

January 17, 2018

Mr. Michael Malone
CPS Energy
145 Navarro Street
San Antonio, Texas 78205

Project No. 0337367

**Environmental
Resources
Management**

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Subject: CCR Units - 2017 Annual Inspection and
Fugitive Dust Control Report
Calaveras Power Station
San Antonio, Texas

Dear Mr. Malone:

Environmental Resources Management (ERM) conducted an inspection of coal combustion residual (CCR) units for two power plants located at the CPS Energy Calaveras Power Station in Bexar County, Texas. The CCR units are shared by the J.K. Spruce and J.T. Deely Power Plants, which are co-located at 12940 U.S. Highway 181 South in San Antonio, Texas. The CCR units utilized by the power plants are described in Table 1.



Table 1. Calaveras Power Station CCR Unit Descriptions

Unit Name	Unit ID	Purpose of Unit
Fly Ash Landfill (a.k.a. 5-Year Landfill)	010	Receives fly ash, bottom ash, economizer ash, scrubber sludge from flue gas desulphurization ponds, and flue gas desulphurization gypsum (temporary storage).
Evaporation Pond	021	Receives boiler chemical cleaning waste and other authorized liquid wastes.
North Bottom Ash Pond (North BAP)	005	Receives sluiced bottom ash.
South Bottom Ash Pond (South BAP)	006	Receives sluiced bottom ash.
Sludge Recycle Holding (SRH) Ponds (North and South)	026	Receives flue gas desulphurization scrubber sludge.

The annual inspection was conducted by Mr. Chris Cunningham, P.E., on December 19, 2017. Photographs taken during the inspection are provided in Attachment 1. No issues were observed that indicated potential stability or operational issues at the CCR units. Details of the observations made by Mr. Cunningham are provided below.

Unit Descriptions

All units are built with above-grade earthen embankments reportedly composed of sandy clay and clayey sand fill. Some units have CCR ash used in the surface roadways of the features (e.g., Fly Ash Landfill and Bottom Ash Ponds). Figure 1 shows the locations of each CCR unit. Dimensions of the CCR units were not measured during the annual inspection. Measurements used herein are based on an assessment conducted in June 2014 by CDM Smith, and checked using computer satellite mapping software.

Based on a comparison of recent and historical aerial photographs dating back to 1995, no significant changes in the dimensions or geometry of the units were observed. Table 2 provides a summary of the unit dimensions.

TABLE 2: Calaveras Power Station CCR Unit Dimensions

Dimension	Fly Ash Landfill	Evaporation Pond	North BAP	South BAP	SRH Ponds
Length (feet)	1,000	500	530	680	440
Width (feet)	950	400	460	400	330
Depth (feet)	32.5	22	12	12	8
Avg. Crest Width (feet)	20	20	15	15	15
Perimeter (feet)	4,000	1,800	2,100	2,200	1,550
Interior Slopes, H:V	3:1	2:1	2:1	2:1	3:1
Exterior Slopes, H:V	3:1	3:1	3:1	3:1	3:1
Total Area (acres)	21.8	4.5	6.0	7.0	3.5

The Evaporation Pond is reportedly lined with 30-mil high-density polyethylene (HDPE) liner. There are no inlet or outlet structures to the pond. Liquid from boiler chemical cleanouts and other authorized liquid wastes are trucked to the pond, and are allowed to evaporate. Periodically, dried material is removed from the Pond and placed in the Fly Ash Landfill.

The North and South BAPs are reportedly lined with clay, but the thickness and hydraulic conductivity of the clay are unknown. Both ponds have two discharge points. One 24-inch steel pipe in each pond allows water to be returned to the plant for reuse. Both ponds also have outlet structures consisting of a horizontal 12-inch steel discharge pipe at an approximate elevation of 489 feet MSL (bottom drain used to empty the pond), and a vertical 12-inch steel overflow pipe at an approximate of elevation 499 feet MSL (normal operation level pool drain). The outfall structure is in one corner of each pond (northeast for North BAP and southeast for South BAP) and is partially surrounded by steel sheet piling. The sheet piling and pond berms create an opening for water to reach the discharge pipes. This opening is typically protected by floating sorbent booms. Water from these outlets discharges to Calaveras Lake through a TPDES permitted outfall.

The interior slopes of the two SRH Ponds are reportedly covered with 30-mil HDPE liner and a six-inch thick concrete slab. The ponds are delineated by a concrete divider wall with a sluice gate that allows the two sides to be isolated from each other. Water is pumped from the ponds to clarifiers via two 18-inch steel pipes. Both ponds have eight-foot-wide concrete overflow chutes that discharge to the South BAP. These overflow chutes are at an approximate elevation of 499.5 feet MSL.

The Fly Ash Landfill is reportedly lined with a 30-mil HDPE liner covered with a 10-ounce geotextile and 12 inches of sand. The bottom of the landfill slopes from west-to-east, from approximately 514 feet MSL to 503 feet MSL. The top berm is at an approximate elevation of 535.5 feet MSL, for a total landfill depth of approximately 32.5 feet at the deepest point. Storm water collects in the southeast corner of the landfill and is allowed to settle. A water quality sample is collected and analyzed prior to discharge through a TPDES permitted outfall.

No instrumentation is associated with the CCR units. All units are located within the Upper San Antonio River watershed, though water in the immediate vicinity drains to Calaveras Lake.

Unit History

The Evaporation Pond was originally constructed as a fly ash landfill. In 1990, a pond liner was installed. Then in 1996, the unit was converted from a landfill to an impoundment. Fly ash was placed in the landfill prior to it being used as an impoundment. The top of the Evaporation Pond is at an approximate elevation of 522 feet MSL and the bottom is at an approximate elevation of 500 feet MSL.

The North and South BAPs were constructed in 1977, and the SRH Ponds in 1992. Embankments are reported to have been constructed of on-site material, though the actual location of the borrow pit is unknown. The top of the SRH Ponds embankments is at an approximate elevation of 500 feet MSL, and the bottom at an approximate elevation of 492 feet MSL. Up to a foot of ash and other material have been added to the roads on the top of the BAP embankments, making the top elevation approximately 501 feet MSL. The bottom of the BAPs is at an approximate elevation of 489 feet MSL.

The Fly Ash Landfill was constructed in 1992 with a HDPE liner. Liner on the side slopes was originally not covered with a protective layer, and began to show signs of deterioration. Portions of the liner on the north and west side embankments were repaired in 2010 and all side slopes are currently covered with a protective layer

No changes to unit operations or dimensions were reported to have occurred during the life of the facility.

Structural Integrity

There is no reported historic evidence of structural instability in the CCR units.

Geotechnical properties of the foundation and abutment materials, on which the ponds were constructed, are provided in the document entitled "*Geotechnical Engineering Study for Ash Pond Berms – Spruce/Deely Generation Units, San Antonio, Texas*", dated May 7, 2014 by Raba Kistner Consultants, Inc., and are summarized in the reports entitled "*Assessment of Dam Safety of Coal Combustion Surface Impoundments Final Report*" for the Deely and Spruce power plants, June 2014 revision, by CDM Smith.

As summarized in the CDM Smith report, embankment material is light clay (ASTM "CL") with a clay fraction of approximately 45%, and an assumed liquid limit between 35 and 47. Foundation material for the BAPs and SRH Ponds consists of sandy clay (ASTM "CL") with a clay fraction between 50% and 60%, and a liquid limit of approximately 51; or clayey sand (ASTM "ML") with a clay fraction of approximately 35%, and a liquid limit of approximately 33. Evaporation Pond material is similar, except the liquid limits for the foundation materials are approximately 55.

No information on the embankment and foundation materials were available for the Fly Ash Landfill, but foundation materials are anticipated to be similar to those of the Evaporation Pond based on the proximity of the units.

Annual Inspection Summary

Signage was present at each CCR unit and no issues were observed at the CCR units which threatened structural integrity.

Fly Ash Landfill

The Fly Ash Landfill (a.k.a. 5-Year Landfill) was at approximately 36.5% capacity based on calculations provided by CPS Energy. Approximately six acres of the landfill interior were covered with discrete piles of ash, the largest piles appearing to be less than 20 feet in height. Minor surface erosion was observed in the interior of the northeast corner, and minor rutting from vehicle traffic at the exterior toe of the north embankment. Two animal burrows were observed on the exterior of the north embankment, near the center of the landfill. The observed burrows were approximately two to three inches in diameter. Grass on the exterior of the landfill was less than six inches in height, with no woody plants observed. The erosion and animal burrows do not appear to immediately impact unit stability.

Inspection records from January 4, 2017 through December 13, 2017 reported no problems observed at the Fly Ash Landfill.

Since the 2016 annual inspection, there have been no noticeable changes in the geometry of the landfill, or any other changes that appear likely to have affected the stability or operation of the landfill.

Evaporation Pond

The Evaporation Pond had approximately six feet of freeboard available at the time of the inspection. This corresponds to an available capacity of approximately 38 acre-feet, with approximately 84 acre-feet of water and CCR contained.

A small amount of water from recent rains was ponding on the top of the northern berm. Grass along the external slope of the embankment was observed to be less than six inches high. One area approximately four feet in diameter on the southern berm was observed to be bare of vegetation, but did not appear to be eroding. Nothing was observed that is likely to immediately impact unit stability.

Inspection records from January 4, 2017 through December 13, 2017 reported no problems observed at the Evaporation Pond.

Since the 2016 annual inspection, there have been no noticeable changes in the geometry of the impoundment, or any other changes that appear likely to have affected the stability or operation of the impoundment. Based on information provided by CPS Energy, the maximum depth of the water and CCR in the impoundment during 2017 was 20 feet, which corresponds to a volume of 109.1 acre-ft. The minimum depth was approximately 18 feet, which corresponds to a volume of 96.6 acre-ft.

North Bottom Ash Pond

The North BAP was offline and completely drained of liquid during the inspection. Most of the accumulated CCR had been removed from the pond and transported offsite for beneficial use.

No obstruction of or damage to outfall structures was observed. Grass along the external slope of the embankment was observed to be less than six inches high.

Inspection records from January 4, 2017 through December 13, 2017 reported minor damage to the surface of the berm from animals digging in the northeast corner on March 13, 2017. A work order was filed for repairs. The work order resolution was not available for review by ERM, but the facility reports the damage was repaired during routine grounds maintenance. The damage was not reported in subsequent inspections.

Since the 2016 annual inspection, there have been no noticeable changes in the geometry of the impoundment, or any other changes that appear likely to have affected the stability or operation of the impoundment. Based on information provided by CPS Energy, the maximum depth of the water and CCR in the impoundment during 2017 was 10 feet, which corresponds to a volume of 60.6 acre-ft. The minimum depth is zero feet, as observed during the inspection.

South Bottom Ash Pond

The South BAP was in use during the inspection, with an estimated freeboard of approximately 2.0 feet. This is the maximum operating capacity, corresponding to approximately 14.7 acre-feet

of available capacity (including freeboard), with approximately 67.5 acre-feet of water and CCR contained.

Some shallow (i.e., less than one foot deep) erosion channels were observed on interior of the north embankment of the South BAP. The eroded material appears to be mostly ash, with no evidence of damage to underlying clay. This erosion does not appear to impact unit stability. No obstruction of or damage to outfall structures were observed. High grass (i.e. one to two feet) was observed growing on the interior portion of the south berm. Grass along the external slope of the embankment was observed to be less than six inches high.

Inspection records from January 4, 2017 through December 13, 2017 reported erosion on the south bank during each inspection in January, though no work order for repairs was documented. The erosion was not reported after the January 24, 2017 inspection, implying it was repaired. High grass was reported in the pond on February 27, 2017, and damage to the berm surface in the southeast corner due to animals digging was reported on March 6, 2017. Work orders were prepared for both issues. The work order resolutions were not available for review by ERM, but the facility reports the damage was repaired and grass addressed during routine grounds maintenance. The damage was not reported in subsequent inspections.

Since the 2016 annual inspection, there have been no noticeable changes in the geometry of the impoundment, or any other changes that appear likely to have affected the stability or operation of the impoundment. Based on information provided by CPS Energy, the maximum depth of the water and CCR in the impoundment during 2017 was 10 feet, which corresponds to a volume of 67.5 acre-ft. The minimum depth since the last inspection was approximately zero feet.

Sludge Recycle Holding (SRH) Ponds

At the time of the inspection, the gate on the divider wall between the SRH Ponds was closed, with water having been drained from the North SRH Pond, and approximately six feet of water in the South SRH Pond. The North SRH Pond appeared to be approximately 75% full of CCR and had been taken offline. This corresponds to an approximate available capacity (including freeboard) of 11.0 acre-feet, with approximately 19.2 acre-feet of water and CCR contained.

No obstruction of or damage to outfall structures was observed. Grass along the external slope of the embankment was observed to be less than six inches high.

Inspection records from January 4, 2017 through December 13, 2017 reported less than two feet of freeboard in the North SRH Pond on November 14, 2017. The North SRH Pond has been taken offline for cleaning, as noted above.

Since the 2016 annual inspection, there have been no noticeable changes in the geometry of the impoundment, or any other changes that appear likely to have affected the stability or operation of the impoundment. Based on information provided by CPS Energy, the maximum depth of the water and CCR in the impoundment during 2017 was 8 feet in both ponds, which corresponds to a volume of 30.1 acre-ft. The minimum depth since the last inspection was one pond empty, which corresponds to a volume of 15.0 acre-ft.

Fugitive Dust Control

ERM assessed compliance with the Fugitive Dust Control Plan (FDCP) in conjunction with the annual inspection. CPS Energy reported no citizen complaints regarding fugitive dust emissions from the CCR units or the handling equipment. Paved roads are reportedly swept several times per month, which is more frequent than the minimum monthly requirement specified in the FDCP. Visual observations are made quarterly at each unit. Emission observations are recorded on a standard opacity form utilized for non-CCR inspections and not on the form provided in the FDCP. The standard opacity form contains more detailed information than the FDCP form.

Emissions averaging 6.5% over six minutes were observed from the landfill on August 28, 2017 during dumping of ash by a truck. The emissions do not require controls due to the limited intensity, duration, and distance from the nearest off-site receptor.

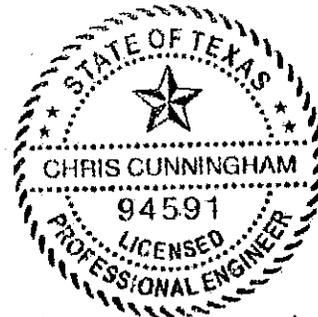
We appreciate the opportunity to work with you on this project. Should you have any questions, please contact us.

Sincerely,

Environmental Resources Management



Chris Cunningham, P.E.

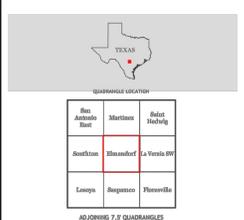
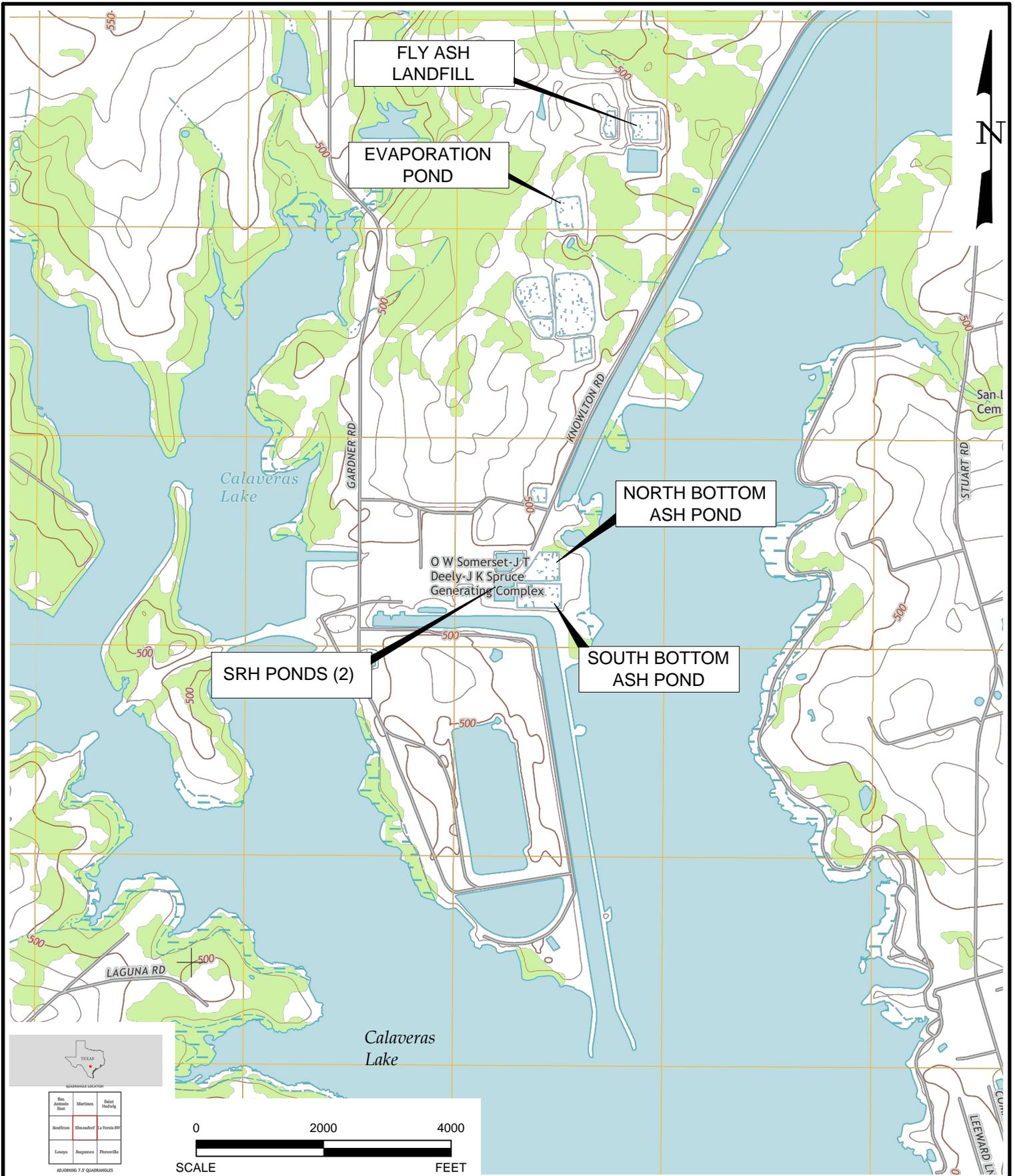


cc: Gregg Tieken, CPS Energy



Attachments

Figure



San Antonio	Martinez	Ball
Bourbon	Blumhoff	La Verda
Lopez	Beggs	Phonville

ADJOINING 7.5' QUADRANGLES



Environmental Resources Management

FIGURE 1
 CCR Unit Locations
 Calaveras Power Station
 CPS Energy
 San Antonio, Texas



DESIGN: CC	DRAWN: RLM	CHKD.: CC
DATE: 1/6/2016	SCALE: AS SHOWN	REV.:
W.O. NO.: H:\DWG\A16\0328985A01.dwg, 1/6/2016 9:48:22 AM		

ERM-Southwest, Inc. TX PE Firm No. 2393

Photo Log
Attachment 1

January 2018
Project No. 0337367
CPS Energy



Photograph: 1 Fly Ash Landfill – standing on western berm – facing north. Mobile ash conditioning machine located in northwest corner of landfill. Photo taken 12/19/17.



Photograph: 2 Fly Ash Landfill - standing on western berm – facing east. Photo taken 12/19/17.



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Photograph: 3 Fly Ash Landfill – standing on western berm – facing southeast. Radial stacker located in southwest corner of landfill. Photo taken 12/19/17.



Photograph: 4 Fly Ash Landfill – standing on eastern berm - facing south. Photo taken 12/19/17.



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Photograph: 5 Fly Ash Landfill – standing on eastern berm – facing southwest. Water accumulation from recent rain events. Photo taken 12/19/17.



Photograph: 6 Fly Ash Landfill – standing on northern berm – facing west. Photo taken 12/19/17.



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Photograph: 7 Fly Ash Landfill – standing on northern berm. Animal burrow in exterior slope. Photo taken 12/19/17.



Photograph: 8 Fly Ash Landfill – standing on southern berm – facing west. Photo taken 12/19/17.



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Photograph: 9 Fly Ash Landfill – standing on southern berm – facing east. Photo taken 12/19/17.



Photograph: 10 Fly Ash Landfill – outside eastern perimeter at northeast corner drainage discharge. Photo taken 12/19/17.



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Photograph: 11 Evaporation Pond – standing on northwest corner – facing east. Photo taken 12/19/17.



Photograph: 12 Evaporation Pond – standing on northwest corner – facing south. Photo taken 12/19/17.



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Photograph: 13 Evaporation Pond – standing on southwest corner – facing north. Photo taken 12/19/17.



Photograph: 14 Evaporation Pond – standing on southeast corner – facing west. Photo taken 12/19/17.



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Photograph: 15 North Bottom Ash Pond – standing on southwestern corner – facing northeast. Pond was drained to remove residuals. Photo taken 12/19/17.



Photograph: 16 North Bottom Ash Pond – standing on northern berm – facing west. Photo taken 12/19/17.



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Photograph: 17 North Bottom Ash Pond – standing on northwestern berm – facing southeast. Photo taken 12/19/17.



Photograph: 18 North Bottom Ash Pond – Outside of eastern berm. Photo taken 12/19/17.



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Photograph: 19 North Bottom Ash Pond – standing on northeast corner – facing south. Photo taken 12/19/17.



Photograph: 20 North Bottom Ash Pond – standing on southern berm – facing west. Photo taken 12/19/17.



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Photograph: 21 North SRH Pond – standing on northeast corner – facing west. Photo taken 12/19/17.



Photograph: 22 North SRH Pond – standing on northern berm – facing southeast. Photo taken 12/19/17.



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Photograph: 23 North SRH Pond – standing on northeast corner – facing south. Photo taken 12/19/17.



Photograph: 24 North SRH Pond – Overflow structure to South Bottom Ash Pond. Photo taken 12/19/17.



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Photograph: 25 South SRH Pond – standing on southwestern corner – facing east. Photo taken 12/19/17.



Photograph: 26 South SRH Pond – standing on western berm – facing north. Photo taken 12/19/17.



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Photograph: 27 South Bottom Ash Pond – standing on southeastern corner – facing west. Photo taken 12/19/17.



Photograph: 28 South Bottom Ash Pond – Outfall structure. Photo taken 12/19/17.



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Photograph: 29 South Bottom Ash Pond – standing on northeast corner – facing southwest. Erosional features on eastern berm. Photo taken 12/19/17.



Photograph: 30 South Bottom Ash Pond – standing on northwest corner – facing west. Photo taken 12/19/17.



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