

January 15, 2016

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

Project No. 0328985

**Environmental
Resources
Management**

CityCentre Four
840 West Sam Houston Pkwy N.
Suite 600
Houston, Texas 77024
(281) 600-1000
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Subject: CCR Units - 2015 Annual Inspection
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. Jeffery L. Bauguss, P.E., on December 16, 2015. 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. Bauguss are provided below.

Unit Descriptions

All units are reportedly built with above-grade earthen embankments 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 is trucked to the pond, and is 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 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 clay fraction between 50% and 60%, and liquid limit approximately 51; or clayey sand (ASTM "ML") with clay fraction approximately 35% and liquid limit 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

In general, signage was present at each CCR unit and no issues were observed at the CCR units which threatened structural integrity. This report summarizes the first annual inspection required by 40 CFR 257.83(b). Therefore, there are no prior annual inspection reports to evaluate.

Fly Ash Landfill

The Fly Ash Landfill (a.k.a. 5-Year Landfill) was at approximately 33% capacity based on calculations provided by CPS Energy. Approximately two 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 south embankment. An animal burrow was observed on the exterior of the east embankment, near the northeast corner of the landfill. Grass on the exterior of the landfill was over two feet high. It is recommended that the grass on the slopes be mowed to facilitate desired grass growth and to prevent the formation of woody plant materials. The erosion and animal burrow does not appear to immediately impact unit stability.

Inspection records from October 22, 2015 through December 8, 2015 reported no problems observed at the Fly Ash Landfill.

Evaporation Pond

The Evaporation Pond had approximately five feet of freeboard available at the time of the inspection. This corresponds to an available capacity of approximately 31.5 acre-feet, with approximately 90.4 acre-feet of water and CCR contained.

Some erosion channels were observed on the interior of the north embankment, none of which appeared to be sufficient enough to impact unit stability. Grass along the external slope of the embankment was observed to be over 12 inches high. It is recommended to that the grass on the slopes be mowed to facilitate desired grass growth and to prevent the formation of woody plant materials.

Inspection records from October 22, 2015 through December 8, 2015 reported no problems observed at the Evaporation Pond.

North Bottom Ash Pond

The North BAP was offline and completely drained of liquid during the inspection. Ash was being excavated from the pond and transported offsite for beneficial use by a third party. Some shallow (i.e., less than one foot deep) erosion channels were observed on interior embankments of the North BAP in the northwest corner, and the west and east embankments. The erosion was mostly concentrated near the bottom of the slope. It appeared to be primarily of ash, with underlying clay relatively undisturbed. This erosion does not appear to impact unit stability. No obstruction of or damage to outfall structures were observed. Grass along the external slope of the embankment was observed to be over 12 inches high. It is recommended to that the grass on the slopes be mowed to facilitate desired grass growth and to prevent the formation of woody plant materials.

Inspection records from October 22, 2015 through December 8, 2015 reported no problems observed at the North BAP.

South Bottom Ash Pond

The South BAP was in use during the inspection, with an estimated freeboard of approximately 3.5 feet. This corresponds to approximately 22.9 acre-feet of capacity, with approximately 59.3 acre-feet of water and CCR contained. No erosion was observed on the embankments; and no obstruction of or damage to outfall structures was observed. Grass along the external slope of the embankment was observed to be over 12 inches high. It is recommended to that the grass on the slopes be mowed to facilitate desired grass growth and to prevent the formation of woody plant materials.

Inspection records from October 22, 2015 through December 8, 2015 reported no problems observed at the South BAP.

Sludge Recycle Holding (SRH) Ponds

The SRH Ponds contained water at the time of the inspection. The gate on the divider wall between the SRH Ponds was open, with water one to two feet deep. This corresponds to an approximate available capacity of 26.8 acre-feet, with approximately 3.4 acre-feet of water and CCR contained. Some erosion channels were observed on interior embankments of the SRH Ponds near the spillway on the South SRH Pond, and the interior east embankment. The erosion was mostly concentrated near the bottom of the slope and appeared to be primarily of ash, with underlying clay relatively undisturbed. This erosion does not appear to impact the underlying HDPE liner or the unit stability. No obstruction of or damage to outfall structures was observed.

Inspection records from October 22, 2015 through December 8, 2015 reported no problems observed at the SRH Ponds.

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

Sincerely,

Environmental Resources Management



Jeffery L. Bauguss, P.E.

cc: Gregg Tieken, CPS Energy

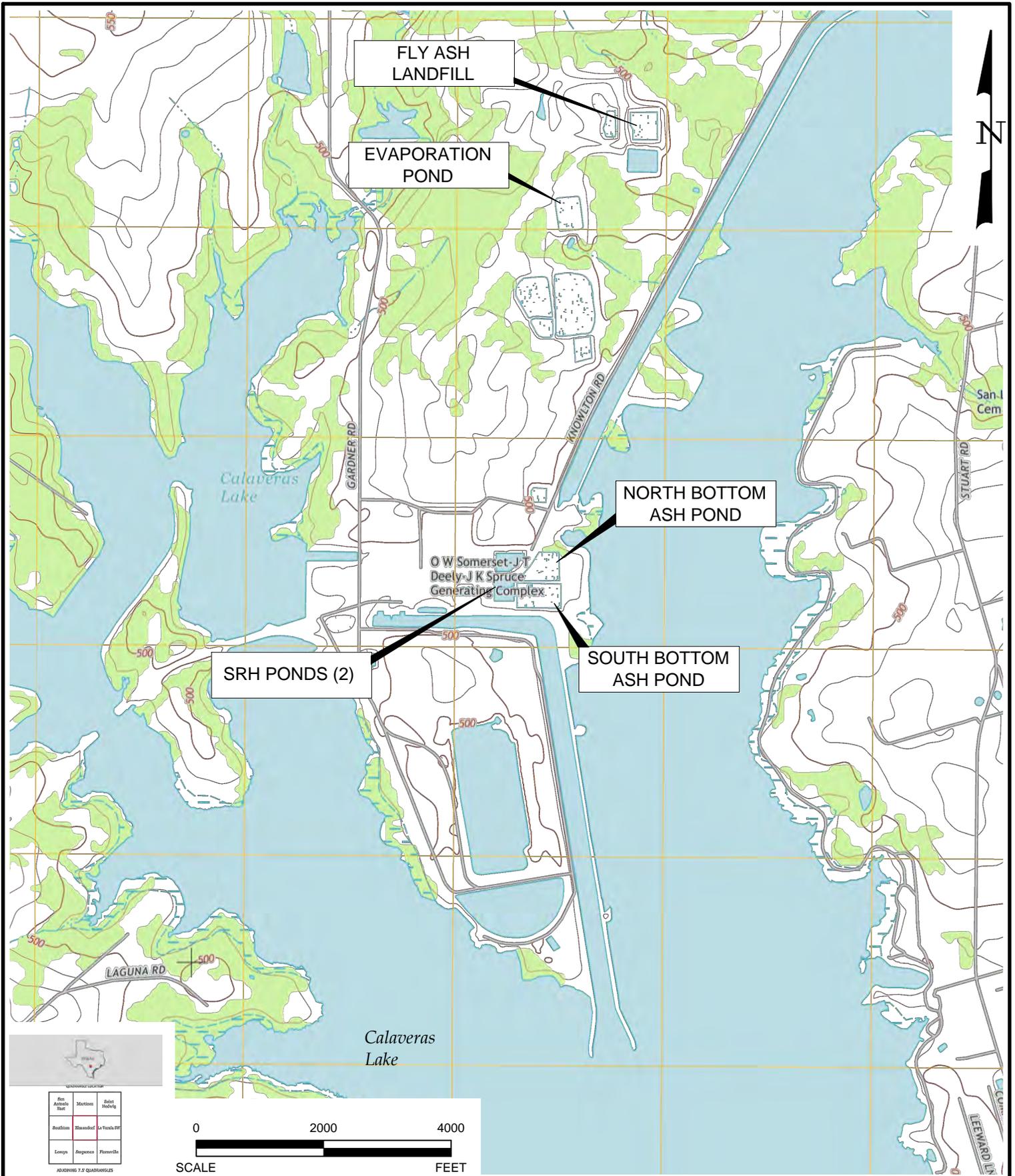
Attachments



1/15/16

Figure

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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		

Photo Log
Attachment 1

January 2016
Project No. 0328985
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 12/16/15.



Photograph: 2 Fly Ash Landfill - standing on western berm – facing northeast. Photo taken 12/16/15.



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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 12/16/15.



Photograph: 4 Fly Ash Landfill – standing on eastern berm - facing south. Photo taken 12/16/15.



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Photograph: 5 Fly Ash Landfill – standing on southeast corner of landfill – facing north. Rain water accumulates in southeast corner of landfill. Photo taken 12/16/15.



Photograph: 6 Fly Ash Landfill – standing on southern berm – facing northwest. Erosion features on southern berm near radial stacker. Photo taken 12/16/15.



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Photograph: 7 | Evaporation Pond – standing on northern berm – facing southeast. Photo taken 12/16/15.



Photograph: 8 | Evaporation Pond – standing on northern berm – facing south. Photo taken 12/16/15.



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Photograph: 9 | Evaporation Pond – standing on northern berm – facing southwest. Photo taken 12/16/15.



Photograph: 10 | Evaporation Pond – standing on southwest corner of pond – facing east. Photo taken 12/16/15.



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Photograph: 11 North Bottom Ash Pond – standing on western berm – facing northeast. Pond was drained to remove residuals. Photo taken 12/16/15.



Photograph: 12 North Bottom Ash Pond – standing on western berm – facing east. Pond was drained to remove residuals. Photo taken 12/16/15.



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Photograph: 13 North Bottom Ash Pond – standing on western berm – facing southeast. Pond was drained to remove residuals. Photo taken 12/16/15.



Photograph: 14 North Bottom Ash Pond – standing on western berm – facing east. Erosion features on inside of western berm. Photo taken 12/16/15.



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Photograph: 15 North Bottom Ash Pond – standing on northeast corner of pond – facing southwest. Outlet pipe in northeast corner of pond. Photo taken 12/16/15.



Photograph: 16 North Bottom Ash Pond – standing on southern berm – facing west. Photo taken 12/16/15.



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Photograph: 17 North SRH Pond – standing on northeast corner of pond – facing west. Photo taken 12/16/15.



Photograph: 18 North SRH Pond – standing on eastern berm – facing southwest. Photo taken 12/16/15.



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Photograph: 19 North SRH Pond – standing on northern berm – facing southeast. Photo taken 12/16/15.



Photograph: 20 North SRH Pond – standing on northern berm – facing southwest. Erosional features on western berm. Photo taken 12/16/15.



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Photograph: 21 South SRH Pond – standing on western berm – facing east. Photo taken 12/16/15.



Photograph: 22 South SRH Pond – standing on western berm – facing southeast. Photo taken 12/16/15.



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Photograph: 23 South SRH Pond – standing on western berm – facing south. Photo taken 12/16/15.



Photograph: 24 South SRH Pond – standing on eastern berm – facing south. Erosional features on eastern berm. Photo taken 12/16/15.



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Photograph: 25 South Bottom Ash Pond – standing on western berm – facing northeast. Photo taken 12/16/15.



Photograph: 26 South Bottom Ash Pond – standing on western berm – facing east. Photo taken 12/16/15.



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Photograph: 27 South Bottom Ash Pond – standing on western berm – facing southeast. Photo taken 12/16/15.



Photograph: 28 South Bottom Ash Pond – standing on southwest corner of pond – facing east. Photo taken 12/16/15.



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