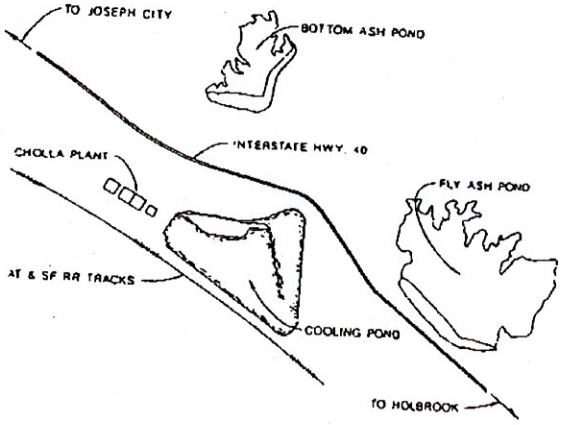
CHOLLA POWER PLANT
Fly Ash Dam, Bottom Ash Dam, Sedimentation Pond, and Bottom Ash Monofill

Annual CCR Impoundment and Landfill Inspection Report

2019



GENERATION ENGINEERING
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Registered Professional Engineer (Geological)
CERTIFICATE NO.
53462
BYRON R.
CONRAD
DATE SIGNED 2/9/2020
ARIZONA U.S.A.
EXPIRES
06/30/2021

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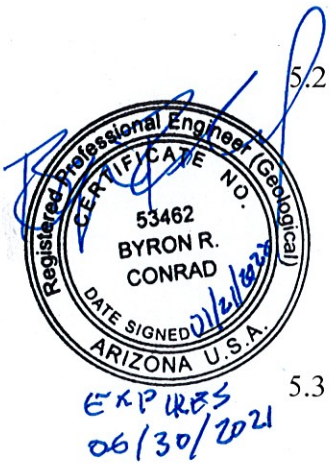

EXPIRES
06/30/2021

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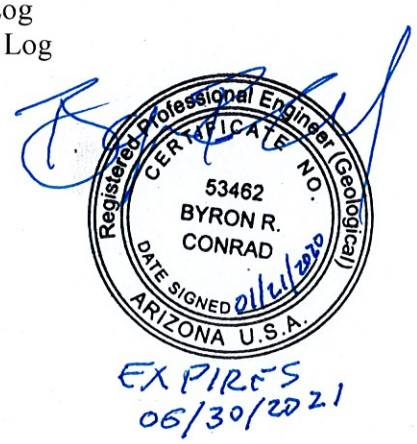

1.0 INTRODUCTION

Arizona Public Service Company (APS) prepared this report to comply with the Environmental Protection Agency's (EPA) Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals From Electric Utilities; Final Rule (2015) requiring "*...inspections by a qualified professional engineer at intervals not exceeding one year to ensure that the design, construction, operation, and maintenance of the CCR unit is consistent with recognized and generally accepted good engineering standards*" (40 CFR 257.83(b)(1) for CCR surface impoundments and 40 CFR 257.84(b)(1) for CCR landfills). AECOM staff participated in the CCR unit inspection and provided technical support in the preparation of this document.

This report includes a review of relevant data in the operating record and visual inspections of the Fly Ash Dam, Bottom Ash Dam, Sedimentation Pond, and the Bottom Ash Monofill. The Fly Ash Dam and Bottom Ash Dam are instrumented with piezometers, settlement monuments, seepage totalizers, and wells.

Inspection Conducted by

Byron R. Conrad, P.E.
Consulting Geological Engineer
Design Engineering
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Geotechnical Engineer
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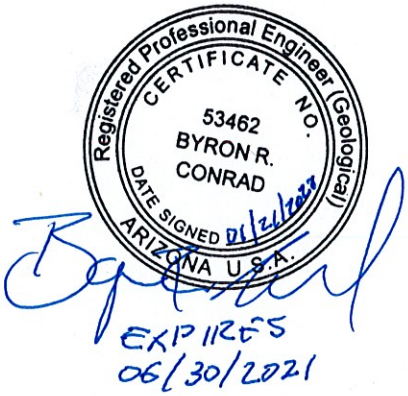

2.0 SITE BACKGROUND AND INSPECTION CONDITIONS

The Cholla Power Plant (Cholla, the Plant) is located nine miles west of Holbrook, Arizona. The Plant is located in the north half of Section 23, Township 18 North, Range 19 East in Navajo County, adjacent to and north of the Little Colorado River. The Plant site and off-site facilities comprise portions of Sections 22 through 27 in Township 18 North, Range 19 East and Section 30 in Township 18 North, Range 20 East. The Plant began operation of Unit 1 at the site in 1961 and Units 2, 3, and 4 were constructed between 1976 and 1981. Three operational units (Units 1, 3, and 4) currently burn sub-bituminous coal to provide a total net generating capacity of 767 megawatts (MW). Units 1, 3, and 4 are operated based on load and economic factors.

The coal combustion process produces Coal Combustion Residuals (CCR) including; bottom ash (silty sand, Unified Soil Classification System SM), fly ash (low plasticity silt, Unified Soil Classification System ML), and Flue Gas Desulfurization sludge (FGD). The Plant has four CCR units: the Bottom Ash Pond, the Fly Ash Pond, the Bottom Ash Monofill, and the Sedimentation Pond. The Bottom Ash Pond and the Fly Ash Pond are used for CCR disposal. The Bottom Ash Monofill is a coal combustion waste landfill used for long-term storage and disposal of dewatered bottom ash transferred from the Bottom Ash Pond. The Sedimentation Pond collects water from drains located on the Plant site and receives CCR in storm water, process water, and Plant washdown from the west side of the Plant. CCR material is also unloaded from vacuum trucks into this unit at an unloading station with a water spray system for dust suppression. These coal combustion waste facilities are the subject of this inspection report.

The field inspection was conducted on Monday, November 18, 2019. Conditions were mild (45-65 degrees Fahrenheit) with light winds and mostly clear skies. Approximately 4.51 inches of precipitation had fallen since the start of the year based on data recorded near Holbrook, Arizona (Weather Underground 2019). Units 1 and 3 were running at the time of the inspection.

Instrumentation at the dams consists of open standpipe PVC piezometers, open well points, simulated weirs, flow meters with totalizers, and brass survey caps on a concrete base measured using a Global Positioning System Survey (GPS). The water level in the piezometers is measured with an electronic water level indicator attached to a cable stamped with increments of 0.01 feet. The impounded water level in the Bottom Ash Pond is measured by an elevation indicator based on NGVD29 set at the edge of the water. The impounded water level in the Fly Ash Pond is measured on a monthly basis using a GPS survey.

The benchmark for the elevations reported for GPS surveys of the settlement monuments at the Cholla Power Plant is based on the Randell 2 monument located on the north side of the Joseph City I-40 overpass. Detailed information of Randell 2 can be found on the National Geodetic Survey (NGS) website. The latitude and longitude of the monument are based on the NAD83 datum. The NGS (2019) lists the elevation of the monument as 5088.09 feet (NAVD88).

3.0 UNIT DESCRIPTIONS

3.1 FLY ASH DAM

The Fly Ash Dam is represented on Figure 1 – Fly Ash Pond Site Map.

The Fly Ash Dam (listed by the Arizona Department of Water Resources (ADWR) as Dam #09.28) was constructed between 1976 and 1978, has a capacity of 18,000 acre-feet, is approximately 80 feet high with an approximately 4,583-foot long clay core zoned earth embankment, and has a Federal Emergency Management Agency (FEMA) rating of intermediate size and high hazard. The maximum normal operating water level is elevation (EL) 5114 feet. The water level was measured most recently by survey to be at EL 5086.791 feet on November 12, 2019. The water level in the Fly Ash Pond is measured on a monthly basis because the water level gauge is located in an area that has been covered with evaporites and can no longer be read. The monthly water level readings are recorded during the monthly settlement monument survey.

3.2 BOTTOM ASH DAM

The Bottom Ash Dam is represented on Figure 2 – Bottom Ash Pond Site Map.

The Bottom Ash Dam (ADWR Dam #09.27) was constructed between 1976 and 1978, has a capacity of 2,300 acre-feet, is approximately 73 feet high with an approximately 4,040-foot long clay core zoned earth embankment, and has a FEMA rating of intermediate size and high hazard. The maximum operating water level is EL 5117.8 feet. The water level was observed to be at EL 5112.40 feet during the inspection on November 18, 2019.

In 1993, the pond was re-permitted to an operating level of EL 5118.6 feet (NGVD29). In 1997, a reassessment of the flood pool allocation revealed the need to lower the operating level to EL 5117.8 feet (NGVD29). In April 1999, APS obtained a major modification of ADEQ APP permit, File No. 100568, that allows dewatered bottom ash to be dredged from the pond and placed in a new facility known as the Bottom Ash Monofill located on a 43-acre parcel located adjacent to the north and east sides of the Bottom Ash Pond.

3.3 SEDIMENTATION POND

The Sedimentation Pond is represented on Figure 3 – Sedimentation Pond Site Map.

The Sedimentation Pond is a holding pond for CCR solids and CCR-impacted surface water that was placed into service in 1976 by constructing an embankment along the southeast and northwest sides. The area surrounding the Sedimentation Pond was subsequently mass-filled such that the crest appears to be at ground level. It has two cells with a maximum depth of 10 feet, a surface area of approximately 1.6 acres, and a total capacity of approximately 10.7 acre-feet. The crest is at EL 5019.0 feet (NGVD29) and the water level was observed to be at approximate EL 5015.44 feet in the south cell and approximate EL 5014.04 feet in the north cell during the inspection.

3.4 BOTTOM ASH MONOFILL

The Bottom Ash Monofill is represented on Figure 4 – Bottom Ash Monofill Site Map.

The Bottom Ash Monofill is a coal combustion waste landfill that was constructed beginning in the late 1990s. In 2009, the Arizona Department of Environmental Quality (ADEQ) executed an amendment to Cholla Plant Aquifer Protection Permit No. P-100568 for the currently-permitted 43-acre footprint and maximum storage elevation of 5,261.0 feet, with final slopes of 4H:1V (horizontal : vertical). Storm water run on is diverted around the landfill by a diversion ditch sized to convey the peak 100-year flow. On-site storm water runoff is conveyed to a retention basin and eventually routed to the Bottom Ash Pond. The retention basin has a capacity of 8.2 acre-feet with an overall depth of 12 feet and 3H:1V side slopes.

In 2015, the Bottom Ash Monofill was expanded to the north and east to its maximum APP-permitted footprint to add capacity for continuing operations at the Plant.

4.0 FIELD INSPECTIONS

This section contains the 2019 annual field inspections conducted by APS and accompanied by a representative from AECOM at the Fly Ash Dam (Section 4.1), the Bottom Ash Dam (Section 4.2), the Sedimentation Pond (Section 4.3), and the Bottom Ash Monofill (Section 4.4). The results are reprinted and formatted to fit this report.

4.1 APS FIELD INSPECTION – FLY ASH DAM

<table>
<tr><td colspan="2">Fly Ash Dam</td><td colspan="2">State Identification Number (SID): 09.28</td><td rowspan="16">Not Applicable</td><td rowspan="16">No</td><td rowspan="16">Yes</td><td rowspan="16">Monitor</td><td rowspan="16">Repair</td><td rowspan="16">Investigate</td></tr>
<tr><td>SID: 09.28</td><td>Dam Name: Fly Ash Dam</td><td>Type: Earth</td><td>Purpose: Fly ash disposal</td></tr>
<tr><td colspan="2">Contact(s): Byron Conrad, P.E. (APS)</td><td colspan="2">Report Date: January 17, 2020</td></tr>
<tr><td colspan="2">Inspected by: Byron Conrad, P.E. (APS)
Lee Wright, P.E. (AECOM)</td><td colspan="2">Inspection Date: November 18, 2019</td></tr>
<tr><td colspan="2">Reviewed by: Byron Conrad, P.E. (APS)</td><td colspan="2">Review Date: January 15, 2020</td></tr>
<tr><td colspan="2">Design Dam Crest Elevation (ft): 5,120</td><td colspan="2">Design Spillway Crest Elevation: None</td></tr>
<tr><td colspan="2">Design Total Freeboard (ft): 6</td><td colspan="2">Measured Total Freeboard (ft): ~33.2</td></tr>
<tr><td colspan="2">Statutory Dam Height (ft): 80</td><td colspan="2">Structural Height (ft): 80</td></tr>
<tr><td colspan="2">Dam Crest Length (ft): 4,583</td><td>Upstream Slope: 3:1</td><td>Downstream Slope: 3:1</td></tr>
<tr><td colspan="2" rowspan="2">Dam Crest Width (ft): 24</td><td>Lat: 34° 56' 10.0" N</td><td rowspan="2">Water Rights: N/A</td></tr>
<tr><td>Long: 110° 16' 06.0" W</td></tr>
<tr><td colspan="2">Reservoir Area (acres): 420</td><td colspan="2">Reservoir Storage (ac-ft): 18,000</td></tr>
<tr><td colspan="4">Inflow Design Flood/Safe Flood-Passing Capacity: PMF – fully contained</td></tr>
<tr><td colspan="2">Reservoir Level During Inspection (ft): EL 5086.791 (November 12, 2019)</td><td rowspan="2">Photos: Yes</td><td rowspan="2">Pages: 4</td></tr>
<tr><td colspan="2">Estimated Solids Level (ft): ~ EL 5094.4 at the discharge pipe</td></tr>
</table>

Fly Ash Dam		SID: **09.28**		N/A	No	Yes	Mon	Rep	Inv
COMPLIANCE CHECKLIST									
1	***CONDITION SUMMARY, LICENSE, EAP, NEXT INSPECTION***								
a	Recorded downstream hazard: **High**	Should hazard be revised?			**X**				
b	If high hazard, estimate downstream persons-at-risk (PAR): **>301**	Is there a significant increase since the last inspection?			**X**				
c	Recorded size: **Intermediate**	Should size be revised?			**X**				
d	Any safety deficiencies? **No**	Describe:			**X**				
e	Any statute or rule violations? **No**	Describe and list required action:			**X**				
f	Safe storage level on License: **5,114 feet**	Should level be revised:			**X**				
g	Any License violations? **No**	Describe and list required action:			**X**				
h	Date of current License: **10/21/1986**	Should new License be issued?			**X**				
i	Date of last Emergency Action Plan revision: **03/2017**	Should EAP be revised?			**X**				
j	Any Agency actions? **No**	Describe and list required action:			**X**				
k	Normal inspection frequency: **Weekly, Annually**	Should inspection frequency be revised?			**X**				
l	Recommended date for next inspection: **November 2020**								

MONITORING CHECKLIST									
2	***INSTRUMENTATION AND MONITORING***								
a	Describe: **1) A review of the file indicates 37 piezometers and wells in and around the embankment. 2) Sixteen settlement monuments located along the crest. 3) The water level in the reservoir is measured by GPS survey each month. 4) Flow measurement devices at each downstream sump and the return lines to the reservoir to estimate seepage rates.**								
b	Any repair or replacement required? **No**	Describe: **See comment i.**			**X**				
c	Date of last report: **January 2019 (for 2018)**	Should new readings be taken and new report provided? **Annual reporting is required.**				**X**			

DAM EMBANKMENT CHECKLIST									
3	***DAM CREST***								
a	Settlements, slides, depressions?				**X**				
b	Misalignment?				**X**				
c	Longitudinal/Transverse cracking?				**X**				
d	Animal burrows?	**Ant hills were observed at various locations across the crest (Photo IMG_5705).**				**X**	**X**	**X**	
e	Adverse vegetation?				**X**				
f	Erosion?				**X**				
4	***UPSTREAM SLOPE***								
a	Erosion?	**Minor erosion and soil wasting observed along the upstream slope. See comment ii.**				**X**	**X**		
b	Inadequate ground cover?				**X**				
c	Adverse vegetation?	**None observed. Continue to monitor vegetation.**			**X**		**X**		
d	Longitudinal/Transverse cracking?				**X**				
e	Inadequate riprap?				**X**				
f	Stone deterioration?	**Minor wasting observed. See comment iii.**				**X**	**X**		
g	Settlements, slides, depressions, bulges?				**X**				
h	Animal burrows?	**None observed. Continue to monitor.**			**X**		**X**		

Fly Ash Dam		SID: **09.28**	N/A	No	Yes	Mon	Rep	Inv
5	***DOWNSTREAM SLOPE***							
a	Erosion?	**No deep erosion (greater than 1 foot deep) observed. Continue to monitor.**		**X**		**X**		
b	Inadequate ground cover?			**X**				
c	Adverse vegetation?	**Continue removing adverse vegetation.**		**X**		**X**		
d	Longitudinal/Transverse cracking?			**X**				
e	Inadequate riprap?			**X**				
f	Stone deterioration?	**Minor wasting observed. See comment iii.**			**X**	**X**		
g	Settlements, slides, depressions, bulges?			**X**				
h	Soft spots or boggy areas?	**There is evidence of historic seepage beyond the downstream toe. Continue to monitor.**			**X**	**X**		
i	Movement at or beyond toe?			**X**				
j	Animal burrows?	**None observed. Continue to monitor.**		**X**		**X**		
6	***ABUTMENT CONTACTS***							
a	Erosion?	**No significant erosion (greater than 1 foot deep) observed. Continue to monitor.**		**X**		**X**		
b	Differential movement?			**X**				
c	Cracks?			**X**				
d	Settlements, slides, depressions, bulges?			**X**				
e	Seepage?	**Historic seepage has been observed downstream of the Northwest Abutment during previous inspections. The areas were observed to be dry during this inspection.**		**X**		**X**		
f	Animal burrows?	**None observed. Continue to monitor.**		**X**		**X**		
7	***SEEPAGE/PIPING CONTROL DESIGN FEATURE(S)***							
a	Describe:	**1) The Geronimo and Hunt seepage collection and pump back systems are located downstream of the dam near I-40 for fluid interception.** **2) Discharge from the crest side of the reservoir creates a beach to prevent water from being stored against the upstream face.**						
b	Internal drains flowing?				**X**	**X**		
c	Seepage at or beyond toe?	**See comment iv.**			**X**	**X**		
d	If so, does seepage contain fines?	**The water in the sumps was observed to be clear during the inspection.**		**X**		**X**		
e	Evidence of sand boils at or beyond toe?			**X**				

RESERVOIR CHECKLIST								
8	***RESERVOIR***							
a	High water marks?			**X**				
b	Erosion/slides into pool area?			**X**				
c	Sediment accumulation?	**The reservoir was designed to impound sediment.**			**X**			
d	Floating debris present?			**X**				
e	Depressions, sinkholes, or vortices?			**X**				
f	Low ridges/saddles allowing overflow?			**X**				
g	Structures below dam crest elevation?			**X**				

Additional comments and recommendations for the Fly Ash Dam:

i. The water level gauge was covered with sediment in 2015. The water level in the pond is currently measured by GPS survey along with the monthly monument readings (Photo IMG_5780). This method is sufficient so long as the water level continues to remain low.

ii. Minor erosion was observed along the upstream slope near the piezometers screened in the dam core (Photo IMG_5729). The eroded portion was observed to be wider during this inspection compared to the 2018 inspection, but there does not appear to be additional headcutting in this area. The affected portion of the upstream slope is part of the dam crest widening constructed in early 2000 to accommodate piezometer installation activities. The crest is approximately 40 feet wide in this area (compared to the design crest of 24 feet). The erosion appears to be in the extended portion and is not affecting the original crest.

iii. Minor stone deterioration was also observed during previous inspections. Continue to monitor.

iv. Seepage has historically been observed at the Geronimo seep, the Hunt seep, the I-40 seep, and in areas of relatively lower elevation along the downstream toe. The Geronimo and Hunt Sumps were active during the inspection; however, the I-40 seep (Photo IMG_5822) and historic seepage areas downstream of the West Embankment were dry. In the 2018 annual inspection report, the I-40 seep was observed to have been drier than it was during previous inspections.

v. Continue removing excessive natural vegetation in accordance with APS's preferred protocol, the NMOSE "*Vegetation Management on Dams*" (2011) document.

vi. The weekly inspection reports for the period between October 1, 2018 and September 30, 2019 were reviewed and indicate the following:

    a. Seepage at the abutment contacts was noted as requiring monitoring throughout the year. APS monitors seepage on a regular basis and did not record any adverse seepage conditions during the review period.

vii. The weekly inspection reports for the period between October 1, 2018 and September 30, 2019 do not indicate that there were any appearances of actual or potential structural weakness or other conditions that have the potential to disrupt the operation or safety of the CCR unit.

4.2 APS FIELD INSPECTION – BOTTOM ASH DAM

<table>
<tr><td colspan="2">Bottom Ash Dam</td><td colspan="2">State Identification Number (SID): 09.27</td><td rowspan="15">Not Applicable</td><td rowspan="15">No</td><td rowspan="15">Yes</td><td rowspan="15">Monitor</td><td rowspan="15">Repair</td><td rowspan="15">Investigate</td></tr>
<tr><td>SID: 09.27</td><td>Dam Name: Bottom Ash Dam</td><td>Type: Earth</td><td>Purpose: Bottom ash containment</td></tr>
<tr><td colspan="2">Contact(s): Byron Conrad, P.E. (APS)</td><td colspan="2">Report Date: January 17, 2020</td></tr>
<tr><td colspan="2">Inspected by: Byron Conrad, P.E. (APS),
Lee Wright, P.E. (AECOM)</td><td colspan="2">Inspection Date: November 18, 2019</td></tr>
<tr><td colspan="2">Reviewed by: Byron Conrad, P.E. (APS)</td><td colspan="2">Review Date: January 15, 2020</td></tr>
<tr><td colspan="2">Design Dam Crest Elevation (ft): 5,123.3</td><td colspan="2">Design Spillway Crest Elevation: None</td></tr>
<tr><td colspan="2">Design Total Freeboard (ft): 5.5</td><td colspan="2">Measured Total Freeboard (ft): 10.9</td></tr>
<tr><td colspan="2">Statutory Dam Height (ft): 73</td><td colspan="2">Structural Height (ft): 73</td></tr>
<tr><td colspan="2">Dam Crest Length (ft): 4,040</td><td>Upstream Slope: 3:1</td><td>Downstream Slope: 3:1</td></tr>
<tr><td colspan="2" rowspan="2">Dam Crest Width (ft): 12</td><td>Lat: 34° 57' 07.0" N</td><td rowspan="2">Water Rights: N/A</td></tr>
<tr><td>Long: 110° 17' 22.7" W</td></tr>
<tr><td colspan="2">Reservoir Area (acres): 80</td><td colspan="2">Reservoir Storage (ac-ft): 2,300</td></tr>
<tr><td colspan="4">Inflow Design Flood/Safe Flood-Passing Capacity: PMF – fully contained.</td></tr>
<tr><td colspan="2">Reservoir Level During Inspection (ft): 5112.40</td><td rowspan="2">Photos: Yes</td><td rowspan="2">Pages: 4</td></tr>
<tr><td colspan="2">Estimated Solids Level (ft): Varies – approx. EL 5115 feet</td></tr>
</table>

Bottom Ash Dam			SID: **09.27**		N/A	No	Yes	Mon	Rep	Inv
COMPLIANCE CHECKLIST										
1	***CONDITION SUMMARY, LICENSE, EAP, NEXT INSPECTION***									
a	Recorded downstream hazard:	**High**	Should hazard be revised?			**X**				
b	If high hazard, estimate downstream persons-at-risk (PAR): **>301**		Is there a significant increase since the last inspection?			**X**				
c	Recorded size:	**Intermediate**	Should size be revisited?			**X**				
d	Any safety deficiencies?	**No**	Describe:			**X**				
e	Any statute or rule violations?	**No**	Describe and list required action:			**X**				
f	Safe storage level on License:	**5,117.8 feet**	Should level be revised:			**X**				
g	Any License violations?	**No**	Describe and list required action:			**X**				
h	Date of current License:	**12/11/1998**	Should new License be issued?			**X**				
i	Date of last Emergency Action Plan revision: **03/2017**		Should EAP be revised?			**X**				
j	Any Agency actions?	**No**	Describe and list required action:			**X**				
k	Normal inspection frequency:	**Weekly, Annually**	Should inspection frequency be revised?			**X**				
l	Recommended date for next inspection: **November 2020**									

MONITORING CHECKLIST										
2	***INSTRUMENTATION AND MONITORING***									
a	Describe:	**1) 19 piezometers and wells in and around the embankment.** **2) 10 settlement monuments.** **3) A V-notch weir and seepage monitoring systems.** **4) Water level gauge in the reservoir.**								
b	Any repair or replacement required?	**No.**	Describe:			**X**				
c	Date of last report:	**January 2019 (for 2018)**	Should new readings be taken and new report provided? **Annual reporting is required.**				**X**			

DAM EMBANKMENT CHECKLIST									
3	***DAM CREST***								
a	Settlements, slides, depressions?				**X**				
b	Misalignment?				**X**				
c	Longitudinal/Transverse cracking?	**See comment i.**			**X**				
d	Animal burrows?				**X**		**X**		
e	Adverse vegetation?				**X**				
f	Erosion?	**See comment i.**				**X**	**X**	**X**	
4	***UPSTREAM SLOPE***								
a	Erosion?	**Minor erosion near the crest observed. See comment ii.**				**X**	**X**		
b	Inadequate ground cover?				**X**				
c	Adverse vegetation?	**There is vegetation in the pond near the West Abutment (Photo IMG_5827).**				**X**		**X**	
d	Longitudinal/Transverse cracking?				**X**				
e	Inadequate riprap?				**X**				
f	Stone deterioration?				**X**				
g	Settlements, slides, depressions, bulges?				**X**				
h	Animal burrows?	**None observed. Continue to monitor.**			**X**		**X**		

Bottom Ash Dam		SID: **09.27**	N/A	No	Yes	Mon	Rep	Inv
5	***DOWNSTREAM SLOPE***							
a	Erosion?	**Erosion gullies at the toe of the East Embankment downstream slope do not appear to be affecting the embankment.**		**X**		**X**		
b	Inadequate ground cover?			**X**				
c	Adverse vegetation?	**Dense vegetation and some woody vegetation were observed near the West Abutment Weir.**			**X**		**X**	
d	Longitudinal/Transverse cracking?			**X**				
e	Inadequate riprap?			**X**				
f	Stone deterioration?	**Riprap deterioration does not appear to have accelerated since the previous inspection.**			**X**	**X**		
g	Settlements, slides, depressions, bulges?				**X**			
h	Soft spots or boggy areas?	**See comment iii.**			**X**	**X**		
i	Movement at or beyond toe?			**X**				
j	Animal burrows?	**None observed. Continue to monitor.**		**X**		**X**		
6	***ABUTMENT CONTACTS***							
a	Erosion?			**X**				
b	Differential movement?			**X**				
c	Cracks?			**X**				
d	Settlements, slides, depressions, bulges?			**X**				
e	Seepage?	**Yes. Measured approximately 2.32 gpm at the West Abutment Weir during the inspection. Continue to monitor.**			**X**	**X**		
f	Animal burrows?	**None observed. Continue to monitor.**		**X**		**X**		
7	***SEEPAGE/PIPING CONTROL DESIGN FEATURE(S)***							
a	Describe:	**Several monitoring, seepage, and pump back collection systems are located downstream of the dam.**						
b	Internal drains flowing?				**X**			
c	Seepage at or beyond toe?	**See comment ii.**			**X**	**X**		
d	If so, does seepage contain fines?			**X**		**X**		
e	Evidence of sand boils at or beyond toe?			**X**				

RESERVOIR CHECKLIST								
8	***RESERVOIR***							
a	High water marks?			**X**				
b	Erosion/slides into pool area?			**X**				
c	Sediment accumulation?	**Bottom ash settles in the reservoir, is removed, and is placed in the Bottom Ash Monofill.**			**X**			
d	Floating debris present?			**X**				
e	Depressions, sinkholes, or vortices?			**X**				
f	Low ridges/saddles allowing overflow?			**X**				
g	Structures below dam crest elevation?	**There is a divider dike in the center of the pond.**			**X**			

Additional comments and recommendations for the Bottom Ash Dam:

i. Fewer erosion holes were observed in the South Embankment crest (Photos IMG_5840 and IMG_5857) compared to the 2018 inspection. The series of five erosion holes observed on the East Embankment crest (Photo IMG_5901) during the 2018 inspection manifested as a series of four shallow holes and depressions during this inspection. Other isolated erosion holes (Photos IMG_5871 and IMG_5879) were present on the southern half of the East Embankment. The erosion holes should be repaired and the area should be monitored for additional erosion.

ii. Continue to monitor the erosion around the siphon line encasements, soil wasting, and erosion gullies observed during the 2018 inspection. Repair erosion if the eroded depth exceeds 1 foot. Investigate the source of sediment collecting in the diversion ditch between the East Embankment access road and the East Embankment.

iii. Seepage and boggy areas were observed along the downstream toe in locations of known and active seepage (e.g. the Petroglyph Seep (Photo IMG_5924), the Tanner Wash seep, the Bottom Ash Toe Drain Sump, the West Abutment Weir (Photo IMG_5912), and the P-232 seepage intercept area). Water in the sumps appeared to be clear during the inspection.

iv. The weekly inspection reports for the period between October 1, 2018 and September 30, 2019 were reviewed and indicate the following:

    a. Erosion at the abutment contacts was noted as requiring monitoring throughout the year.

    b. Seepage at the abutment contacts was noted as requiring monitoring throughout the year. APS monitors seepage on a regular basis and did not record any adverse seepage conditions during the review period.

v. The weekly inspection reports for the period between October 1, 2018 and September 30, 2019 do not indicate that there were any appearances of actual or potential structural weakness or other conditions that have the potential to disrupt the operation or safety of the CCR unit.

4.3 APS FIELD INSPECTION – SEDIMENTATION POND

<table>
<tr><td colspan="2">Sedimentation Pond</td><td colspan="2">State Identification Number (SID): N/A</td><td rowspan="15">Not Applicable</td><td rowspan="15">No</td><td rowspan="15">Yes</td><td rowspan="15">Monitor</td><td rowspan="15">Repair</td><td rowspan="15">Investigate</td></tr>
<tr><td>SID: N/A</td><td>Dam Name: Sedimentation Pond</td><td>Type: Earth</td><td>Purpose: CCR-Impacted Surface Water Collection</td></tr>
<tr><td colspan="2">Contact(s): Byron Conrad, P.E. (APS)</td><td colspan="2">Report Date: January 17, 2020</td></tr>
<tr><td colspan="2">Inspected by: Byron Conrad, P.E. (APS), Lee Wright, P.E. (AECOM)</td><td colspan="2">Inspection Date: November 18, 2019</td></tr>
<tr><td colspan="2">Reviewed by: Byron Conrad, P.E. (APS)</td><td colspan="2">Review Date: January 15, 2020</td></tr>
<tr><td colspan="2">Design Dam Crest Elevation (ft): 5019</td><td colspan="2">Design Spillway Crest Elevation: Twin 16-inch corrugated polyethylene pipes, ungated, with trash rack</td></tr>
<tr><td colspan="2">Design Total Freeboard (ft): 2</td><td colspan="2">Measured Total Freeboard (ft): 3.56 (south cell)
4.96 (north cell)</td></tr>
<tr><td colspan="2">Statutory Dam Height (ft): 11</td><td colspan="2">Structural Height (ft): East embankment: 11 ft
West embankment: 0 ft (areal fill around the Pond raised the surrounding ground surface to the elevation of the dam crest)</td></tr>
<tr><td colspan="2">Dam Crest Length (ft): 1,100</td><td>Upstream Slope: 1.5:1 (by inspection)</td><td>Downstream Slope: 1.5:1 (by inspection)</td></tr>
<tr><td colspan="2" rowspan="2">Dam Crest Width (ft): 24</td><td>Lat: 34° 56′ 29.9″N</td><td rowspan="2">Water Rights: N/A</td></tr>
<tr><td>Long: 110° 18′ 14.9″W</td></tr>
<tr><td colspan="2">Reservoir Area (acres): 1.6</td><td colspan="2">Reservoir Storage (ac-ft): 10.7</td></tr>
<tr><td colspan="4">Inflow Design Flood/Safe Flood-Passing Capacity: Not Calculated</td></tr>
<tr><td colspan="2">Reservoir Level During Inspection (ft): 5015.44 (south cell)
5014.04 (north cell)</td><td rowspan="2">Photos: Yes</td><td rowspan="2">Pages: 4</td></tr>
<tr><td colspan="2">Estimated Solids Level (ft): Below EL 5015.44 (south cell)
~5014.5 (max, north cell)</td></tr>
</table>

Sedimentation Pond		SID: N/A		N/A	No	Yes	Mon	Rep	Inv
COMPLIANCE CHECKLIST									
1	***CONDITION SUMMARY/LICENSE/EAP/NEXT INSPECTION***								
a	Recorded downstream hazard: **Very Low**	Should hazard be revised?			**X**				
b	If high hazard, estimate downstream persons-at-risk (PAR): **N/A**	Is there a significant increase since the last inspection?			**X**				
c	Recorded size: **Small**	Should size be revised?			**X**				
d	Any safety deficiencies? **No**	Describe:			**X**				
e	Any statute or rule violations? **No**	Describe and list required action:			**X**				
f	Safe storage level on License: **N/A**	Should level be revised:			**X**				
g	Any License violations? **No**	Describe and list required action:			**X**				
h	Date of current License: **N/A**	Should new License be issued?			**X**				
i	Date of last Emergency Action Plan revision: **N/A**	Should EAP be revised?			**X**				
j	Any Agency actions? **No**	Describe and list required action:			**X**				
k	Normal inspection frequency: **Weekly, Annually**	Should inspection frequency be revised?			**X**				
l	Recommended date for next inspection: **November 2020**								

MONITORING CHECKLIST									
2	***INSTRUMENTATION AND MONITORING***								
a	Describe: **There are no instruments or other monitoring devices for this structure due to its small size.**								
b	Any repair or replacement required? **No.**	Describe: **N/A**	**X**						
c	Date of last report: **January 2019 (for 2018)**	Should new readings be taken and new report provided? **Annual reporting is required.**			**X**				

DAM EMBANKMENT CHECKLIST								
3	***DAM CREST***							
a	Settlements, slides, depressions?			**X**				
b	Misalignment?			**X**				
c	Longitudinal/Transverse cracking?			**X**				
d	Animal burrows?			**X**				
e	Adverse vegetation?			**X**				
f	Erosion?			**X**				
4	***UPSTREAM SLOPE***							
a	Erosion? **The upstream slope appears to be steeper than the 3H:1V design slope.**			**X**				
b	Inadequate ground cover?			**X**				
c	Adverse vegetation?			**X**				
d	Longitudinal/Transverse cracking?			**X**				
e	Inadequate riprap?			**X**				
f	Stone deterioration?			**X**				
g	Settlements, slides, depressions, bulges?			**X**				
h	Animal burrows?			**X**				

Sedimentation Pond		SID: N/A	N/A	No	Yes	Mon	Rep	Inv
5	***DOWNSTREAM SLOPE***							
a	Erosion?	**See comment ii.**			**X**	**X**		
b	Inadequate ground cover?			**X**				
c	Adverse vegetation?			**X**				
d	Longitudinal/Transverse cracking?			**X**				
e	Inadequate riprap?			**X**				
f	Stone deterioration?			**X**				
g	Settlements, slides, depressions, bulges?			**X**				
h	Soft spots or boggy areas?			**X**				
i	Movement at or beyond toe?			**X**				
j	Animal burrows?			**X**				
6	***ABUTMENT CONTACTS***							
Abutments are not defined due to general grading in the area.								
a	Erosion?		**X**					
b	Differential movement?		**X**					
c	Cracks?		**X**					
d	Settlements, slides, depressions, bulges?		**X**					
e	Seepage?		**X**					
f	Animal burrows?		**X**					
7	***SEEPAGE/PIPING CONTROL DESIGN FEATURE(S)***							
a	Describe:	**None.**						
b	Internal drains flowing?		**X**					
c	Seepage at or beyond toe?			**X**				
d	If so, does seepage contain fines?		**X**					
e	Evidence of sand boils at or beyond toe?			**X**				

RESERVOIR CHECKLIST								
8	***RESERVOIR***							
a	High water marks?			**X**				
b	Erosion/slides into pool area?			**X**				
c	Sediment accumulation?	**Suspended sediment and CCR are designed to settle in the two chambers of the impoundment.**			**X**			
d	Floating debris present?	**Trash and debris were observed in the north cell.**			**X**			
e	Depressions, sinkholes, or vortices?			**X**				
f	Low ridges/saddles allowing overflow?	**There is a concrete weir separating the north cell from the south cell.**			**X**			
g	Structures below dam crest elevation?	**Yes, two 16-inch corrugated polyethylene pipe outlets in the south cell (see Photos IMG_6007 and IMG_6009).**			**X**			

Additional comments and recommendations for the Sedimentation Pond:

i. The upstream slopes appear to be steeper than the design slope; however, this may be due to previous excavation activities and is not necessarily an indication of slope instability.

ii. Minor erosion was observed along the edges of the concrete outfall structure (Photos IMG_6007 and IMG_6009). The erosion did not appear to be worse compared to previous inspections. Continue monitoring.

iii. In February 2019, APS began designing an alternative storage system for CCR to permit the decommissioning of the existing Sedimentation Pond to comply with regulations in 40 CFR Part 257 (EPA 2015). APS currently intends to replace the unlined Sedimentation Pond with a new below-ground concrete tank expected to be in service by July 31, 2020. APS intends to follow the applicable closure, post-closure, recordkeeping, and notification requirements when removing the Sedimentation Pond from service.

iv. The weekly inspection reports for the period between October 1, 2018 and September 30, 2019 were reviewed and do not indicate that there were any appearances of actual or potential structural weakness or other conditions that have the potential to disrupt the operation or safety of the CCR unit.

4.4 APS FIELD INSPECTION – BOTTOM ASH MONOFILL

<table>
<tr><td colspan="2">Bottom Ash Monofill</td><td colspan="2">State Identification Number (SID): N/A</td><td rowspan="12">Not Applicable</td><td rowspan="12">No</td><td rowspan="12">Yes</td><td rowspan="12">Monitor</td><td rowspan="12">Repair</td><td rowspan="12">Investigate</td></tr>
<tr><td>SID: N/A</td><td>Landfill Name: Bottom Ash Monofill</td><td>Type: Landfill</td><td>Purpose: Permanent Storage of Dry Bottom Ash Dredged from Bottom Ash Pond</td></tr>
<tr><td colspan="2">Contact(s): Byron Conrad, P.E. (APS)</td><td colspan="2">Report Date: January 17, 2020</td></tr>
<tr><td colspan="2">Inspected by: Byron Conrad, P.E. (APS), Lee Wright, P.E. (AECOM)</td><td colspan="2">Inspection Date: November 18, 2019</td></tr>
<tr><td colspan="2">Reviewed by: Byron Conrad, P.E. (APS)</td><td colspan="2">Review Date: January 15, 2020</td></tr>
<tr><td colspan="2">Design Maximum Ash Elevation (ft): 5261</td><td colspan="2">Current Ash Elevation: 5184 feet for capped west portion, 5116 feet for east portion.</td></tr>
<tr><td colspan="2">Dam Crest Length (ft): Not a dam, not applicable.</td><td>Design Side Slope: 4:1 (Final)</td><td>Observed Side Slope: 3:1, steeper (2:1) towards the south end of the west side.</td></tr>
<tr><td colspan="2" rowspan="2">Dam Crest Width (ft): Not a dam, not applicable.</td><td>Lat: 34° 57' 35.4"N</td><td rowspan="2">Water Rights: N/A</td></tr>
<tr><td>Long: 110° 17' 06.3"W</td></tr>
<tr><td colspan="2">Landfill Area (acres): 43 (maximum permitted area)</td><td colspan="2">Landfill Capacity (ac-ft): 2,417</td></tr>
<tr><td colspan="4">Inflow Design Flood/Safe Flood-Passing Capacity: Diversion of 100-year, 24-hour run-on storm</td></tr>
<tr><td colspan="2">Photos: Yes</td><td colspan="2">Pages: 2</td></tr>
</table>

Bottom Ash Monofill		SID: N/A	N/A	No	Yes	Mon	Rep	Inv
MONITORING CHECKLIST								
1	***INSTRUMENTATION AND MONITORING***							
a	Describe: **There are no instruments or other monitoring devices for this structure.**							
b	Any repair or replacement required? **N/A**	Describe: **N/A**	**X**					
c	Date of last report: **January 2019 (for 2018)**	Should new readings be taken and new report provided? **N/A**	**X**					
2	***CONDITION SUMMARY***							
a	Waste placed in good practices? **See comment i.**				**X**			
3	***LANDFILL CONFIGURATION***							
a	Settlements, slides, slope instability?			**X**				
b	Cracking?			**X**				
c	Run on control?				**X**			
d	Run off control?				**X**			
e	Erosion? **See comment ii.**			**X**		**X**		
f	Dust control issues?			**X**				

Additional comments and recommendations for the Bottom Ash Monofill:

i. APS did not place bottom ash in the Bottom Ash Monofill in 2019.

ii. Erosion on the slopes of the Stormwater Detention Basin has been repaired (Photos IMG_5967, IMG_5972, and IMG_5974). Continue to monitor and repair erosion if the eroded depth exceeds 1 foot.

iii. The 2018 inspection identified an erosion gully approximately 2.5 feet deep on the eastern side of the top of the CCR unit. The erosion gully was not observed during this inspection. Continue to repair erosion features if the eroded depth exceeds 1 foot.

iv. The weekly inspection reports for the period between October 1, 2018 and September 30, 2019 were reviewed and do not indicate that there were any appearances of actual or potential structural weakness or other conditions that have the potential to disrupt the operation or safety of the CCR unit.

5.0 DATA REVIEW

5.1 FLY ASH DAM

5.1.1 Geometry Changes Since Last Inspection

There have not been any significant changes to the geometry of the unit since the last inspection in 2018.

5.1.2 Instrumentation

The locations of geotechnical and other related instrumentation in the vicinity of the Fly Ash Dam are shown on Figure 5 – Fly Ash Dam Instrumentation Map.

The minimum and maximum recorded readings for each instrument over the October 1, 2018 – September 30, 2019 (current) review period are reported in the following table:

Instrument Name	Minimum	Maximum	Unit
Open Standpipe Piezometers (10/1/18 to 9/30/19)			
F-81	5058.60	5059.36	EL (ft)
F-88	5000.27	5003.87	EL (ft)
F-89	5054.73	5058.76	EL (ft)
F-90	4992.61	4995.86	EL (ft)
F-91	5005.03	5007.61	EL (ft)
F-92	5010.19	5012.80	EL (ft)
F-93	5016.19	5017.87	EL (ft)
F-100	5078.28	5080.59	EL (ft)
F-101	5048.76	5049.95	EL (ft)
F-102	5025.04	5026.21	EL (ft)
F-103	5017.45	5018.15	EL (ft)
F-104	5063.01	5065.46	EL (ft)
F-105	5082.98	5086.88	EL (ft)
F-106	5014.68	5016.02	EL (ft)
F-107	5024.18	5025.97	EL (ft)
F-108	5055.94	5058.24	EL (ft)
F-109	5034.52	5035.93	EL (ft)
F-110	5087.81	5091.16	EL (ft)
F-111	5030.24	5031.50	EL (ft)
F-112	5026.74	5027.80	EL (ft)
F-113	5041.22	5042.37	EL (ft)
F-114	Dry	Dry	EL (ft)
F-115	5031.69	5032.92	EL (ft)

Instrument Name	Minimum	Maximum	Unit
F-117	5082.99	5087.05	EL (ft)
F-123	5085.57	5086.53	EL (ft)
F-124	5086.43	5087.06	EL (ft)
F-125	Dry	Dry	EL (ft)
F-126	5078.10	5080.15	EL (ft)
F-127	5071.64	5073.70	EL (ft)
F-128	5090.38	5091.08	EL (ft)
F-129	5083.71	5087.06	EL (ft)
F-130	5075.93	5078.22	EL (ft)
F-131	5057.17	5059.07	EL (ft)
F-132	5086.86	5087.56	EL (ft)
F-133	5080.55	5084.44	EL (ft)
F-134	5062.31	5064.61	EL (ft)
W-123	5035.68	5037.65	EL (ft)
Settlement Monuments (10/1/18 to 9/30/19)			
M-1	5120.892	5121.005	EL (ft)
M-2	5120.417	5120.503	EL (ft)
M-3	5119.781	5119.885	EL (ft)
M-4	5118.948	5119.049	EL (ft)
M-5	5117.910	5118.017	EL (ft)
M-5A	5117.728	5117.818	EL (ft)
M-5B	5117.557	5117.645	EL (ft)
M-5C	5117.897	5117.972	EL (ft)
M-6	5119.021	5119.096	EL (ft)
M-6A	5118.672	5118.736	EL (ft)
M-6B	5119.660	5119.727	EL (ft)
M-6C	5120.028	5120.100	EL (ft)
M-7	5119.458	5119.552	EL (ft)
M-8	5119.567	5119.668	EL (ft)
M-9	5119.990	5120.062	EL (ft)
M-10	5119.930	5120.029	EL (ft)
Totalizers (10/1/18 to 9/30/19)			
Geronimo	0.47	31.29	gpm
Hunt	0.00	8.70	gpm

The data for the piezometers during the current review period indicate that the water levels are generally declining along with the reservoir water level; however, the water levels in piezometers F-110 (screened in the alluvium underlying the dam) and F-128 (screened in the core of the dam)

are higher than the current reservoir water level. In addition, the water level in piezometer F-129 (screened in the upstream shell of the dam) was recorded at an elevation above the reservoir water level at the end of August 2019. Approximately 50 feet of CCR is impounded against the upstream slope of the dam near these instruments, forming a buttress to prevent slope instability. APS will continue to monitor these and nearby instruments.

The data for the settlement monuments during the current review period indicate no significant elevation changes or trends related to the performance of the dam.

The data for the totalizers during the current review period indicates that the seepage flow rates have decreased slightly compared to the October 1, 2017 – September 30, 2018 review period, likely due to a lower and further reservoir pool and relatively drier weather. The edge of the impounded water observed during the 2019 inspection is approximately 140 feet further away from the Fly Ash Dam embankment than it was during the 2018 inspection, representing a smaller volume of impounded water. In addition, the total rainfall recorded in 2019 is lower than the total rainfall recorded during the same period in 2018 (APS 2019).

5.1.3 CCR and Water Elevations

The approximate minimum, maximum, and present depth and elevation of the impounded water and CCR since the previous annual inspection (the October 1, 2018 – September 30, 2019 timeframe) is presented in the following table:

Water	Depth of Water (ft) (calculated)	Water Elevation (ft) (surveyed)	Measurement Location
Minimum	16.952	5086.952 (9/12/2019)	Northeast Area of Pond
Maximum	19.015	5089.015 (1/23/2019)	Northeast Area of Pond
Present (this inspection)	16.804	5086.791 (11/12/2019)	Lathe in Northwest Area of Pond
CCR	**Depth of CCR (ft) (calculated)**	**CCR Elevation (ft) (estimated)**	**Measurement Location**
Minimum	54.4	5094.4 (2019 inspection)	Inlet Pipe
Maximum	54.8	~5094.8 (2018 inspection)	Inlet Pipe
Present (this inspection)	54.4	5094.4	Inlet Pipe

Water elevation measurements are made by Plant surveyors using GPS techniques on a monthly basis. The CCR elevation is estimated by measuring the gap from the invert of the discharge pipe to the top of the CCR surface at the time of the annual inspection.

Reported water depths are calculated relative to the estimated lowest elevation (approximately EL 5070 feet) of the intersection of the upstream edge of the impounded fly ash with natural ground, based on a 2015 bathymetry survey. Reported CCR depths are calculated relative to the estimated lowest elevation (approximately EL 5040 feet) of the intersection of the upstream slope of the dam with natural ground, based on original as-built dam construction drawings (APS 1977). Although CCR has been added to the reservoir throughout 2019, the measured top of CCR elevation appears to have declined by approximately 0.4 feet since the last inspection. The reason for the apparent decline is most likely to be either consolidation of the impounded CCR as the free water pond

elevation is lowered, the accuracy of the field measurement technique, or a combination of the two.

5.1.4 Storage Capacity

The estimated storage capacity of the CCR unit at the time of the inspection was 18,000 acre-feet (ac-ft).

5.1.5 Approximate Impounded Volume at Time of Inspection

The approximate volume of impounded water and CCR at the time of the inspection was 7,400 ac-ft.

5.1.6 Structural Weakness or Operational Change/Disruption

No conditions associated with structural weakness were identified during the field inspection.

No conditions that are or could be disruptive to the operation and safety of the CCR unit and appurtenant structures were identified during the field inspection.

There are no significant changes to the structural integrity or operation of the impoundment since the 2018 inspection.

5.2 BOTTOM ASH DAM

5.2.1 Geometry Changes Since Last Inspection

There have not been any significant changes to the geometry of the unit since the last inspection in 2018.

5.2.2 Instrumentation

The locations of geotechnical and other related instrumentation in the vicinity of the Bottom Ash Dam are shown on Figure 6 – Bottom Ash Dam Instrumentation Map.

The minimum and maximum recorded readings for each instrument over the October 1, 2018 – September 30, 2019 (current) review period are reported in the following table:

Instrument Name	Minimum	Maximum	Unit
Open Standpipe Piezometers (10/1/18 to 9/30/19)			
B-200	5047.00	5049.05	EL (ft)
B-201	5044.15	5045.90	EL (ft)
B-202	5040.49	5042.19	EL (ft)
B-204	5097.71	5099.61	EL (ft)
B-206	5028.52	5030.41	EL (ft)
B-207	5030.93	5033.04	EL (ft)
B-208B	Dry	Dry	EL (ft)
B-209	5072.20	5072.77	EL (ft)
B-210	5066.24	5066.95	EL (ft)
B-211	Dry	Dry	EL (ft)
B-212	5090.38	5091.63	EL (ft)
B-213	5079.60	5080.24	EL (ft)
B-214	5078.72	5079.68	EL (ft)
B-215	5078.41	5079.33	EL (ft)
B-216	5071.12	5072.51	EL (ft)
B-217	5099.57	5102.35	EL (ft)
B-218	5093.63	5095.40	EL (ft)
B-225	5058.65	5059.89	EL (ft)
W-227	5090.65	5092.49	EL (ft)
Settlement Monuments (10/1/18 to 9/30/19)			
M-11	5123.259	5123.332	EL (ft)
M-12	5122.793	5122.858	EL (ft)
M-13	5122.713	5122.775	EL (ft)
M-14	5119.391	5119.468	EL (ft)
M-15	5123.006	5123.042	EL (ft)

Instrument Name	Minimum	Maximum	Unit
M-16	5123.475	5123.537	EL (ft)
M-17	5122.954	5123.012	EL (ft)
M-18	5123.238	5123.281	EL (ft)
M-19	5123.362	5123.418	EL (ft)
PI	5123.406	5123.481	EL (ft)
Totalizers (10/1/18 to 9/30/19)			
West Abutment Totalizer	2.53	7.43	gpm
West Abutment Weir	1.00	2.00	gpm
P-226	9.48	12.72[1]	gpm
Tanner Wash Totalizer[2]	3.16	4.30	gpm
Petroglyph	3.12	5.82	gpm

1) The P-226 totalizer indicated a flowrate equal to 147.82 gpm for the period between 9/22/18 and 12/13/18. A confirmation reading was recorded on 2/5/19 and the flowrate was observed to be 9.48 gpm. Subsequent flowrates were recorded between 9.76 and 12.72 gpm. APS believes the totalizer may have malfunctioned in late 2018, resulting in a high flowrate.
2) The Tanner Wash flow meter was replaced in early 2019.

The data for the piezometers during the current review period indicate no significant elevation changes or trends related to the performance of the dam.

The data for the settlement monuments during the current review period indicate no significant elevation changes or trends related to the performance of the dam.

The data for the totalizers and seeps during the current review period indicates that the seepage flow rates have not significantly increased compared to the October 1, 2017 – September 30, 2018 review period.

5.2.3 CCR and Water Elevations

The approximate minimum, maximum, and present depth and elevation of the impounded water and CCR since the previous annual inspection is presented in the following table:

Water	Depth of Water (ft) (calculated)	Water Elevation (ft) (measured)	Measurement Location
Minimum	8.1	5108.1 (12/7/2018)	Upstream slope at the staff gauge
Maximum	12.6	5112.6 (3/15-3/19/2019)	Upstream slope at the staff gauge
Present (this inspection)	12.4	5112.4 (NGVD29)	Upstream slope at the staff gauge
CCR	**Depth of CCR (ft) (calculated)**	**CCR Elevation (ft) (estimated)**	**Measurement Location**
Minimum	30-45	5115-5130 (NGVD29)	Visual observation in the north end of the impoundment and around the divider dikes
Maximum	~45	~5100 (NGVD29)	Upstream slope at the staff gauge
Present (this inspection)	30-45	5100-5115 (NGVD29)	Visual observation in the East Decant Cell

Water elevation measurements are made by Plant personnel on a daily basis by reading the staff gauge on the upstream slope along the South Embankment of the dam. APS constructed divider dikes in 2009 to create the East and West Decant Cells in the northern half of the reservoir. The divider dikes were constructed on top of the existing impounded ash and currently prevent most of the newly deposited ash from reaching the South Embankment. Since the water elevation is measured against the South Embankment, the resulting water depth is calculated based on the depth of impounded water to the top of previously-deposited bottom ash.

The CCR elevation varies throughout the year based on the volume of ash discharged to the reservoir and the volume of ash taken to the Bottom Ash Monofill. The CCR elevation and depth of CCR are estimated based on observations of ash levels around the divider dikes, ash levels in the East Decant Cell, recent ash excavation activity, and preconstruction topography. CCR depths are based on a minimum original ground surface elevation of 5055 feet along the upstream toe of the South Embankment near the current staff gauge location (APS Drawing #G-44556). The maximum CCR depth is typically along the southeast side of the East Decent Cell divider dike where the original topography is lowest and the minimum CCR depth is typically in the north half of the reservoir where the original topography is relatively higher.

APS normally excavates bottom ash from the Bottom Ash Pond at various times throughout the year and places it in the Bottom Ash Monofill; however, no bottom ash was removed to the Bottom Ash Monofill in 2019. When planning the Bottom Ash Monofill expansion in 2015, APS estimated an average of 150,000 cubic yards (cy) would be removed from the Bottom Ash Pond each year. Since no bottom ash was removed from the Bottom Ash Pond in 2019, it is conservatively assumed that the volume of CCR in the Bottom Ash Pond increased by 150,000 cy during 2019.

5.2.4 Storage Capacity

The estimated storage capacity of the CCR unit at the time of the inspection was 2,300 ac-ft.

5.2.5 Approximate Impounded Volume at Time of Inspection

The approximate volume of impounded water and CCR at the time of the inspection was 1,843 ac-ft.

5.2.6 Structural Weakness or Operational Change/Disruption

No conditions associated with structural weakness were identified during the field inspection.

No conditions that are or could be disruptive to the operation and safety of the CCR unit and appurtenant structures were identified during the field inspection.

There are no significant changes to the structural integrity or operation of the impoundment since the 2018 inspection.

5.3 SEDIMENTATION POND

5.3.1 Geometry Changes Since Last Inspection

There have not been any significant changes to the geometry of the embankments since the last inspection in 2018. The Sedimentation Pond is occasionally cleaned for operational use.

5.3.2 Instrumentation

There are no instruments associated with the Sedimentation Pond.

5.3.3 CCR and Water Elevations

The approximate minimum, maximum, and present depth and elevation of the impounded water and CCR since the previous annual inspection is presented in the following table:

Water	Depth of Water (ft) (calculated)	Water Elevation (ft) (measured)	Measurement Location
Minimum	Not available	Not available	APS does not regularly record the water elevation.
Maximum	Not available	Not available	
Present (this inspection)	8.44 7.04	5015.44 (south cell) 5014.04 (north cell)	Southwest Edge Center of North Embankment
CCR	**Depth of CCR (ft) (estimated)**	**CCR Elevation (ft) (estimated)**	**Measurement Location**
Minimum	Not available	Not available	Not available
Maximum	Not available	Not available	Not available
Present (this inspection)	< 8.44 ~7.5	Below EL 5015.44 (south cell) ~5014.5 (max, north cell)	Concrete weir at the outlet structure Western half of the north cell

Present water and CCR depths are based on original topography presented on APS Drawing #G-44573.

Since the CCR unit is periodically emptied, the impounded CCR elevation varies throughout the year.

5.3.4 Storage Capacity

The estimated storage capacity of the Sedimentation Pond at the time of the inspection was 10.7 ac-ft.

5.3.5 Approximate Impounded Volume at Time of Inspection

The approximate volume of impounded CCR in the Sedimentation Pond at the time of the inspection was 7.6 ac-ft. Since the CCR unit is periodically emptied, the impounded CCR volume varies throughout the year.

5.3.6 Structural Weakness or Operational Change/Disruption

No conditions associated with structural weakness were identified during the field inspection.

No conditions that are or could be disruptive to the operation and safety of the CCR unit and appurtenant structures were identified during the field inspection.

There are no significant changes to the structural integrity or operation of the impoundment since the 2018 inspection.

5.4 BOTTOM ASH MONOFILL

5.4.1 Geometry Changes Since Last Inspection

There have not been any significant changes to the geometry of the embankments since the last inspection in 2018. APS normally excavates bottom ash from the Bottom Ash Pond and places it in the Bottom Ash Monofill; however, no ash was placed in the Bottom Ash Monofill in 2019.

5.4.2 Instrumentation

There are no instruments associated with the Bottom Ash Monofill.

5.4.3 CCR Volume

Since no CCR was added to the Bottom Ash Monofill during 2019, the CCR unit is estimated to contain the same volume, 1,014.6 ac-ft, as it contained in November 2018. The estimated maximum storage capacity is 2,417 ac-ft.

5.4.4 Structural Weakness or Operational Change/Disruption

No conditions associated with structural weakness were identified during the field inspection.

Erosion in the Stormwater Detention Basin observed during the 2018 inspection has been repaired. No other conditions that are or could be disruptive to the operation and safety of the CCR unit and appurtenant structures were identified during the field inspection.

There are no significant changes to the structural integrity or operation of the impoundment since the 2018 inspection.

6.0 OPERATION AND MAINTENANCE RECOMMENDATIONS

The following items were noted during inspections as requiring attention.

6.1 FLY ASH DAM

Action Item	Action Status
1) Continue identifying and remediating scattered animal burrows and ant hills.	1) Mark ant hills and animal burrows identified during weekly inspections. 2) Establish regular schedule (e.g. semi-annually) to remediate identified burrows. NOTE: This will always be an ongoing maintenance activity.
2) Continue monitoring the groin of the Northwest Abutment and the access road near the Geronimo sumps for erosion.	Repair the erosion at the Northwest Abutment and continue to repair other areas if the eroded depth exceeds 1 foot.
3) Continue to maintain, treat, and remove excessive vegetation.	Remove trees, shrubs, and other deleterious vegetation on the dam as per NMOSE (2011). Large stumps should be removed and the resulting void should be filled with compacted soil. NOTE: This will always be an ongoing maintenance activity.
4) Continue monitoring the riprap for additional signs of deterioration.	Replace riprap as needed.
5) Monitor erosion and soil wasting along the upstream slope.	Repair if the eroded depth exceeds 1 foot or if erosion reaches the original 24-foot wide dam crest.
6) Continue to monitor seepage through the embankment.	NOTE: This will always be an ongoing maintenance activity.

6.2 BOTTOM ASH DAM

Action Item	Action Status
1) Record the location and sizes of erosion holes during the weekly inspections.	Repair the erosion holes and monitor the area around M-16 for cracking and new holes. NOTE: this is a carry-over from the 2018 report.
2) Monitor the erosion gullies at the downstream slope of the East Embankment.	Repair erosion if it exceeds 1 foot in depth.
3) Identify and remediate scattered animal burrows and ant hills.	1) Mark animal burrows and ant hills during weekly inspections. 2) Establish regular schedule (e.g. semi-annually) to remediate identified burrows. NOTE: This will always be an ongoing maintenance activity.
4) Continue to maintain, treat, and remove excessive vegetation, including vegetation on the upstream and downstream slopes.	Remove trees, shrubs, and other deleterious vegetation on the dam as per NMOSE (2011). Large stumps should be removed and the resulting void should be filled with compacted soil. NOTE: This will always be an ongoing maintenance activity.
5) Continue monitoring the riprap for additional signs of deterioration.	Replace riprap as needed.
6) Continue to monitor seepage through the embankment.	NOTE: This will always be an ongoing maintenance activity.
7) Remove vegetation and debris from the West Abutment Weir.	Location is currently obscured and access is restricted. Location should be cleared so that it can be accessed and measured during regular inspections. Add to maintenance work list and repair as needed. NOTE: this is a carry-over from the 2018 report.
8) Remove vegetation from the upstream slope at the West Abutment.	Woody vegetation rooted in the embankment should be removed and the resulting disturbed area should be replaced with compacted material similar to the embankment material per NMOSE (2011).
9) Continue to monitor the erosion around the siphon line encasements, soil wasting, and erosion gullies observed during the 2018 inspection.	Repair erosion if the eroded depth exceeds 1 foot. Investigate the source of sediment collecting in the diversion ditch between the East Embankment access road and the East Embankment.

6.3 SEDIMENTATION POND

Action Item	Action Status
1) Monitor the erosion around the outfall structure and the surface of the CCR unit.	Repair as needed.

6.4 BOTTOM ASH MONOFILL

Action Item	Action Status
1) Minor erosion throughout the CCR unit.	Repair erosion if it exceeds 1 foot in depth. NOTE: This will always be an ongoing maintenance activity.

7.0 REFERENCES

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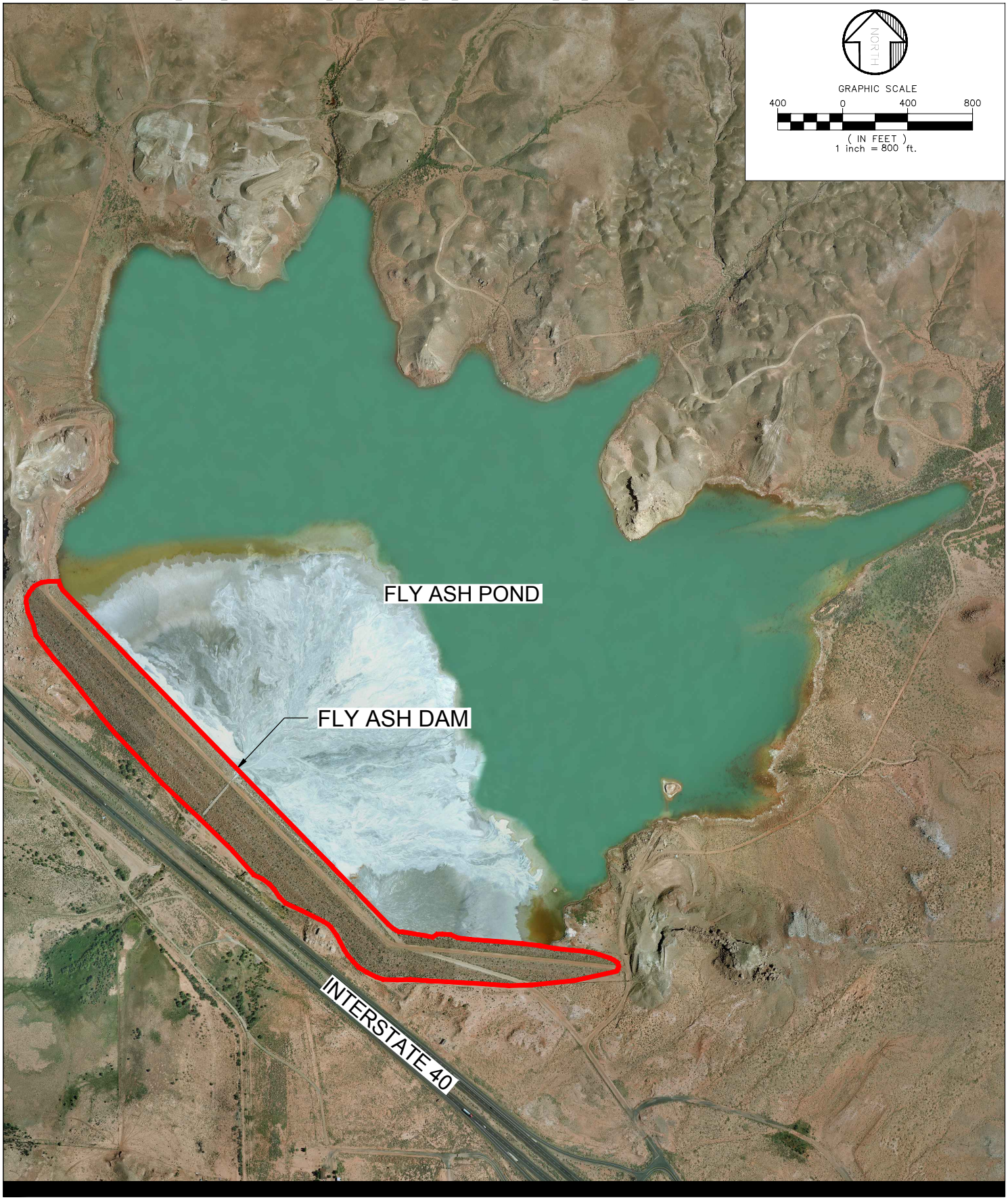
FIGURES

Last saved by: LEE.WRIGHT(2018-11-27) Last Plotted: 2018-11-27
Filename: P:\PROJECTS\ARIZONA_PUBLIC_SERVICE\60589229_2018_FC_CH_MD_CCR_INSPECTIONS\900_CAD_GIS\910_CAD\25-SKETCHES\FIGURE 1 - FLY ASH POND.DWG
ANSI A 8.5" x 11"



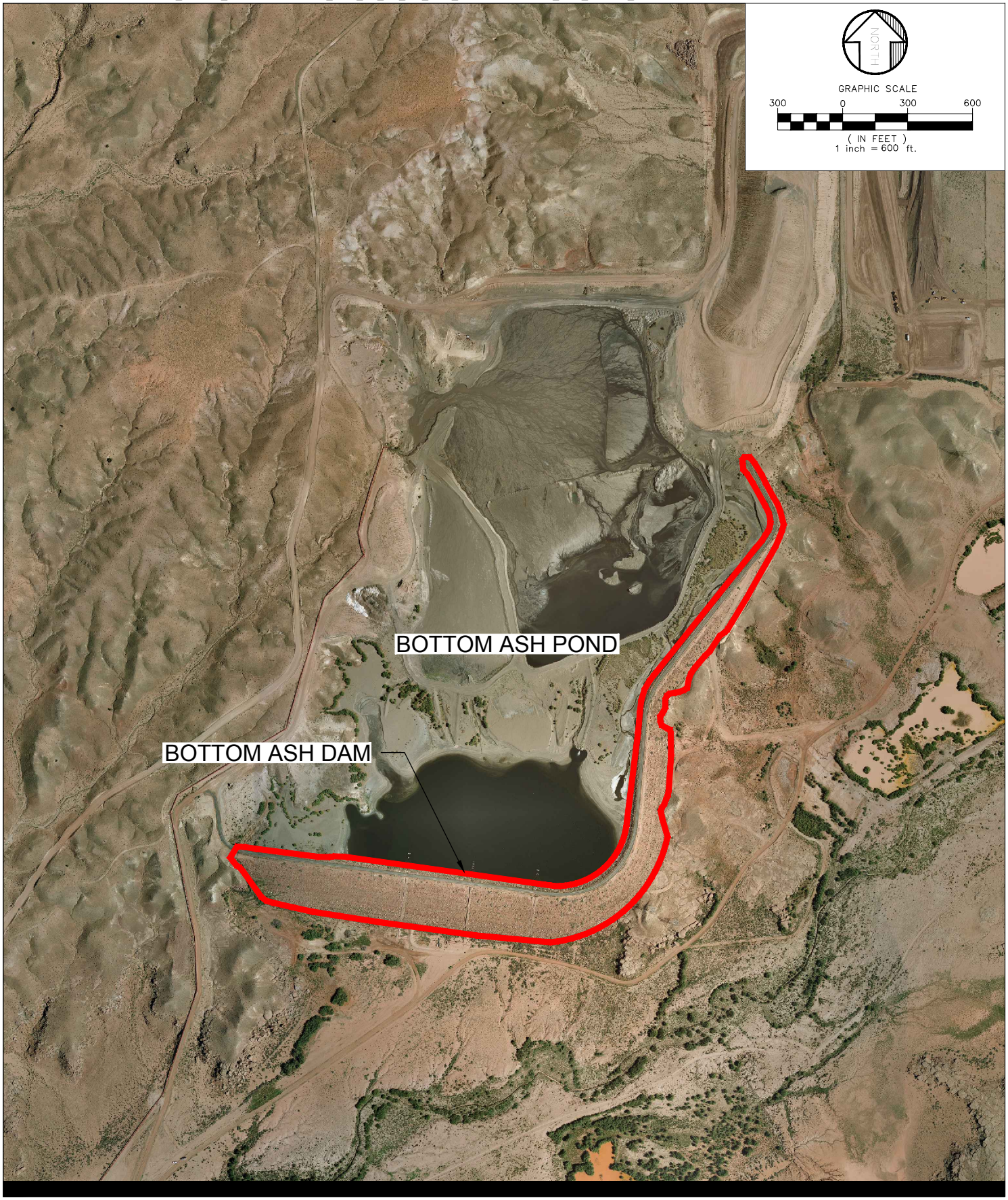
CHOLLA POWER PLANT
CCR IMPOUNDMENT AND LANDFILL INSPECTION REPORT
ARIZONA PUBLIC SERVICE

FLY ASH POND
SITE MAP

AECOM

FIGURE 1

Last saved by: LEE.WRIGHT(2018-11-27) Last Plotted: 2018-11-27 ANSI A 8.5" x 11"
Filename: P:\PROJECTS\ARIZONA_PUBLIC_SERVICE\60589229_2018_FC_CH_MD_CCR_INSPECTIONS\900_CAD_GIS\910_CAD\25-SKETCHES\FIGURE 2 - BOTTOM ASH POND.DWG



CHOLLA POWER PLANT
CCR IMPOUNDMENT AND LANDFILL INSPECTION REPORT
ARIZONA PUBLIC SERVICE

BOTTOM ASH POND
SITE MAP

AECOM

FIGURE 2

Last saved by: LEE.WRIGHT(2018-11-27) Last Plotted: 2018-11-27 ANSI A 8.5" x 11"
Filename: P:\PROJECTS\ARIZONA_PUBLIC_SERVICE\60589229_2018_FC_CH_MD_CCR_INSPECTIONS\900_CAD_GIS\910_CAD\25-SKETCHES\FIGURE 3 - SEDIMENTATION POND.DWG

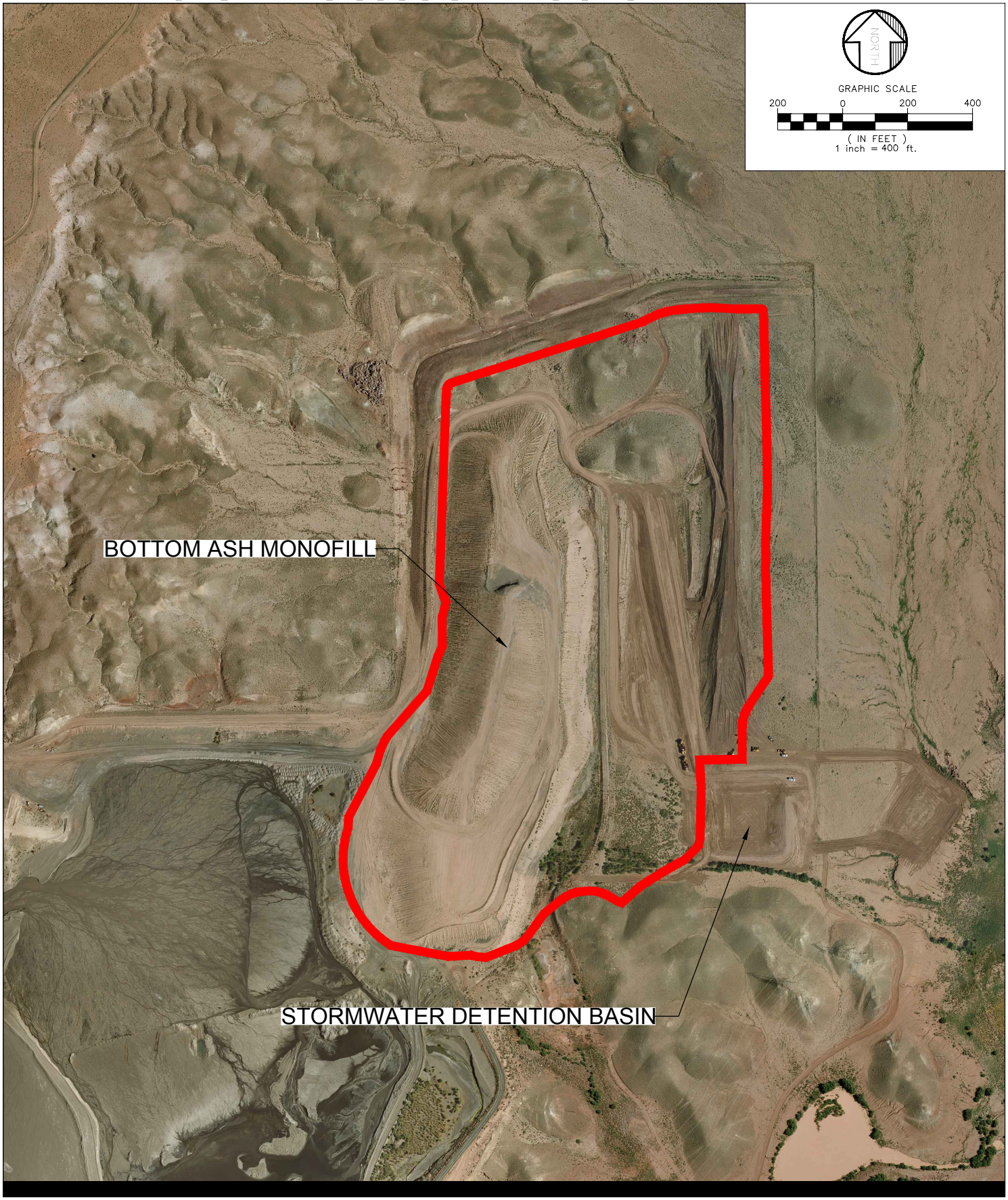
CHOLLA POWER PLANT
CCR IMPOUNDMENT AND LANDFILL INSPECTION REPORT
ARIZONA PUBLIC SERVICE

SEDIMENTATION POND
SITE MAP

AECOM

FIGURE 3

Last saved by: LEE.WRIGHT(2018-11-27) Last Plotted: 2018-11-27 ANSI A 8.5" x 11"
Filename: P:\PROJECTS\ARIZONA_PUBLIC_SERVICE\60589229_2018_FC_CH_MD_CCR_INSPECTIONS\900_CAD_GIS\910_CAD\25-SKETCHES\FIGURE 4 - BOTTOM ASH MONOFILL.DWG



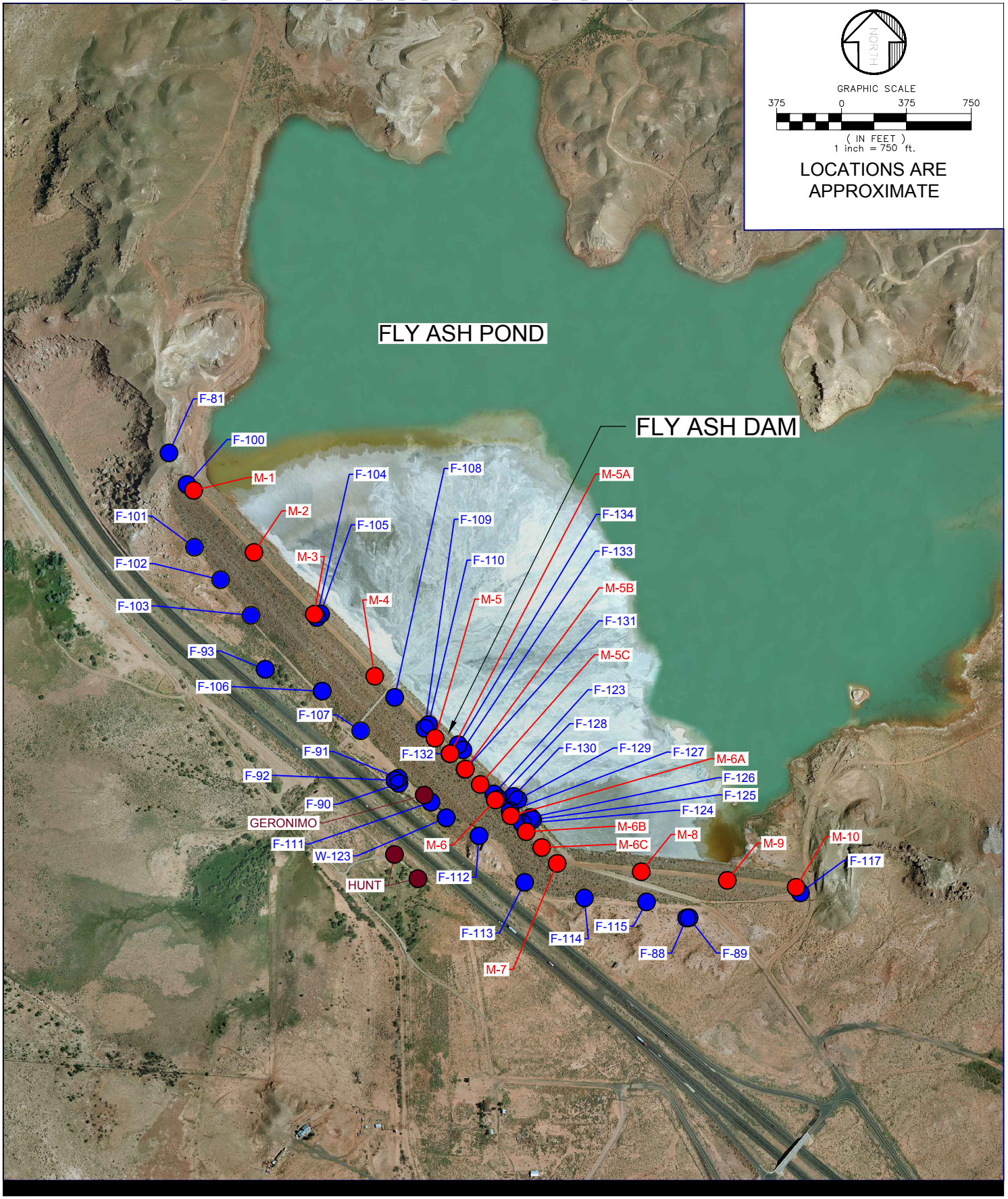
CHOLLA POWER PLANT
CCR IMPOUNDMENT AND LANDFILL INSPECTION REPORT
ARIZONA PUBLIC SERVICE

BOTTOM ASH MONOFILL
SITE MAP

AECOM

FIGURE 4

Last saved by: LEE.WRIGHT(2018-12-07) Last Plotted: 2018-12-07 ANSI A 8.5" x 11"
Filename: P:\PROJECTS\ARIZONA_PUBLIC_SERVICE\60589229_2018_FC_CH_MD_CCR_INSPECTIONS\900_CAD_GIS\910_CAD\25-SKETCHES\FIGURE 5 - FLY ASH DAM INSTRUMENTS.DWG



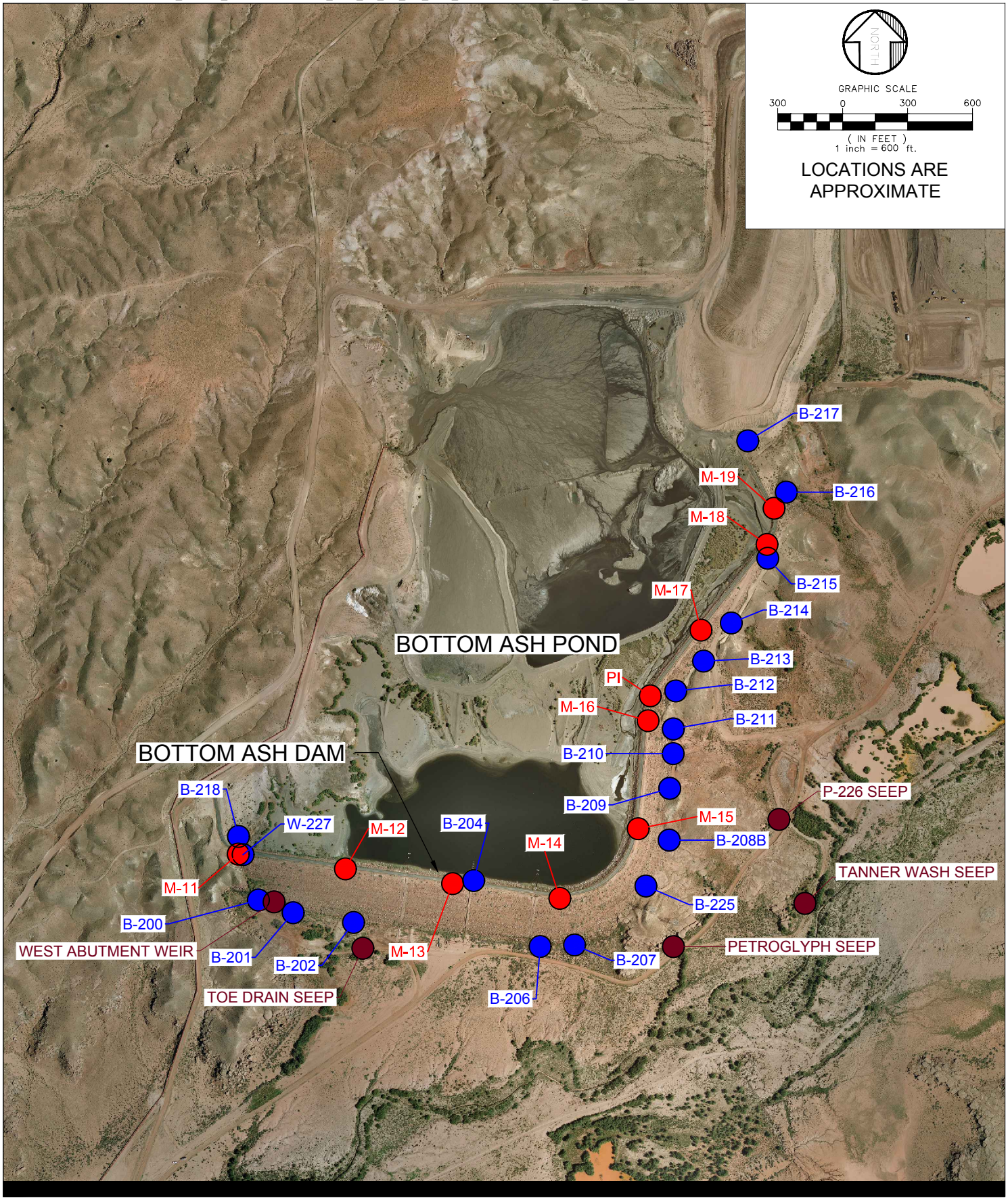
CHOLLA POWER PLANT
CCR IMPOUNDMENT AND LANDFILL INSPECTION REPORT
ARIZONA PUBLIC SERVICE

FLY ASH DAM
INSTRUMENTATION MAP

AECOM

FIGURE 5

Last saved by: LEE.WRIGHT(2018-12-03) Last Plotted: 2018-12-07 ANSI A 8.5" x 11"
Filename: P:\PROJECTS\ARIZONA_PUBLIC_SERVICE\60589229_2018_FC_CH_MD_CCR_INSPECTIONS\900_CAD_GIS\910_CAD\25-SKETCHES\FIGURE 6 - BOTTOM ASH DAM INSTRUMENTS.DWG



CHOLLA POWER PLANT
CCR IMPOUNDMENT AND LANDFILL INSPECTION REPORT
ARIZONA PUBLIC SERVICE

BOTTOM ASH DAM
INSTRUMENTATION MAP

AECOM

FIGURE 6

APPENDIX A

FLY ASH DAM PHOTO LOG

20191118 – IMG_5698
Downstream slope of the South Embankment, facing west from the East Abutment.

20191118 – IMG_5702
Repainted sign identifying allowed and disallowed materials in the Fly Ash Pond.

20191118 – IMG_5704
The crest and downstream slope of the South Embankment, facing west from the East Abutment.

20191118 – IMG_5705
Ant hill in the crest of the South Embankment.

20191118 – IMG_5707
The upstream slope of the dam, facing northwest from the South Embankment.

20191118 – IMG_5716
The upstream slope of the South Embankment, facing east.

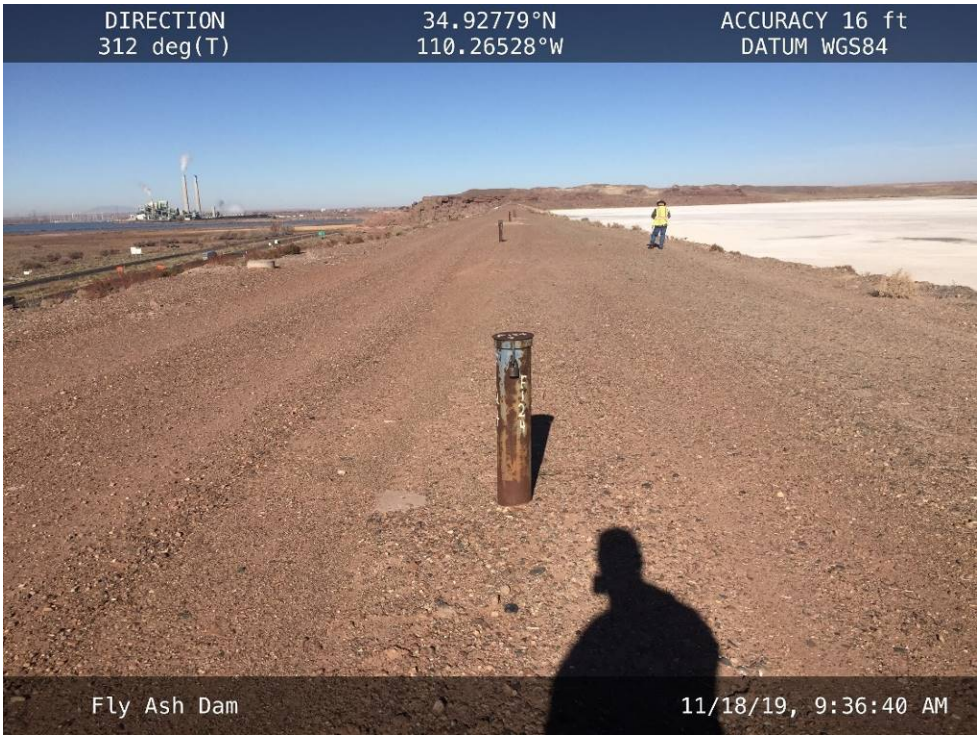
20191118 – IMG_5717
The upstream slope of the West Embankment, facing northwest.

20191118 – IMG_5720
The downstream slope of the South Embankment, facing east.

20191118 – IMG_5722
The upstream slope of the West Embankment, facing northwest.

20191118 – IMG_5726
Settlement Monument M-6B.

20191118 – IMG_5729
Minor erosion on the upstream side of the crest in an area where the crest is wider.



20191118 – IMG_5730
The piezometers in the crest of the West Embankment, facing northwest.

20191118 – IMG_5733
The upstream slope of the West Embankment, facing northwest.

20191118 – IMG_5742
The inlet pipe depositing CCR into the impoundment.

20191118 – IMG_5745
The inlet pipes along the upstream slope.

20191118 – IMG_5747
The inlet pipes along the downstream slope.

20191118 – IMG_5753
The downstream slope, facing southeast from the Northwest Abutment.

20191118 – IMG_5754
The upstream slope, facing southeast from the northern half of the West Embankment.

20191118 – IMG_5760
The crest of the West Embankment, facing southeast from the Northwest Abutment.

20191118 – IMG_5761
The upstream slope, facing southeast from the Northwest Abutment.

20191118 – IMG_5766
The downstream side of the Northwest Abutment contact.

20191118 – IMG_5768
The crest, facing southeast from the northern half of the West Embankment.

20191118 – IMG_5780
Lathe marking the location where the Fly Ash Pond elevation is measured.

20191118 – IMG_5790
Area of historic erosion along the downstream toe of the West Embankment.

20191118 – IMG_5793
A sump at the Geronimo Seep.

20191118 – IMG_5802
The downstream toe of the West Embankment, facing northwest from the inlet pipes.

20191118 – IMG_5810
The downstream toe of the West Embankment near the Northwest Abutment contact.

20191118 – IMG_5811
The Northwest Abutment contact, downstream slope, and area of historic erosion.

20191118 – IMG_5819
The downstream slope of the West Embankment, facing southeast along the downstream toe.

20191118 – IMG_5822
The I-40 seep in a dry condition.

APPENDIX B

BOTTOM ASH DAM PHOTO LOG

20191118 – IMG_5826
The South Embankment crest, facing east from the West Embankment.

20191118 – IMG_5827
Trees and other woody vegetation to be removed from the South Embankment upstream slope.

20191118 – IMG_5829
The downstream slope along the South Embankment, facing east from the West Abutment.

20191118 – IMG_5840
Two shallow erosion holes on the upstream side of the South Embankment crest.

20191118 – IMG_5844
The western siphon line along the downstream slope of the South Embankment.

20191118 – IMG_5845
The central siphon lines along the downstream slope of the South Embankment.

20191118 – IMG_5854
The reservoir level staff gauge adjacent to the central siphon lines.

20191118 – IMG_5855
The upstream slope along the eastern half of the South Embankment, facing east.

20191118 – IMG_5856
The upstream slope along the western half of the South Embankment, facing west.

20191118 – IMG_5857
An erosion hole on the upstream side of the South Embankment crest.

20191118 – IMG_5860
The eastern siphon line along the downstream slope of the South Embankment.

20191118 – IMG_5862
The downstream slope of the South Embankment, facing west from the crest.

20191118 – IMG_5868
The upstream slope at the southern end of the East Embankment.

20191118 – IMG_5869
The upstream slope at the eastern end of the South Embankment.

20191118 – IMG_5871
An erosion hole in the crest along the southern half of the East Embankment.

20191118 – IMG_5879
An erosion hole in the crest along the southern half of the East Embankment.

20191118 – IMG_5880
The downstream slope of the northern half of the East Embankment, facing northeast.

20191118 – IMG_5881
The downstream slope of the southern half of the East Embankment, facing south.

20191118 – IMG_5884
The Divider Dike in the reservoir and vegetation on the upstream side of the East Embankment.

20191118 – IMG_5886
The downstream slope of the East Embankment, facing south.

20191118 – IMG_5892
The crest and upstream slope of the East Embankment, facing south from the North Abutment.

20191118 – IMG_5901
A series of erosion holes on the upstream shoulder of the crest near settlement monument M-16.

20191118 – IMG_5912
The West Abutment Weir at the downstream toe near the West Abutment.

20191118 – IMG_5914
Historic and active seepage in the vicinity of the West Abutment Weir.

20191118 – IMG_5915
The downstream slope and toe of the South Embankment, east of the West Abutment Weir.

20191118 – IMG_5916
The downstream toe of the South Embankment, east of the West Abutment Weir.

20191118 – IMG_5921
The toe and downstream slope of the South Embankment, facing west near the Toe Drain Seep.

20191118 – IMG_5922
The downstream slope of the South Embankment near the western siphon line.

20191118 – IMG_5924
Water ponding at the Petroglyph Seep.

20191118 – IMG_5934
The downstream slope at the South Embankment/East Embankment transition.

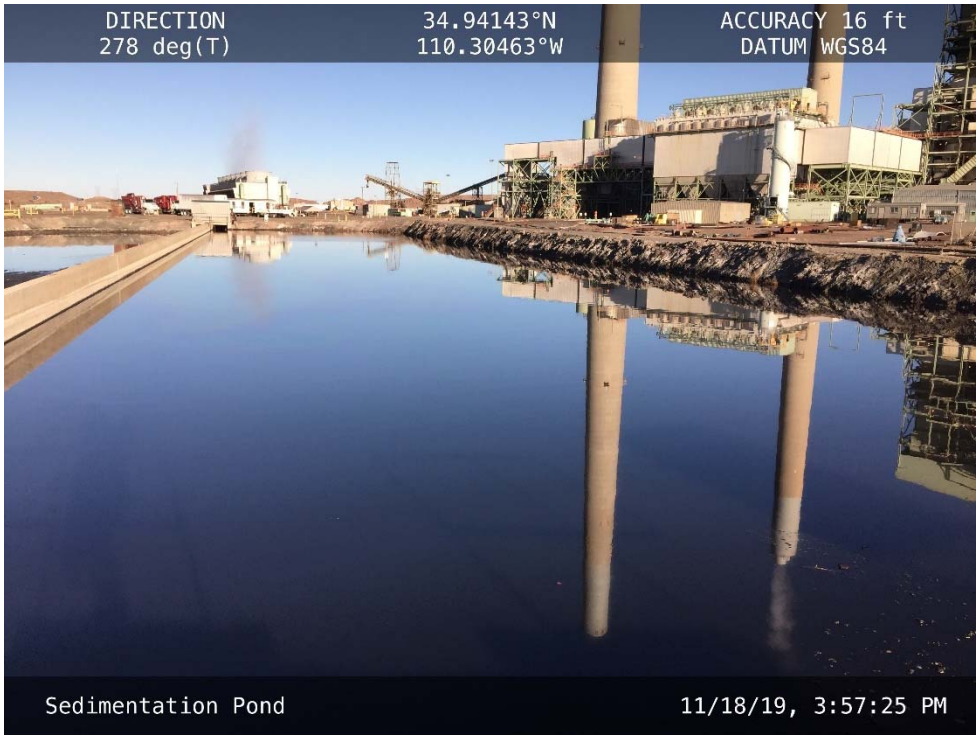
20191118 – IMG_5937

The downstream slope of the South Embankment, facing west toward the eastern siphon line.

APPENDIX C

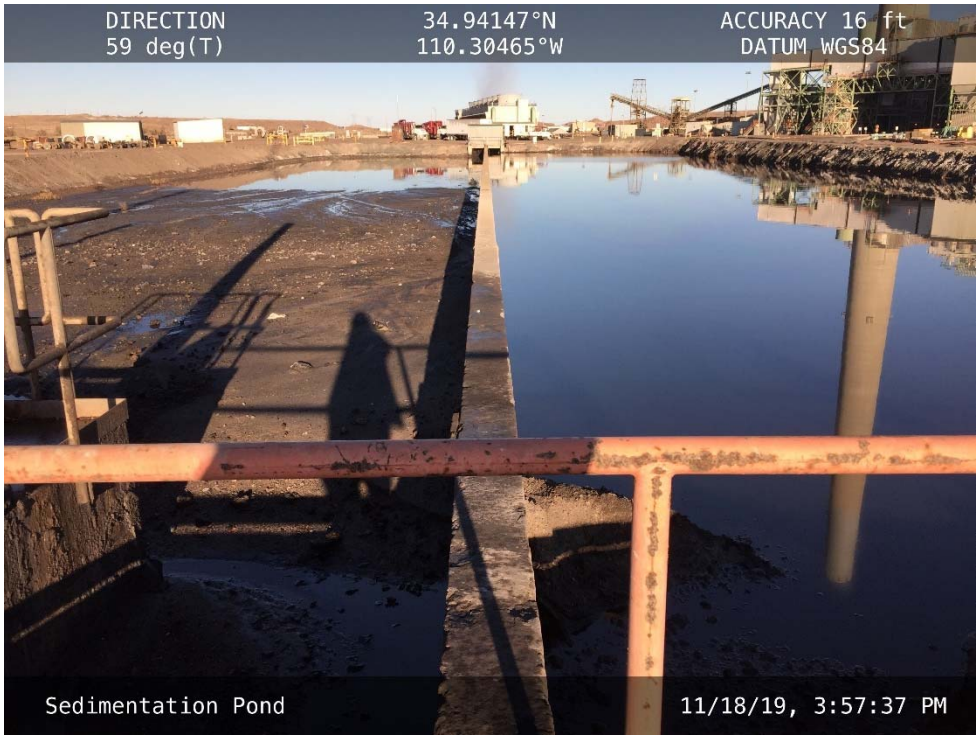
SEDIMENTATION POND PHOTO LOG

20191118 – IMG_5994
The Divider Wall in the Sedimentation Pond, facing northeast.



20191118 – IMG_5995
The South Cell, facing northeast from the western embankment.

20191118 – IMG_5996
The western end of the South Cell, facing south from the Divider Dike.



20191118 – IMG_5997
The Divider Wall in the middle of the Sedimentation Pond, facing northeast.

20191118 – IMG_6007
The concrete spillway on the downstream side of the south embankment.

20191118 – IMG_6009
Erosion under the concrete spillway on the downstream side of the south embankment.

20191118 – IMG_6010
The eastern end of the South Cell, facing north from the south embankment.

20191118 – IMG_6014
The pump house at the northeast end of the Sedimentation Pond.

20191118 – IMG_6019
The upstream slope of the North Cell, facing southwest from the eastern side.

20191118 – IMG_6022
The eastern end of the North Cell, facing east from the north side.

20191118 – IMG_6031
Sediment accumulated in the west side of the North Cell.

APPENDIX D

BOTTOM ASH MONOFILL PHOTO LOG

20191118 – IMG_5894

The south end of the Bottom Ash Monofill, facing north from the Bottom Ash Dam.

20191118 – IMG_5947

The eastern portion of the Bottom Ash Monofill, facing north from the top of the Monofill.

20191118 – IMG_5949

The eastern portion of the Bottom Ash Monofill, facing south from the top of the Monofill.

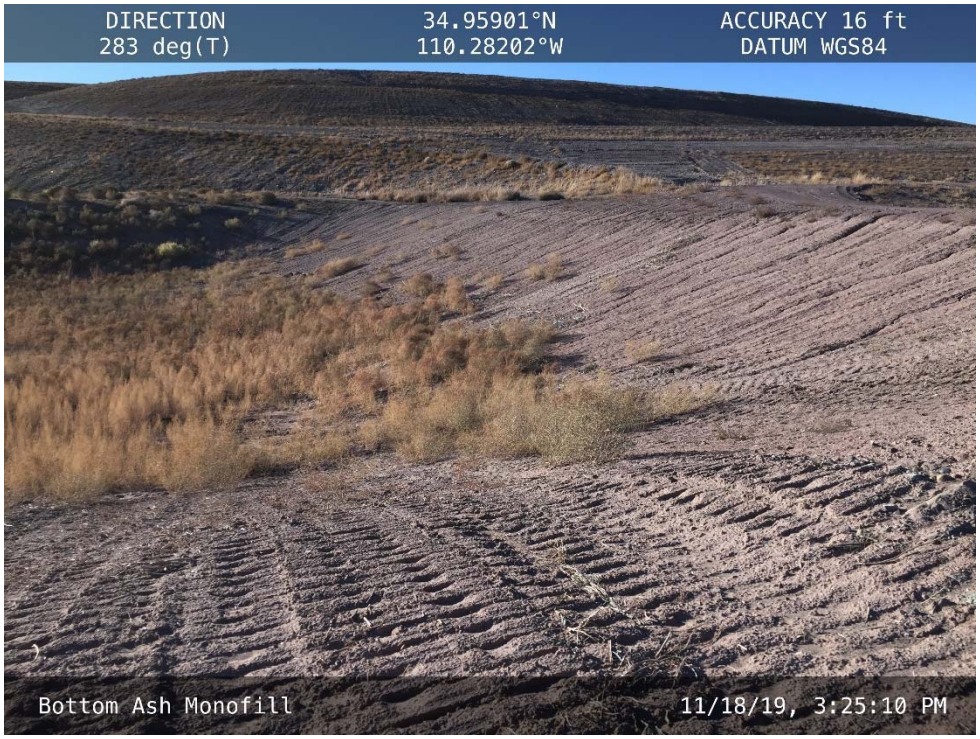
20191118 – IMG_5950

The access ramp to the top of the Bottom Ash Monofill, facing south from the northeast corner.

20191118 – IMG_5959
The eastern slope of the Bottom Ash Monofill.

20191118 – IMG_5967
Area of repaired erosion in the northwest corner of the Stormwater Detention Basin.

20191118 – IMG_5972
Area of repaired headcutting on the east side of the Stormwater Detention Basin.



20191118 – IMG_5974
Area of repaired headcutting on the east side of the Stormwater Detention Basin.