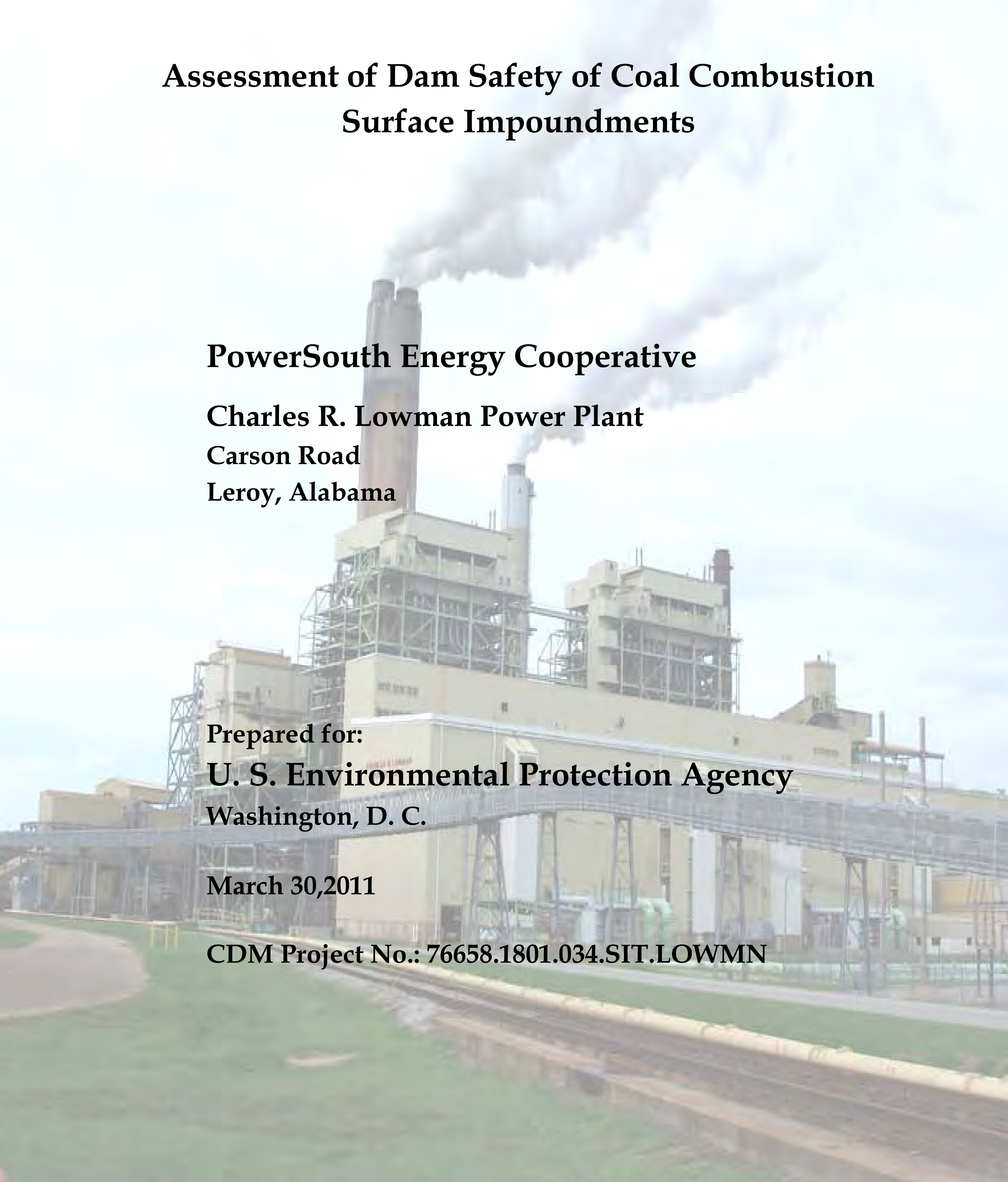

Assessment of Dam Safety of Coal Combustion Surface Impoundments

PowerSouth Energy Cooperative

Charles R. Lowman Power Plant
Carson Road
Leroy, Alabama

Prepared for:
U. S. Environmental Protection Agency
Washington, D. C.

March 30,2011

CDM Project No.: 76658.1801.034.SIT.LOWMN

Preface

The assessment of the general condition of the impoundments is based upon available data and visual observations. Detailed investigations and analyses involving topographic mapping, subsurface investigations, testing and detailed computational evaluations are beyond the scope of this report.

In reviewing this report, it should be realized that the reported condition of the impoundments is based on observations of field conditions at the time of assessment, along with data made available to the assessment team. In cases where an impoundment may have been lowered or drained prior to the assessment, such action, while improving the stability and safety of the impoundment, removes the normal load on the structure and may obscure certain conditions, which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is critical to note that the condition of impoundments depends on numerous and constantly changing internal and external conditions and is evolutionary in nature. It would be incorrect to assume that the present condition of the impoundment at the time of the assessment is representative of the condition of the impoundment at some point in the future. Only through continued care and assessment can there be any chance that unsafe conditions will be detected.

Prepared By:

CDM

I certify that the management unit (s) referenced herein have been assessed on July 1 and 2, 2010:

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Section 1
Introduction and Project Description

1.1 Introduction

CDM was contracted by the United States Environmental Protection Agency (USEPA) to perform site assessments of selected coal combustion waste (CCW) surface impoundments. As part of this contract, CDM performed a site assessment at the Charles R. Lowman Power Plant (Plant), owned by PowerSouth Energy Cooperative (PSEC).

CDM made a site visit to the Plant on July 1 and 2, 2010 to collect relevant information, inventory the impoundments, and perform visual assessments of the impoundments.

CDM representatives William Friers, P.E. and Bevin A. Barringer, P.E. were accompanied by representatives from PSEC and CDG Engineers & Associates (CDG), which included the following individuals:

Company	Name and Title
PSEC	Gabe Cartee, Technical Services Engineer
PSEC	Keith Stephens, Manager of Environmental Services
PSEC	Larry Spann, Environmental Compliance Specialist
PSEC	Art Brunson, Manager of Legal Affairs
PSEC	Jamie Waite, Safety Coordinator
CDG	Daniel Webb, Project Manager

1.2 State Regulation

Currently no state entity regulates the CCW impoundments in the State of Alabama.

1.2.1 Permits

The Plant was issued a permit under the National Pollutant Discharge Elimination System (NPDES) authorizing discharge to the Tombigbee River in accordance with effluent limitations, monitoring requirements, and other conditions set forth in the permit. The station's permit expired February 28, 2010, but is currently under review by the Alabama Department of Environmental Management (ADEM). PSEC provided CDM documentation from ADEM stating that the NPDES permit application was received on September 1, 2009 and the current NPDES permit is extended until a new permit is reissued. The permit number is AL0003671.

1.3 Datum

Elevations are referenced to the North American Vertical Datum of 1988 (NAVD 88). Directional coordinates are referenced to magnetic north.

1.4 Site Description and Location

The Plant is located southeast of Leroy, Alabama in Washington County on the Tombigbee River as shown on **Figure 1.** The area around the Plant showing critical infrastructure within approximately five miles down gradient of the impoundments is shown on **Figure 2.** An aerial view of the pond impoundments is shown on **Figure 3.**

1.4.1 CCW Impoundment Construction and Historical Information

The Plant began operation in 1969. The CCW is generated by Unit 1 (online since 1969), Unit 2 (online since 1979), and Unit 3 (online since 1980).

Construction of Unit 1 included the #1 Bottom Ash Pond. Construction of Units 2 and 3 commenced in 1976, with commercial operation of Unit 2 and 3 beginning in 1979 and 1980, respectively. This construction included the #2/#3 Bottom Ash Pond, Scrubber Waste Pond, and Process Waste Pond.

The original CCW impoundment, #1 Bottom Ash Pond, was constructed between 1965 and 1969. Based on design drawings dated 1970 and included in **Figures 4** and **5**, the #1 Bottom Ash Pond was originally constructed by excavating soil within the pond to elevations ranging from El. 10 to 13. The 15-foot-wide crest was constructed to El. 34.5, which was between 8 and 17 feet above the existing ground surface. Interior embankment slopes were constructed at 4H:1V below existing ground surface, and at 2H:1V above existing ground surface. Exterior slopes were constructed at 2H:1V. The original design drawings dated 1970 called out an ash pond overflow structure, but did not include details for the structure. Based on information provided by PSEC, the #1 Bottom Ash Pond embankment crest was raised to El. 39 in 1998.

Based on soil borings performed on the east embankment of the #1 Bottom Ash Pond by CDG Engineers & Associates (CDG) in 2009, the embankment is comprised of sandy clay and silty sand.

As shown on Figure 3, the #1 Bottom Ash Pond shares a common embankment with the #2/#3 Bottom Ash Pond.

The #2/#3 Bottom Ash Pond, Scrubber Waste Pond, and Process Waste Pond were constructed between 1976 and 1980. Based on design drawings dated 1976 and included on **Figures 6** and **7**, the #2/#3 Bottom Ash Pond, Scrubber Waste Pond, and Process Water Pond were constructed with “Compacted Type A Embankment Material”. No details or specifications were found regarding the “Compacted Type A Embankment Material”. The ponds were constructed by excavating to El. 13 within the pond and placing “Compacted Type A Embankment Material” up to El. 15. The 17-foot-wide crest was constructed to El. 42, which was between 16 and 27 feet above existing ground surface. Interior and exterior embankment slopes were constructed at

2H:1V. Riprap is shown covering the entire face of the interior slopes on the design drawings.

Six soil borings were drilled along the western embankment of the Scrubber Waste Pond by CDG in 2009. Based on material encountered in the soil borings, it appears that the embankment was constructed with silty sand.

As shown in Figure 3, the #2/#3 Bottom Ash Pond and Scrubber Waste Pond share a common embankment. The Scrubber Waste Pond and Process Waste Pond share a common embankment. PSEC-owned railroad spur lines are located on the crest of the #2/#3 Bottom Ash Pond west, south, and east embankments, the Scrubber Waste Pond north and west embankment, and the entire perimeter of the Process Waste Pond.

1.4.2 Current CCW Impoundment Configuration

The impoundments at the Charles R. Lowman Power Plant currently are used as settling ponds for CCW waste and other plant wastes. CCW sluiced into the impoundments include:

- Bottom ash;
- Fly ash;
- Boiler slag; and
- Flue gas desulfurization (FGD) residuals.

Other plant wastes sluiced into the ash ponds include liquids from:

- Recirculating cooling tower blowdown;
- Gypsum plant wastes;
- Limestone mill wastes;
- Miscellaneous FGD wastes; and
- Stormwater runoff.

There are currently four CCW Impoundments at the Plant as shown on Figure 3. They include: #1 Bottom Ash Pond, #2/#3 Bottom Ash Pond, Scrubber Waste Pond, and Process Waste Pond. The approximate lowest crest elevations of the embankments and pond areas are shown in **Table 1.**

Table 1 – Approximate Ash Pond Lowest Crest Elevations and Areas

Pond	Approximate Lowest Crest Elevation (feet)	Approximate Pond Area[1] (acres)
#1 Bottom Ash	33.0	16.5
#2/#3 Bottom Ash	42.0	29.0
Scrubber Waste	41.0	36.0
Process Waste	42.0	6.0

1 – Pond areas measured at lowest crest elevation.

The #1 Bottom Ash Pond is used to process CCW from Units 1, 2, and 3. CCW from each unit enters the pond by one 10-inch-diameter High Density Polyethylene (HDPE) pipe near the northwest corner of the pond. Water is pumped out of the #1 Bottom Ash Pond through two 10-inch-diameter pipes located at the southeast corner of the pond and into the #2/#3 Bottom Ash Pond through a 14-inch-diameter HDPE pipe.

The #2/#3 Bottom Ash Pond has piping configured to allow receiving CCW from Units 1, 2, and 3, through two 10-inch-diameter HDPE pipes; though this pipe was not connected during the assessment (Photograph 119, 120, and 121). The pond receives water from the #1 Bottom Ash Pond through a 14-inch-diameter HDPE pipe. The pump station located on the northwest corner of the pond can pump water to and from the #2/#3 Bottom Ash Pond. Water may be pumped into the pond from the Scrubber Waste Pond and discharged through a 10-inch-diameter HDPE pipe. A 36-inch-diameter iron pipe intakes water from the #2/#3 Bottom Ash Pond to the pump house where it can be pumped to the Scrubber Waste Pond, the Process Waste Pond, or to the Plant for use as process water.

The Scrubber Waste Pond receives water from: the gypsum plant (through one 6-inch-diameter and one 8-inch-diameter polyvinyl chloride (PVC) pipe); the limestone mill (through three 6-inch-diameter HDPE pipes); and cooling tower blowdown (through one 10-inch-diameter steel pipe). The pump station, located at the southwest corner, is configured such that it intakes water from the pond through one 16-inch-diameter iron pipe, and two 10-inch-diameter HDPE pipes, and can pump water to the #2/#3 Bottom Ash Pond, Process Waste Pond, and the Plant for use as process water.

The Process Waste Pond receives inflows from the #2/#3 Bottom Ash Pond and the Scrubber Waste Pond via the pump station through a 10-inch-diameter HDPE pipe and an outfall that was submerged during the assessment, and from the FGD processes directly through a 10-inch-diameter HDPE pipe. The outlet for the Process Waste Pond consists of a V-shaped weir structure allowing flow into a 12-inch-diameter corrugated metal pipe that discharges to the Tombigbee River in accordance with the NPDES permit. Alternatively, water from the Process Waste Pond may be used as plant make-up water.

1.4.3 Other Impoundments

Other impoundments identified at the Charles R. Lowman Power Plant include a construction runoff pond, and a coal pile runoff treatment pond. These ponds store runoff from the site and are not used for storage or processing of CCW.

1.5 Previously Identified Dam Safety Issues

Based on our review of the information provided to CDM by plant personnel and the USEPA, there have been no identified dam safety issues at the Plant in the last 10 years.

1.6 Site Geology

The Plant is located along the western bank of the Tombigbee River. The natural ground surface elevation in the area of the impoundments ranges from approximately El. 15 to 30. According to the Geologic Map of Alabama, southwest Alabama is located in the Coastal Plain Province that consists of soils deposited in an ancient marine environment and low-grade sedimentary rock (often limestone and sandstone). The Plant site is located in an area of relatively recent alluvial, coastal, and low terrace deposits, water-deposited during the meandering and flooding of the Tombigbee River. These deposits consist of fine to coarse quartz sand containing clay lenses and varying amounts of gravel.

Based on borings conducted in 2009 by CDG, existing soils present within and below the embankments consist of sandy clay and silty sand with varying amounts of rock fragments and gravel. The boring location plan is shown on **Figure 8** and the boring logs and subsurface soil profiles are included in **Appendix A**.

Section 2
Field Assessment

2.1 Visual Observations

CDM performed a visual assessment of the CCW impoundments at the Charles R. Lowman Power Plant. The perimeter and divider embankments of the impoundments total approximately 12,850 feet in length and are up to 29 feet high. The assessments were completed following the general procedures and considerations contained in Federal Emergency Management Agency's (FEMA's) Federal Guidelines for Dam Safety (April 2004) to make observations concerning settlement, movement, erosion, seepage, leakage, cracking, and deterioration. A Coal Combustion Dam Inspection Checklist and CCW Impoundment Inspection Form, developed by USEPA, were completed for each impoundment. Copies of these forms are included in **Appendix B**. Photograph location are shown in **Figures 9a** through **9d**, and photographs are included in **Appendix C**. Photograph locations were logged using a handheld GPS device. The photograph coordinates are listed in **Appendix D.**

CDM visited the site on July 1 and 2, 2010 to make visual assessments of the impoundments. The weather was generally sunny with daytime high temperatures up to 90 degrees Fahrenheit. The daily total precipitation prior to the site visit is shown in **Table 2**. The data was recorded in Leroy, AL, approximately four miles northwest of the Plant.

Table 2 – Approximate Precipitation Prior to Site Visit

Dates of Site Visits – July 1, 2010 & July 2, 2010		
Day	**Date**	**Precipitation (inches)**
Thursday	June 24	0.00
Friday	June 25	0.00
Saturday	June 26	0.00
Sunday	June 27	0.00
Monday	June 28	0.10
Tuesday	June 29	0.67
Wednesday	June 30	0.13
Thursday	July 1	0.00
Friday	July 2	0.33
Total	**Week Prior to Site Visit**	**1.23**
Total	**Month Prior to Site Visit**	**2.48**

Note: Precipitation data from www.accuweather.com

2.2 #1 Bottom Ash Pond

An overview of the #1 Bottom Ash Pond photograph locations is shown on Figure 9a. The #1 Bottom Ash Pond contained standing water and ash at the time of this assessment and approximately 6 feet of freeboard. Based on information provided by PSEC, the #1 Bottom Ash Pond was commissioned in 1965.

2.2.1 Exterior Slope

The exterior slopes appear to be in good condition. The exterior slope of the embankments was approximately 2H:1V on the upper 8 to 10 feet, and 3H:1V towards the bottom of the slope. The exterior slope of the east embankment and portions of the south embankment were covered with grass and brush, approximately 10 to 18 inches tall, and saplings less than one inch in diameter (Photograph 14). The exterior slopes of the remaining south embankment and north embankment were covered with grass generally less than 6 inches tall (Photograph 17). The exterior slope of the west embankment was generally covered with grassy vegetation 1 to 3 inches tall. Standing water was observed along the toe of the west embankment exterior slope (Photograph 7). Due to the significant recent rainfall, the observed standing water could not be clearly identified as seepage or surface runoff.

An electric substation was located approximately 85 feet north of the exterior slope of the south embankment, and square-base transmission towers were located near the toe of the exterior slope of the north and south embankments. The north embankment exterior slope, in the vicinity of the towers, was approximately 1.5H:1V. Standing water was observed within the base area of two of the towers located at the north embankment, and grassy vegetation 24 to 36 inches in height was observed at the base of the south embankment towers (Photographs 46 and 21). Due to the significant recent rainfall, the observed standing water could not be clearly identified as seepage or surface runoff.

Minor surface erosion was observed along portions of the exterior slope of the north and east embankments (Photographs 22 and 43).

2.2.2 Crest

The crest of the #1 Bottom Ash Pond appeared to be in good condition (Photographs 40, 8, 13, and 30). The crest was approximately 20 feet wide with the exception of the west embankment that was approximately 35 feet wide. The north, west, and east crests are exposed to vehicle traffic. The surface of the crests, exposed to traffic, consists of compacted granular soils on the north and east embankments, and asphalt paving on the west embankment.

A section of the crest and interior slope of the south embankment has been excavated and remains open, apparently to facilitate the repair of the discharge pipe (Photograph 19). This created a localized area of erosion that has cut into the crest's width by approximately 3 feet.

2.2.3 Interior Slope

The interior slopes appear to be in poor condition. The upper 8 to 10 feet of the embankment interior slopes are approximately 2H:1V and 3H:1V towards the bottom of the slope (Photograph 6). Light vegetation less than 6 inches tall covers the interior embankments to the high water line, where the surface is void of protective cover and embankment fill materials are subject to erosion (Photographs 3, 4, 15, and 25). No armoring of the interior slope is present, and approximately half of the pond's interior surface consists of exposed ash product.

A section of the interior slope of the south embankment has been excavated and remains open, apparently to facilitate the repair of the discharge pipe (Photograph 19). Erosion features, including minor sloughing and erosion rills, were observed on portions of the interior slopes (Photographs 22, 24, 25, 28, 31, 47, and 48).

2.2.4 Outlet Structures

The outlet pipes in the #1 Bottom Ash Pond appear to be in good condition. Two 10-inch-diameter pipes, located at the southwestern end of the pond, intake water that is pumped to the #2/#3 Bottom Ash Pond through one 14-inch-diameter HDPE pipe (Photographs 23 and 24). No unusual movement was observed around the pumps or piping.

2.3 #2/#3 Bottom Ash Pond

An overview of the #2/#3 Bottom Ash Pond photograph locations is shown on Figure 9b. The #2/#3 Bottom Ash Pond contained standing water and ash at the time of this assessment and approximately 3 feet of freeboard. Cattails and other vegetation were growing within approximately half of the pond. The pond's north embankment serves as a divider embankment with the Scrubber Waste Pond. Based on information provided by PSEC, #2/#3 Bottom Ash Pond was commissioned in 1979.

2.3.1 Exterior Slope

The embankment exterior slopes appear to be in fair condition. The exterior slopes are approximately 2H:1V. Grass, ranging from 3 to 6 inches tall covers the south and east embankment exterior slopes (Photographs 144 and 116). The majority of the west embankment exterior slope is covered in dense, vegetation including trees and saplings (Photographs 139 and 141). The exterior slope of the north (divider) embankment is sparsely covered with riprap (Photograph 78).

Surface erosion features were observed on the exterior slopes of the north embankment that is a divider embankment with the adjacent pond (Photographs 76 and 81). Spongy soils, sloughing, and voids were observed along the length of the south embankment in the location of a buried pipeline (Photograph 77). PSEC reported that the pipeline was installed in 2009 by excavating into the embankment slope. The excavation was backfilled, and riprap was replaced at the completion of the work. Also observed was missing riprap, voids within the riprap, and vegetation growing within the riprap on the exterior slope of the north embankment (Photographs 80 and 81).

An area of possible seepage was observed near the toe of the west embankment exterior slope, near the northwest corner of the impoundment (Photograph 141). The area consisted of damp, spongy ground that extended approximately 55 feet out from the toe. CDG reported that active water seepage was observed in this area during a site visit conducted on March 25 and 26, 2009.

2.3.2 Crest

The crest appears to be in good condition (Photographs 110 and 130). The average crest width is approximately 20 feet, except at the east embankment, where the crest is approximately 30 feet wide. A Norfolk Southern railroad spur is located on the west, south, and east embankment crests that are covered with crushed stone railroad ballast (Photographs 110 and 118). The north embankment crest is covered with asphalt paving and subject to vehicle traffic (Photograph 133). No depressions, ruts, or evidence of settlement were observed on the crests (Photographs 110, 118, and 130).

2.3.3 Interior Slope

The interior slopes appear to be in satisfactory condition. The embankment interior slopes are approximately 2H:1V. Riprap armor was observed on each of the interior slopes, with the exception of the north embankment. The north embankment interior slope is heavily vegetated with grass and brush starting at a point approximately 350 feet east of the edge of the pond and continuing to the west embankment. The vegetation, ranging in height from 24 to 48 inches, was growing within riprap armoring (Photographs 129 and 132). Clearing and cutting of vegetation in this area appears to be adversely impacted by three above-grade sluice lines running along the edge of the embankment. The 350-foot-long section of the south exterior embankment (between the east embankment and the beginning of the sluice lines) is obscured from view by an accumulation of sediment and vegetation. Some partially exposed (riprap) stones were observed on the surface of the embankment (Photograph 129).

Locations of erosion due to missing riprap, vegetation growing within riprap, and possible localized settlement were observed a various locations on the interior slopes (Photographs 108, 114, 129 and 132).

2.3.4 Outlet Structures

The outlet pipe in the #2/#3 Bottom Ash Pond was kept free of debris by a wood-framed structure and was submerged at the time of the assessment (Photograph 103). Based on drawings provided by PSEC, a 36-inch-diameter cast or ductile iron pipe, with invert elevation El. 35.5, is the intake for the pump house located on the crest at the northwest corner of the pond. From the limited view, the outlet appeared to be free of debris. No unusual movement was observed around the pipe penetrations.

2.4 Scrubber Waste Pond

An overview of the Scrubber Waste Pond photograph locations is shown on Figure 9c**.** The Scrubber Waste Pond had areas of standing water and ash, with approximately 2 feet of freeboard. The pond's north and south embankments serve as divider embankments between the Process Waste Pond and #2/#3 Bottom Ash Pond, respectively. The pond receives water from the #2/#3 Bottom Ash Pond, gypsum plant, limestone mill, and cooling tower blowdown. Based on information provided by PSEC, the Scrubber Waste Pond was commissioned in 1979.

PSEC reported the 2009 installation of an underground pipeline running the length of the south embankment. The south embankment interior slope was excavated for installation of the pipe. The excavation was backfilled and riprap was replaced at the completion of the work. PSEC also reported that up to 3 feet of fill material had been placed along the interior slope of the north (divider) embankment sometime in the past to create a temporary construction haul road. Most of these materials remain.

2.4.1 Exterior Slope

The west embankment exterior slope appears to be in poor condition. The north and south embankment exterior slopes appear to be in fair condition. The north and south embankment exterior slopes are approximately 2H:1V. The east embankment is incised, with the crest extending into the generating facility, so there is effectively no east embankment exterior slope (Photograph 89). Heavy vegetation with trees up to 8 inches in diameter covers the exterior slope of the west embankment (Photographs 158, 159, 161, and 162). The exterior slopes of the north and south (divider) embankments are armored with riprap (Photograph 61 and 133).

The south embankment (divider) exterior slope is heavily vegetated with grass and brush starting at a point approximately 350 feet east of the edge of the pond and continuing to the west embankment. The vegetation, ranging in height from 24 to 48 inches, was growing within riprap armoring (Photographs 129 and 132). Clearing and cutting of vegetation in this area appears to be adversely impacted by three above-grade sluice lines running along the edge of the embankment. The 350-foot-long section of the south exterior embankment (between the east embankment and the beginning of the sluice lines) is obscured from view by an accumulation of sediment and vegetation. Some partially exposed (riprap) stones were observed on the surface of the embankment (Photograph 129).

Minor surface erosion, sloughing, and scarps, as well as several animal burrow holes, were observed on the exterior slope of the west embankment within the dense vegetation (Photographs 153, 149, and 150).

An area of possible seepage was observed near the toe of the west embankment, near the southwest corner (Photograph 141). The area consisted of damp, spongy ground that extended about 55 feet out from the toe. CDG reported that active water seepage was observed in this area during a site visit conducted on March 25 and 26, 2009.

2.4.2 Crest

The crest appears to be in good condition (Photographs 60 and 127). The average crest width is approximately 20 feet, except at the east embankment that is incised, extending to the generating facility. A PSEC-owned railroad spur runs along the north and west embankment crests that are covered with a layer of crushed stone railway ballast (Photograph 71 and 94). The south and east embankment crests are paved and subject to vehicle traffic (Photographs 85 and 133). No depressions, ruts, or evidence of settlement were observed on the crests.

2.4.3 Interior Slope

The embankment interior slopes appear to be in poor condition. The interior slopes generally appear be approximately 3H:1V, except at areas on the south embankment that are approximately 2H:1V. The west and south interior slopes are armored with riprap (Photographs 73 and 78). The east embankment interior slope is sparsely vegetated with grass and vegetation generally less than 8 inches tall and some small saplings up to one inch in diameter. The east embankment did not have armoring (Photograph 89). Bare fill material placed to create a haul road is covering the north embankment interior slope (Photograph 100).

Erosion rills observed along the north embankment interior slope appeared to only extend into the haul road fill materials (Photograph 101).

Surface erosion features were observed on the interior slopes of the south and east embankments (Photograph 82 and 84). Spongy soils, sloughing, and voids were observed along the length of the south embankment in the location of a buried pipeline (Photograph 77).

Also observed on the south and east embankments were areas where riprap coverage was less than 50 percent, voids within the riprap, and vegetation growing within the riprap (Photographs 80, 81, 84, and 89).

2.4.4 Outlet Structures

The three outlet pipes, located at the southwest corner of the pond, were submerged during the assessment. These pipes are intakes to the pump house that is located on the crest of the south embankment. Based on drawings provided by PSEC, one of the outlet pipes is a 16-inch-diameter cast or ductile iron pipe, with invert elevation El. 35.5 (Photograph 75). Two additional outlet pipes were observed during the assessment and consisted of 8-inch-diameter HDPE pipes with floats attached (Photograph 74). From the limited view, the outlets appeared to be free of debris. No unusual movement was observed around the pumps or pipe penetrations.

2.5 Process Waste Pond

An overview of the Process Waste Pond photograph locations is shown on Figure 9d**.** The Process Waste Pond contained standing water during the assessment, with approximately 2 feet of freeboard. The pond's south embankment serves as a divider embankment between the Scrubber Waste Pond. The pond is charged with water from the #2/#3 Bottom Ash Pond, Scrubber Waste Pond, and plant processes. Based on information provided by PSEC, the Scrubber Waste Pond was commissioned in 1979. The pond perimeter is three-sided, therefore has only north, west, and south embankments.

PSEC reported that up to 3 feet of fill material had been placed along the exterior slope of the south (divider) embankment sometime in the past to create a temporary construction access road. Most of these materials remain.

2.5.1 Exterior Slope

The west embankment exterior slope appears to be in poor condition. The south embankment exterior slope appears to be in fair condition. The north embankment is incised into the finished yard grade, so there is effectively no north embankment exterior slope (Photograph 64). The west embankment exterior slope is approximately 2H:1V. Heavy vegetation with trees up to 18 inches in diameter covers the exterior slope of the west embankment (Photograph 162). The exterior slope of the south (divider) embankment, covered by fill, is the interior slope of the Scrubber Waste Pond (Photograph 57).

Erosion rills were observed along the exterior slope of the south embankment, but the rills appeared to only extend into the fill material (Photograph 101).

The presence of heavy vegetation precluded observation of any erosion features, animal burrows, or seepage on the exterior slope of the west embankment.

2.5.2 Crest

The crest appeared to be in good condition (Photographs 53, 60, and 64). All three of the embankment crests include a PSEC-owned railroad spur on crushed stone railroad ballast. The north embankment extends nearly horizontal to the plant. The west embankment crest is approximately 100 feet wide. The south embankment crest is approximately 15 feet wide. No depressions, ruts, or evidence of settlement were observed on the crests.

2.5.3 Interior Slope

The interior slopes appear to be good condition. The interior slopes generally appear to 2H:1V. The interior slopes are armored with riprap that extends below and above the water level.

Minor surface erosion was observed on the interior slope of the west embankment (Photograph 55).

Vegetation, consisting primarily of brush less than 24 inches tall, was observed on the interior slopes of the north and south embankments (Photographs 61 and 67).

2.5.4 Outlet Structures

The outlet pipe in the Process Waste Pond was submerged at the time of the assessment. Based on drawings provided by PSEC, a 12-inch-diameter corrugated metal pipe, with invert elevation El. 31.5, is the intake for a pump located on northwest corner of the pond. From the limited view, the outlet appeared to be free of debris. No unusual movement was observed around the pipe penetrations.

2.6 Monitoring Instrumentation

Based on the documents reviewed by CDM, four piezometers were installed by CDG in 2009 in the vicinity of the CCW impoundments. A summary of the piezometer installation and water level readings was included in the CDG report titled *Report of Subsurface Exploration and Berm Stability Evaluation* (Stability Report) dated November 2009. The piezometers were located on the crest of the #1 Bottom Ash Pond and Scrubber Waste Pond at soil boring locations. The approximate locations of the test borings, which included wells, B-2, B-5, B-11, and B-13, are shown on Figure 8. The stand-pipe for piezometer B-2 was the only one observed during the site visit. Based on conversations with CDG personnel and review of the Stability Report, water levels were measured in the piezometers twice in 2009. PSEC indicated the piezometers at B-11 and B-13 were inoperative at the time of the field visit. A summary of the recorded water levels measured in July and August 2009 is presented in **Table 3**.

Table 3 – Groundwater Elevation Readings

Piezometer	Date	Groundwater Elevation
B-2	July 14, 2009	30.5
	August 4, 2009	33.0
B-5	July 15, 2009	13.0
	August 4, 2009	24.0
B-11	July 13, 2009	not reported
	August 4, 2009	26.0
B-13	July 16, 2009	29.0
	August 4, 2009	20.0

A staff gauge is located within each pond to measure the impoundment water level (Photographs 49 and 75). Based on information provided by PSEC personnel, the pond water levels are monitored and recorded daily.

Section 3
Data Evaluation

3.1 Design Assumptions

PSEC provided some construction drawings related to the original construction of the #1 Bottom Ash Pond, #2/#3 Bottom Ash Pond, Scrubber Waste Pond, and Process Waste Pond. PSEC also provided a copy of the *Report of Document Review and Site Reconnaissance* (Review Report) and the *Report of Subsurface Exploration and Berm Stability Evaluation* (Stability Report), both prepared by CDG in 2009. CDM was not provided with the original design assumptions for the Plant's CCW impoundments.

The Review Report included a review of available design and construction quality assurance documentation for the impoundments, a comparison of the current embankment slopes to the original design slopes, and documentation of potential areas of concern. The Stability Report included results of subsurface investigations performed under the direction of CDG, a summary of the Kingston Fossil Plant failure conditions, slope stability analysis, embankment stabilization recommendations, and maintenance considerations.

3.2 Hydrologic and Hydraulic Design

PSEC provided a hydrologic/hydraulic analysis, prepared by CDG and dated March 2, 2011. The analysis was performed to establish flood elevations for the #1 Bottom Ash Pond, #2/#3 Bottom Ash Pond, Scrubber Waste Pond, and Process Waste Pond resulting from the Probable Maximum Precipitation (PMP) event. The analysis was performed using methodology prescribed in FEMA Dam Safety Guidance.

Hydrologic parameters for storm simulation were developed using the PMP estimates from data available in *NOAA Hydrometeorological Report No, 51* (HMR 51) *Probable Maximum Precipitation Estimates – United States East of the 105th Meridian.* CDG used PMP estimates of the Probable Maximum Storm (PMS) using methodology described in *NOAA Hydrometeorological Report No, 52* (HMR 52) *Application of Probable Maximum Precipitation Estimates – United States East of the 105th Meridian* and its corresponding HMR-52 software program. The PMS simulations for hydraulic modeling were determined to be:

- 49.40 inches over a 72-hour period (100% PMP)
- 13.81 inches over a 24-hour period

CDG then utilized the US Army Corps of Engineers (USACE) HEC-HMS program to develop hydraulic modeling scenarios for Plant operations occurring during PMS events. CDG modeled four (4) water balance scenarios provided by PSEC. CDG assumed that discharge pumps, currently in place and in operation, would be available during the events. CDG used pump ratings and outflow capacities provided by PSEC, after their review of manufacturer's pump model information. Results of CDG's analysis indicates there is capacity, with existing pumps operating, to manage 50% of the PMP event in the Unit 2/3 Ash Pond and Scrubber Waste Pond at the current operating pools without being overtopped. CDG's analysis indicates there is capacity, with existing pumps operating, to manage 100% of the PMP event in the #1 Bottom Ash Pond and the Process Waste Pond without being overtopped. CDG's analysis further indicates that the Unit 2/3 Ash Pond is overtopped by approximately 0.1-foot during the 100% PMP event and the Scrubber Waste Pond's crest is over topped by approximately 0.67 foot during the 100% PMP event.

The State of Alabama does not currently have requirements related to the hydrologic or hydraulic design of coal ash impoundments. FEMA standards require impoundments to have the capacity to store the Probable Maximum Precipitation (PMP) for a 6-hour storm event over a 10-square-mile area in the vicinity of the site. Significant and high hazard structures are required to store 50% PMP and 100% PMP, respectively. Recommended Hazard Ratings of "Significant" have been assigned to the Plants impoundments.

3.3 Structural Adequacy and Stability

Currently the State of Alabama does not have regulations regarding coal ash impoundments. Pending legislation, House Bill 454, would provide for the inventory and classification of dams by the Water Resources Division of the Alabama Department of Economic and Community Affairs for the purpose of assuring the safety of state dams and to define certain terms associated with dams and dam safety.

Procedures established by the United States Army Corps of Engineers (USACE), the United States Bureau of Reclamation, the Federal Energy Regulatory Commission, and the Natural Resources Conservation Service are generally accepted engineering practice. Minimum required factors of safety outlined by the USACE in EM 1110-2-1902, Table 3-1 and seismic factors of safety by FEMA Federal Guidelines for Dam Safety, Earthquake Analyses and Design of Dams (pgs. 31, 32 and 38, May 2005) are provided in **Table 4**.

Table 4 - Minimum Safety Factors

Load Case	Minimum Required Factor of Safety
Steady-State Condition at Normal Pool or Maximum Storage Pool Elevation	1.5
Rapid Drawdown Condition from Normal Pool Elevation	1.2
Maximum Surcharge Pool (Flood) Condition	1.4
Seismic Condition from at Normal Pool Elevation	1.0
Liquefaction	1.3

Note: Based on required factors of safety published by USACE. Currently not required in the State of Alabama.

3.3.1 Ash Pond Impoundments

CDM was provided the Stability Report prepared by CDG that included results of their subsurface investigations and slope stability analyses. CDG's subsurface investigation included soil borings and the installation of piezometers. The soil boring and piezometer locations are included in Figure 8. Four borings and two piezometers were located along the east crest of the #1 Bottom Ash Pond. One soil boring and one piezometer were located on the west crest of the #2/#3 Bottom Ash Pond. Four borings and one piezometer were located on the west crest of the Scrubber Waste Pond. One boring was located on the west crest of the Process Waste Pond. Based on the Stability Report, the embankments in the area where soil borings were performed generally consist of silty sand and sandy clay.

In 2009, CDG evaluated the slope stability of representative cross-sections for the #1 Bottom Ash Pond and Scrubber Waste Pond, using the slope stability analysis computer program ReSSA 2.0. The locations of the cross-sections are shown in Figure 8. The program computed the factor of safety for both circular and wedge slip surfaces. Static, steady-state slope stability analyses were performed on the downstream embankment slopes at one location for each pond. Analyses were performed for both total and effective stress conditions, though only results of the effective stress condition were reported.

The slope stability analysis considered at Cross Section D-D′ through the Scrubber Waste Pond included of the following:

- Coal ash loading, applied to full embankment height;
- Embankment fill consisting of railroad ballast, dense silty sand, and medium dense silty sand;
- Foundation soils consisting of loose silty sand;
- Hydrostatic loading, water level at 2.5 feet below crest.

The slope stability analysis considered at Cross Section F-F′ through the #1 Bottom Ash Pond included of the following:

- Coal ash loading, applied to full embankment height;
- Embankment fill consisting of crushed aggregate with silty sand, and medium dense silty sand;
- Foundation soils consisting of medium dense silty sand, medium clay, soft clay, and medium dense clayey sand;
- Hydrostatic loading, water level at 5 feet below crest.

CDG determined the coal ash and water levels based on information provided by PSEC. PSEC indicated that the coal ash would not be stored at a level above the top of crest at the cross section locations due to operational considerations. The water levels were determined based on information provided by PSEC and the water levels surveyed by CDG.

It is unknown if the cross sections analyzed by CDG were based on individual soil borings performed at the cross section location or a combination of results of several soil borings and laboratory tests. Strength parameters of the embankment material were based on correlations with Standard Penetration Test (SPT) data and soil index properties. CDG's report did not indicate how the strength parameters were determined for the foundations soils, but reported that one consolidated undrained triaxial shear test was performed on the foundation soils encountered below the #1 Bottom Ash Pond embankments. Soil parameters used for the analyses are presented in **Table 5**, below.

Table 5 – Soil Parameters

Stratum	**Unit Weight (psf)**	**Effective Stress Parameters**	
		Φ (°)	**C (psf)**
Coal Ash	90	20	25
Railroad Ballast	105	36	0
Crushed Aggregate with silty sand	120	33	0
Loose silty sand	115	28	50
Medium dense silty sand, embankment fill	120	32	50
Medium dense silty sand, foundation soils	120	28	100
Dense silty sand	125	34	50
Medium dense clayey sand	125	30	50
Soft clay	115	0	250
Medium clay	120	0	750

The results of the slope stability analysis for the #1 Bottom Ash Pond and Scrubber Waste Pond embankments indicate a factor of safety against slope stability was 1.59 and 1.40, respectively. The Scrubber Waste Pond does not meet the industry standard minimum factor of safety of 1.5 against failure for the steady-state condition at normal pool or maximum storage pool elevation, as discussed above. CDG reports that the water level in the Scrubber Waste Pond would be required to be no greater than 5 feet below the top of crest to result in a factor of safety of 1.5. During CDMs site visit, the water level was approximately 2 feet below the top of crest in the Scrubber Waste Pond.

According to the Stability Report, proposed Alabama code would require more-stringent requirements if facilities are located in a seismic impact zone. According to the Stability Report, a Seismic Impact Zone is defined as an area with 10% or greater probability that the maximum horizontal acceleration in lithified earth material exceeds 0.10g in 250 years. Based on a CDG's review of the seismic map, "Peak Acceleration (%g) with 2% Probability of Exceedance in 50 Years"; USGS Map; October 2002, CDG reported a maximum horizontal acceleration of 0.068g for the Plant site. Based on CDM's review of the USGS National Seismic Hazard Map - "Peak Acceleration (%g) with 2% Probability of Exceedance in 50 Years", the maximum horizontal acceleration is approximately 0.07g in the vicinity of the Plant.

Section 4 outlines recommendations for additional stability analyses to be performed to confirm that the embankments are stable under all potential loading conditions.

3.4 Foundation Conditions

Based on 10 test borings performed by CDG on the crest of the CCW impoundments, the embankments were constructed over a surface deposit of sandy clay and silty sand with varying amounts of rock fragments and gravel. The soils were classified according to Unified Soil Classification System as CL and SM and extended to the bottom of the exploration at 40 feet below the top of the crest. Test soils boring locations are shown on Figure 8. Soil boring logs and subsurface soil profiles are included in Appendix A.

The design drawings for the #1 Bottom Ash Pond, prepared by Stanley Engineering Company in 1970, do not provide any information regarding subgrade preparation, embankment material specifications, or compaction requirements. Based on the documents, it appears that a pond liner was not included in the design of the embankments.

The design drawings for the #2/#3 Bottom Ash Pond, Scrubber Waste Pond, and Process Waste Pond, prepared by Burns & McDonnell in 1976, indicated that the ponds were to be excavated to El. 13.0, and brought up to El. 15.0 with "Compacted

Type A Embankment" material. The two feet of over excavation did not extend beneath the embankments. No information regarding subgrade preparation, embankment material specifications, or compaction requirements was provided.

3.5 Operations & Maintenance

PSEC personnel indicated that there is no written formal operation or maintenance program. The Plant has a general plant Emergency Action Plan (EAP), however it does not pertain to the operation of the impoundments. Routine maintenance performed includes mowing grass on embankment slopes, and other activities as needed to address other observed conditions such as erosion and revegetation.

PSEC personnel also indicated water levels are monitored and recorded daily by operators. In addition, PSEC personnel perform visual inspections of the impoundments during daily rounds, and more-extensive walk-down inspections monthly.

Section 4
Conclusions and Recommendations
4.1 Hazard Classification

The Charles R. Lowman Power Plant impoundments currently do not have a Hazard Potential Classification. Based on the USEPA classification system as presented on page 2 of the USEPA check list (Appendix B) and our review of the site and downstream areas, recommended hazard ratings have been assigned to the impoundments as summarized in **Table 6** below:

Table 6 – Recommended Impoundment Hazard Classification Ratings

Impoundment	Recommended Hazard Rating	Basis
#1 Bottom Ash Pond	Significant Hazard	• A breach could have an environmental impact on the Tombigbee River, approximately 365 feet east of the pond. • A breach could damage 115kV overhead transmission lines. • A breach could result in damage to rural areas located south of the pond, and downstream on the Tombigbee River.
#2/#3 Bottom Ash Pond	Significant Hazard	• A breach could damage/washout the PSEC-owned railroad spurs located on the west, south, and east embankment crests of the pond. • A breach could release waste into the Scrubber Pond which may result in a breach of the Scrubber Pond and cause environmental impacts to the Tombigbee River, located 1,300 feet north of the Scrubber Pond.
Scrubber Waste Pond	Significant Hazard	• A breach could release waste into either the Process Waste or #2/#3 Bottom Ash Pond. A breach of the #2/#3 Bottom Ash Pond as a result of a breach in the Scrubber Pond could damage/washout the PSEC-owned railroad spurs located on the west, south, and east embankment crests of the #2/#3 Bottom Ash Pond. • A breach could damage/washout the PSEC-owned railroad spur west of the pond. • A breach could have an environmental impact of the Tombigbee River, approximately 1,300 feet north of the pond.
Process Waste Pond	Significant Hazard	• A breach could have an environmental impact of the Tombigbee River, approximately 800 feet north of the pond. • A breach could damage/washout the PSEC-owned railroad spur north of the pond.

4.2 Acknowledgement of CCW Impoundment Unit Condition

CDM acknowledges that the management units (#1 Bottom Ash Pond, #2/#3 Bottom Ash Pond, Scrubber Waste Pond, and Process Waste Pond) referenced herein were assessed by William J. Friers, P.E. and Bevin A. Barringer, P.E. The #1 Bottom Ash, #2/#3 Bottom Ash, Scrubber Waste, and Process Waste Ponds appear to be in fair condition based on site observations. However, there is lack of documentation relative to the design and construction of these facilities. The CDG Stability Report reported a factor of safety of 1.40 for the Scrubber Pond and 1.59 for the #1 Bottom Ash Pond for steady-state conditions at normal pool elevation. Based on industry standards developed by USACE, a factor of safety of 1.5 is required for the steady-state condition at normal pool elevation. It is not known if critical studies or investigations (stability and seismic) have been performed on each of the coal ash impoundments for the various load cases required by industry standards to confirm that potential safety deficiencies do not exist. Therefore, the #1 Bottom Ash Pond is judged to be in **FAIR** condition, and the #2/#3 Bottom Ash Pond, Scrubber Waste Pond, and Process Waste Pond are judged to be in **POOR** condition. Additional documentation and future studies performed to confirm the condition and performance of these impoundments and maintenance activities may be sufficient to substantiate an improved condition assessment.

As described in the following sections, further studies, maintenance, and monitoring could improve the condition of these impoundments.

4.3 Maintaining and Controlling Vegetation Growth

Dense vegetation obscured observation of the west embankment exterior slopes of the Scrubber Waste and Process Waste Ponds. Tree roots can allow for the seepage of the retained water through the embankments. This may lead to internal erosion of the embankment, resulting in a slope failure. In addition, uprooting of trees during storms or other adverse conditions can create large voids in the embankment that are then susceptible to erosion. Brush also obscures the surface, limiting visual observations, provides a haven for burrowing animals, and retards growth of desirable grass vegetation.

CDM recommends that all trees and brush be cleared from the interior and exterior slopes of all ash pond embankments in accordance with the procedures outlined in “FEMA 534 Technical Manual for Dam Owners – Impacts of Plants on Earthen Dams”. CDM further recommends that stumps and all roots greater than 1 inch in diameter be removed. The area should then be graded to adjacent contours, using compacted structural fill and reseeded with desirable grass vegetation.

Bare areas on the interior embankment of the #1 Bottom Ash Pond are void of protective cover (e.g. grass, asphalt, riprap etc.). They are more susceptible to erosion that can lead to localized stability problems such as small slides and sloughs. CDM recommends bare areas be repaired by establishing a proper grass cover or by installing other protective cover. If using grass, the topsoil must be prepared with fertilizer and then scarified before sowing seed. A type of grass vegetation that has been used successfully in Alabama for full sun exposure, according to the United States Department of Agriculture (USDA) is Bermuda grass.

Areas of surface erosion or sparse vegetation were observed on multiple embankment slopes of the ash ponds as discussed in Section 2. CDM recommends that PSEC perform reseeding maintenance in these areas. CDM recommends that vegetation be cut on a regular basis to ensure that adequate visual observations can be made during scheduled inspections.

CDM observed vegetation growing through riprap along a 350-foot-long section of the north embankment interior slope of the #2/#3 Bottom Ash Pond. CDM recommends removal through chemical spraying, if precautions are taken to protect the local environment. Note that some chemical spraying may require proper training prior to application. If chemical spraying is not an option, weed trimmers or power brush-cutters may be used to control vegetation, not accessible with standard mowing equipment.

4.4 Erosion Protection and Repair

Erosion rills, voids in riprap and subsequent loss of riprap, and excavations into embankments were observed on embankment slopes of the ash ponds as discussed in Section 2. CDM recommends corrective actions be taken for the specific conditions identified below:

- Erosion rills – Erosion rills were observed on the interior slopes of the #1 Bottom Ash Pond. Place and compact structural fill in the rills and grade to adjacent existing contours.
- Voids and missing riprap – Locations of voids within riprap armor and missing riprap were observed at the interior slopes of the #2/#3 Bottom Ash Pond and Scrubber Pond. In these areas, remove the existing riprap and restore the embankment face to a slope no steeper than 2.5H:1V or the original contour (whichever is flatter) with compacted structural fill. Place rock riprap consisting of a heterogeneous mixture of irregular shaped rocks placed over the compacted fill and a geotextile fabric, both extending at least 3 feet below the anticipated low water level. The maximum rock size and weight must be large enough to dissipate the energy of the maximum anticipated wave action while holding the smaller stones in place.
- Excavated embankment – A section of the interior slope of the #1 Bottom Ash Pond south embankment had been excavated to facilitate a sluice line repair. CDM recommends PSEC repair this condition. The suggested repair effort should include:

  - Remove loose and eroded materials to neat lines.
  - Restore the embankment slope to the original contour; placing select structural fill in 12-inch lifts and compacting to recommended density.
  - Stabilize exposed surface of the embankment with sod, hydro seeding, or riprap consisting of a heterogeneous mixture of irregular-shaped rocks placed over the compacted fill and a geotextile fabric, both extending at least 3 feet below the anticipated low water level. The maximum rock size and weight must be large enough to dissipate the energy of the maximum anticipated wave action and hold the smaller stones in place.

All repairs should be designed by a registered professional engineer experienced with earthen dam design.

4.5 Animal Control

Evidence of rodent burrows was observed on the west embankments of the Scrubber Waste Pond. Although not seen on other embankments, vegetation cover may have hidden additional rodent burrows, particularly on the exterior slopes of the Process Waste Pond west embankment. CDM recommends that PSEC accurately document areas disturbed by animal activity, remove the animals, and backfill the burrows with compacted structural fill to protect the integrity of the embankments.

4.6 Instrumentation

Based on the documents reviewed by CDM, four piezometers were installed by CDG in 2009 in the vicinity of the CCW impoundments. The piezometers were located on the crest of the #1 Bottom Ash Pond and Scrubber Waste Pond at soil boring locations. The approximate locations of the test borings, which included wells, B-2, B-5, B-11, and B-13, are shown on Figure 8. The stand-pipe for piezometer B-2 was the only one observed during the site visit. Based on conversations with CDG personnel and review of the Stability Report, water levels were measured in the piezometers twice in 2009. PSEC indicated the piezometers at B-11 and B-13 were inoperative at the time of the field visit. It should be noted that an earth embankment that is safe under current conditions may not be safe in the future if conditions change. Conditions that may change include changes in the phreatic surface, embankment deformation, or changes in seepage patterns. CDM recommends installation of additional piezometers at selective locations and parameters related to these conditions be routinely monitored so that preemptive measures can be taken in response to these observations.

4.7 Impoundment Hydraulic and Stability Analysis

PSEC provided a hydrologic/hydraulic analysis, prepared by CDG and dated March 2, 2011. The analysis was performed to establish flood elevations for the #1 Bottom Ash Pond, #2/#3 Bottom Ash Pond, Scrubber Waste Pond, and Process Waste Pond resulting from the Probable Maximum Precipitation (PMP) event. The analysis was performed using methodology prescribed in FEMA Dam Safety Guidance.

CDG's analysis indicates there is capacity, with existing pumps operating, to manage 100% of the PMP event in the #1 Bottom Ash Pond and the Process Waste Pond without being overtopped. CDG's analysis further indicates that the Unit 2/3 Ash Pond is overtopped by approximately 0.1-foot during the 100% PMP event and the Scrubber Waste Pond's crest is over topped by approximately 0.67 foot during the 100% PMP event.

CDG performed limited stability analyses for the #1 Bottom Ash Pond and Scrubber Waste Pond that indicated that the embankments were marginally stable and remedial work was required. CDG reported a factor of safety of 1.40 for the Scrubber Pond and 1.59 for the #1 Bottom Ash Pond for steady-state conditions at normal pool elevation. Based on industry standards developed by USACE, a factor of safety of 1.5 is required for the steady-state condition at normal pool elevation. The CDG stability analyses did not consider other potential critical cross-sections or loading conditions for maximum surcharge pool (flood), seismic, or rapid drawdown conditions.

CDM was not provided with information regarding stability analyses performed prior to or following construction of the #2/#3 Bottom Ash Pond and Process Waste Pond.

Based on CDMs review of available information for the impoundments, CDM recommends that the following analyses be performed to confirm that the embankments are stable under the various loading conditions outlined in Section 3.

- Additional cross sections should be evaluated, as the geometry of the embankments is not consistent and the cross sections that have been evaluated may not be representative of critical areas. The stability analyses for each pond should include a subsurface investigation to evaluate existing soil parameters in the embankments and foundation soils, and the installation of piezometers to measure the current phreatic surface.

- CDM recommends evaluating the stability of the embankments under maximum surcharge pool (flood) conditions.

- CDM recommends evaluating the stability of the interior slope under seismic and steady-state seepage loading conditions. CDM also recommends that a liquefaction potential analysis be performed.

- CDM recommends evaluating the stability of the interior slope under rapid drawdown loading conditions. While a rapid drawdown is not a scenario that has a high probability of occurrence, CDM recommends evaluating the condition and meeting recommended factor of safety for the unlikely event that an emergency condition develops in one of the embankments.

- CDM recommends the existing stability analyses be re-evaluated for the current normal pool level.

CDM recommends that all analyses be performed by a registered professional engineer experienced in earthen dam design.

CDG outlined methods to increase stability of the embankments that included maintaining a lowered water level, flattening the embankment slopes, constructing a toe berm, or using mechanical stabilization methods. CDG performed a slope stability analysis on the Scrubber Waste Pond embankment with an 8-foot high, 10-foot wide toe embankment at a slope of 2H:1V. CDG calculated a factor of safety of 1.70 with the addition of the toe berm.

4.8 Seepage Control

A location of possible seepage was observed at the western exterior toe of the #2/#3 Bottom Ash Pond and the Scrubber Waste Pond. The area of possible seepage was observed by CDM during the assessment and reported by CDG in the Review Report.

It should be noted the seepage may be a violation of the NPDES permit depending on the concentration of the constituents in the seepage water. CDM recommends PSEC evaluate alternative methods to manage and control the potential seepage on the #2/#3 Bottom Ash Pond and Scrubber Waste Pond west embankments. Regular monitoring is essential to detect and monitor seepage and to reduce the potential for failure. Without knowledge of the dam's history, the owner may not be able to determine whether the seepage condition is in a steady or changing state. To evaluate the nature of the seepage condition, CDM recommends PSEC take the following actions:

- Develop a regular surveillance program to monitor areas of seepage and potential seepage to measure the rate, volume, and turbidity of flow emerging from the embankment slopes; and

- Develop and execute a geotechnical exploration program that includes additional test borings and installation of piezometers and other instrumentation to analyze and regularly monitor embankment seepage and stability.

CDM further recommends PSEC evaluate alternative methods to control seepage. Such methods may include:

- Installation of an impervious membrane liner, such as a 60-mil HDPE liner; or
- Installation of a filter berm or french drain with a toe drain and discharge sump to collect seepage water.

4.9 Inspection Recommendations

Based on the information reviewed by CDM it does not appear that PSEC has adequate inspection practices. Currently daily informal inspections and monthly walk-down inspections are performed, however they are not documented.

CDM recommends that plant personnel be trained in dam inspection techniques. CDM also recommends that they develop detailed inspection documentation procedures to aid in ensuring that they are performing adequate inspections and adequately documenting observations over time. Documentation should include a sketch of relevant features observed, and the documentation should be periodically reviewed to identify if conditions are worsening and/or if significant changes are occurring that could lead to additional maintenance issues or safety concerns.

Inspections should be made following heavy rainfall and/or high water events on the Tombigbee River, and the occurrence of these events should be documented. It is recommended that inspection records be retained at the facility for a minimum of three years.

4.10 Emergency Action Plan

Currently the State of Alabama does not require Emergency Action Plans (EAPs) for CCW impoundments. PSEC does not have an EAP for the #1 Bottom Ash, #2/#3 Bottom Ash, Scrubber Waste, and Process Waste Ponds, judged by CDM to be Significant Hazard structures. CDM recommends that PSEC develop an EAP for these ponds.

Section 5
Closing

The information presented in this report is based on visual field observations and review of reports and data provided to CDM by PowerSouth for the C.R. Lowman Generating Station surface impoundments. The conclusions and recommendations presented are based, in part, on limited information available at the time of this report. This report has been prepared in accordance with generally accepted engineering practices. No other warranty, expressed or implied, is made. Should additional information or changes in field conditions occur, the conclusions and recommendations provided in this report should be re-evaluated by a qualified professional engineer.

Section 6

Reports and References

The following is a list of reports and drawings that were provided by PowerSouth Energy Cooperative and were utilized during the preparation of this report and the development of the conclusions and recommendations presented herein.

1. Report of Topographic and Hydraulic Analysis, prepared by CDG Engineers & associates, March 2, 2011
2. Response to U.S. EPA 104(e) Information Request, prepared by Power South Energy Cooperative, March 26, 2009
3. Report of Document Review and Site Reconnaissance, prepared by CDG, May 26, 2009
4. Report of Subsurface Exploration and Berm Stability Evaluations, prepared by CDG, November 23, 2009
5. National Pollutant Discharge Elimination System Permit, prepared by Alabama Department of Environmental Management, issuance date February 18, 2005
6. Ramsey, Scott (SRamsey@adem.state.al.us), June 18, 2010, E-mail, RE: PowerSouth Lowman Permit Application, to Larry Spann
7. Report of Mechanical Analyses and Atterberg Limits on Soil Samples, prepared by Vester J. Thompson, Jr., Inc., dated October 29, 1965
8. Plant Flow Diagram Figure, prepared by PowerSouth Energy Cooperative, not dated
9. Drawing No. 3200-2, "Site Arrangement", prepared by Stanley Engineering Company, November 13, 1965, revised in 1966, 1968, and 1970
10. Drawing No. 3200-3, "Property Outline and Base Line Location", prepared by Stanley Engineering Company, November 13, 1965, revised in 1966 and 1970
11. Drawing No. 3200-4, "Soil Boring Location Plan", prepared by Stanley Engineering Company, November 13, 1965, revised in 1966 and 1970
12. Drawing No. 3200-6, "Site Grading – Sheet 2", prepared by Stanley Engineering Company, November 13, 1965, revised in 1966, 1968, and 1970
13. Drawing No. Y-1, "Site Plan", prepared by Burns & McDonnell, June 20, 1979
14. Drawing No. Y-2, "Grading Plan Area 2", prepared by Burns & McDonnell, June 20, 1979

15. Drawing No. Y-4, "Grading Plan Area 3", prepared by Burns & McDonnell, June 20, 1979

16. Drawing No. Y-5, "Grading Plan Area 4", prepared by Burns & McDonnell, June 20, 1979

17. Drawing No. Y-6, "Grading Plan Area 5", prepared by Burns & McDonnell, June 20, 1979

18. Drawing No. Y-7, "Grading Section 1", prepared by Burns & McDonnell, June 20, 1979

19. Drawing No. Y-8, "Grading Section 2", prepared by Burns & McDonnell, June 20, 1979

20. Drawing No. Y-9, "Profiles 1", prepared by Burns & McDonnell, June 20, 1979.

21. Drawing No. Y-10, "Grading Details 1", prepared by Burns & McDonnell, June 20, 1979

22. Drawing No. Y-23, "Site Plan", prepared by Burns & McDonnell, June 20, 1979

23. Drawing No. Y-24, "Plant Roads Geometry", prepared by Burns & McDonnell, June 20, 1979

24. Drawing No. Y-25, "Railroad Layout Geometry", prepared by Burns & McDonnell, June 20, 1979

25. Drawing No. Y-27, "Grading Plan Area 2", prepared by Burns & McDonnell, June 20, 1979

26. Drawing No. Y-28, "Grading Plan Area 3", prepared by Burns & McDonnell, June 20, 1979

27. Drawing No. Y-29, "Grading Plan Area 4", prepared by Burns & McDonnell, June 20, 1979

28. Drawing No. Y-31, "Grading Plan Area 6", prepared by Burns & McDonnell, June 20, 1979

29. Drawing No. Y-32, "Grading Plan Area 7", prepared by Burns & McDonnell, June 20, 1979

30. Drawing No. Y-33, "Grading Plan Area 8", prepared by Burns & McDonnell, June 20, 1979

31. Drawing No. Y-42, “Railroad Profiles 1”, prepared by Burns & McDonnell, June 20, 1979

32. Drawing No. Y-43, “Railroad Profiles 2”, prepared by Burns & McDonnell, June 20, 1979

33. Drawing No. Y-44, “Grading Sections 1”, prepared by Burns & McDonnell, June 20, 1979

34. Drawing No. Y-45, “Grading Sections 2”, prepared by Burns & McDonnell, June 20, 1979

35. Drawing No. Y-46, “Road Crossing Details”, prepared by Burns & McDonnell, June 20, 1979

36. Drawing No. Y-47, “Grading Details 1”, prepared by Burns & McDonnell, June 20, 1979

37. Drawing No. Y-48, “Grading Details 2”, prepared by Burns & McDonnell, June 20, 1979

38. Drawing No. Y-49, “Storm Drainage Details”, prepared by Burns & McDonnell, June 20, 1979

39. Drawing No. U-21, “Yard Piping Details III”, prepared by Burns & McDonnell, April 15, 1980

40. Drawing No. S3000, “Grading and Drainage – Site Key Plan, General Notes and Legend,” prepared by Black & Veatch Corporation, May 26, 2009

41. Drawing No. S3001, “Grading and Drainage Plan – Area 1”, prepared by Black & Veatch Corporation, May 26, 2006

42. Drawing No. S3003, “Grading and Drainage Plan – Area 3”, prepared by Black & Veatch Corporation, May 26, 2006

43. Drawing No. S3005, “Grading and Drainage Plan – Area 5”, prepared by Black & Veatch Corporation, May 26, 2006

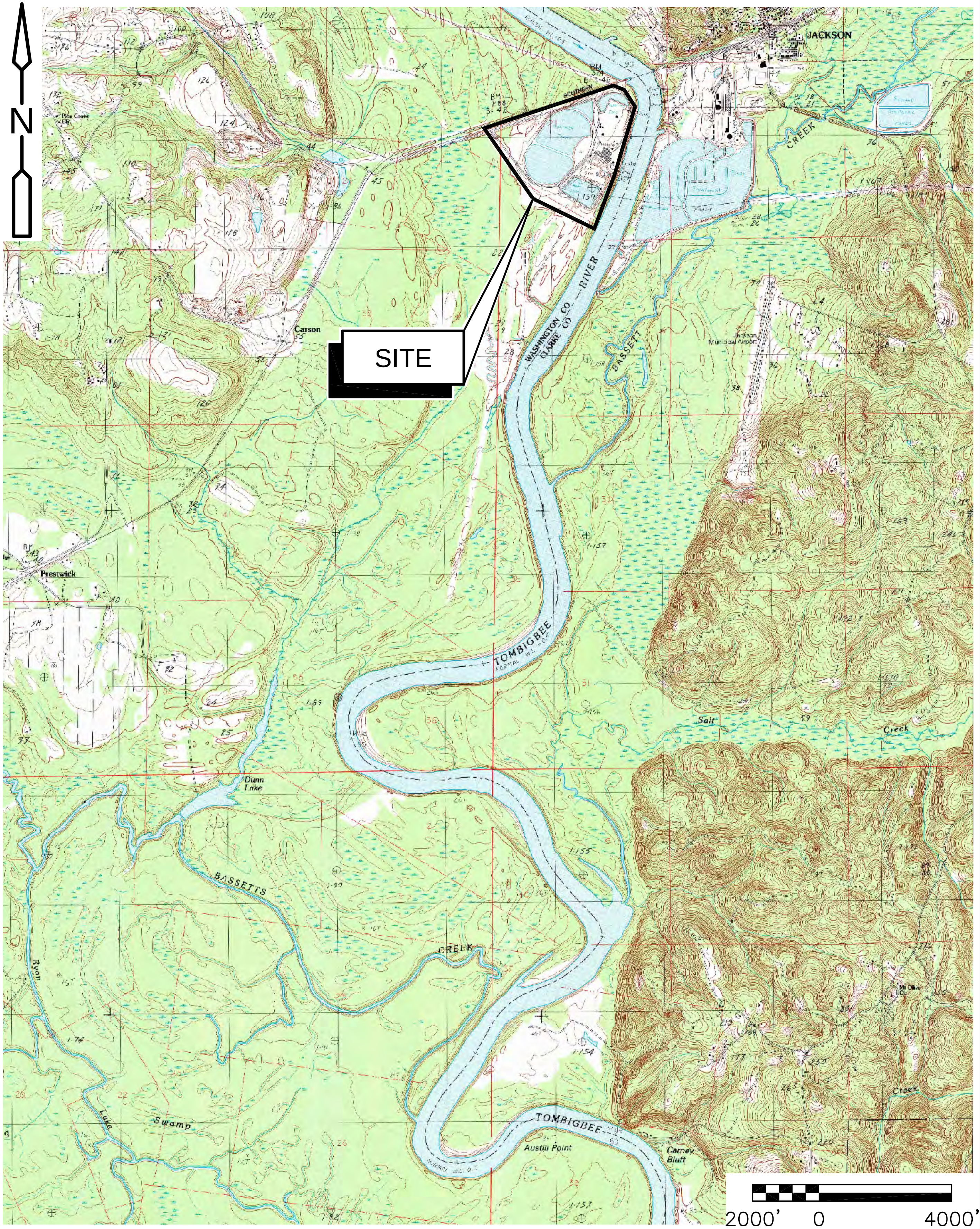
44. Drawing No. S3007, “Grading and Drainage Plan – Area 7”, prepared by Black & Veatch Corporation, May 26, 2006

45. Drawing No. S3306, “Underground Utilities – Site Plan Area 3”, prepared by Black & Veatch Corporation, May 26, 2006

46. Drawing No. S3303, “Underground Utilities – Site Plan Area 6”, prepared by Black & Veatch Corporation, May 26, 2006

Figures

PW:\\camxmsvr01.cdm.com:PW_XM1\Documents\5119\77646_Lowman\03 Reports and Studies\09 CADD Figures and Graphics\TLMFG001.dwg



USGS TOPOGRAPHIC MAPS
PRESTWICK QUADRANGLE MAP
CONTOURS AND ELEVATIONS IN FEET

CHARLES R. LOWMAN POWER PLANT
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LOCUS PLAN
JULY 2010

FIGURE 1

AERIAL PHOTOGRAPH SOURCE:
GOOGLE EARTH PRO.

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CRITICAL INFRASTRUCTURE MAP

JULY 2010

FIGURE 2

PW: \\camxmsvr01.cdm.com:PW_XM1\Documents\51119\77646_Lowman\03 Reports and Studies\09 CADD Figures and Graphics\TCIFG002.dwg

PW:\\camxmsvr01.cdm.com:PW_XMI\Documents\51119\77646_Lowman\03 Reports and Studies\09 CADD Figures and Graphics\TAMFG003.dwg

AERIAL PHOTOGRAPH SOURCE:
GOOGLE EARTH PRO.

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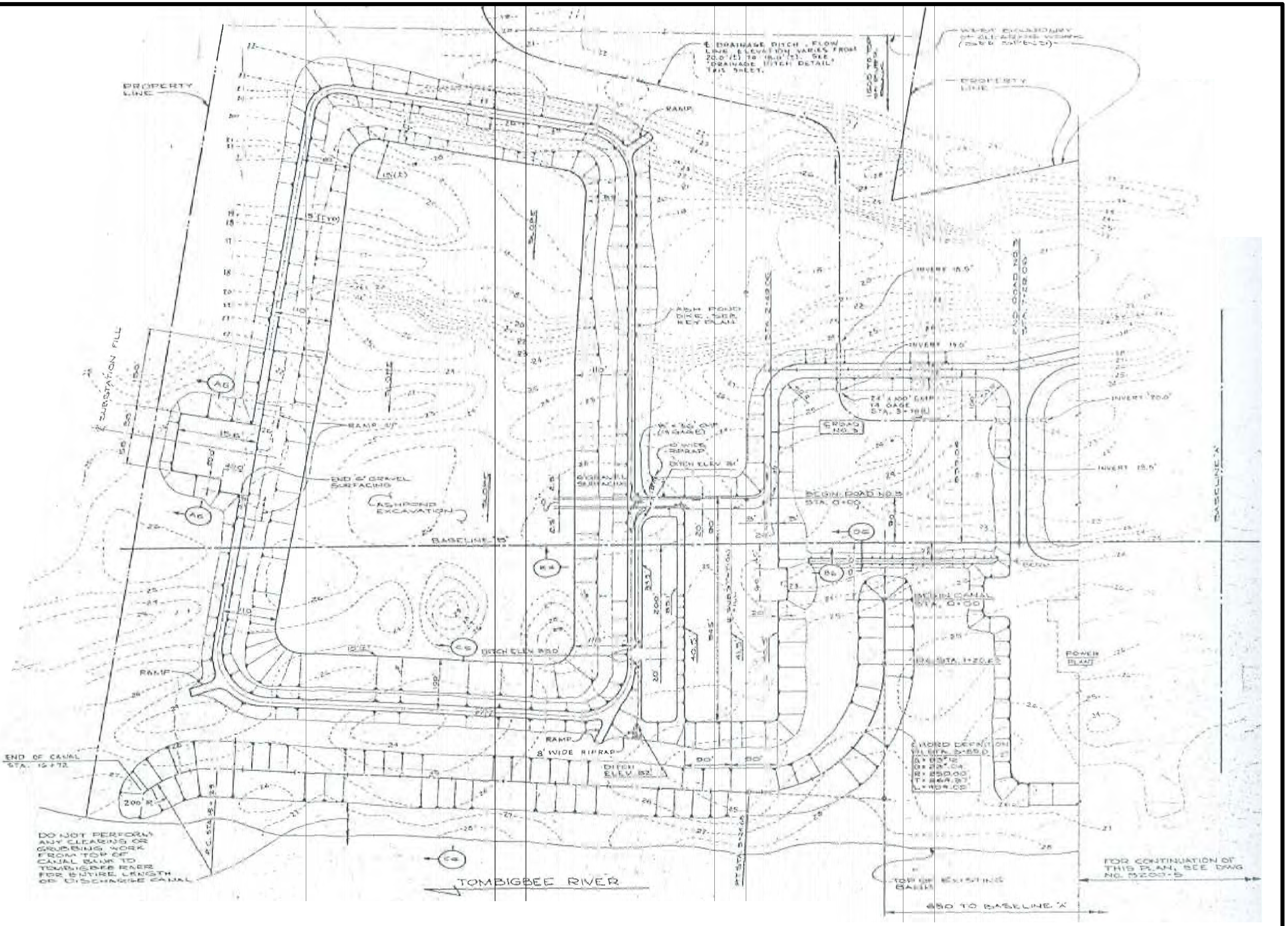
AERIAL MAP

JULY 2010

FIGURE 3



NOTES:

1. FIGURE FROM STANLEY ENGINEERING COMPANY CONSTRUCTION DRAWING "SITE GRADING – SHEET 2 PLAN DRAWING No. 3200-6", DATED JANUARY 20, 1970.
2. PLAN NOT TO SCALE.

PW:\\camxmsvr01.cdm.com:PW_XMI\Documents\5119\77646_Lowman\03 Reports and Studies\09 CADD Figures and Graphics\TGPFG004.dwg

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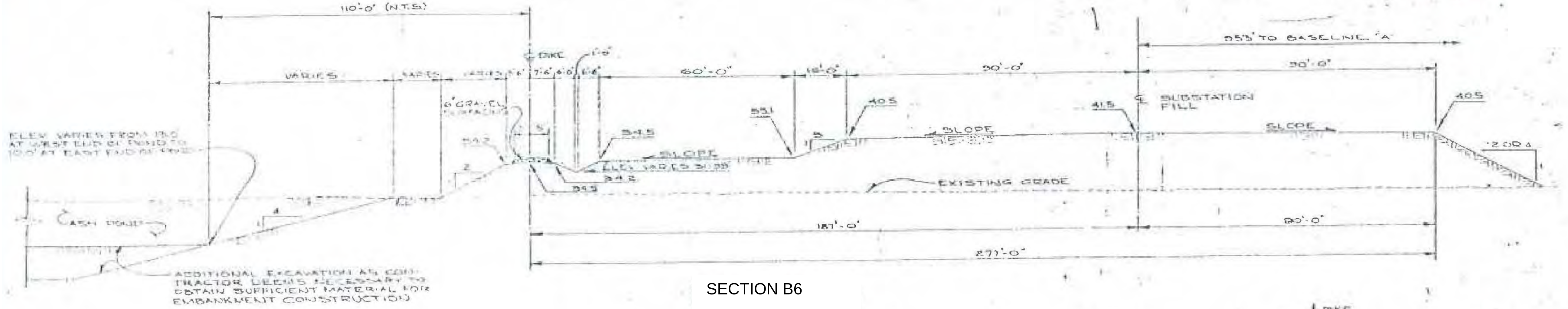
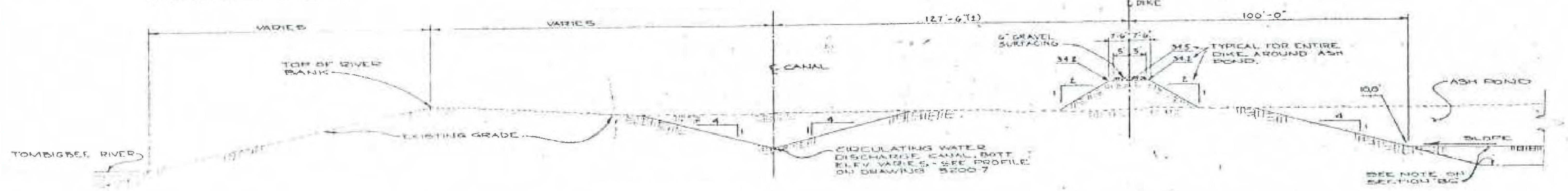
GRADING PLAN
1969 CONSTRUCTION
FIGURE 4



SECTION B6



SECTION C6

NOTES:

1. FIGURE FROM STANLEY ENGINEERING COMPANY CONSTRUCTION DRAWING "SITE GRADING – SHEET 2 PLAN DRAWING No. 3200-6", DATED JANUARY 20, 1970.
2. SECTIONS NOT TO SCALE.

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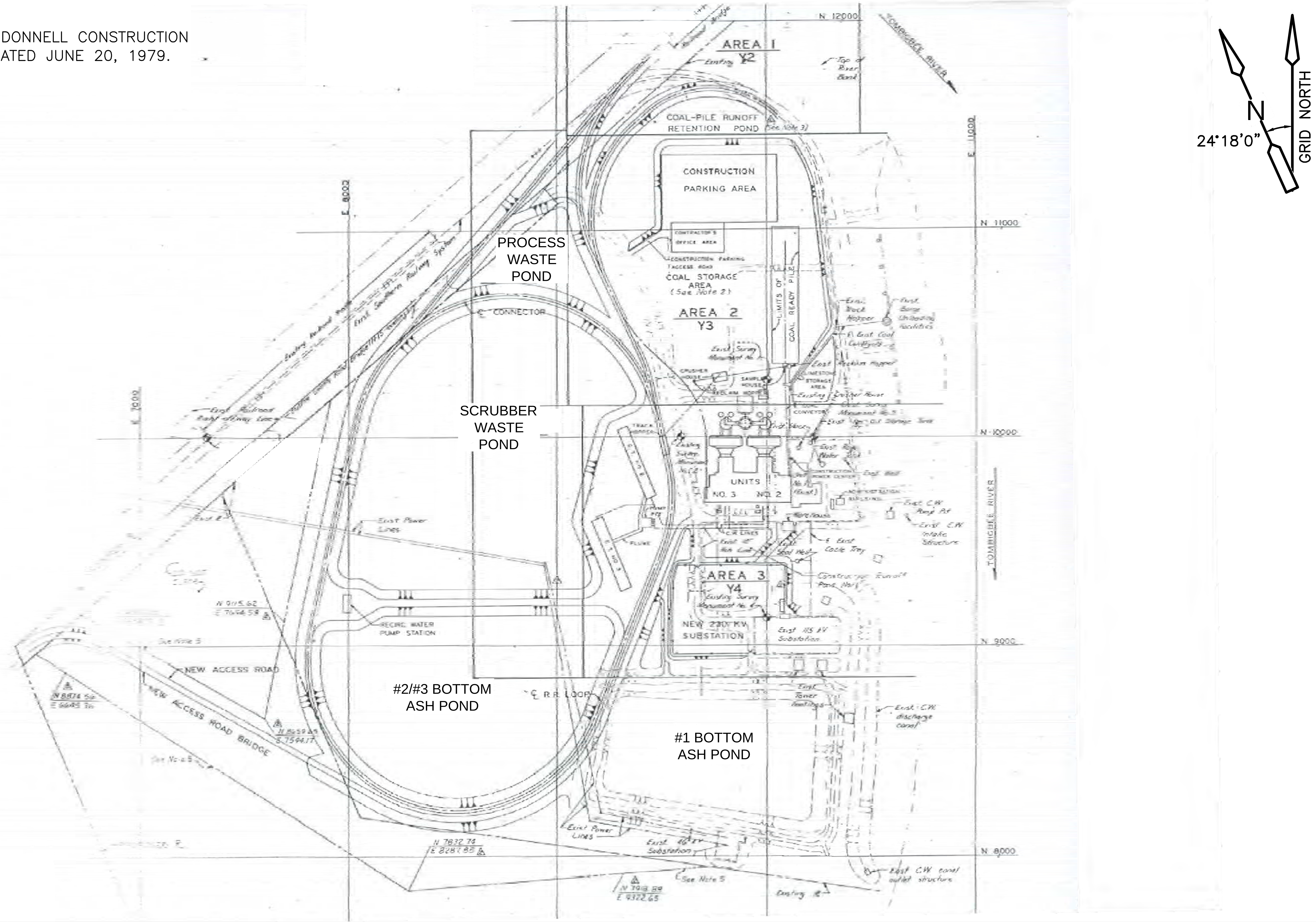
EMBANKMENT SECTIONS
1969 CONSTRUCTION
FIGURE 5

PW:\\camxmsvr01.cdm.com:PW_XMI\Documents\51119\77646_Lowman\03 Reports and Studies\09 CADD Figures and Graphics\TESFG005.dwg

NOTES:

1. FIGURE FROM BURNS & McDONNELL CONSTRUCTION DRAWING "SITE PLAN–Y1" DATED JUNE 20, 1979.
2. PLAN NOT TO SCALE.



PW:\\camxmsvr01.cdm.com:PW_XMI\Documents\5119\77646_Lowman\03 Reports and Studies\09 CADD Figures and Graphics\TSCFG006.dwg

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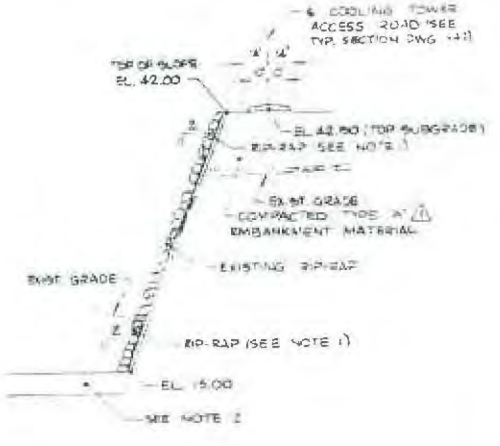
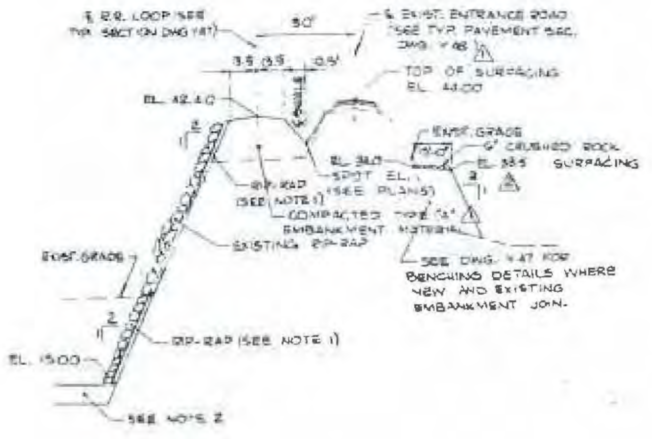
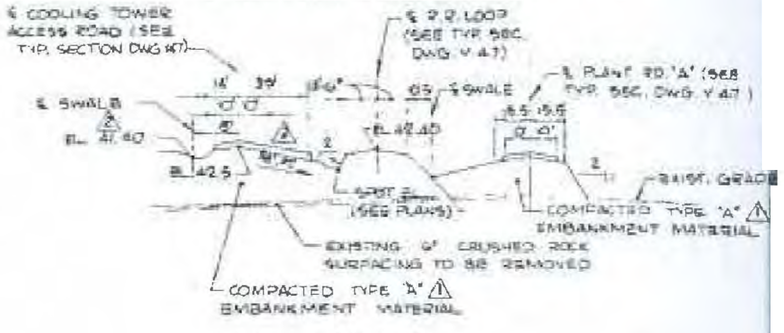
SITE PLAN
1979 CONSTRUCTION
FIGURE 6



SECTION 28-A-44
NOT TO SCALE



SECTION 28-C-44
NOT TO SCALE



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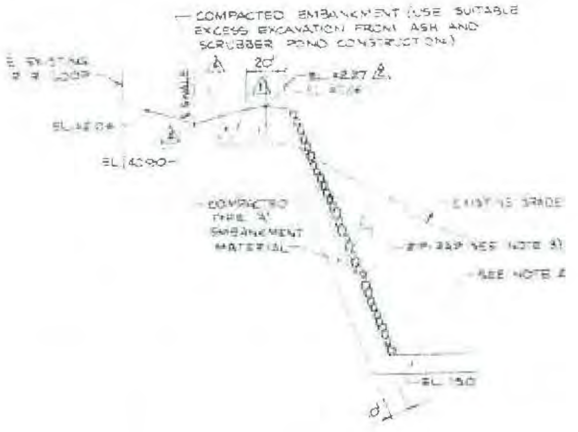
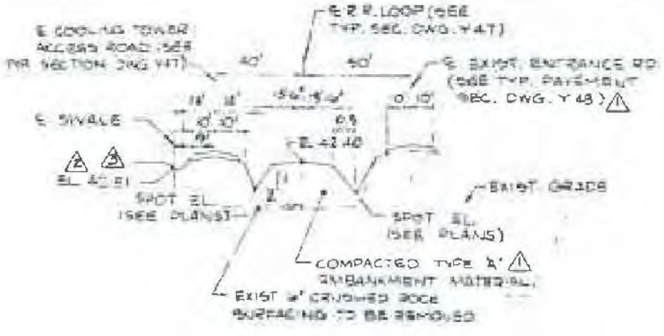
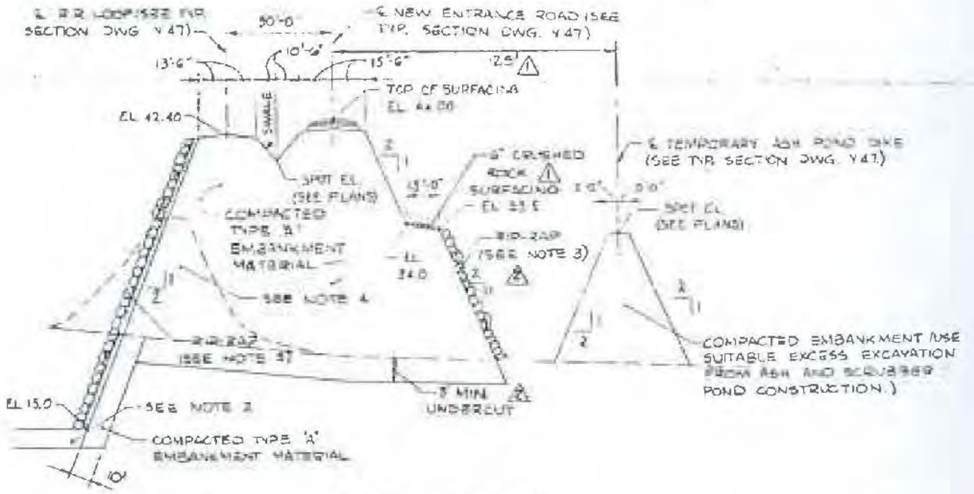
NOT TO SCALE



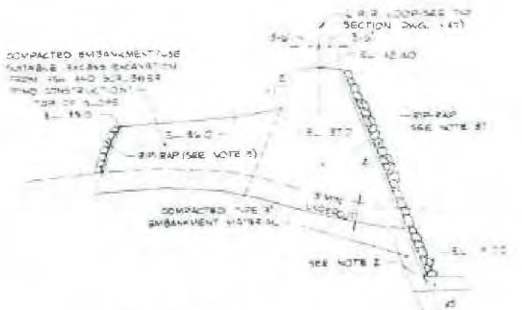
SECTION 31-H-44
NOT TO SCALE



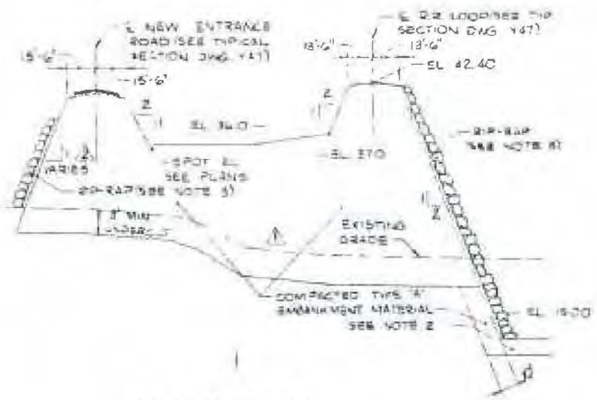
SECTION 28-F-44
NOT TO SCALE



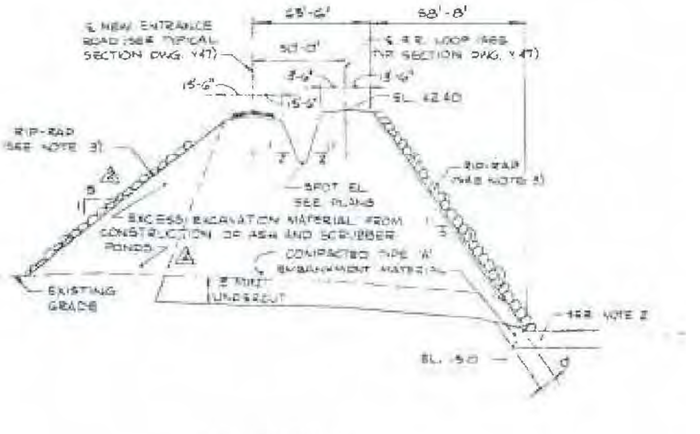
SECTION 29-G-44
NOT TO SCALE



SECTION 33-K-44
NOT TO SCALE



SECTION 33-L-44
NOT TO SCALE



SECTION 33-M-44
NOT TO SCALE

NOTES:

1. FIGURE FROM BURNS & McDONNELL CONSTRUCTION DRAWING "GRADING SECTIONS 1 – DRAWING No. Y–44" DATED JUNE 20, 1979.
2. SECTIONS NOT TO SCALE.

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EMBANKMENT SECTIONS
1979 CONSTRUCTION
FIGURE 7

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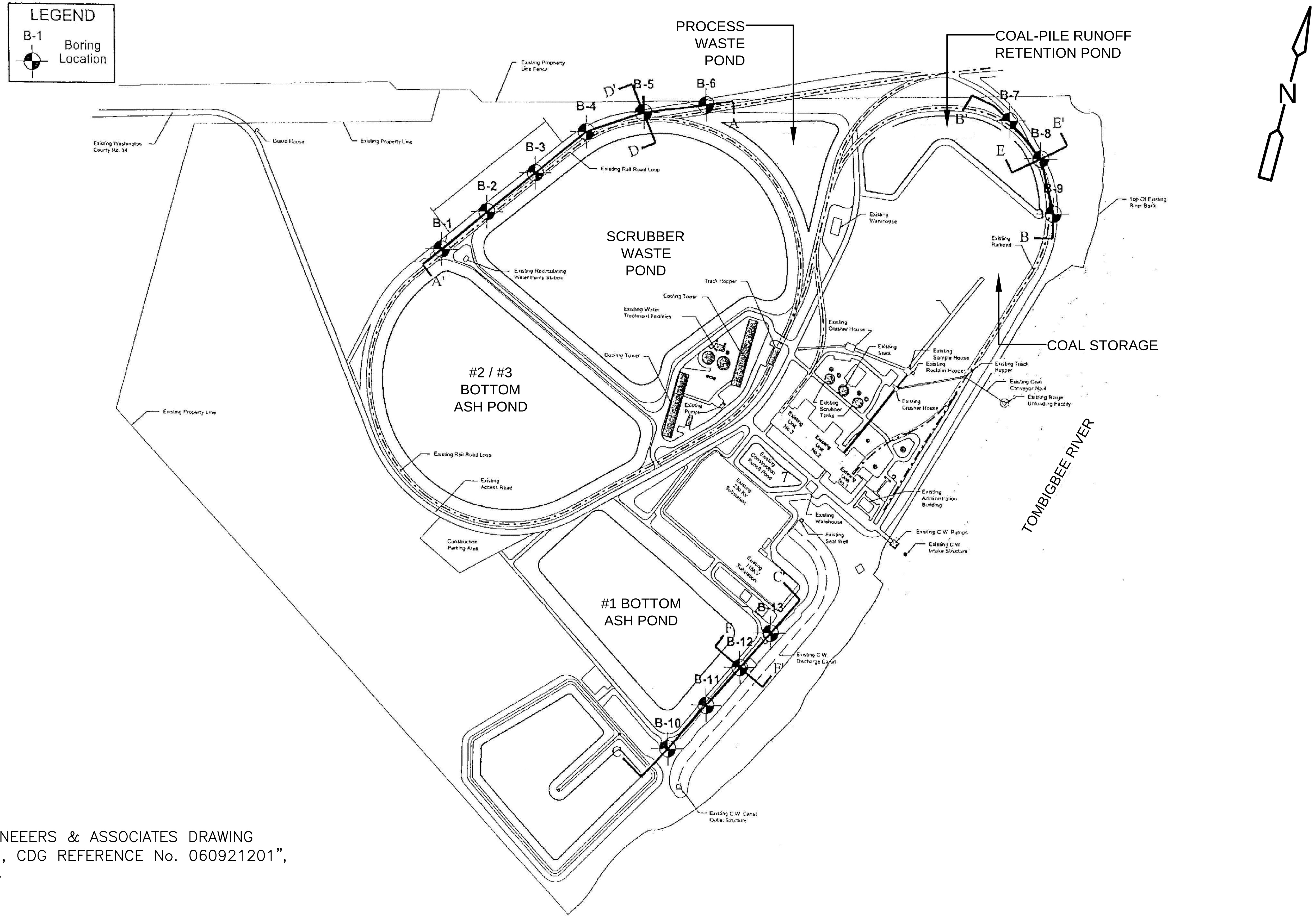

NOTES:

1. FIGURE FROM CDG ENGINEEERS & ASSOCIATES DRAWING "BORING LOCATION PLAN, CDG REFERENCE No. 060921201", DATED AUGUST 5, 2009.

2. PLAN NOT TO SCALE.

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BORING LOCATION PLAN

FIGURE 8

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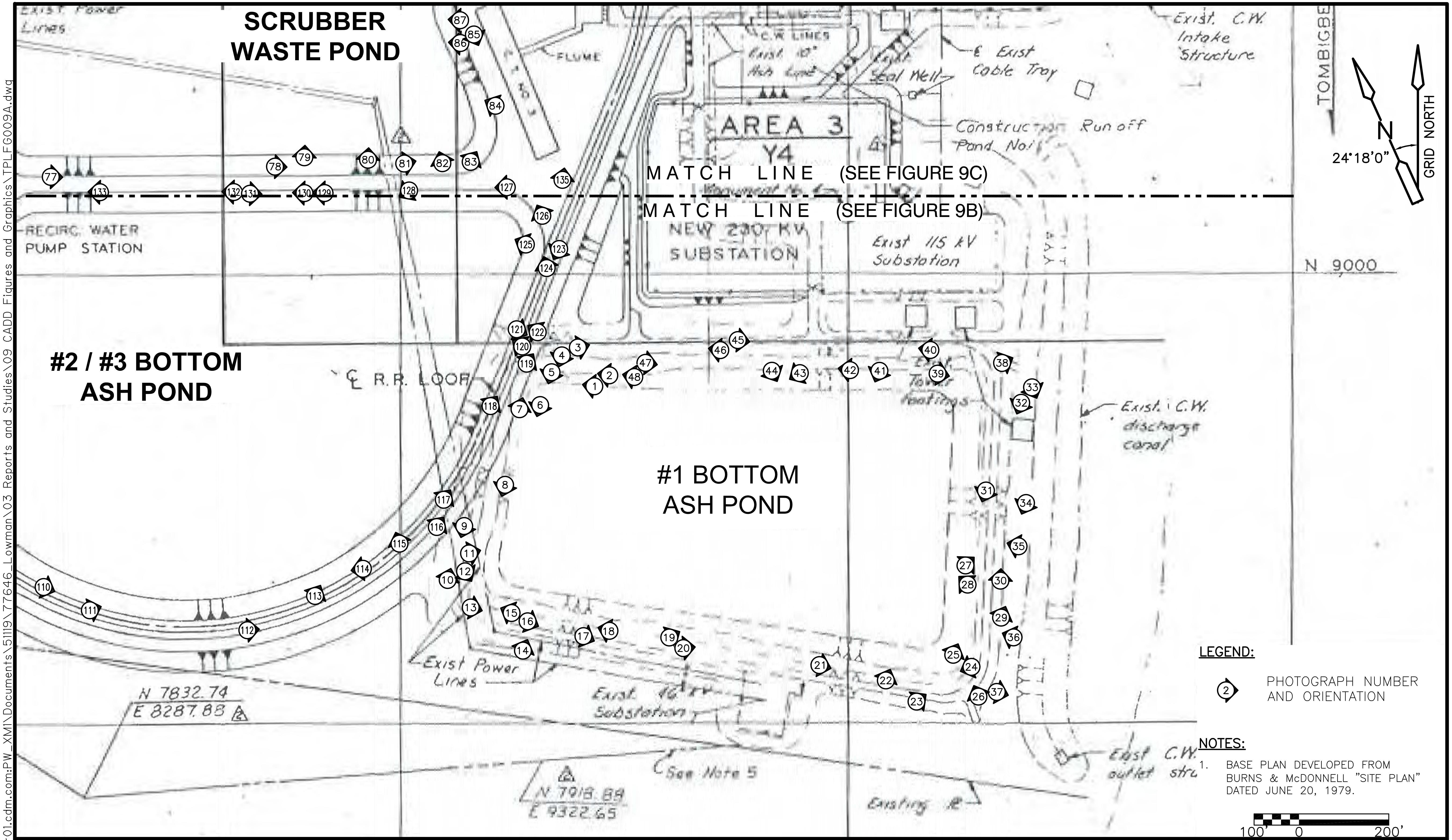

LEGEND:

② PHOTOGRAPH NUMBER AND ORIENTATION

NOTES:

1. BASE PLAN DEVELOPED FROM BURNS & McDONNELL "SITE PLAN" DATED JUNE 20, 1979.

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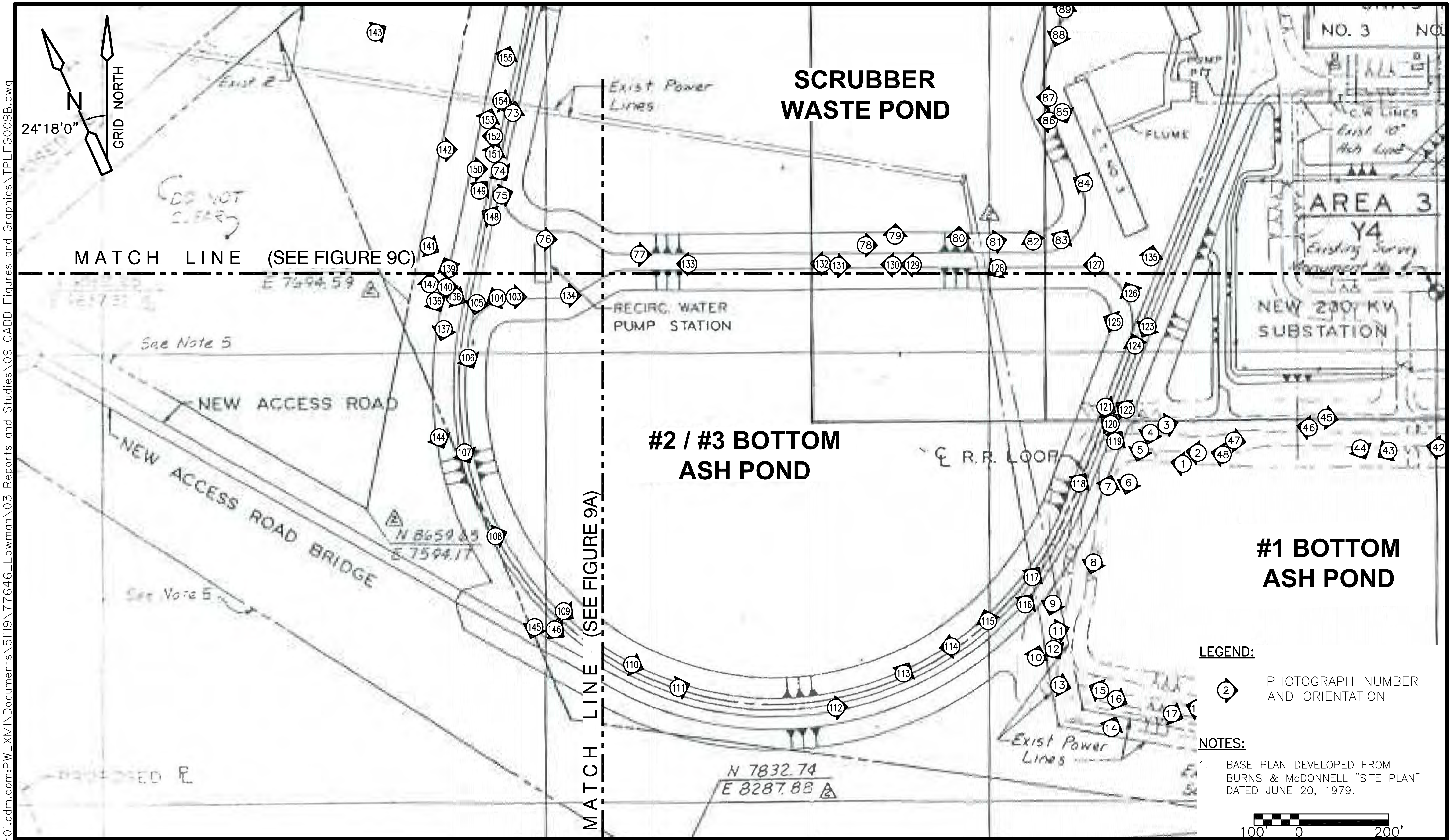
#1 BOTTOM ASH POND
PHOTOGRAPH LOCATION PLAN
FIGURE 9A

PW:\\camxmsvr01.cdm.com:PW_XM\Documents\5119\77646_Lowman\03 Reports and Studies\09 CADD Figures and Graphics\TPLFG009A.dwg



LEGEND:

② PHOTOGRAPH NUMBER AND ORIENTATION

NOTES:

1. BASE PLAN DEVELOPED FROM BURNS & McDONNELL "SITE PLAN" DATED JUNE 20, 1979.

100' 0 200'

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#2/#3 BOTTOM ASH POND
PHOTOGRAPH LOCATION PLAN
FIGURE 9B

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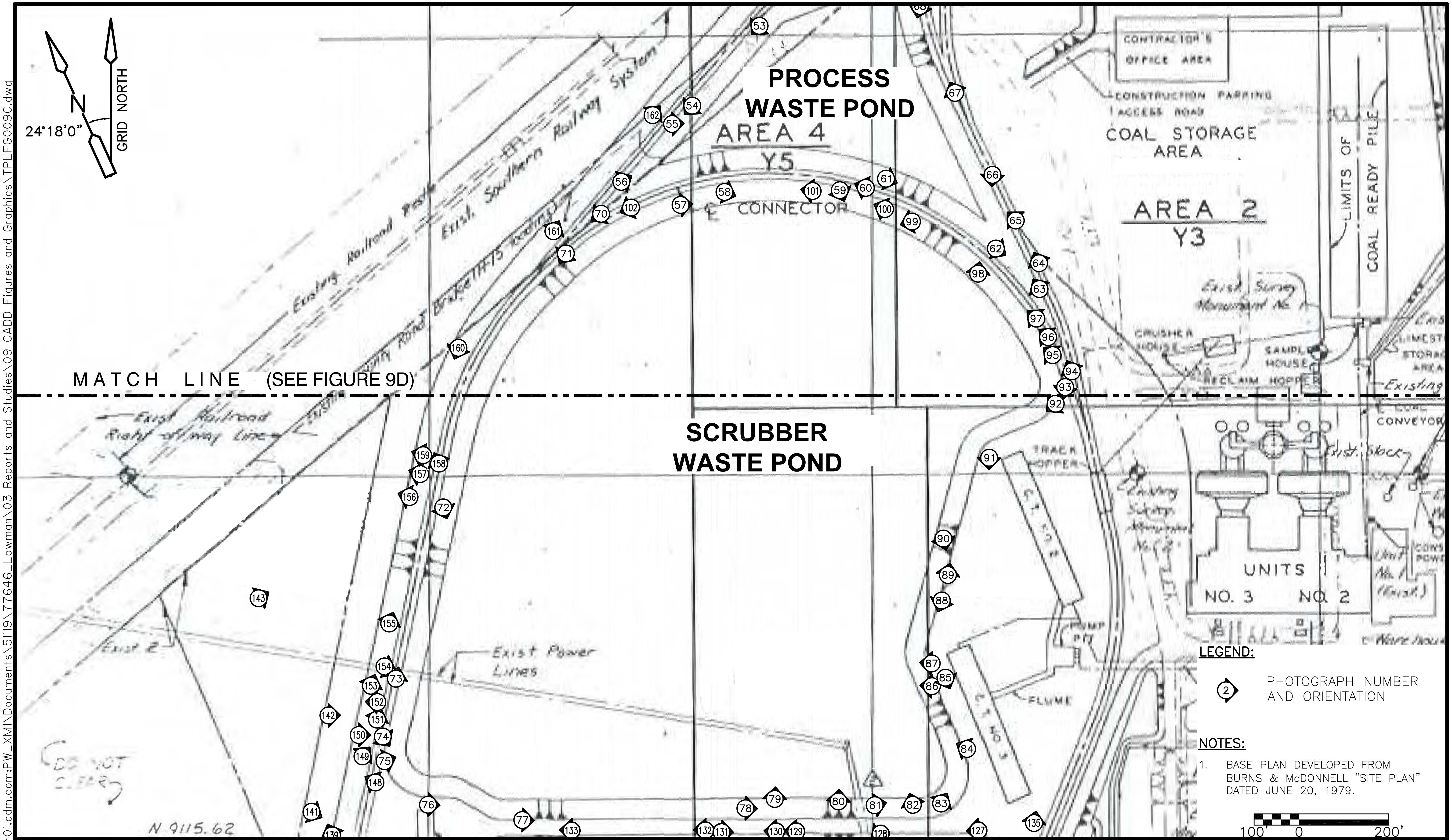
PW:\\camxmsvr01.cdm.com:PW_XM\Documents\5119\77646_Lowman\03 Reports and Studies\09 CADD Figures and Graphics\TPLFG009C.dwg



LEGEND:

② PHOTOGRAPH NUMBER AND ORIENTATION

NOTES:

1. BASE PLAN DEVELOPED FROM BURNS & McDONNELL "SITE PLAN" DATED JUNE 20, 1979.

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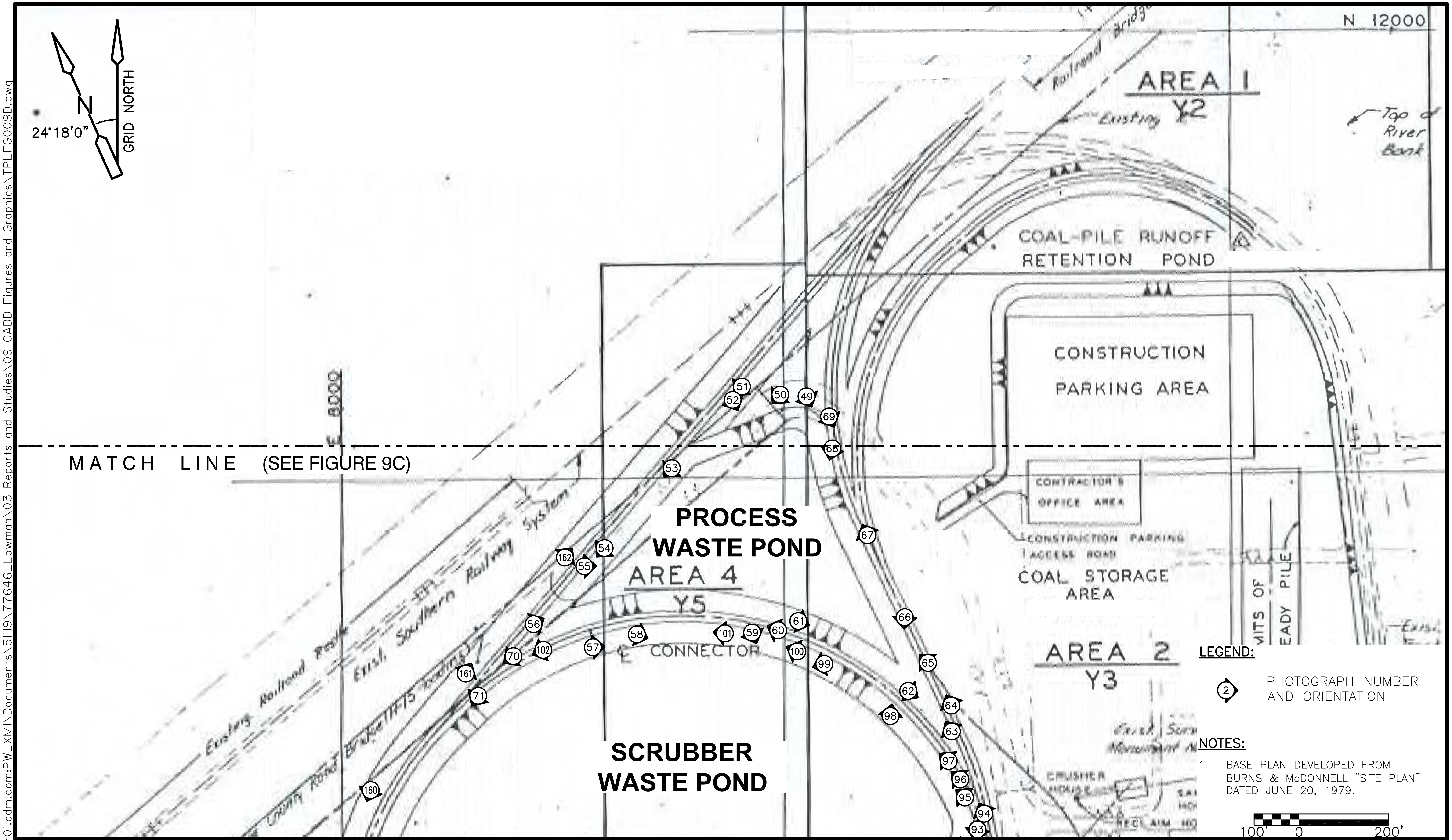
SCRUBBER WASTE POND
PHOTOGRAPH LOCATION PLAN
FIGURE 9C



NOTES:

1. BASE PLAN DEVELOPED FROM BURNS & McDONNELL "SITE PLAN" DATED JUNE 20, 1979.

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PROCESS WASTE POND
PHOTOGRAPH LOCATION PLAN
FIGURE 9D

PW:\\camxmsvr01.cdm.com:PW_XMI\Documents\51119\77646_Lowman\03 Reports and Studies\09 CADD Figures and Graphics\TPLFG009D.dwg

Appendix A

Boring Logs and Subsurface Profiles

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Dothan, AL
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BORING LOG

Project Name: Berm Stability Evaluation - Lowman Power Plant
Project Number: 060921201
Boring Number: B-1
Date Drilled: July 15, 2009
Page 1 of 2

Notes: SS = Split Spoon
PPqu = Pocket Penetrometer Unconfined Compressive Strength

Depth (feet)	Approx. Elev. (feet)	Graphic Scale	MATERIAL DESCRIPTION	TYPE	BLOWS/ 6 INCHES	N	CORE REC. (%)	RQD (%)	REMARKS
0	44								
			Crushed aggregate						
			Very dense, red, silty fine to medium SAND, with numerous rock fragments	SS	26-27-28	50+			
5	39								
				SS	20-22-23	45			
			..same	SS	24-24-26	50			
10	34								
			... with numerous rock fragments	SS	29-37-40	50+			
15	29								
			Very dense, silty, coarse-grained SAND, with trace rock fragments	SS	26-38-43	50+			▽ Groundwater encountered at 20 feet at time of boring
20	24								
			Stiff, brown, fine sandy CLAY with gravel	SS	6-6-7	13			
25	19								

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BORING LOG

Project Name: Berm Stability Evaluation - Lowman Power Plant
Project Number: 060921201 Phase 3
Boring Number: B-1
Date Drilled: July 15, 2009
Page 2 of 2

Notes: SS = Split Spoon
PPqu = Pocket Penetrometer Unconfined Compressive Strength

Depth (feet)	Approx. Elev. (feet)	Graphic Scale	MATERIAL DESCRIPTION	TYPE	BLOWS/ 6 INCHES	N	CORE REC. (%)	RQD (%)	REMARKS
25	19		Stiff, brown, fine sandy CLAY with gravel (Fill)						
			Medium, grey and tan, fine sandy CLAY	SS	2-3-4	7			
30	14								
			... stiff, grey	SS	3-5-5	10			PPqu = 1.25 tsf
35	9								
			(Low Terrace Deposits)	SS	4-4-7	11			PPqu = 1.25 tsf
40	4		Boring Terminated at 40 feet						
45	-1								
50	-6								Boring backfilled with grout upon completion.

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BORING LOG

Project Name: Berm Stablity Evaluation - Lowman Power Plant
Project Number: 060921201
Boring Number: B-2
Date Drilled: July 14, 2009
Page 1 of 2

Notes: SS = Split Spoon

Depth (feet)	Approx. Elev. (feet)	Graphic Scale	MATERIAL DESCRIPTION	TYPE	BLOWS/ 6 INCHES	N	CORE REC. (%)	RQD (%)	REMARKS
0	44		Crushed aggregate						
			Dense, red, silty fine to medium SAND	SS	19-20-20	40			LL=18, PL=14, PI=4 Fines Content = 33.5% USCS = SC-SM MC = 8.8%
5	39								
				SS	20-21-22	43			MC = 8.4%
			...very dense, with numerous rock fragments	SS	14-23-30	50+			MC = 10.2%
10	34								∇ Groundwater encountered at +/-11 feet on 8/4/2009.
			Dense, tan, silty coarse SAND with numerous rock fragments	SS	21-18-20	38			∇ Groundwater encountered at 13.5 feet at time of boring MC = 13.3%
15	29								
20	24		Medium dense, reddish tan, silty fine SAND with trace rock fragments	SS	7-10-14	24			LL=23, PL=20, PI=3 Fines Content = 25.5% USCS = SM MC = 14.9%
25	19		...dense, with gravel	SS	8-13-20	33			MC = 11.3%

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BORING LOG

Project Name: Berm Stability Evaluation - Lowman Power Plant
Project Number: 060921201
Boring Number: B-2
Date Drilled: July 14, 2009
Page 2 of 2

Notes: SS = Split Spoon

Depth (feet)	Approx. Elev. (feet)	Graphic Scale	MATERIAL DESCRIPTION	TYPE	BLOWS/ 6 INCHES	N	CORE REC. (%)	RQD (%)	REMARKS
25	19		Dense, reddish tan, silty fine SAND, with gravel (Fill)						
			Medium dense, reddish tan, silty fine to coarse-grained SAND	SS	6-12-8	20			MC = 14.2%
30	14								
			Loose, grey, silty fine SAND	SS	2-3-4	7			LL=NP, PL=NP, PI=NP Fines Content = 20.0% USCS = SM MC = 28.3%
35	9								
			... medium dense, with gravel (Low Terrace Deposits)	SS	6-8-8	16			MC = 23.9%
40	4		Boring Terminated at 40 feet						
45	-1								
50	-6								Piezometer installed at the time of boring.

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BORING LOG

Project Name:	Berm Stability Evaluation - Lowman Power Plant
Project Number:	060921201
Boring Number:	B-3
Date Drilled:	July 15, 2009

Page 1 of 2

Notes: SS = Split Spoon

Depth (feet)	Approx. Elev. (feet)	Graphic Scale	MATERIAL DESCRIPTION	TYPE	BLOWS/ 6 INCHES	N	CORE REC. (%)	RQD (%)	REMARKS
0	44								
			Crushed aggregate						
			Medium dense, red, silty fine to medium SAND, with numerous rock fragments	SS	7-10-15	25			
5	39								
			... dense	SS	10-18-16	34			
			...reddish tan, with gravel	SS	16-18-18	36			
10	34								
			... very dense, tan, with gravel	SS	24-28-34	50+			
15	29								
20	24		... dense, reddish tan, with trace rock fragments	SS	18-20-29	49			∇ Groundwater encountered at 20 feet at time of boring
			...red, with gravel	SS	10-16-22	38			
25	19								

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BORING LOG

Project Name:	Berm Stability Evaluation - Lowman Power Plant
Project Number:	060921201
Boring Number:	B-3
Date Drilled:	July 15, 2009

Page 2 of 2

Notes: SS = Split Spoon

Depth (feet)	Approx. Elev. (feet)	Graphic Scale	MATERIAL DESCRIPTION	TYPE	BLOWS/ 6 INCHES	N	CORE REC. (%)	RQD (%)	REMARKS
25	19								
30	14		Dense, red, silty fine to medium SAND, with gravel (Fill)	SS	11-14-11	25			
35	9		Stiff, grey and tan, fine sandy CLAY, with gravel	SS	5-6-6	12			
40	4		Medium dense, grey and tan, silty fine SAND (Low Terrace Deposits)	SS	5-6-7	13			
			Boring Terminated at 40 feet						
45	-1								
50	-6								Boring backfilled with grout upon completion

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BORING LOG

Project Name: Berm Stability Evaluation - Lowman Power Plant
Project Number: 060921201
Boring Number: B-4
Date Drilled: July 13, 2009
Page 1 of 2

Notes: SS = Split Spoon

Depth (feet)	Approx. Elev. (feet)	Graphic Scale	MATERIAL DESCRIPTION	TYPE	BLOWS/ 6 INCHES	N	CORE REC. (%)	RQD (%)	REMARKS
0	44								
			Crushed aggregate						
			Dense, red, silty fine to medium SAND	SS	21-24-26	50			MC = 8.4%
5	39								
			...very dense, with gravel	SS	15-25-27	50+			MC = 8.5%
			..medium dense	SS	9-12-15	27			MC = 14.2%
10	34								
15	29		...very dense, reddish brown	SS	30-35-40	50+			MC = 7.3%
20	24		...dense, orange and tan	SS	12-14-19	33			MC = 14.7% ∇ Groundwater encountered at 20 feet at time of boring
25	+A39		...medium dense, red	SS	10-12-15	27			MC = 21.4%

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BORING LOG

Project Name: Berm Stability Evaluation - Lowman Power Plant
Project Number: 060921201
Boring Number: B-5
Date Drilled: July 15, 2009
Page 1 of 2

Notes: SS = Split Spoon

Depth (feet)	Approx. Elev. (feet)	Graphic Scale	MATERIAL DESCRIPTION	TYPE	BLOWS/ 6 INCHES	N	CORE REC. (%)	RQD (%)	REMARKS
0	43		Crushed aggregate						
			Dense, red, silty fine to coarse SAND, with gravel	SS	10-18-20	38			LL=17, PL=16, PI=1 Fines Content = 21.1% USCS = SM MC = 7.2%
5	38								
			..medium dense	SS	8-12-16	28			MC = 8.3%
			...reddish orange	SS	10-11-12	23			LL=NP, PL=NP, PI=NP Fines Content = 15.3% USCS = SM MC = 8.6%
10	33								
15	28		...same	SS	10-12-16	28			
									∇ Groundwater encountered at +/-19 feet on 8/4/2009.
20	23		...same	SS	8-10-14	24			MC = 13.6%
25	18		..dense	SS	15-18-23	41			MC = 15.2%

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BORING LOG

Project Name:	Berm Stability Evaluation - Lowman Power Plant
Project Number:	060921201
Boring Number:	B-5
Date Drilled:	July 15, 2009

Page 2 of 2

Notes: SS = Split Spoon
PPqu = Pocket Penetrometer Unconfined Compressive Strength

Depth (feet)	Approx. Elev. (feet)	Graphic Scale	MATERIAL DESCRIPTION	TYPE	BLOWS/ 6 INCHES	N	CORE REC. (%)	RQD (%)	REMARKS
25	18								
			Reddish orange, silty fine to medium SAND, with gravel (Fill)						
			Stiff, grey, fine sandy CLAY	SS	6-8-8	16			∇ Groundwater encountered at 30 feet at time of boring PPqu = 1.0 tsf
30	13								
			Medium dense, grey and tan, silty fine SAND	SS	4-6-6	12			LL=23, PL=21, PI=2 USCS = SM MC = 29.7%
35	8								
			...same (Low Terrace Deposits)	SS	4-4-7	11			MC = 28.5%
40	3		Boring Terminated at 40 feet						
45	-2								
50	-7								Piezometer installed at the time of boring.

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BORING LOG

Project Name: Berm Stability Evaluation - Lowman Power Plant
Project Number: 060921201
Boring Number: B-6
Date Drilled: July 15, 2009
Page 1 of 2

Notes: SS = Split Spoon

Depth (feet)	Approx. Elev. (feet)	Graphic Scale	MATERIAL DESCRIPTION	TYPE	BLOWS/ 6 INCHES	N	CORE REC. (%)	RQD (%)	REMARKS
0	43								
			Crushed aggregate						
			Medium dense, red, silty fine to medium SAND, with trace gravel	SS	10-11-12	23			
5	38								
				SS	11-14-14	28			
			...red and orange	SS	16-16-14	30			
10	33								∇ Groundwater encountered at 10 feet at time of boring
15	28		... dense, orange with gravel	SS	19-24-26	40			
20	23		...medium dense	SS	8-9-10	19			
25	18		...same	SS	10-10-12	22			

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BORING LOG

Project Name: Berm Stability Evaluation - Lowman Power Plant
Project Number: 060921201
Boring Number: B-6
Date Drilled: July 15, 2009
Page 2 of 2

Notes: SS = Split Spoon
PPqu = Pocket Penetrometer Unconfined Compressive Strength

Depth (feet)	Approx. Elev. (feet)	Graphic Scale	MATERIAL DESCRIPTION	TYPE	BLOWS/ 6 INCHES	N	CORE REC. (%)	RQD (%)	REMARKS
25	18		Medium dense, orange, silty fine to medium SAND, with gravel (Fill)						
30	13		Stiff, grey, fine sandy CLAY	SS	5-5-7	12			PPqu = 1.25 tsf
35	8		Medium dense, brown, silty fine SAND	SS	6-6-10	16			
40	3		...tan and brown (Low Terrace Deposits)	SS	6-8-10	18			
			Boring Terminated at 40 feet						
45	-2								
50	-7								Boring backfilled with grout upon completion

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BORING LOG

Project Name:	Berm Stability Evaluation - Lowman Power Plant
Project Number:	060921201
Boring Number:	B-7
Date Drilled:	July 17, 2009

Page 1 of 2

Notes: SS = Split Spoon

Depth (feet)	Approx. Elev. (feet)	Graphic Scale	MATERIAL DESCRIPTION	TYPE	BLOWS/ 6 INCHES	N	CORE REC. (%)	RQD (%)	REMARKS
0	41								
			Crushed aggregate with silty SAND						
			Medium dense, brown and orange, silty fine to medium SAND, with gravel	SS	12-13-8	21			
5	36								
			... brown and grey, fine - grained	SS	7-12-12	24			
			...dense	SS	10-15-16	31			
10	31								∇ Groundwater encountered at 10 feet at time of boring
			... medium dense, grey	SS	7-9-13	22			
15	26								
			(Fill)						
			Loose, brown, silty fine to medium SAND	SS	2-3-3	6			
20	21								
			...medium dense	SS	5-12-14	26			
25	16								

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BORING LOG

Project Name: Berm Stability Evaluation - Lowman Power Plant
Project Number: 060921201
Boring Number: B-7
Date Drilled: July 17, 2009
Page 2 of 2

Notes: SS = Split Spoon

Depth (feet)	Approx. Elev. (feet)	Graphic Scale	MATERIAL DESCRIPTION	TYPE	BLOWS/ 6 INCHES	N	CORE REC. (%)	RQD (%)	REMARKS
25	16								
30	11		Medium dense, brown, silty fine to medium SAND	SS	7-8-6	14			
35	6		...loose, brown	SS	4-5-5	10			
40	1		...medium dense (Low Terrace Deposits)	SS	5-7-7	14			
			Boring Terminated at 40 feet						
45	-4								
50	-9								Boring backfilled with grout upon completion.

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BORING LOG

Project Name: Berm Stability Evaluation - Lowman Power Plant
Project Number: 060921201
Boring Number: B-8
Date Drilled: July 17, 2009

Page 1 of 2

Notes: SS = Split Spoon
UD = Undisturbed Sample

Depth (feet)	Approx. Elev. (feet)	Graphic Scale	MATERIAL DESCRIPTION	TYPE	BLOWS/ 6 INCHES	N	CORE REC. (%)	RQD (%)	REMARKS
0	41								
			Crushed aggregate with silty SAND						
			Dense, greyish brown, silty fine SAND	SS	12-19-20	39			MC = 14.7%
5	36								
			...grey and brown	SS	10-16-20	36			LL=NP, PL=NP, PI=NP Fines Content = 34.5% USCS = SM MC = 7.2%
10	31								∇ Groundwater encountered at 10 feet at time of boring
			... medium dense, brown	SS	5-10-12	22			MC = 11.7%
15	26								
			(Fill)						
			Very loose, brown, silty fine SAND	SS	2-2-2	4			LL=24, PL=20, PI=4 Fines Content = 48.9% USCS = SM-SC MC = 30.0%
20	21								
				UD					
			Stiff, grey, fine sandy CLAY	SS	3-5-5	10			MC = 32.9%
25	16								

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BORING LOG

Project Name: Berm Stability Evaluation - Lowman Power Plant
Project Number: 060921201
Boring Number: B-8
Date Drilled: July 17, 2009
Page 2 of 2

Notes: SS = Split Spoon

Depth (feet)	Approx. Elev. (feet)	Graphic Scale	MATERIAL DESCRIPTION	TYPE	BLOWS/ 6 INCHES	N	CORE REC. (%)	RQD (%)	REMARKS
25	16								
30	11		...medium, brown	SS	2-3-3	6			LL=34, PL=15, PI=19 Fines Content = 67.9% USCS = CL MC = 35.6% ▽ Groundwater encountered at +/-31 feet on 8/4/2009.
35	6		Medium dense, brown, silty fine SAND	SS	11-15-15	30			MC = 18.6%
40	1		...same (Low Terrace Deposits) Boring Terminated at 40 feet	SS	5-5-7	12			MC = 31.7%
45	-4								
50	-9								Piezometer installed at the time of boring.

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BORING LOG

Project Name: Berm Stability Evaluation - Lowman Power Plant
Project Number: 060921201
Boring Number: B-9
Date Drilled: July 16, 2009

Page 1 of 2

Notes: SS = Split Spoon

Depth (feet)	Approx. Elev. (feet)	Graphic Scale	MATERIAL DESCRIPTION	TYPE	BLOWS/ 6 INCHES	N	CORE REC. (%)	RQD (%)	REMARKS
0	41								
			Crushed aggregate with silty SAND						
			Dense, grey and brown, silty fine SAND	SS	6-13-20	33			LL=22, PL=19, PI=3 Fines Content = 43.9% USCS = SM MC = 10.9%
5	36								
				SS	14-19-21	40			MC = 8.9%
			...same	SS	14-16-16	32			MC = 10.5%
10	31								▽ Groundwater encountered at 10 feet at time of boring
			Medium dense, brown, fine SAND with silt	SS	5-6-8	14			LL=NP, PL=NP, PI=NP Fines Content = 7.8% USCS = SM MC = 16.9%
15	26								
			(Fill)						
			Medium, brown, fine sandy CLAY	SS	3-4-3	7			MC = 31.5%
20	21								
			...soft	SS	3-3-2	5			LL=26, PL=21, PI=5 Fines Content = 54.4% USCS = CL MC = 30.3%
25	16								

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BORING LOG

Project Name: Berm Stability Evaluation - Lowman Power Plant
Project Number: 060921201
Boring Number: B-9
Date Drilled: July 16, 2009
Page 2 of 2

Notes: SS = Split Spoon

Depth (feet)	Approx. Elev. (feet)	Graphic Scale	MATERIAL DESCRIPTION	TYPE	BLOWS/ 6 INCHES	N	CORE REC. (%)	RQD (%)	REMARKS
25	16								
30	11		...stiff	SS	5-5-5	10			MC = 24.6%
35	6		...soft, silty	SS	3-1-3	4			LL=25, PL=18, PI=7 Fines Content = 51.0% USCS = CL-ML MC = 29.8%
40	1		...stiff (Low Terrace Deposits)	SS	2-5-7	12			MC = 29.4%
			Boring Terminated at 40 feet						
45	-4								
50	-9								Boring backfilled with grout upon completion

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BORING LOG

Project Name: Berm Stability Evaluation - Lowman Power Plant
Project Number: 060921201
Boring Number: B-10
Date Drilled: July 13, 2009
Page 1 of 2

Notes: SS = Split Spoon
PPqu = Pocket Penetrometer Unconfined Compressive Strength

Depth (feet)	Approx. Elev. (feet)	Graphic Scale	MATERIAL DESCRIPTION	TYPE	BLOWS/ 6 INCHES	N	CORE REC. (%)	RQD (%)	REMARKS
0	39								
			Very stiff, red, fine sandy CLAY with numerous rock fragments	SS	3-4-10	14			
5	34		...stiff (Fill)	SS	2-4-5	9			PPqu = 1.25 tsf
			Very stiff, grey and brown, fine sandy CLAY	SS	5-5-9	14			
10	29		...stiff, grey	SS	4-4-5	9			
15	24		...medium	SS	2-2-4	6			PPqu = 0.50 tsf ▽ Groundwater encountered at 15 feet at time of boring
20	19		Very loose, brown, silty fine to medium SAND	SS	2-1-2	3			
25	14		...same	SS	2-1-1	2			

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BORING LOG

Project Name: Berm Stability Evaluation - Lowman Power Plant
Project Number: 060921201
Boring Number: B-10
Date Drilled: July 13, 2009
Page 2 of 2

Notes: SS = Split Spoon

Depth (feet)	Approx. Elev. (feet)	Graphic Scale	MATERIAL DESCRIPTION	TYPE	BLOWS/ 6 INCHES	N	CORE REC. (%)	RQD (%)	REMARKS
25	14								
30	9		...brown and grey	SS	3-2-1	3			
35	4		... loose, grey and orange	SS	3-2-3	5			
40	-1		...grey (Low Terrace Deposits) Boring Terminated at 40 feet	SS	4-3-3	6			
45	-6								
50	-11								Boring backfilled with grout upon completion

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BORING LOG

Project Name: Berm Stability Evaluation - Lowman Power Plant
Project Number: 060921201
Boring Number: B-11
Date Drilled: July 13, 2009
Page 1 of 2

Notes: SS = Split Spoon
PPqu = Pocket Penetrometer Unconfined Compressive Strength

Depth (feet)	Approx. Elev. (feet)	Graphic Scale	MATERIAL DESCRIPTION	TYPE	BLOWS/ 6 INCHES	N	CORE REC. (%)	RQD (%)	REMARKS
0	39								
			Very stiff, orange and tan, fine sandy CLAY	SS	4-7-10	17			LL=39, PL=18, PI=21 Fines Content = 55.4% USCS = CL
5	34		... stiff	SS	3-4-4	9			LL=36, PL=20, PI=16 Fines Content = 56.5% USCS = CL
			Medium dense, brown, clayey fine to medium SAND with gravel	SS	6-9-14	23			
10	29								
			...with clay	SS	8-8-9	17			
			(Fill)						▽ Groundwater encountered at +/-13 feet on 8/4/2009.
			Soft, grey, silty CLAY with fine sand	SS	2-2-3	5			LL=40, PL=17, PI=23 Fines Content = 91.6% USCS = CL PPqu < 0.25 tsf
15	24								
20	19		...medium	SS	2-3-3	6			
			Soft, grey, fine sandy CLAY	SS	2-2-3	5			LL=28, PL=20, PI=8 Fines Content = 67.2% USCS = CL MC = 35.3% PPqu < 0.25 tsf
25	14								

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BORING LOG

Project Name: Berm Stability Evaluation - Lowman Power Plant
Project Number: 060921201
Boring Number: B-11
Date Drilled: July 13, 2009
Page 2 of 2

Notes: SS = Split Spoon

Depth (feet)	Approx. Elev. (feet)	Graphic Scale	MATERIAL DESCRIPTION	TYPE	BLOWS/ 6 INCHES	N	CORE REC. (%)	RQD (%)	REMARKS
25	14		Soft, grey, fine sandy CLAY						
30	9		Loose, brown, silty fine SAND	SS	3-3-3	6			MC = 26.2%
35	4		...very loose	SS	1-1-1	2			LL=21, PL=20, PI=1 Fines Content = 19.6% USCS = SM MC = 36.9%
40	-1		...loose (Low Terrace Deposits)	SS	7-5-4	9			MC = 27.1%
			Boring Terminated at 40 feet						
45	-6								
50	-11								Piezometer installed at the time of boring

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BORING LOG

Project Name: Berm Stability Evaluation - Lowman Power Plant
Project Number: 060921201
Boring Number: B-12
Date Drilled: July 16, 2009

Page 1 of 2

Notes: SS = Split Spoon
PPqu = Pocket Penetrometer Unconfined Compressive Strength

Depth (feet)	Approx. Elev (feet)	Graphic Scale	MATERIAL DESCRIPTION	TYPE	BLOWS/ 6 INCHES	N	CORE REC. (%)	RQD (%)	REMARKS
0	39								
			Crushed aggregate with silty SAND						
			Medium dense, orange and tan, silty fine to medium SAND	SS	4-5-6	11			
5	34								
				SS	7-11-11	22			
			(Fill)						
			Medium dense, brown, silty fine to medium SAND	SS	5-8-9	17			
10	29								∇ Groundwater encountered at 10 feet at time of boring
			...grey	SS	7-7-10	17			
15	24								
			Medium, grey, fine sandy CLAY	SS	4-4-4	8			PPqu = 0.75 tsf
20	19								
			...same	SS	3-4-3	7			
25	14								

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BORING LOG

Project Name:	Berm Stability Evaluation - Lowman Power Plant
Project Number:	060921201
Boring Number:	B-12
Date Drilled:	July 16, 2009

Page 2 of 2

Notes: SS = Split Spoon
PPqu = Pocket Penetrometer Unconfined Compressive Strength

Depth (feet)	Approx. Elev. (feet)	Graphic Scale	MATERIAL DESCRIPTION	TYPE	BLOWS/ 6 INCHES	N	CORE REC. (%)	RQD (%)	REMARKS
25	14								
30	9		...very soft	SS	2-1-2	3			PPqu < 0.25 tsf
35	4		...soft	SS	2-2-3	5			PPqu < 0.25 tsf
			Medium dense, grey, clayey fine to medium SAND (Low Terrace Deposits)	SS	7-9-13	22			
40	-1		Boring Terminated at 40 feet						
45	-6								
50	-11								Boring backfilled with grout upon completion

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BORING LOG

Project Name: Berm Stability Evaluation - Lowman Power Plant
Project Number: 060921201
Boring Number: B-13
Date Drilled: July 16, 2009
Page 1 of 2

Notes: SS = Split Spoon
PPqu = Pocket Penetrometer Unconfined Compressive Strength
UD = Undisturbed Sample

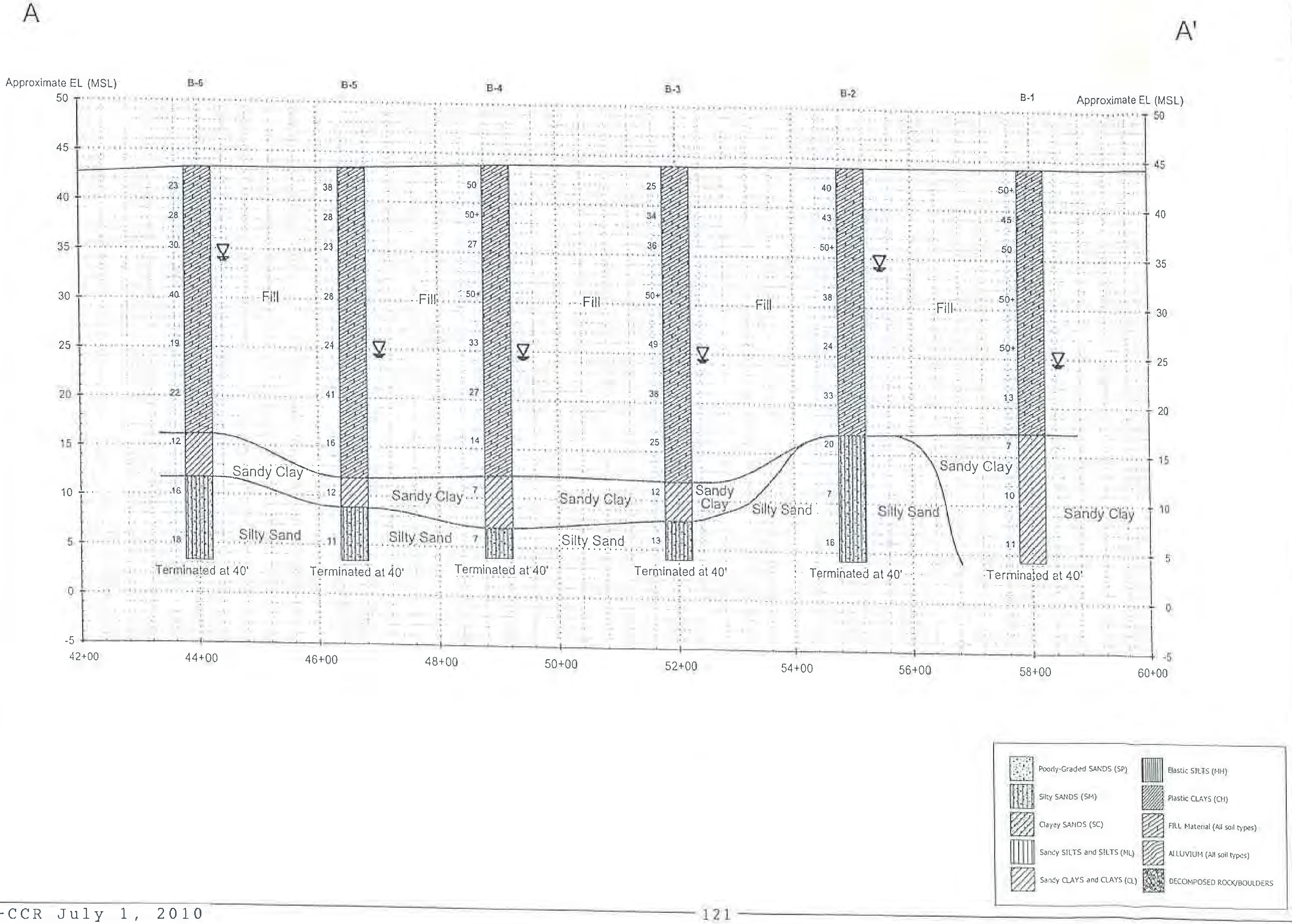
Depth (feet)	Approx. Elev. (feet)	Graphic Scale	MATERIAL DESCRIPTION	TYPE	BLOWS/ 6 INCHES	N	CORE REC. (%)	RQD (%)	REMARKS
0	39								
			Crushed aggregate with silty SAND						
			Stiff, red, fine sandy CLAY	SS	5-7-8	15			LL=42, PL=19, PI=23 Fines Content = 51.6% USCS = CL MC = 13.6%
5	34								
			...hard, with gravel	SS	26-28-30	50+			MC = 11.0%
			(Fill)						
			Medium dense, tan, silty fine to medium SAND		10-10-10	20			MC = 20.2% ▽ Groundwater encountered at 10 feet at time of boring
10	29								
				UD					
				SS	3-3-3	6			No Recovery
15	24								
			Very soft, grey, fine sandy CLAY	SS	1-1-2	3			▽ Groundwater encountered at +/-19 feet on 8/4/2009. MC = 34.0% PPqu < .025 tsf
20	19								
			Very loose, grey, silty fine to medium SAND	SS	2-1-2	3			MC = 31.5%
25	14								

BORING LOG

Project Name: Berm Stability Evaluation - Lowman Power Plant
Project Number: 060921201 Phase 3
Boring Number: B-13
Date Drilled: July 16, 2009
Page 2 of 2

Notes: SS = Split Spoon

Depth (feet)	Approx. Elev. (feet)	Graphic Scale	MATERIAL DESCRIPTION	TYPE	BLOWS/ 6 INCHES	N	CORE REC. (%)	RQD (%)	REMARKS
25	14								
30	9		Very loose, grey, silty fine to medium SAND	SS	2-2-2	4			MC = 34.9%
35	4		Loose, brown, fine SAND with silt	SS	3-5-5	10			LL=NP, PL=NP, PI=NP Fines Content = 10.8% USCS = SM MC = 26.0%
40	-1		...grey (Low Terrace Deposits) Boring Terminated at 40 feet	SS	4-4-4	8			MC = 33.4%
45	-6								
50	-11								Piezometer installed at the time of boring.



Coal Ash Pond Berm Stability Evaluation
Charles R. Lowman Power Plant
Leroy, Alabama
CDG Reference No. : 060921201

Cross Section
A - A'

Date: 08/05/2009

Scale:
(H):1"=+/-160'
(V): 1"=+/-10'

Drawn By: JDA

CDG Engineers
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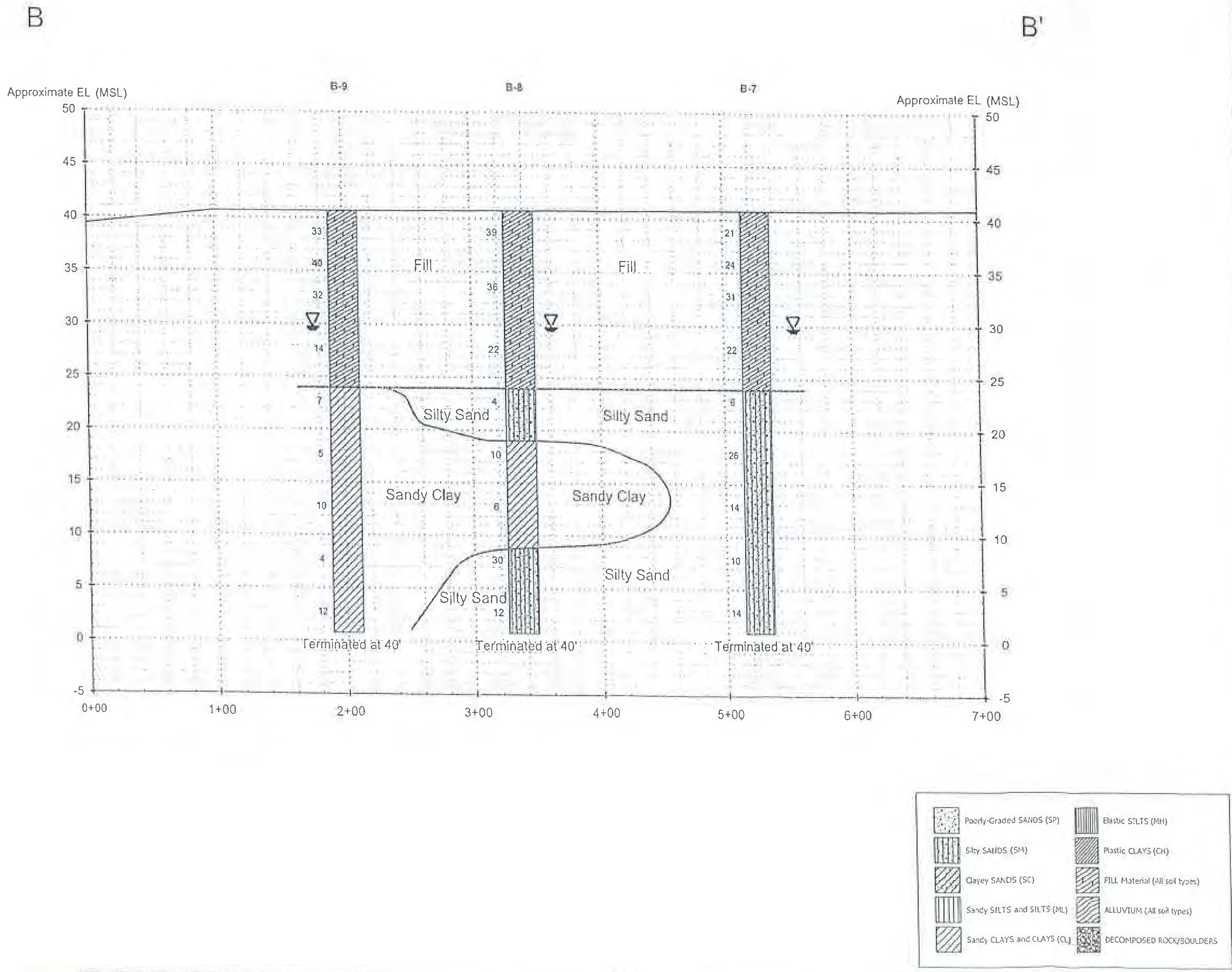

Coal Ash Pond Berm Stability Evaluation
Charles R. Lowman Power Plant
Leroy, Alabama
CDG Reference No. : 060921201

Cross Section
B - B'

Drawn By: JDA

Scale:
(H):1"=+/-160'
(V): 1"=+/-10'

Date: 08/05/2009

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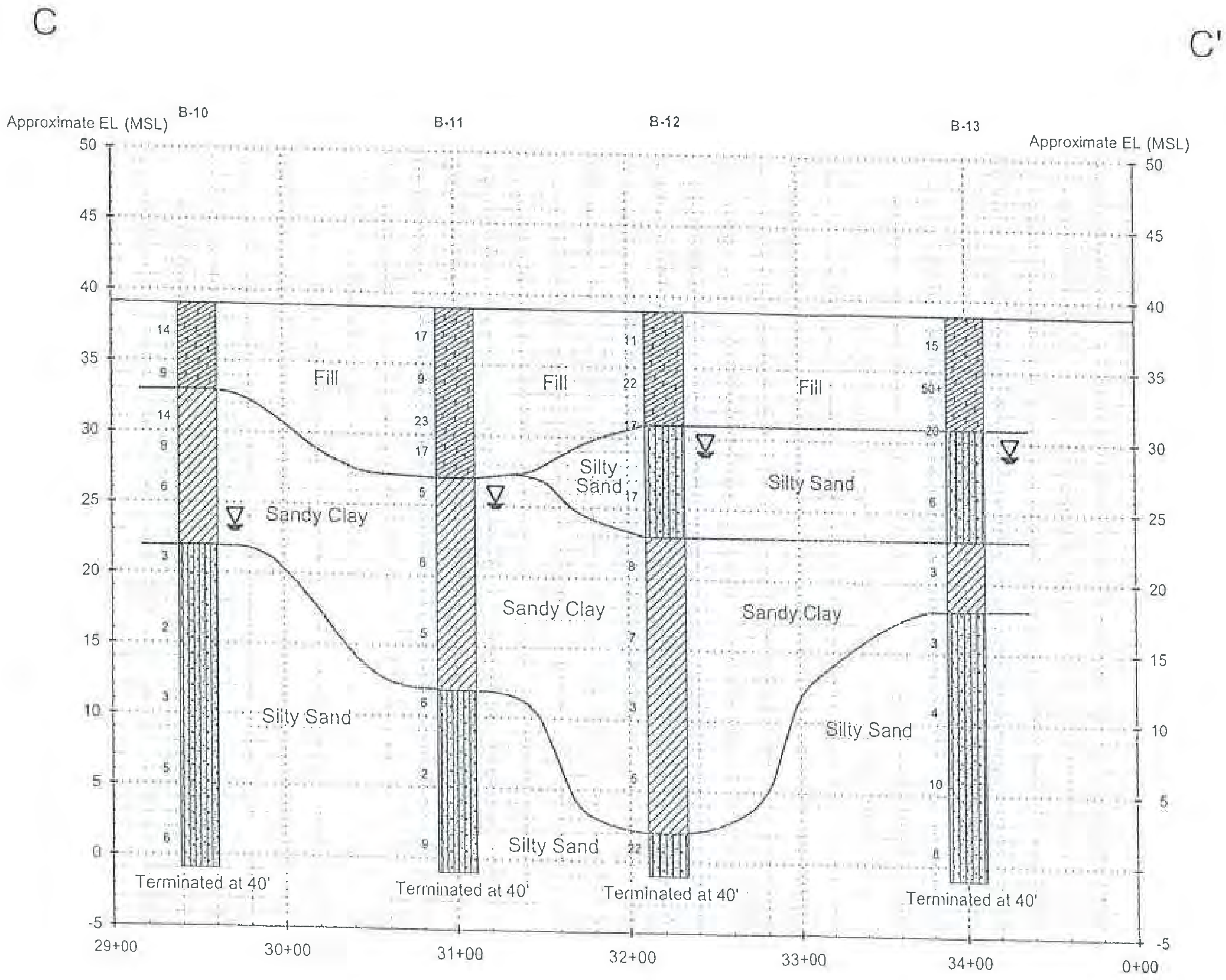

▨ Poorly-Graded SANDS (SP)
▨ Silty SANDS (SM)
▨ Clayey SANDS (SC)
▨ Sandy SILTS and SILTS (ML)
▨ Sandy CLAYS and CLAYS (CL)
▨ Elastic SILTS (MH)
▨ Plastic CLAYS (CH)
▨ FILL Material (All soil types)
▨ ALLUVIUM (All soil types)
▨ DECOMPOSED ROCK/BOULDERS

Coal Ash Pond Berm Stability Evaluation
Charles R. Lowman Power Plant
Leroy, Alabama
CDG Reference No. : 060921201

Cross Section
C - C'

Drawn By: JDA

Scale:
(H): 1"=+/-160'
(V): 1"=+/-10'

Date: 08/05/2009

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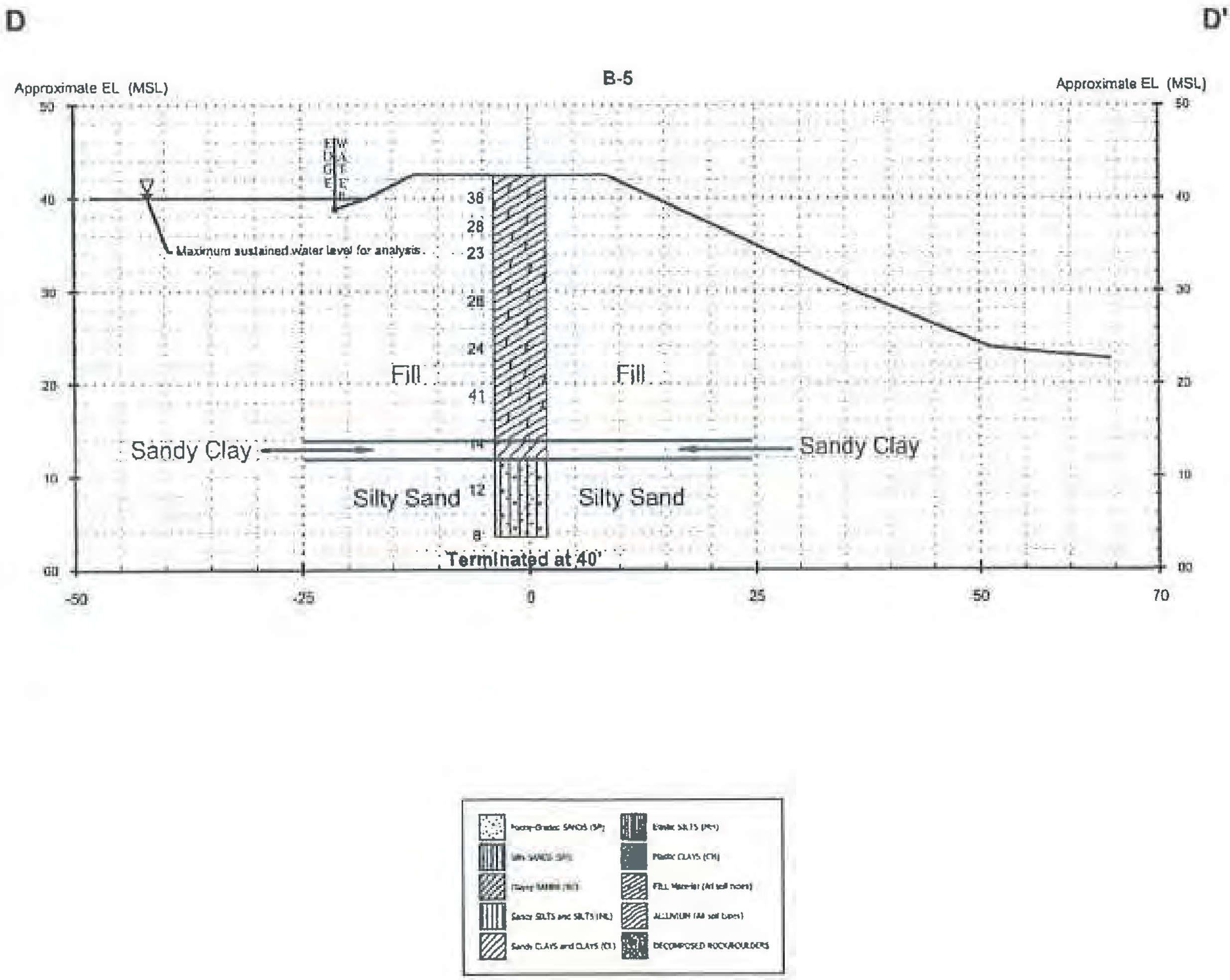

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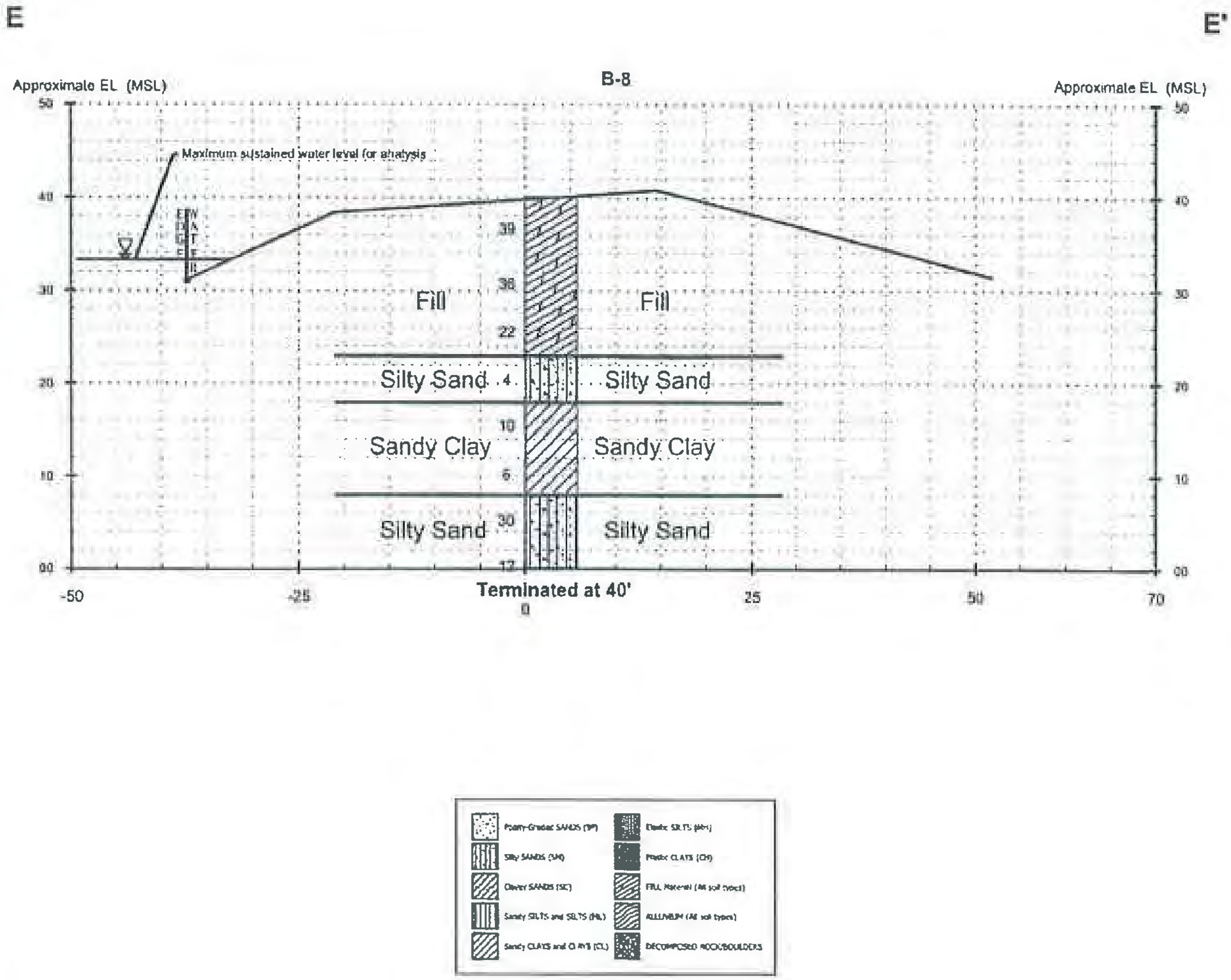
Cross Section D-D'

Drawn By: JDA | Scale: 1"=+/-20' | Date: 08/05/2009

Coal Ash Pond Berm Stability Evaluation
Charles R. Lowman Power Plant
Leroy, Alabama
CDG Reference No. : 060921201



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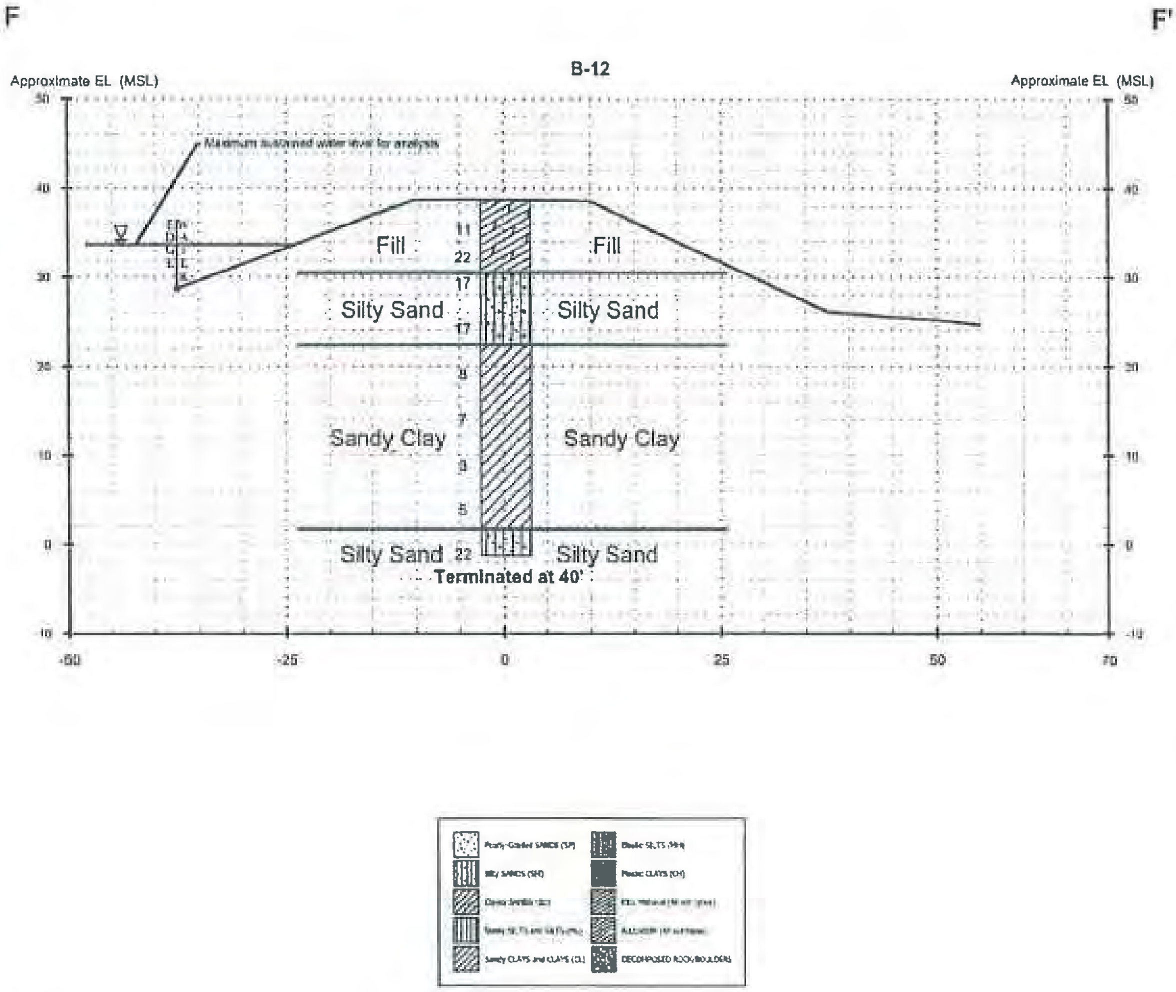
Cross Section E-E'

Drawn By: JDA | Scale: 1"=+/-20' | Date: 08/05/2009

Coal Ash Pond Berm Stability Evaluation
Charles R. Lowman Power Plant
Leroy, Alabama
CDG Reference No. : 060921201



CDG Engineers
& associates

Cross Section F-F'

Drawn By: JDA | Scale: 1"=+/-20' | Date: 08/05/2009

Coal Ash Pond Berm Stability Evaluation
Charles R. Lowman Power Plant
Leroy, Alabama
CDG Reference No. : 060921201

Appendix B

USEPA Coal Combustion Dam Inspection Checklist Forms

Coal Combustion Dam Inspection Checklist Form

US Environmental
Protection Agency

Site Name: Charles R Lowman Power Plant

Date: July 1, 2010

Unit Name: #1 Bottom Ash Pond

Operator's Name: PowerSouth Energy Cooperative

Unit I.D.: n/a

Hazard Potential Classification: High [✓ Significant] Low

Inspector's Name: Bill Friers, Bevin Barringer

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	see note		18. Sloughing or bulging on slopes?	x	
2. Pool elevation (operator records)?	33.0		19. Major erosion or slope deterioration?	x	
3. Decant inlet elevation (operator records)?	n/a		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	d/n/a		Is water entering inlet, but not exiting outlet?	x	
5. Lowest dam crest elevation (operator records)?	39.0		Is water exiting outlet, but not entering inlet?		x
6. If instrumentation is present, are readings recorded (operator records)?	see note		Is water exiting outlet flowing clear?	see note	
7. Is the embankment currently under construction?		x	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation,stumps, topsoil in area where embankment fill will be placed)?	d/n/a		From underdrain?	d/n/a	
9. Trees growing on embankment? (If so, indicate largest diameter below)	x		At isolated points on embankment slopes?		x
10. Cracks or scarps on crest?		x	At natural hillside in the embankment area?		x
11. Is there significant settlement along the crest?		x	Over widespread areas?		x
12. Are decant trashracks clear and in place?	d/n/a		From downstream foundation area?		x
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		x	"Boils" beneath stream or ponded water?		x
14. Clogged spillways, groin or diversion ditches?		x	Around the outside of the decant pipe?		x
15. Are spillway or ditch linings deteriorated?	d/n/a		22. Surface movements in valley bottom or on hillside?		x
16. Are outlets of decant or underdrains blocked?		x	23. Water against downstream toe?		x
17. Cracks or scarps on slopes?	x		24. Were Photos taken during the dam inspection?	x	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Inspection Issue # Comments

1. Daily general overall inspection for integrity performed by plant personnel. Monthly walk-down inspections performed by plant personnel.

2. Daily water level recorded off staff gauge within pond.

2.,5. Elevations shown reference NAVD 88.

6. Two piezometers installed on east embankment crest in 2009 during field investigation performed by CDG Engineers & Associates as part of a slope stability analysis. Piezometers have subsequently been destroyed.

9. Minor vegetation and trees (less then 1" in diameter) located along south embankment interior slope.

17. Erosion rills and surface erosion on north and east embankment interior slopes.

18. Minor sloughing on east and north embankment interior slopes.

19. Major slope deterioration, including sloughing and minor erosion rills, on south embankment interior slope at location of excavation into slope to make pipe repair.

n/a = Not Available
d/n/a = Does Not Apply

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # AL0003671 INSPECTOR Bill Friers, Bevin Barringer
Date July 1, 2010

Impoundment Name #1 Bottom Ash Pond
Impoundment Company PowerSouth Energy Cooperative
EPA Region 4
State Agency (Field Office) Addresss 2204 Perimeter Rd
Mobile, AL 36615
Name of Impoundment #1 Bottom Ash Pond
(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New X Update

	Yes	No
Is impoundment currently under construction?		X
Is water or ccw currently being pumped into the impoundment?	X	

IMPOUNDMENT FUNCTION: Processing CCW from Units 1, 2, and 3

Nearest Downstream Town : Name Carson, Alabama
Distance from the impoundment 2 Miles
Impoundment
Location: Longitude 87 Degrees 54 Minutes 47 Seconds W
Latitude 31 Degrees 29 Minutes 06 Seconds N
State Alabama County Washington

Does a state agency regulate this impoundment? YES NO X

If So Which State Agency?

HAZARD POTENTIAL (In the event the impoundment should fail, the following would occur):

______ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

______ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

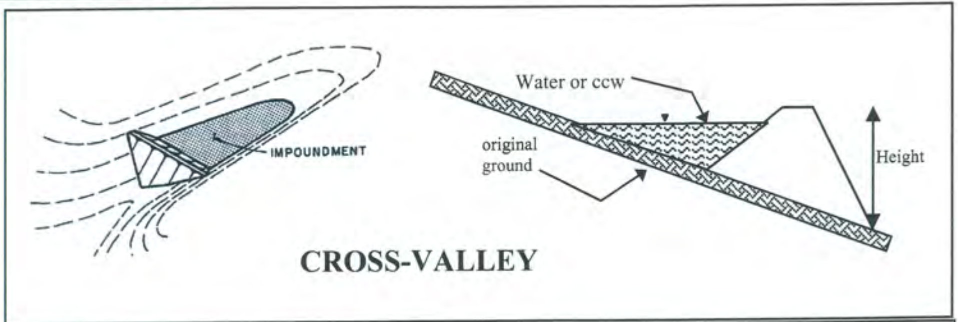
__X__ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

______ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

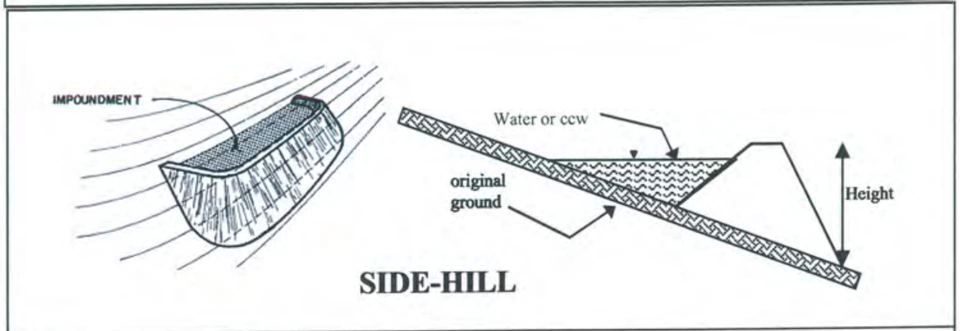
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

1) A breach could have an environmental impact on the Tombigbee River, which is approximately 365 ft east of the pond.
2) A breach could damage 115 kV overhead transmission lines.
3) A breach could result in property damage to rural areas located south of the pond, and downstream on the Tombigbee River.

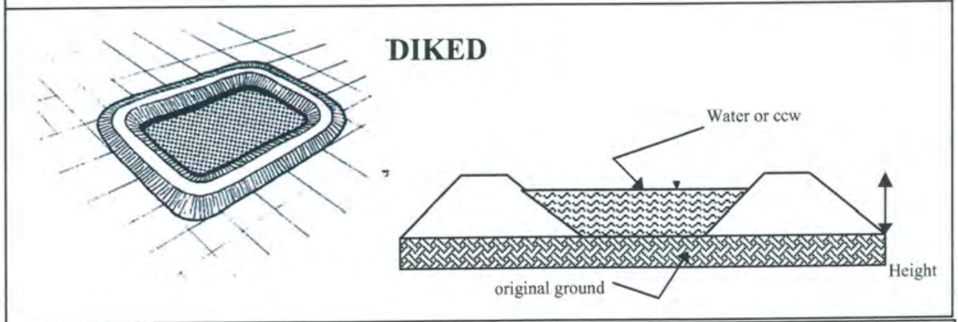
CONFIGURATION:

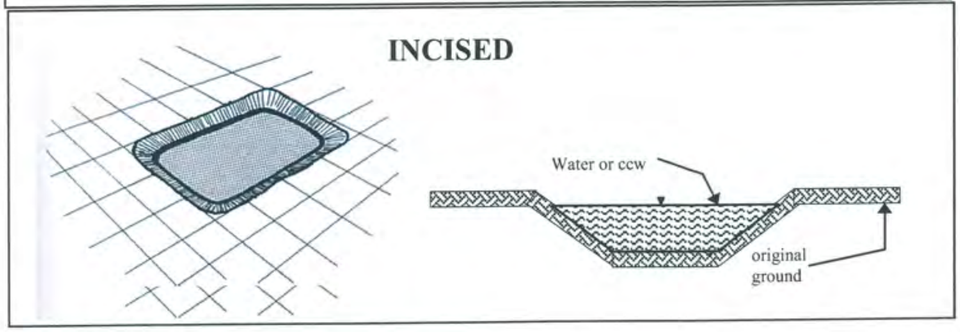


CROSS-VALLEY



SIDE-HILL


DIKED


INCISED

_____ Cross-Valley
_____ Side-Hill
__X__ Diked
_____ Incised (form completion optional)
_____ Combination Incised/Diked

Embankment Height ___29___ feet Embankment Material ___Earthen___
Pool Area ___16.5___ acres Liner ___None___
Current Freeboard ___6___ feet Liner Permeability ___d/n/a___

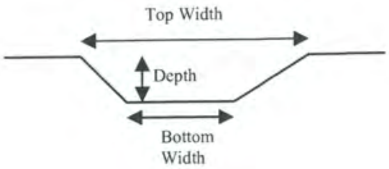
d/n/a = Does Not Apply

TYPE OF OUTLET (Mark all that apply)

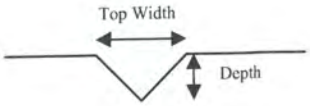
_____ **Open Channel Spillway**
_____ Trapezoidal
_____ Triangular
_____ Rectangular
_____ Irregular

_____ depth
_____ bottom (or average) width
_____ top width

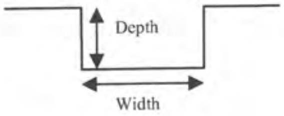
TRAPEZOIDAL



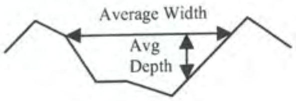
TRIANGULAR



RECTANGULAR

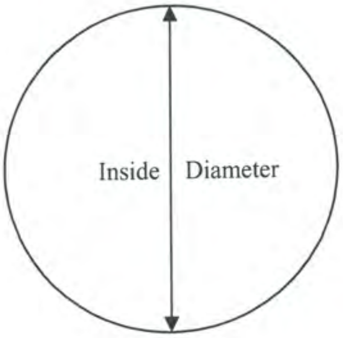


IRREGULAR



X **Outlet**

14" inside diameter



Material
_____ corrugated metal
X welded steel
_____ concrete
_____ plastic (hdpe, pvc, etc.)
_____ other (specify) _____________________

Is water flowing through the outlet? YES _______ NO X

_____ **No Outlet**

_____ **Other Type of Outlet** (specify) _____________________________

The Impoundment was Designed By Stanley Engineering Company

Has there ever been a failure at this site? YES __________ NO ____X______

If So When? ____________________________

If So Please Describe : ____

Has there ever been significant seepages at this site? YES _______ NO __X__

If So When? ______________________________

IF So Please Describe: ______________________________

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES ________ NO X, see note

If so, which method (e.g., piezometers, gw pumping,...)? ____________________

If so Please Describe : ____________________

Two piezometers were installed in 2009 during a field investigation performed by CDG Engineers & Associates as part of a slope stability analysis, not as a result of past seepage or breaches. Two water level readings were measured from each piezometers in 2009 and they have subsequently been destroyed.

Coal Combustion Dam Inspection Checklist Form

US Environmental
Protection Agency

Site Name: Charles R Lowman Power Plant

Date: July 1 and 2, 2010

Unit Name: #2/#3 Bottom Ash Pond

Operator's Name: PowerSouth Energy Cooperative

Unit I.D.: n/a

Hazard Potential Classification High [✓ Significant] Low

Inspector's Name: Bill Friers, Bevin Barringer

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	see note		18. Sloughing or bulging on slopes?		x
2. Pool elevation (operator records)?	39.3		19. Major erosion or slope deterioration?		x
3. Decant inlet elevation (operator records)?	n/a		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	d/n/a		Is water entering inlet, but not exiting outlet?	n/a	
5. Lowest dam crest elevation (operator records)?	42.0		Is water exiting outlet, but not entering inlet?	n/a	
6. If instrumentation is present, are readings recorded (operator records)?	d/n/a		Is water exiting outlet flowing clear?	n/a	
7. Is the embankment currently under construction?		x	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation,stumps, topsoil in area where embankment fill will be placed)?	d/n/a		From underdrain?	d/n/a	
9. Trees growing on embankment? (If so, indicate largest diameter below)	x		At isolated points on embankment slopes?	x	
10. Cracks or scarps on crest?		x	At natural hillside in the embankment area?		x
11. Is there significant settlement along the crest?		x	Over widespread areas?		x
12. Are decant trashracks clear and in place?	x		From downstream foundation area?		x
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?	x		"Boils" beneath stream or ponded water?		x
14. Clogged spillways, groin or diversion ditches?		x	Around the outside of the decant pipe?		x
15. Are spillway or ditch linings deteriorated?	d/n/a		22. Surface movements in valley bottom or on hillside?		x
16. Are outlets of decant or underdrains blocked?		x	23. Water against downstream toe?		x
17. Cracks or scarps on slopes?	x		24. Were Photos taken during the dam inspection?	x	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Inspection Issue # Comments

1. Daily general overall inspection for integrity performed by plant personnel. Monthly walk-down inspections performed by plant personnel.

2. Daily water level recorded off staff gauge within pond.

2.,5. Elevations shown reference NAVD 88.

9. Heavy vegetation and trees (up to 18" in diameter) located along west embankment exterior slope.

13. Small area (approximately 12" in diameter) of wet material within pond near the east embankment. A pipe collar with a minor leak was encountered upon excavation.

17. East embankment interior slopes have minor erosion near riprap.

20. Water was being discharged into the pond during inspection. The outlet pipe was submerged and it could not be determined if the outlet pumps were operating at the time of inspection.

21. Damp soil, which may be a result of seepage, observed near west embankment exterior toe.

n/a = Not Available
d/n/a = Does Not Apply

EPA FORM -XXXX

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # AL0003671 INSPECTOR Bill Friers, Bevin Barringer

Date July 1 and 2, 2010

Impoundment Name #2/#3 Bottom Ash Pond

Impoundment Company PowerSouth Energy Cooperative

EPA Region 4

State Agency (Field Office) Addresss 2204 Perimeter Rd
Mobile, AL 36615

Name of Impoundment #2/#3 Bottom Ash Pond

(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New X Update ______

	Yes	No
Is impoundment currently under construction?		X
Is water or ccw currently being pumped into the impoundment?	X	

IMPOUNDMENT FUNCTION: Processing CCW from Units 1, 2, and 3

Nearest Downstream Town : Name Carson, Alabama

Distance from the impoundment 2 Miles

Impoundment Location:	Longitude	87	Degrees	54	Minutes	58	Seconds	W
	Latitude	31	Degrees	29	Minutes	13	Seconds	N
	State	Alabama	County	Washington				

Does a state agency regulate this impoundment? YES ______ NO X

If So Which State Agency? ______

HAZARD POTENTIAL (In the event the impoundment should fail, the following would occur):

______ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

______ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

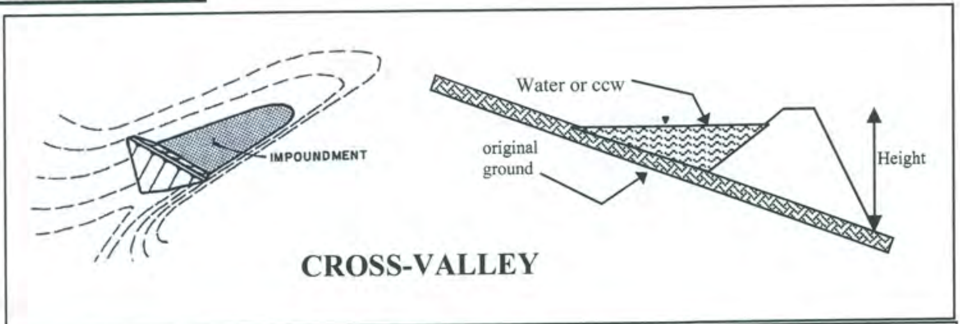
__X__ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

______ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

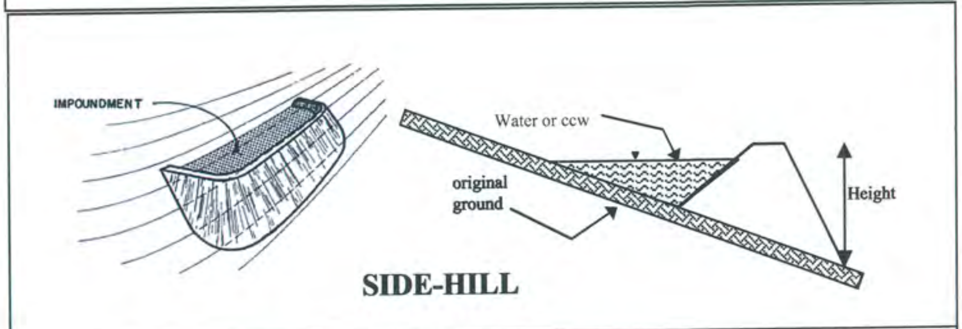
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

1) A breach could damage/washout the PSEC railroad spurs located on the west, south, and east embankment crests of the pond.
2) A breach could release waste into the Scrubber Pond which may result in a breach of the Scrubber Pond and cause environmental impacts to the Tombigbee River, located 1,300 feet north of the Scrubber Pond.

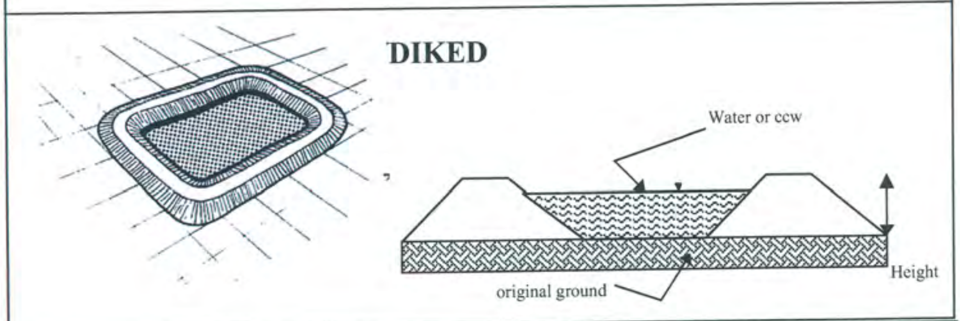
CONFIGURATION:



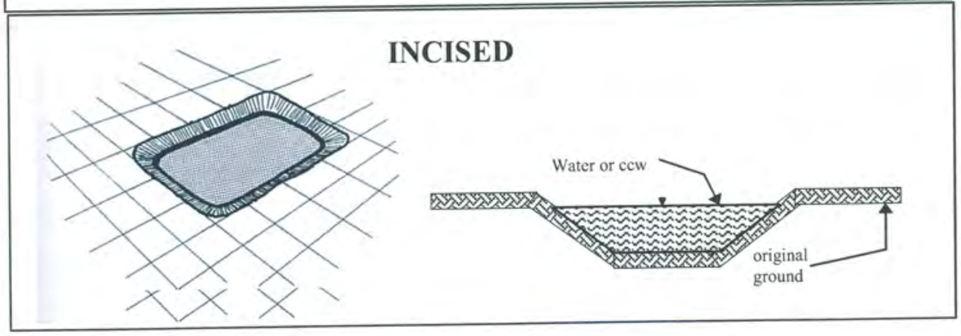
CROSS-VALLEY



SIDE-HILL



DIKED



INCISED

_____ Cross-Valley
_____ Side-Hill
__X__ Diked
_____ Incised (form completion optional)
_____ Combination Incised/Diked

Embankment Height 27 feet
Pool Area 29 acres
Current Freeboard 2.7 feet

Embankment Material Earthen
Liner None
Liner Permeability d/n/a

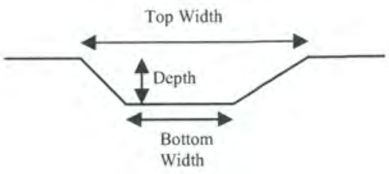
d/n/a = Does Not Apply

TYPE OF OUTLET (Mark all that apply)

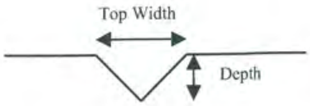
_____ **Open Channel Spillway**
_____ Trapezoidal
_____ Triangular
_____ Rectangular
_____ Irregular

_____ depth
_____ bottom (or average) width
_____ top width

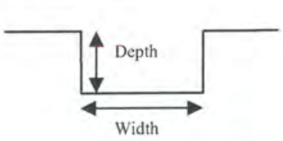
TRAPEZOIDAL



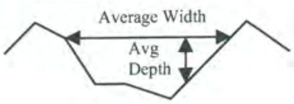
TRIANGULAR



RECTANGULAR

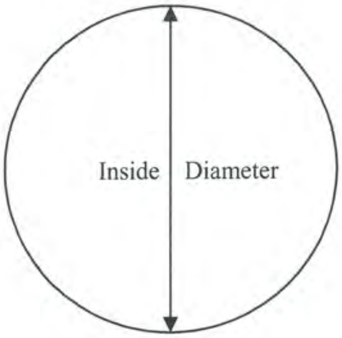


IRREGULAR



__X__ **Outlet**

__36"__ inside diameter



Material
_____ corrugated metal
_____ welded steel
_____ concrete
_____ plastic (hdpe, pvc, etc.)
__X__ other (specify) cast iron or ductile iron

Is water flowing through the outlet? YES __n/a__ NO _______

_____ **No Outlet**

_____ **Other Type of Outlet** (specify) ____________________

The Impoundment was Designed By Burns & McDonnell

Has there ever been a failure at this site? YES __________ NO ____X______

If So When? ____________________________

If So Please Describe : ____

Has there ever been significant seepages at this site? YES __X__ NO ______

If So When? March 2009

IF So Please Describe:

According to CDG Engineers & Associates, seepage was observed at the northernmost end of the west embankment exterior toe in March 2009 during field investigations. According to the CDG report prepared dated November 23, 2009 the seepage was not observed in September 2009, and suggests that the seepage observed in March 2009 may have been resulted from relatively high precipitation levels.

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES X NO

If so, which method (e.g., piezometers, gw pumping,...)? piezometers

If so Please Describe :

CDG Engineers & Associates (CDG) installed two piezometers on the east embankment crest of the adjacent scrubber pond in July 2009 to monitor groundwater levels for use in a slope stability analysis after observing seepage in March 2009. Groundwater levels were measured in July and August of 2009 by CDG. The piezometers are still in operation, but no water level readings have been obtained since August 2009.

Coal Combustion Dam Inspection Checklist Form

US Environmental
Protection Agency

Site Name: Charles R Lowman Power Plant

Date: July 1, 2010

Unit Name: Process Waste Pond

Operator's Name: PowerSouth Energy Cooperative

Unit I.D.: n/a

Hazard Potential Classification: High [✓ Significant] Low

Inspector's Name: Bill Friers, Bevin Barringer

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No
1. Frequency of Company's Dam Inspections?	see note	
2. Pool elevation (operator records)?	40.0	
3. Decant inlet elevation (operator records)?	n/a	
4. Open channel spillway elevation (operator records)?	d/n/a	
5. Lowest dam crest elevation (operator records)?	42.0	
6. If instrumentation is present, are readings recorded (operator records)?	d/n/a	
7. Is the embankment currently under construction?		x
8. Foundation preparation (remove vegetation,stumps, topsoil in area where embankment fill will be placed)?	d/n/a	
9. Trees growing on embankment? (If so, indicate largest diameter below)	x	
10. Cracks or scarps on crest?		x
11. Is there significant settlement along the crest?		x
12. Are decant trashracks clear and in place?	d/n/a	
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		x
14. Clogged spillways, groin or diversion ditches?		x
15. Are spillway or ditch linings deteriorated?	d/n/a	
16. Are outlets of decant or underdrains blocked?		x
17. Cracks or scarps on slopes?		x

	Yes	No
18. Sloughing or bulging on slopes?		x
19. Major erosion or slope deterioration?		x
20. Decant Pipes:		
Is water entering inlet, but not exiting outlet?	n/a	
Is water exiting outlet, but not entering inlet?	n/a	
Is water exiting outlet flowing clear?	n/a	
21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
From underdrain?	d/n/a	
At isolated points on embankment slopes?		x
At natural hillside in the embankment area?		x
Over widespread areas?		x
From downstream foundation area?		x
"Boils" beneath stream or ponded water?		x
Around the outside of the decant pipe?		x
22. Surface movements in valley bottom or on hillside?		x
23. Water against downstream toe?		x
24. Were Photos taken during the dam inspection?	x	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Inspection Issue # Comments

1. Daily general overall inspection for integrity performed by plant personnel. Monthly walk-down inspections performed by plant personnel.

2. Daily water level recorded off staff gauge within pond.

2.,5. Elevations shown reference NAVD 88.

9. Heavy vegetation and trees (up to 18" in diameter) located along west embankment exterior slope.

20. Water was being discharged into the pond during inspection. The outlet pipe was submerged and it could not be determined if the outlet pumps were operating at the time of inspection.

n/a = Not Available
d/n/a = Does Not Apply

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # AL0003671 INSPECTOR Bill Friers, Bevin Barringer

Date July 1, 2010

Impoundment Name Process Waste Pond

Impoundment Company PowerSouth Energy Cooperative

EPA Region 4

State Agency (Field Office) Addresss 2204 Perimeter Rd
Mobile, AL 36615

Name of Impoundment Process Waste Pond

(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New X Update ____

	Yes	No
Is impoundment currently under construction?		X
Is water or ccw currently being pumped into the impoundment?	X	

IMPOUNDMENT FUNCTION: Processing CCW prior to discharging into the Tombigbee River

Nearest Downstream Town : Name Carson, Alabama

Distance from the impoundment 2 Miles

Impoundment Location:
Longitude 87 Degrees 54 Minutes 44 Seconds W
Latitude 31 Degrees 29 Minutes 30 Seconds N
State Alabama County Washington

Does a state agency regulate this impoundment? YES ____ NO X

If So Which State Agency? ____

HAZARD POTENTIAL (In the event the impoundment should fail, the following would occur):

______ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

______ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

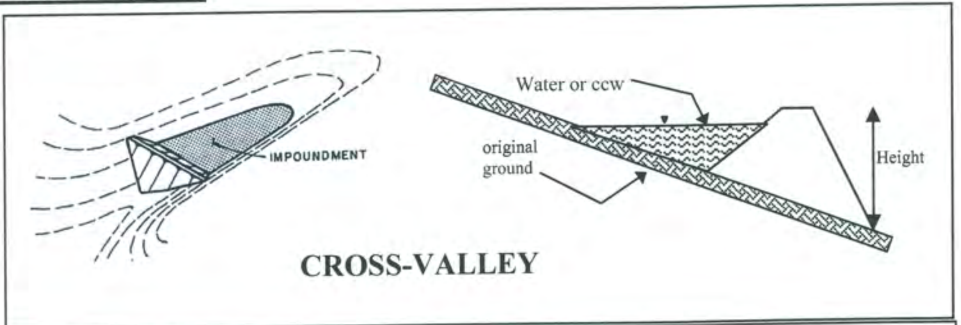
__X__ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

______ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

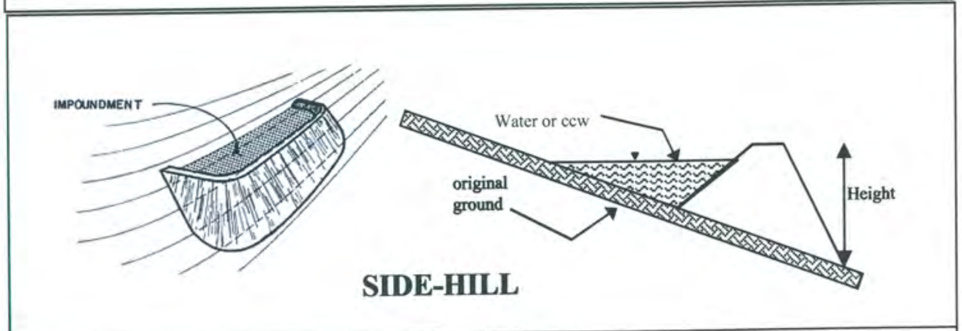
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

1) A breach could have an environmental impact on the Tombigbee River, which is approximately 800 ft north of the pond.
2) A breach could damage/washout the Norfolk Southern railroad line north of the pond.

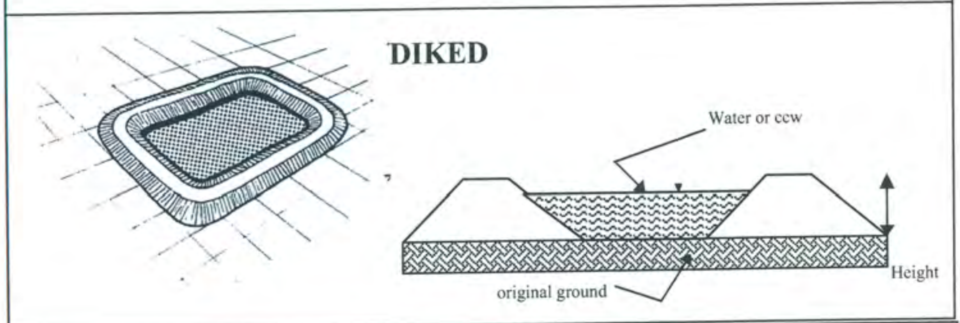
CONFIGURATION:



CROSS-VALLEY



SIDE-HILL



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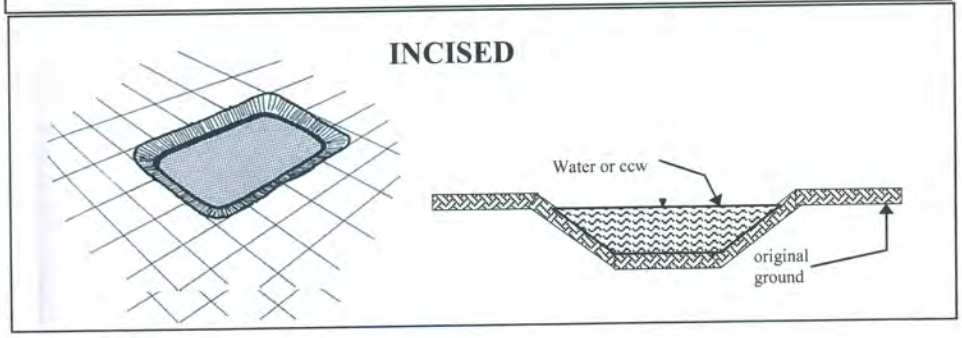


INCISED

_____ Cross-Valley
_____ Side-Hill
__X__ Diked
_____ Incised (form completion optional)
_____ Combination Incised/Diked

Embankment Height __27__ feet Embankment Material __Earthen__
Pool Area __6__ acres Liner __None__
Current Freeboard __2__ feet Liner Permeability __d/n/a__

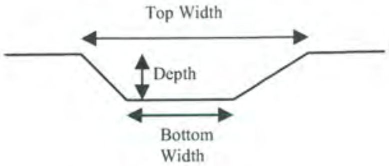
d/n/a = Does Not Apply

TYPE OF OUTLET (Mark all that apply)

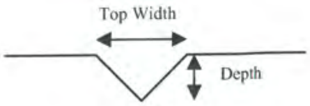
_____ **Open Channel Spillway**
_____ Trapezoidal
_____ Triangular
_____ Rectangular
_____ Irregular

_____ depth
_____ bottom (or average) width
_____ top width

TRAPEZOIDAL



TRIANGULAR



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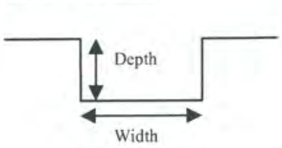
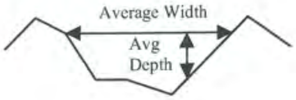
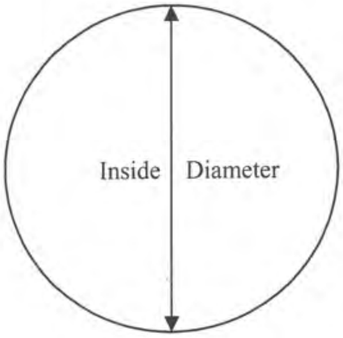


IRREGULAR



X **Outlet**

12" inside diameter



Material
X corrugated metal
_____ welded steel
_____ concrete
_____ plastic (hdpe, pvc, etc.)
_____ other (specify) __________

Is water flowing through the outlet? YES n/a NO _____

_____ **No Outlet**

_____ **Other Type of Outlet** (specify) __________

The Impoundment was Designed By Burns & McDonnell

Has there ever been a failure at this site? YES __________ NO ___X___

If So When? ______________________________

If So Please Describe : ______________________________

Has there ever been significant seepages at this site? YES _______ NO __X__

If So When? ______________________________

IF So Please Describe: ______________________________

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES ________ NO ___X____

If so, which method (e.g., piezometers, gw pumping,...)? ____________________

If so Please Describe : ______________________________

Coal Combustion Dam Inspection Checklist Form

US Environmental
Protection Agency

Site Name: Charles R Lowman Power Plant

Date: July 1, 2010

Unit Name: Scrubber Waste Pond

Operator's Name: PowerSouth Energy Cooperative

Unit I.D.: n/a

Hazard Potential Classification: High [✓ Significant] Low

Inspector's Name: Bill Friers, Bevin Barringer

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	see note		18. Sloughing or bulging on slopes?		x
2. Pool elevation (operator records)?	39.0		19. Major erosion or slope deterioration?		x
3. Decant inlet elevation (operator records)?	n/a		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	d/n/a		Is water entering inlet, but not exiting outlet?	n/a	
5. Lowest dam crest elevation (operator records)?	41.0		Is water exiting outlet, but not entering inlet?	n/a	
6. If instrumentation is present, are readings recorded (operator records)?	see note		Is water exiting outlet flowing clear?	n/a	
7. Is the embankment currently under construction?		x	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation,stumps, topsoil in area where embankment fill will be placed)?	d/n/a		From underdrain?	d/n/a	
9. Trees growing on embankment? (If so, indicate largest diameter below)	x		At isolated points on embankment slopes?	x	
10. Cracks or scarps on crest?		x	At natural hillside in the embankment area?		x
11. Is there significant settlement along the crest?		x	Over widespread areas?		x
12. Are decant trashracks clear and in place?			From downstream foundation area?		x
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		x	"Boils" beneath stream or ponded water?		x
14. Clogged spillways, groin or diversion ditches?		x	Around the outside of the decant pipe?		x
15. Are spillway or ditch linings deteriorated?	d/n/a		22. Surface movements in valley bottom or on hillside?		x
16. Are outlets of decant or underdrains blocked?		x	23. Water against downstream toe?		x
17. Cracks or scarps on slopes?	x		24. Were Photos taken during the dam inspection?	x	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Inspection Issue # Comments

1. Daily general overall inspection for integrity performed by plant personnel. Monthly walk-down inspections performed by plant personnel.

2. Daily water level recorded off staff gauge within pond.

2.,5. Elevations shown reference NAVD 88.

6. Two piezometers installed on west embankment crest in 2009 during field investigation performed by CDG Engineers & Associates as part of a slope stability analysis.

9. Heavy vegetation and trees (up to 18" in diameter) located along west embankment exterior slope.

17. South and east embankment interior slopes have minor erosion near riprap.

20. Water was being discharged into the pond during inspection. The outlet pipe was submerged and it could not be determined if the outlet pumps were operating at the time of inspection.

21. Damp soil, which may be a result of seepage, observed near west embankment exterior toe.

n/a = Not Available
d/n/a = Does Not Apply

EPA FORM -XXXX

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # AL0003671 INSPECTOR Bill Friers, Bevin Barringer

Date July 1, 2010

Impoundment Name Scrubber Waste Pond

Impoundment Company PowerSouth Energy Cooperative

EPA Region 4

State Agency (Field Office) Addresss 2204 Perimeter Rd
Mobile, AL 36615

Name of Impoundment Scrubber Waste Pond

(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New X Update ______

	Yes	No
Is impoundment currently under construction?		X
Is water or ccw currently being pumped into the impoundment?	X	

IMPOUNDMENT FUNCTION: Processing scrubber waste

Nearest Downstream Town : Name Carson, Alabama

Distance from the impoundment 2 Miles

Impoundment Location:

Longitude	87	Degrees	54	Minutes	51	Seconds	W
Latitude	31	Degrees	29	Minutes	23	Seconds	N

State Alabama County Washington

Does a state agency regulate this impoundment? YES ______ NO X

If So Which State Agency?____________________

HAZARD POTENTIAL (In the event the impoundment should fail, the following would occur):

______ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

______ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

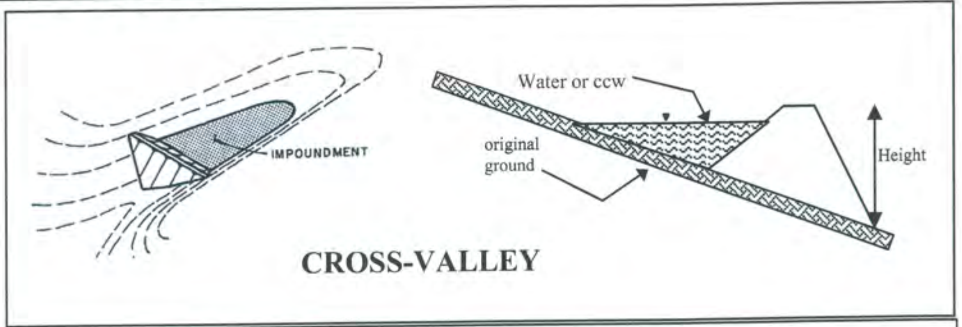
__X__ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

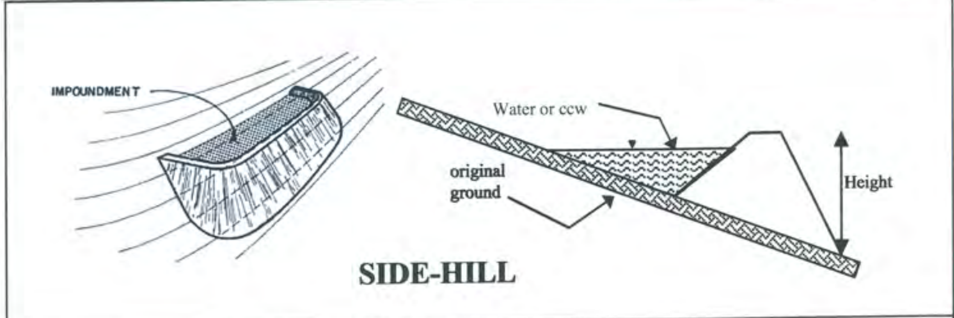
______ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

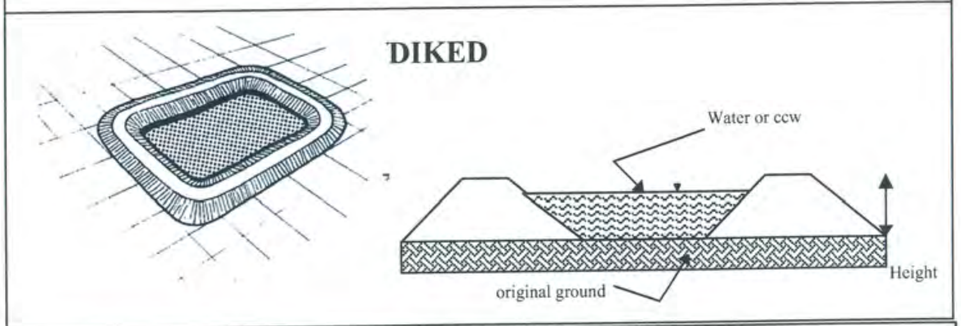
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

1) A breach could release waste into either the Process Waste or #2/#3 Bottom Ash Pond. A breach of the #2/#3 Bottom Ash Pond as a result of a breach in the Scrubber Pond could damage/washout the PSEC railroad spurs located on the west, south, and east embankment crests of the #2/#3 Bottom Ash Pond.
2) A breach could have an environmental impact of the Tombigbee River, approximately 1,300 feet north of the pond.

CONFIGURATION:


CROSS-VALLEY


SIDE-HILL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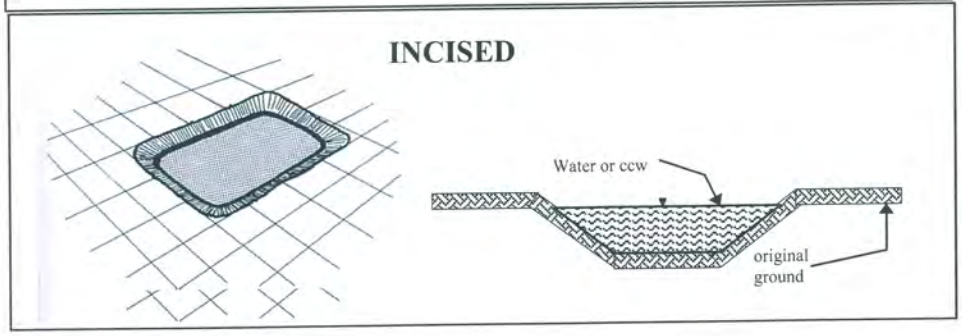

INCISED

_____ Cross-Valley
_____ Side-Hill
X Diked
_____ Incised (form completion optional)
_____ Combination Incised/Diked

Embankment Height 27 feet Embankment Material Earthen
Pool Area 36 acres Liner None
Current Freeboard 2 feet Liner Permeability d/n/a

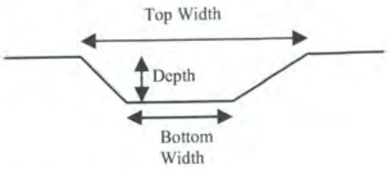
d/n/a = Does Not Apply

TYPE OF OUTLET (Mark all that apply)

_____ **Open Channel Spillway**
_____ Trapezoidal
_____ Triangular
_____ Rectangular
_____ Irregular

_____ depth
_____ bottom (or average) width
_____ top width

TRAPEZOIDAL



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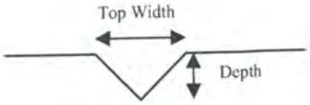

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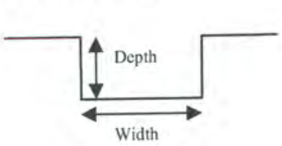
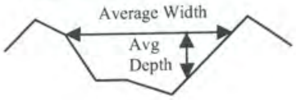
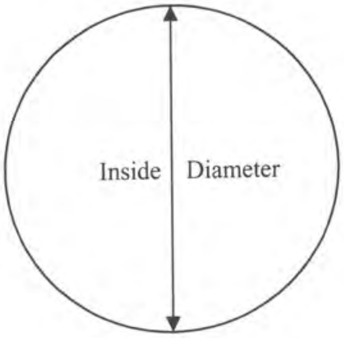


IRREGULAR



_X_ **Outlet**

_16"_ inside diameter



Material
_____ corrugated metal
_____ welded steel
_____ concrete
_____ plastic (hdpe, pvc, etc.)
_X_ other (specify) cast iron or ductile iron

Is water flowing through the outlet? YES _n/a_ NO _____

_____ **No Outlet**

_____ **Other Type of Outlet** (specify) _____

The Impoundment was Designed By Burns & McDonnell

Has there ever been a failure at this site? YES __________ NO ____X______

If So When? ____________________________

If So Please Describe : ____

Has there ever been significant seepages at this site? YES __X__ NO ______

If So When? March 2009

IF So Please Describe:

According to CDG Engineers & Associates, seepage was observed at the southernmost end of the west embankment exterior toe in March 2009 during field investigations. According to the CDG report dated November 23, 2009 the seepage was not observed in September 2009, and suggests that the seepage observed in March 2009 may have been resulted from relatively high precipitation levels.

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES X NO ____

If so, which method (e.g., piezometers, gw pumping,...)? piezometers

If so Please Describe :

CDG Engineers & Associates (CDG) installed two piezometers on the east embankment crest of the scrubber pond in July 2009 to monitor groundwater levels for use in a slope stability analysis after observing seepage in March 2009. Groundwater levels were measured in July and August of 2009 by CDG. The piezometers are still in operation, but no water level readings have been obtained since August 2009.

Appendix C

Photographs

Photo No. 1: #1 Bottom Ash Pond – North embankment crest looking west.

Photo No. 2: #1 Bottom Ash Pond – North embankment interior slope, looking west. Looking at sluice line discharge from Units 2 & 3.

Photo No. 3: #1 Bottom Ash Pond – North embankment interior slope, looking east. Ash product covering slope.

Photo No. 4: #1 Bottom Ash Pond – West embankment interior slope, looking south.

Photo No. 5: #1 Bottom Ash Pond – West embankment interior slope, looking south, typical vegetation.

Photo No. 6: #1 Bottom Ash Pond – West embankment interior slope. 3H:1V slope measured toward bottom of slope, 2H:1V measured on upper 8 to 10 feet.

Photo No. 7: #1 Bottom Ash Pond – West embankment exterior slope, looking north. Note standing water in drainage ditch at toe.

Photo No. 8: #1 Bottom Ash Pond – West embankment crest, looking south. Plant access road embankment on right.

Photo No. 9: #1 Bottom Ash Pond – West embankment crest, looking south.

Photo No. 10: #1 Bottom Ash Pond – West embankment interior slope, looking north.

Photo No. 11: #1 Bottom Ash Pond – South embankment crest. Looking at granular road.

Photo No. 12: #1 Bottom Ash Pond – Southwest corner interior slope, looking south.

Photo No. 13: #1 Bottom Ash Pond – South embankment crest, looking east.

Photo No. 14: #1 Bottom Ash Pond – South embankment exterior slope, looking north. Note surface erosion.

Photo No. 15: #1 Bottom Ash Pond – South embankment interior slope, looking west. Note minor surface erosion.

Photo No. 16: #1 Bottom Ash Pond – South embankment interior slope, looking east.

Photo No. 17: #1 Bottom Ash Pond – South embankment exterior slope, looking east. Note surface erosion.

Photo No. 18: #1 Bottom Ash Pond – South embankment interior slope, looking west. Note erosion and undercut of slope.

Photo No. 19: #1 Bottom Ash Pond – South embankment interior slope. Location of excavation into slope/crest and subsequent erosion.

Photo No. 20: #1 Bottom Ash Pond – South embankment crest, looking east. Note substation in background.

Photo No. 21: #1 Bottom Ash Pond – South embankment exterior slope, looking east. Looking at vegetation around transmission towers.

Photo No. 22: #1 Bottom Ash Pond – South embankment exterior slope. Looking at minor erosion rill.

Photo No. 23: #1 Bottom Ash Pond – South embankment exterior slope, looking north. Looking at outlet pumps.

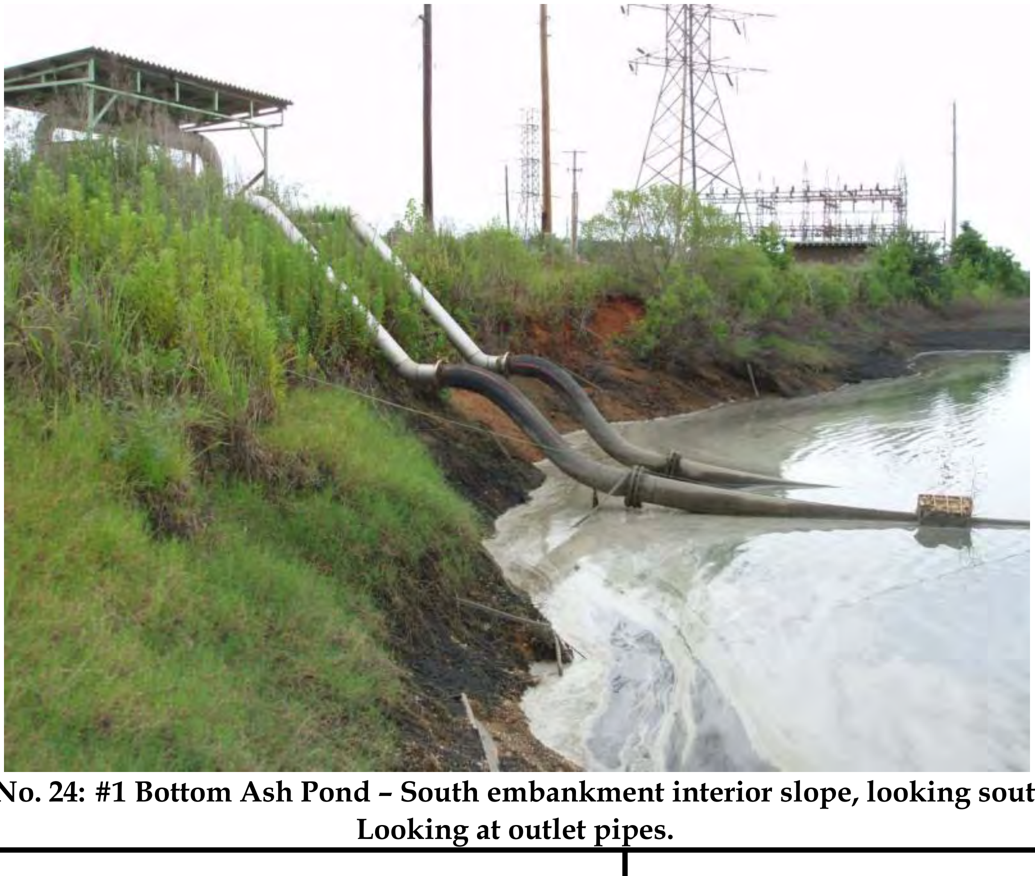


Photo No. 24: #1 Bottom Ash Pond – South embankment interior slope, looking southwest. Looking at outlet pipes.

Photo No. 25: #1 Bottom Ash Pond – East embankment interior slope, looking north. Note surface erosion near water line.

Photo No. 26: #1 Bottom Ash Pond – South embankment exterior slope, looking north.

Photo No. 27: #1 Bottom Ash Pond – East embankment interior slope. Looking at minor erosion rills.

Photo No. 28: #1 Bottom Ash Pond – East embankment interior slope. Looking at erosion rills.

Photo No. 29: #1 Bottom Ash Pond – East embankment exterior slope, looking north.

Photo No. 30: #1 Bottom Ash Pond – East embankment crest, looking north.

Photo No. 31: #1 Bottom Ash Pond – East embankment interior slope. Note vegetation and surface erosion.

Photo No. 32: #1 Bottom Ash Pond – East embankment exterior slope, looking south.

Photo No. 33: #1 Bottom Ash Pond – Drainage ditch running along east embankment, looking south.

Photo No. 34: #1 Bottom Ash Pond – East embankment exterior slope, looking southwest.

Photo No. 35: #1 Bottom Ash Pond – East embankment exterior slope. Looking at minor surface erosion.

Photo No. 36: #1 Bottom Ash Pond – East embankment exterior slope. Looking at typical vegetation.

Photo No. 37: #1 Bottom Ash Pond – East embankment exterior slope, looking east.

Photo No. 38: #1 Bottom Ash Pond – East embankment interior slope. Looking at eroded or missing soils near utility pole.

Photo No. 39: #1 Bottom Ash Pond – North embankment interior slope, looking east.

Photo No. 40: #1 Bottom Ash Pond – North embankment crest and exterior slope, looking west. Note transmission towers on slope.

Photo No. 41: #1 Bottom Ash Pond – North embankment interior slope. Looking at erosion rill.

Photo No. 42: #1 Bottom Ash Pond – North embankment interior slope, looking west.

Photo No. 43: #1 Bottom Ash Pond – North embankment interior slope. Looking at surface erosion.

Photo No. 44: #1 Bottom Ash Pond – North embankment interior slope. Looking at surface erosion/erosion rill.

Photo No. 45: #1 Bottom Ash Pond – North embankment exterior slope, looking east. Note surface erosion on upper slope.

Photo No. 46: #1 Bottom Ash Pond – North embankment exterior slope, looking west. Note standing water near transmission tower base.

Photo No. 47: North embankment interior slope, looking northeast. Looking at erosion rill. Sluice line from Unit 1 to the right.

Photo No. 48: #1 Bottom Ash Pond – North embankment interior slope, looking northwest. Looking at surface erosion.

Photo No. 49: Process Waste Pond – North embankment interior slope. Looking at intake pumps.

Photo No. 50: Process Waste Pond – West embankment interior slope, looking south.

Photo No. 51: Process Waste Pond – West embankment crest, looking south.

Photo No. 52: Process Waste Pond – West embankment crest, looking east.

Photo No. 53: Process Waste Pond – West embankment crest, looking south.

Photo No. 54: Process Waste Pond – West embankment crest, looking south.

Photo No. 55: Process Waste Pond – West embankment interior slope, looking north. Note surface erosion.

Photo No. 56: Process Waste Pond – West embankment interior slope, looking northeast.

Photo No. 57: Process Waste Pond – South (divider) embankment exterior slope, looking east. Note erosion rills in fill material, placed in the past for construction access road.

Photo No. 58: Process Waste Pond – South (divider) embankment exterior slope, looking southeast. Looking at erosion rills in fill material.

Photo No. 59: Process Waste Pond – South (divider) embankment exterior slope. Looking at erosion rills in fill material.

Photo No. 60: Process Waste Pond – South embankment crest, looking east.

Photo No. 61: Process Waste Pond – South embankment interior slope, looking east. Note vegetation growing within riprap

Photo No. 62: Process Waste Pond – South embankment interior slope, looking east. Looking at discharge outfall from pump station.

Photo No. 63: Process Waste Pond – South and north embankment interior slopes, looking northwest. Note vegetation growing within riprap.

Photo No. 64: Process Waste Pond – North embankment crest, looking north.

Photo No. 65: Process Waste Pond – North embankment interior slope, looking north. Looking at second discharge pipe from pump station.

Photo No. 66: Process Waste Pond – South embankment interior slope, looking south. Looking at discharge from FGD (concrete structure) and second discharge pipe from pump station (HDPE pipe).

Photo No. 67: Process Waste Pond – North embankment interior slope, looking north. Note vegetation growing in riprap.

Photo No. 68: Process Waste Pond – North embankment interior slope. Looking at capped pipe (unknown origin).

Photo No. 69: Process Waste Pond – North embankment crest, incised into finished yard grade.

Photo No. 70: Scrubber Waste Pond – North embankment interior slope, looking southwest.

Photo No. 71: Scrubber Waste Pond – West embankment crest, looking south.

Photo No. 72: Scrubber Waste Pond – West embankment interior slope. Looking at vegetation on slope.

Photo No. 73: Scrubber Waste Pond – West embankment interior slope, looking north. Note erosion of riprap.

Photo No. 74: Scrubber Waste Pond – West embankment interior slope, looking southeast. Looking at intake piping and pump station.

Photo No. 75: Scrubber Waste Pond – South embankment interior slope. Intake structure near southwest corner.

Photo No. 76: Scrubber Waste Pond – South (divider) embankment interior slope, looking east. Note surface erosion and settlement above riprap.

Photo No. 77: Scrubber Waste Pond – South embankment interior slope, looking east. Looking at location of spongy soils in area of buried pipeline.

Photo No. 78: Scrubber Waste Pond – South embankment interior slope, looking east. Note surface erosion and sparse riprap.

Photo No. 79: Scrubber Waste Pond – South embankment exterior slope. Looking at 10-inch-deep void beneath riprap.

Photo No. 80: Scrubber Waste Pond – South embankment exterior slope. Looking at 10-inch-deep void in soils.

Photo No. 81: Scrubber Waste Pond – South embankment interior slope, looking east. Note sparse riprap and surface erosion.

Photo No. 82: Scrubber Waste Pond – South embankment interior slope. Looking at 8-inch-deep void.

Photo No. 83: Scrubber Waste Pond – South embankment interior slope, looking northeast. Dredge pipe left in place after pond cleanout.

Photo No. 84: Scrubber Waste Pond – East embankment interior slope. Looking at surface erosion and sparse riprap.

Photo No. 85: Scrubber Waste Pond – East embankment crest, looking south.

Photo No. 86: Scrubber Waste Pond – East embankment interior slope. Looking discharge pipe from cooling tower blowdown.

Photo No. 87: Scrubber Waste Pond – East embankment interior slope. Looking at surface erosion, sparse riprap and vegetation within riprap.

Photo No. 88: Scrubber Waste Pond – East embankment interior slope, looking south. Looking at vegetation and fill material.

Photo No. 89: Scrubber Waste Pond – East embankment crest, looking north.

Photo No. 90: Scrubber Waste Pond – East embankment interior slope, looking southeast. Looking at ash product and vegetation on slope.

Photo No. 91: Scrubber Waste Pond – East embankment crest. Looking at storm drain that discharges to the Scrubber Waste Pond.

Photo No. 92: Scrubber Waste Pond – North embankment interior slope. Looking at discharge pipes from limestone mill.

Photo No. 93: Scrubber Waste Pond – North embankment crest, looking southeast.

Photo No. 94: Scrubber Waste Pond – North embankment crest, looking northwest.

Photo No. 95: Scrubber Waste Pond – North embankment interior slope. Looking at discharge pipes from gypsum plant.

Photo No. 96: Scrubber Waste Pond – North (divider) embankment interior slope. Looking at erosion rills in fill material.

Photo No. 97: Scrubber Waste Pond – North (divider) embankment interior slope, looking west. Note ash product and vegetation on slope.

Photo No. 98: Scrubber Waste Pond – North embankment interior slope, looking northwest. Looking at erosion rills in fill material.

Photo No. 99: Scrubber Waste Pond – North embankment interior slope. Looking at erosion rill in fill material.

Photo No. 100: Scrubber Waste Pond – North (divider) embankment interior slope, looking west. Looking at haul road fill material.

Photo No. 101: Scrubber Waste Pond – North embankment interior slope. Looking at erosion rills in fill material.

Photo No. 102: Scrubber Waste Pond – North embankment interior slope, looking southwest. Looking at unknown pipe.

Photo No. 103: #2/#3 Bottom Ash Pond – North embankment interior slope. Looking at outlet structure.

Photo No. 104: #2/#3 Bottom Ash Pond – West embankment interior slope, looking southwest. Looking at discharge pipe from pump station.

Photo No. 105: #2/#3 Bottom Ash Pond – West embankment interior slope, looking south.

Photo No. 106: #2/#3 Bottom Ash Pond – West embankment interior slope. Looking at erosion of riprap.

Photo No. 107: #2/#3 Bottom Ash Pond – West embankment interior slope, looking south.

Photo No. 108: #2/#3 Bottom Ash Pond – West embankment interior slope. Looking at surface erosion and possible localized settlement.

Photo No. 109: #2/#3 Bottom Ash Pond – South embankment interior slope, looking southeast. Note cattails growing within impoundment in background.

Photo No. 110: #2/#3 Bottom Ash Pond – South embankment crest, looking east.

Photo No. 111: #2/#3 Bottom Ash Pond – South embankment interior slope, looking east.

Photo No. 112: #2/#3 Bottom Ash Pond – South embankment exterior slope, looking east.

Photo No. 113: #2/#3 Bottom Ash Pond – South embankment interior slope, looking northeast.

Photo No. 114: #2/#3 Bottom Ash Pond – South embankment interior slope, looking southwest. Looking at erosion and missing riprap.

Photo No. 115: #2/#3 Bottom Ash Pond – East embankment interior slope. Looking at discharge pipe from #1 Bottom Ash Pond.

Photo No. 116: #2/#3 Bottom Ash Pond – East embankment exterior slope, looking north.

Photo No. 117: #2/#3 Bottom Ash Pond – East embankment interior slope, looking north. Note sparse riprap and cattails growing on slope.

Photo No. 118: #2/#3 Bottom Ash Pond – East embankment crest, looking north.

Photo No. 119: #2/#3 Bottom Ash Pond – East embankment exterior slope, looking north. Looking at piping from Units 1, 2, & 3.

Photo No. 120: #2/#3 Bottom Ash Pond – East embankment interior slope. Looking at inactive discharge pipe from Units 1, 2, & 3. Note sluice lines were configured for discharge of Units 1, 2 & 3 CCW to #1 Bottom Ash Pond.

Photo No. 121: #2/#3 Bottom Ash Pond – East embankment exterior slope. Looking at piping used to divert Units 1, 2, & 3 CCW from the #1 Bottom Ash Pond into the #2/#3 Bottom Ash Pond.

Photo No. 122: #2/#3 Bottom Ash Pond – East embankment exterior slope. Looking at piping used to divert Units 1, 2, & 3 CCW from the #1 Bottom Ash Pond into the #2/#3 Bottom Ash Pond.

Photo No. 123: #2/#3 Bottom Ash Pond – East embankment exterior slope, looking south. Looking at piping used to divert Units 1, 2, & 3 CCW from the #1 Bottom Ash Pond into the #2/#3 Bottom Ash Pond.

Photo No. 124: #2/#3 Bottom Ash Pond – East embankment interior slope. Looking at abandoned electrical line.

Photo No. 125: #2/#3 Bottom Ash Pond – East embankment interior slope. Looking at buried piping within ash product.

Photo No. 126: #2/#3 Bottom Ash Pond – East embankment interior slope and crest, looking north.

Photo No. 127: #2/#3 Bottom Ash Pond – North (divider) embankment interior slope and crest, looking west.

Photo No. 128: #2/#3 Bottom Ash Pond – North embankment interior slope. Looking at rut or inactive erosion rill.

Photo No. 129: #2/#3 Bottom Ash Pond – North embankment interior slope. Looking at vegetation and sparse riprap.

Photo No. 130: #2/#3 Bottom Ash Pond – North (divider) embankment interior slope and crest, looking west. Note vegetation around sluice lines.

Photo No. 131: #2/#3 Bottom Ash Pond – North embankment interior slope, looking east. Note vegetation growing on slope and cattails within pond.

Photo No. 132: #2/#3 Bottom Ash Pond – North embankment interior slope, looking west. Note vegetation growing within riprap.

Photo No. 133: #2/#3 Bottom Ash Pond – North (divider) embankment interior slope and crest, looking west. Note dense vegetation covering slope.

Photo No. 134: #2/#3 Bottom Ash Pond – North embankment interior slope, looking east.

Photo No. 135: C. R. Lowman Power Plant

Photo No. 136: #2/#3 Bottom Ash Pond – West embankment exterior slope, looking southeast.

Photo No. 137: #2/#3 Bottom Ash Pond – West embankment exterior slope, looking southeast.

Photo No. 138: #2/#3 Bottom Ash Pond – West embankment exterior slope. Looking at area of possible seepage.

Photo No. 139: #2/#3 Bottom Ash Pond – West embankment exterior slope, looking north. Note dense vegetation on slope.

Photo No. 140: #2/#3 Bottom Ash Pond – West embankment exterior slope, looking east.

Photo No. 141: #2/#3 Bottom Ash Pond – West embankment exterior slope, looking east. Looking at extent of spongy material in area of possible seepage.

Photo No. 142: Scrubber Waste Pond – West embankment exterior slope. Note dense vegetation on slope.

Photo No. 143: Scrubber Waste Pond – Outside west embankment toe. Looking at cattails in area of possible seepage.

Photo No. 144: #2/#3 Bottom Ash Pond – West embankment exterior slope, looking north.

Photo No. 145: #2/#3 Bottom Ash Pond – South embankment exterior slope. Looking at plant survey monument.

Photo No. 146: #2/#3 Bottom Ash Pond – South embankment exterior slope, looking east.

Photo No. 147: #2/#3 Bottom Ash Pond – West embankment exterior slope, looking north.

Photo No. 148: Scrubber Waste Pond – West embankment exterior slope, looking west. Looking at typical vegetation on slope.

Photo No. 149: Scrubber Waste Pond – West embankment exterior slope. Looking at surface erosion.

Photo No. 150: Scrubber Waste Pond – West embankment exterior slope. Looking at rodent burrow (4 inches in diameter, 26 inches deep).

Photo No. 151: Scrubber Waste Pond – West embankment exterior slope and crest, looking north.

Photo No. 152: Scrubber Waste Pond – West embankment exterior slope. Looking at possible seepage/standing water near toe.

Photo No. 153: Scrubber Waste Pond – West embankment exterior slope. Looking at minor slough.

Photo No. 154: Scrubber Waste Pond – West embankment exterior slope. Looking at rodent burrow (4 inches in diameter, 20 inches deep).

Photo No. 155: Scrubber Waste Pond – West embankment exterior slope, looking north.

Photo No. 156: Scrubber Waste Pond – West embankment exterior slope, looking west. Looking at cattails near toe.

Photo No. 157: Scrubber Waste Pond – West embankment exterior slope. Looking at surface erosion or possible animal trail.

Photo No. 158: Scrubber Waste Pond – West embankment exterior slope. Looking at 6-inch-diameter tree recently cut down.

Photo No. 159: Scrubber Waste Pond – West embankment exterior slope, looking west. Looking at standing water outside toe.

Photo No. 160: Scrubber Waste Pond – West embankment exterior slope. Looking at minor scarp.

Photo No. 161: Scrubber Waste Pond – West embankment exterior slope, looking north. Note dense vegetation on slope.

Photo No. 162: Process Waste Pond – West embankment exterior slope, looking north. Note dense vegetation on slope.

Appendix D

Photo GPS Locations

Appendix D
Photo GPS Locations

Site: Charles R. Lowman Power Plant
Datum: NAD 1983
Coordinate Units: Decimal Degrees

Photo No.	Latitude	Longitude
1	31.486145	-87.913430
2	31.486152	-87.913398
3	31.486235	-87.913753
4	31.486205	-87.913823
5	31.486152	-87.913927
6	31.485997	-87.914097
7	31.486025	-87.914243
8	31.485638	-87.914558
9	31.485510	-87.914945
10	31.485250	-87.915210
11	31.485357	-87.915028
12	31.485298	-87.915065
13	31.485038	-87.915140
14	31.484667	-87.914925
15	31.484895	-87.914883
16	31.484843	-87.914833
17	31.484597	-87.914488
18	31.484558	-87.914300
19	31.484372	-87.913935
20	31.484280	-87.913872
21	31.483845	-87.913033
22	31.483593	-87.912645
23	31.483398	-87.912507
24	31.483488	-87.912052
25	31.483502	-87.912083
26	31.483272	-87.912088
27	31.484018	-87.911823
28	31.483960	-87.911788
29	31.483657	-87.911710
30	31.483865	-87.911607
31	31.484405	-87.911438
32	31.484842	-87.910918
33	31.484867	-87.910837
34	31.484235	-87.911213
35	31.484012	-87.911388
36	31.483515	-87.911687
37	31.483252	-87.911955
38	31.484927	-87.910737
39	31.485378	-87.911120
40	31.485478	-87.911202
41	31.485592	-87.911622
42	31.485640	-87.911813
43	31.485752	-87.912162
44	31.485923	-87.912260
45	31.486047	-87.912552
46	31.485990	-87.912670

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Site: Charles R. Lowman Power Plant
Datum: NAD 1983
Coordinate Units: Decimal Degrees

Photo No.	Latitude	Longitude
47	31.486183	-87.913283
48	31.486172	-87.913295
49	31.492408	-87.911672
50	31.492485	-87.911847
51	31.492745	-87.912163
52	31.492573	-87.912163
53	31.492343	-87.912760
54	31.492065	-87.913432
55	31.492013	-87.913617
56	31.491817	-87.914117
57	31.491683	-87.913738
58	31.491637	-87.913408
59	31.491377	-87.912770
60	31.491250	-87.912472
61	31.491215	-87.912433
62	31.490495	-87.911880
63	31.490155	-87.911885
64	31.490328	-87.911628
65	31.490615	-87.911657
66	31.490928	-87.911675
67	31.491480	-87.911680
68	31.492050	-87.911653
69	31.492238	-87.911580
70	31.491688	-87.914342
71	31.491663	-87.914845
72	31.490507	-87.916330
73	31.489607	-87.917038
74	31.489420	-87.917288
75	31.489420	-87.917198
76	31.489013	-87.917125
77	31.488735	-87.916472
78	31.488155	-87.915035
79	31.488068	-87.914833
80	31.487960	-87.914417
81	31.487848	-87.914192
82	31.487755	-87.913942
83	31.487692	-87.913753
84	31.487782	-87.913515
85	31.488327	-87.913455
86	31.488302	-87.913510
87	31.488348	-87.913497
88	31.488675	-87.913245
89	31.488802	-87.913135
90	31.489017	-87.913058
91	31.489193	-87.912633
92	31.489500	-87.911902

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Site: Charles R. Lowman Power Plant
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Photo No.	Latitude	Longitude
93	31.489560	-87.911820
94	31.489612	-87.911760
95	31.489770	-87.911808
96	31.489910	-87.911782
97	31.490022	-87.911807
98	31.490412	-87.912057
99	31.489248	-87.912157
100	31.491047	-87.912367
101	31.491380	-87.912822
102	31.491648	-87.914128
103	31.488877	-87.917432
104	31.488873	-87.917433
105	31.488817	-87.917725
106	31.488512	-87.917915
107	31.487825	-87.918340
108	31.487275	-87.918378
109	31.486690	-87.918157
110	31.486217	-87.917857
111	31.485975	-87.917635
112	31.485472	-87.916660
113	31.485492	-87.916122
114	31.485522	-87.915732
115	31.485573	-87.915418
116	31.485572	-87.915120
117	31.485707	-87.914995
118	31.486115	-87.914423
119	31.486335	-87.914038
120	31.486422	-87.914003
121	31.486407	-87.914010
122	31.486403	-87.913993
123	31.486820	-87.913513
124	31.486813	-87.913573
125	31.486930	-87.913722
126	31.487052	-87.913528
127	31.487518	-87.913627
128	31.487732	-87.914223
129	31.487948	-87.914727
130	31.488020	-87.914827
131	31.488168	-87.915195
132	31.488182	-87.915182
133	31.488403	-87.916290
134	31.488875	-87.917355
135	31.487051	-87.913385
136	31.488797	-87.918003
137	31.488567	-87.918117
138	31.488807	-87.917998

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Site: Charles R. Lowman Power Plant
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Coordinate Units: Decimal Degrees

Photo No.	Latitude	Longitude
139	31.488858	-87.917923
140	31.488858	-87.917923
141	31.489068	-87.917975
142	31.489667	-87.917562
143	31.490053	-87.917812
144	31.487973	-87.918463
145	31.486667	-87.918395
146	31.486683	-87.918327
147	31.488858	-87.917950
148	31.489080	-87.917468
149	31.489297	-87.917450
150	31.489392	-87.917427
151	31.489420	-87.917278
152	31.489483	-87.917288
153	31.489483	-87.917288
154	31.489697	-87.917073
155	31.489875	-87.916813
156	31.490528	-87.916330
157	31.490683	-87.916282
158	31.490683	-87.916282
159	31.490783	-87.916207
160	31.491297	-87.915668
161	31.491710	-87.914703
162	31.492110	-87.913710