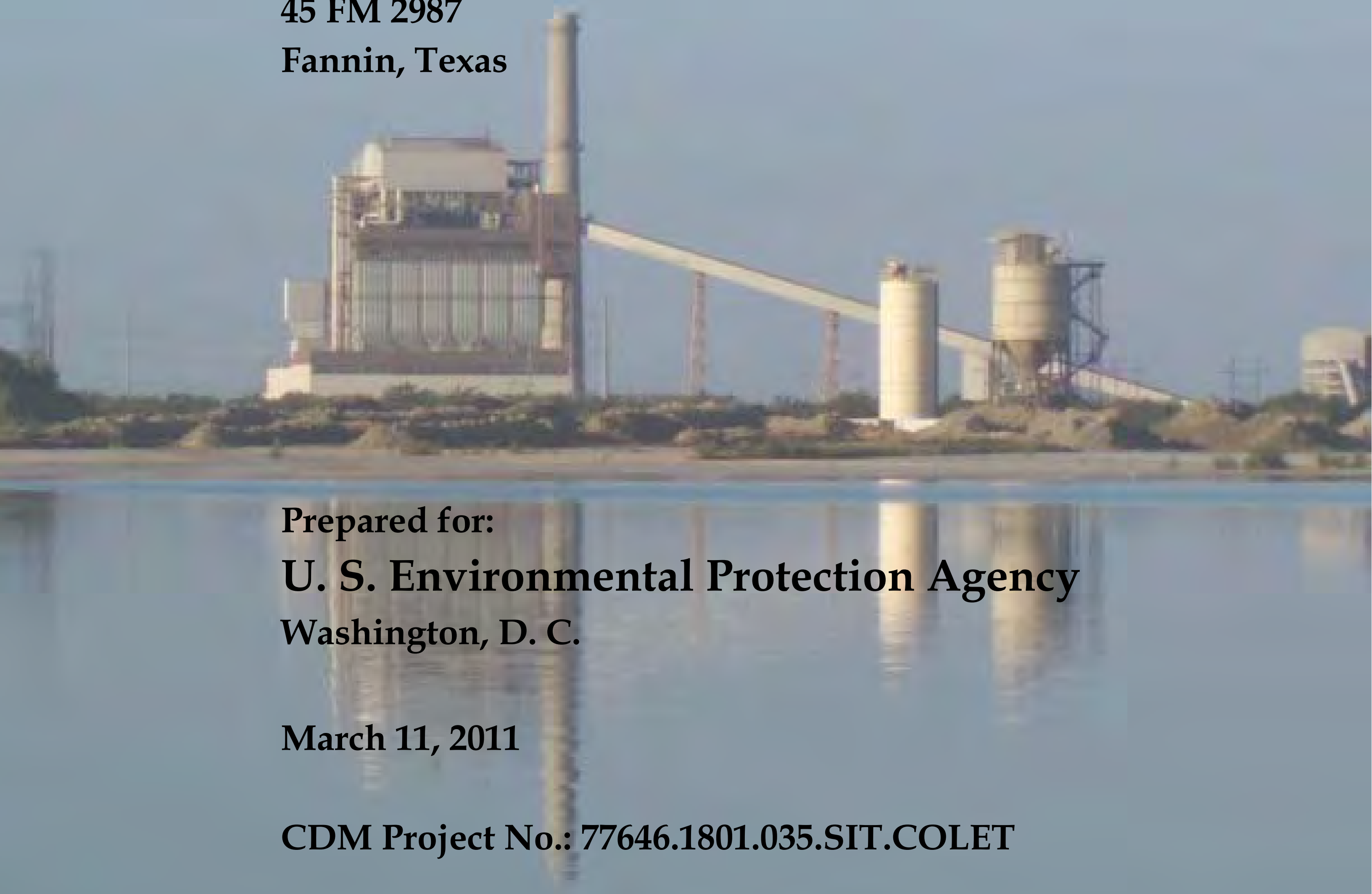
Assessment of Dam Safety of Coal Combustion Surface Impoundments

Coleto LP, LLC

Coleto Creek Power, LP
45 FM 2987
Fannin, Texas



Prepared for:

U. S. Environmental Protection Agency
Washington, D. C.

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CDM Project No.: 77646.1801.035.SIT.COLET

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 June 21 and 22, 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 of two CCW impoundments at the Coleto Creek Power, LP Plant (Plant), owned by Coleto LP, LLC of Marlborough, MA and operated by IPA Operations, LLC (IPA) of Marlborough, MA.

The Plant is located near the Town of Fannin, Goliad County, Texas as shown on **Figure 1**, Locus Plan. The Coleto Creek Dam and the Route 59 Bridge over Coleto Creek are approximately 2.65 miles and 4.2 miles southeast of the site, respectively, as shown on **Figure 2**.

CDM made a site visit to the Plant on June 21 and 22, 2010 to collect relevant information, inventory the impoundments, and perform visual assessments of the impoundments. CDM representatives Michael L. Schumaker, P.E. and Michael P. Smith were accompanied by the following individuals:

Company	Name and Title
IPA	Ross Crysup, EHS Coordinator
IPA	Bill Steinhauser, EHS Manager

1.2 State Regulation

The Texas Commission on Environmental Quality (TCEQ) is responsible for the State's dam safety program. It is our understanding that under TCEQ's dam safety regulation 30 T.A.C. § 299, that the impoundments are exempt from the regulations because they are "off-channel impoundments authorized by the commission under TWC, Chapter 26."

IPA personnel stated there are no State inspection reports for the impoundments at the Plant. IPA personnel indicated that the TCEQ only requires that a minimum of two feet of freeboard be maintained at the impoundments as a condition of their permit. The permit is described in Section 1.2.1 of this report.

1.2.1 Permits

The Plant was issued a permit authorizing discharge at the Secondary Pond outfall to the "hot" side of Coleto Creek Reservoir under the Texas Pollutant Discharge Elimination System (TPDES), in accordance with effluent limitations, monitoring requirements, and other conditions set forth in the permit. The permit number is WQ0002159000. It is our understanding that under the TPDES permit, seepage from the impoundments is considered an unpermitted discharge. The current permit was amended in 2009 and submitted for renewal on February 10, 2010 according to plant personnel.

1.3 Datum

Elevations are referenced to Mean Sea Level (MSL) and are in feet. Directional coordinates are referenced to magnetic north.

1.4 Site Description and Location

1.4.1 Impoundment Construction and Historical Information

Unit-1 at the Plant began operation in 1980. The Primary Ash and Secondary Ponds were constructed between 1976 and 1977 as part of the Plant construction. It is our understanding that the impoundments were sized for two generating units, however only one unit was constructed. The impoundments were constructed by H. B. Zachry Construction Company. Construction oversight was performed by field engineers from Sargent & Lundy and field testing services were performed by Trinity Testing Laboratory, Inc. In conjunction with the construction of these two impoundments, an evaporation pond and coal pile run-off pond were constructed on site. Details of the evaporation pond and coal pile run-off pond are discussed herein.

As part of the plant development, the Guadalupe-Blanco River Authority (GBRA) constructed the Coleto Creek Reservoir Dam to create Coleto Creek Reservoir to use for plant cooling water. Based on the USGS map in Figure 1, Coleto Creek Reservoir impounds water from Coleto Creek, Payton Branch, Turkey Creek, Perdido Creek, and Sulphur Creek. As part of the reservoir creation, two smaller dams and two discharge flumes were also constructed to divide the reservoir into a “hot” side and “cool” side. The normal pools for the “hot” side and “cool” side are elevation El. 101 and El. 97, respectively.

It is our understanding that the dam and reservoir as well as the reservoir shoreline up to elevation El. 107 are owned by Coleto LP, LLC. The Plant and reservoir area encompasses approximately 8,000 acres. The Coleto Creek Reservoir Dam is operated by a subcontractor and is regulated by the State.

Based on 63 test borings performed by Sargent & Lundy and others, the Plant embankments were constructed over a surficial deposit of cohesive soils consisting of clayey sand and silty clay with and without caliche. Caliche is a highly calcarious soil consisting of sand, silt, and/or clay mixtures with varying amounts of calcium carbonate. The soils were classified according to Unified Soil Classification System as CH, CL, and SC and ranged in thickness from 4 to 20 feet. Based on the documents reviewed, the in-situ soil was intended to be used to construct impoundment liners. However existing sub-grade preparation requirements were not indicated in the documents reviewed. Based on laboratory test results reviewed, the permeability of the in-situ soil ranged from a high of 2.8×10^{-7} cm/sec to a low of 1.3×10^{-8} cm/sec. Underground Resource Management, Inc. (URM), advanced 10 test borings in 1981 to evaluate seepage and embankment stability. Laboratory index test results completed as part of this investigation indicated the permeability of foundations soil was as high as 3×10^{-6} cm/sec.

Impoundment embankments were constructed with cohesive soils excavated from borrow areas around the Plant site and material excavated from the area of the discharge flumes. The soils generally consisted of clayey sand and silty clay, with various amounts of caliche. Based on the documents reviewed, the embankment fill material was to have a minimum of 35% fines. The subgrade areas for the embankments were "stripped" prior to placing fill. Details relative to additional subgrade preparation was not indicated. Embankment fill was specified to be placed and compacted to a minimum of 95% of the maximum density as determined by ASTM D698. Based on a review of construction field reports 420 field density tests reported densities ranging from about 92% to less than 96%. Details relative to reworking areas of fill not meeting the compaction requirements to achieve the specified compaction were not included in the information reviewed.

The exterior embankments for the two impoundments were constructed approximately 4 to 56 feet above existing grade to a crest elevation of approximately El. 140. The embankment design plans depict a 15-foot-wide crest with a gravel access road. The Primary Ash Pond side slopes were designed at 2.5 Horizontal: 1Vertical (2.5H: 1V) on both the interior and exterior slopes based on a review of construction plans. The Secondary Pond side slopes were designed at 3H: 1V on both the interior and exterior slopes. Typical cross-sections of the embankments are presented on **Figure 3. Figure 4** shows an overview and layout of the impoundments.

Information reviewed indicates that the Primary Ash Pond encompasses approximately 190 acres, has embankments up to 39 feet high, and has a storage capacity of 2,700 acre-feet. The Secondary Ash Pond encompasses approximately 10 acres, has embankments up to 56 feet high, and has a storage capacity of 300 acre-feet.

A divider embankment was constructed between the Primary Ash Pond and Secondary Pond. The plans depict a 15-foot-wide crest with a gravel access road at elevation El. 140 and a 60-foot-wide bench at elevation El. 115 on the exterior face of the embankment. The side slopes of the divider embankment were designed at 3H: 1V on the Primary Ash Pond (southwest) and Secondary Pond (northeast) side. The bottom of the Secondary Pond was also filled to elevation El. 101. A typical cross-section of the embankment is presented on Figure 3.

The drawings reviewed showed an inlet structure located on the divider embankment to connect the Primary Ash Pond and Secondary Pond. The inlet structure consists of a 7-foot-wide by 9.5-foot-long concrete structure with provisions for concrete stoplogs. The inlet structure was designed to be supported on a 12-foot-wide by 14.5-

foot-long foundation with a bottom of footing elevation of El. 100. The concrete sill for the stoplogs is at elevation El. 108.5. A 30-inch-diameter corrugated metal pipe (CMP) from the inlet structure passes through the divider embankment with 7-foot by 7-foot steel seepage collars at 28 feet on center. The CMP has an inlet invert of El. 106 and an outlet invert of El. 105.

The information reviewed showed two (2) 20-inch-diameter carbon steel pipes (CSP) on the east embankment of the Secondary Pond that would discharge water at an outfall into the “hot” side of Coleto Creek Reservoir. The discharge pipes had 6-foot by 6-foot steel seepage collars constructed at 25 feet on center. At a point in time prior to Unit-1 going online, the recirculating pump station was constructed and the two 20-inch CSP pipes were connected to a 10-inch-diameter discharge pipe and the recirculating pump station. No design documents for the pump station were available for CDM to review.

In December, 1980, seepage was first noticed adjacent to the recirculating pump station along the toe of the Primary Ash Pond east embankment. Following an investigation by URM, a subsurface drain system was installed at the toe of the embankment adjacent to the pump station in 1981. As more seepage developed at the toe of the Secondary Pond east embankment adjacent to the pump station, a second subsurface drain system was installed in 1991.

1.4.2 Current CCW Impoundment Configuration

Impoundments at the Plant are currently used as settling ponds for CCW waste and other plant wastes. CCW waste sluiced into the ash ponds include:

- Bottom ash;
- Fly ash; and
- Boiler slag.

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

- Aqueous lab waste generated from analytical tests;
- Boiler chemical cleaning rinseate;
- Air preheater cleaning rinseate;
- Air preheater cleaning residue;
- Basin solids;
- De-ionizer regenerate wastewater;
- Heat exchanger cleaning rinseate;
- Waste de-ionizer resin beads;
- Waste molybdate contaminated cooling water;
- Waste filter media;
- Boiler blowdown;
- Demineralizer effluent;

- Storm water;
- Low Volume Waste; and
- Effluent Water/Wastewater from plant processes.

There are currently two impoundments at the Plant that impound CCW, as shown on Figure 4.

The Primary Ash and Secondary Ponds are approximately 190 and 10 acres in area, respectively. The embankment crest elevation of both impoundments is approximately El. 140. The water levels in the ponds are generally operated at an elevation of approximately El. 137. The water level was measured at El. 136.8 on the staff gage during the site visit on June 21 and 22, 2010.

In 2007, Unit 1 at the Plant produced approximately 124,308 tons of CCW. Approximately 26,619 tons of bottom ash/boiler slag and 59,545 tons of fly ash were recycled for beneficial reuse. The remaining 4,458 tons of bottom ash/boiler slag and 33, 686 tons of fly ash were sluiced into the Primary Ash Pond. Boral Materials Technologies (BMT) manages the recycling of the CCW material at the Plant. BMT has two flash silos on the crest of the southwest embankment of the Primary Ash Pond. Fly ash material is pneumatically sluiced to the silos. Fly ash not used is wet sluiced by two 8-inch-diameter sluice pipes back to the pond.

The Primary Ash Pond is used as the primary settling basin for sluiced liquid waste materials. All CCW and other liquids are currently sluiced into the Primary Ash Pond.

Bottom ash and boiler slag are wet sluiced along the south embankment into the Primary Ash Pond via two (2) 12-inch-diameter high density polyethylene (HDPE) pipes. Ash is sluiced onto a screen processor to separate fine and coarse material.

Demineralizer effluent is sluiced into the Primary Ash Pond along the southeast embankment through an 8-inch-diameter HDPE pipe.

A boiler area sump in the plant collects other liquid waste and sluices it through a 20-inch-diameter ductile iron (DI) pipe along the Primary Ash Pond west embankment adjacent to the groin with the evaporation pond. A valve in the pipeline also allows the capability for Coleto Creek personnel to discharge the boiler area sump into the evaporation pond. Personnel regulate flow to the Primary Ash Pond from the boiler area sump depending on water levels and weather conditions. The pipeline can also be used as a clean water decanting pipe. Clean water above elevation El. 137 can be decanted into the evaporation pond. The evaporation pond is discussed further in **Section 1.4.3**.

1.4.3 Other Impoundments

At the Plant, there is an evaporation pond and coal pile run-off pond in addition to the Primary and Secondary Ash Ponds. The evaporation pond is located adjacent to the toe of the north and west embankment of the Primary Ash Pond (see Figure 4).

The crest of the evaporation pond is at El. 128. The evaporation pond has an 8-foot-wide crest at elevation El. 128. The evaporation pond side slopes were designed at 2.5H: 1V on both the interior and exterior slopes. The design bottom of the evaporation pond is shown as elevation El. 123.5. The pond is normally dry based on information provided by plant personnel. The boiler area sump can pump other liquid waste from the plant to the evaporation pond or the Primary Ash Pond through a 20-inch-diameter DI pipe. As previously mentioned, the pipeline is regulated by personnel to control the discharge of the effluent. Plant personnel indicated that there is no CCW stored in the evaporation pond, there is no direct connecting pipe between the ash ponds and the evaporation pond, and there is no direct pipe line from the Plant to introduce CCW to the evaporation pond.

The coal pile run-off pond receives surface water run-off from the coal piles. The pond is incised. Water collected in the pond can be decanted and pumped to the evaporation pond. The coal pile run-off pond is shown on **Figure 4**.

1.5 Previously Identified Safety Issues

Based on our review of the information provided to CDM and as reported by EPA, there have been no identified safety issues at the Plant within the last 10 years.

1.6 Site Geology

The Plant is located in the Gulf of Mexico coastal plain (TWDB, February 2006), that gradually rises up from mean sea level in the east to as high as El. 900 in the north and the west at the contact with the coastal uplands. In the vicinity of the site the surficial geology consists of Holocene-age deposits of alluvium generally consisting of clayey sand and silty clay, with various amounts of caliche and gravel. The alluvium is underlain by Pleistocene-age deposits of the Lissie Formation. The Lissie Formation consists of fluvial and meander belt deposits composed predominantly of fine-grained sand and sandy clay. The Lissie Formation overlies older fluvial and lower-coastal plain deposits.

Section 2
Field Assessment

2.1 Visual Observations

CDM performed a visual assessment of the CCW impoundments at the Plant. The perimeter embankments of the impoundments total approximately 12,855 feet in length and are up to 56 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) relative to 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 on site for each impoundment during the site visit. Copies of these forms are included in **Appendix A**. Photograph location plans are shown on **Figure 5**, and photographs are included in **Appendix B.**

It should be noted tall vegetation in areas obscured visual observations of the interior and exterior embankments.

CDM visited the site on June 21, 2010 and June 22, 2010 to make visual observations of the impoundments. The weather during the site visit was sunny with high temperatures of approximately 96 and 97 degrees Fahrenheit, respectively. Prior to the site visit the following precipitation occurred as shown in **Table 1**.

Table 1 – Approximate Precipitation Prior to Site Visit

Dates of Site Visit – June 21, 2010 & June 22, 2010		
Day	**Date**	**Precipitation (inches)**
Monday	June 14	0.0
Tuesday	June 15	0.1
Wednesday	June 16	0.0
Thursday	June 17	0.0
Friday	June 18	0.0
Saturday	June 19	0.0
Sunday	June 20	0.0
Monday	June 21	0.0
Tuesday	June 22	0.0
Total	**Week Prior to Site Visit**	**0.1**
Total	**Month Prior to Site Visit**	**2.51**

Notes:

1. Precipitation data from www.weather.com.

2.2 Primary Ash Pond

2.2.1 Exterior Slope

The exterior slopes appear to be in fair condition. The exterior slopes on the north, southern, west, and east embankments were approximately 2.5H:1V (Photos 49, 52, 53, 56, 62, 66, 67, 72, 76, 79, 82, 86, 90, 91, 96, 99, 104, 111, and 114). The northeast slope of the divider embankment between the Primary Ash Pond and Secondary Pond was approximately 3H: 1V (Photos 1 and 15).

The north, west, and east embankments were generally covered with grass and small brush approximately 24 to 48 inches tall. On the north and west embankments there were 6- to 12-inch-diameter mesquite trees on the slope (Photos 52, 62, and 66). Smaller mesquite trees, 1 to 2 inch inches in diameter were observed on the east embankment. On the north embankment, areas of well-established vegetation were observed (Photo 53). The southwest, south, and southeast embankments were covered with grass approximately 6 to 12 inches tall.

The northeast slope of the divider embankment was covered with grass and small brush approximately 24 to 36 inches tall on the top 1 to 2 feet of the slope. Below the upper portion of the slope, soil was exposed and there was approximately 1 to 2 feet of erosion from wave action.

On the north embankment there was some minor surface erosion near the toe adjacent to the evaporation pond (Photo 55). Water was observed adjacent to the west embankment toe in the evaporation pond (Photos 67 and 69).

On the southeast embankment two seeps were observed. One of the seeps appeared to have developed at the location of an 8-inch-diameter animal burrow (Photo 97). The other seep observed on the southeast embankment was near the toe of the slope and was approximately 8-feet-long by 2-feet-wide (Photo 98). Flow from the seeps was visually estimated to be averaging less than 10 gallons per day (gpd).

There were multiple seeps observed on the east embankment exterior face and in the toe area. An approximately 40-foot-long by 10-foot-wide seep was observed on the lower third of the slope (Photo 105). To the north of that seep there were more minor seeps that were less than 2-feet-wide and observed near the toe of the slope. These seeps appeared dry and crusted at the time of the site visit. A surface depression approximately 4 feet long by 4 feet wide by 2 feet deep was also observed in the area (Photo 106) of these seeps. A large seepage area approximately 400 feet long by 20 feet wide was observed at the embankment toe area (Photos 107 and 108). The seepage area was saturated, soft, and boggy with standing water up to 12 inches in depth. Well established vegetation, mesquite trees, and hog wallows were also observed in this seepage area. Seepage rates could not be visually estimated in the area of this large seep due to its extent.

More seepage was observed on the east embankment near the recirculating pump station. The sump pit for a subsurface drain seepage collection system was observed to the south of the pump station (Photo 25). The visually estimated flow from the sump pit through a 4-inch-diameter PVC pipe was averaging approximately 50 gallons per minute (gpm). A seep was also observed on the inside of the access road to the pump station (Photo 26).

2.2.2 Crest

The crest of the Primary Ash Pond generally appeared to be in fair condition (Photos 2, 14, 50, 57, 63, 73, 77, 79, 82, 85, 86, 87, 89, 92, 95, 100, 103, 112, and 115). The crest was approximately 20 feet wide. The crest is surfaced with compacted gravel and is used as an access road. Sparse vegetation was growing in the middle and on both sides of the roadway. Desiccation cracks approximately a ¼ inch wide were observed at various locations on the crest (Photo 68). Observed freeboard at the time of the visit was approximately three feet with an approximate water level at El. 137.

2.2.3 Interior Slope

The visible portions of the interior slope generally appeared to be in fair condition (Photos 3, 9, 10, 12, 13, 51, 54, 58, 61, 64, 70, 74, 78, 79, 85, 87, 88, 93, 94, 101, 102,110, 113, and 116). The north, east, and west interior slope and southwest slope of the divider embankment generally appeared to be armored with a layer of riprap. No riprap was observed on the southern embankments. Grass and brush approximately 24 to 36 inches tall was observed growing in the riprap. An 8-inch-diameter mesquite tree was observed on west end of the north embankment (Photo 54).

During the site visit, four sets of sluice pipes were observed. The two CCW sluice pipes on the southeast and south embankment appeared to be in fair condition (Photos 80, 81, 83, and 84). The boiler area sump sluice pipe on the west embankment and the demineralizer effluent sluice pipe on the southeast embankment also appeared to be in fair condition (Photos 75 and 85). No seepage was observed where the pipes penetrated through the embankment.

Two areas on the east embankment were observed where BMT has dumped excess flyash and bottom ash and pushed the material into the Primary Ash Pond (Photo 12).

2.2.4 Inlet Structure

The inlet structure in the Primary Ash Pond appeared to be in fair condition (Photo 6, 7, and 8). The inlet structure was clear of debris. Some cracking in the concrete around the top of the intake structure was observed (Photo 7). The remainder of the structure above the water level and the catwalk appeared to be good condition.

2.3 Secondary Pond

2.3.1 Exterior Slope

The exterior slopes appear to be in fair condition. The exterior slope on the north and east embankments were approximately 3H: 1V (Photos 18, 27, 29, 32, 35, 37, 38, and 40). Embankment vegetation consisted mainly of grass approximately 36 to 48 inches tall. On the east embankment, 8- to 12-inch-diameter dead mesquite trees and an area of thick brush were observed (Photos 27, 29 and 30). On the north embankment, small brush and mesquite trees less than 2 inches in diameter were observed (Photos 33 and 35).

IPA leases portions of the east and north embankment area for cattle grazing. There is a barbed wire fence along the edge of the crest and along portions of the north and east embankment exterior slopes (Photos 27, 30, 32, 35, 37, 46, 47, 48). Bare areas, sparsely vegetated areas, and livestock trails were observed on the east and north embankment exterior slopes.

Multiple depressions were observed on the north and east embankment exterior slopes (Photos 28, 30, 31, 32, and 36). The depressions ranged in size from 4 to 8 feet long and up to 3 feet deep. The depressions appear to be grown in erosion rills because no displaced material was observed below the depressions. Multiple erosion rills were observed at the toe of the north embankment exterior slope (Photo 33, 34, and 36). The erosion rills ranged in size from 6 to 10 feet long and up to 3 feet deep.

Seepage was observed at the toe of the east embankment exterior toe. The discharge sump for the subsurface drain seepage collection system was observed adjacent to the recirculating pump station (Photo 23). Flow was visually estimated to be approximately 5 gpm in the sump through a 2-inch-diameter pipe.

On the north embankment a 12-inch-diameter DI pipe was observed. Based on information from IPA personnel, an 8-inch-diameter pipe (Photos 1, 4, and 15) from the recirculating pump station conveys water back to the Secondary Pond or the outlet pipe located in the evaporation pond (Photo 39).

2.3.2 Crest

The crest of the Secondary Pond embankments appeared to be generally in fair condition (Photos 2, 14, 17, 41, 46, and 47). The crest was generally approximately 20 feet wide. The crest is surfaced with compacted gravel and is used as an access road. Sparse vegetation was growing in the middle and on both sides of the roadway. A barbed wire fence used to contain livestock was observed on the north and east embankment crest perimeter (Photos 46, 47, and 48). The vertical alignment of the fence posts was in good condition. Observed freeboard at the time of the visit was approximately three feet.

2.3.3 Interior Slope

The visible portions of the interior slope generally appeared to be in fair to poor condition (Photos 1, 15, 42, 43, 46, and 47). The interior slopes on the north and east embankments and the northeast slope of the divider embankment were approximately 3H: 1V.

No riprap was observed on the interior slopes. Grass and brush approximately 24 to 36 inches tall was observed growing on the top 1 to 2 feet. Below, the soil was exposed and there was approximately 1 to 2 feet of erosion from wave action (Photos 4 and 43).

The 8-inch-diameter discharge pipe from the recirculating pump station was observed on the northeast slope of the divider embankment (Photos 1, 4, and 15). The discharge pipe was supported on concrete piers spaced at approximately 10 feet on center.

2.3.4 Outlet Pipes and Recirculating Pump Station

The outlet pipes and recirculating pump station appeared to be in fair condition (Photos 19, 20, 21, and 24). The outfall in the discharge canal appeared to be in poor condition (Photo 22). The discharge channel has deteriorated. The concrete is overgrown with vegetation, cracked and spalled, and sections of the channel are missing exposing the underlying soil.

2.4 Instrumentation

Based on the documents reviewed by CDM, there are a total of 34 water level monitoring instruments at the site consisting of monitoring wells, static piezometers, and pneumatic piezometers. Thirty-one of the instruments are located on the crest, exterior slope, and in the exterior foundation areas of both impoundments. The approximate locations of the wells are shown on **Figure 6A** and **Figure 6B**. The stand pipes for some of the wells were observed during the site visit (Photos 12, 16, 18, 19, 47, and 116). Based on conversations with IPA personnel, 13 of the monitoring wells are read semi-annually to monitor water levels and groundwater quality, as required under the Plants' TPDES permit. The remaining instruments are not read on regular basis and their condition is unknown. A summary of the recorded water levels from July 2006 to May 2010 is presented on **Figure 7A** and **Figure 7B**.

There is a staff gage on the inlet structure that is used to measure the impoundment water level elevation (Photos 6 and 8). Based on information provided by IPA personnel, the pond water levels are monitored daily. The pond water level during the site visit was at El. 136.8.

There is also a staff gage in Coleto Creek Reservoir based on information provided by IPA personnel. The pond and reservoir water levels are also recorded on a semi-annual basis along with monitoring well data collection. A summary of the recorded water levels from July 2007 to May 2010 is presented in **Figure 8**.

Section 3
Data Evaluation

3.1 Design Assumptions

CDM was not provided with all of the original design documentation, such as design calculations, for the CCW impoundments. CDM has reviewed information made available by IPA personnel related to subsequent evaluations completed.

3.2 Hydrologic and Hydraulic Design

CDM was not provided with any hydrologic and hydraulic design information or analyses for the two subject impoundments. CDM completed a preliminary evaluation of the hydraulic capacity of the impoundments to estimate if the ponds are adequately sized to store or pass the design storm event. Based on the Texas Administrative Code title 30 Chapter 299 Dams and Reservoirs (Code), the impoundments would be categorized as intermediate sized, low hazard potential structures. Such structures with drainage areas less than 10 square miles are required to pass 25 to 50% of the Probable Maximum Flood (PMF) depending on the size and hazard classifications, for a minimum 1-hour storm event based on the Code and "Hydrologic and Hydraulic Guidelines for Dams in Texas", TCEQ, January 2007 (HHG).

The drainage area contributing to the impoundments at this site is limited to the storage area within the impoundments and is significantly less than 10 square miles. The HHG indicates that for drainage areas less than 10 square miles, the PMF is to be developed by applying the total depth of the Probable Maximum Precipitation (PMP) from Hydrometeorological Reports 51 and 52 (HMR-51 and HMR-52) to the entire drainage area for all storm durations. The 6-hour, 10-square-mile PMP is approximately 31 inches. CDM assumed that the PMP is equal to the PMF for the purpose of evaluating impoundment storm capacity. Based on a normal pool level of El. 137, preliminary evaluations indicate that there is enough storage capacity and freeboard in both impoundments to store a 100% of the PMP event without being overtopped.

3.3 Structural Adequacy and Stability

The Code contains requirements relative to stability evaluations for new and existing dams under standard engineering design guidelines. However, it is our understanding that CWW impoundments are exempt from these Code requirements.

Procedures established by the United States Army Corps of Engineers (USACE), the United States Bureau of Reclamation, the Federal Energy Regulatory Commission, and the United States 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 Federal Emergency Management Agency (FEMA) Federal Guidelines for Dam Safety, Earthquake Analyses and Design of Dams (pgs. 31, 32 and 38, May 2005) are provided in **Table 2**.

Table 2 – Minimum Safety Factors Required

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

In 1981 URM evaluated the slope stability of two representative cross-sections for the Primary Ash Pond and Secondary Pond embankments using the slope stability analysis computer program, SSTAB1. The program computed the factor of safety for both circular and non-circular shear (slip) surfaces. Analyses were performed for the undrained conditions in and for long-term steady-state conditions with stored water at the normal pool level. Soil parameters used for the analyses are presented in **Table 3**, below. The unit weight of soil strata modeled in the analyses was not indicated in the URM documentation.

Table 3 – Soil Parameters

Stratum	**Condition**			
	Undrained		**Drained**	
	C (psf)	**Φ (°)**	**C (psf)**	**Φ (°)**
Compacted Fill	2000	0	250	25
Overburden Sand	Not used	Not used	200	35

The interior slope of the Primary Ash and Secondary Pond was evaluated under undrained conditions.URM performed the analyses assuming a pond water level of El. 125. Although not specifically indicated, it appears that this analysis may have been selected to model a drawdown condition. The results of the undrained analysis for the primary ash and Secondary Pond embankments are shown on **Figures 9** and **10**, respectively. Figures 9 and 10 indicate the factor of safety against slope stability was 2.21 and 1.87 for the primary Ash and Secondary Pond interior slopes, respectively.

The exterior slope of the Primary Ash and Secondary Pond was also evaluated under long-term steady-state conditions assuming a normal pool elevation of El. 135. For the steady-state analyses, URM assumed effective soil strength parameters. The results of the drained analysis for the Primary Ash and Secondary Pond embankments are shown on Figures 9 and 10, respectively. Figures 9 and 10 indicate the factor of safety against slope stability was 2.37 and 1.68 for the Primary Ash and Secondary Pond exterior slopes, respectively, which is greater than the minimum required 1.5. It should be noted that the stability analyses performed almost 30 years ago and utilized a normal pool level that is two feet lower than the current normal pool level of El. 137.

In addition, URM's evaluations did not consider the following load cases:

- Maximum surcharge pool (flood) condition;
- Rapid drawdown condition;
- Seismic loading; or
- Liquefaction.

Section 4 of this report outlines recommendations for additional analyses to be performed to confirm that the embankments are stable under the loading conditions discussed above.

3.4 Foundation Conditions

Based on 63 test borings performed by Sargent & Lundy and others, the embankments were constructed over natural surficial deposits. The surficial deposits were predominantly cohesive soils consisting of clayey sand and silty clay that in some instances also included caliche. The soils were classified according to Unified Soil Classification System as CH, CL, and SC and ranged in thickness from 4 to 20 feet. The drawings and geotechnical report prepared by Sargent & Lundy indicate the site was to be stripped prior to constructing the embankments. Based on the documents, the in-situ soil was intended to be used as the pond liner; however the sub-grade preparation requirements were not indicated. Based on laboratory test results, the permeability of the in-situ soil ranged from a high of 2.8×10^{-7} cm/sec to a low of 1.3×10^{-8} cm/sec.

Field engineers from Sargent & Lundy were responsible for construction oversight based on our review of the information provided. The fill used to construct the embankments was to be compacted to at least 95% of the maximum dry density as determined by the Standard Proctor Test (ASTM D-698). It is our understanding that the embankments have not been modified since completion in 1978.

3.5 Operations and Maintenance

IPA personnel indicated that there is no written formal operation or maintenance program. IPA personnel indicated that the impoundments are inspected daily in conjunction with obtaining pool water levels. Inspection results are not formally documented. They also indicated that an outside consultant inspects the impoundments approximately every 10 years or as needed. It is our understanding that IPA has scheduled a professional engineer to perform an engineering assessment in the first quarter of 2011.

Groundwater levels are recorded in the monitoring wells and analytical samples are taken semi-annually to evaluate the quality of the seepage water to determine if the groundwater is within limits of the TPDES permit.

Coleto Creek Power, LP has a general plant emergency action plan. There is no emergency action plan specific to the impoundments. However, it is our understanding that portions of the plant emergency action plan pertain to the impoundments.

Routine maintenance performed includes mowing grass on embankment slopes once per year, and other activities as needed to address other observed deficient conditions such as erosion and revegetation. It is our understanding that current IPA practices include assessment of vegetation conditions concurrent with semi-annual monitoring well sampling. Roadways on the embankment crests are also maintained.

Section 4 Conclusions/Recommendations

4.1 Hazard Classification

The Plant impoundments currently do not have a TCEQ- developed Hazard Potential Classification. Based on the USEPA classification system, as presented on page 2 of the USEPA check list (**Appendix A**), recommended hazard ratings have been assigned to the impoundments, summarized in **Table 4**, below.

Table 4 – Recommended Impoundment Hazard Classification Ratings

Impoundment	Recommended Hazard Rating	Basis
Primary Ash Pond	Low Hazard	• A breach would have an environmental impact on Coleto Creek Reservoir • A breach could have an impact on the evaporation pond. • A failure or misoperation could cause the Secondary Pond to fail. • A breach or misoperation is anticipated to result in no probable loss of life and low economic and/or environmental losses, and losses are anticipated to be principally limited to the owner's property.
Secondary Pond	Low Hazard	• A breach would have an environmental impact on Coleto Creek Reservoir. • A breach could have an impact on the evaporation pond. • A failure or misoperation could cause the Primary Ash Pond to fail. • A breach or misoperation is anticipated to result in no probable loss of life, and low economic and/or environmental losses. Losses are anticipated to be principally limited to the owner's property.

4.2 Acknowledgement of CCW Impoundment Condition

CDM acknowledges that the management units (Primary Ash Pond and Secondary Pond) referenced herein were assessed by Michael L. Schumaker, and Michael P. Smith. The Primary Ash Pond and Secondary Pond appeared to be in fair condition based on site observations. However, there is a lack of documentation relative to the design and construction of these facilities. It is not known if critical studies or investigations (complete stability analyses, hydrologic, hydraulic, seismic) have been performed to confirm that potential safety deficiencies do not exist. Therefore, the Primary Ash Pond and Secondary Pond are judged to be in **POOR** condition. Additional documentation and future studies performed to confirm the condition and performance of these impoundments may be sufficient to substantiate an improved condition assessment.

Discussed in the following sections are deficiencies and recommendations for further studies, maintenance and monitoring that may further improve the condition of these impoundments.

4.3 Maintaining and Controlling Vegetation Growth

Tall vegetation and brush obscured visual observations of the exterior slopes. In particular, this is the case on the, north, west, and east embankments around the perimeter of both impoundments. As identified in section 3.5 of this report, IPA performs routine maintenance that includes mowing grass on embankment slopes once per year and semi-annual assessment of vegetation conditions. CDM recommends that vegetation be cut more frequently to ensure that adequate visual observations can be made by IPA's personnel during routine inspections.

Live and dead mesquite trees up to 12 inches in diameter were observed on the embankments. CDM recommends the mesquite trees including the root ball be removed and filled with compacted fill under the supervision of a qualified professional engineer familiar with earthen dam design. CDM also recommends continued maintenance and removal of brush.

4.4 Erosion Protection and Repair

The north embankment exterior slope of the Secondary Pond had erosion rills and subsequent loss of grass cover resulting from concentrated water flow. These erosion rills should be filled in with compacted fill and be stabilized. CDM recommends on-going maintenance to reduce erosion from run-off. This may include minor grading to divert surface runoff, establishment of vegetative cover, or other measures.

An animal borrow was observed on the exterior slope of the Primary Ash Pond southeast embankment. Hog wallows were also observed at the toe of the Primary Ash Pond east embankment. Animal control measures should be implemented to reduce embankment disturbance. All affected areas should be backfilled with compacted fill, graded to match the surrounding topography, and seeded.

4.5 Impoundment Hydraulic and Stability Analysis

IPA did not provide CDM with a hydraulic analysis demonstrating the ability of the impoundments store safely pass or store the applicable design storm, which appears to be the 50% PMF event. However, a preliminary evaluation performed by CDM suggests there is enough storage capacity at the current operating pool levels to safely store precipitation from the full PMF, which exceeds the Code requirements. CDM recommends IPA perform a detailed complete study to confirm this conclusion and update the study if operating levels of the pond change in the future.

Based on CDM's review of available information for the impoundments, the following analyses are recommended to confirm that the embankments are adequately stable under the loading conditions outlined in Section 3.

- The geometry of the embankments is not consistent the cross sections previously evaluated, which may not be the most critical with respect to slope stability. An evaluation should be made to determine the most-critical embankment cross sections. The most-critical cross sections should be analyzed relative to slope stability. CDM recommends that the stability of a cross section through the divider embankment between the Primary Ash and Secondary Ponds also be evaluated under all appropriate loading conditions, including rapid drawdown.

- Evaluate the stability of the embankments under maximum surcharge pool (flood) conditions.

- Evaluate the stability of the interior and exterior slopes under seismic and steady-state seepage loading conditions.

- Perform a liquefaction potential analysis.

- Evaluate 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, it should be demonstrated that stability under rapid drawdown conditions meets the industry recommended factor of safety since the development of a catastrophic condition in one of the impoundments may create a rapid drawdown situation.

- The existing stability analyses should be re-evaluated considering the current normal pool level.

- All analyses should be performed under the direction of a registered professional engineer experienced in earthen dam design.

4.6 Instrumentation

Plant personnel record water levels in the some of the monitoring wells at the ponds on a semi-annual basis. CDM recommends that wells be read at a minimum of a quarterly basis to establish an adequate data base of seasonal water level fluctuations for use in slope stability analyses and to evaluate potential development of unstable embankment conditions. CDM also recommends that it be determined if the other monitoring wells function and, if functional, if they can be utilized as part of the water level monitoring program.

CDM recommends that maximum allowable water level elevations in monitoring wells and piezometers be established based on the results of slope stability analysis. Based on the maximum water levels, threshold values should be determined for use in the evaluation of water level data and assessment of potentially unstable conditions during routine inspections.

4.7 Seepage Control

Significant amounts of seepage were observed at the Plant impoundments, particularly along the southeast and east embankment of the Primary Ash Pond.

The seepage observed near the subsurface drain system may be an indication that the system is not functioning properly. CDM recommends inspecting the drain and cleaning the system to determine if it is functioning properly. If the system is not functioning properly, a registered professional engineer experienced in earthen dam design should be engaged to address the seepage condition.

Uncontrolled seepage was observed in multiple areas along the eastern and southeastern embankment of the Primary Ash Pond. It is our understanding that, in general, seepage may be considered non-compliant from an environmental perspective relative to TPDES permit requirements depending on the concentration of the constituents in the seepage water. It is also our understanding that seepage areas at this site have been inspected and evaluated by the TCEQ and the USEPA Region 6, and that no permit compliance issues have been identified. However, CDM recommends that IPA monitor the seepage on the Primary Ash Pond southeast and east embankments and evaluate alternative methods of seepage control to address geotechnical concerns. Such methods may include:

- Installation of a cut-off wall; or
- Installation of a filter berm or subsurface drains connected to a toe drain and discharge sump to control and collect seepage water.

4.8 Inspection Recommendations

Currently inspections are carried out by daily "drive-by" rounds by plant personnel and every 10 years by an outside consultant. There is no written checklist used for daily inspections to document specific potential items that need to be addressed and the area where they are located. The last documented inspection performed by plant personnel was January 9, 2009, using the TCEQ inspection checklist and the last inspection performed by professional engineer was done in 1993 by Geraghty & Miller. Based on the information reviewed by CDM, it does not appear that IPA has adequate inspection practices. As previously discussed, IPA has scheduled a professional engineer to perform an assessment of the impoundments in the first quarter of 2011.

CDM recommends that plant personnel develop detailed inspection documentation procedures to aid in ensuring that they are performing adequate inspections during their daily inspections and to adequately document observations over time. Documentation should include a sketch of relevant features observed. The documentation should be periodically reviewed to identify if conditions are worsening and/or if significant changes are occurring which could lead to additional maintenance issues or safety concerns. Inspection procedures should include a mechanism to address identified deficiencies before they worsen and become a safety concern. Detailed inspections should be carried out at a minimum on an annual basis. In addition to the above documentation, procedures should be developed for recording data from existing piezometers, monitoring wells, and the staff gage. In addition, inspections should be made following heavy rainfall events, 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.

4.9 Operations

No stoplogs were observed at the inlet structure in the Primary Ash Pond at the time of the site visit.CDM recommends IPA have stop logs readily available to control flow between the impoundments in the unlikely event that a catastrophic condition develops in one of the embankments. Although the catwalk for the inlet structure has handrails, CDM recommends a life preservation device be installed at the inlet structure. It is our understanding that a life preserver has been staged at this location since our site visit.

There is no formal operations and maintenance manual for the impoundments. CDM recommends that an operation and maintenance outline be developed that highlights a list of procedures for the maintenance of the embankments and operational procedures for the impoundments and appurtenant structures.

There is no formal emergency action plan (EAP) for the impoundments. Both impoundments have a low hazard classification. However, failure or misoperation of the impoundments could result in a condition that needs to be managed from an environmental and property damage standpoint. It is recommended that the existing plant-wide emergency action plan be updated to include impoundment-specific emergency procedures, identify roles and responsibilities, and provide a means to facilitate internal and external communication necessary to manage an impoundment failure. Impoundment emergency procedures should include coordination with GBRA relative to the impact on the three dams on Coleto Creek Reservoir and to mitigate the environmental impact in the event of an unintended release of breach in the impoundments.

4.10 Capital Improvements

As previously discussed, the CCW impoundments were originally designed and constructed for two power plant units but only one unit was constructed. On June 14, 2010, IPA announced plans to construct Unit 2, which is a 650-MW coal-burning unit at the Plant. An anticipated online date for Unit-2 is sometime in 2015. As such, IPA should consider any potential changes to proposed ash management practices and any capital improvements or modifications to the impoundments that may be necessary to ensure the longevity and safe operation of the CCW impoundments.

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 Coleto LP, LLC for Coleto Creek Power, LP 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 become available 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 IPA Operations, Inc. and were reviewed during the preparation of this report and the development of the recommendations presented herein.

1. Drawing No. C-45, "Ash Pond - Plan", prepared by Sargent & Lundy, Revised April 21, 1978

2. Drawing No. C-46, "Ash Pond Sections", prepared by Sargent & Lundy, Revised August 18, 1978

3. Drawing No. C-48, "Weirbox Structure Plan & Sections", prepared by Sargent & Lundy, Revised October 14, 1976

4. Drawing No. C-50, "Pipe Inlet Structure Secondary Settling Pond Plan & Sections", prepared by Sargent & Lundy, Revised October 14, 1976

5. Design and Construction Summary for Coal Pile and Wastewater Pond Facilities, Coleto Creek Power Station - Unit 1, Report SL – 3689, prepared by Sargent & Lundy, December 1, 1978

6. Investigation of Seepage from Primary and Secondary Settling Ponds at the Coleto Creek Power Station, Prepared by Underground Resource Management, Inc., July 29, 1981

7. Ash and Secondary Settling Pond Dike Inspection Coleto Creek Power Station, Central Power & Light Company, Geraghty & Miller, Inc., November 10, 1993

8. Notice of Registration, Coleto Creek Power Station, Fannin, Texas, Coleto Creek Power, LP

9. Coleto Creek Power Station, Monitoring well network semi-annual water level records July 2006 to May 2010

10. Coleto Creek Power Station, Static piezometer network semi-annual water level records July 2006 to May 2010

11. Coleto Creek Power Station, Coleto Creek Reservoir and Ash Pond water level records July 2007 to May 2010

12. Design and Construction Guidelines for Dams in Texas, Dam Safety Program, Texas Commission on Environmental Quality, RG-473, August 2009

13. Hydrologic and Hydraulic Guidelines for Dams in Texas, Dam Safety Program, Texas Commission on Environmental Quality, GI-364, January 2007

14. Chapter 2, Geology of the Gulf Coast Aquifer, Texas, Report 365: Aquifers of the Gulf Coast of Texas, Texas Water Development Board, February 2006

15. Hydrostratigraphy of the Gulf Coast Aquifer from the Brazos River to the Rio Grande, Texas Water Development Board, February 2010

16. Texas Administrative Code, Title 30, Chapter 299, Dams and Reservoirs

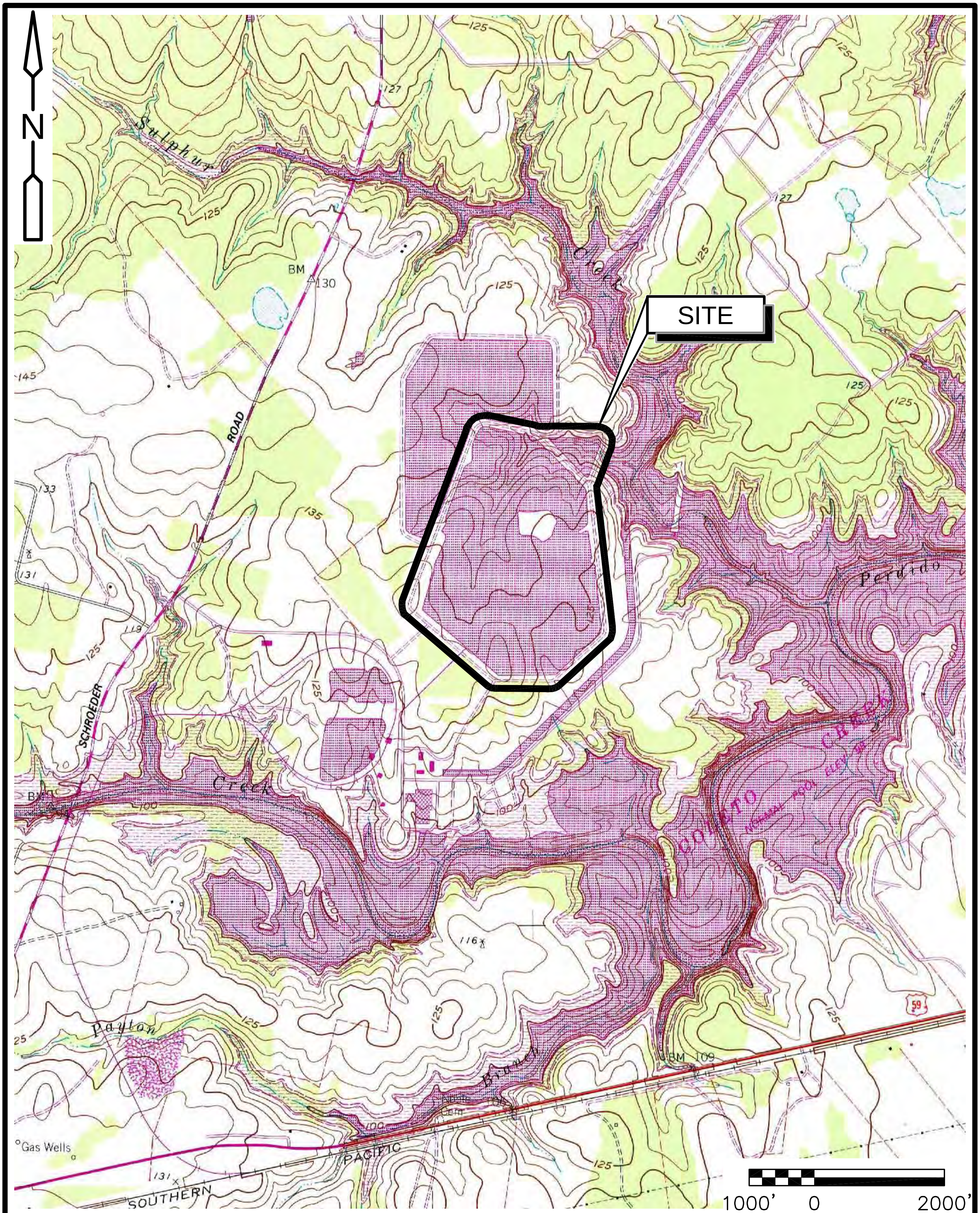
17. National Inventory of Dams Methodology, State and Federal Agency Manual, Version 4.0, US Army Corps of Engineers, April 2008

18. Risk Prioritization Tool for Dams, Users Manual, Federal Emergency Management Agency, March 3, 2008

19. Federal Guidelines for Dam Safety, Hazard Potential Classification System for Dams, , Federal Emergency Management Agency, April 2004

Figures

PW:\\camxmsvr01:PW_XM1\Documents\51119\77646_Coleto\03 Reports and Studies\09 CADD Figures and Graphics\TLMFG001.dwg



USGS TOPOGRAPHIC MAPS
FANNIN QUADRANGLE MAP
CONTOURS AND ELEVATIONS IN FEET

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LOCUS PLAN

JULY 2010

FIGURE 1

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AERIAL PHOTOGRAPH SOURCE:
GOOGLE EARTH PRO.

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CRITICAL INFRASTRUCTURE MAP

JULY 2010

FIGURE 2

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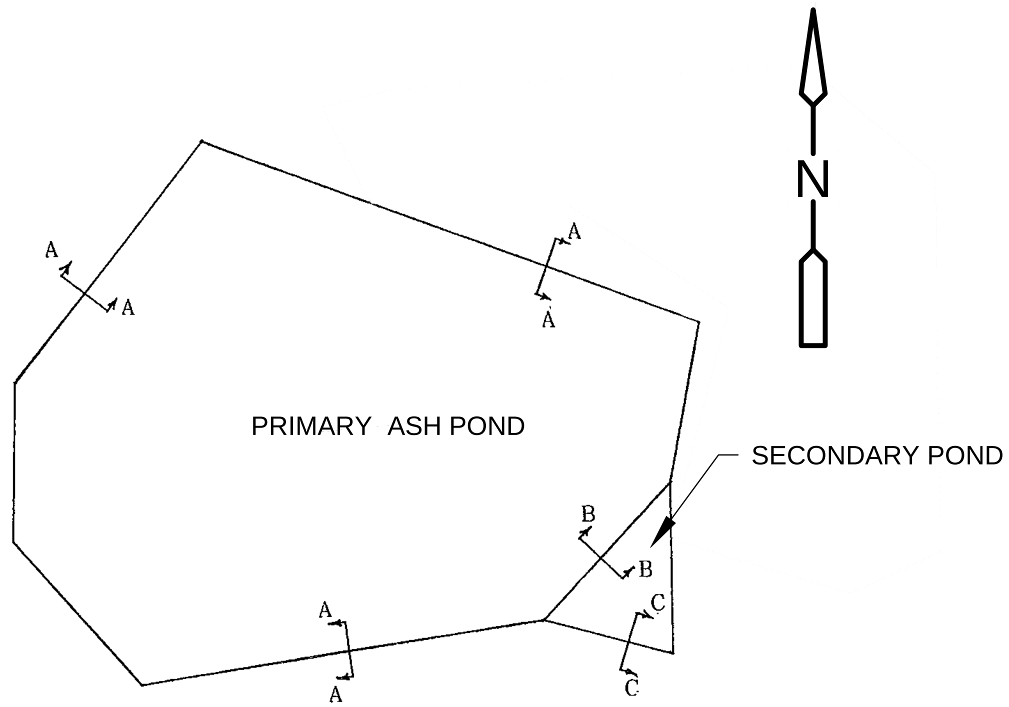
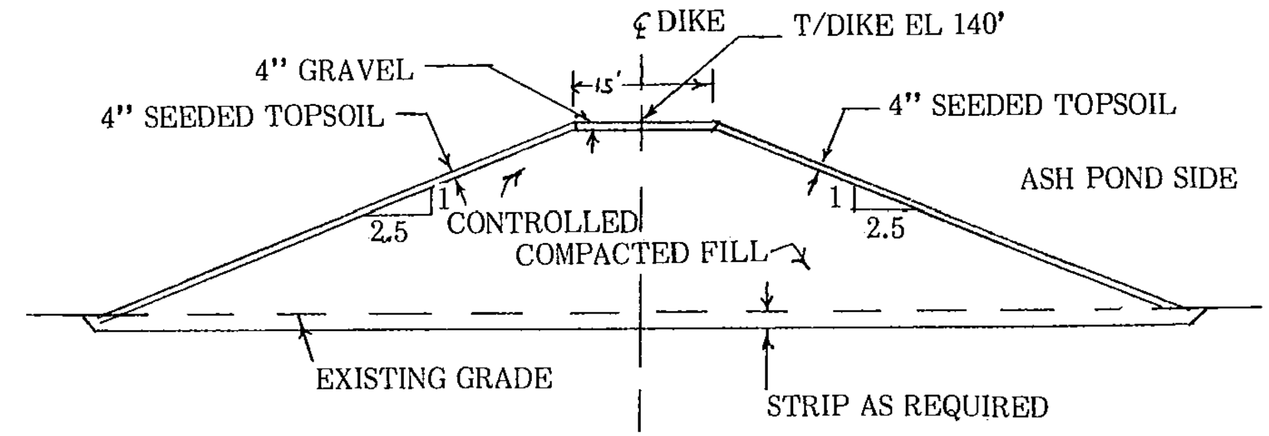
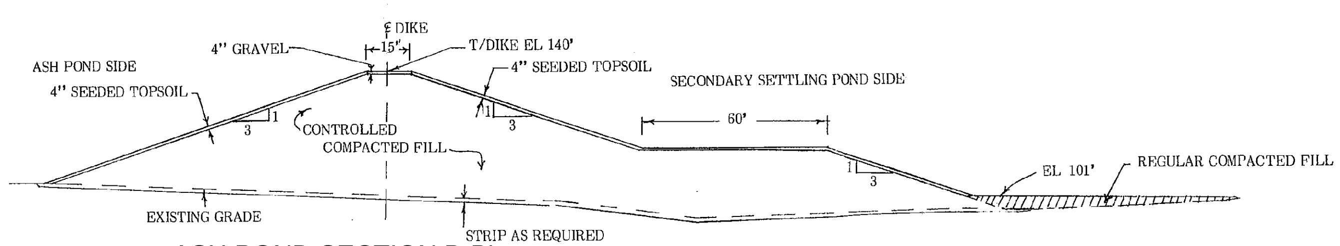


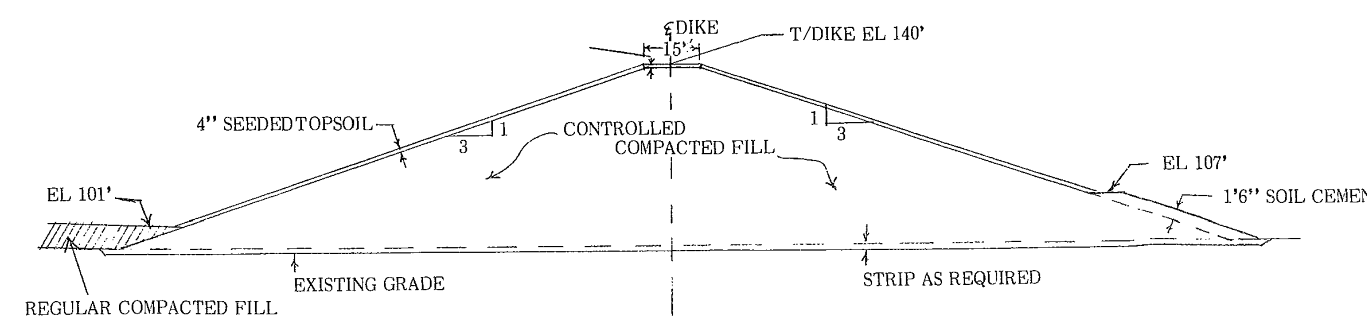
PRIMARY ASH POND PLAN



ASH POND SECTION A-A'



ASH POND SECTION B-B'



ASH POND SECTION C-C'

NOTES:

1. TYPICAL SECTIONS OBTAINED FROM S&L DRAWING No. C-46 REV. F, DATED JULY 18, 1977.

2. SECTIONS AND PLAN NOT TO SCALE.

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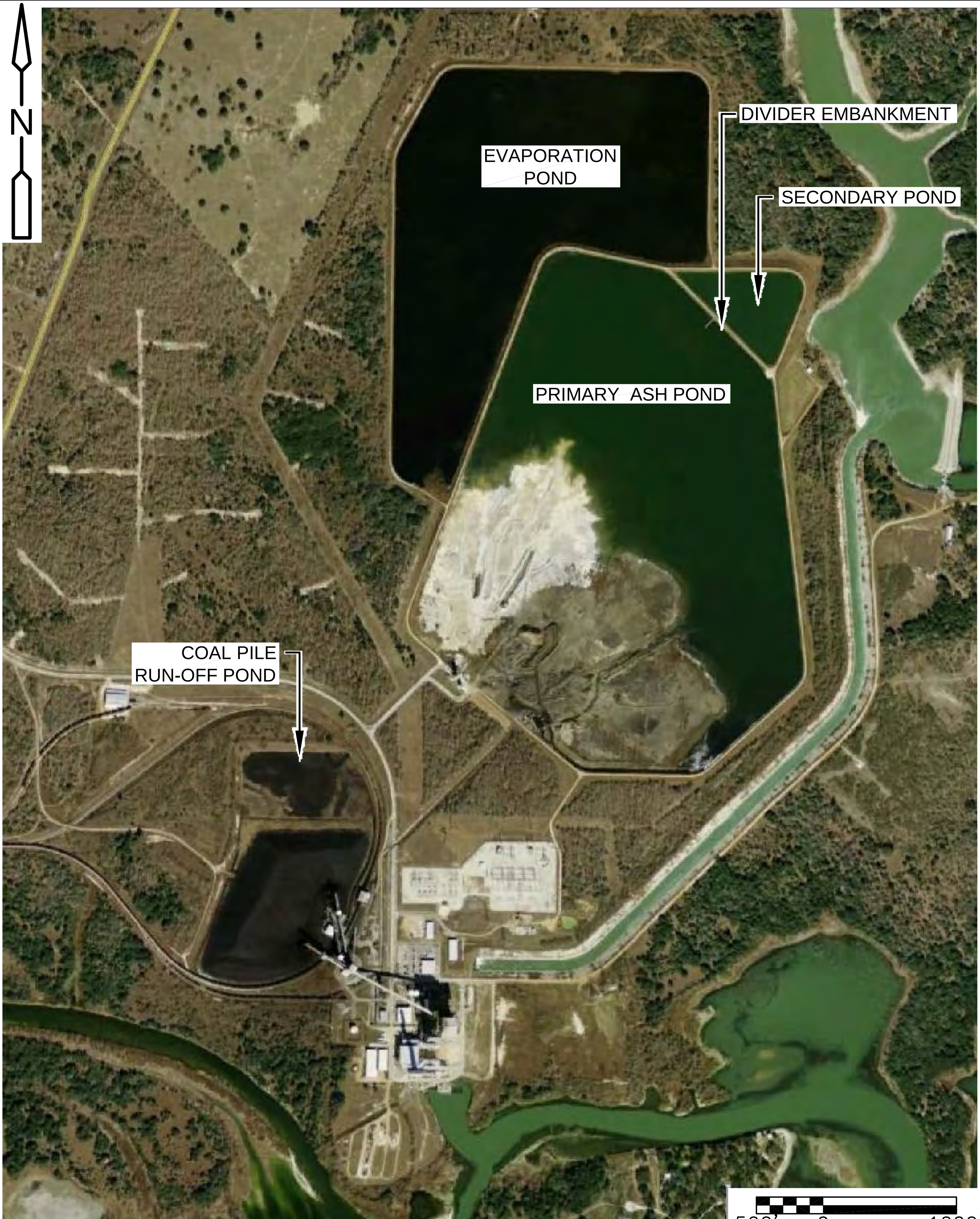
TYPICAL CROSS-SECTIONS
PRIMARY ASH POND & SECONDARY POND
FIGURE 3



AERIAL PHOTOGRAPH SOURCE:
GOOGLE EARTH PRO.

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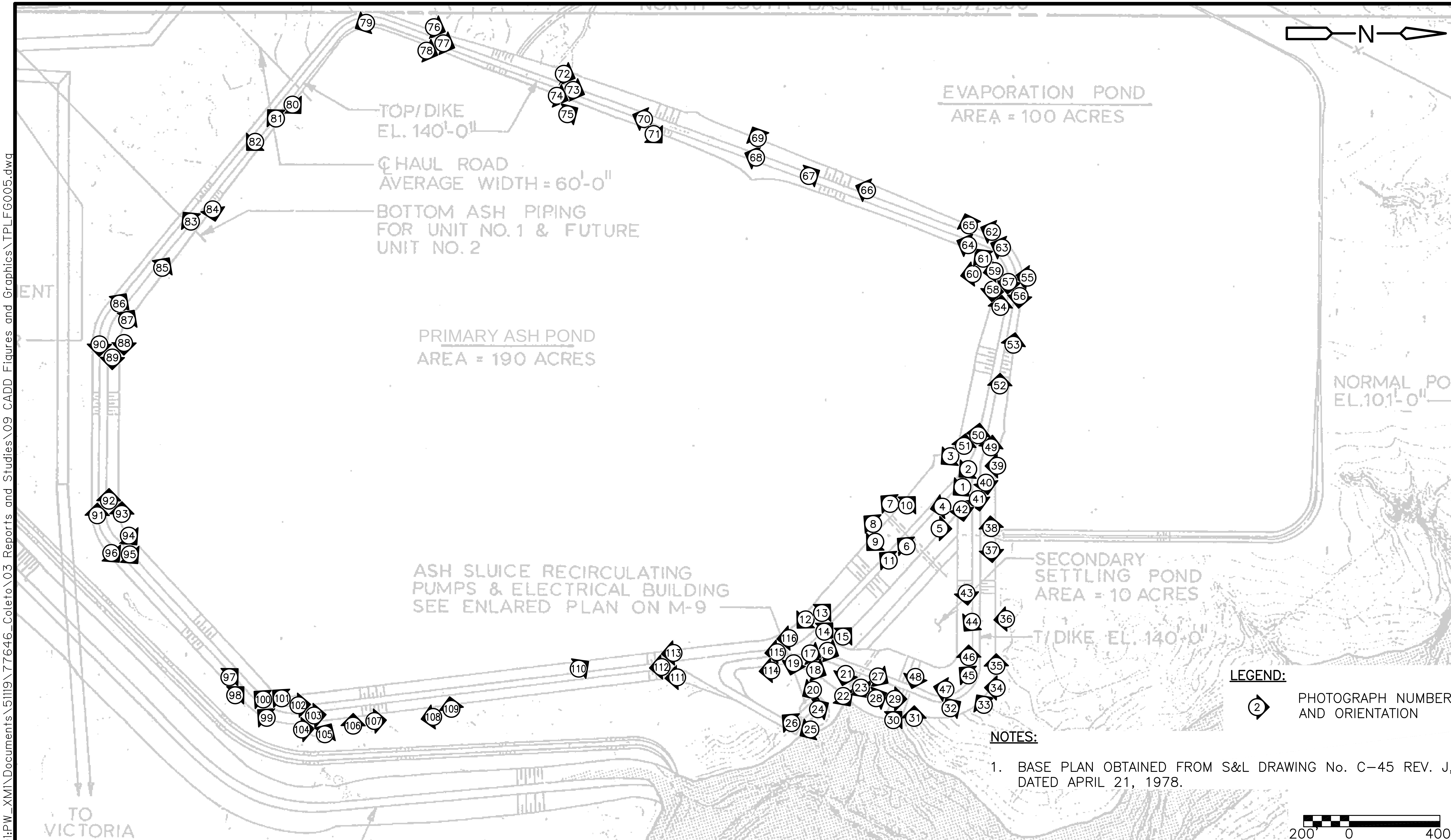
AERIAL MAP

JULY 2010

FIGURE 4



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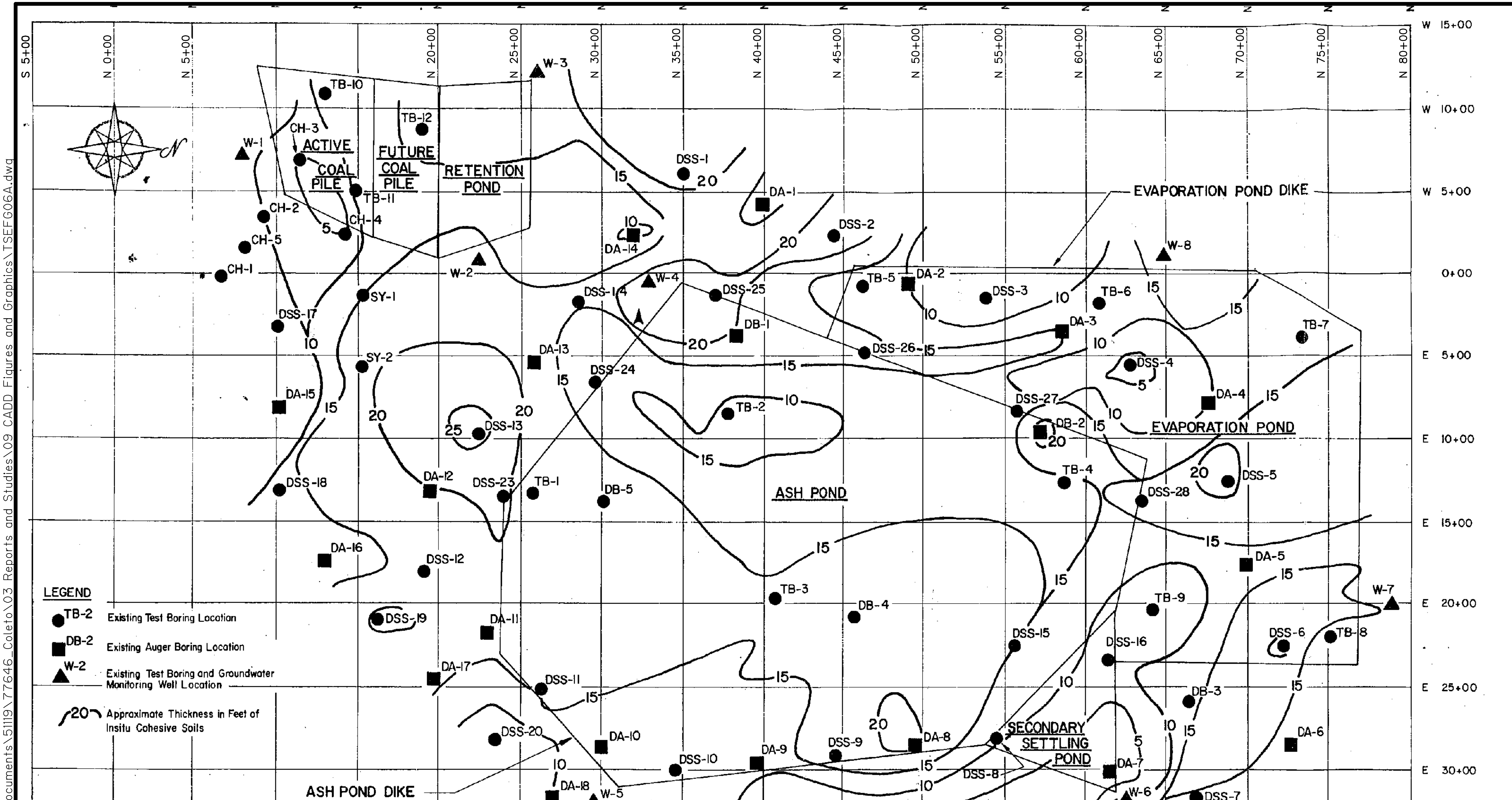
PHOTOGRAPH LOCATION PLAN

FIGURE 5



NOTES:

1. THICKNESS COUTOURS REPRESENT THICKNESS OF SURFACE COHESIVE SOIL DEPOSITS (CH, CL, AND SC MATERIAL WITH AND WITHOUT CALICHE).
2. PLAN FROM SARGENT & LUNDY REPORT SL-3689, DATED DECEMBER 1, 1978.

1" = 600'
300 0 600

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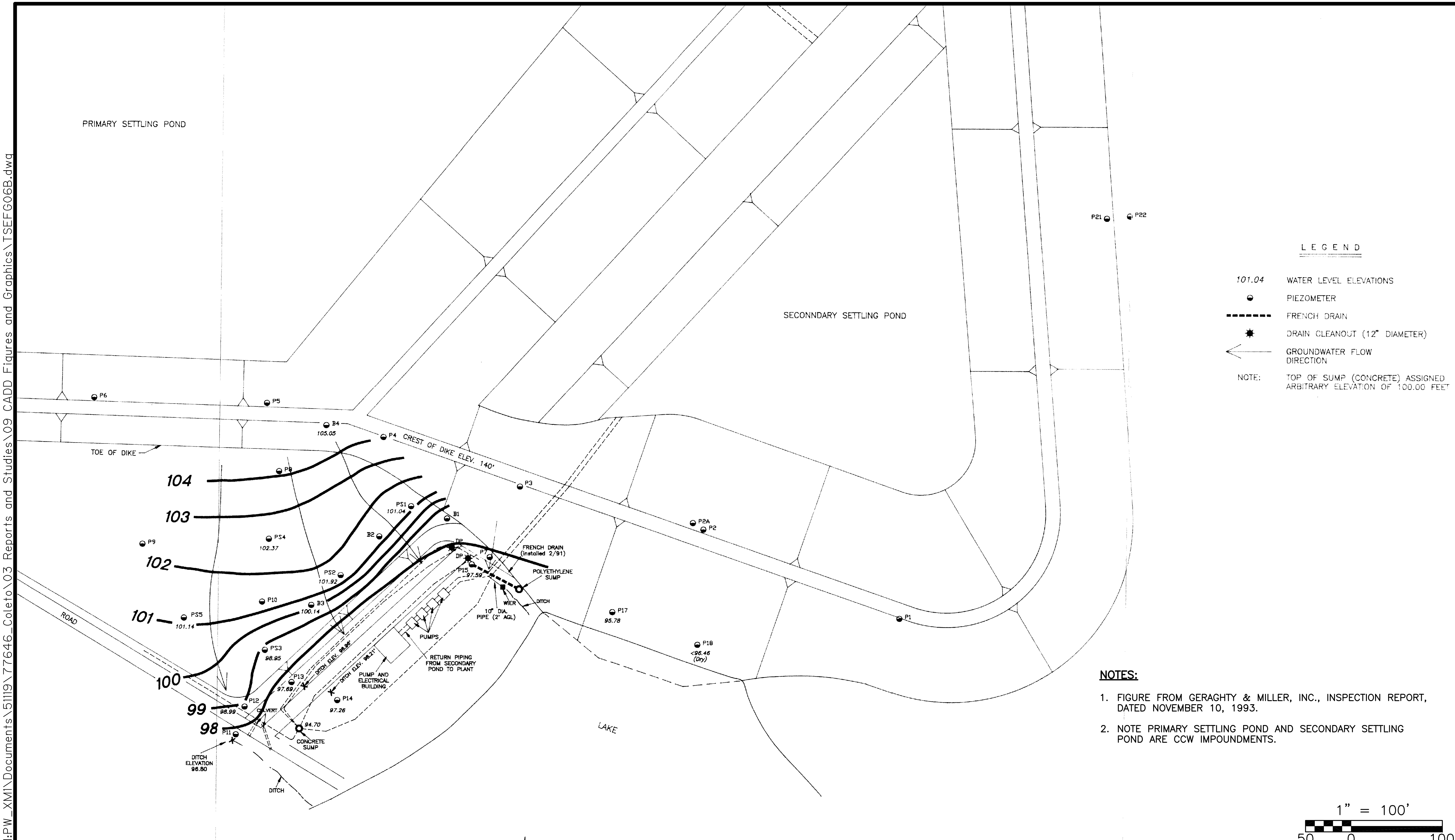
TEST BORING AND MONITORING WELL LOCATION PLAN (1 OF 2)

FIGURE 6A



NOTES:

1. FIGURE FROM GERAGHTY & MILLER, INC., INSPECTION REPORT, DATED NOVEMBER 10, 1993.
2. NOTE PRIMARY SETTLING POND AND SECONDARY SETTLING POND ARE CCW IMPOUNDMENTS.

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TEST BORING AND MONITORING WELL LOCATION PLAN (PLAN 2 OF 2)
FIGURE 6B

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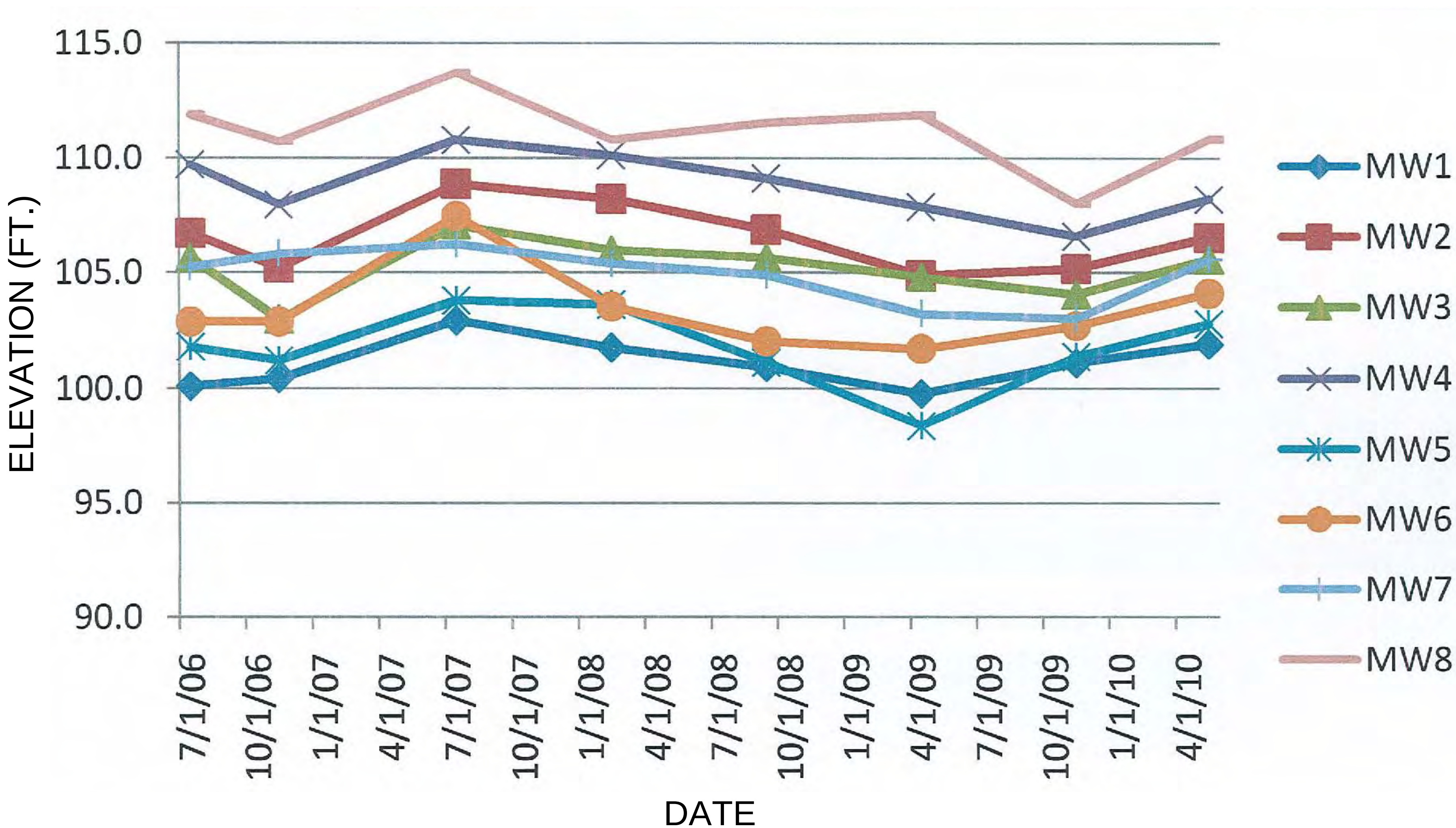

NOTES:

1. MONITORING WELL READINGS PROVIDED BY IPA PERSONNEL.

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MONITORING WELL WATER LEVEL RECORDS

FIGURE 7A

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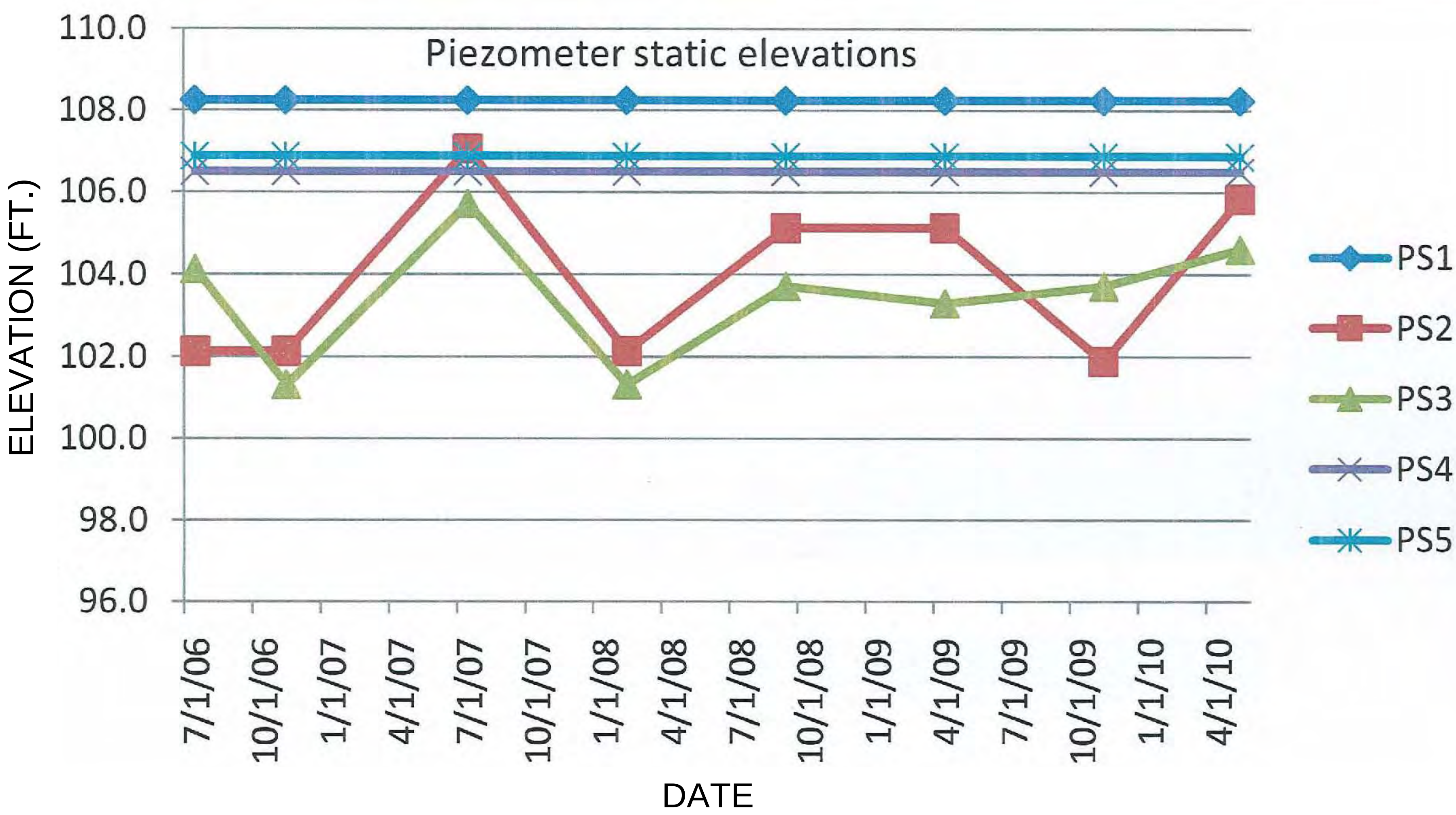

NOTES:

1. PIEZOMETER READINGS PROVIDED BY IPA PERSONNEL.

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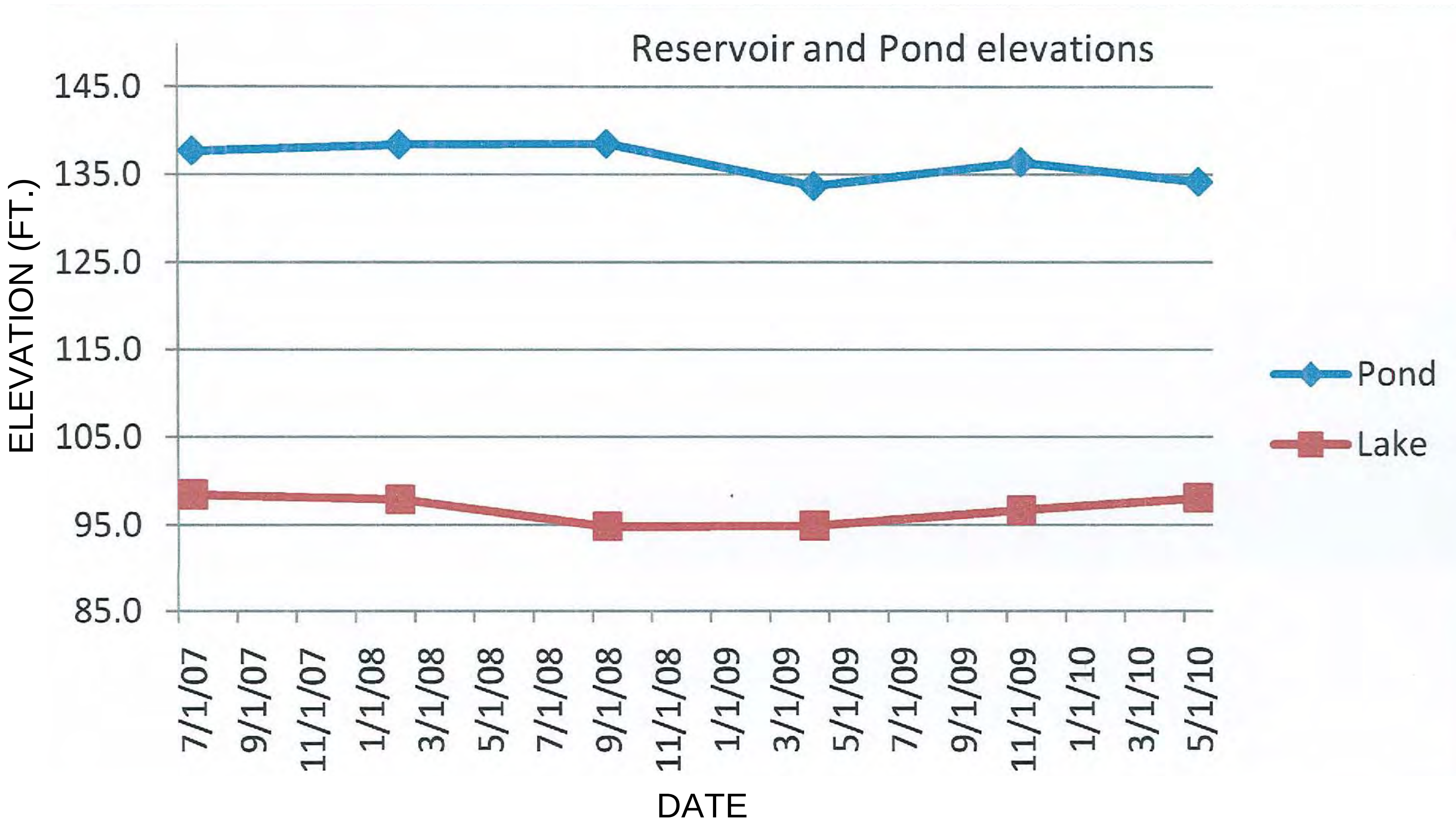
PIEZOMETER WATER LEVEL RECORDS

FIGURE 7B



NOTES:

1. RESERVOIR AND POND ELEVATIONS PROVIDED BY IPA PERSONNEL.

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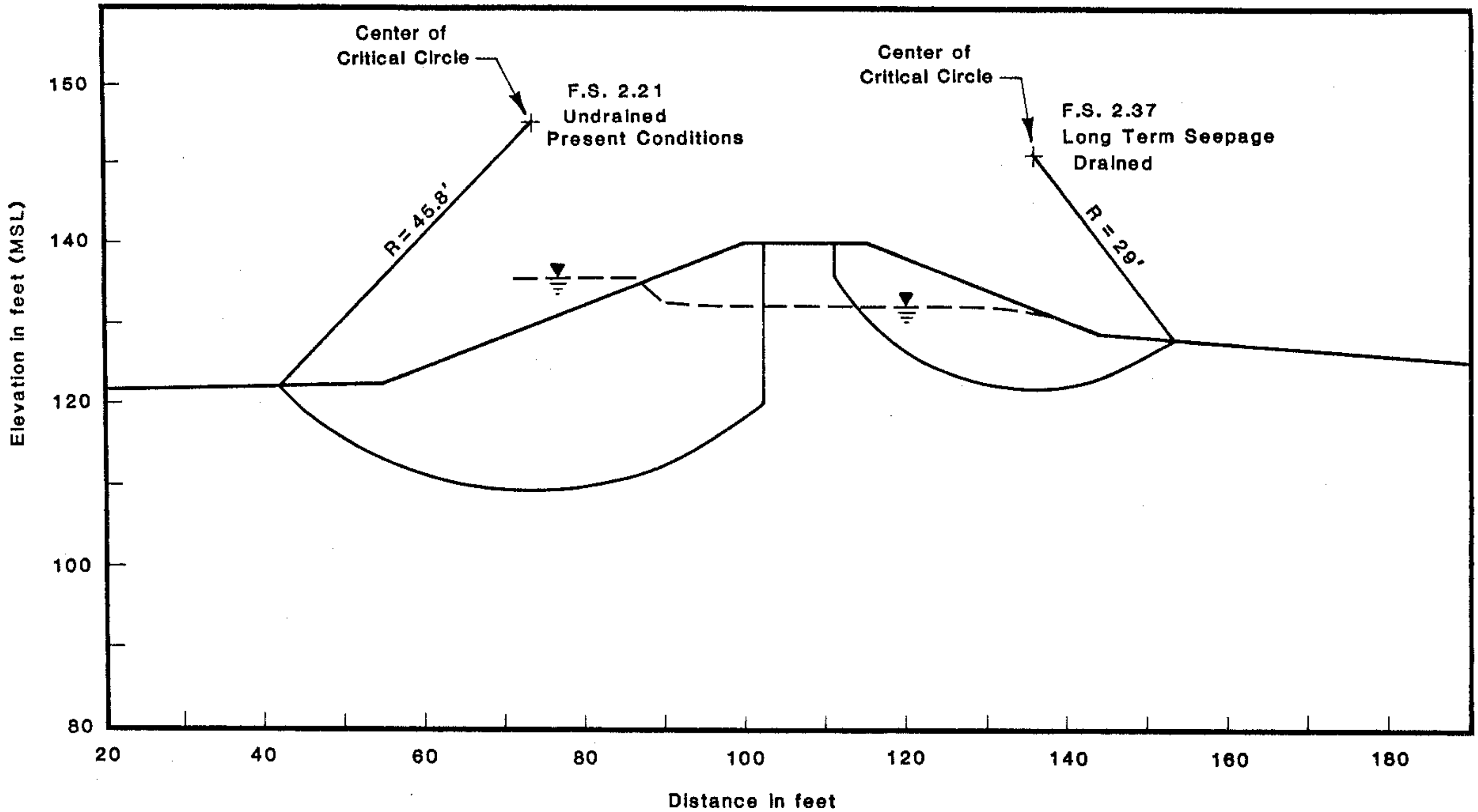
COLETO CREEK RESERVOIR & ASH POND WATER LEVEL RECORDS

FIGURE 8



NOTES:

1. STABILITY ANALYSES FROM URM, INC., INVESTIGATION REPORT, DATED JULY 29, 1981.

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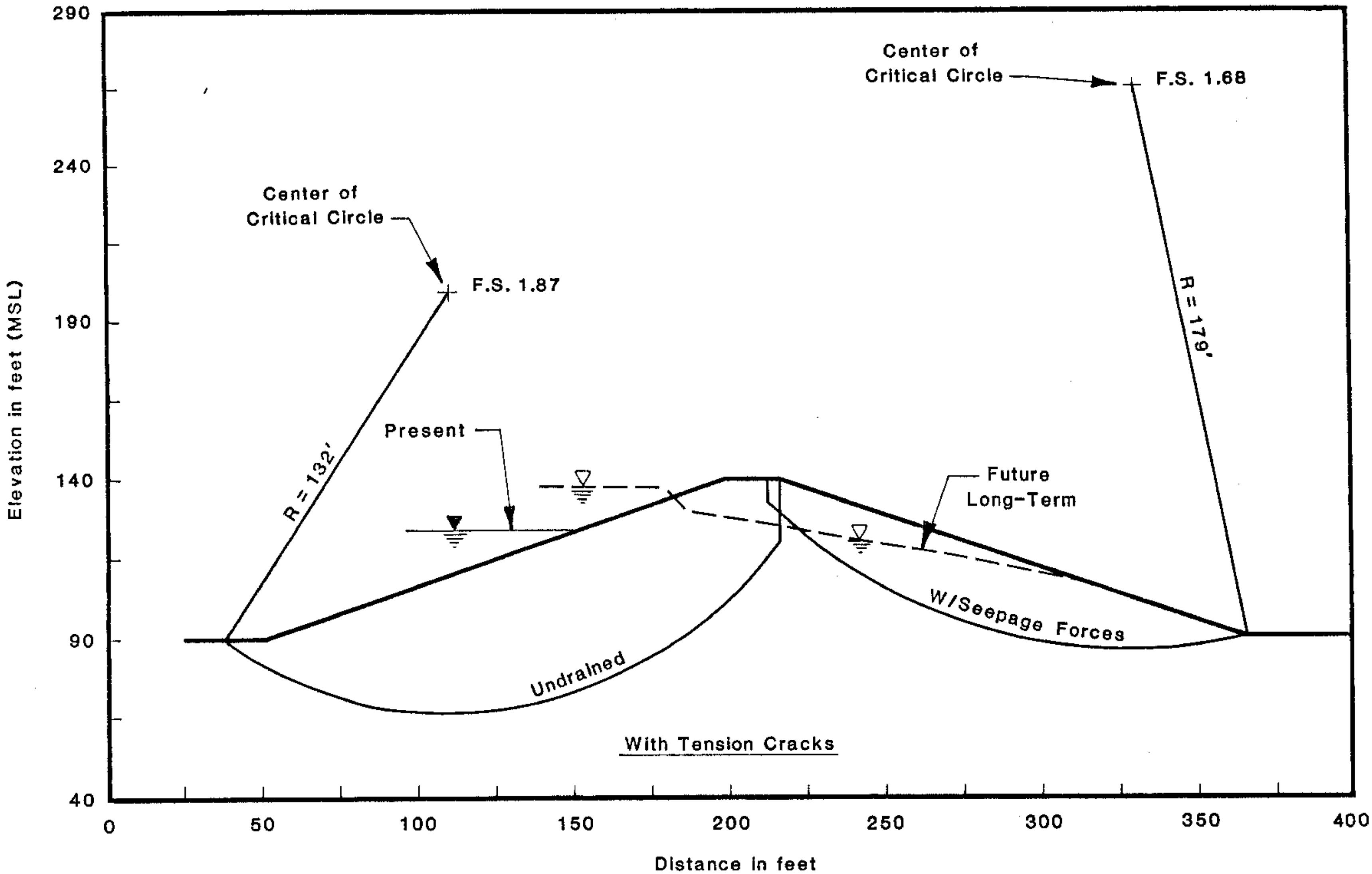
PRIMARY ASH POND
EAST EMBANKMENT STABILITY ANALYSIS

FIGURE 9



NOTES:

1. STABILITY ANALYSES FROM URM, INC., INVESTIGATION REPORT, DATED JULY 29, 1981.

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SECONDARY POND STABILITY ANALYSIS

FIGURE 10

Appendix A
USEPA Coal Combustion Dam Inspection Checklist Forms

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name:	Coleto Creek Power, LP	Date:	June 22, 2010
Unit Name:	Primary Ash Pond	Operator's Name:	IPA Operations, Inc.
Unit I.D.:	d/n/a	Hazard Potential Classification:	High Significant Low
Inspector's Name:	Michael Smith, Michael Schumaker		

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 1		18. Sloughing or bulging on slopes?		x
2. Pool elevation (operator records)?	136.8		19. Major erosion or slope deterioration?		x
3. Decant inlet elevation (operator records)?	108.5		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)?	140.0		Is water exiting outlet, but not entering inlet?		x
6. If instrumentation is present, are readings recorded (operator records)?	see note 6		Is water exiting outlet flowing clear?	x	
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)?	x		From underdrain?	x	
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?		x	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. Informal inspections made daily, not documented. Periodic inspections by an Engineering firm "as needed", on approximate 10 year intervals.
2. Water level based on staff gage reading taken on 6/22/10 and referenced to MSL.
3. Invert elevation based on Drawing C-48, prepared by Sargent & Lundy, 10/14/76 and referenced to MSL.
5. Crest elevation based on Drawing C-45, prepared by Sargent & Lundy, 6/6/76 and referenced to MSL.
6. Water levels recorded semi-annually.
8. Foundation preparation information based on review of construction drawings.
9. Max 12-inch-diameter mesquite tree.
10. ~1/4" wide dessication cracks on crest.
17. Dessication cracks on west embankment exterior face.
21. Seepage collected in french drain at toe of east embankment near recirculating pump station. Estimated flow in sump pit ~50gpm. Isolated seeps on southeast and east embankment. One ~400'Lx20'W seepage area located at the toe of east embankment. Ground wet, soft, saturated. On southeast embankment possible piping or former animal burrow with seepage.
23. Evaporation pond at west embankment exterior toe.

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

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # WQ0002159000 (permit is a TPDES permit) INSPECTOR Michael Smith, Michael Schumaker

Date June 22, 2010

Impoundment Name Primary Ash Pond
Impoundment Company Coleto LP, LLC
EPA Region 6
State Agency (Field Office) Addresss 1445 Ross Avenue Suite 1200
Dallas, Texas 75202
Name of Impoundment Primary 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: Fly Ash, bottom ash, boiler slag, waste water, storm drainage

Nearest Downstream Town : Name Raisin, TX
Distance from the impoundment 6.5 miles
Impoundment
Location: Longitude 97 Degrees 12 Minutes 33 Seconds W
Latitude 28 Degrees 43 Minutes 29 Seconds N
State Texas County Goliad

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

If So Which State Agency? TCEQ

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.

__X___ **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.

______ **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.

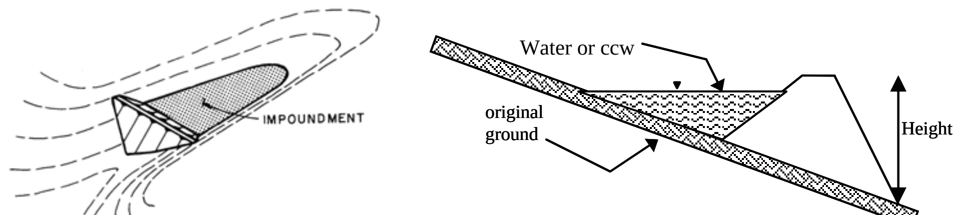
______ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

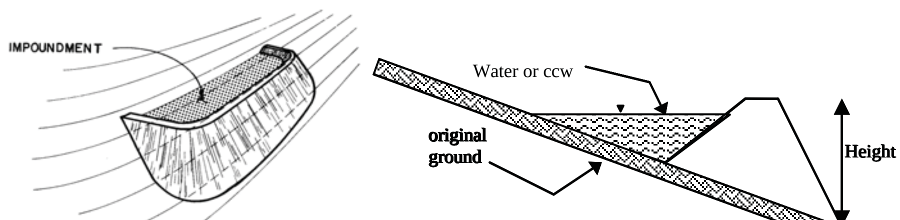
A.) A breach would have an environmental impact on Coleto Creek Reservoir.

B.) A breach may have an impact on plant facilities.

CONFIGURATION:

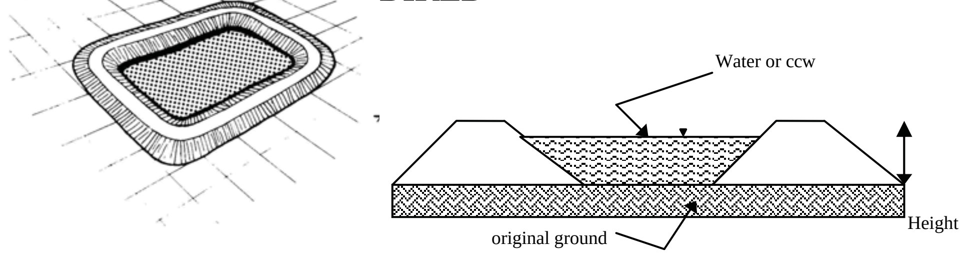


CROSS-VALLEY

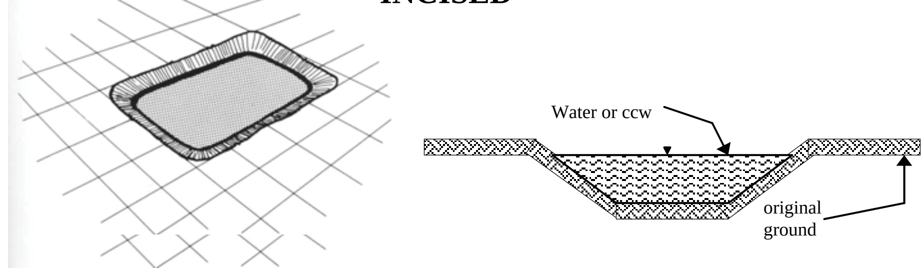


SIDE-HILL

DIKED



INCISED



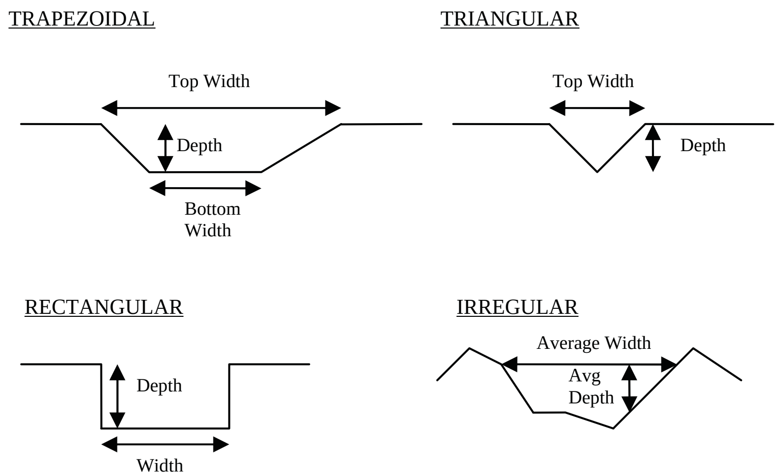
______ Cross-Valley
______ Side-Hill
______ Diked
______ Incised (form completion optional)
__X__ Combination Incised/Diked

Embankment Height ___39___ feet   Embankment Material Compacted Fill
Pool Area ___190___ acres   Liner 2-foot thick Compacted Clay
Current Freeboard ___3.2___ feet   Liner Permeability k= 3.8×10^{-8} cm/sec

TYPE OF OUTLET (Mark all that apply)

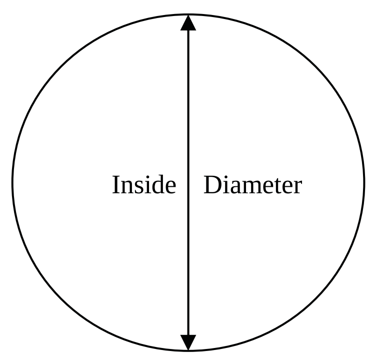
_N/A_ **Open Channel Spillway**
______ Trapezoidal
______ Triangular
______ Rectangular
______ Irregular

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



_X_ **Outlet**

_30"_ inside diameter



Material
_X_ corrugated metal
______ welded steel
______ concrete
______ plastic (hdpe, pvc, etc.)
______ other (specify) ______________________

Is water flowing through the outlet? YES _X_ NO _______

______ **No Outlet**

______ **Other Type of Outlet** (specify) ____________________________________

The Impoundment was Designed By _Sargent & Lundy Engineers_

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? Since December 1980.

IF So Please Describe:

In December, 1980, seepage was first noticed to adjacent to the recirculating pump station along the toe of the east embankment. By January 5, 1981 seepage water was accumulating along the toe of the slope. In 1981, when the water level in the impoundment was raised from approximately El. 121 to the present level of approximately El. 136.8, seepage in these areas was noted to increase. Two (2) french drains were installed along the toe of the east embankment near the pump station to collect seepage. Estimated flow in the french drain sump pits was ~5gpm and ~50gpm at the time of the site visit. Along the southeast and east embankment multiple seeps were noted at various isolated locations.
One seep along the east embankment is approximately 400 feet long by 20 feet wide. The seep area is wet, soft, boggy, with standing water and lush vegetation. Hog wallows were also observed in the seep area.

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 and Monitoring wells

If so Please Describe :

Impoundment water levels and select piezometer and monitoring well levels are recorded semi-annually. Some piezometers present on the embankments are not read.

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name: Coleto Creek Power, LP	Date: June 21, 2010
Unit Name: Secondary Settling Pond	Operator's Name: IPA Operations, Inc.
Unit I.D.: d/n/a	Hazard Potential Classification: High Significant Low
Inspector's Name: Michael Smith, Michael Schumaker	

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 1		18. Sloughing or bulging on slopes?		x
2. Pool elevation (operator records)?	136.8		19. Major erosion or slope deterioration?	x	
3. Decant inlet elevation (operator records)?	108		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)?	140.0		Is water exiting outlet, but not entering inlet?		x
6. If instrumentation is present, are readings recorded (operator records)?	see note 6		Is water exiting outlet flowing clear?	x	
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)?	x		From underdrain?	x	
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?	x		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. Informal inspections made daily, not documented. Periodic inspections by an Engineering firm "as needed", on approximate 10 year intervals.
2. Water level based on staff gage reading taken on 6/22/10 and referenced to MSL.
3. Invert elevation based on Drawing C-50, prepared by Sargent & Lundy, 10/14/76 and referenced to MSL.
5. Crest elevation based on Drawing C-45, prepared by Sargent & Lundy, 6/6/76 and referenced to MSL.
6. Water levels recorded semi-annually.
8. Foundation preparation information based on review of construction drawings.
9. Max 12-inch-diameter mesquite trees. Trees growing on east and north embankments.
15. Concrete in discharge channel has deteriorated. Concrete is cracked/spalled/missing and soil is exposed.
19. Erosion rills/depressions on east and north embankment exterior slope near toe ranging in size from 4' wide to 8' wide and up to 3' deep. Erosion on interior slopes from wave action. 1' to 2' of scour on interior slopes.
21. Seepage collected in french drain at toe of east embankment near recirculating pump station. Estimated flow in sump pit ~5gpm.
23. Coleto Creek Reservoir ("hot" side) at toe of east embankment.

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

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW) Impoundment Inspection

Impoundment NPDES Permit # WQ0002159000 (permit is a TPDES permit)
INSPECTOR Michael Smith Michael Schumaker
Date June 21, 2010

Impoundment Name Secondary Settling Pond
Impoundment Company Coleto LP, LLC
EPA Region 6
State Agency (Field Office) Addresss 1445 Ross Avenue Suite 1200
Dallas, Texas 75202
Name of Impoundment Secondary Settling 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: Fly Ash, bottom ash, boiler slag, waste water, storm drainage

Nearest Downstream Town : Name Raisin, TX
Distance from the impoundment 6.5 miles
Impoundment
Location: Longitude 97 Degrees 12 Minutes 23 Seconds W
Latitude 28 Degrees 43 Minutes 43 Seconds N
State Texas County Goliad

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

If So Which State Agency? TCEQ

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.

__X___ **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.

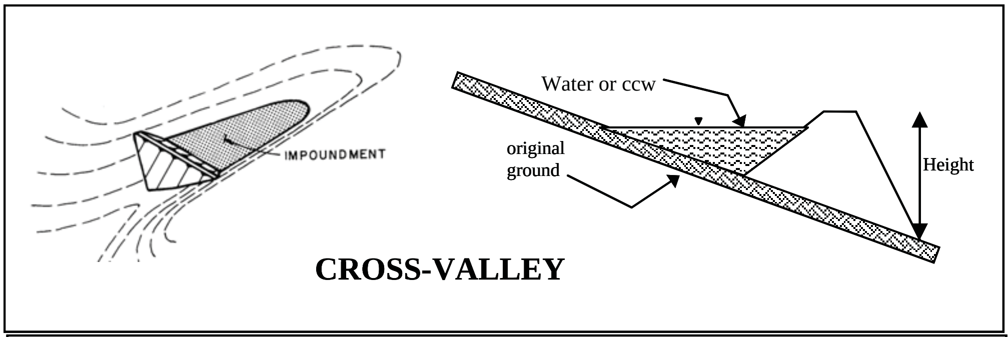
______ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. 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.

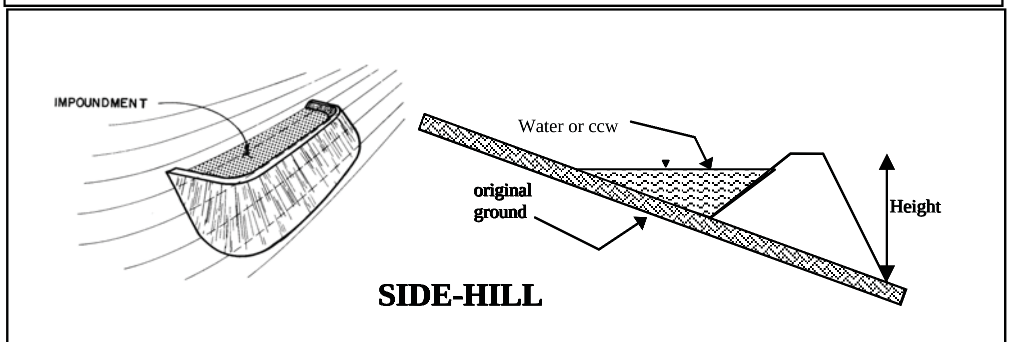
______ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

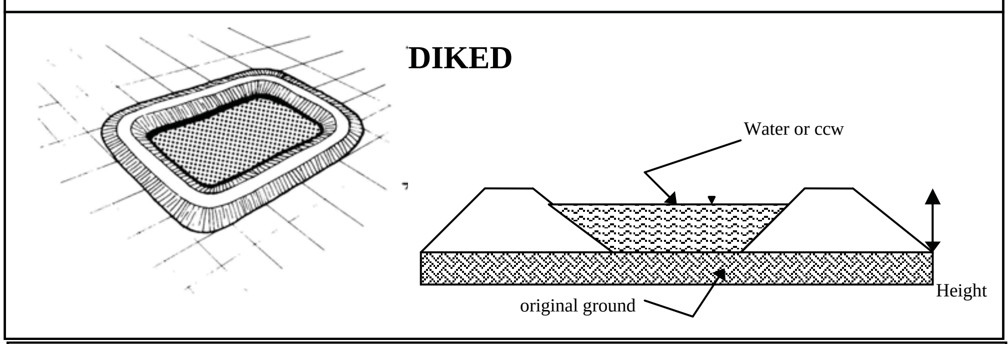
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

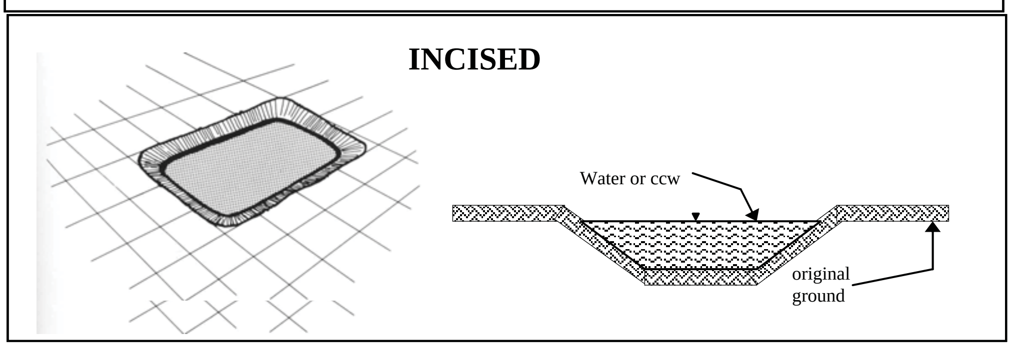
A.) A breach would have an environmental impact on Coleto Creek Reservoir.

CONFIGURATION:









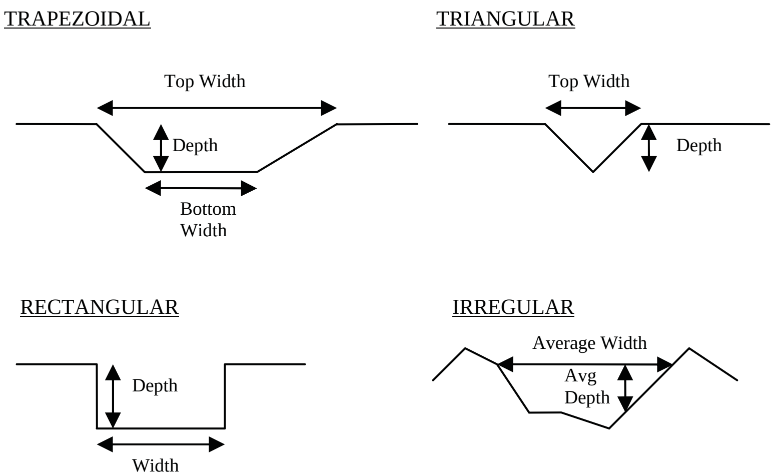
______ Cross-Valley
______ Side-Hill
______ Diked
______ Incised (form completion optional)
__X__ Combination Incised/Diked

Embankment Height ____56____ feet   Embankment Material _Compacted Fill____
Pool Area ________10______ acres   Liner __2-foot thick Compacted Clay____
Current Freeboard ____3.2____ feet   Liner Permeability _k= 3.8×10^{-8} cm/sec____

TYPE OF OUTLET (Mark all that apply)

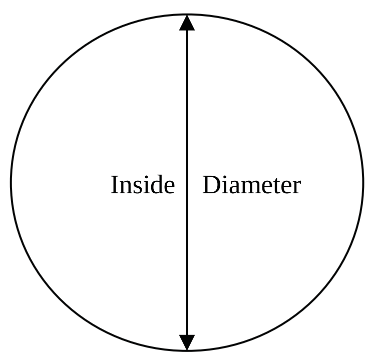
__N/A__ **Open Channel Spillway**
______ Trapezoidal
______ Triangular
______ Rectangular
______ Irregular

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



__X__ **Outlet**

2 - 20" 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 Sargent & Lundy Engineers

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 X NO ________

If so, which method (e.g., piezometers, gw pumping,...)? Piezometers and Monitoring wells

If so Please Describe :

Impoundment water levels and select piezometer and monitoring well levels are recorded semi-annually. Some piezometers present on the embankments are not read.

Appendix B
Photographs

Photo No. 1: Secondary Pond - Northeast slope of divider embankment from northwest corner, looking southeast.

Photo No. 2: Crest of divider embankment from northwest corner, looking southeast.

Photo No. 3: Primary Ash Pond - Southwest slope of divider embankment from northwest corner, looking southeast.

Photo No. 4: Secondary Ash Pond - Northeast slope of divider embankment, looking at typical erosion area from wave action. Erosion area shown approximately 6'Wx2'D.

Photo No. 5: Secondary Pond - Overview of north interior slope, looking north at typical erosion from wave action. Note approximately 1 to 2 feet of erosion on north interior slope.

Photo No. 6: Primary Ash Pond - Overview of staff gage and inlet structure, looking southwest. Note water level on 6/21/10 and 6/22/10 was El. 136.8

CDM	Coleto LP, LLC Coleto Creek Power, LP Fannin, TX
CDM Project No.: 77646.1801.035.SIT.COLET	June 21 and 22, 2010

Photo No. 7: Stop-log slots on inlet structure.

Photo No. 8: Close-up of inlet structure, looking southwest.

Photo No. 9: Primary Ash Pond - Southwest slope of divider embankment, looking southeast.

Photo No. 10: Primary Ash Pond - Southwest slope of divider embankment, looking northwest.

Photo No. 11: Primary Ash Pond - Overview of impoundment and power plant, looking southwest.

Photo No. 12: Primary Ash Pond - East interior slope, looking southeast. Note areas where Boral trucks have dumped excess material on the interior slope.

Photo No. 13: Primary Ash Pond - Southwest slope of divider embankment from southeast corner, looking northwest.

Photo No. 14: Crest of divider embankment, looking northwest.

Photo No. 15: Secondary Pond - Northeast slope of divider embankment, looking northwest.

Photo No. 16: Secondary Pond – East embankment interior slope , looking north.

Photo No. 17: Secondary Pond – East embankment crest, looking northeast.

Photo No. 18: Secondary Pond – East embankment exterior slope, looking northeast.

Photo No. 19: Secondary Pond – East embankment downstream area, looking southeast at the recirculating pump station and Coleto Creek Reservoir.

Photo No. 20: Overview of recirculating pump station, looking southeast.

Photo No. 21: Overview of secondary pond 8-inch-diameter Outfall 003 with weir box.

Photo No. 22: Overview of outfall channel. Note channel is deteriorated. Concrete is cracked, spalled, and missing and there is exposed soil.

Photo No. 23: French drain discharge sump at toe of Secondary Pond near outfall. Estimated flow approximately 5 gpm through a 2-inch-diameter PVC pipe.

Photo No. 24: Secondary Pond - outlet pipes connected to outfall and recirculating pump station.

Photo No. 25: French drain discharge sump at toe of Primary Ash Pond east embankment. Estimated flow approximately 50 gpm through a 4-inch-diameter PVC pipe.

Photo No. 26: Primary ash pond – East embankment exterior slope, looking at seepage at toe near French drain.

Photo No. 27: Secondary Pond – East embankment exterior slope looking northeast. Note 8- to 12-inch-diameter dead mesquite trees on the slope.

Photo No. 28: Secondary Pond – East embankment exterior slope, looking at 4'Wx2'D depression.

Photo No. 29: Secondary Pond – East embankment exterior slope, looking north at thick brush and dead trees.

Photo No. 30: Secondary Pond – East embankment exterior slope, looking at 8′Lx8′Wx2′D depression.

Photo No. 31: Secondary Pond – East embankment exterior slope, looking at 6′Lx4′Wx3′D depression.

Photo No. 32: Secondary Pond – North embankment exterior slope, looking at 8′Lx8′Wx3′D depression.

Photo No. 33: Secondary Pond – North embankment exterior slope, looking at 10′Lx4′Wx3′D erosion rill. Note the brush in background.

Photo No. 34: Secondary Pond – North embankment exterior slope, looking at 8′Lx4′Wx2′D erosion rill.

Photo No. 35: Secondary Pond – North embankment exterior slope, looking west. Note trees and brush growing on the slope.

Photo No. 36: Secondary Pond – North embankment exterior slope, looking at 6′Lx4′Wx2′D erosion rill.

Photo No. 37: Secondary Pond – North embankment exterior slope, looking east.

Photo No. 38: Secondary Pond – North embankment exterior slope, looking west.

Photo No. 39: Secondary Pond, north embankment exterior slope, looking at 12-inch-diameter DI recirculating pipeline. Pipeline discharges from recirculating pump station into Evaporation Pond.

Photo No. 40: Secondary Pond – North embankment exterior slope, looking east.

Photo No. 41: Secondary Pond – North embankment crest, looking east.

Photo No. 42: Secondary Pond – North embankment interior slope, looking east.

Photo No. 43: Secondary Pond – North embankment interior slope, looking east at typical 1 to 2 feet of erosion from wave action.

Photo No. 44: Secondary Pond – Looking southeast at east embankment interior slope from north embankment.

Photo No. 45: Secondary Pond - Looking southwest from north embankment at interior slope of divider embankment.

Photo No. 46: Secondary Pond – North embankment interior slope and crest, looking west.

Photo No. 47: Secondary Pond – East embankment interior slope and crest, looking south.

Photo No. 48: Secondary Pond – East embankment, looking east at Coleto Creek Reservoir at toe of embankment.

Photo No. 49: Primary Ash Pond – North embankment exterior slope, looking west. Note 8- to 12-inch-diameter mesquite trees on slope.

Photo No. 50: Primary Ash Pond – North embankment crest, looking west.

Photo No. 51: Primary Ash Pond – North embankment interior slope, looking west.

Photo No. 52: Primary Ash Pond – North embankment exterior slope, looking west at tall grass and 6-inch-diameter mesquite tree.

Photo No. 53: Primary Ash Pond – North embankment exterior slope, looking west at lush vegetation.

Photo No. 54: Primary Ash Pond – North embankment interior slope, looking west at a dead 8-inch-diameter mesquite tree.

Photo No. 55: Primary Ash Pond – North embankment exterior slope, looking at surface erosion area.

Photo No. 56: Primary Ash Pond – North embankment exterior slope, looking east.

Photo No. 57: Primary Ash Pond – North embankment crest, looking east.

Photo No. 58: Primary Ash Pond – North embankment interior slope, looking east.

Photo No. 59: Primary Ash Pond – Overview of impoundment of power plant, looking south from the north embankment.

Photo No. 60: Primary Ash Pond – Close up power plant, looking south from the north embankment.

CDM	Coleto LP, LLC Coleto Creek Power, LP Fannin, TX
CDM Project No.: 77646.1801.035.SIT.COLET	June 21 and 22, 2010

Photo No. 61: Primary Ash Pond – Overview of west embankment interior slope, looking southwest from the north embankment.

Photo No. 62: Primary Ash Pond – West embankment exterior slope, looking south.


Photo No. 63: Primary Ash Pond – West embankment crest, looking south.


Photo No. 64: Primary Ash Pond – West embankment interior slope, looking south.

CDM

Coleto LP, LLC
Coleto Creek Power, LP
Fannin, TX

CDM Project No.: 77646.1801.035.SIT.COLET

June 21 and 22, 2010

Photo No. 65: Primary Ash Pond – West embankment exterior slope, looking southwest at bare spot at toe and two mesquite trees. Tree diameters range from 6 to 12 inches.

Photo No. 66: Primary Ash Pond – West embankment exterior slope, looking south at thick vegetation and mesquite trees.

Photo No. 67: Primary Ash Pond – West embankment, looking northwest at Evaporation Pond.

Photo No. 68: Primary Ash Pond – West embankment crest, looking at typical desiccation crack.

Photo No. 69: Primary Ash Pond – West embankment, looking southwest at Evaporation Pond.

Photo No. 70: Primary Ash Pond – West embankment interior slope, looking south at surface water drainage ditch.

Photo No. 71: Primary Ash Pond – Interior slope looking northeast at impoundment and surface water drainage ditch.

Photo No. 72: Primary Ash Pond – West embankment exterior slope, looking northeast.

Photo No. 73: Primary Ash Pond – West embankment crest, looking northeast.

Photo No. 74: Primary Ash Pond – West embankment interior slope, looking northeast.

Photo No. 75: Primary Ash Pond – West embankment interior slope, looking at 20-inch-diameter DI surface water decant pipe.

Photo No. 76: Primary Ash Pond – West embankment exterior slope, looking northeast.

Photo No. 77: Primary Ash Pond – West embankment crest, looking northeast.

Photo No. 78: Primary Ash Pond – West embankment interior slope, looking northeast.

Photo No. 79: Primary Ash Pond – Southwest embankment crest and exterior slope, looking southeast toward Boral Materials Technologies' fly ash silos.

Photo No. 80: Primary Ash Pond – Southwest embankment, looking northeast at fly ash silo sluice area.

Photo No. 81: Primary Ash Pond – Southwest embankment, looking at two 8-inch-diameter sluices pipes from Boral Material Technologies' silos.

Photo No. 82: Primary Ash Pond – Southwest embankment exterior slope and crest, looking southeast.

Photo No. 83: Primary Ash Pond – Southwest embankment, looking southwest at sluice pipe trench.

Photo No. 84: Primary Ash Pond – Southwest embankment, looking northeast at sluice pipe discharge into screen processor.

Photo No. 85: Primary Ash Pond – Southwest embankment interior slope, looking northwest at 8-inch-diameter demineralizer effluent pipe.

Photo No. 86: Primary Ash Pond – Southwest embankment exterior slope and crest, looking northwest.

Photo No. 87: Primary Ash Pond – Southwest embankment interior slope and crest, looking northwest.

Photo No. 88: Primary Ash Pond – South embankment interior slope, looking east.

Photo No. 89: Primary Ash Pond – South embankment crest, looking east.

Photo No. 90: Primary Ash Pond – South embankment exterior slope, looking east.

Photo No. 91: Primary Ash Pond – South embankment exterior slope, looking west.

Photo No. 92: Primary Ash Pond – South embankment crest, looking west.

Photo No. 93: Primary Ash Pond – South embankment interior slope, looking west.

Photo No. 94: Primary Ash Pond – Southeast embankment interior slope, looking northeast.

Photo No. 95: Primary Ash Pond – Southeast embankment crest, looking northeast.

Photo No. 96: Primary Ash Pond – Southeast embankment exterior slope, looking northeast.

Photo No. 97: Primary Ash Pond – Southeast embankment exterior slope, looking at 8-inch-diameter rodent burrow hole and seep.

Photo No. 98: Primary Ash Pond – Southeast embankment exterior slope, looking at 8'Lx2'W seep near toe.

Photo No. 99: Primary Ash Pond – Southeast embankment exterior slope, looking southwest.

Photo No. 100: Primary Ash Pond – Southeast embankment crest, looking southwest.

Photo No. 101: Primary Ash Pond – Southeast embankment interior slope, looking southwest.

Photo No. 102: Primary Ash Pond – East embankment interior slope, looking north.

Photo No. 103: Primary Ash Pond – East embankment crest, looking north.

Photo No. 104: Primary Ash Pond – East embankment exterior slope, looking north.

Photo No. 105: Primary Ash Pond – East embankment exterior slope, looking northwest at 40’Lx10’W seep on lower third of the slope.

Photo No. 106: Primary Ash Pond – East embankment exterior slope, looking at 4’Wx4’Lx2’D depression. Note apparent dried seepage areas in the vicinity.

Photo No. 107: Primary Ash Pond – East embankment exterior slope, looking north at beginning of approximately 400-foot-long seepage area. Note area is saturated, soft, with standing water and lush vegetation. Isolated hog wallows were observed in the seepage area.

Photo No. 108: Primary Ash Pond – East embankment exterior slope, looking south at end of approximately 400-foot-long seepage area.

Photo No. 109: Primary Ash Pond – East embankment exterior slope, looking at an area disturbed by animal activity.

Photo No. 110: Primary Ash Pond – East embankment interior slope, looking north at the southwest slope of the divider embankment.

Photo No. 111: Primary Ash Pond – East embankment exterior slope, looking south.

Photo No. 112: Primary Ash Pond – East embankment crest, looking south.

Photo No. 113: Primary Ash Pond – East embankment interior slope, looking south.

Photo No. 114: Primary Ash Pond – East embankment exterior slope, looking south.

Photo No. 115: Primary Ash Pond – East embankment crest, looking south.

Photo No. 116: Primary Ash Pond – East embankment interior slope, looking south.

Appendix C
Photo GPS Locations

Appendix C
Photo GPS Locations

Site: Coleto Creek Power, LP
System: US State Plane 1983
Zone:Texas South Central 4204
Datum: NAD 1983 (Consus)
Coordinate Units: Feet

Photo No.	Northing	Easting
1, 2, and 3	13,453,560	2,542,702
4 and 5	13,453,394	2,542,874
6	13,453,231	2,543,022
7, 8, 9, and 10	13,453,170	2,542,957
11	13,453,213	2,543,048
12	13,452,870	2,543,391
13, 14, and 15	13,452,874	2,543,398
16, 17, 18, and 19	13,452,851	2,543,482
20	13,452,917	2,543,625
21, 22, and 23	13,452,984	2,543,685
24	13,452,942	2,543,690
25	13,452,802	2,543,793
26	13,452,695	2,543,815
27	13,453,157	2,543,642
28 and 29	13,453,218	2,543,691
30	13,453,271	2,543,716
31	13,453,323	2,543,735
32	13,453,552	2,543,711
33	13,453,603	2,543,702
34	13,453,624	2,543,679
35	13,453,677	2,543,595
36	13,453,679	2,543,385
37	13,453,635	2,543,063
38	13,453,618	2,542,975
39	13,453,642	2,542,722
40, 41, and 42	13,453,601	2,542,721
43	13,453,592	2,543,313
44	13,453,600	2,543,392
45 and 46	13,453,575	2,543,644
47	13,453,478	2,543,693
48	13,453,328	2,543,664
49, 50, and 51	13,453,600	2,542,655
52	13,453,675	2,542,325
53	13,453,713	2,542,162
54	13,453,717	2,541,994
55	13,453,769	2,541,889
56, 57, 58, 59, 60, and 61	13,453,741	2,541,865
62, 63, and 64	13,453,650	2,541,711
65	13,453,582	2,541,674
66	13,453,118	2,541,506
67	13,452,890	2,541,424
68 and 69	13,452,654	2,541,351
70 and 71	13,452,166	2,541,177
72, 73, 74, and 75	13,451,834	2,541,053

Appendix C
Photo GPS Locations

Site: Coleto Creek Power, LP
System: US State Plane 1983
Zone:Texas South Central 4204
Datum: NAD 1983 (Consus)
Coordinate Units: Feet

Photo No.	Northing	Easting
76, 77, and 78	13,451,263	2,540,835
79	13,450,877	2,540,746
80 and 81	13,450,544	2,541,126
82	13,450,406	2,541,275
83	13,450,163	2,541,585
84	13,450,192	2,541,597
85	13,449,988	2,541,827
86 and 87	13,449,822	2,542,025
88, 89, and 90	13,449,788	2,542,114
91	13,449,745	2,542,921
92	13,449,783	2,542,923
93	13,449,806	2,542,924
94 and 95	13,449,816	2,542,991
96	13,449,804	2,543,008
97	13,450,317	2,543,615
98	13,450,347	2,543,646
99	13,450,476	2,543,727
100 and 101	13,450,492	2,543,707
102, 103, and 104	13,450,592	2,543,751
105	13,450,706	2,543,799
106	13,450,833	2,543,769
107	13,450,939	2,543,763
108	13,451,212	2,543,735
109	13,451,260	2,543,718
110	13,451,844	2,543,586
111, 112, and 113	13,452,241	2,543,543
114, 115, and 116	13,452,819	2,543,469

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March 11, 2011

Mr. Jim Kohler, P.E.
Environmental Engineer
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U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW (5304P)
Washington, DC 20460

Subject: Response to Coleto Creek Power, L.P. Comments
Draft Report Dated August 4, 2010
Assessment of Dam Safety of Coal Combustion Surface Impoundments
Round 5
GSA No.: GS-10F-0227J
BPA No.: EP-09-W-001728

Dear Mr. Barton:

CDM Federal Programs Corporation (CDM) presents our response to comments dated October 25, 2010 provided by Coleto Creek Power, L.P. (Coleto) regarding the subject report prepared by CDM. This response follows the same numbering format indicated in Coleto's comment letter.

> *Comment 1: Section 4.3 -Coleto Creek Power agrees with the CDM report that vegetation should be controlled. Historically, Coleto Creek Power has inspected the impoundments (including observation of the vegetation) daily as part of routine rounds and if repairs were needed a work order was written and the repairs completed. Note that native south Texas vegetation (clump grasses or bunch grasses) is utilized to maintain dike stability and fails to thrive if mowed regularly and too closely. Therefore, the need for mowing and vegetation management is infrequent and difficult to predict. However, as a result of the CDM report Coleto Creek Power has implemented a more formal vegetation management program. Assessment of vegetation on the impoundments is conducted concurrently with semi-annual monitoring well sampling. Additionally, the remaining two quarters will have an inspection performed by competent staff including vegetation inspection and impoundment integrity. Work orders resulting from the above inspections are generated as needed. In the draft CDM report, there is no mention of the existing vegetation management program and insinuates there is not currently any vegetation management at Coleto Creek. Coleto Creek Power requests the CDM report be revised to include the above information.*
>
> Response: The draft version of the report addresses Coleto Creek Power's routine maintenance practices, including mowing grass on the embankments, in Section 3.5. Sections 3.5 and 4.3 of the report have been modified to further clarify maintenance practices relative to mowing and vegetation inspection.

Comment 2: Section 4.5 -As mentioned in the opening paragraph of this letter, USEPA should note that the plant has scheduled a Professional Engineer (PE) from a consulting firm to address the seven recommendations and/or exclusions noted in this section. The PE is planned/budgeted to visit the site during the first quarter of 2011, in conjunction with the already scheduled assessment of the main dam.

Response: Section 3.5 of the report has been modified to include reference to the planned engineering assessment.

Comment 3: Section 4.6 -No justification is provided for the recommendation to perform quarterly water level readings for the monitoring wells. Additionally, no justification is provided for increasing the number of monitoring wells. The Texas Commission on Environmental Quality (TCEQ) has approved the plant Groundwater Monitoring Plan which documents the existing monitoring wells as adequate and sampling every six months as adequate for characterizing the site. Based upon the semi-annual trend analysis provided to CDM there is no objective evidence that additional granularity would provide value. The PE review mentioned in Section 2 above will consider whether an increase in monitoring well readings is advisable. Therefore, Coleto Creek Power requests that the recommendations to increase monitoring well readings and the number of monitoring wells monitored be removed from CDM's report.

Response: The draft report includes the recommendation that wells be read at a minimum of a quarterly basis to establish an adequate data base of seasonal water level fluctuations for use in slope stability analyses and to evaluate potential development of unstable embankment conditions. The report also recommends that it be determined if the other monitoring wells, which we understood were not monitored, function they be utilized as part of the water level monitoring program. The report did not include a recommendation for additional monitoring wells. It is CDM's opinion that more frequent monitoring is a prudent, common practice that is useful in evaluation seasonal fluctuations in piezometric levels and in the evaluation of slope stability. As such, the recommendations have not been changed. Note that the recommendation is only to increase the frequency of monitoring water levels, not sampling or environmental testing.

Comment 4: Section 4.7 -Coleto Creek Power seeks to always operate in full compliance with state and federal regulations. The seepage areas have been inspected and evaluated by the TCEQ and USEPA Region 6 and no permit compliance problems have been identified. The plant will continue to monitor as recommended in Section 4.8 and will continue to respond according to changes observed. The comment in Section 4.7 of the CDM report regarding permit compliance should be removed.

Response: The reference to permit compliance was intended to be general in nature and identify the potential for a compliance issue. The report has been modified as follows:

> "It is our understanding that in general, seepage may be considered non-compliant from an environmental perspective relative to TPDES permit requirements depending on the concentration of the constituents in the seepage water. It is also our understanding that seepage areas at this site have been inspected and evaluated by the TCEQ and the USEPA Region 6, and that no permit compliance issues have been identified. However, CDM recommends that IPA monitor the seepage on the Primary Ash Pond southeast and east embankments and evaluate alternative methods of seepage control to address geotechnical concerns."

Comment 5: Section 4.8 -As mentioned above, Coleto Creek Power has scheduled an evaluation by a PE for the first quarter of 2011 (in conjunction with the main dam inspection) and believes it appropriate to include that information in this section of the CDM report or hold the report in draft status until the PE evaluation can be completed. The TCEQ dam inspection form used by the site does not include a requirement for a sketch and captures the data intended by CDM's recommendation without the need for sketches. Therefore, Coleto Creek Power requests the recommendation to include sketches as part of the periodic inspection process be removed from the report.

Response: The use of sketches in conjunction with inspection reports is a common engineering practice used to document issues and potentially changing conditions. It is CDM's opinion that the use of sketches is a standard, prudent practice used in conjunction with routine inspections. As such, the recommendation will remain in the report.

Comment 6: Section 4.9 -a.) The CDM report states that no stoplogs were observed at the inlet structure in the Primary Ash Pond. The stoplogs are stored out of the weather to prevent damage and are immediately available if needed. b.) The report also recommends that a life preservation device be installed at the inlet structure, and one has been staged there since the time of the site visit. c.)The CDM report recommends that a formal, detailed operations and maintenance manual be developed. The system is operated following initial design and commissioning and additional formal procedures for the simple impoundment system is onerous and presents undue burden. Coleto Creek Power requests the removal of the recommendation to develop a formal operations and maintenance manual from the report. d.) Finally, the CDM report recommends the development of a formal emergency action plan (EAP) for the impoundments. Coleto Creek Power believes an impoundment-specific EAP would be redundant with the existing plant-wide EAP and therefore unnecessary. Any emergency impoundment failure would be addressed like all emergencies at the site, by following the existing site EAP which includes roles and responsibilities. Any event would be unique and require case-by-case management rendering detailed planning a valueless endeavor. Coleto Creek Power requests the removal of the recommendation to develop and implement an impoundment-specific EAP from the report.

Response: The report has been revised to include a recommendation that a detailed operation and maintenance outline be developed that highlights a list of procedures for the maintenance of the embankments and operational procedures for the impoundments and appurtenant structures as opposed to a detailed operations and maintenance manual. The report has also been modified to include a recommendation that the existing plant-wide emergency action plan be updated to include impoundment specific emergency procedures, identify roles and responsibilities and provide a means to facilitate internal and external communication necessary to manage an impoundment failure.

Administrative comments identified in the letter have also been addressed. The letter also requests that the POOR condition rating be revised. Based on the criteria specified by the EPA, a revision to the condition rating is not warranted at this time. However, note that the report does indicate that additional documentation and future studies performed to confirm the condition and performance of these impoundments may be sufficient to substantiate an improved condition assessment.

We trust that this information meets your needs. Please do not hesitate to contact me if you have any questions.

Very truly yours,

CDM Federal Programs Corporation

Stephen L. Whiteside

Stephen L. Whiteside
Vice President

cc: J. Litwin, CDM
R. Goltz, CDM
M. Schultz, CDM
M. Diaz, CDM