2021 Annual Inspection Report
Inactive CCR Surface Impoundment

City of Ames Steam Electric Plant

Ames Municipal Electric System
502 Carroll Avenue
Ames, Iowa 50010

SCS ENGINEERS

Report Number 27221400.00 | April 2022

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April 12, 2022
File No. 27221400.00

Mr. Brian Trower
Assistant Director – Electric Services
Ames Municipal Electric System
502 Carroll Avenue
Ames, Iowa 50010

Subject: 2021 Coal Combustion Residuals (CCR) Inactive Surface Impoundment Inspection

Dear Mr. Trower:

SCS Engineers has prepared the 2021 CCR Inactive Surface Impoundment Inspection Report for the City of Ames Steam Electric Plant in general accordance with the requirements set forth in §257.83(b) of the CCR Rule (40 CFR 257.50-107).

If you have any questions regarding this document, please contact the undersigned.

Sincerely,

Christine L. Collier, P.E.
Project Manager
SCS ENGINEERS
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PE CERTIFICATION

I hereby certify that this document 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.

Christine L Collier April 12, 2022

Christine L. Collier Date

My license renewal date is: December 31, 2023

Pages or sheets covered by this seal:

All

1 INTRODUCTION

On April 17, 2015, the United States (US) Environmental Protection Agency (EPA) issued the final rule of the federal Coal Combustion Residuals (CCR) Rule to regulate the disposal of CCR materials generated from the combustion of coal at electric utilities and independent power producers. The initial federal CCR Rule allowed for inactive CCR surface impoundments that had completely closed by April 17, 2018, to have no other requirements applied to that unit (i.e., the "early closure" provisions). However, on June 14, 2016, the United States Court of Appeals for the D.C. Circuit ordered the vacatur of these "early closure" provisions in the Code of Federal Regulations (CFR) 40 Part §257.100. The effect of the vacatur is that inactive CCR surface impoundments must now comply with the requirements applicable to existing CCR surface impoundments. Inactive power plant ash impoundments containing CCR are regulated under 40 CFR Part §257.100.

The City of Ames (City) Ames Municipal Electric System operates a Steam Electric Plant (SEP) located at 200 East 5th Street in Ames, Iowa. The inactive CCR surface impoundment (Impoundment) associated with the Ames Municipal Electric System's SEP is subject to the CCR Rule and in accordance with the rule must be inspected annually by a qualified professional engineer as specified in Section §257.83 of the rule. SCS Engineers (SCS) completed the 2021 annual site inspection of the Ames Municipal Electric System SEP Impoundment on December 22, 2021. This report provides documentation of the requirements in 257.83(b)(1) and (2).

1.1 PURPOSE

The purpose of the annual site inspection is to, through observation, ensure that the design, construction, operation, and maintenance of the CCR unit is consistent with recognized and generally accepted good engineering practices. Per 40 CFR §257.83(b)(1), the site inspection must, at a minimum, include:

- A review of available information regarding the status and condition of the CCR unit, operating records files, weekly inspections, structural stability assessments, and results of previous annual inspections - §257.83 (b)(1)(i)
- A visual site inspection of the CCR unit and appurtenant structures to identify signs of distress or malfunction of the CCR unit and appurtenant structures - §257.83 (b)(1)(ii)
- A visual site inspection of any hydraulic structures underlying the base or passing through the dike of the CCR unit for structural integrity and continued safe and reliable operation - §257.83 (b)(1)(iii)
- A site inspection report that includes the following:
    - Changes in geometry since the last inspection - §257.83 (b)(2)(i)
    - Location and type of existing instrumentation and maximum recorded readings since the last inspection -§257.83 (b)(2)(ii)
    - Approximate minimum, maximum and present depth and elevation of impounded water and CCR since the last inspection - §257.83 (b)(2)(iii)

- Storage capacity of the impounding structure at time of inspection - §257.83(b)(2)(iv)
- Approximate volume of impounded water and CCR at the time of inspection -§257.83 (b)(2)(v)
- Appearance of actual or potential structural weakness of the CCR unit - §257.83(b)(2)(vi)
- Any other changes which may have affected the stability or operation of the CCR unit since the last inspection - §257.83 (b)(2)(vii)

1.2 FACILITY DESCRIPTION

The City of Ames owns and operates a full service electric utility d/b/a the Ames Municipal Electric System with generation, transmission, and distribution assets necessary to serve the City. The City owns and operates two generating facilities, the SEP and the Combustion Turbine Station. The SEP has two generating units (7 and 8), with nameplate ratings of 33 and 65 megawatts, which went into commercial operation in 1967 and 1982, respectively. Both units were outfitted with pulverized coal boilers providing steam to non-reheat turbine-generators. For fuel, the boilers fired ultra-low sulfur sub-bituminous coal from the Powder River Basin in Wyoming, along with co-firing refuse derived fuel (RDF). In 2016, both units were converted to fire natural gas, while still co-firing RDF, which has been done since 1975. By discontinuing the discharge of CCR to the ash site as of October 19, 2015, the Impoundment qualifies as an "inactive" site under 40 CFR §257.53.

Placement of CCR into the Impoundment ceased prior to October 19, 2015. The Impoundment continued to be operated by the Ames Municipal Electric System SEP to dispose of the non-CCR ash from the co-firing of RDF in the power plant's boilers until April 11, 2021, per 40 CFR §257.101(a)(1). The Ames Municipal Electric System SEP is in the process of designing and permitting a partial clean closure/partial in-place closure of the Impoundment. The clean closure portion of the Impoundment will be permitted and reconstructed to manage the RDF ash that is transported (sluiced) from the power plant and now temporarily discharged into the first of two clear water ponds. After passing through the two clear water ponds, the water enters the pump house at the southwest corner of the second clear water pond where it is pumped back to the power plant for reuse as ash transport (sluice) water. There are times in order to best manage the water balance of the pond system that it becomes necessary to decant a portion of the clean return water into the field lying to the south of the pump house and clear water ponds.

2 REVIEW OF AVAILABLE INFORMATION

Ms. Christine Collier, P.E. of SCS Engineers (SCS) completed an annual site inspection and review of the Ames Municipal Electric System SEP Impoundment on December 22, 2021, in accordance with 40 CFR §257.83(b)(1). Ms. Collier is a licensed professional engineer in Iowa and holds a Master of Science degree in Civil Engineering. She has over 20 years of experience in the design, construction, and operation of solid waste management facilities.

2.1 OPERATING RECORD REVIEW

In accordance with §257.83(b)(1)(i), SCS reviewed the available information in the operating record for the Impoundment in support of the visual observation discussed below. SCS reviewed operating record materials provided by the Ames Municipal Electric System SEP and the information posted on the Ames Municipal Electric System's CCR Rule Compliance Data and Information website for this facility. Compliance documents to meet the April 17, 2018, deadline under §257.100(e)(3)(i), (iv), and (v), §257.100(e)(4)(ii), and §257.100(e)(6)(i) and (ii) were completed as required. Additional specific documents reviewed include, but are not limited to the previous annual site inspection report by SCS dated April 14, 2021, and weekly visual inspection logs and monthly instrumentation readings provided by Ames Municipal Electric System SEP.

Review of the above documents did not identify any unresolved issues that indicated operation, safety, or structural concerns on the Ames Municipal Electric System SEP Impoundment.

2.2 VISUAL INSPECTION

SCS visually observed the Impoundment to identify signs of distress or malfunction of the CCR unit and appurtenant structures per §257.83(b)(1)(ii). In addition, a visual observation of the hydraulic structures underlying the base of the CCR unit or passing through the dike of the CCR unit for structural integrity and continued safe and reliable operation of these features per §257.83(b)(1)(iii) was completed for features readily visible from the ground surface. Figure 1 contains the overall site layout, monitoring well locations, site features, and noted areas. No sluice water or cooling tower blowdown discharge into the Impoundment was occurring during the inspection as previously noted. Ames Municipal Electric System continues to prepare to complete a partial clean closure (east portion) and partial close in place (west portion) of the Impoundment.

3 ANNUAL INSPECTION RESULTS

The site observation checklist, included in Appendix A, was utilized during the annual site inspection. The overall site layout is shown on Figure 1. Photographs taken to compare the current facility conditions to those during the 2020 site inspection are included in Appendix B. No significant changes were noted in comparing 2021 with 2020 photographs, with the exception of observed water levels. The results of the annual site inspection, along with a description of any deficiencies identified during the visual observation, are further summarized in the following sections in accordance with 40 CFR §257.83(b)(2).

3.1 CHANGES IN GEOMETRY

There were no apparent changes in the geometry of the Impoundment when compared to the previous SCS site inspection report, the historical construction drawings provided by the Ames Municipal Electric System SEP, or the site observation photographs. No significant change to the geometry of the RDF/coal ash material within the Impoundment was observed during the inspection.

3.2 INSTRUMENTATION AND READINGS

Historically there have been three piezometers and one groundwater monitoring well (east of the bike path and lying east of the Impoundment) that are utilized for groundwater level readings. Eight additional groundwater monitoring wells were installed in June 2018. Figure 1 shows the locations of these points. Table 1 below provides a summary of the monitoring points, maximum recorded readings since the previous annual site inspection and the date on which those readings occurred.

Table 1. Instrument Information

Instrument Name[1]	Max Reading Since Previous Observation[2,3]	Date Recorded
MW-1[4]	54.32	3/12/2021
PZ-1[4]	56.45	1/22/2021
PZ-2[4]	56.17	3/12/2021
PZ-3[4]	55.98	3/12/2021
MW-101[4]	53.56	4/1/2021
MW-102[4]	53.40	4/1/2021
MW-103[4]	53.35	4/1/2021
MW-104[4]	52.92	4/1/2021
MW-105[4]	52.51	4/1/2021

Instrument Name[1]	Max Reading Since Previous Observation[2,3]	Date Recorded
MW-106[4]	52.67	4/1/2021
MW-107[4]	52.90	4/1/2021
MW-108[4]	53.13	4/1/2021

Notes:
(1) See Figure 1 for location of monitoring points.
(2) Groundwater elevation based on local site datum, top of casing based on City survey data from July 2018 and March 2019.
(3) Elevations shown relate to the Plant Datum. Adjust City survey data by adding (823.549 feet) to City Datum to obtain elevations related to Plant Datum.
(4) Readings taken monthly by Ames Municipal Electric System SEP Staff and during background/semi-annual sample events by SCS staff.

3.3 DEPTH AND ELEVATION OF IMPOUNDED WATER AND CCR

The maximum and minimum depths of impounded water frequently change depending on Ames Municipal Electric System SEP operations and rainfall events. Additionally, since there has been no discharge to the Impoundment since April 11, 2021, the levels of impounded water have decreased. The minimum, maximum, and present depth and elevation of the impounded surface water and the CCR since the previous annual site inspection are noted in Table 2 below. Please note that dry CCR is stockpiled above the dike elevation within the western portion of the Impoundment.

Table 2. Water and CCR Level Information

	Depth	Elevation	Description
Minimum Water Level[1]	7.80[2]	66.80[2]	Water level from Ames Municipal Electric System SEP measurements
Maximum Water Level[1]	11.17[2]	70.17[2]	
Present Water Level	7.80[2]	66.80[2]	Water level on date of inspection
Current – CCR Level[3]	16.70	75.70	Pad elevation at northwest corner of former hoop building location
	43.45	102.45	Built-up CCR stockpiles within Impoundment – pile located between two sluice channels

Notes:
(1) Based on water level information provided by Ames Municipal Electric System SEP.
(2) Depth and elevation at the primary pond outlet structure. January and February 2021 levels were not considered since estimated due to Impoundment being frozen.
(3) Based on May 2019 topographical survey by Bolton & Menk.

3.4 STORAGE CAPACITY

Based on the grades provided on the Construction Record drawings, Sheet 7 of 14 dated December 1982 by Lutz, Daily & Brain LLC, the storage capacity of the Impoundment to the top of the berm

(elevation 74 feet) is approximately 209,262 cubic yards (cy). The storage capacity to the operating level, with three feet freeboard (elevation 71 feet) is approximately 161,995 cy. There have not been modifications to the Impoundment since the 1982 construction; therefore, these storage capacities remain the same.

3.5 VOLUME OF IMPOUNDED CCR AND WATER

The approximate volume of the impounded water and CCR/RDF ash material at the time of the site inspection was 182,820 cubic yards (cy). A bathymetric and topographical survey of the Impoundment was performed by Bolton & Menk in May 2019. Calculations based on the survey information resulted in a total volume of 172,500 cubic yards (cy) of CCR/RDF ash material. The volume of the free water at the time of the bathymetric survey was estimated to be 31,900 cy for a total estimated volume of 204,400 cy. The water level at the time of the 2019 bathymetric/topographical survey was 893.91 feet above mean sea level or 70.36 feet by Plant datum. Re-evaluation with the water level at 66.80 feet as noted during the December 2021 inspection provides an estimated total of 8,630 cy of water. In addition, based on estimates provided by Ames Municipal Electric System staff, approximately 2,028 tons of RDF ash material, or 1,690 cy of RDF ash material, were added to the pond in 2021. The volume of impounded CCR and water at the time of the inspection was therefore estimated to be 182,820 cy. Table 3 provides data used to determine the 2021 volume.

Table 3. Estimated Volume of Impounded Water and CCR

Source	Quantity	Notes
May 2019 Calculated CCR Ash/RDF Ash Volume	172,500 cy	May 2019 Bolton & Menk bathymetric and topographic survey
May 2019 Calculated Water Volume	31,900 cy	May 2019 Bolton & Menk bathymetric and topographic survey
December 2021 Calculated Water Volume	8,630 cy	Calculated through CADD
2021 RDF Ash/Material Added to Impoundment	1,690 cy	Provided by Ames Municipal Electric System staff
2021 Volume of Impounded CCR and Water	**182,820 cy**	**Approximate based on calculations**

3.6 STRUCTURAL WEAKNESS OR DISRUPTIVE CONDITIONS

The site inspection included a review of the appearance of an actual or potential structural weakness of the Impoundment. The visual observation included a review for the presence of the conditions listed in Table 4, which also includes items noted during the site inspection.

Table 4. Site Inspection Item Details

Site Observation Condition	Comment
Seepage	None noted.
Sloughing, slumping, or sliding	None noted.
Excessive settlement	None noted.
Surface cracking	None noted.
Inappropriate vegetation growth	See comments below.
Animal impacts	See comments below.
Erosion damage	See comments below.
Failing riprap	None noted.
Failing outlet or outfall structures	None noted.

Item Noted	Comment	Action Level
Inappropriate vegetation growth	Trees were noted growing on both the upstream and downstream slopes.	Removal with routine maintenance or with closure of Impoundment
Animal impacts	Indications of beavers were noted based on tree marks. There was no observed animal activity in the exterior dikes. Area 1 on Figure 1 denotes area of past observations.	Continued observation
Erosion damage	Erosion noted in southeast corner of Impoundment on the inboard slope. Also noted in the last site observation. Ames Municipal Electric System are in the process of developing a plan for the future of the Impoundment. See Appendix A Checklist Notes, Area 2 on the aerial photograph for approximate area.	Repair with routine maintenance or with closure of Impoundment

3.7 OTHER CHANGES AFFECTING STABILITY OR OPERATION

Based on the information provided by the Ames Municipal Electric System SEP staff and on-site observation, other change(s) which may have affected the stability or operation of the Impoundment structure since the previous annual site inspection were not observed.

4 REVISIONS, RECORDKEEPING, AND REPORTING

This document will be placed in the facility's operating record (§257.105(g)(6)) and on the Ames Municipal Electric System SEP's CCR Rule Compliance Data and Information website (§257.107(g)(5)). The Ames Municipal Electric System SEP will notify the Iowa Department of Natural Resources (DNR) that this report has been completed and placed in the facility's operating record and on the Ames Municipal Electric System SEP CCR Rule Compliance Data and Information website (40 CFR §257.106(g)(5)). The next annual site inspection report is due one year from the completion of this report.

LEGEND:

▲ MONITORING WELL OR PIEZOMETER

200 0 200 400

SCALE FEET

REV.	DATE	CK. BY
1	-	-
2	-	-
3	-	-
4	-	-
5	-	-
6	-	-

SHEET TITLE
CCR SITE INSPECTION

PROJECT TITLE
2021 ANNUAL INSPECTION REPORT
INACTIVE CCR SURFACE IMPOUNDMENT

CLIENT
CITY OF AMES MUNICIPAL ELECTRIC SYSTEM
AMES, IA

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PROJ. NO.	DWN. BY:	Q/A RVW BY:
27221400.00	ZEM	CLC
DSN. BY:	CHK. BY:	PROJ. MGR
JRR	CLC	CLC

CADD FILE:
CCR SITE INSPECTION.DWG

DATE:
4/7/22

FIGURE NO.
1

Appendix A

Site Observation Checklist

Coal Combustion Residuals Impoundment
Annual Site Observation Checklist

Facility Name	Feature ID	Observation Date
CCR Ash Unit Ames Municipal Electric System	CCR Impoundment	December 22, 2021

1.	Date: 12/22/2021	2.	Check the type of observation being conducted		x Annual Site Observation by Qualified Professional Engineer □ Special Observation
3.	Observer's Name: Christine L. Collier, P.E.			4.	Name of Impoundment: CCR Ash Unit Ames Municipal Electric System
5.	Weather: Sunny, Wind S 9 mph			6.	Temperature: 24 degrees F

A.	CREST	YES	NO	N/A
1.	Are there any visual settlements cracks or scarps on the crest or embankment?		X	
	If yes: Type of Visual Concern / Location / Comments 1 _____ _____ _____ 2 _____ _____ _____ 3 _____ _____ _____			
2.	Is roadway well-maintained and safe to travel?	X		
3.	Are animal burrows present?		X	
B.	**UPSTREAM FACE**	**YES**	**NO**	**N/A**
1.	Is there water impounded against face?		X	
2.	Are there any brush, trees, or other unwanted vegetation? Multiple locations	X		
3.	Are there any slumps or eroded areas? See Figure 1 Area 2	X		
4.	Are animal burrows present? Indications of beavers were noted based on tree marks. There was no animal activity observed in the exterior dikes and no animal burrows were observed during this inspection.		X	
5.	Is vegetation in good condition?	X		
C.	**IMPOUNDMENT POOL**	**YES**	**NO**	**N/A**
1.	Are depressions or sinkholes present?		X	
2.	Are there any eddies or other signs of leakage or scarps?		X	
3.	Is extraneous material floating in the pool (trees, limbs, etc.)? Refuse Derived Fuel Remnants	X		
4.	Is water entering the spillway, but not exiting through the outlet?			X
5.	Is water exiting the spillway, but not entering the spillway? For C.5. and C.6., spillway is referring to the outfall between the primary pond and east clear water basin.			X
6.	Is water exiting the spillway flow clear and without visible particles?			X
7.	If impoundment is closed, is cover eroded?			X
8.	If impoundment is closed, is vegetative cover well established?			X
9.	Is sufficient freeboard present?			X
10.	Is pond in danger of overtopping?		X	
11.	Approximate amount of freeboard - 7.2 feet freeboard. No discharge to the Impoundment has occurred since April 11, 2021.			

Coal Combustion Residuals Impoundment
Annual Site Observation Checklist

Facility Name	Feature ID	Observation Date
CCR Ash Unit Ames Municipal Electric System	CCR Impoundment	December 22, 2021

D.	DOWNSTREAM SLOPE AND TOE	YES	NO	N/A
1.	Are any of the following present: erosion, slides, cracks, depressions, bulges, or sloughing? If so, describe:		X	
2.	Are seeps present? If so, describe flow and location:		X	
3.	Is rip rap present? If so, describe condition:		X	
4.	Are animal burrows present?		X	
5.	Is vegetation in good condition?	X		
6.	Is water flowing from internal drains?			X
E.	**SPILLWAYS: ERODABLE CHANNEL**	**YES**	**NO**	**N/A**
1.	Are any of the following present: erosion, slides, cracks, depressions, bulges, or sloughing?			X
2.	Is vegetation in good condition?			X
3.	Is there any debris in the channel?			X
4.	Is rip rap continuous and in good condition?			X
F.	**SPILLWAYS: STRUCTURES AND OUTLET PIPES**	**YES**	**NO**	**N/A**
1.	Are there any restrictions or obstructions (debris, vegetation, trees)?		X	
2.	Any observed distress to structure?		X	
3.	Any deterioration of outlet pipe? Visual only		X	
4.	Any erosion where outlet pipe exits the embankment? If so, describe:		X	

Appendix B

Photographs

Coal Combustion Residuals Impoundment
Annual Site Observation Photographs

Facility Name	Feature ID	Site Observation Date
CCR Ash Unit Ames Municipal Electric System	CCR Impoundment	December 22, 2021

Photo 1: 2020 East Ash sluice pipe to Ash Pond Receiving Ditch

Photo 2: 2021 East Ash sluice pipe to Ash Pond Receiving Ditch

Photo 3: 2020 North dike crest view east along Ash Pond

Photo 4: 2021 North dike crest view east along Ash Pond

Coal Combustion Residuals Impoundment
Annual Site Observation Photographs

Facility Name	Feature ID	Site Observation Date
CCR Ash Unit Ames Municipal Electric System	CCR Impoundment	December 22, 2021

Photo 5: 2020 North dike interior slope view west along ash pond

Photo 6: 2021 North dike interior slope view west along ash pond

Photo 7: 2020 Erosion along inside slope south embankment

Photo 8: 2021 Erosion along inside slope south embankment

Coal Combustion Residuals Impoundment
Annual Site Observation Photographs

Facility Name	Feature ID	Site Observation Date
CCR Ash Unit Ames Municipal Electric System	CCR Impoundment	December 22, 2021

Photo 9: 2020 Ash pond outlet structure

Photo 10: 2021 Ash pond outlet structure

Photo 11: 2020 Inside the Clear Water Basin outlet valve control structure

Photo 12: 2021 Inside the Clear Water Basin outlet valve control structure

Coal Combustion Residuals Impoundment
Annual Site Observation Photographs

Facility Name	Feature ID	Site Observation Date
CCR Ash Unit Ames Municipal Electric System	CCR Impoundment	December 22, 2021

Photo 13: 2020 Gauge located at ash pound outlet structure (AP-1)

Photo 14: 2021 Gauge located at ash pound outlet structure (AP-1)

Photo 15: 2020 Gauge located within pump house (CW-2)

Photo 16: 2021 Gauge located within pump house (CW-2)

Coal Combustion Residuals Impoundment
Annual Site Observation Photographs

Facility Name	Feature ID	Site Observation Date
CCR Ash Unit Ames Municipal Electric System	CCR Impoundment	December 22, 2021

Photo 17: 2020 Example of vegetative growth to be removed on northeast corner of the ash pond.

Photo 18: 2021 Example of vegetative growth to be removed on northeast corner of the ash pond.

Photo 19: 2020 Area of previously noted animal impacts. See Area 1 on aerial photo.

Photo 20: 2021Area of previously noted animal impacts. See Area 1 on aerial photo.

Coal Combustion Residuals Impoundment
Annual Site Observation Photographs

Facility Name	Feature ID	Site Observation Date
CCR Ash Unit Ames Municipal Electric System	CCR Impoundment	December 22, 2021

Photo 21: 2020 Erosion on inboard slope southeast portion of the ash pond from south looking northeast. See Area 2 for location.

Photo 22: 2021 Erosion on inboard slope southeast portion of the ash pond from west looking along the south/southeast. See Area 2 for location.

Photo 23: 2020 Ash sluice pipe to West Ash Pond Receiving Ditch

Photo 24: 2021 Ash sluice pipe to West Ash Pond Receiving Ditch

Coal Combustion Residuals Impoundment
Annual Site Observation Photographs

Facility Name	Feature ID	Site Observation Date
CCR Ash Unit Ames Municipal Electric System	CCR Impoundment	December 22, 2021

Photo 25: 2020 Typical groundwater monitoring well installed in June 2018.

Photo 26: 2021 Typical groundwater monitoring well installed in June 2018.

Photo 27: 2020 Pipe structure connecting west channel to northern area in the ash pond.

Photo 28: 2021 Pipe structure connecting west channel to northern area in the ash pond.

Coal Combustion Residuals Impoundment
Annual Site Observation Photographs

Facility Name	Feature ID	Site Observation Date
CCR Ash Unit Ames Municipal Electric System	CCR Impoundment	December 22, 2021

Photo 29: 2020 SEP floor drain and cooling tower blowdown discharge pipe into the north side of north storage area in the ash pond.

Photo 30: 2021 SEP floor drain and cooling tower blowdown discharge pipe into the north side of north storage area in the ash pond.

Photo 31: 2020 Chain link fence installed around perimeter of the ash pond property.

Photo 32: 2021 Chain link fence installed around perimeter of the ash pond property.