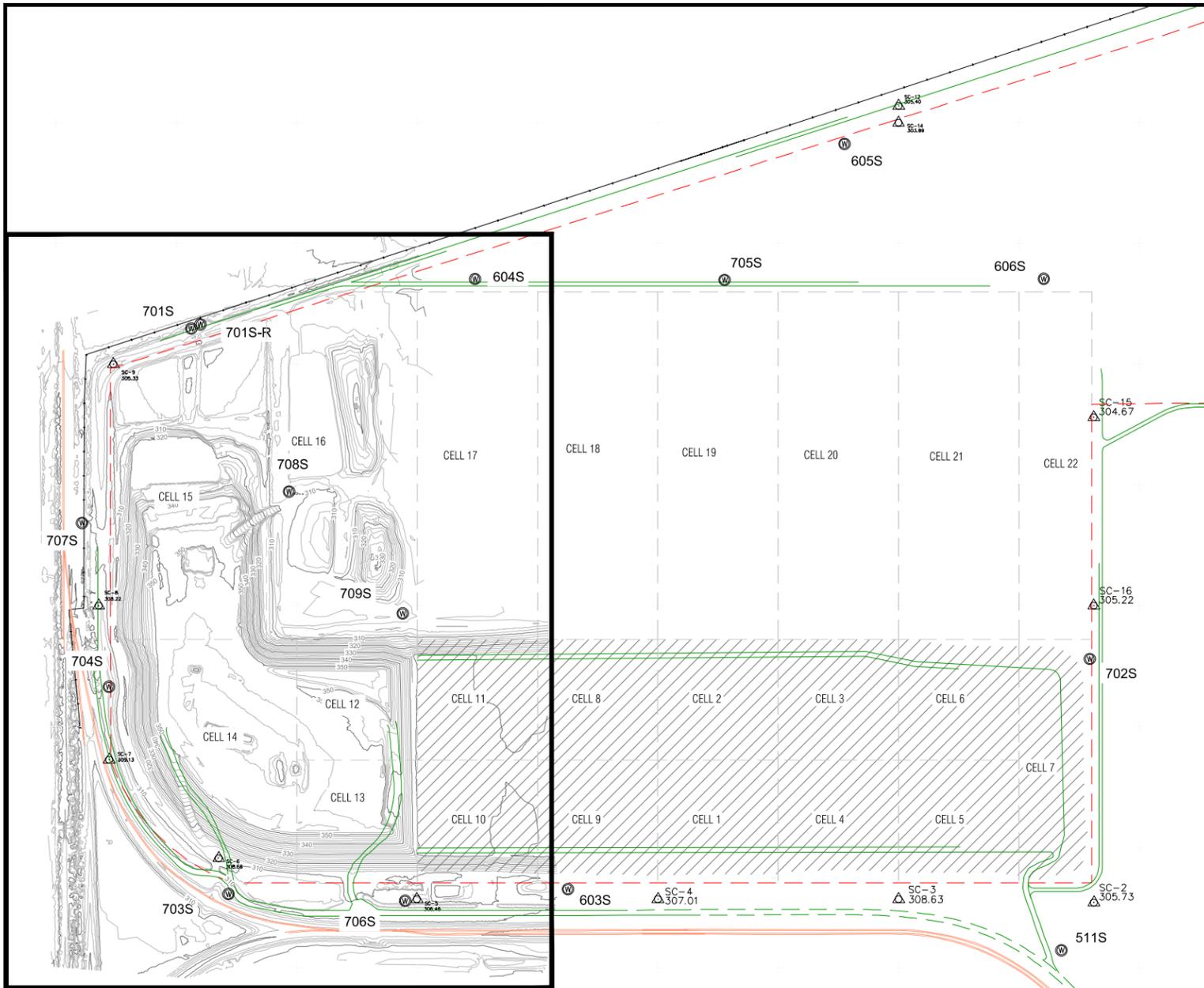
25809 INTERSTATE 30 S BRYANT, ARKANSAS 72022
 PH. (501) 847-9292 FAX. (501) 847-2910

SITE MAP

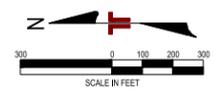
2020 LANDFILL INSPECTION REPORT
ENTERGY INDEPENDENCE PLANT
 CLASS 3N LANDFILL

NEWARK ARKANSAS

FIG. No.	1
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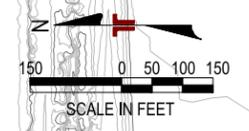
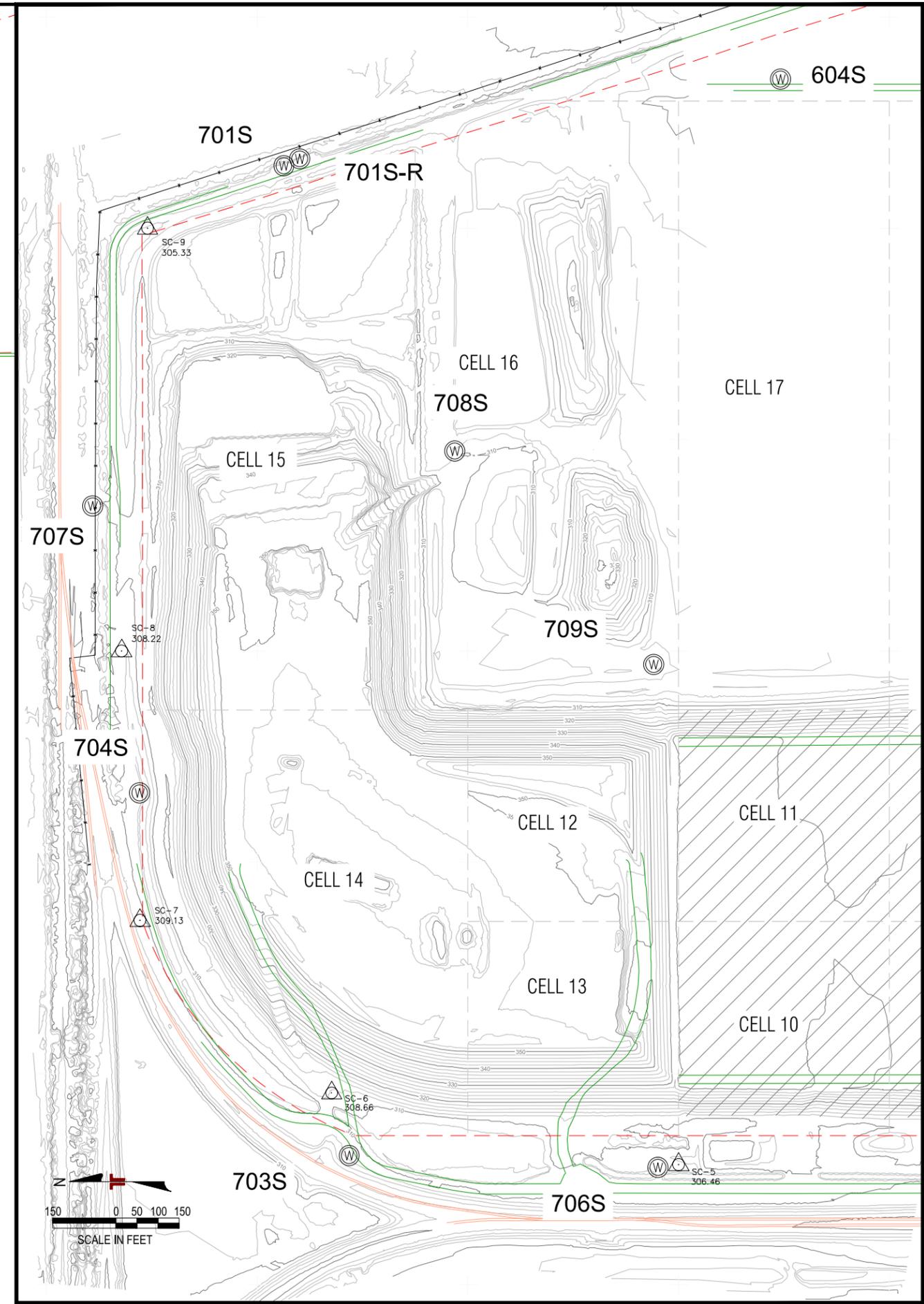
SEE VIEW "A"



LEGEND

- INDEX CONTOUR
- INTERMEDIATE CONTOUR
- ☐ TREES
- EXISTING ROAD (UNPAVED)
- EXISTING ROAD (PAVED)
- EXISTING RAILROAD
- CELL BOUNDARY
- LANDFILL PERMIT BOUNDARY
- PROPOSED TOP OF FINAL COVER
- PLANT GRID TICK
- △ SC-# ELEV. SURVEY CONTROL BENCHMARK
- ▨ CLOSED WASTE DISPOSAL AREA
- ⊙ 511S MONITORING WELL LOCATION
- ▨ WASTE/ASH PILES (AVG HEIGHT)

- NOTES:
1. TOPOGRAPHIC INFORMATION IS FROM AN AERIAL SURVEY BY TERRACON CONSULTANTS, INC. DATED DECEMBER 9, 2020
 2. SURVEY CONTROL POINTS WERE ESTABLISHED IN AUGUST 1997 BY DESIGN, DRAFTING, SURVEYING, AND MAPPING, LLC.



VIEW "A"

REV.	DATE	BY	DESCRIPTION

EXISTING CONDITIONS

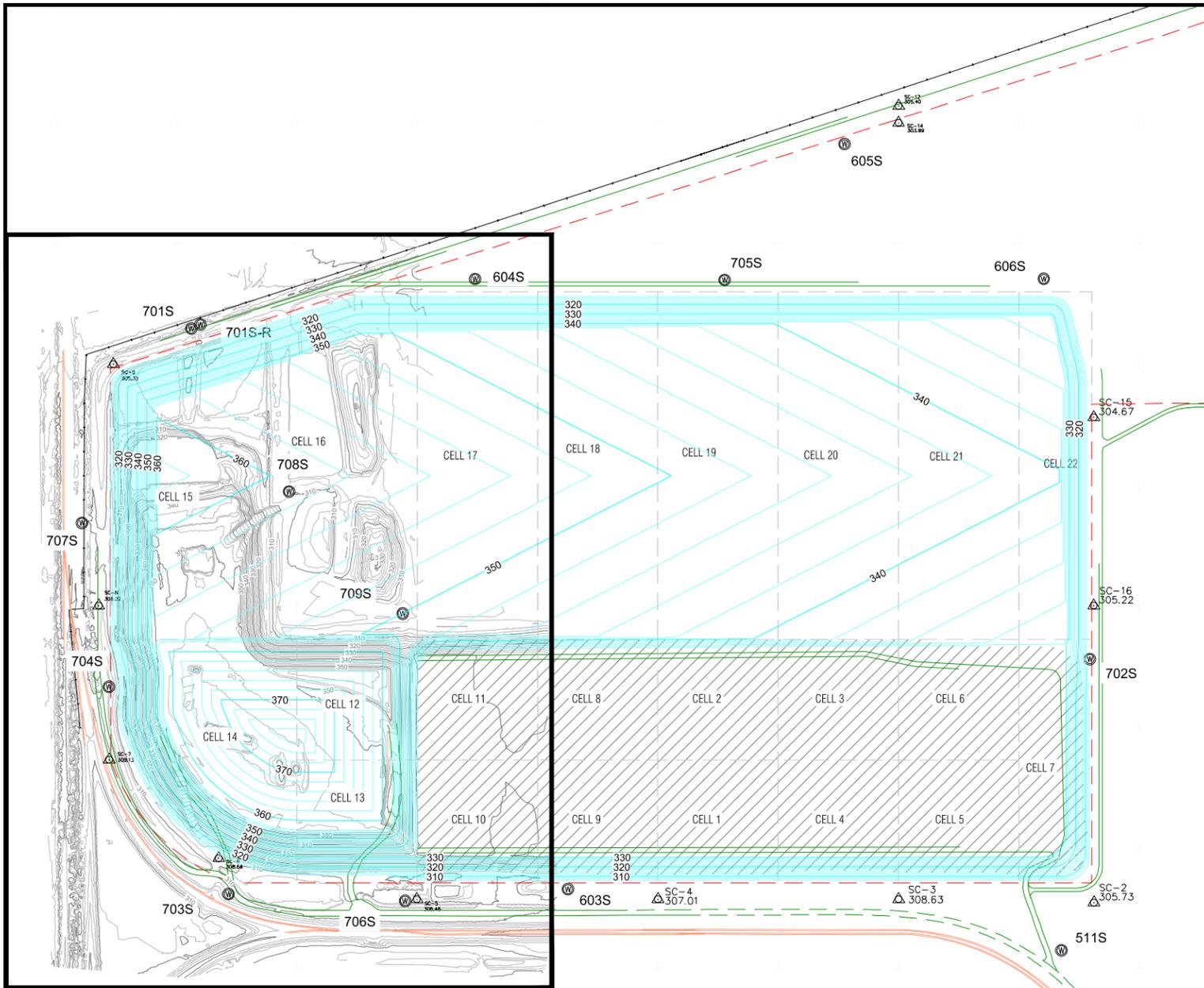
2020 LANDFILL INSPECTION REPORT
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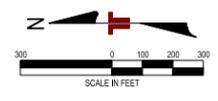
25808 L40 SOUTH BRYANT, AR 72022
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FIGURE 2

DESIGNED BY:	TLB
DRAWN BY:	TLB
APP'D. BY:	DCM
SCALE:	SEE SCALEBAR
DATE:	1/4/2021
JOB NO.:	028-001-35207215
ACAD NO.:	002
SHEET NO.:	2 OF 3

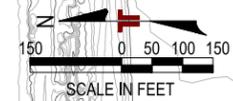
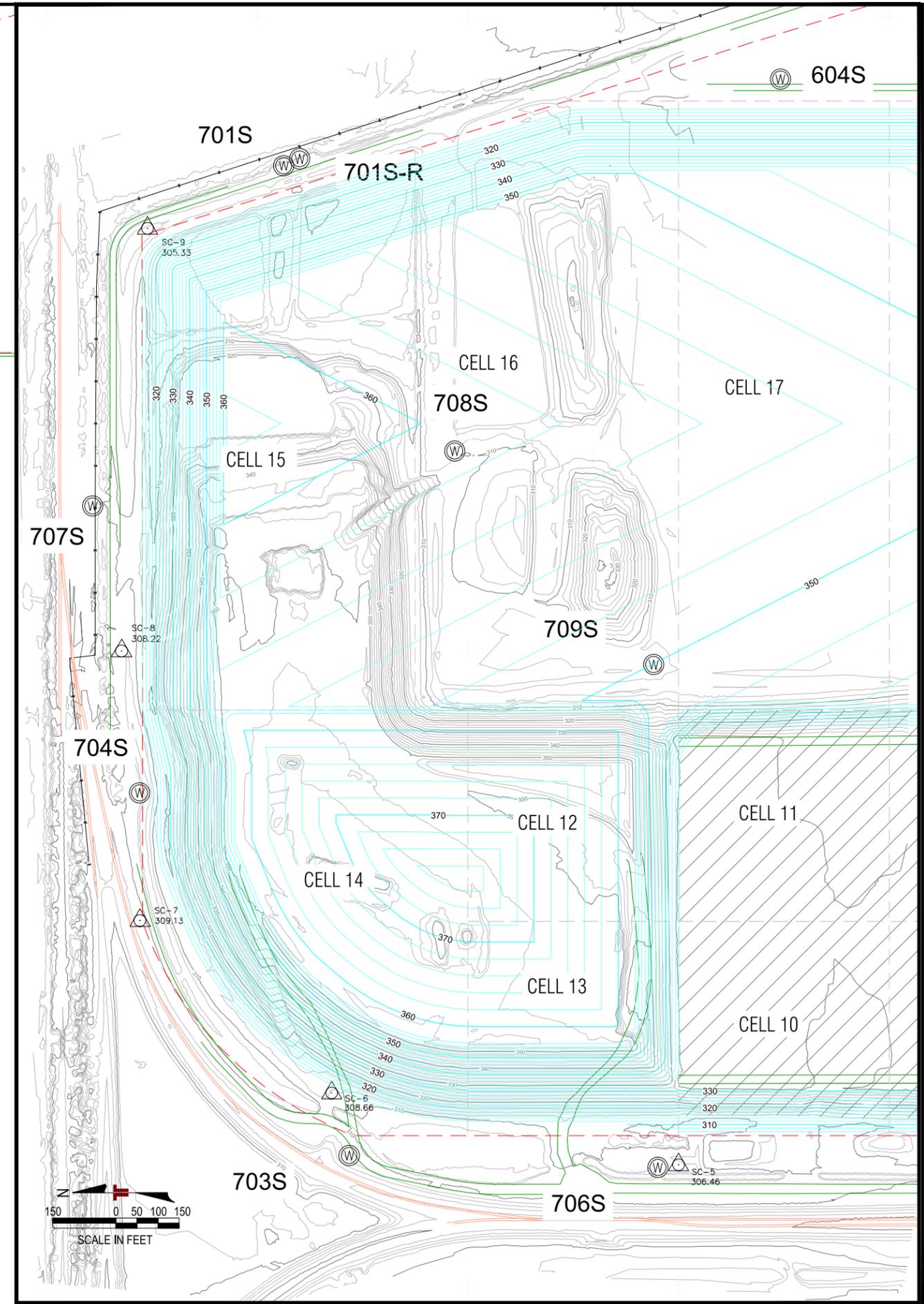


SEE VIEW "A"



- NOTES:
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- LEGEND**
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 - == EXISTING ROAD (PAVED)
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 - ▨ WASTE/ASH PILES (AVG HEIGHT)



VIEW "A"

REV.	DATE	BY	DESCRIPTION

FINAL PERMIT CONTOURS
2020 LANDFILL INSPECTION REPORT

ENTERGY INDEPENDENCE PLANT
CLASS 3N LANDFILL

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FIGURE 3

DESIGNED BY:	TLB
DRAWN BY:	TLB
APPROV. BY:	DCM
SCALE:	SEE SCALEBAR
DATE:	12/15/2020
JOB NO.:	028-011-35207215
ACAD NO.:	002
SHEET NO.:	3 OF 3

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APPENDIX B
Photos of Annual Engineering Inspection



1. Waste Cell 15 north slope looking south.



2. Waste Cell 14 north slope looking south.



3. Waste Cell 15 east slope looking west.



4. Waste Cell 15 leachate riser.



5. Waste Cell 15 south slope looking north.



6. Waste Cell 12 east slope and Waste Cell 15 south slope looking north.



7. Waste Cells 12 and 13 south side and Phase 1 north side looking north.



8. Looking southeast at open Waste Cells 12-15.



9. South slope of Phase 1 looking west.



10. East slope of Phase 1 looking north.