



**Subject: 2018 USEPA CCR Surface Impoundment Annual Inspection Report
Brunner Island Ash Basin No. 6**

This report presents the findings of the 2018 annual inspection for the Brunner Island Ash Basin No. 6 facility. This inspection was performed by a Talen Energy employee on October 11th, 2018. The annual inspection was conducted in accordance with the requirements of the United States Environmental Protection Agency (USEPA) 40 CFR Parts 257 and 261 Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule, April 17, 2015 (CCR Final Rule).

1.0 Executive Summary

Brunner Island Ash Basin No. 6 is an operating Coal Combustion Residual (CCR) surface impoundment, referred to as an ash basin, which is owned and operated by Brunner Island, LLC, a division of Talen Energy (Talen). The ash basin is formed by an earthen embankment dam with a maximum height of approximately 30 feet. The ash basin is, therefore, required to have an annual inspection performed by a qualified engineer in accordance with the CCR Final Rule. This is the fourth annual inspection performed in accordance with the CCR Final Rule. The ash basin is also subject to regulation by the Pennsylvania Department of Environmental Protection (PADEP) and is classified as Size B, Hazard Classification 3 under the PADEP Dam Safety Guidelines, corresponding to a medium-sized, significant-hazard-potential dam. Talen and their predecessor, PPL, have been inspecting the ash basin in accordance with PADEP requirements for a number of years.

The CCR Final Rule requires that the annual inspection include the following:

- a review of available information to verify that the design, construction, operation, and maintenance of the CCR unit is consistent with recognized and generally accepted good engineering standards;
- a visual inspection of the CCR unit to identify signs of distress or malfunction of the CCR unit and appurtenant structures; and
- a visual inspection of any hydraulic structures underlying the base of the CCR unit or passing through the dike of the CCR unit for structural integrity and continued safe and reliable operation.

The supporting studies required by the rule were completed in 2016. The project documentation indicates that Ash Basin No. 6 was designed and constructed in accordance with good engineering standards that were recognized and generally accepted at the time of design and construction between 1975 and 1979.

No signs of significant distress or malfunction of the CCR unit, appurtenant structures, and hydraulic structures passing through the dike were observed during the visual inspection. The project is generally operated and maintained in accordance with recognized and generally accepted good engineering standards and the CCR Final Rule. Continued attention to the items noted below is appropriate to adequately satisfy the CCR Final Rule inspection requirements for surface impoundments:

- Maintenance of vegetation on the slopes of the embankment, and periodic repair of ruts, sloughs, and slope irregularities;
- Monitoring of seepage and slope stability, with additional action conducted as necessary if conditions change significantly or evidence of internal erosion is observed. This should include monitoring of downstream slopes following recession of flooding on the Susquehanna River;
- Maintenance of the outlet system including trash handling and removal, to maintain the hydraulic capacity; and
- Ongoing Monitoring and Maintenance of the piezometer road boxes.

2.0 Project Description and History

Ash Basin No. 6 is located between Black Gut Creek and the Susquehanna River at the southern end of Brunner Island in East Manchester Township, York County, Pennsylvania. The island is located along the western shore of the river and can be located on the York Haven U.S. Geological Survey (USGS) 7.5 Minute Quadrangle Map at 40°04'59"N, 76°40'58"W. The global positioning system (GPS) address is 1281 Wago Rd, York Haven, PA 17370. The basin was originally owned by PPL Brunner Island, LLC (PPL). In June of 2015, the company changed their name to Brunner Island, LLC, which is a division of Talen Energy (Talen).

The ash basin was designed and constructed between 1975 and 1979. The basin is formed by an oval-shaped, above-ground embankment constructed with random earth fill and includes a 10-foot-thick clay liner covering the upstream slope, from bedrock to elevation 287.5 feet. The maximum height of the embankment is approximately 30 feet. The nominal crest elevation of the embankment is 290 feet. Overall, the embankment is about 8,300 feet long and the impoundment has a surface area of about 70 acres. The basin is subdivided into three main areas. The northern part of the main basin has been completely filled with ash. The southern part of the main basin has not been completely filled and retains open water. To the south of the main basin is a polishing pond separated from the main basin by a dike which also retains open water. Elevations in this report refer to Plant datum. The Plant vertical datum, National Geodetic Vertical Datum of 1929 (NGVD 29), is approximately 0.76 feet higher than the North American Vertical Datum of 1988 (NAVD 88) at Ash Basin 6.

Water enters the polishing pond from the ash basin for final treatment via a flow-through concrete drop structure. The structure consists of a weir-type riser and a drop structure that discharges into one 48-inch-diameter, reinforced-concrete pipe that discharges to the polishing pond.

The terminal outlet structure is located in the polishing pond and consists of two 60-inch-diameter, reinforced-concrete riser pipes with skimmers draining into a single 48-inch-diameter, reinforced-concrete discharge pipe that discharges into the Susquehanna River. A flapper gate and an outlet control structure are provided at the river-end of the discharge pipe to prevent river water from entering the ash basin during high tailwater conditions.

Talen is no longer discharging ash slurry into the basin, although process water which has come into contact with ash is still being discharged at the northwest corner of the basin; therefore, the ash basin is still considered to be active. The plant's equalization pond also discharges into the basin at the northeast corner.

In accordance with the CCR Final Rule inspection requirements for surface impoundments, the following information is required.

2.1 Changes in Geometry since the Previous Inspection

No significant quantities of fill are currently being discharged into the basin, although existing ash near the north end of the basin is being reclaimed and removed for beneficial re-use as noted below. The water level in the main basin is unchanged from last year which is controlled by the overflow outlet structure, which uses concrete panels to maintain the reservoir level. The concrete panel sill height is at elevation 283.5 feet with a normal water surface elevation of about 283.9 feet. The sill of the outlet structure in the polishing pond is at elevation 268.0 feet, resulting in a normal water surface elevation in the polishing of about 268.30 feet.

2.2 Location and Type of Instrumentation

Refer to Section 5 of this report for a discussion of instrumentation.

2.3 Approximate Minimum, Maximum, and Present Depth of and Elevation of Impounded Water and CCR

Elevations and depths of CCR and free water are shown in Table 1 below. These are based on the original ash basin topography, as shown on Drawing E158595 sheet 1, Revision 6. Contours shown on Drawing E244272 Sheet 1 Rev. 21 were based on a bathymetric survey conducted on May 1 & 2, 2018 and aerial survey conducted on May 3, 2018.

Table 1
Elevations and Depths of CCR and Free Water

CCR Surface Elevation (feet)	Original Ground Surface (feet)	Water Surface Elevation (feet)	Ash Depth (feet)	Free Water Depth (feet)	Location
290 (dam crest elevation) or dry stacked up to 314	varies from 262 to 284	284.0	12' at the shallowest (284 to 296) up to 40' at the deepest (268 to 308) considering dry stacked piles	N/A	North End of Main Basin
Ash varies from 262 to 284.5	varies from 262 to 280	284.0	0' at the shallowest (262-262) to 20.5 at the deepest (264 to 284.5)	22.0' at the deepest (262 to about 284.0)	South end of Main Basin

Talen calculated the volume of free standing water, using both the water in the main pond and the polishing pond based on the 2018 bathymetric survey, to be roughly 124 acre-feet as of the date of inspection on October 11th, 2018.

Talen reported that the CCR Removal Project has resulted in the removal of 83,545 tons in 2015, 182,559 tons in 2016, 189,704 tons in 2017, and as of the time of the inspection approximately 120,775 tons resulting in a total of 576,583 tons of non-dry CCR material since ash removal began in 2015. Lehigh Cement, the recipient of the ash, calculates an average unit weight of non-dry CCR material to be 100.3 pounds per cubic foot (pcf); however, during the excavation process some of the moisture in the ash is relieved and the moisture content of the ash as it leaves the site is closer to 87 pcf. Prior to the start of the CCR Removal Project, an estimated 3,598,130 tons of non-dry CCR were in the ash basin, using the average density of 100.3 pcf. Talen re-calculated their estimate of the ash in place in 2018, using the 87 pcf value, along with re-evaluating the contours of the basin bottom and estimate that the basin had a starting tonnage of 3,415,000 tons at 87 pcf. Subtracting what has currently been removed leaves the basin with 2,838,201 tons of non-dry impounded CCR material remaining at 87 pcf (approximately 1,498 acre feet).

2.4 CCR Storage Capacity

The total permitted CCR storage capacity of the ash basin is approximately 3,864,000 tons (approximately 1,768.8 acre-feet). An estimated 2,838,201 tons (approximately 1,498 acre feet) of CCR remains in the ash basin, resulting in a remaining CCR storage capacity from the existing CCR surface to the reservoir surface elevation, of 1,025,799 tons in the southern part of the basin where ash has not been deposited or 270.8 acre feet. Note these values were re-calculated in 2018 and differ slightly from the previous year's annual inspection. This number is expected to increase annually since the plant no longer is sluicing ash into the basin and ash removal activities for beneficial reuse are active and ongoing.

3.0 Review of Supporting Technical Information

As required by the USEPA CCR Final Rule, the annual inspection is to include verification that the design, construction, operation, and maintenance of the CCR unit are consistent with recognized and generally accepted good engineering standards.

Talen established their CCR website, posted their fugitive dust control plan, continued required record keeping, provided required notifications, implemented weekly inspections, and implemented monthly monitoring of instrumentation by October 19, 2015, in accordance with the CCR Final Rule. The permanent marker required by the CCR Final Rule was installed prior to December 17, 2015.

Talen prepared the initial reports summarizing the following information by October 17, 2016, in accordance with the USEPA CCR Final Rule.

- Periodic Hazard Potential Classification Assessments;
- History of Construction;
- Liner Documentation;
- Periodic Structural Stability Assessments; and
- Periodic Safety Factor Assessments.

Talen's consultant prepared the location restriction reports and Talen submitted them to the Facility Operating Record as required by the CCR Final Rule prior to the deadline of October 17, 2018. The Ash Basin No. 6 met the requirements for location restrictions with the exception to groundwater separation as outlined in 40 CFR §257.60.

Other available supporting technical information that was reviewed included the following:

- Project drawings;
- Previous annual inspection reports by HDR Engineering, Inc. and Talen, from 2008 to 2017;
- The 7 day inspection reports and the 30 day instrument monitoring reports completed by qualified personnel; and
- USEPA inspection report, dated December 12, 2012.

In general, the design, construction, operation, and maintenance of the CCR unit is consistent with recognized and generally accepted good engineering standards, and the documentation complies with the requirements of the CCR Final Rule. Upon review of the 30 day instrument monitoring reports, it appears that the piezometer B09-1 became blocked as early as March 25, 2017. The plant hired a drilling company and attempted a clean out of the piezometer. The clean out was unsuccessful and Talen is currently in the process of permitting with the PADEP Division of Dam Safety to abandoned the piezometer and install a new piezometer to replace it. Additional discussion regarding design, construction, and maintenance practices and documentation is presented below. It is also noted that readings from April 2018 were not placed in the Facility Operating Record.

The Potential Hazard Classification Assessment (HDR 2016) contains the information required by the CCR Final Rule. Ash Basin No. 6 has a significant hazard potential based on potential economic and environmental impacts.

Based on a review of the information described above, it appears the embankment was designed and was reportedly constructed in accordance with good engineering standards that were recognized and generally accepted at the time of design and construction between 1975 and 1979. The embankment was constructed with a 10-foot-thick (horizontally) clay liner on the upstream face of the embankment, and the embankment was constructed of controlled, compacted sandy silt to silty clay fill, with a specified compaction of 95 percent of the Standard Proctor maximum density. The embankment was constructed with an upstream slope of 2.5H to 1V, a crest width of 15 feet, and a downstream slope of 2H to 1V. The original slope stability analyses were not available for review, but the embankment slopes are consistent with common embankment construction design practices of the time.

Seepage was observed at the toe of the embankment at the northwestern, and southeastern sections of the embankment. The observed seepage is not considered particularly unusual, and there is no evidence of piping or internal erosion. Non-flowing saturated areas were observed along the southwestern corner of the impoundment at the toe of the polishing pond and also at the northeastern section of the dam.

No seepage has been identified that is associated with the through-embankment conduits, though seepage along the underside of conduits would be difficult to view directly.

Several shallow sloughs of the downstream face of the embankment occurred previously, reportedly as significant flooding of the Susquehanna River receded. Talen, through a consultant, performed a

rapid drawdown analysis of the downstream embankment slope assuming partially saturated conditions and determined that the stability of the downstream slope for critical failure surfaces satisfies the requirements of the USEPA CCR Final Rule.

The Constructed Liner Determination Report (Talen 2016) verified that the basin is considered to be unlined, as it was not constructed with a two-layer composite liner including an upper geomembrane component and lower compacted soil component.

The Initial Structural Stability Requirement Assessment (HDR 2016) contains the information required by the CCR Final Rule. The adequacy of the spillway was assessed previously as a result of a recommendation presented by USEPA during their inspection of the ash basin in 2012. Note that the basin is formed by an above-ground embankment for its full perimeter, so that all inflow is the result of precipitation falling directly on the basin, with no run-on from adjacent areas. The 2012 analysis determined that the ash basin could safely pass the inflow resulting from the ½ Probable Maximum Flood (PMF), which was the Inflow Design Flood (IDF) prescribed by the PADEP, provided that the discharge structures remain unobstructed during the flood. The IDF prescribed by the USEPA CCR Final Rule is the 1,000-year flood, which has significantly lower inflow than the ½ PMF. In addition, Talen has lowered the normal operating surface from approximate elevation 286.0 feet in 2012 to the current (typical normal) elevation of roughly 284.0 feet, providing an additional 2.0 feet of usable water storage in the open part of the basin. Updated analyses determined that the spillway capacity is adequate, again assuming unobstructed discharge. Although the 2012 USEPA inspection report recommended that provisions be made for an emergency spillway, they acknowledged that *“some of the above studies and analyses and remedial measures recommendations may not be critical given the current permanent closure plans.”*

The sole spillway for the basin comprises an outlet structure at the main basin with a conduit leading to the polishing pond and an outlet structure at the polishing pond with a conduit leading to the Susquehanna River. A mixing chamber is located within the conduit between the main basin and the polishing pond. This structure is associated with monitoring and treatment of discharge in accordance with Talen’s environmental permits. The impact of the mixing chamber has been included in the assessment of discharge capability and spillway adequacy. The discharge capability of the outlet structures is adequate, provided that the outlet structures in general, and the mixing chamber in particular, are maintained clear of debris.

As noted previously, the only discharge to the basin is process water, which does not carry significant CCR, and no gate operations are necessary to pass the inflow design flood assuming the gates are operated in the fully open position, so that operational needs for the ash basin are limited. Talen staff reportedly patrol the ash basin daily to observe the basin, pond, embankments, and discharge structures for any abnormalities such as excessive flow, leakage, or structural damage. Talen also reportedly conducts monthly inspections of the ash basin, including monitoring of the piezometers, as well as 7-day inspections as required by the USEPA’s CCR Final Rule, and annual inspection reports that are required by the PADEP.

The Initial Safety Factor Assessment (HDR 2016) contained the information required by the CCR Final Rule.

Maintenance measures include vegetation control and repair of ground disturbance that occurs during vegetation control along with the on-going ash scavenging activities for beneficial reuse within the

impoundment. These measures are generally consistent with good practice and are described in more detail in Section 4.

An assessment of the groundwater monitoring program, sampling, analysis, and detection, as described by the CCR Final Rule, is not a required element of the visual inspection and was not included in this inspection report.

The April 17th 2017 Emergency Action Plan (EAP) and certification were stored in the facility operating record and on Brunner Island's CCR Rule Compliance Data and Information website. A review of the EAP provided no technical changes were necessary at this point and Talen reports that they hosted the annual face to face meeting with local emergency responders on March 17th, 2018.

4.0 Visual Inspection Site Visit

The visual inspection site visit was conducted on October 11th, 2018, by Benjamin Wilburn, P.E. who is a Talen Employee. The reservoir was at elevation 283.9 feet which is 0.1' lower than the previous year. The weather was sunny and roughly 75 degrees Fahrenheit. Approximately 0.7" of rain occurred the day prior.

The visual inspection was conducted in accordance with the CCR Final Rule to identify signs of distress or malfunction of the CCR unit and appurtenant structures, and consisted of observations of features and conditions readily discernible by external visual inspection through reasonable efforts. An internal pipe inspection was made by Talen employees during the week of October 29th, 2018 which was performed after a thorough cleaning of the pipes, cleaning of the internal mixing chamber for the pipe between the basin and the downstream polishing pond, and cleaning of the downstream flapper gate. Relevant photographs and a key plan are provided in Appendix A.

West Embankment

A stone access road and berm was installed along or downstream of the toe of the west embankment in the fall of 2014. The access road and berm are up to 10 feet high above the toe in places, about 10 feet wide, and are constructed of 4-inch stone fill. This berm connects with the gravel road running along or near the toe of the west embankment. This road was regraded with stone as part of the gas line installation in 2016.

The vegetation on the downstream slope of the west embankment was recently cut. Clearing of vegetation extended to the berm at the toe at the northwest corner at the time of the inspection, but the ditch and surrounding area was subsequently cleared and the stumps were removed in August 2016. This ditch was constructed as part of erosion and sedimentation control measures during original construction and is effectively part of the embankment.

There was no evidence of movement, seepage, sinkholes, distress, or erosion, except as noted below. Minor slope irregularities were observed along the upper edge of the slope at the northwest corner, which were likely due to mowing equipment, road traffic, or snow plowing and unchanged from the previous year's inspection. There was no evidence of cracking. The toe of the downstream slope was observed to have standing water in the Sedimentation Basin No. 1 (located outside of the basin at the toe of slope) and a trickle of water was flowing out of the pond's discharge pipe. There was no evidence of piping, material deposition, or entrained fines and is similar to past observations. Artesian conditions were observed in the riser of Monitoring Well 6-1B near the northwest corner of the basin,

with flow coming from a hole in the riser about 2 feet above grade (approximately 3 to 4 feet above the embankment toe and 8 feet above the Sedimentation Basin No. 1 drainage ditch). This is indicative of the wet conditions in this area. The ditch adjacent to Sedimentation Basin No. 1, located along the toe in the northwest corner of the basin, was vegetated with standing water, but no flow.

The northern part of the basin has been filled with ash to within 900 feet of the polishing pond. The southern part of the basin still retains water. The upstream slope of the west embankment, where it is filled and where it retains water, was heavily vegetated. There was no visible evidence of movement, settlement, sinkholes, cracking, or other distress.

East Embankment

The east embankment generally appeared to be in good condition. Vegetation had been recently cut. Clearing of vegetation extended to the ditch at the toe of the east slope at the time of the inspection. A seep, with a trickle of flow, was observed at the southern end of the basin where a weighted filter blanket has previously been installed. There is no signs of piping associated with the seep. The filter blanket extends about 20 feet upslope and is about 3 feet thick. The sedimentation ditch had standing water in it and was constructed as part of erosion and sedimentation control measures during original construction which is now effectively part of the embankment.

There was no evidence of woodchuck burrows. There was no other evidence of instability, deformation, sinkholes, cracking, or leakage except as described above.

The crest of the embankment consisted of a gravelly surface. No evidence of movement, settlement, cracking, or other distress was observed. Minor erosion rills were observed along the downstream edge of the crest earlier in the year, but have been repaired prior to the inspection. The condition of the roadway crest was consistent around the entire ash basin. Talen periodically regrades the access road and repairs the erosion rills.

Little of the upstream slope of the east embankment was exposed above the basin water level or ash fill, though more of the upstream slope of the embankment was exposed than in previous inspections due to the lower reservoir level and dry swale. Vegetation along the upstream face of the west embankment, east embankment, and splitter dike has grown and should be cut and removed or eliminated to prevent clogging of outlet structures. No evidence of instability, movement, sinkholes, or burrows was observed.

North Embankment

The north embankment separates Ash Basin No. 5, which is closed, and Ash Basin No. 6. This embankment has been filled on both sides and currently can only be distinguished by the presence of the access road on its crest. An approximately 18-inch-diameter pipe discharges process water from the equalization pond into a small channel at the northeast end of Ash Basin 6. Talen has implemented a monitoring program to address concerns regarding overtopping due to this discharge. A staff gage has been installed at the northeast corner of the basin to monitor water level.

At the northeastern corner of the embankment wet soils were observed roughly 4' up the slope and appears unchanged from previous inspection. No flow or any signs of instability was observed.

The process water discharge pipes, which were used previously for ash discharge, cross the north dike near its west end and discharge to a pool near the west end of the basin, as noted below.

South Embankment/Polishing Pond

The downstream slope of the south embankment appeared to be in good condition with no visible evidence of movement, sinkholes, distress, or erosion. The vegetation had been trimmed over the downstream face and toe prior to the inspection. The toe of the downstream embankment has two areas with saturated soil conditions at the south and southeast side. There was no visible rutting, standing water, seepage or evidence of piping.

The upstream slope appeared to be in good condition, and the vegetation along the upstream slope had been trimmed recently. Wetland vegetation along the waters edge and growing on the outlet works was observed during the inspection, and Talen reports that it has been removed following the inspection. There was no evidence of movement, sinkholes, or distress. The small amount of erosion observed at the stairway footing leading to the riser intakes from the previous year's inspection has been repaired.

Internal Channel

The internal ash process water sluice channel is located near the northwest corner of the basin and meanders south to the open pool area. The discharge into the basin, which feeds the sluice channel, consists of three pipes that currently discharge ash process water following the removal of bottom ash. Although ash sluicing has been discontinued, the discharge sluices are still used to discharge process water from the steam plant dewatering troughs. Previous reports noted a concern with the potential for the discharge channel to back up, potentially resulting in flow overtopping the embankment. This concern has been partially addressed by ceasing sluicing operations. As noted previously, a separate discharge pipe for equalization pond process water is located near the northeast end of the basin, which is also still in service. Talen monitors the discharge area daily for evidence of flow backing up, though the likelihood of this happening is lessening as the grades in these areas are actively being lowered by the ash scavenging activities. Additionally, an emergency swale was installed which would convey the equalization pond discharge to open water if the normal swale becomes blocked.

Intake/Outlet Structures

The outlet structure located between the main basin and the polishing pond was in good condition. The concrete appeared to be in good condition, and the skimmer gate was in good condition. The walkway paint showed some signs of deterioration, although the walkway itself was sound. The winches with stainless cables are in good condition and are used to suspend the skimmer gates at the outlet structure. The operator for the control gate was locked. The top of sill elevation is 283.5 feet, and the impoundment water surface elevation at the time of the inspection was 283.9 feet.

Talen engineers performed a dewatered inspection of the outlet structure in February 2012 and reported that the structure was in good condition and the gates operated smoothly. Talen reported that Marion Hill Associates performed a dive inspection on October 15, 2015, after the 2015 inspection. The dive inspection included observations of the interior concrete, the gate, stem guides, concrete stoplogs, and concrete panels. The divers did not report any other adverse findings regarding the

condition of the outlet structure or its ability to convey flow. This structure is to be modified when Talen initiates dewatering of the basin.

The CCR Final Rule requires that the annual inspection include a visual inspection of any hydraulic structures underlying the base of the CCR unit or passing through the dike of the CCR unit for structural integrity and continued safe and reliable operation. Since the conduits that comprise the hydraulic structures underlying the base of the CCR unit cannot be readily accessed for visual inspection due to confined space safety concerns, an ROV inspection of the discharge pipes is typically conducted; however, Talen decided to enter and clean the pipes along with the internal mixing chamber as preventative maintenance this year and the internal inspection was conducted following the pipe cleaning during the week of October 29th, 2018. Talen reported that the conduit, gates, and mixing chamber were all in good condition.

The outlet structure from the polishing pond to the Susquehanna River consists of an inlet in the polishing pond and a regulating structure just upstream of the discharge point. Both of these structures appeared to be in good condition. The stem of the control gate operator on the regulating structure was replaced in early 2017. The flapper valve at the end of the discharge line was reported by Talen to have been lubricated and exercised for its full range of motion by Talen operations personnel in 2016. The interior of the conduit through the polishing pond embankment was also inspected by Talen staff during the week of October 29th, 2018. The conduit appeared to be in good condition, and no unusual conditions were observed that would affect the integrity or discharge capacity of the conduit. A buildup of vegetation developed around the edge of the riser structure and Talen reports that a contractor cleaned the riser following the inspection.

5.0 Instrumentation

Four piezometers were installed in the east embankment in 2009 along two sections at approximately Stations 22+60 and 7+30 as seen in the figures in Appendix B. The piezometers at Station 22+60 were installed adjacent to a repaired sloughed area, while the piezometers at Station 7+30 were installed in an area with no nearby sloughs. Two piezometers were installed at each section; one piezometer was located in the crest road and the second was located on the slope approximately 1/4 to 1/3 of the way up from the toe. During previous inspections, the road box cover for Piezometer B09-1 was observed to be broken and the riser was filled with bentonite but the piezometer tube was intact. It appears that piezometer B09-1 started to become blocked in March 2017 and Talen attempted a cleanout in early 2018. Talen reports that they are actively working with the PADEP Division of Dam Safety to permit the installation of a new piezometer in the dam crest and properly abandon the blocked piezometer.

A weir was observed at the northeast corner of the basin about 50 feet downstream of the toe. This weir, which measures runoff from the marshy area at the northeast corner of the ash basin. It has been reported that this weir was not considered as dam safety instrumentation.

Other instrumentation consists of gage boards and level transducers at the outlet structures in the main basin and polishing pond. The level transducers are monitored full time by the Brunner Island Steam Electric Station System Operator. The water surface elevation in the main basin was 283.9 feet and the elevation readout at the polishing pond outlet structure read 267.8 feet at the time of the inspection. Talen replaced the dock structure in 2018 within the polishing pond leading up to and

aside the riser structure for sampling and inspection purposes. The elevation in the polishing pond appears to be slightly elevated by an inch or two due to a buildup of vegetation around the riser structure and Talen reports that a contractor cleaned the riser following the inspection.

6.0 Closure

Based on the information provided to me, information available on Talen's CCR website, and my visual observations, this annual inspection was conducted in accordance with the requirements of the USEPA 40 CFR Parts 257 and 261 Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule, April 17, 2015 (CCR Final Rule), to the best of my knowledge, information, and belief, and was conducted in accordance with professional standards of care for similar work.

5.0 Certification

By affixing my seal to this, I do hereby certify to the best of my knowledge, information, and belief that the information contained in this report is true and correct. I further certify I am licensed to practice in the Commonwealth of Pennsylvania and that it is within my professional expertise to verify the correctness of the information. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment.

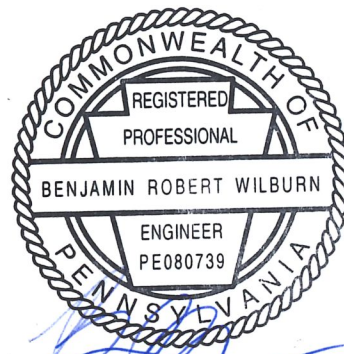
Benjamin R. Wilburn, P.E.

P.E. License Number: PE080739

Signature: *Benjamin R. Wilburn*

Date: 12/6/2018

Appendix A: Inspection Photographs
Appendix B: Instrumentation Data



APPENDIX A
INSPECTION PHOTOGRAPHS



Picture 1 – Northern side of AB6



Picture 2 – Gravel road on nw corner of AB6. Old E&S (sedimentation pond 1) pond on right side of photo.

SITE PHOTOGRAPHS
BRUNNER ASH BASIN 6
ANNUAL INSPECTION



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 Allentown, PA 18101
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SHEET: 1	OF: 7	DATE: 10/11/2018
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Picture 3 – Saturated area with a trickle of water flowing into the riser pipe.



Picture 4 – Well in artesian condition. The flowing water showed no signs of turbidity.

SITE PHOTOGRAPHS
BRUNNER ASH BASIN 6
ANNUAL INSPECTION



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SHEET: 2	OF: 7	DATE: 10/11/2018
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Picture 5 – Standing water at toe of slope of the polishing pond.



Picture 6 –No issues observed at the discharge.

SITE PHOTOGRAPHS
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SHEET: 3	OF: 7	DATE: 10/11/2018
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Picture 7 –Weighted filter blanket at the SE corner.



- Picture 8 – Standing water in the old E&S pond (sedimentation pond 2) on the Eastern side of the dam between the river. No water was leaving the discharge pipe.

SITE PHOTOGRAPHS
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SHEET: 4	OF: 7	DATE: 10/11/2018
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Picture 9 – Saturated area at the NE corner.



Picture 10 – Area where the EQ pond discharges into the basin at the NE corner.

SITE PHOTOGRAPHS
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SHEET: 5	OF: 7	DATE: 10/11/2018
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Picture 11 – Vegetation should be cut and removed from the water's edge around the polishing pond.



Picture 12 – Vegetation should be removed from the risers.

SITE PHOTOGRAPHS
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SHEET: 6	OF: 7	DATE: 10/11/2018
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Picture 13 – Gate open and locked.



Picture 14 – Staff gage on side of structure.

SITE PHOTOGRAPHS
BRUNNER ASH BASIN 6
ANNUAL INSPECTION

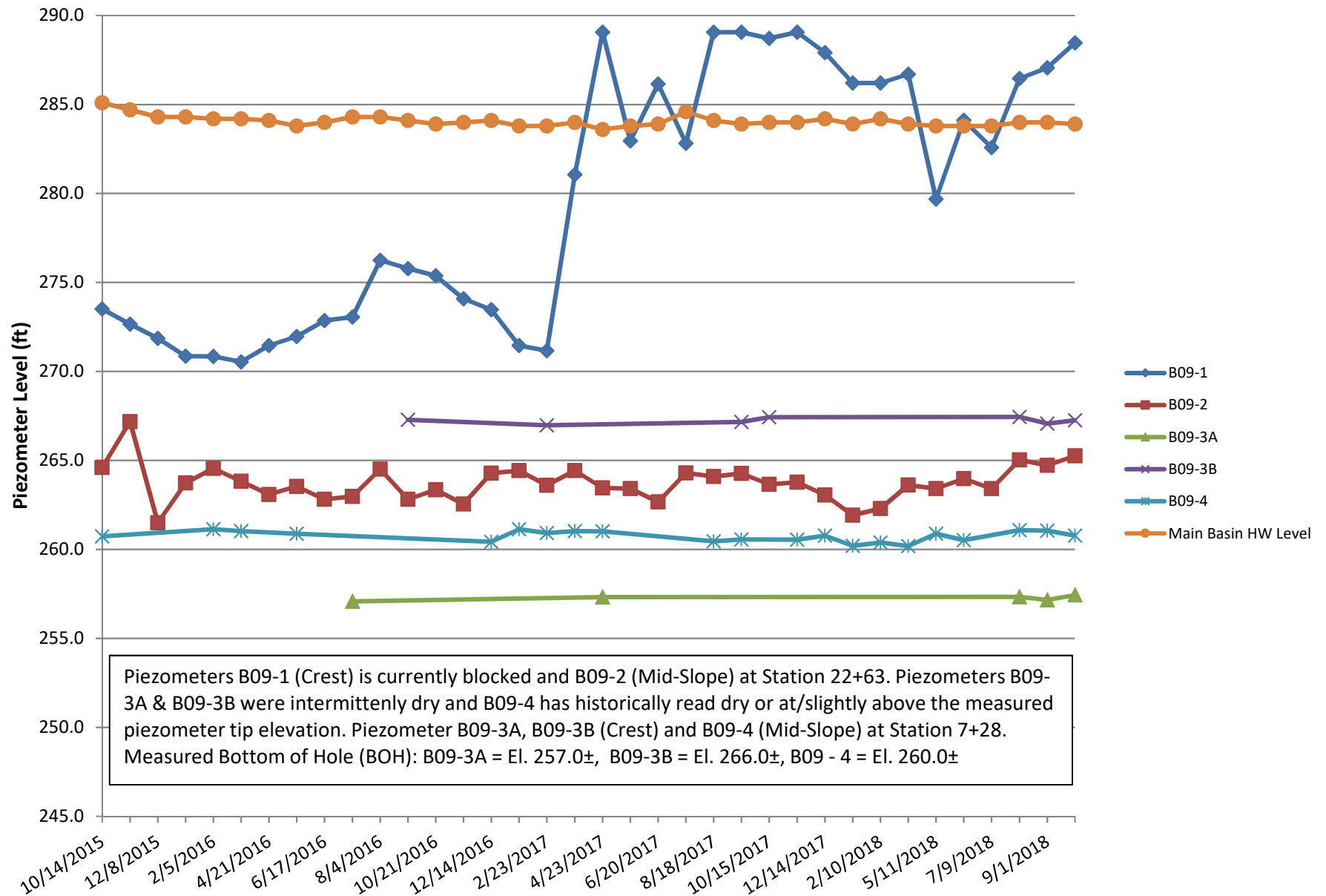


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SHEET: 7	OF: 7	DATE: 10/11/2018
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APPENDIX B
INSTRUMENTATION DATA

Piezometer Time-History Plot



Project: Brunner Island Ash Basin No. 6 Geotechnical Exploration
Subject: Water Level Readings

Data Source: 2009 Geotechnical Exploration (Boring Logs & Piezometer Installation/Specs)

Piezometer ID	B09-1	Units	Note:
Screen Depth	19.0 - 24.0	ft	Datum: MSL
Screen Elev.	266.0 - 271.0	ft	Elevations are estimated
Ground Surface Elev.	290.00	ft	
Top of Steel Casing Elev.	290.00	ft	
Top of PVC Riser Elev.	289.70	ft	
Stickup(TOR - GS)	-0.30	ft	

Data Source: Brunner piezo survey conducted on 5/20/2015

Piezometer ID	B09-1	Units	Note:
Screen Depth	19.0 - 24.0	ft	Datum: NGVD 29 US FEET
Screen Elev.	266.0 - 271.0	ft	Screen elevations are estimated
Ground Surface Elev.	289.89	ft	
Top of Riser (TOR) Elev.	289.06	ft	
Top of Steel Casing (TOC) Elev.	289.30	ft	
TOC to TOR	0.24	ft	
TOC to GS	-0.59	ft	

Data Source: Brunner piezo survey conducted on 5/20/2015

Date	TOR to TOW (ft)	GWT Elev. (ft)	Main Basin HW EL (ft)	Polishing Pond Level
10/14/2015	15.55	273.5	285.1	267.8
11/11/2015	16.40	272.7	284.7	267.9
12/8/2015	17.2	271.9	284.3	267.8
1/7/2016	18.2	270.9	284.3	267.8
2/5/2016	18.2	270.9	284.2	267.7
3/3/2016	18.5	270.5	284.2	267.3
4/21/2016	17.6	271.5	284.1	267.9
5/19/2016	17.1	272.0	283.8	267.7
6/17/2016	16.2	272.86	284	267.9
7/14/2016	16.0	273.06	284.3	268
8/4/2016	12.8	276.25	284.3	268
9/23/2016	13.28	275.8	284.1	267.9
10/21/2016	13.68	275.38	283.9	267.8
11/18/2016	14.98	274.08	284	267.8
12/14/2016	15.59	273.47	284.1	267.9
1/28/2017	17.6	271.46	283.8	267.7
2/23/2017	17.9	271.16	283.8	267.7
3/25/2017	8	281.06	284	267.3
4/23/2017	0	289.06	283.6	267.2
5/22/2017	6.11	282.95	283.8	267.8
6/20/2017	2.91	286.15	283.9	267.4
7/19/2017	6.24	282.82	284.6	267.5
8/18/2017	0	289.06	284.1	267.5
9/15/2017	0	289.06	283.9	267.8
10/15/2017	0.35	288.71	284.0	267.9
11/14/2017	0.00	289.06	284.0	267.8
12/14/2017	1.14	287.92	284.2	267.9
1/11/2018	2.85	286.21	283.9	267.7
2/10/2018	2.85	286.21	284.2	268.0
3/12/2018	2.36	286.7	283.9	267.9
5/11/2018	9.37	279.69	283.8	267.8
6/9/2018	4.95	284.11	283.8	267.8
7/9/2018	6.48	282.58	283.8	267.4
8/2/2018	2.60	286.46	284.0	267.9
9/1/2018	2.00	287.06	284.0	267.4
10/1/2018	0.6	288.46	283.9	267.8
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-				
-				

Missing April

Maximum reading since last inspection. Piezometer is blocked.

Maximum reading since last inspection.

Maximum reading since last inspection.

Project: Brunner Island Ash Basin No. 6 Geotechnical Exploration
Subject: Water Level Readings

Data Source: 2009 Geotechnical Exploration (Boring Logs & Piezometer Installation/Specs)

Piezometer ID	B09-2	Units	Note:
Screen Depth	5.0 -10.0	ft	TP = Top of PVC Riser
Screen Elev.	261.1 - 266.1	ft	Elevations are estimated
Ground Surface Elev.	271.10	ft	Datum: MSL
Top of PVC Riser Elev.	273.50	ft	
Top of Steel Casing Elev.	273.80	ft	
Stickup (TOR - GS)	2.40	ft	

Data Source: Brunner piezo survey conducted on 5/20/2015

Piezometer ID	B09-2	Units	Note:
Screen Depth	5.0 -10.0	ft	Datum: NGVD 29 US FEET
Screen Elev.	261.1 - 266.1	ft	Screen elevations are estimated
Ground Surface Elev.	270.76	ft	
Top of Riser (TOR) Elev.	273.73	ft	
Top of Steel Casing (TOC) Ele	273.86	ft	
TOC to TOR	0.13	ft	
TOC to GS	3.10	ft	

Data Source: Brunner piezo survey conducted on 5/20/2015

Date	TOR to TOW (ft)	GWT Elev. (ft)	Main Basin HW EL (ft)	Polishing Pond Level
10/13/2015	9.1	264.6	285.1	267.8
11/11/2015	6.6	267.2	284.7	267.9
12/8/2015	12.2	261.5	284.3	267.8
1/7/2016	10.0	263.7	284.3	267.8
2/5/2016	9.2	264.5	284.2	267.7
3/3/2016	9.9	263.8	284.2	267.3
4/21/2016	10.7	263.1	284.1	267.9
5/19/2016	10.2	263.5	283.8	267.7
6/17/2016	10.9	262.8	284	267.9
7/14/2016	10.8	263.0	284.3	268
8/4/2016	9.2	264.5	284.30	268
9/23/2016	10.91	262.8	284.10	267.9
10/21/2016	10.38	263.3	283.90	267.8
11/18/2016	11.18	262.5	284.00	267.8
12/14/2016	9.45	264.3	284.10	267.9
1/28/2017	9.3	264.4	283.80	267.7
2/23/2017	10.13	263.6	283.80	267.7
3/25/2017	9.3	264.4	284.00	267.3
4/23/2017	10.27	263.5	283.60	267.2
5/22/2017	10.31	263.4	283.80	267.8
6/20/2017	11.06	262.7	283.90	267.4
7/19/2017	9.43	264.3	284.60	267.5
8/18/2017	9.63	264.1	284.10	267.5
9/15/2017	9.46	264.3	283.90	267.8
10/15/2017	10.08	263.6	284.0	267.9
11/14/2017	9.95	263.8	284.0	267.8
12/14/2017	10.68	263.0	284.2	267.9
1/11/2018	11.81	261.9	283.9	267.7
2/10/2018	11.44	262.3	284.2	268.0
3/12/2018	10.12	263.6	283.9	267.9
5/11/2018	10.31	263.4	283.8	267.8
6/9/2018	9.75	264.0	283.8	267.8
7/9/2018	10.32	263.4	283.8	267.4
8/2/2018	8.70	265.0	284.0	267.9
9/1/2018	9.01	264.7	284.0	267.4
10/1/2018	8.47	265.3	283.9	267.8

Missing April

Maximum reading
since last
inspection.

Project: Brunner Island Ash Basin No. 6 Geotechnical Exploration
Subject: Water Level Readings

Data Source: 2009 Geotechnical Exploration (Boring Logs & Piezometer Installation/Specs)

Piezometer ID	B09-3A	Units	Note:
Screen Depth	30.0 - 35.0	ft	Elevations are estimated
Screen Elev.	255.0 - 260.0	ft	Datum: MSL
Ground Surface Elev.	290.00	ft	
Top of Steel Casing Elev.	290.00	ft	
Top of Riser Pipe Elev.	289.70	ft	
Stickup (TOR - GS)	-0.30	ft	

General Notes:

- TOC = Top of steel casing
- TOR = Top of PVC Riser
- TOW = Top of the water table
- MSL = Mean Sea Level

Data Source: Brunner piezo survey conducted on 5/20/2015

Piezometer ID	B09-3A	Units	Note:
Screen Depth	30.0 - 35.0	ft	Datum: NGVD 29 US FEET
Screen Elev.	255.0 - 260.0	ft	Screen elevations are estimated
Ground Surface Elev.	290.34	ft	
Top of Riser (TOR) Elev.	289.98	ft	
Top of Steel Casing (TOC) Elev.	290.34	ft	
TOC to TOR	0.36	ft	
TOC to GS	0.00	ft	

Source: Brunner piezo survey conducted on 5/20/2015

Date	TOR to TOW (ft)	GWT Elev. (ft)	Main Basin HW Elevation (ft)	Polishing Pond Level
10/13/2015	DRY	#N/A	285.1	267.8
11/11/2015	DRY	#N/A	284.7	267.9
12/8/2015	DRY	#N/A	284.3	267.8
1/7/2016	32.69 - DRY	#N/A	284.3	267.8
2/5/2016	32.8 - DRY	#N/A	284.2	267.7
3/3/2016	DRY	#N/A	284.2	267.3
4/21/2016	DRY	#N/A	284.1	267.9
5/19/2016	DRY	#N/A	283.8	267.7
6/17/2016	DRY	#N/A	284	267.9
7/14/2016	32.8	257.21	284.3	268
8/4/2016	Dry	#N/A	284.3	268
9/23/2016	DRY	#N/A	284.1	267.9
10/21/2016	DRY	#N/A	283.9	267.8
11/18/2016	DRY	#N/A	284	267.8
12/14/2016	DRY	#N/A	284.1	267.9
1/28/2017	DRY	#N/A	283.8	267.7
2/23/2017	DRY	#N/A	283.8	267.7
3/25/2017	DRY	#N/A	284	267.3
4/23/2017	32.52	257.46	283.6	267.2
5/22/2017	Dry	#N/A	283.8	267.8
6/20/2017	Dry	#N/A	283.9	267.4
7/19/2017	Dry	#N/A	284.6	267.5
8/18/2017	Dry	#N/A	284.1	267.5
9/15/2017	Dry	#N/A	283.9	267.8
10/15/2017	32.69	257.29	284.0	267.9
11/14/2017	32.69	257.29	284.0	267.8
12/14/2017	32.69	257.29	284.2	267.9
1/11/2018	32.72	257.26	283.9	267.7
2/10/2018	32.72	257.26	284.2	268.0
3/12/2018	32.72	257.26	283.9	267.9
5/11/2018	32.67	257.31	283.8	267.8
6/9/2018	32.67	257.31	283.8	267.8
7/9/2018	32.67	257.31	283.8	267.4
8/2/2018	32.64	257.34	284.0	267.9
9/1/2018	32.81	257.17	284.0	267.4
10/1/2018	32.54	257.44	283.9	267.8

Missing April

Maximum reading since last inspection.

Project: Brunner Island Ash Basin No. 6 Geotechnical Exploration
Subject: Water Level Readings

Data Source: 2009 Geotechnical Exploration (Boring Logs & Piezometer Installation/Specs)

Piezometer ID	B09-3B	Units	Note:
Screen Depth	19.0 -24.0	ft	Elevations are estimated
Screen Elev.	266.0 - 271.0	ft	Datum: MSL
Ground Surface Elev.	290.00	ft	
Top of Steel Casing Elev.	290.00	ft	
Top of PVC Riser Pipe Elev.	289.70	ft	
Stickup (TOR - GS)	-0.30	ft	

Data Source: Brunner piezo survey conducted on 5/20/2015

Piezometer ID	B09-3B	Units	Note:
Screen Depth	19.0 -24.0	ft	Datum: NGVD 29 US FEET
Screen Elev.	266.0 - 271.0	ft	Screen elevations are estimated
Ground Surface (GS) Elev.	290.34	ft	
Top of Riser (TOR) Elev.	289.85	ft	
Top of Steel Casing (TOC) Elev.	290.34	ft	
TOC to TOR	0.49	ft	
TOC to GS	0.00	ft	

Data Source: Brunner piezo survey conducted on 5/20/2015

Date	TOR to TOW (ft)	GWT Elev. (ft)	Main Basin HW Elevation (ft)	Polishing Pond Level
10/13/2015	DRY	#N/A	285.1	267.8
11/11/2015	DRY	#N/A	284.7	267.9
12/8/2015	DRY	#N/A	284.3	267.8
1/7/2016	23.2 - DRY	#N/A	284.3	267.8
2/5/2016	23.2 - DRY	#N/A	284.2	267.7
3/3/2016	DRY	#N/A	284.2	267.3
4/21/2016	DRY	#N/A	284.1	267.9
5/19/2016	DRY	#N/A	283.8	267.7
6/17/2016	DRY	#N/A	284	267.9
7/14/2016	23.18-Dry	#N/A	284.3	268
8/4/2016	22.7	267.15	284.30	268.00
9/23/2016	DRY	#N/A	284.10	267.90
10/21/2016	DRY	#N/A	283.90	267.80
11/18/2016	DRY	#N/A	284.00	267.80
12/14/2016	DRY	#N/A	284.10	267.90
1/28/2017	23	266.85	283.80	267.70
2/23/2017	DRY	#N/A	283.80	267.70
3/25/2017	DRY	#N/A	284.00	267.30
4/23/2017	DRY	#N/A	283.60	267.20
5/22/2017	DRY	#N/A	283.80	267.80
6/20/2017	DRY	#N/A	283.90	267.40
7/19/2017	DRY	#N/A	284.60	267.50
8/18/2017	22.82	267.03	284.10	267.50
9/15/2017	22.55	267.30	283.90	267.80
10/15/2017	22.51	267.34	284.0	267.9
11/14/2017	22.91	#N/A	284.0	267.8
12/14/2017	22.87	#N/A	284.2	267.9
1/11/2018	22.9	#N/A	283.9	267.7
2/10/2018	22.9	#N/A	284.2	268.0
3/12/2018	22.9	#N/A	283.9	267.9
5/11/2018	22.8	#N/A	283.8	267.8
6/9/2018	22.8	#N/A	283.8	267.8
7/9/2018	22.8	#N/A	283.8	267.4
8/2/2018	22.4	267.45	284.0	267.9
9/1/2018	22.78	267.07	284.0	267.4
10/1/2018	22.59	267.26	283.9	267.8

Maximum reading
since last
inspection.

Project: Brunner Island Ash Basin No. 6 Geotechnical Exploration
Subject: Water Level Readings

Data Source: 2009 Geotechnical Exploration (Boring Logs & Piezometer Installation/Specs)

<i>Piezometer ID</i>	B09-4	Units	Note:
<i>Screen Depth</i>	3.5 - 8.5	ft	TP = top of PVC riser pipe
<i>Screen Elev.</i>	260.7 - 265.7	ft	Elevations are estimated
<i>Ground Surface Elev.</i>	269.20	ft	Datum: MSL
<i>Top of PVC Riser Elev.</i>	272.00	ft	
<i>Top of Steel Casing Elev.</i>	272.30	ft	
<i>Stickup (TOR - GS)</i>	2.80	ft	

Data Source: Brunner piezo survey conducted on 5/20/2015

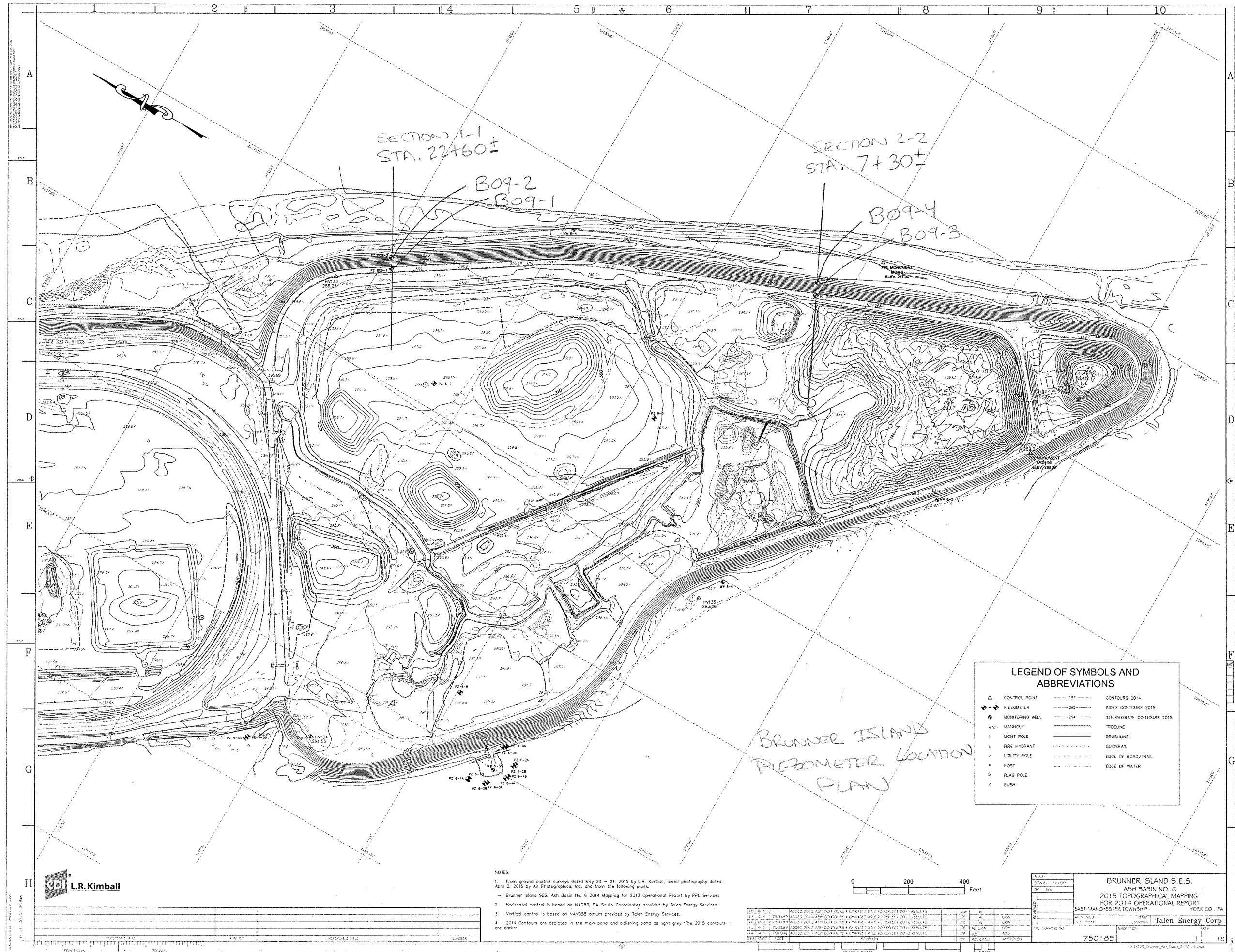
<i>Piezometer ID</i>	B09-4	Units	Note:
<i>Screen Depth</i>	3.5 - 8.5	ft	Datum: NGVD 29 US FEET
<i>Screen Elev.</i>	260.7 - 265.7	ft	Screen elevations are estimated
<i>Ground Surface (GS) Elev.</i>	269.28	ft	
<i>Top of Riser (TOR) Elev.</i>	271.33	ft	
<i>Top of Steel Casing (TOC) Elev.</i>	271.56	ft	
<i>TOC to TOR</i>	0.23	ft	
<i>TOC to GS</i>	2.28	ft	

Data Source: Brunner piezo survey conducted on 5/20/2015

Date	TOR to TOW (ft)	GWT Elev. (ft)	Main Basin HW Elevation (ft)	Polishing Pond Level
10/13/2015	10.6	260.73	285.1	267.8
11/11/2015	DRY	#N/A	284.7	267.9
12/8/2015	DRY	#N/A	284.3	267.8
1/7/2016	11.08 - DRY	#N/A	284.3	267.8
2/5/2016	10.2	261.13	284.2	267.7
3/3/2016	10.3	261.03	284.2	267.3
4/21/2016	DRY	#N/A	284.1	267.9
5/19/2016	10.45	260.88	283.8	267.7
6/17/2016	DRY	#N/A	284	267.9
7/14/2016	11.15-Dry	#N/A	284.3	268
8/4/2017	DRY	#N/A	284.3	268
9/23/2017	DRY	#N/A	284.1	267.9
10/21/2016	DRY	#N/A	283.9	267.8
11/18/2016	DRY	#N/A	284.00	267.8
12/14/2016	10.9	260.43	284.10	267.9
1/28/2017	10.2	261.13	283.80	267.7
2/23/2017	10.41	260.92	283.80	267.7
3/25/2017	10.3	261.03	284.00	267.3
4/23/2017	10.32	261.01	283.60	267.2
5/22/2017	Dry	#N/A	283.80	267.8
6/20/2017	dry	#N/A	283.90	267.4
7/19/2017	dry	#N/A	284.60	267.5
8/18/2017	10.88	260.45	284.10	267.5
9/15/2017	10.77	260.56	283.90	267.8
10/15/2017	dry	#N/A	284.0	267.9
11/14/2017	10.78	260.55	284.0	267.8
12/14/2017	10.55	260.78	284.2	267.9
1/11/2018	11.13	260.20	283.9	267.7
2/10/2018	10.94	260.39	284.2	268.0
3/12/2018	11.14	260.19	283.9	267.9
5/11/2018	10.45	260.88	283.8	267.8
6/9/2018	10.81	260.52	283.8	267.8
7/9/2018	dry	#N/A	283.8	267.4
8/2/2018	10.25	261.08	284.0	267.9
9/1/2018	10.27	261.06	284.0	267.4
10/1/2018	10.55	260.78	283.9	267.8

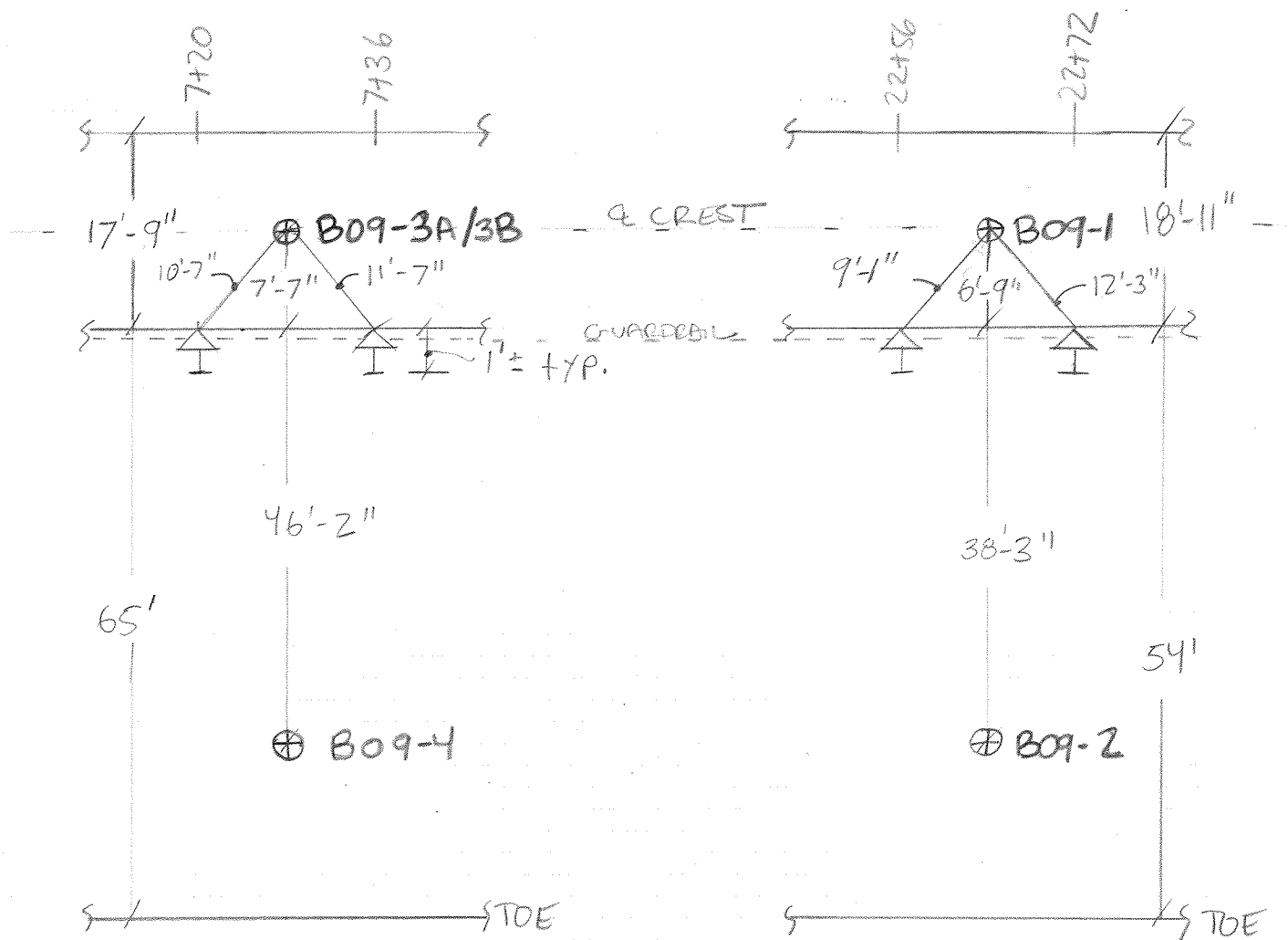
Missing April

Maximum reading
since last
inspection.



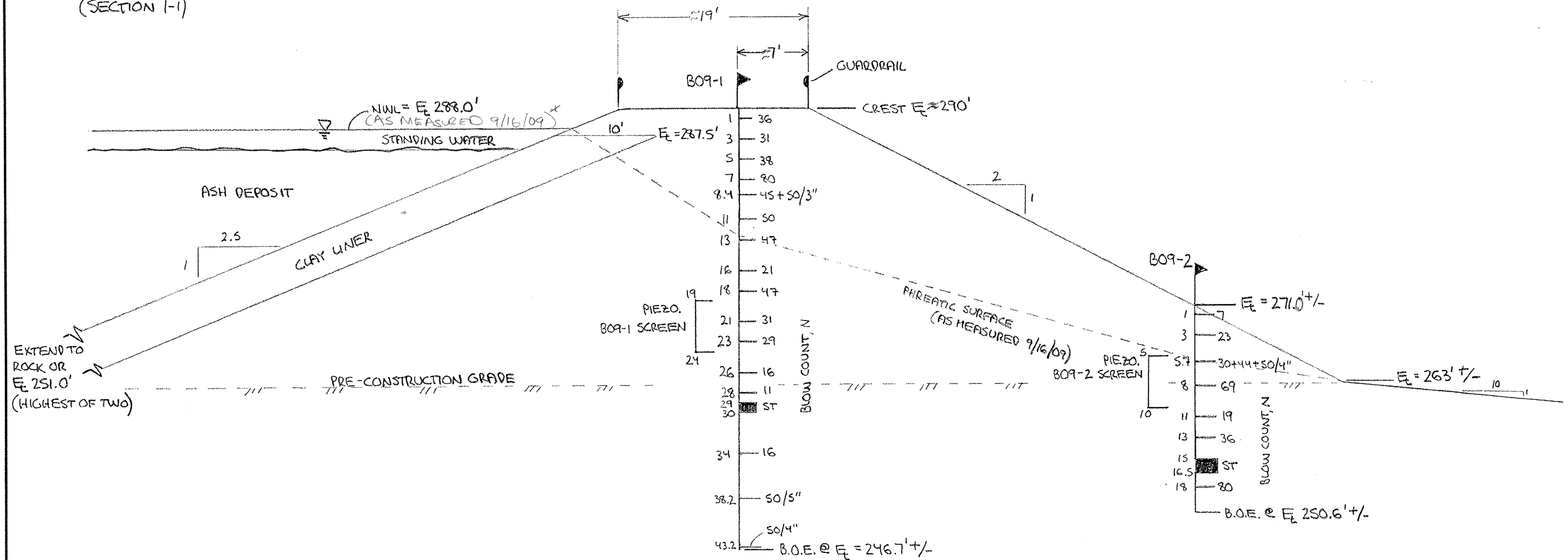


Project: <u>BRUNNER ISLAND</u>	Computed: <u>HAN</u>	Date: <u>8/4/15</u>
Subject: <u>PIEZOMETER LOCATION</u>	Checked:	Date:
Task: <u>B09-1 THROUGH B09-4</u>	Page:	of:
Job #:	No:	



PLAN N.T.S.

STATION 22+60 +/- :
(SECTION 1-1)

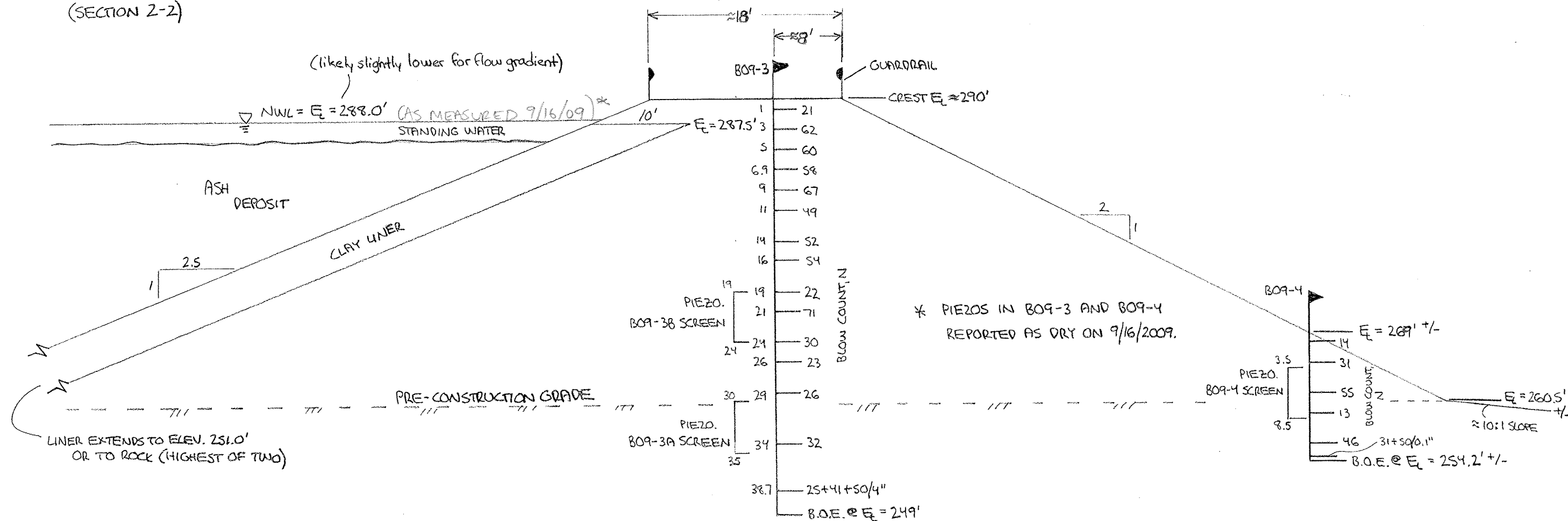


* NOTE: "ST" = SHELBY TUBE

* NOTE, TALEN HAS REMOVED STOPLOGS FROM THE BASIN WHICH HAS LOWERED THE POOL TO ABOUT EL 284.75'.

BRUNNER ISLAND AB 6 - STATION 21+80					PAGE 1 OF 2
REV	BY	DATE	CHECKED	DATE	
	NBS	9/23/09			JOB NO
					CALC NO

STATION 7+30 +/-:
(SECTION 2-2)



* NOTE, TALEN HAS REMOVED STOPLOGS FROM THE BASIN WHICH HAS LOWERED THE POOL TO ABOUT EL 284.75'

							JOB NO	PAGE 2.
	NBS	9/23/09					CALC NO	OF 2.
REV	BY	DATE	CHECKED	DATE				