FINAL, Rev 2

Coal Combustion Waste Impoundment
Round 5 - Dam Assessment Report

BIG CAJUN II GENERATING STATION
(Site No. 009)
Fly Ash Pond,
Bottom Ash Pond,
Primary and Secondary Water Treatment Ponds

LOUISIANA GENERATING, LLC
NEW ROADS, LA

Prepared for:

United States Environmental Protection Agency
Office of Resource Conservation and Recovery

Prepared by:

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July 2010
Revised November 2010
Revised March 2011

INTRODUCTION, SUMMARY, CONCLUSION AND RECOMMENDATIONS

The release of over five million cubic yards of coal ash from the Tennessee Valley Authority's Kingston, Tennessee facility in December 2008, which flooded more than 300 acres of land, damaging homes and property, is a wake-up call for diligence on coal combustion waste disposal units. A first step to prevent such catastrophic failure and damage is to assess the stability and functionality of ash impoundments and other units, then quickly take any needed corrective measures.

This assessment of the stability and functionality of the Big Cajun II Generating Station ash management units is based on a review of available documents and on the site assessment conducted by Dewberry personnel June 22, 2010. The supporting technical documentation is not adequate to determine the structural integrity of the existing dikes. However documents supporting a proposed expansion of the management unit provided data that were used, through interpolation, to conclude the existing dike structural integrity is sufficient (Section 1.1.3). Section 1.2.6 presents seven recommendations that may help to maintain a safe and trouble-free operation.

In summary, the facility is rated **FAIR** for continued safe and reliable operation. The classification represents a balance between the lack of technical documentation of critical engineering analyses (rated POOR) verifying design slope stability safety factors of the Management Unit dikes and recent actions taken by the power plant to improve dike maintenance and integrity (rated SATISFACTORY). We understand Louisiana Generating is performing a geotechnical study to correct the technical documentation deficiency.

PURPOSE AND SCOPE

The U. S. Environmental Protection Agency (EPA) is embarking on an initiative to investigate the potential for catastrophic failure of Coal Combustion Surface Impoundments (i.e. management unit) from occurring at electric utilities in an effort to protect lives and property from the consequences of a dam failure or the improper release of impoundment slurry. The EPA initiative is intended to identify conditions that may adversely affect the structural stability and functionality of a management unit and its appurtenant structures (if present); to note the extent of deterioration (if present); status of maintenance and/or a need for immediate repair; to evaluate conformity with current design and construction practices, and to determine the hazard potential classification for units not currently classified by the management unit owner or by a state or federal agency. The initiative will address management units that are classified a Less-than-Low, Low, Significant or High Hazard Potential ranking. (For Classification, see pp. 3-8 of the 2004 Federal Guidelines for Dam Safety)

In March 2009, the EPA sent letters to coal-fired electric utilities seeking information on the safety of surface impoundments and similar facilities that receive liquid-borne material that store or dispose if coal combustion waste. This letter was issued under the authority of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Section 104(e), to assist the Agency in assessing the structural stability and functionality of such management units, including which facilities should be visited to perform a safety assessment of the berms, dikes, and dams used in the construction of these impoundments.

EPA asked utility companies to identify all management units: surface impoundments or similar diked or bermed structures; and; landfills receiving liquid-borne materials that store or dispose of coal-combustion residuals or by-products, including, but not limited to, fly ash, bottom ash, boiler slag, and flue gas emission control residuals. Utility companies responded with information on the size, design, age, and the amount of material placed in the units so that EPA could gauge which management units had or potential could rank as having High Hazard Potential. The USEPA and its contractors used the following definitions for this study:

> "Surface Impoundment or impoundment means a facility or part of a facility which is a natural topographic depression, man-made excavation, or diked area formed primarily of earthen materials (although it may be lined with man-made materials), which is designed to hold an accumulation of liquid wastes or wastes containing free liquids, and which is not an injection well. Examples of surface impoundments are holding, storage, settling and aeration pits, ponds, and lagoons."
>
> For this study, the earthen materials could include coal combustion residuals. EPA did not provide an exclusion for small units based on whether the placement was temporary or permanent. Furthermore, the study covers not only waste units designated as surface impoundments, but also other units designated as landfills which receive free liquids.
>
> EPA is addressing any land-based units that receive fly ash, bottom ash, boiler slag, or flue gas emission control waster along with free liquids. If the landfill is receiving coal combustion wastes with liquids limited to that for proper compaction, then there should not be free liquids present and the EPA did not seek information on such units which are appropriately designated a landfill.
>
> In some cases coal combustion wastes are separated from the water, and the water containing de minimum levels of fly ash, bottom ash, boiler slag, or flue gas emission control wastes are sent to an impoundment. EPA is including such impoundments in

this study, because chemicals of concern may have leached from the solid coal combustion wastes into the waster waters, and the suspended solids from the coal combustion wastes remain.

The purpose of this report is to evaluate the condition and potential of waste release from management units that have not been rated for hazard potential classification. A two-person team reviewed the information submitted to EPA, reviewed any relevant publicly available information from state or federal agencies regarding the unit potential hazard classification (if any) and accepted information provided via telephone communication with a management unit representative.

This evaluation included a site visit. EPA sent two engineers, one licensed in the State of Louisiana, for a one-day visit. The two-person team met with the owner of the management unit as well as technical and several technical representative and management unit supervisors to discuss the engineering characteristics of the unit as part of the site visit. During the site visit the team collected additional information about the management unit to be used in determining the hazard potential classifications of the management unit(s). Subsequent to the site visit the management unit owner provided additional engineering data pertaining to the management units.

Factors considered in determining the hazard potential classification of the management unit(s) included the age and size of the impoundment, that quantity of coal combustion residuals or by-products that were stored or disposed in the these impoundments, its past operating history, and its geographic location relative to down gradient population centers and/or sensitive environmental systems.

This report presents the opinion of the assessment team as to the potential of catastrophic failure and reports on the condition of the management units(s). The team considered criteria in evaluating the dams under the National Inventory of Dams in making these determinations.

<u>LIMITATIONS</u>

The assessment of dam safety reported herein is based on field observations and review of readily available information provided by the owner/operator of the subject coal combustion waste management unit(s). Qualified Dewberry engineering personnel performed the field observations and review and made the assessment in conformance with the required scope of work and in accordance with reasonable and acceptable engineering practices. No other warranty, either written or implied, is made with regard to our assessment of dam safety.

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1.0 CONCLUSIONS AND RECOMMENDATIONS

1.1 CONCLUSIONS

Conclusions are based on visual observations from a one-day site visit performed on Tuesday, June 22, 2010, and a review of technical information provided by Louisiana Generating LLC, NRG.

These conclusions apply to the Fly Ash Pond, the Bottom Ash Pond and both the Primary and Secondary Water Treatment Ponds. The Dewberry team did not evaluate the rainfall surge pond, as it is below grade, without any dikes or dams.

1.1.1 Conclusions Regarding the Structural Soundness of the Management Unit(s)

The structural soundness of the Management Unit is rated FAIR, based on the lack of documentation of critical engineering data verifying design slope stability analyses.

1.1.2 Conclusions Regarding the Hydrologic/Hydraulic Safety of the Management Unit(s)

Hydrologic and hydraulic data provided to Dewberry for review indicate adequate capacity to contain the 25 year/24 hour design storm event without overtopping the dikes.

1.1.3 Conclusions Regarding the Adequacy of Supporting Technical Documentation

The supporting technical documentation is not adequate to determine the structural integrity of the existing dikes.

1.1.4 Conclusions Regarding the Description of the Management Unit(s)

The description of the management units provided by Big Cajun II was an accurate representation of what was observed in the field.

1.1.5 Conclusions Regarding the Field Observations

Dewberry staff was provided access to all areas in the vicinity of the management units required to conduct a thorough field observation. The conclusions provided in this section reflect the engineering team's field observations. The visible parts of the dike embankments and outlet structure were observed to have no signs of overstress, significant settlement, shear failure, or other signs of instability. However, visual observations were hampered by the presence of thick vegetation in some areas. Embankments visually appear structurally sound. Other than excess vegetation on areas of the embankment slopes, there are no indications of unsafe conditions or conditions needing immediate remedial action.

Subsequent to the site visit Dewberry was informed that the excess vegetation on areas of the embankment slopes that hampered visual observation has been removed.

1.1.6 Conclusions Regarding Adequacy of Maintenance and Methods of Operation

There appears to be a lack of maintenance regarding vegetation control on the embankment slopes. Inadequate control of vegetative growth can hide indications of dike performance issues including seepage and surface slips that can become major safety hazards if not abated early.

Subsequent to the site visit Dewberry was informed that maintenance procedures have been implemented to keep the embankments clear of excess vegetative growth.

1.1.7 Conclusions Regarding the Adequacy of the Surveillance and Monitoring Program

The surveillance program consists of daily drive-by inspections conducted by plant personnel. These inspections are documented as of February 2010. The dikes are not instrumented.

1.1.8 Conclusions Regarding Suitability for Continued Safe and Reliable Operation

The facility is rated FAIR for continued safe and reliable operation. The classification is a balance between the lack of technical documentation of critical engineering analyses verifying design slope stability safety factors of the Management Unit dikes, and recent improvements in dike maintenance.

1.2 RECOMMENDATIONS

Based upon the above conclusions as well as the sum of information found within this report, the recommendations presented below are proposed.

1.2.1 Recommendations Regarding the Structural Stability

Although observations made during the site visit do not indicate signs of overstress, significant settlement, shear failure, or other signs of instability, the structural stability cannot be evaluated without reviewing the results of engineering analyses of the slope stability factors of safety under various load conditions. It is recommended that if the original design analyses cannot be located, a new geotechnical engineering evaluation be conducted. The new geotechnical engineering evaluation should be based on current standards, including seismic loading conditions.

Subsequent to the site visit Dewberry was informed that Big Cajun II was unable to locate the original slope stability analyses. Big Cajun II has contacted the original geotechnical engineering firm which will review its files in an effort to locate the original analyses. Big Cajun II also has requested a proposal to perform a new geotechnical engineering evaluation.

1.2.2 Recommendations Regarding the Hydrologic/Hydraulic Safety

Recommendations regarding the Hydrologic/Hydraulic safety at the site were inconclusive at the time of the assessment. See Section 1.2.3.

1.2.3 Recommendations Regarding the Supporting Technical Documentation.

The following recommendations are provided to document that the design and construction of the existing dike embankments meet the requirements of the current Louisiana Dam Safety Program:

- Conduct slope stability analysis of existing embankments to verify safety factors meet or exceed the minimum requirements of the dam safety program for all required loading condition.
- Conduct a hydrologic/hydraulic analysis of the existing impoundment to verify that it can store storm water from a 1 percent probability (100-year) design event without overtopping the dike. Amend and expand the Emergency Action Plan to include a dam break response.

Subsequent to the site visit Dewberry was informed that proposals for conducting slope stability analyses and hydrologic/hydraulic analyses have been requested by Big Cajun II. Based on the results of the hydrologic/hydraulic analyses, the Big Cajun II Emergency Action Plan will be amended to include a dam break response.

1.2.4 Recommendations Regarding the Description of the Management Unit(s).

No recommendations appear warranted at this time.

1.2.5 Recommendations Regarding the Field Observations.

The appearance of sloughing along the Bottom Ash Pond's landside southern embankment should be addressed. This area appeared to be wet and muddy. The possibility of partial collapse at this location should be investigated. At the time of the field observations, there appeared to be a slight depression in the embankment.

Subsequent to the site visit Dewberry was informed by Big Cajun II that sloughing observed during the site visit would be investigated by a geotechnical engineering consultant and any recommended corrective actions would be implemented.

1.2.6 Recommendations Regarding the Maintenance and Methods of Operation.

To help maintain a safe and trouble free operation, we recommend:

Develop and implement a written Operations and Maintenance program for the dike embankments to include regular inspection by qualified dam safety/assessment engineers.

1.2.7 Recommendations Regarding the Surveillance and Monitoring Program.

To help maintain a safe and trouble free operation, we recommend:

- Monitor the areas of local sloughing and soft, wet spots along the downstream slope of the bottom ash cell dike to evaluate the cause and appropriate corrective measures, if required.
- Implement a program of regular inspections by dam safety engineers to identify changes in the performance of the embankments in a timely manner.

Subsequent to the site visit Dewberry was informed that Big Cajun II is consulting with the Louisiana Department of Transportation and Development – Dam Safety for guidance on developing a dam inspection program. Based on the results of those consultations, a program for periodic inspections by dam safety engineers will be implemented.

1.2.8 Recommendations Regarding Continued Safe and Reliable Operation.

No recommendations appear warranted at this time.

1.3 PARTICIPANTS AND ACKNOWLEDGEMENT

1.3.1 List of Participants

Gary Elender, Louisiana Generating, LLC
Ash G. Namjoshi, Louisiana Generating, LLC
Jeff Morrison, Louisiana Generating, LLC
John Flanagan, Lead Site Engineer, Dewberry
Lauren Ohotzke, Staff Site Engineer, Dewberry

1.3.2 Acknowledgement and Signature

We acknowledge that the management units referenced herein have been assessed on June 22, 2010.

John J Flanagan, P.E.	Lauren Ohotzke
John Flanagan, PE (LA PE # 15902)	Lauren Ohotzke

2.0 DESCRIPTION OF THE COAL COMBUSTION WASTE MANAGEMENT UNIT(S)

2.1 LOCATION

The Big Cajun II Generating Station is located in the town of New Roads, Louisiana, approximately 35 miles northwest of Baton Rouge, Louisiana. The Big Cajun II Generating Station is located just west of Cajun II Road (981) (Appendix A – Document 2). There is a new stretch of LA-10 being constructed in this area, running parallel south of the Station and cutting northwest just south of the fly ash unit.

The site, in general, is approximately 1,500 feet from the west bank of the Mississippi River, with the closest pond being approximately 2,750 feet from the river.

The combustion waste management unit at the Big Cajun II Generating Station consists of four cells: a fly ash unit, a bottom ash unit, a primary water treatment unit and a secondary treatment unit. Additionally, there is a rainfall surge pond which receives coal combustion waste water from the Bottom Ash Pond (See Appendix A – Document 1). Note that we did not evaluate the rainfall surge pond because it is below grade and does have any dikes or dams.

2.2 SIZE AND HAZARD CLASSIFICATION

The classification for size, based on the height of the embankments is “Small” and based on the storage capacity is “Intermediate” in accordance with the USACE Recommended Guidelines for Safety Inspection of Dams – ER 1110-2-106 criteria summarized in Table 2.2.a.

Table 2.2a: USACE ER 1110-2-106 Size Classification		
Category	**Impoundment**	
	Storage (Ac-ft)	**Height (ft)**
Small	50 and < 1,000	25 and < 40
Intermediate	1,000 and < 50,000	40 and < 100
Large	> 50,000	> 100

Dewberry conducted a qualitative hazard classification based on the Federal Guidelines for Dam Safety, dated April, 2004. The hazard assessment classifications are summarized in Table 2.2.b

Table 2.2b: FEMA Federal Guidelines for Dam Safety Hazard Classification		
	Loss of Human Life	**Economic, Environmental, Lifeline Losses**
Low	None Expected	Low and generally limited to owner
Significant	None Expected	Yes
High	Probable. One or more expected	Yes (but not necessary for classification)

There are no residences within approximately 2 miles down-gradient of the fly ash impoundments. Based on the 10 to 18 ft. height of the embankment impoundment, the agricultural land between the impoundment and the False River, the failure or misoperation of the dike is not expected to result in loss of human life. The economic impact is expected to include agricultural and/or Company-owned property.

In summary, based on the small size of the impoundments, neither loss of life nor significant economic damage is expected in the event of a failure or misoperation of the impoundments. Therefore, Dewberry evaluated **the impoundment embankments as "LOW hazard potential"**

2.3 AMOUNT AND TYPE OF RESIDUALS CURRENTLY CONTAINED IN THE UNIT(S) AND MAXIMUM CAPACITY

The data reviewed by Dewberry did not include the volume of residuals stored in the fly ash and bottom ash cell at the time of inspection. The utility provided a March 2009 document (see Appendix A – Document 03) that contains the information listed in Table 2.3.

Table 2.3: Amount of Residuals and Maximum Capacity of Unit

	Fly Ash Cell	Bottom Ash Cell
Surface Area (acre)[1]	175	66
Current Storage Capacity (cubic yards)[1]	1,181,203	893,158
Current Storage Capacity (acre-feet)	730	555
Total Storage Capacity (cubic yards)[1]	2,823,300	1,916,650
Total Storage Capacity (acre-feet)	1750	1,188
Crest Elevation (feet)	40	48

[1]See Appendix A – Document 03. Values from December 2008.

2.4 PRINCIPAL PROJECT STRUCTURES

2.4.1 Earth Embankment Dam

The dike is a compacted clay fill embankment. The crest elevation of the fly ash cell is 40 feet, and the crest elevation of the bottom ash cell is 48 feet (See Appendix A – Documents 3)

2.4.2 Outlet Structures

Water from the fly ash and bottom ash cells is transported by gravity to a rainfall surge pond. The rainfall surge pond is the collection point for all rainfall water and wastewater from the plant, coal storage areas, and ash disposal areas (See Appendix A - Document 4).

2.5 CRITICAL INFRASTRUCTURE WITHIN FIVE MILES DOWN GRADIENT

The owner did not report any critical infrastructure within this area (See Appendix A – Doc 4).

Based on aerial photographs and topographic maps (See Appendix A – Documents 1 and 5), surface drainage in the area of the coal combustion waste impoundment is to the southwest. Topography slopes toward New Roads until reaching a ridge bordering the northeast portion of the city and directing flow into Patin Lake. No critical infrastructure was identified within the area reviewed. The review did not include facilities across the Mississippi River.

3.0 SUMMARY OF RELEVANT REPORTS, PERMITS AND INCIDENTS

3.1 SUMMARY OF REPORTS ON THE SAFETY OF THE MANAGEMENT UNIT(S)

The coal combustion waste impoundment cells are inspected daily by plant personnel. Daily inspections are documented using a standard inspection form. Dewberry conducted a review of recent filed daily inspection reports and found no indication of issues requiring immediate repairs to the dike embankments. The owner indicated that the appropriate specialist is consulted if problems are detected during the daily inspections.

3.2 SUMMARY OF LOCAL, STATE AND FEDERAL ENVIRONMENTAL PERMITS

The Louisiana Department of Environmental Quality (DEQ) has granted a NPDES permit to Big Cajun II Generating Station for wastewater discharge (permit number LA0054135, March, 2010: see Appendix A - Document 04). The Louisiana DEQ also has permitted the solid waste management units (permit number P-0108).

The coal combustion waste impoundment dikes were constructed prior to the implementation of the Louisiana dam safety program. The dam safety program regulations state that dams constructed prior to promulgation of the regulations will be reviewed to assess their disposition under the program. The owner indicated that the Louisiana Department of Transportation and Development, Public Works and Flood Control Directorate have been contacted and that the Directorate has yet to schedule an assessment. Contact documentation was not provided.

Subsequent to the site visit Dewberry was informed that Big Cajun II has been in contact with Mt. Stephen Tassin of the Louisiana Department of Transportation and Development, Dam Safety concerning the disposition of the impoundment dikes under the State dam safety program. Results of that contact were not provided.

3.3 SUMMARY OF SPILL/RELEASE INCIDENTS (IF ANY)

Data reviewed by Dewberry did not indicate any spills, unpermitted release, or other performance related problems with the dike over the past 10 years.

4.0 SUMMARY OF HISTORY OF CONSTRUCTION AND OPERATION

4.1 SUMMARY OF CONSTRUCTION HISTORY

4.1.1 Original Construction

The Big Cajun II Generating Station's bottom ash impoundment was designed by the engineering firm of Burns & Roe.

The impoundment was constructed in 1980 with a crest elevation of 48 feet around the bottom ash cell and a crest elevation of 40 feet around the fly ash cell.

The impoundment design drawings (See Appendix A – Document 9) indicate the embankments were constructed over existing natural ground. Borrow soil used to construct the embankments was taken from an area to the west of the impoundment.

4.1.2 Significant Changes/Modifications in Design since Original Construction

There have been no changes in design since original construction.

The owner has submitted an application to the Louisiana Department of Environmental Quality for the expansion of the bottom ash impoundment. The proposed expansion includes raising the dike elevation approximately 10 feet (See Appendix A – Document 04). The application review process in on-going.

The application to expand the coal combustion waste impoundment (See Appendix A – Doc 4) includes a facility closure plan. The application indicates the treatment ponds and Rainfall Surge pond are expected to remain in use in excess of 20 years from the 2006 application date. Based on the beneficial use of fly ash generated at the plant, the fly ash pond is expected to remain in use until 2020 at a minimum. The projected closure date for the Bottom Ash pond is between 2011 and 2012.

4.1.3 Significant Repairs/Rehabilitation since Original Construction

No information was provided regarding major repairs or rehabilitation. No evidence of prior releases, failures or significant patchwork repairs was observed during the visual assessment and no documents or statements were provided to the dam assessor that indicates prior releases have occurred.

4.2 SUMMARY OF OPERATIONAL HISTORY

4.2.1 Original Operational Procedures

The coal combustion waste impoundment was designed and operated for fly ash and bottom ash sedimentation and control. Ash process water and surface runoff is collected and transported by gravity to the Rainfall Surge Pond. Water collected in the surge pond, including water from the plant island and coal storage areas, is treated under the LPDES program. Note that all the fly ash and some of the bottom ash are currently trucked to the impoundments for storage. The only coal combustion residue waste water discharged to the Bottom Ash Pond is sluice water from Plant Units 1 and 2.

4.2.2 Significant Changes in Operational Procedures since Original Startup

No documents were provided to indicate any operational procedures of the fly ash or bottom ash cells have changed.

4.2.3 Current Operational Procedures

Original operational procedures remain in effect.

4.2.4 Other Notable Events since Original Startup

No additional information was provided to Dewberry of other notable events impacting the operation of the impoundment.

5.0 FIELD OBSERVATIONS

5.1 PROJECT OVERVIEW AND SIGNIFICANT FINDINGS

Dewberry personnel John Flanagan, PE and Lauren Ohotzke performed a site visit on Tuesday, June 22, 2010 in company with utility personnel.

The site visit began at 9:00 AM. The weather was overcast and warm. Photographs were taken of conditions observed and are included in this section for ease of visual reference. All photographs were taken by Dewberry personnel during the site visit.

The EPA Dam Inspection Checklist is provided in Appendix B.

The overall assessment of the impoundment dike was that it was visually in satisfactory condition and no significant findings were noted.

5.2 EARTH EMBANKMENT DAM

5.2.1 Crest

The crest of the dike had no signs of depressions, tension cracks, or other indications of significant settlement or shear failure, and appeared to be in satisfactory condition. Figure 5.2.1-1 shows the typical crest condition.

Figure 5.2.1-1. Photo Showing Crest and Upstream Slope of Fly Ash Cell Dike View to East at North Embankment

5.2.2 Upstream Slope

The upstream/inside dike embankments include areas protected by various species of grass and areas of bare earth. Figure 5.2.2-1 shows the general condition of the upstream slope. Figure 5.2.2-2 shows a relatively long area of the inside, upstream slope with no grass protection.

Figure 5.2.2-1. Photo Showing Upstream/Inside Slope at Fly Ash Cell

Figure 5.2.2-2. Photo Showing Long Unprotected Section of Upstream/Inside Slope at Fly Ash Cell

There were no observed scarps, sloughs or other indications of slope instability or significant erosion of the upstream slope.

5.2.3 Downstream Slope and Toe

The downstream or outside slopes of the dike embankments are covered with various species of grass. There were no observed major scarps, sloughs, bulging, cracks, depressions or other indications of slope instability. Figure 5.2.3-1 shows the general conditions of the outside slopes.

Figure 5.2.3-1. Photograph Showing Typical Downstream Slope Conditions

Dewberry observed small areas of minor sloughing and several soft, wet spots along the downstream slope and along the toe of the dike embankments at the bottom ash cell. Figures 5.2.3-2 and 5.2.3-3 show typical wet spots observed. The wet areas did not appear to be the result of seepage through the dike embankments.

Figure 5.2.3-2. Photograph Showing Soft Wet Area and Shallow Sloughing at Toe of Downstream Slope of Bottom Ash Cell Embankment

Figure 5.2.3-3. Photograph Showing Soft Wet Area at Toe of Downstream Slope of Bottom Ash Cell Embankment

5.2.4 Abutments and Groin Areas

The Big Cajun II coal combustion waste impoundment is formed by a perimeter fill dike. The dike has no abutments. Groin areas are formed at the intersection of perpendicular embankments of the dike and are included in the description of the embankment slopes.

5.3 OUTLET STRUCTURES

5.3.1 Overflow Structure

Fly ash surface water from the fly ash cell is directed by an interior drainage swale to a pipe connection into the Bottom Ash Cell. The Bottom Ash Cell process water and surface water combined with water from the Fly Ash Cell are directed by an interior swale to a weir located at the northeast corner of the Bottom Ash Cell. A 30-inch diameter pipe carries the combined water gravity flow to the Rainfall Surge Pond. There is a flow control valve between the Bottom Ash Cell and the Rainfall Surge Pond. Water from the Rainfall Surge Pond is pumped into the Primary Treatment Pond. Water flows by gravity from the Primary Treatment Pond to the Secondary Treatment Pond. A pump station moves water from the Secondary Treatment Pond to the Mississippi River discharge point. Figure 5.3.1-1 shows a schematic of the coal combustion waste impoundment drainage system.

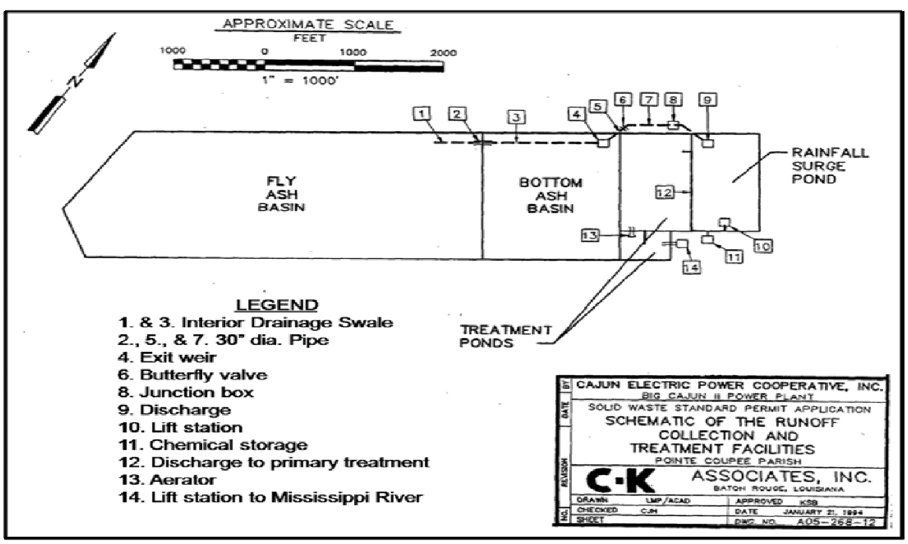


Figure 5.3.1-1 Schematic Drawing of Interior Drainage System for Coal Combustion Waste Impoundment (See Appendix A – Doc 04)

5.3.2 Outlet Conduit

The outlet for combined fly ash cell and bottom ash cell is a 30-inch diameter gravity flow pipe to the Rainfall Surge Pond.

5.3.3 Emergency Spillway

No emergency spillway is present.

6.0 HYDROLOGIC/HYDRAULIC SAFETY

6.1 SUPPORTING TECHNICAL DOCUMENTATION

6.1.1 Floods of Record

No documentation has been provided about the flood of record.

6.1.2 Inflow Design Flood

No documentation has been provided about the inflow design flood for the existing coal combustion waste impoundment dike.

Documentation provided for the proposed expansion of the impoundment indicates the design inflow is the 25-year/24-hour event (See Appendix A – Document 04).

6.1.3 Spillway Rating

No spillway hydraulic data were provided for review.

6.1.4 Downstream Flood Analysis

No downstream flood analysis data were provided for review.

6.2 ADEQUACY OF SUPPORTING TECHNICAL DOCUMENTATION

Supporting documentation reviewed by Dewberry is not adequate to assess the hydrologic and hydraulic safety of the existing impoundment dike. Additional analytical data documenting the impacts of a 1-percent probability storm on the Management Unit is not provided.

6.3 ASSESSMENT OF HYDROLOGIC/HYDRAULIC SAFETY

The 30-year successful performance of the dike indicates that the hydrologic and hydraulic performance of the existing impoundment has been adequate. As the hydrologic/hydraulic data omits analyses of the 1 percent probability (100-year) storm event. Therefore, the hydrologic/hydraulic safety of the Management Unit is satisfactory.

7.0 STRUCTURAL STABILITY

7.1 SUPPORTING TECHNICAL DOCUMENTATION

7.1.1 Stability Analyses and Load Cases Analyzed

No slope stability analyses for the existing dike embankments were provided for review. Documentation pertaining to the original construction included a partial set of design drawings sealed by a registered engineer licensed in the state of Louisiana.

The documentation of slope stability analyses that was provided included a 2005 geotechnical report prepared for a proposed expansion of the bottom ash dike (See Appendix A –Doc. 4). The new stability analyses included evaluation of raising the existing crest elevation 20 feet by extending the current down-gradient slope upward on the existing 3:1 slope. The up-gradient expansion would be constructed over the existing embankment with a slope of 2:1. Existing fly ash in the area of the up-gradient slope is to be removed from the new embankment sub grade prior to construction.

Two static load conditions were analyzed for the proposed expansion: ground water with a horizontal surface at current elevation, and a fully saturated condition of groundwater equal to the embankment and stack height.

The analyses for the proposed embankment expansion also included evaluation of a two dike configuration with a new 38 ft. high dike located abutting the up-gradient toe of the existing dike.

7.1.2 Material Properties and Design Parameters

Documentation provided to Dewberry for review was the 2005 "Geotechnical Investigation. Bottom Ash Storage Pond Expansion, Big Cajun II) prepared by Louis J. Capozzoli & Assoc. (See Appendix A – Doc. 4). The documentation indicated the stability analyses assumed six material strata, composed of the following: ash fill, medium to high plasticity clay fill, and in situ medium to high plasticity clay. The material properties used for the primary stability analyses are shown in Table 7.1.2

Table 7.1.2 Summary of Soil Properties Used in Stability Analyses			
Soil Strata	**Unit Weight (pounds/cubic foot)**	**Cohesive Strength (pounds/square foot)**	**Angle of Internal Friction**
Embankment Fill	115	1000	0°
Loose Clayey Silt	110	800	0°
Soft Clay	105	500	0°
Firm Sand	108	0	20°
Dense Sand	110	0	25°
Dense Silty Sand	115	0	30°

The geotechnical assessment includes a second set of analyses for the same loading conditions and increasing the cohesive strength of strata 2 and 3 to 1,000 psf and 625 psf respectively, to account for strength gains as consolidation occurs, which decreases the internal pore pressures and increases the soil effective strength.

7.1.3 Uplift and/or Phreatic Surface

No documentation of the uplift and/or phreatic surface conditions used in the design of the existing dike embankments was provided.

The geotechnical report for the proposed embankment expansion analyzed two phreatic surface conditions: a horizontal ground water surface at the existing ground surface, and a ground water surface at the surface of the embankment and ash pile.

The geotechnical report for the ash pond expansion does not include documentation of uplift stresses used in the calculations.

7.1.4 Factors of Safety and Base Stresses

No documentation of factors of safety or base stresses for the existing dike embankments was provided.

The safety factors computed in the Geotechnical Investigations for the bottom ash embankment expansion (See Appendix A - Doc. 4) are listed in Table 7.1.4.

Table 7.1.4 Safety Factors for Bottom Ash Embankment			
Dike Geometry	**Ground Water Conditions**	**Required Safety Factor (US Army Corps of Engineers)**	**West Dike Average Computed Safety Factor**
3H:1V Slope	Level with Existing Ground Surface	1.5	1.31
	Fully Saturated Dike and Ash Pile	1.3	1.22
2H:1V Slope	Level with Existing Ground Surface	1.5	1.15
	Fully Saturated Dike and Ash Pile	1.3	1.15
2H:1V Slope with Increased Soil Shear Strength	Level with Existing Ground Surface	1.3	1.32

The results of the analyses indicate the safety factors for the proposal to expand the dike by extending the existing down-gradient slope upward do not meet the required minimum safety factors. Although the safety factors for the existing embankment are expected to be higher than those calculated for the expanded embankment, additional analytical data is required to validate that expectation.

7.1.5 Liquefaction Potential

No documentation of liquefaction potential used in the design of the existing dike embankments was provided.

The Geotechnical Investigation (See Appendix A - Doc. 4) for the proposed embankment expansion does not include an evaluation of liquefaction potential.

7.1.6 Critical Geological Conditions

Geologic formations at the coal combustion waste impoundment site are alluvial bar deposits. Shallow soil deposits consist of alternating beds of clay/silt aquicludes and sand/gravel aquifers (See Appendix A – Document 04).

7.2 ADEQUACY OF SUPPORTING TECHNICAL DOCUMENTATION

Supporting documentation reviewed by Dewberry is not adequate to assess the structural stability of the existing impoundment dike.

7.3 ASSESSMENT OF STRUCTURAL STABILITY

The 30-year successful performance of the dike and observations during the site visit suggest the existing impoundment is structurally stable under static conditions. The satisfactory performance of the facility since its construction is the only evidence that the slope stability safety factors for long term loading exceed 1.0. However, the history of performance is not sufficient to document that the long term slope stability safety factor meets accepted standards. Additionally, the history of satisfactory performance under long term loading conditions does not ensure that the embankment slope stability safety factors are adequate under short term loading conditions, including a rapid draw down of the impoundment, or seismic conditions.

Documentation provided for review included geotechnical reports and slope stability analyses for the proposed impoundment expansion (See Appendix A – Document 4). Slope stability analyses were conducted for ground water level at the ground surface and at the top of the embankment, and for total strength and effective strength soil parameters. The computed safety factors for an embankment constructed by extending the existing down-gradient slope upward ranged from 1.15 to 1.32. The analyses excluded seismic loading. The calculated safety factors do not meet the minimum requirements for the conditions analyzed. Although the safety factor is expected to be higher for the lower existing slope, the documentation is not sufficient to validate that expectation. Furthermore, no documentation has been provided for seismic loading,

Based on the lack of documentation supporting the structural stability of the existing embankment, in combination with the 30-year successful performance, the structural stability of the dike is rated as FAIR.

8.0 MAINTENANCE AND METHODS OF OPERATION

8.1 OPERATIONAL PROCEDURES

The facility is operated for storage of fly ash and bottom ash deposits. Coal combustion process water is routed to the Rainfall Surge Pond for treatment as part of the solid waste landfill surface impoundment permitted under the LPDES program.

8.2 MAINTENANCE OF THE DAM AND PROJECT FACILITIES

Routine scheduled maintenance consists of monthly grass cutting on the dike embankments. Additional maintenance rating is conducted in response issues identified during the daily inspection.

8.3 ASSESSMENT OF MAINTENANCE AND METHODS OF OPERATION

8.3.1 Adequacy of Operational Procedures

Based on the assessment of this report, operational procedures seem to be adequate. However, in anticipation of being required to comply with the Louisiana dam safety program, a recommendation (as noted in Section 1.2.6) is to prepare and implement a written Operations and Maintenance Manual.

Big Cajun II has an approved Emergency Action Plan. However, the plan lacks a response plan to a catastrophic dam failure. A recommendation is to amend the existing Emergency Action Plan to include a dam break response plan.

8.3.2 Adequacy of Maintenance

Maintenance of the dike embankments appears to be adequate.

9.0 SURVEILLANCE AND MONITORING PROGRAM

9.1 SURVEILLANCE PROCEDURES

Daily inspections of the dike embankments are conducted by plant personnel. Inspection reports are presented to the plant manager for review and appropriate corrective actions.

9.2 INSTRUMENTATION MONITORING

The Big Cajun II coal combustion waste impoundment dike does not have an instrumented monitoring system.

9.3 ASSESSMENT OF SURVEILLANCE AND MONITORING PROGRAM

9.3.1 Adequacy of Inspection Program

Based on the data reviewed by Dewberry, including observations during the site visit, the current inspection program is adequate. However, in anticipation of being required to comply with the Louisiana dam safety program a recommendation is made to implement a program of regular inspections by qualified dam assessment or dam safety engineers as part of the Operations and Maintenance program.

9.3.2 Adequacy of Instrumentation Monitoring Program

The Big Cajun II coal combustion waste impoundment dike embankments are not instrumented. Based on the size of the dikes, the history of satisfactory performance and the current inspection program, installation of a dike monitoring system is not needed at this time.

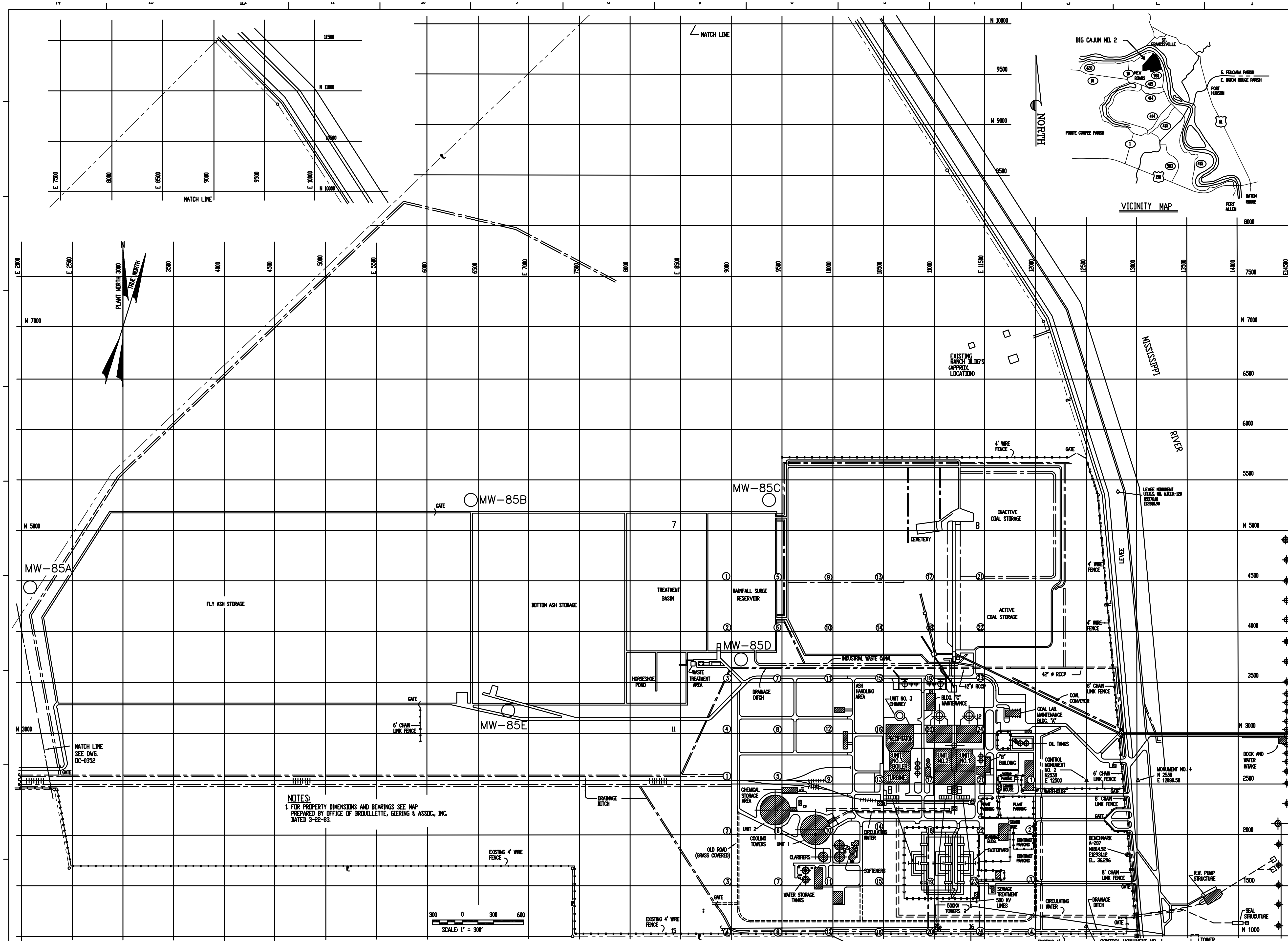
Appendix A

Document 1: Site Location Aerial Photograph


St Francisville
St Francisville
Saint Maurice Towhead
New Roads
New Roads, LA
Image USDA Farm Service Agency
Image U.S. Geological Survey
Image © 2010 DigitalGlobe
© 2010 Google
©2009 Google
Imagery Dates: Oct 14, 2005 - May 18, 2009
30°44'08.53" N 91°24'21.15" W elev 31 ft
Eye alt 49014 ft

Appendix A

Document 2: Big Cajun II Site Plan



REV No.	Revision	DATE	Dsn	Chkd	Approved Chief Engr.
5	ADD MAINT. BLDG. PER W.O. #WC4099	5/86	WSK	BHE	EJW
6	REDRAWN ON CAD	7/96	C.D.		
7	ADDED PHASE II	1/03	C.D.		
8	REVISED FENCES & ROADS	8/03	C.D.		
9	ADD WELLS	4/04	C.D.		

Rev. No.	Revision	Date	Dsn	Chkd	Approved Chief Engr
1	DRAWING REDRAWN AND UPDATED AS PER PCN 510	6/83	WQ	WL	GFM
2	UPDATED DWG. TO SHOW OUTLINES OF TOWER ROAD. DITCHES & CONC. SLAP AND FIRE HOUSE PER PCN SID	9/83	WQ	DM	GFM
3	DEL. FIRE HOUSE, C.W. ACCESS ROAD & ROAD TO SEAL STR.	6/84	ACF	GM	GFM
4	RECORD DRAWING REFLECTING CONTRACTOR REPORTED FIELD CHANGES G3-87	4/85	JA	GM	GFM

Drawing Control

Purpose	Approved By	Date	Released By	Date
For Information				
For Comment				
For Bid				
For Construction				

CONTRACTS G3-87

Engineering Review

CIVIL ENGINEERING

BIG CAJUN NO. 2 POWER PLANT
CAJUN ELECTRIC POWER COOPERATIVE INC.

KEY SITE PLAN & VICINITY PLAN

BURNS AND ROE, INC.
Engineers and Constructors
Headquarters Office - Oradell, N.J.

Reviewed by: Manager - Design & Drafting
Approved for Construction: For Chief Civil Engineer
Date: 5/13/83
Scale: 1"=300'

Work Order	Drawing No.	Rev.
3622	OC-0325	9

Appendix A

Document 3: Letter to US EPA (March 30, 2009)

NRG

CERTIFIED MAIL No. 7008 1300 0000 5575 4304 March 30, 2009

Mr. Richard Kinch
US Environmental Protection Agency (5306P)
1200 Pennsylvania Avenue, NW
Washington, DC 20460

SUBJECT: Request for Information Under Section 104(e) of the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. 9604(e)
Big Cajun 2 Power Station
Louisiana Generating LLC

Dear Mr. Kinch:

Pursuant to your Section 104(e) of CERCLA information request letter dated March 9, 2009, Louisiana Generating LLC hereby provides information and documentation relating to this matter at the Big Cajun 2 Power Station located near New Roads, Louisiana. Your information request letter was received by Louisiana Generating LLC on March 16, 2009. We are submitting this information to EPA within ten (10) business days of receipt of your letter. Enclosed as an attachment to this letter are our responses for each of the coal combustion by-product waste management units at the subject facility. Also attached is an inspection report by the Louisiana Department of Environmental Quality as requested in question 6. Each information request is reiterated in italics followed by our response.

I certify that the information contained in this response to EPA's request for information and the accompanying documents is true, accurate, and complete. As to the identified portions of this response for which I cannot personally verify their accuracy, I certify under penalty of law that this response and all attachments were prepared in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

If you have questions regarding the submittal information, please contact me at (225) 618-4407.

Sincerely,

Jeffrey M. Baudier

Jeff Baudier
President, South Central Region

ATTACHMENT A

Fly-Ash Unit
Big Cajun II
Louisiana Generating, LLC

Please provide the information requested below for each surface impoundment or similar diked or bermed management unit(s) or management units designated as landfills which receive liquid-borne material for the storage or disposal of residuals or by-products from the combustion of coal, including, but not limited to, fly ash, bottom ash, boiler slag, or flue gas emission control residuals. This includes units that no longer receive coal combustion residues or by-products, but still contain free liquids.

1. Relative to the National Inventory of Dams criteria for High, Significant, Low, or Less- than-Low, please provide the potential hazard rating for each management unit and indicate who established the rating, what the basis of the rating is, and what federal or state agency regulates the unit(s). If the unit does not have a rating, please note that fact.
The unit has no rating. The fly ash unit is regulated by the Louisiana Department of Environmental Quality.

2. What year was each management unit commissioned and expanded?
Commissioned 1980. No expansion has occurred.

3. What materials are temporarily or permanently contained in the unit? Use the following categories to respond to this question: (1) fly ash; (2) bottom ash: (3) boiler slag; (4) flue gas emission control residuals; (5) other. If the management unit contains more than one type of material, please identify all that apply. Also, if you identify "other," please specify the other types of materials that are temporarily or permanently contained in the unit(s).
This unit consists primarily of fly ash. The fly ash is permanently stored in the unit, some fly ash is removed from the unit for recycle/reuse. Because this management unit receives effluent from the adjacent bottom-ash unit, it may contain de-minimus amounts of bottom-ash and raw water treatment wastes (see description for the bottom-ash unit).

4. Was the management unit(s) designed by a Professional Engineer? Is or was the construction of the waste management unit(s) under the supervision of a Professional Engineer? Is inspection and monitoring of the safety of the waste management unit(s) under the supervision of a Professional Engineer?
The fly ash unit was designed by a professional engineer as denoted on original construction plans. The construction of the fly ash unit was conducted under the auspices of a professional engineer as denoted in the "Control of Earthwork" section of the construction

contract/specification. Inspection and monitoring of the fly ash unit are conducted by plant specialist and/or technicians. Should abnormalities or significant observation surface during routine inspections, the appropriate subject matter specialist is consulted.

5. When did the company last assess or evaluate the safety (i.e., structural integrity) of the management unit(s)? Briefly describe the credentials of those conducting the structural integrity assessments/evaluations. Identify actions taken or planned by facility personnel as a result of these assessments or evaluations. If corrective actions were taken, briefly describe the credentials of those performing the corrective actions, whether they were company employees or contractors. If the company plans an assessment or evaluation in the future, when is it expected to occur?

The condition of the fly ash unit is assessed with regard to safety on a weekly basis by plant staff. These staff individuals are trained with respect to basic embankment safety observation/assessment (ie embankment sloughing, embankment seepage, erosion, burrow holes, vegetation assessment, etc.). Should observations of a severe nature be made, consultation with company engineers experienced in this area or external geotechnical engineers is conducted. No significant embankment/impoundment safety issues have been observed with respect to the fly ash unit during recent inspections. Plans are to continue with the weekly inspection conducted by plant specialist/technicians and perform semi annual assessments by a company civil engineer.

6. When did a State or a Federal regulatory official last inspect or evaluate the safety (structural integrity) of the management unit(s)? If you are aware of a planned state or federal inspection or evaluation in the future, when is it expected to occur? Please identify the Federal or State regulatory agency or department which conducted or is planning the inspection or evaluation.

Please provide a copy of the most recent official inspection report or evaluation.

The last inspection of the fly ash management unit was in September 2006 by personnel from the Louisiana Department of Environmental Quality (LDEQ), Waste Division. As part of the LDEQ report, it was stated that the units were checked for erosion, and no problems were observed at the units. Big Cajun 2 is not aware of any planned state or federal inspection or evaluation in the future. (The 2006 DEQ inspection report is attached)

7. Have assessments or evaluations, or inspections conducted by State or Federal regulatory officials conducted within the past year uncovered a safety issue(s) with the management unit(s), and, if so, describe the actions that have been or are being taken to deal with the issue or issues. Please provide any documentation that you have for these actions.

No evaluations or inspections have been conducted by State or Federal regulatory officials within the past year. The last inspection was by a State official with the Waste Division of the Louisiana Department of Environmental Quality in 2006. The inspection did not uncover any safety issues associated with the management unit.

8. What is the surface area (acres) and total storage capacity of each of the management units? What is the volume of material currently stored in each of the management unit(s). Please provide the date that the volume measurement was taken. Please provide the maximum height of *the management unit(s). The basis for determining maximum height is explained later in this Enclosure.*

Management Unit	Surface Area (acres)	Total Storage Capacity (acre-ft)	Currently Stored Material (cu yds)	Height (feet)
Fly Ash	175	1750	1,181,203	10

Currently stored estimated through December 2008. (Currently stored based on volume measurement survey in 2001 and flyover in 2004, with addition of volumes disposed in years 2005-2008.)

9. Please provide a brief history of known spills or unpermitted releases from the unit within the last ten years, whether or not these were reported to State or federal regulatory agencies. For purposes of this question, please include only releases to surface water or to the land (do not include releases to groundwater).
There have been no known spills or unpermitted releases from the unit in the last ten years.

10. Please identify all current legal owner(s) and operator(s) at the facility.
The legal owners are Louisiana Generating LLC (86%) and Entergy Gulf States, Inc. (14%). The operator is Louisiana Generating LLC.

ATTACHMENT B

Bottom Ash Unit
Big Cajun II
Louisiana Generating, LLC

Please provide the information requested below for each surface impoundment or similar diked or bermed management unit(s) or management units designated as landfills which receive liquid-borne material for the storage or disposal of residuals or by-products from the combustion of coal, including, but not limited to, fly ash, bottom ash, boiler slag, or flue gas emission control residuals. This includes units that no longer receive coal combustion residues or by-products, but still contain free liquids.

1. Relative to the National Inventory of Dams criteria for High, Significant, Low, or Less- than-Low, please provide the potential hazard rating for each management unit and indicate who established the rating, what the basis of the rating is, and what federal or state agency regulates the unit(s). If the unit does not have a rating, please note that fact.
The unit has no rating. The bottom ash unit is regulated by the Louisiana Department of Environmental Quality.

2. What year was each management unit commissioned and expanded?
Commissioned 1980. No expansion has occurred.

3. What materials are temporarily or permanently contained in the unit? Use the following categories to respond to this question: (1) fly ash; (2) bottom ash: (3) boiler slag; (4) flue gas emission control residuals; (5) other. If the management unit contains more than one type of material, please identify all that apply. Also, if you identify "other," please specify the other types of materials that are temporarily or permanently contained in the unit(s).
The materials stored in his unit include consists primarily of bottom ash with minor amounts of clarifier underflow (settled solids from clarifying river water used for cooling). These materials are permanently stored in the Bottom Ash Unit, although some bottom ash is removed from the basin for recycle/reuse.

4. Was the management unit(s) designed by a Professional Engineer? Is or was the construction of the waste management unit(s) under the supervision of a Professional Engineer? Is inspection and monitoring of the safety of the waste management unit(s) under the supervision of a Professional Engineer?
The bottom ash unit was designed by a professional engineer as denoted on original construction plans. The construction of the bottom ash unit was conducted under the auspices of a professional engineer as denoted in the "Control of Earthwork" section of the construction contract. Inspection and monitoring of the bottom ash unit are conducted by plant specialist and/or technicians. Should abnormalities or significant observation surface during routine inspections, the appropriate subject matter specialist is consulted.

5. When did the company last assess or evaluate the safety (i.e., structural integrity) of the management unit(s)? Briefly describe the credentials of those conducting the structural integrity assessments/evaluations. Identify actions taken or planned by facility personnel as a result of these assessments or evaluations. If corrective actions were taken, briefly describe the credentials of those performing the corrective actions, whether they were company employees or contractors. If the company plans an assessment or evaluation in the future, when is it expected to occur?

The condition of the bottom ash unit is assessed with regard to safety on a weekly basis by plant staff. These staff individuals are trained with respect to basic embankment safety observation/assessment (ie embankment sloughing, embankment seepage, erosion, burrow holes, vegetation assessment, etc.). Should observations of a severe nature be made, consultation with company engineers experienced in this area or with external geotechnical engineers is conducted. No significant embankment/impoundment safety issues have been observed with respect to the bottom ash unit during recent inspections. Plans are to continue weekly plant staff assessments and conduct semi annual assessments by a company civil engineer.

6. When did a State or a Federal regulatory official last inspect or evaluate the safety (structural integrity) of the management unit(s)? If you are aware of a planned state or federal inspection or evaluation in the future, when is it expected to occur? Please identify the Federal or State regulatory agency or department which conducted or is planning the inspection or evaluation. Please provide a copy of the most recent official inspection report or evaluation.

The last inspection of the bottom ash management unit was in September 2006 by personnel from the Louisiana Department of Environmental Quality (LDEQ), Waste Division. As part of the LDEQ report, it was stated that the surface impoundments were checked for erosion, and no problems were observed at the surface impoundments. Big Cajun 2 is not aware of any planned state or federal inspection or evaluation in the future. (The 2006 DEQ inspection report is attached)

7. Have assessments or evaluations, or inspections conducted by State or Federal regulatory officials conducted within the past year uncovered a safety issue(s) with the management unit(s), and, if so, describe the actions that have been or are being taken to deal with the issue or issues. Please provide any documentation that you have for these actions.

No evaluations or inspections have been conducted by State or Federal regulatory officials within the past year. The last inspection was by a State official with the Waste Division of the Louisiana Department of Environmental Quality in 2006. The inspection did not uncover any safety issues associated with the management unit.

8. What is the surface area (acres) and total storage capacity of each of the management units? What is the volume of material currently stored in each of the management unit(s). Please provide the date that the volume measurement was taken. Please provide the maximum height of the management unit(s). The basis for determining maximum height is explained later in this Enclosure.

Management Unit	Surface Area (acres)	Total Storage Capacity (acre-ft)	Currently Stored Material (cu yds)	Height (feet)
Bottom Ash	66	1,188	893,158	18
Clarifier Underflow			12,550	

Currently stored estimated through December 2008. (Currently stored based on volume measurement survey in 2001 and flyover in 2004, with addition of volumes disposed in years 2005-2008.)

9. Please provide a brief history of known spills or unpermitted releases from the unit within the last ten years, whether or not these were reported to State or federal regulatory agencies. For purposes of this question, please include only releases to surface water or to the land (do not include releases to groundwater).

There have been no known spills or unpermitted releases from the unit in the last ten years.

10. Please identify all current legal owner(s) and operator(s) at the facility.

The legal owners are Louisiana Generating LLC (86%) and Entergy Gulf States, Inc. (14%). The operator is Louisiana Generating LLC.

ATTACHMENT C

Water Treatment Unit
Big Cajun II
Louisiana Generating, LLC

Please provide the information requested below for each surface impoundment or similar diked or bermed management unit(s) or management units designated as landfills which receive liquid-borne material for the storage or disposal of residuals or by-products from the combustion of coal, including, but not limited to, fly ash, bottom ash, boiler slag, or flue gas emission control residuals. This includes units that no longer receive coal combustion residues or by-products, but still contain free liquids.

1. Relative to the National Inventory of Dams criteria for High, Significant, Low, or Less- than-Low, please provide the potential hazard rating for each management unit and indicate who established the rating, what the basis of the rating is, and what federal or state agency regulates the unit(s). If the unit does not have a rating, please note that fact.
The unit has no rating. The water treatment units are regulated by the Louisiana Department of Environmental Quality.

2. What year was each management unit commissioned and expanded?
Commissioned 1979. No expansion has occurred.

3. What materials are temporarily or permanently contained in the unit? Use the following categories to respond to this question: (1) fly ash; (2) bottom ash: (3) boiler slag; (4) flue gas emission control residuals; (5) other. If the management unit contains more than one type of material, please identify all that apply. Also, if you identify "other," please specify the other types of materials that are temporarily or permanently contained in the unit(s). Other:
This unit is an above-grade surface impoundment that contains wastewater and de-minimus amounts of solids that are removed from the wastewater. This unit consists of two bermed water settling/treatment ponds, consisting of a primary treatment basin and secondary treatment basin. The wastewater is introduced into the impoundment where the solids settle out and accumulate at the bottom of the pond leaving clear water at the surface. These basins are operated in series to facilitate the settling of solids with plant wastewaters, bottom ash sluice water, and stormwater runoff first entering the rainfall surge pond (below grade). Subsequently, these wastewaters are then pumped to the primary treatment basin, and then enter the secondary treatment basin prior to discharge to the Mississippi River.

4. Was the management unit(s) designed by a Professional Engineer? Is or was the construction of the waste management unit(s) under the supervision of a Professional Engineer? Is inspection and monitoring of the safety of the waste management unit(s) under the supervision of a Professional Engineer?

The water treatment unit was designed by a professional engineer as denoted on original construction plans. The construction of the water treatment unit was conducted under the auspices of a professional engineer as denoted in the "Control of Earthwork" section of the construction contract. Inspection and monitoring of the water treatment unit are conducted by plant specialist and/or technicians. Should abnormalities or significant observation surface during routine inspections, the appropriate subject matter specialist is consulted.

5. When did the company last assess or evaluate the safety (i.e., structural integrity) of the management unit(s)? Briefly describe the credentials of those conducting the structural integrity assessments/evaluations. Identify actions taken or planned by facility personnel as a result of these assessments or evaluations. If corrective actions were taken, briefly describe the credentials of those performing the corrective actions, whether they were company employees or contractors. If the company plans an assessment or evaluation in the future, when is it expected to occur?

The condition of the water treatment unit is assessed with regard to safety on a weekly basis by plant staff. These staff individuals are trained with respect to basic embankment safety observation/assessment (ie embankment sloughing, embankment seepage, erosion, burrow holes, vegetation assessment, etc.). Should observations of a severe nature be made, consultation with company engineers experienced in this area or with external geotechnical engineers is conducted. Plans are to continue weekly plant staff assessments and conduct quarterly to semi-annual assessments by company civil engineers. No significant embankment or impoundment safety issues have been observed with respect to the water treatment unit during recent inspections. Plans are to continue with the weekly inspection conducted by plant specialist/technicians and perform semi annual assessments by a company civil engineer.

6. When did a State or a Federal regulatory official last inspect or evaluate the safety (structural integrity) of the management unit(s)? If you are aware of a planned state or federal inspection or evaluation in the future, when is it expected to occur? Please identify the Federal or State regulatory agency or department which conducted or is planning the inspection or evaluation.

Please provide a copy of the most recent official inspection report or evaluation.

The last inspection of the water treatment unit was in September 2006 by personnel from the Louisiana Department of Environmental Quality (LDEQ), Waste Division. As part of the LDEQ report, it was stated that the surface impoundments were checked for erosion, and no problems were observed at the surface impoundments. Big Cajun 2 is not aware of any planned state or federal inspection or evaluation in the future. (The 2006 DEQ inspection report is attached)

7. Have assessments or evaluations, or inspections conducted by State or Federal regulatory officials conducted within the past year uncovered a safety issue(s) with the management unit(s), and, if so, describe the actions that have been or are being taken to deal with the issue or issues. Please provide any documentation that you have for these actions.

No evaluations or inspections have been conducted by State or Federal regulatory officials within the past year. The last inspection was by a State official with the Waste Division of the

Louisiana Department of Environmental Quality in 2006. The inspection did not uncover any safety issues associated with the management unit.

8. What is the surface area (acres) and total storage capacity of each of the management units? What is the volume of material currently stored in each of the management unit(s). Please provide the date that the volume measurement was taken. Please provide the maximum height of the management unit(s). The basis for determining maximum height is explained later in this Enclosure.

Management Unit	Surface Area (acres)	Total Storage Capacity (acre-ft)	Currently Stored Material (cu yds)	Height (feet)
Primary Treatment Unit	25.4	457.2		18
Secondary Treatment Unit	7.1	127.8		18

9. Please provide a brief history of known spills or unpermitted releases from the unit within the last ten years, whether or not these were reported to State or federal regulatory agencies. For purposes of this question, please include only releases to surface water or to the land (do not include releases to groundwater).

There have been no spills or unpermitted releases from the unit in the last ten years.

10. Please identify all current legal owner(s) and operator(s) at the facility.

The legal owners are Louisiana Generating LLC (86%) and Entergy Gulf States, Inc. (14%). The operator is Louisiana Generating LLC.

Appendix A

Document 4: Type I Solid Waste Facility Permit Renewal and Modification Application

PER19960002

Shaw Environmental & Infrastructure, Inc.
4171 Essen Lane
Baton Rouge, LA
225 932-2500
FAX: 225-987-7300

MAIN FILE

Shaw™ Shaw Environmental & Infrastructure, Inc.

April 28, 2006

original to IOSW
copy to SW/G1/Townsel
AVG

Dr. Chuck Carr Brown
LDEQ – Office of Environmental Services
Permits Division
P. O. Box 4313
Baton Rouge, LA 70821-4313

RE: Louisiana Generating, LLC
Big Cajun II Power Plant
Type I Solid Waste Facility
Permit Renewal and Modification Application
GD-077-0583/P-0108
✓AI # 38867

Dear Dr. Brown:

On behalf of Louisiana Generating, LLC (LaGen), Shaw Environmental and Infrastructure, Inc. (Shaw) is pleased to submit one signed original and four copies of the Solid Waste Permit Renewal and Modification Application for the Type I Solid Waste Facility located at the Big Cajun II plant in New Roads, Louisiana.

If you have any questions, feel free to contact me at (225) 987-7472, or Ms. Jennifer Tassin at (225) 987-7487.

Sincerely,
Shaw Environmental and Infrastructure, Inc.

Richard "Shan" Schatzle
Client Program Manager

RECEIVED
APR 28 2006
LDEQ

LOUISIANA GENERATING, LLC
BIG CAJUN II POWER PLANT
NEW ROADS, LOUISIANA
GD-077-0583
AI No. 38867

TYPE I SOLID WASTE FACILITY PERMIT RENEWAL AND MODIFICATION APPLICATION
PERMIT NO. P-0108

April 2006

Prepared for:
Louisiana Generating, LLC
New Roads, Louisiana

Prepared by:
Shaw Environmental and Infrastructure, Inc.
4171 Essen Lane
Baton Rouge, Louisiana 70809

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Department of Environmental Quality
Office of Environmental Services
Permits Division
Post Office Box 82135
Baton Rouge, LA 70884-2135

FOR DEPARTMENT USE ONLY:
Site I.D. #_____________
Date Received_____________
Reviewed By_____________

==
SOLID WASTE NOTIFICATION FORM

==
THIS NOTIFICATION IS: ______ THE FIRST FOR THIS SITE

____X____ A SUBSEQUENT NOTIFICATION

LOUISIANA IDENTIFICATION NUMBER: Facility No. GD-077-0583

1. Name of Operator (and Company Name if Applicable) Louisiana Generating, LLC

2. Mailing Address: 112 Telly Street, New Roads, LA 70760

3. Facility Name: Big Cajun II

4. Actual Location/Description (street address if possible):Highway 981, 3 miles north of the intersection of Highway 415.

5. Location: Section 37 Township 4S Range 11E and Section 4 Township 4S Range 10E
Parish Pointe Coupee

Coordinates: Lat. - Degrees/Minutes, Seconds 30/43,37
Long. - Degrees/Minutes, Seconds 91/23,06

6. Contact: Mr. Gary C. Ellender, Manager, Environmental Department
7. Telephone: (225) 638-3773
8. Owner: Louisiana Generating, LLC.

9. Owner's Address: 112 Telly Street, New Roads, LA 70760

10. Type and Purpose of Operation: (check each applicable line)

◆Generator of Industrial Solid Waste ______ (Generators must also submit supplemental Form)

◆Transporter __________ (Transporters must also submit supplemental form)
◆Type I Industrial Landfill ______
Industrial Surface Impoundment ___X___
Industrial Landfarm ______
◆Type I-A Industrial Incinerator Waste Handling Facility ______
Industrial Shredder/Compactor/Baler ______
Industrial Transfer Station ______

◆Type II Sanitary Landfill ______
Residential/Commercial Surface Impoundment ______
Residential Commercial Landfarm ______
◆Type II-A Residential/Commercial Incinerator Waste Handling Facility ______
Residential/Commercial Shredder/Compactor/Baler ______
Residential/Commercial Transfer Station ______
Residential/Commercial Refuse-Derived Fuel ______
◆Type III Construction/Demolition-Debris Landfill ______
Woodwaste Landfill ______
Compost Facility ______
Resource Recovery/Recycling Facility ______
◆Other Describe: Fly Ash Basin – Type I Surface Impoundment/Landfill

11. Total Acres 1,740 Processing Acres 0 Disposal Acres 295

12. Certification: I have personally examined and am familiar with the information submitted in the attached document, and I hereby certify under penalty of law that this information is true, accurate, and complete to the best of my knowledge. I am aware that there are significant - penalties for submitting false information, including the possibility of fine and/or imprisonment.

Signature ______

Date 4/27/06

Typed Name and Title Gary C. Ellender, Environmental Manager

Section 1.0

1.0 Introduction

As mandated by Title 33, Part VII, Chapter 5 of the Louisiana Administrative Code (LAC 33:III.Chapter 5), this Solid Waste Standard Permit Application is being submitted by Shaw Environmental and Infrastructure, Inc. (Shaw), as professional consultants on behalf of our client, Louisiana Generating, LLC (LaGen), for their Big Cajun II Power Plant's Industrial Solid Waste Surface Impoundments. The application is for the renewal of the existing Solid Waste Standard Permit No. P-0108, as well as the proposed modification of the Bottom Ash Basin. As required in LAC 33:VII.311, Big Cajun II provides written authorization for Shaw to submit this and other documents on their behalf. That authorization is included prior to the regulatory responses.

LaGen owns and operates an electric power generation plant known as Big Cajun II Power Plant (Big Cajun II) located northeast of New Roads, Pointe Coupee Parish, Louisiana. Big Cajun II's plant includes five Industrial Solid Waste Surface Impoundments/Landfills: Fly Ash Basin, Bottom Ash Basin, Single Rainfall Surge Pond, and LPDES Treatment Ponds, which consist of a Primary and a Secondary Treatment Pond. The Facility Operational Plan has been prepared according to LAC 33: VII.521.H and LAC 33: VII.713.D.

Pursuant to the Louisiana Department of Environmental Quality (LDEQ) letter of May 5, 1993, LaGen (under the former name Cajun Electric Power Cooperative, Inc.) submitted a Mandatory Permit Modification for the five existing Type I Industrial Surface Impoundments to comply with the Solid Waste Rules and Regulations promulgated on February 20, 1993. This update of the application is being submitted in accordance with the request of the LDEQ on August 11, 2004. The initial deadline for application of December 31, 2005, was subsequently extended to April 30, 2006, per LDEQ's correspondence dated December 9, 2005.

In addition, this application includes information regarding LaGen's proposed modification of the existing Bottom Ash Basin. LaGen proposes to expand the capacity of the existing bottom ash basin by increasing the height of the existing dikes by 10 feet. This will increase the capacity of the bottom ash pond by approximately 748,423 cubic yards. The existing foot print of the bottom ash pond will not be affected, as the outer toe of the existing levee will not change. Instead the levee expansion will work inward into the pond. The existing levees will be expanded using compacted earthen clay material with a slope of 4:1 (horizontal:vertical).

The facility will continue to operate as permitted by The Louisiana Department of Environmental Quality under Solid Waste Standard Permit No. P-0108. LaGen is requesting approval to potentially expand the bottom ash basin as described in this application. LaGen is currently evaluating the cost effectiveness of vertically expanding the existing bottom ash basin. If LaGen determines that it is not feasible to construct the proposed project, they will inform LDEQ of their decision.

This application addresses all requirements of the LDEQ's Solid Waste Permitting program under Subchapter C of LAC 33:VII.Chapter 5. The application has been prepared in a citation-response format. Each regulatory citation is presented in bold face and the response to the citation in normal typeface. Regulatory citations not applicable to this permit application are indicated as such and a rationale is presented as to why the section is not applicable. Supporting documentation is included as tables, figures, and appendices. The application specifically addresses in Section 2.0 through Section 5.0 the standards of the LDEQ's Solid Waste Regulations listed below.

- Section 2.0: §519.Part I: Permit Application Form
- Section 3.0 §520: Addendum to Permit Applications per LAC 33:I.1701
- Section 4.0: §521.Part II: Supplementary Information, All Processing and Disposal Facilities
- Section 5.0: §523.Part III: Additional Supplementary Information

Applicable standards of LAC 33:VII.709 [Standards Governing All Solid Waste Disposal Facilities (Type I and II)], LAC 33:VII.713 [Standards Governing Surface Impoundments (Type I and II)], and LAC 33:VII.727 [Financial Assurance] are addressed within the applicable responses to LAC 33:VII.521 (Section 4.0).

As required under LAC 33:VII.519, the Solid Waste Standard Permit Application – Part I form, as contained in Appendix B of LAC 33:VII.3003, has been prepared and included in the application document in Section 2.0. In addition, no sooner than 45 days prior to submittal of this standard permit application, Big Cajun II published a public notice of the intent to submit the permit application in The Advocate, the official journal of this state, and in *The Pointe Coupee Banner*, a major local newspaper of general circulation, in accordance with LAC 33:VII.513.A.1. Proof of publication is included in Appendix A of this application.

1.1 Facility Description

The Big Cajun II facility consists of 1,740 acres. The surface impoundments occupy approximately 295 acres of Big Cajun II's property and are located to the northwest of the three Boiler Units. The Fly Ash and Bottom Ash Basins are designed to collect the two ash types. The wastewater from the two Ash Basins is routed to the LPDES Treatment Ponds (Primary and Secondary Treatment Ponds) prior to discharge to the Mississippi River via LPDES Outfall 001. Once-through non-contact cooling water from the Mississippi River is discharged directly back to the river through LPDES Outfall 003.

Big Cajun II does not accept waste generated from off-site locations for treatment, storage, or disposal. Fly ash and the coarser sand-like bottom ash are removed from the three Boiler Units' combustion exhausts during power generation. Fly ash is transported by truck to the Fly Ash Basin for disposal. The bottom ash from Units 1 and 2 is transported via a sluice to the Bottom Ash Basin for disposal, while the bottom ash from Unit 3 is transported via truck. The wastewater that collects in these basins from rainfall and the bottom ash sluice transport water is routed to the LPDES Treatment Ponds' Primary and Secondary Treatment Ponds. Both ash types are essentially inert materials. Fly ash, as it is collected from the stack gas, is a tan-colored, finely powdered substance with the consistency of talcum powder. However, when fly ash mixes with water, the silicon oxide and aluminum oxide components react with its calcium fraction to form a slow hardening cement. The result of the reaction is a hard, structurally stable compound with very low permeability. It is this characteristic that makes fly ash a marketable resource as a cement substitute or additive for a variety of purposes. Big Cajun II sells the fly ash generated at its facility for beneficial reuse as cement additive. The commercial sale of the fly ash meets the requirements of all applicable regulations.

The Industrial Solid Waste Surface Impoundments consist of existing facilities which have proven to be a cost-effective method for the disposal of the wastes handled. The facilities are a key element in Big Cajun II's long-range plan of waste management as they play a major role in their solid waste disposal operation. Big Cajun II is proposing to expand the Bottom Ash Basin vertically, which will not affect the footprint of the basin. A geotechnical investigation was conducted to collect data to verify that the basin will be able to support the expansion. Every effort has been made to ensure compliance with all environmental permits issued to the site and to eliminate to the maximum extent possible any negative effects to the environment. Big Cajun II pledges to continue to operate the Industrial Solid Waste Surface Impoundments in an efficient and environmentally sound manner.

Section 2.0

2.0 LAC 33:VII.519. Part I: Permit Application Form

The applicant shall complete a standard permit application Part I Form (LAC 33:VII.3003). The following subsections refer to the items on the form requiring that information:

A. name of applicant (prospective permit holder) applying for a standard permit;

Louisiana Generating, LLC, Big Cajun II Power Plant

B. facility name;

Type I Industrial Solid Waste Facility (Fly Ash Basin, Bottom Ash Basin, Rainfall Surge Pond, Primary Treatment Pond, and Secondary Treatment Pond).

C. description of the location of the facility (identify by street and number or by intersection of roads, or by mileage and direction from an intersection);

Highway 981, 3 miles north of the intersection of Highway 415

D. geographic location (section, township, range, and parish where the facility is located, and the coordinates [as defined by the longitude and latitude to the second] of the centerpoint of the facility);

Section 37 Township 4S Range 10E and Section 4, Township 4S, Range 11E of Pointe Coupee Parish. The approximate centerpoint of the facility is located at Latitude 30°43'37" and Longitude 91°23'06".

E. mailing address of the applicant;

112 Telly Street, New Roads, Louisiana 70760

F. contact person for the applicant (position or title of the contact person is acceptable);

Mr. Gary C.Ellender, Manager, Environmental Department

G. telephone number of the contact person;

225-638-3773

H. type and purpose of operation (check each applicable box);

Type I Industrial Surface Impoundment: Bottom Ash Basin, Rainfall Surge Pond, Primary and Secondary Treatment Ponds

Other (Type I Industrial Surface Impoundment/Landfill): Fly Ash Basin

I. status of the facility (if leased, state the number of years of the lease and provide a copy of the lease agreement);

Owned

J. operational status of the facility;

Existing

K. total site acreage and the amount of acreage that will be used for processing and/or disposal;

295 acres

L. list of all environmental permits that relate directly to the facility represented in this application;

LPDES Permit No. LA0054135
Title V Part 70 Operating Permit (Permit No. 2260-00012-V0)
PSD Permit (Permit No. PSD-LA-677)
PSD-LA-62 (Unit 3)
Acid Rain (Permit No. 2260-00012-IV2)
Radiation License LA-3599-L01

M. a letter attached from the Louisiana Resource Recovery and Development Authority (LRRDA) stating that the operation conforms with the applicable statewide plan;

As Stated below, because Big Cajun II's disposal activity occurs entirely within the boundaries of the plant which generates the waste, the above citation does not apply.

(Note: In accordance with LA R.S. 3:2307. (b), LRRDA authority does not apply to solid waste disposal activity occurring entirely within the boundaries of a plant, industry, or business which generates such solid waste.)

N. zoning of the facility (if the facility is zoned, note the zone classification and zoning authority, and include a zoning affidavit or other documentation stating that the proposed use does not violate existing land-use requirements);

According to Ms. Renell Francis with the Pointe Coupee Parish Police Jury, there are no zoning ordinances for properties located outside of incorporated city limits. Therefore, Big Cajun II is not located on zoned land.

O. types, maximum quantities (wet tons/week), and sources (percentage of the on-site or off-site-generated waste to be received) of waste to be processed or disposed of by the facility;

	Processing		Disposal	
	Onsite	Offsite	Onsite	Offsite
Residential				
Industrial			**90-150 Tons**	
Commercial				
Other				

P. indicate the specific geographic area(s) to be serviced by the solid waste facility;

List of Parishes: Big Cajun II does not receive waste from off-site. Therefore, this section is not applicable.

Q. attach proof of publication of the notice regarding the submittal of the permit application as required in LAC 33:VII.513.A;

Proof of Publication is included in Appendix A.

R. provide the signature, typed name, and title of the individual authorized to sign the application. Proof of the legal authority of the signatory to sign for the applicant must be provided.

Signature: Gary C. Ellender

Date: 4/27/06

Typed Name and Title **Mr. Gary C. Ellender, Environmental Manager**

Proof of the legal authority of the signee to sign for the applicant has been included in Appendix B.

Section 3.0

Media Type (check one)			
Hazardous Waste	☐	Air	☐
Solid Waste	☒	Water	☐
Radiation Licensing	☐		

Agency Interest Number: 38867
Is this a copy of a previously submitted form? Yes ☐ No ☒
If yes, indicate the original submittal date: _____
If yes, indicate the original permit number: _____

Department of Environmental Quality
Permits Division
P.O. Box 4313
Baton Rouge, LA 70821-4313
(225) 219-3181

Addendum to Permit Applications per LAC 33:I.1701

Please Type Or Print			For Permits Division Use Only
	Company Name Louisiana Generating LLC	☒ Owner ☒ Operator	
	Parent Company (if Company Name given above is a division) NRG Energy, Inc.		
	Plant name (if any) Big Cajun II		
	Nearest town New Roads	Parish where located Pointe Coupee	

1. Does the company or owner have federal or state environmental permits identical to, or of a similar nature to, the permit for which you are applying in other states? (This requirement applies to all individuals, partnerships, corporations, or other entities who own a controlling interest of 50% or more in your company, or who participate in the environmental management of the facility for an entity applying for the permit or an ownership interest in the permit.)

   ☐ Permits in Louisiana. List Permit Numbers: ____________________

   ☒ Permits in other states (list states): See Exhibit A.1.

2. Do you owe any outstanding fees or final penalties to the Department? No☒ Yes☐
   If yes, please explain. ____________________

3. Is your company a corporation or limited liability company? No☐ Yes☒ If yes, attach a copy of your company's Certificate of Registration and/or Certificate of Good Standing from the Secretary of State.

Certification:

I certify, under provisions in Louisiana and United States law which provide criminal penalties for false statements, that based on information and belief formed after reasonable inquiry, the statements and information contained in this Addendum to the Permit Application, including all attachments thereto are true, accurate, and complete.

Responsible Official

Name Gary C. Ellender
Title Environmental Affairs Manager
Company Louisiana Generating, LLC
Suite, mail drop, or division
Street or P.O. Box 112 Telly Street

City	State	Zip
New Roads	LA	70760
Business phone (225) 618-4465		
Signature of responsible official(s) Gary C. Ellender		
Date 4/27/06		

form_7037_r03
06/30/04

Exhibit A.1

List of the states where applicant has federal or state environmental permits identical to, or of a similar nature to, the permit being applied for.

California

Connecticut

Delaware

Illinois

Maine

Maryland

Massachusetts

Michigan

Minnesota

Missouri

New York

Pennsylvania

Texas

United States of America
State of Louisiana

As Secretary of State, Al Ater, I do hereby Certify that

LOUISIANA GENERATING LLC

A limited liability company domiciled in WILMINGTON, DELAWARE,

Filed charter and qualified to do business in this State on March 10, 2000,

I further certify that the records of this Office indicate the company has paid all fees due the Secretary of State, and so far as the Office of the Secretary of State is concerned, is in good standing and is authorized to do business in this State.

I further certify that this certificate is not intended to reflect the financial condition of this company since this information is not available from the records of this Office.

In testimony whereof, I have hereunto set My hand and caused the Seal of my Office To be affixed at the City of Baton Rouge on,
April 5, 2006

Secretary of State
349056050

Certificate ID: 20060405002523

To validate this certificate, visit the following web site, go to **Commercial Division, Validate Certificate**, then follow the instructions displayed.
www.sos.louisiana.gov

Section 4.0

4.0 LAC 33:VII.521. Part II: Supplementary Information, All Processing and Disposal Facilities

The following information is required in the permit application for solid waste processing and disposal facilities. All responses and exhibits must be identified in the following sequence to facilitate the evaluation. Additionally, all applicable sections of LAC 33:VII.Chapter 7 must be addressed and incorporated into the application responses. If a section does not apply, the applicant must state that it does not apply and explain why.

A. Location Characteristics. Standards pertaining to location characteristics are contained in LAC 33:VII.709.A (Type I and II facilities), LAC 33:VII.717.A (Type I-A and II-A facilities, and LAC 33.719.A (Type III facilities).

1. The following information on location characteristics is required for all facilities:

a. Area Master Plans. A location map showing the facility, road network, major drainage systems, drainage-flow patterns, location of closest population center(s), location of the public-use airport(s) used by turbojet aircraft or piston-type aircraft, proof of notification of affected airport and Federal Aviation Administration as provided in LAC 33:VII.709.A.2, location of the 100-year flood plain, and other pertinent information. The scale of the maps and drawings must be legible, and engineering drawings are required.

The Louisiana Generating, LLC, Big Cajun II Power Plant (Big Cajun II) is located approximately 3 miles northeast of New Roads, Louisiana. The Area Master Plan (Figure 1) shows the roads and major drainage ways in the area. A scale and north arrow are included. The Industrial Solid Waste Surface Impoundments (Fly Ash Basin, Bottom Ash Basin, Rainfall Surge pond, LPDES Treatment Ponds) are on-site facilities that serve only Big Cajun II.

The Site Master Plan included as Figure 2 illustrates the wells, access roads, and drainage ways. The wells are further discussed in the response given for LAC 33:VII.521.A.2.a. The drainage ways carry only uncontaminated surface runoff from outside the plant island and disposal areas. All runoff from the plant area and the solid waste facilities is collected with a storm water system of pipes and open channels.

These waters are subsequently treated and discharged through the Louisiana Pollutant Discharge Elimination System (LPDES). The nearest public-use airport used by turbojet aircraft is the Baton Rouge Metropolitan Airport located approximately 19 miles southeast of the solid waste facilities. The nearest public-use airport used by piston-type aircraft is the False River Airpark located approximately 6.5 miles west of the solid waste facilities on Louisiana Highway 1. The distances of these airports from the facilities were taken from the Houston sectional Aeronautical Chart published by the National Oceanic and Atmospheric Administration. The Area Master Plan (Figure 1) also depicts the 100-year flood zone in the vicinity of the plant site. This map represents the flood zones as they were prior to construction of Big Cajun II and the associated solid waste facilities. The plant site itself was built on several feet of fill to ensure continuous operation during adverse weather conditions. Dikes were constructed around the solid waste facilities to preclude any contamination of flood waters by waste products.

b. A letter from the appropriate agency or agencies regarding those facilities receiving waste generated off-site, stating that the facility will not have a significant adverse impact on the traffic flow of area roadways and that the construction, maintenance, or proposed upgrading of such roads is adequate to withstand the weight of the vehicles.

Big Cajun II acknowledges the above citation; however, Big Cajun II does not receive waste from off-site facilities. Therefore, the above citation is not applicable.

c. Existing Land Use. A description of the total existing land use within three miles of the facility (by approximate percentage) including, but not limited to:

Land use within a three mile radius of the facility is depicted in Figure 3.

i. residential;

Approximately 5.97% of the land within 3 miles of the Industrial Solid Waste Impoundments is used for residential purposes.

ii. health-care facilities and schools;

Approximately 1% of the land within 3 miles of the Industrial Solid Waste Surface Impoundments is used for commercial and services. The nearest hospital is located greater than 3 miles from the facility. Six schools are located within a three mile radius of the facility. The nearest school is located 1.5 miles from the site.

iii. agricultural;

Approximately 40% of the land within 3 miles of the Industrial Solid Waste Impoundments is used for cropland, pasture, and orchard, grove, vineyard and nursery purposes.

iv. industrial and manufacturing;

Approximately 4.38% of the land within 3 miles of the Industrial Solid Waste Impoundments is used for industrial purposes.

v. other commercial;

Approximately 1% of the land within 3 miles of the Industrial Solid Waste Impoundments is used for commercial and services purposes.

vi. recreational; and

No recreational land use was identified within three miles of the facility.

vii. undeveloped.

Approximately 36.89% of the land within 3 miles of the Industrial Solid Waste Impoundments is undeveloped.

d. Aerial Photograph. A current aerial photograph, representative of the current land use, of a one-mile radius surrounding the facility. The aerial photograph shall be of sufficient scale to depict all pertinent features. (The administrative authority may waive the requirement for an aerial photograph for Type III facilities.)

A current aerial photograph representative of the current land use for a 1-mile radius surrounding the Industrial Solid Waste Facilities is included as Figure 4.

e. Environmental Characteristics. The following information on environmental characteristics:

i. a list of all known historic sites, recreation areas, archaeologic sites, designated wildlife-management areas, swamps and marshes, wetlands, habitats for endangered species, and other sensitive ecologic areas within 1,000 feet of the facility perimeter or as otherwise appropriate;

Extensive literature searches and field surveys of the plant area were conducted as parts of the two Environmental Impact Reports (EIR) prepared for Big Cajun II (Bovay Engineers, Inc. and Burns & Roe , Inc. Environmental Impact report – Big Cajun No. 2 Generating Station, March 1975 and Bovay Engineers, Inc. and Burns & Roe, Inc., Environmental Impact Report – Big Cajun No. 2 Unit No. 3. June 1978.). These reports were prepared in accordance with the National Environmental Policy Act (P.L. 91-190) in March 1975 and June 1978. The following statements regarding the environmental characteristics were taken from the two EIRs:

"From archival research it was learned that within the study area there were no prehistoric archeological sites recorded, nor were there any historic sites listed or proposed for nomination in the national Register of historic sites"

The National Park Service lists no existing or eligible natural or environmental education landmarks in the State of Louisiana. The nearest wildlife area is over 20 miles from the plant site. It was concluded from field surveys that no endangered or threatened species of animals or plants exist on the plant site, nor is the area visited by endangered or threatened migratory species.

ii. documentation from the appropriate state and federal agencies substantiating the historic sites, recreation areas, archaeologic sites, designated wildlife-management areas, wetlands, habitats for endangered species, and other sensitive ecologic areas within 1,000 feet of the facility; and

Appendix C contains documentation from the appropriate state and federal agencies substantiating the historic sites, recreation area, archeological sites, designated wildlife management areas, wetlands, habitats for endangered species, and other sensitive ecological area within 1,000 feet of the facility.

iii. a description of the measures planned to protect the areas listed from the adverse impact of operation at the facility;

The operations of the Big Cajun II facility are designed to conform with the State and Federal controls on air emissions and waste disposal. Such conformance provides a positive approach to protection of sensitive ecological areas in and near the study area.

f. A wetlands demonstration, if applicable, as provided in LAC 33:VII.709.A.4.

LAC 33:VII.709.A.4 requires a wetlands demonstration for facilities which have not received waste prior to October 9, 1993. However, Big Cajun II's Industrial Solid Waste Surface Impoundments have received waste **prior to October 9, 1993. Therefore, the above citation is not applicable.**

The expansion of the bottom ash pond will not change the footprint of the existing impoundments as it will consist of vertically expanding the existing dikes. Therefore no additional land will be impacted.

g. **Demographic Information. The estimated population density within a three-mile radius of the facility boundary based on the latest census figures.**

According to the Louisiana Department of Economic Development which uses data from the 2000 United States Census, the total estimated population within a 3-mile radius of the Industrial Solid Waste Surface Impoundments is 9,392. The population density of the 3-mile radius is approximately 332.17 persons per square mile.

2. **The following information regarding wells, faults and utilities is required for Type I and II facilities:**

a. **Wells. Map showing the locations of all known or recorded shot holes and seismic lines, private water wells, oil and/or gas wells, operating or abandoned, within the facility and within 2,000 feet of the facility perimeter and the locations of all public water systems, industrial water wells, and irrigation wells within one mile of the facility. A plan shall be provided to prevent adverse effects on the environment from the wells and shot holes located on the facility.**

An inventory of water wells was made within a 1-mile radius of Big Cajun II's property boundary. Well data was obtained from the Louisiana Department of Transportation and Development, Water Resources Section, and the Louisiana Department of Natural Resources. Records of water wells within 1-mile radius of the site are contained in Table 1. A total of 53 wells were inventoried. One oil/gas well was present within a 2,000-foot radius of the site. The well was found to be dry and subsequently plugged as of June 6, 1980. All well locations are posted in Figure 5. There are no known shot holes or seismic lines within 2,000 feet of the facilities.

b. **Faults**

i. **scaled map showing the locations of all recorded faults within the facility and within one mile of the perimeter of the facility; and**

The location of Big Cajun II is within a recent meander lobe created by the Mississippi River. Topographic expression of point bar sands associated with continued avulsion of the river indicate no offset created by surface faulting during Holocene time. Additionally, borings drilled within the facility did not intercept any known faults. No other known faults are believed to exist within 1-mile radius of the facility.

ii. **demonstration, if applicable, of alternative fault set-back distance as provided in LAC 33:VII.709.A.5.**

Big Cajun II acknowledges the above citation; however, the facility is not located within 200 feet of a fault. Therefore, the above citation does not apply.

c. **Utilities. Scale map showing the location of all pipelines, power lines, and right-of-ways within the site.**

The locations of all pipelines, power lines, and right-of-way within the site are shown on the Utilities Location Map (Figure 6).

B. Facility Characteristics. Standards concerning facility characteristics are contained in LAC 33:VII.709.B (Type I and II facilities), LAC 33.VII.717.B (Type I-A and II-A facilities), and LAC 33:VII.719.B (Type III facilities). A facility plan, including drawings and a narrative, describing the information required below must be provided.

1. The following information is required for all facilities:

a. **elements of the process or disposal system employed, including, as applicable, property lines, original contours (shown at not greater than five-foot intervals), buildings, units of the facility, drainage, ditches and roads;**

The solid waste facilities are clearly labeled on the Site Master Plan included as Figure 2. Since the Fly Ash and Bottom Ash Basins are kept segregated, both the Fly Ash and Bottom Ash Basins will be used throughout the life of the plant. Neither of the Ash Basins will be deliberately filled with water since runoff will be removed on a routine basis, but there will always be some rainfall and transport water in the basins.

Fly ash will initially be deposited in the southeast corner of the Fly Ash Basin. As the years pass, the filling will proceed westward along the south levee. After the southern half of the basin is full, filling will continue from the northwestern portions of the basin eastward along the north levee. The northeast corner of the Fly Ash Basin will be the last section to be filled.

The Bottom Ash Basin receives bottom ash from Units 1, 2, and 3, as well as sediment from the clarifier beds associated with the cooling towers and boilers. Bottom Ash from Units 1 and 2 is currently sluiced to the south part of the Bottom Ash Basin. Since the bottom ash is carried by water, the filling will radiate from the pipe outlet in a delta-like fashion. The clarifier sediments are piped to the southeast corner of the Bottom Ash Basin. These sediments are produced when water from the Mississippi River is clarified and softened for use as cooling water or boiler water. Clarifier sediments consist primarily of Mississippi River water naturally occurring silts and clays. It also contains some lime, sodium aluminate, and trace amounts of an EPA-approved water treatment polymer. As the clarifier sediment flow enters the bottom ash basin, the sediments settle out and form a delta-like deposit, similar to the bottom ash sluice, originating at the pipe outlet. Bottom ash from Unit 3 is carried to the basin by dump-trucks and deposited in the southwest corner. Details of the ash handling procedures are discussed in the

Industrial Solid Waste Surface Impoundments' Facility Operational Plan, included as Appendix D. The filling of the basin will, therefore, start along the south levee and proceed northward.

The Rainfall Surge pond and the two LPDES Treatment ponds began operation in 1979. The approximate capacities of the existing facilities follow:

	Acre-feet
Fly Ash Basin	1,750.0
Bottom Ash Basin	1,188.0
Rainfall Surge Pond	331.3
Primary Treatment Pond	457.2
Secondary Treatment	127.8

The proposed expansion of the Bottom Ash Basin will add an additional capacity of approximately 91 acre-feet.

The Site Master Plan (Figure 2) depicts the power plant site. The solid waste facilities are located to the northwest of the generating units. The plan clearly shows the property lines, buildings, plant drainage, roads, and other facilities.

Excavation was required for the Rainfall Surge Pond since it is the collection point for all contaminated rainfall runoff and wastewater at the plant site. The bottom of this pond has an elevation of 19 feet mean sea level (MSL), which is approximately 10 to 12 feet below the original land surface. It is anticipated that the Rainfall Surge Pond will be backfilled during closure, and, thus, the final contours. The plan view of the Industrial Solid Waste Facilities depicting the location of cross sections made of the facilities is shown on the Surface Impoundment Cross Sections Location Map (Figure 7). Cross sections of the facilities showing the original contours and the final elevations, based on current conditions, are provided as Figures 8 through 11.

As discussed, Louisiana Generating is proposing to vertically expand the Bottom Ash Basin. A plan view and associated cross sections depicting the original ground elevations, current elevations, and proposed elevations for the expanded dike are depicted in Figure 12a and Figure 12b.

b. the perimeter barrier and other control measures;

An 8-foot high chain link fence topped with barbed wire protects the frontage along Highway 981. Cattle fences and barbed wire limit access to the plant site from the adjacent pasture lands. Drainage ditches and forest lands along some boundaries also help to prevent unauthorized entry. Entrances to the plant site are guarded by swinging or sliding gates, and all vehicles are logged in and out by a private contractor. All fences and gates are shown on the Site Master Plan (Figure 2).

c. a buffer zone;

The solid waste facilities at Big Cajun II have a buffer zone of at least 250 feet on all sides. The buffer zone on the western boundary is 250 feet and it faces undeveloped woodlands. The southern edge of the solid waste facilities is more than 1,600 feet from the property line, while the northern edge has a buffer ranging in width from 400 feet to over 800 feet. The eastern edge surrounding the Industrial Solid Waste Surface Impoundments can be seen depicted on the Site Master Plan (Figure 2).

d. fire-protection measures;

As required by LAC 33:VCII.709.B3, Big Cajun II maintains substantial fire fighting equipment and a fire control system. These facilities are described in the Emergency Action Procedure (Appendix E).

e. landscaping and other beautification efforts;

Big Cajun II acknowledges the above citation; however; since Big Cajun II's Industrial Solid Waste Surface Impoundments are located within the boundaries of the plant which generates the waste to be disposed, landscaping and other beautification efforts are not required (LAC33:VII.709.B.4). In addition, Big Cajun II's Industrial Solid Waste units are existing facilities, rather than proposed facilities.

f. devices or methods to determine, record, and monitor incoming waste;

A scale is used to weigh the fly ash trucks prior to unloading of the ash material into the ash collection area. Visual inspections of the treatment ponds and rainfall surge ponds are conducted regularly to observe freeboard and integrity of the facilities.

g. LPDES discharge points (existing and proposed); and

Big Cajun II currently discharges under LPDES Permit No. LA0054135 (Appendix F). The discharge points for the Big Cajun II facility are shown on the Site Master Plan (Figure 2). All the wastewater from the plant site collects and receives treatment in the LPDES Treatment Ponds. Influent to the Treatment Ponds is made up of the following: cooling tower water blow down, cooling tower chemical storage runoff, boiler blow down, demineralizer wastewater, sanitary wastewater, SPCC runoff, and coal pile runoff. The effluent from the Treatment Ponds is discharged to the Mississippi River through outfall 001. Internal Outfalls 101, 201, and 301, which consist of cooling tower blowdown from Units 1 and 2, treated sanitary wastewaters, and cooling tower blowdown from proposed Unit 4, respectively, discharge into the Treatment Ponds. The Unit 3 once-through, non-contact (no chemical treatment) cooling water from the Mississippi River is discharged directly to the Mississippi River through Outfall 003. The runoff collection and treatment facilities are shown in Figure 13.

h. other features, as appropriate.

Big Cajun II acknowledges that the Administrative Authority may require a description of other features of facility characteristics, as appropriate.

2. The following information is required for Type I and II facilities:

a. areas for isolating nonputrescible waste or incinerator ash, and borrow areas; and

Big Cajun II acknowledges the above citation; however, the Industrial Solid Waste Units have no areas for isolating nonputrescible waste or incinerator ash or borrow areas. Therefore, the above citation is not applicable.

b. location of leachate collection/treatment/removal system.

A leachate collection and treatment system was not deemed necessary for the facilities since they are sited on soils of low permeability. The soil types are discussed in detail in response to LAC 33:VII.521.D.1.a. and prevention of groundwater contamination is addressed in response to LAC 33:VII.521.F.4.

C. Facility Surface Hydrology. Standards governing facility surface hydrology are contained in LAC 33:VII.711.A (Type I and II landfills), LAC 33:VII.713.A (Type I and II surface impoundments), LAC 33:VII.715.A (Type I and II landfarms), LAC 33:VII.717.C. (Type I-A and II-A facilities), and LAC 33:VII.719.C (Type III facilities).

1. The following information regarding surface hydrology is required for all facilities:

a. a description of the method to be used to prevent surface drainage through the operating areas of the facility;

There are three distinct types of flooding or drainage problems which could potentially affect the area surrounding New Roads, Louisiana:

(1) Widespread flooding by the Mississippi River during high water in the spring and summer months.

(2) Backwater flooding caused by excessive rainfall draining into low lying areas and backing up into the drainage ways.

(3) Flash floods in small streams caused by rainfall of high intensity and short duration.

The design of the solid waste facilities at Big Cajun II and the Mississippi River levee protection system insure that uncontaminated surface runoff will not drain through the operating areas, even in the event of excessive rainfall or any of the three types of floods. After the disastrous flood of 1927, Congress adopted a comprehensive plan for flood control in the Mississippi River Alluvial Valley. The project consists of a combination of features including levees along the main channel and its tributaries to retain peak flows; floodways to divert excess flow from the River; and channel improvements such as revetments, dikes, and dredging to increase channel capacity. With the institution of the projects, flooding in this area has been limited to backwater flooding and short term from high-intensity, short duration rainfall. Graphs of the water elevations of the Mississippi River for the years 1972 to 1980 are provided in Figures 14 and 15. Figure 14 plots the stages for the two closest official recording stations, Bayou Sara and Baton Rouge. The Bayou Sara gauge is located on the left descending bank of the river less than 3 miles upstream from the site. The Baton Rouge gauge is located approximately 34 river miles downstream from the site on the left descending bank. The Bayou Sara gauge is much more typical of the actual conditions at the Big Cajun II site due to its proximity. In addition, the river stage at Baton Rouge is influenced by the tides, whereas neither the Bayou Sara area nor the plant area is under that influence. An average river elevation would mean very little due to the large seasonal fluctuations in the water level. Figure 14 shows that the spring floods typically crest at elevations of 35 to 45 feet msl, while in the fall the water surface usually drops to below 10 feet. The following summary of the extreme stage levels are statistical records for the Bayou Sara gauge should give an accurate picture of the river stage elevations near Big Cajun II.

Bayou Sara Stage Recorder

OWDC Number	16865
Station Number	01140
Operating Agency	US Army Corps of Engineers
Location	Left descending bank, River 265.4
Flood Stage	36.0 feet msl
Low Water Stage	5.252 feet msl
Mean Water Surface	18.2 feet msl
Mean Annual Flood	18.1 feet msl
Mean Low Water	3.2 feet msl
Highest Storage/Date	55.46 feet msl/May 15, 1927
Lowest Stage/Date	0.96 feet msl/Nov. 16, 1895

It is interesting to note that during the last week of May and the first part of June 1982, the Mississippi River exhibited the highest stage elevations and largest flows since the flood of 1927. In spite of this near record flood, the Mississippi River levee system performed well and kept the power plant and disposal facilities dry.

Backwater flooding is the most common type of drainage problem in the vicinity of Big Cajun II. As shown on the area master Plan (Figure 1), runoff from the area northeast of New Roads, including the plant area, drains through two points: Patin Dyke on the south and the Portage Canal on the west. It is these two bottlenecks that cause occasional flooding during periods of excessive rainfall. The solid waste facilities at Big Cajun II were designed and constructed to prevent uncontaminated runoff or backwater from flowing through them. The clay dikes which surround the two LPDES treatment ponds and both of the Ash Basins effectively segregate on-site and off-site runoff. The top of the dike surrounding the Fly Ash Basin has an elevation of 40 feet msl, which is approximately 10 feet above grade. The dikes surrounding the Bottom Ash Basin, Primary Treatment Pond and Secondary Treatment Pond currently have elevations of approximately 48 feet msl, approximately 18 feet above grade. The vertical expansion of the Bottom Ash Basin would raise the height of the dikes surrounding it to an elevation of 58 feet msl, approximately 28 feet above grade. All dikes were seeded with grass, covered with an erosion control fabric, and fertilized following construction. All dikes are sufficient height to prevent off-site drainage and floodwater from being contaminated by waste materials. The Rainfall Surge pond has no dikes since its purpose is to collect surface runoff from the plant island and the coal and ash storage areas.

b. a description of the facility runoff/run-on collection system;

All surface runoff from the two ash facilities is collected and transported by gravity to the Rainfall Surge Pond. This pond is the collection point for all rainfall runoff and wastewater from the plant island, coal storage areas, and ash disposal areas. All water collected in the Rainfall Surge Pond is treated in the Industrial Solid Waste Surface Impoundments permitted under the LPDES program. The Schematic of the Runoff Collection and Treatment Facilities (Figure 13) is a plan view which shows the equipment used to collect and treat surface runoff from the Ash Basins. Note that Figure 13 is not drawn to scale as it is intended only to illustrate the relative placement of the equipment in the runoff collection and treatment system. All item numbers cited in the following explanation refer to the equipment numbers in Figure 13. Rainfall runoff from the Fly Ash basin exits in the northeast corner of the basin.

Item 1 on Figure 13 is a "V" shaped swale that is 6 feet wide. The purpose of this swale is to channel the runoff toward the fly ash drain pipe (Item 2). Rainfall runoff leaves the Fly Ash Basin by passing through a concrete entrance box and entering a 30-inch diameter, Schedule 40 steel pipe (Item 2). The fly ash drain pipe passes through the levee that separates the Fly Ash Basin from the Bottom Ash Basin and discharges into a drainage swale (Item 3) in the Bottom Ash Basin.

Item 3 is a "V" shaped swale in the Bottom Ash Basin that runs from west to east near the north levee. This swale serves two purposes. First, it carries the fly ash runoff from the fly ash drain (Item 2) to the bottom ash exit weir. It also collects and channels the surface runoff from the Bottom Ash basin to the exit weir.

Item 4 is the bottom ash exit weir, which serves as an inlet to the bottom ash drain pipe (Item 5). This drain pipe is a 30-inch diameter, Schedule 40 steel pipe that carries the combined fly ash/bottom ash surface runoff through the north levee. The flow of water is controlled with a 30-inch butterfly valve (Item 6). Item 7 is a continuation of the 30-inch drain-pipe, which carries the runoff from the Bottom Ash Basin to the Rainfall Surge Pond.

With the proposed vertical expansion of the Bottom Ash Basin, the 30-inch diameter, schedule 40 steel pipe conveying the runoff from the Fly Ash Basin will be rerouted outside of the dike of the Bottom Ash Basin. The "V" shaped swale in the Bottom Ash Basin, as well as the exit weir located at the northeast corner of the basin will be relocated as shown on Figure 28a. The 30-inch diameter, schedule 40 steel pipes from the Fly Ash and Bottom Ash Basins will be controlled with 30-inch butterfly valves.

Item 9 is the drain pipe discharge area in the Rainfall Surge Pond. It is fitted with a concrete apron to prevent erosion caused by the discharge of the water.

The above described equipment (Items 1 through 9) are the elements of the Ash Basin runoff collection system. Since the discharge point (Item 9) is the lowest point in the system, all movement of surface runoff is by gravity. The collection system was designed without pumps to minimize the operation and maintenance costs and to avoid the drainage problems that could arise from downtime due to equipment failure or maintenance.

Items 10 through 14 are components of the LPDES Treatment Ponds. Item 10 is Lift Station No. 1. Its purpose is to pump the water from the Rainfall Surge pond up to the Primary Treatment Basin. Item 11 is the chemical storage area. Water Treatment chemicals may be added to the wastewater at this point to adjust the pH or to reduce suspended solids to the limits defined in the LPDES permit (Appendix F).

Item 12 is the 24-inch diameter steel pipe that is used to carry the water from Lift Station No. 1 to the Primary Treatment Pond. Item 13 is an air mix chamber that is connected to the end of a 48-inch diameter steel pipe. Water flows from the Primary Treatment Pond through the pipe, over the air mix chamber and into the Secondary Treatment Pond. The air mix chamber adds dissolved oxygen to the water flowing over it.

Item 14 is Lift Station No. 2, which pumps the treated water to the Mississippi River in accordance with the LPDES permit (Appendix F). LPDES Sample Point Number

001 is located at the lift station. Flow and other parameters specified in the permit are recorded or sampled and analyzed at this point.

c. the maximum rainfall from a 24-hour/25-year storm event;

The maximum 24-hour/25-year rainfall for Baton Rouge is 9.6 inches. The maximum 24-hour/25-year rainfall for Melville is 9.0 inches. The largest recorded 24-hour rainfall for Baton Rouge is 12.08 inches based on records maintained by the Louisiana State Office of Climatology.

d. the location of aquifer recharge areas in the site or within 1,000 feet of the site perimeter, along with a description of the measures planned to protect those areas from the adverse impact of operations at the facility; and

The subsurface sediments beneath the site comprise a complex series of southerly dipping, clay, silt, sand, and gravel deposits. The sediment layers dip at the rate of about 20 feet per mile. The freshwater-bearing sediments beneath Pointe Coupee Parish are listed in Table 3 and are illustrated on the Hydrogeologic Section (Figure 16). All of the freshwater sands have been classified into four aquifer zones: Alluvial Aquifer, Zone 1, Zone 2, and Zone 3.

The Alluvial Aquifer consists of coarse sands and gravels and is the first permeable deposit encountered beneath the surficial sediment. The Alluvial Aquifer is as thick as 200 feet in the site area and is covered by as much as 35 feet of surficial silt, clay, and fine sand. The groundwater in the Alluvial Aquifer is a calcium bicarbonate type and contains relatively high hardness and high concentrations of iron. The total dissolved solids (TDS) content ranges from 200 to 600 parts per million (ppm) (Table 4).

The Zone 1 Aquifer occurs about 400 feet beneath the site area and is about 100 feet thick. Water in the Zone 1 Aquifer is of moderately hard to hard, calcium bicarbonate type with a relatively high concentration of iron (Table 4).

The Zone 2 Aquifers occur about 650 feet beneath the site area and consists of several sand units that range in thickness from less than 50 feet to more than 100 feet. The groundwater in the Zone 2 Aquifer is predominantly soft, sodium bicarbonate type. The TDS concentration ranges from about 200 to 450 ppm (Table 4).

The Zone 3 Aquifer is the deepest water aquifer beneath the site. It occurs at about 1,250 feet and consists of several sand units that average about 50 feet in thickness. The groundwater in the Zone 3 Aquifer is a soft, sodium bicarbonate type with TDS concentration that ranges from about 225 to 1250 ppm (Table 4).

Generalized quality-of-water characteristics of the aquifers underlying Pointe Coupee Parish are shown in Table 4. The base of fresh groundwater beneath the site is about elevation 1,900 feet below msl, as shown on the water level profiles of the Alluvial Aquifer (Figure 16). Of the four identified freshwater aquifer zones, only the Alluvial Aquifer has the potential to receive any leachates from the waste disposal area. The Alluvial aquifer beneath the site is separated from the Zone 1 Aquifer by about 100 feet of very low permeable clay and silt (Figure 16), which provides an effective barrier to migration of groundwater between these aquifers.

e. if the facility is located in a flood plain, a plan to ensure that the facility does not restrict the flow of the 100-year base flood or significantly reduce the temporary water-storage capacity of the flood plain, and documentation indicating that the design of the facility is such that the flooding does not affect the integrity of the facility or result in the washout of solid waste.

The Area Master Plan (Figure 1) depicts the 100-year flood zone in the vicinity of the plant site. This map represents the flood zones as they were prior to construction of Big Cajun II and the associated solid waste facilities. The plant site itself was built on several feet of fill to ensure continuous operation during adverse weather conditions. Dikes were constructed around the solid waste facilities to preclude any contamination of flood waters by waste products.

D. Facility Geology. Standards governing facility geology are contained in LAC 33:VII.709.C (Type I and II facilities), LAC 33:VII.717.D (Type I-A and II-A facilities), and LAC 33:VII.719.D (Type III facilities).

1. The following information regarding geology is required for Type I and Type II facilities:

a. isometric profile and cross-sections of soils, by type, thickness, and permeability;

An isometric profile and cross section of the soils within the site are included in Figures 17 and 19. Figure 18 depicts boring, monitoring well, and cross section locations.

b. logs of all known soil borings taken on the facility and a description of the methods used to seal abandoned soil borings;

Soil boring logs taken on the facility are included in Appendix G. Description of the methods used to seal and abandon soil borings are included in Big Cajun II's Sampling and Analysis Plan, Appendix H.

c. results of tests for classifying soils (moisture contents, Atterberg limits, gradation, etc.), measuring soil strength, and determining the coefficients of permeability, and other applicable geotechnical tests;

An extensive soil survey was taken prior to construction, between 1974 and 1977, of the Industrial Solid Waste Surface Impoundments. Soil borings were laid out in a square pattern with a spacing of 250 feet. Classification tests such as the Atterberg Limits Determination, grain size analysis, and compression tests were conducted. Void ratios and permeabilities were also determined at that time. In all, over 260 test holes were bored and analyzed. A listing of the indigenous soil types and their associated permeabilities is included in Table 4. A soil profile showing the south edge of the Fly Ash Basin is provided as Figure 17. Note that the soils have been classified into three groups. Group I contains clay, silty clay, and clayey silt. All of these soils have permeabilities less than 1.0×10^{-7} centimeters per second. Group II contains the various silts which underlie the surficial clays. Group III consists of sands, which are occasionally found as lenses in the silt layers.

Recently, fourteen soil sample borings – ranging from 50 to 70 feet in depth – were performed in the area of the bottom ash basin to support the design of the proposed bottom ash basin vertical expansion. The samples were subjected to strength and unit weight/moisture content determinations. In summary, the laboratory efforts encompassed: 69 unconfined and 14 unconsolidated, drained/undrained triaxial compression tests; 65 dry sieve analyses; 6 moisture content determinations, 6 consolidated tests with rebound, plus 26 Atterberg limit determinations. As per the borehole sampling techniques, all laboratory procedures conformed to appropriate ASTM standards. Results show the soil consists mostly of clay approximately to the depth of 35 feet and then grades to silty sand to a depth of approximately 55 feet bgs. Cross sections incorporating the borings recently installed at the facility are included as Figure 18 and 19. The geotechnical report is included in Appendix N.

d. geologic cross-section from available published information depicting the stratigraphy to a depth of at least 200 feet below the ground surface;

The Hydrogeologic Section (Figure 16) depicts the local geology to 1,800 feet below ground surface (bgs).

e. for faults mapped as existing through the facility, verification of their presence by geophysical mapping or stratigraphic correlation of boring logs. If the plane of the fault is verified within the facility's boundaries, a discussion of measures that will be taken to mitigate adverse effects on the facility and the environment;

Refer to response given for LACC33:VII.521. A.2.b.i.

f. for a facility located in a seismic impact zone, a report with calculations demonstrating that the facility will be designed and operated so that it can withstand the stresses caused by the maximum ground motion, as provided in LAC 33:VII.709.C.2; and

The Big Cajun II site is not located on a seismic impact zone: therefore, this section is not applicable.

g. for a facility located in an unstable area, a demonstration of facility design as provided in LAC 33:VII.709.C.3.

The Big Cajun II site is not located in an unstable area; therefore, this section is not applicable.

2. The following information regarding geology is required by Type III woodwaste, and construction/demolition-debris facilities:

a. general description of the soils provided by a qualified professional (a geotechnical engineer, soil scientist, or geologist) along with a description of the method used to determine soil characteristics; and
b. logs of all known soil borings taken on the facility and a description of the methods used to seal abandoned soil borings.

Big Cajun II acknowledges the above citation: however, Big Cajun II does not utilize Type III woodwaste and construction/demolition debris facilities. Therefore, the above citation is not applicable.

E. Facility Subsurface Hydrology. Standards governing facility subsurface hydrology are contained in LAC 33:VII.715.A (Type I and II landfarms).

1. The following information on subsurface hydrology is required for all Type I facilities and Type II landfills and surface impoundments:

a. delineation of the following information for the water table and all permeable zones from the ground surface to a depth of at least 30 feet below the base of excavation:

i. areal extent beneath the facility;

Refer to the response given for LAC 33:VII.521.E.1.a.iii.

ii. thickness and depth of the permeable zones and fluctuations;

Refer to the response given for LAC 33:VII.521.E.1.a.iii.

iii. direction(s) and rate(s) of groundwater flow based on information obtained from piezometers and shown on potentiometric maps; and

Potentiometric data from the most recent groundwater monitoring events (included as Figures 20 through 23), indicate that the groundwater flow direction in the area of the impoundments varies. The location and vicinity of the Big Cajun II facility with respect to the Mississippi River and its associated meander, historical water level measurements in groundwater units, Mississippi River elevations, and area precipitation are all factors that need to be considered to better understand the groundwater flow in the area.

iv. any change in groundwater flow direction anticipated to result from any facility activities;

Big Cajun II does not anticipate any change in groundwater flow resulting from facility activities.

b. delineation of the following, from all available information, for all recognized aquifers which have their upper surfaces within 200 feet of the ground surface:

i. areal extent;

The Alluvial Aquifer is the primary surficial aquifer within 200 feet bgs at the site. The areal extent of the Alluvial Aquifer is on the order of less than 1 mile to several miles in width. The Alluvial Aquifer consists of dense to very dense gray sand and gravel with interbedded silts and clays. The internal geology of the Alluvial Aquifer is highly complex with beds having a high degree of sinuosity. Depth to the Alluvial Aquifer is variable across the site, ranging from 40 to 80 feet bgs. The Alluvial Aquifer is overlain by surficial sediments consisting of medium to stiff gray and brown clays and interbedded lenses of silts and sands very low permeabilities (Figure 16). Therefore, an effective barrier to migration of groundwater is maintained between the surficial aquifer and the Alluvial Aquifer.

ii. thickness and depth to the upper surface;

Refer to the response given for LAC 33:VII.521.E.1.b.i

iii. any interconnection of aquifers; and
Refer to the response given for LAC 33:VII.521.E.1.b.i

iv. direction(s) and rate(s) of groundwater flow shown on potentiometric maps.

Groundwater level data for the Alluvial Aquifer within the immediate site area are not available. The direction of flow of groundwater in the Alluvial Aquifer was determined by use of existing data in the vicinity of the site but outside the 1-mile radius of the site. The groundwater within the Alluvial Aquifer is in hydraulic communication with the Mississippi River, as indicated in Figure 16. Consequently, the groundwater level rises and falls with the river stage fluctuations. The relationship is illustrated in Figure 14, which shows hydrographs of the Mississippi River and the groundwater level in a well completed in the Alluvial Aquifer. Since a stage recorder is not located directly adjacent to the well location, an interpolation was made between the two stage recorder locations to project a river level at a location near the well PC-156 (Figure 15). As indicated by the hydrographs, during certain months the groundwater level is higher than the river level; therefore, the direction of groundwater flow is toward the river. During the times of high river levels, the direction of flow is from the river toward the well.

A study performed by the Louisiana Geological Survey in Pointe Coupe Parish illustrates the seasonal difference in water level. This study shows that the Alluvial Aquifer may either discharge to or be recharged by the Mississippi River, depending on the hydraulic gradient. The direction of groundwater flow adjacent to the Mississippi River was determined in another study by the Louisiana Geological Survey in the Plaquemine-White Castle Area, which is about 35 miles downstream of the Big Cajun II site. The results of this study indicated the following:

"*Configuration of the piezometric surface of the Plaquemine Aquifer... shows that at high river stages, water enters the aquifer from the river and moves from both sides of the river. Although the pressure changes in the aquifer that accompany a change in river stage and transmitted rapidly through the aquifer, actual movement of water is very slow. Under the maximum natural hydraulic gradient of about 5 feet per mile that occurs when the river is rising rapidly, water would move through the upper sand unit at a rate of less than one foot per day. Thus, water entering the aquifer from the river during periods of rising water levels moves outward only a short distance during the seasonal periods of high river stage. As the river stage begins to fall, the direction of movement is reversed, and water drains from the aquifer to the river.*"

The Plaquemine Aquifer is the near surface aquifer and is in direct hydraulic communication with the Mississippi River, which is a similar hydrogeologic condition to the Alluvial Aquifer at the Big Cajun II site. Based on the hydrographs shown in Figure 14 and the results of the studies discussed above, the direction of flow of groundwater at the Fly Ash Basin site is approximated to be from the site northeasterly toward the Mississippi River. Seasonal fluctuations in the river level cause temporary reversals in the flow direction, but the long term movement of the groundwater beneath the disposal site is toward the river.

2. **The following information on subsurface hydrology is required for Type II landfarms. Delineation of the following information for the water table and all permeable zones from the ground surface to a depth of at least 30 feet below the zone of incorporation:**

   a. **aerial extent beneath the facility;**
   b. **thickness and depth of the permeable zones and fluctuations;**
   c. **direction(s) and rate (s) of groundwater flow based on information obtained from piezometers and shown on potentiometric maps); and**
   d. **any change in groundwater flow direction anticipated to result from any facilities activities.**

   Big Cajun II acknowledges the above citation: the Industrial Solid Waste Surface Facilities are Type I facilities. Therefore, the above citation is not applicable.

F. **Facility Plans and Specifications. Standards governing facility plans and specifications are contained in LAC 33:VII.711.B (Type I and II landfills), LAC 33:VII.713.B (Type I and II surface impoundments), LAC 33:VII.715.B (Type I and II landfarms), LAC 33:717.E (Type I-A and II-A facilities), LAC 33:VII.721.A (Type III construction and demolition debris and woodwaste landfills), LAC 33:VII.723.A (Type III composting facilities), and LAC 33:VII.725.A (Type III separation facilities). Standards for groundwater monitoring are contained in LAC 33:VII.709.E (Type I and II facilities).**

   1. **Certification. The person who prepared the permit application must provide the following certification:**

      "I certify under penalty of law that I have personally examined and I am familiar with the information submitted in this permit application and that the facility as described in this permit application meets the requirements of the solid waste rules and regulations. I am aware that there are significant penalties for knowingly submitting false information, including the possibility of fine and imprisonment."

      Certification of compliance by Mr. Gary C. Ellender, as the preparer of this permit renewal modification, is included as Appendix M.

2. **The following information on plans and specifications is required for Type I and II facilities:**

   a. **detailed plan-view drawing(s) showing original contours, proposed elevations of the base of units prior to installation of the liner system, and boring locations;**

   The Industrial Solid Waste Units are existing facilities located within the property boundaries of Big Cajun II. The area is of a relatively flat terrain, as evidenced by the contour lines shown on the Area Master Plan (Figure 1). Cross Sections depicting the depth of the facilities and the elevations of the surrounding levee systems are shown in Figures 8 through 11. Historical soil boring locations are depicted in Figure 25.

   As discussed previously, the proposed bottom ash basin expansion will consist of vertically expanding the surrounding, existing dikes approximately 10 feet. A detailed drawing depicting the existing conditions and contours of the bottom ash basin is included as Figure 26. An initial grading plan for the bottom ash basin expansion is depicted in Figure 27. As shown in these figures, the footprint of the basin will not change, as the outer toe of the dike will remain the same. A map showing the locations of soil borings recently installed around the Bottom Ash Basin is included as Figure 18.

   b. **detailed drawings of slopes, levees, and other pertinent features; and**

   Cross sections detailing the slopes, levees, and other pertinent features of the existing Industrial Solid Waste facilities are shown on Figures 8 through 11. The plan views of the cross sections are shown on the Surface Impoundment Cross Sections Location Map (Figure 7).

   A plan view and cross sections depicting the proposed expansion of the dikes surrounding the bottom ash basin are shown in Figure 12a and Figure 12b. Figure 28a and Figure 28b, present information regarding final slope, elevations, and design of the proposed cap for the Bottom Ash Basin Expansion.

   c. **the type of material and its source for levee construction. Calculations shall be submitted demonstrating that an adequate volume of material is available for the required levee construction.**

   The levee system surrounding the existing Industrial Solid Waste Surface Impoundments were constructed of compacted earthen, clay material sloped to a ratio of 3:1 (horizontal:vertical) to adequately contain the solid waste within the facilities. A grass cover is maintained to minimize wind and water erosion. The levee system rises to an elevation of at least 40 feet National Geodetic Vertical Datum (NGVD) around the Industrial Solid Waste Surface Impoundments protecting the facilities from the 100-year flood elevation of approximately 35 feet NGVD. An adequate freeboard is maintained within each facility.

The proposed expansion of the bottom ash basin will consist of vertically expanding the existing levees surrounding the bottom ash basin to a height of 10 feet above the existing elevation. The levees will be constructed of compacted earthen, clay material sloped to a ratio of 4:1 (horizontal:vertical) to provide stability and adequately contain the solid waste within the facility. A stability analysis was conducted by Louis J Cappozzoli and Associates, Inc. utilizing the existing geotechnical data, and is included in Appendix N. Calculations are included in Appendix O. A grass cover will also be installed and maintained for the proposed levee to minimize wind and water erosion.

3. **The following information on plans and specifications is required for Type I, II, and III landfills:**

   a. **approximate dimensions of daily fill and cover; and**

   b. **the type of cover material and its source for daily, interim, and final cover. Calculations shall be submitted demonstrating that an adequate volume of material is available for daily, interim, and final cover.**

   Not Applicable. Fly ash is a pozzolanic material, that is, its silicon oxide and aluminum oxide components react with its calcium fraction in the presence of water to form slow hardening cement. The result of this reaction produces a hard, structurally stable compound with very low permeability. The bottom ash has similar characteristics of the fly ash and is transported via a sluice to the Bottom Ash Basin or hauled in a hydrated state by truck for disposal.

   Both ash types are essentially inert materials and are used as components of construction cement and other beneficial reuse applications. In addition, the inert, solid waste ash to be stored within the landfill is a non-combustible, granular material that does not have the potential to generate litter or noxious odors.

4. **The following information on plans and specifications for the prevention of groundwater contamination must be submitted for Type I and II facilities:**

   a. **representative cross-sections and geologic cross-sections showing original and final grades, approximate dimensions of daily fill and cover, drainage, the water table, groundwater conditions, the location and type of liner, and other pertinent information;**

   Figure 7 is a plan view of the solid waste facilities which shows the locations of the four cross-sections provided as Figures 8 through 11. These cross-sections show the undisturbed soil surface, the levees and excavations, final fill elevations, the water table, soil boring locations, and the clay layer that provides groundwater protection. The clay layer (indicated by shading) consists of clay, somewhat silty clay, silty clay and clayey silt. A much deeper hydrogeologic cross-section showing the Alluvial Aquifer, the water-bearing sands, and the clay or silt layers to a depth of 2,000 feet is provided as Figure 16. Refer to the response given to LAC 33:VII.521.D.1.c for information of permeability of the clay liner used in the construction of the liner system.

The proposed Bottom Ash Basin Expansion will consist of vertically expanding the existing dikes which surround it. Figure 12a is a plan view which shows the locations of the cross-sections provided in Figure 12b. The cross-sections depict the elevations of original ground surface and current conditions. Final grades are included in Figure 28a and Figure 28b.

b. a description of the liner system, which shall include: calculations of anticipated leachate volumes, rationale for particular designs of such systems, and drawings; and

The two Ash Basins and two LPDES Treatment Ponds have liners of naturally occurring clay from at least 3 to over 10 feet thick. The Rainfall Surge Pond is composed of a 2-foot thick recompacted clay and silty clay layer. Approximately 230 10-foot borings were taken to confirm the existence of sufficient thickness. Clay, silty clay, which by laboratory test met the required coefficient of permeability, were found to be present ranging in thickness from 3 to more than 10 feet over 97% of the site. Approximately 7% of the test boring indicated a clay thickness ranging from 2 to 3 feet. A 1-foot layer of recompacted clay was added to these areas to insure that the liner had the required minimum of 3 feet of recompacted clay to prevent leachate from entering the underlying soil and into the water table located approximately 20 feet bgs. A levee constructed of a compacted fill contains the contents of the impoundments, while a minimum 1.5-foot freeboard prevents overflowing, even during adverse weather conditions.

c. a description of the leachate collection and removal system, which shall include calculations of anticipated leachate volumes, rationale for particular designs of such systems, and drawings.

A leachate collection and treatment system was not deemed necessary for the facilities since they are sited on soils of low permeability and sufficient thickness to prevent groundwater contamination. The soil types are discussed in detail in response to LAC 33:VII.521.D.1.a, and prevention of groundwater contamination is addressed in response to LAC 33:VII.521.F.4.a.

5. The following information on plans and specifications for groundwater monitoring must be provided for Type I and II facilities:

a. a minimum of three piezometers or monitoring wells in the same zone must be provided in order to determine groundwater flow direction;

The groundwater monitoring system will consist of the five existing monitoring wells, 85A through 85E, and five proposed piezometers that will surround the Bottom Ash Basin and adjacent solid waste facilities. The wells and piezometers are for the intended purpose of monitoring the uppermost aquifer and gaining a better understanding of groundwater flow. Potentiometric data collected during 2004 and 2005 does not present a consistent direction of groundwater flow as shown on Figures 20 through 23. It is proposed that five piezometers be installed as shown in Figure 24 and discussed in the Groundwater Sampling and Analysis Plan (Appendix H) and monitored for a period of one year. At that time data will be reviewed and groundwater flow direction determined. Upon review of this data, additional wells will be proposed in order to meet the location requirements of LAC 33:VII.709.E.b.

b. for groundwater monitoring wells, cross-sections illustrating construction of wells, a scaled map indicating well locations and the relevant point of compliance, and pertinent data on each well, presented in tabular form, including drilled depth, the depth to which the well is cased, screen interval, slot size, elevations of the top and bottom of the screen, casing size, type of grout, ground surface elevation, etc.;

Please refer to Big Cajun II's Sampling and Analysis Plan (Appendix H) for groundwater monitoring well specifications. Cross sections illustrating the construction of wells are located in the Soil Boring Logs (Appendix G). A relevant point of compliance has not yet been determined as additional potentiometric data points are needed to establish true upgradient/downgradient wells. As discussed in the Sampling and Analysis Plan (Appendix H), upon LDEQ's approval, five piezometers will be installed at the locations depicted in Figure 24. Potentiometric data will be collected from the piezometers and existing wells for a period of one year. At this point the data will be evaluated to determine upgradient/downgradient wells, and additional wells will be installed as necessary.

c. a groundwater monitoring program including a sampling and analysis plan that includes consistent sampling and analysis procedures that ensure that monitoring results provide reliable indications of groundwater quality;

A groundwater sampling and analysis plan is included in Big Cajun II's Sampling and Analysis Plan (Appendix H).

d. for an existing facility, all data on samples taken from monitoring wells in place at the time of the permit application must be included. (If this data exists in the department records, the administrative authority may allow references

to the data in the permit application.) For an existing facility with no wells, groundwater data shall be submitted within 90 days after the installation of monitoring wells. For a new facility, groundwater data (one sampling event) shall be submitted before waste is accepted;

Groundwater samples from the existing monitoring wells are collected for analysis on a semi-annual basis. Groundwater Monitoring Reports are submitted to the LDEQ subsequent to each sampling event and contain all data generated from the samples.

e. **a plan for detecting, reporting, and verifying changes in groundwater; and**

A groundwater sampling and analysis plan is included in Big Cajun II's Groundwater Sampling and Analysis Plan (Appendix H).

f. **the method for plugging and abandonment of groundwater monitoring systems.**

A groundwater sampling and analysis plan is included in Big Cajun II's Sampling and Analysis Plan (Appendix H).

6. **The facility plans and specifications for Type I and II landfills and surface impoundments (surface impoundments with on-site closure and a potential to produce gases) must provide a gas collection and treatment or removal system.**

The waste contained in the Industrial Solid Waste Facilities does not have the potential to produce methane gas or any other type of gas that might migrate and adversely affect human health or the environment. Therefore, the above citation does not apply.

G. **Facility Administrative Procedures. Standards governing facility administrative procedures are contained in LAC 33:VII.711.C (Type I and II landfills), LAC 33:VII.713.C (Type I and II surface impoundments), LAC 33:VII.715.C (Type I and II landfarms), LAC 33:VII.717.F (Type I-A and II-A facilities), LAC 33:VII.721.B (Type III construction and demolition debris and wood waste landfills), LAC 33:VII.723.B (Type III composting facilities), and LAC 33:VII.725.B (Type III separation facilities).**

1. **The following information on administrative procedures is required for all facilities:**

a. **recordkeeping system; types of records to be kept; and the use of records by management to control operations;**

In accordance with LAC 33:VII.713.Cb.II, the following records will be maintained for the surface impoundments:

- Current Solid Waste Rules and Regulations;
- Permit upon receipt;
- Permit Application;
- Any permit modification;
- Operator Training Programs;
- Daily Log;
- Quality-Assurance/Quality-Control Records;
- Monitoring, testing, and /or analytical data;
- Emergency Procedure
- Annual Reports;
- Correspondence with the Louisiana DEQ-SWD; and
- Any other applicable or required data deemed necessary by the Administrative Authority.

b. an estimate of the minimum personnel, listed by general job classification, required to operate the facility; and

Typically, the following three persons are required to operate Big Cajun II's Industrial Solid Waste Facilities:

- Operator;
- Truck Driver; and
- Instrument Technician.

c. maximum days of operation per week and per facility operating day (maximum hours of operation within a 24-hour period).

The Industrial Solid Waste Facilities operate continuously 24 hours per day. Shutdowns occur only to accommodate needed maintenance.

2. Administrative procedures for Type II facilities shall include the number of facility operators certified by the Louisiana Solid Waste Operator Certification and Training Program (R.S. 37:3151 et seq.).

Big Cajun II acknowledges the above citation; however, the Industrial Solid Waste Facilities are Type I facilities. Therefore, the above citation is not applicable.

H. Facility Operational Plans. Standards governing facility operational plans are contained in LAC 33:VII.711.D (Type I and II landfills), LAC 33:VII.713.D (Type I and II surface impoundments), LAC 33:VII.715.D (Type I and II landfarms), LAC 33:VII.717.G (Type I-A and II-A facilities), LAC 33:VII.721.C (Type III construction

and demolition debris and wood waste landfills), LAC 33:VII.723.C (Type III composting facilities), and LAC 33:VII.725.C (Type III separation facilities).

l. The following information on operational plans is required for all facilities:

a. types of waste (including chemical, physical, and biological characteristics of industrial wastes generated on-site), maximum quantities of wastes per year, and sources of waste to be processed or disposed of at the facility;

The five facilities involved in the storage, treatment, and disposal of solid waste at Big Cajun II are

Fly Ash Basin
Bottom Ash Basin
Rainfall Surge Pond
LPDES Treatment Ponds
(Primary Treatment Pond, Secondary Treatment Pond)

Table 2 is a summary of all wastes disposed in the facilities at Big Cajun II. Included in this table are: types of wastes, facility involved, and quantity of wastes generated. The chemical and physical characteristics of these wastes are provided in the following pages.

A complete discussion of each waste, its source, and the handling procedures is in Big Cajun II's Facility Operational Plan (Appendix D).

CHEMICAL AND PHYSICAL CHARACTERISTICS OF SOLID WASTES

Fly Ash
Chemical Characteristics: Fly ash is composed primarily of oxides of silicon, aluminum, calcium, sulfur, and iron. A typical chemical analysis of coal from the Big Cajun II stockpile showing the chemical composition of the ash is included as Appendix P.

Physical Characteristics: Fly Ash, as it is collected from the stack gas, is a tan colored finely powdered substance. It has consistency similar to talcum powder. Fly ash undergoes a distinct change in chemical and physical characteristics when mixed with water. Fly ash from western coal is a pozzolanic material, that is, its silicon oxide and aluminum oxide components react with its calcium fraction in the presence of water to form slow hardening cement. The result of this reaction produces a hard, structurally stable compound with very low permeability.

The ability to form a hard cement compound when mixed with water makes fly ash a valuable resource that can be used as cement substitute for a variety of purposes. The John Hancock Center, the Sears Tower, and the Standard Oil Building are examples of high rise buildings that were constructed with concrete utilizing fly ash. Big Cajun II sells the fly ash generated at its facility for beneficial reuse as cement additive, for road base, and in soil stabilization applications.

Bottom Ash
Chemical Characteristics: Bottom ash is generated concurrently with fly ash during the combustion of coal. It is formed in the boiler when particles of ash fuse together. These fused particles become too large to remain entrained in the rising flue gas and fall to the bottom of the boiler. Due to their similar origins, bottom ash and fly ash have the same approximate chemical makeup (Appendix N).

Physical Characteristics: Bottom Ash is medium brown in color and has a sandy texture. Particles of bottom ash vary in diameter but approximate the size of coarse sand.

Clarifier Sediment
Chemical Characteristics: Clarifier sediments consist primarily of Mississippi River water and naturally occurring silts and clays. It also contains some lime, sodium aluminate, and trace amounts of an EPA-approved water treatment polymer. The lime, sodium aluminate, and polymer are used in the water treatment area to soften the water and aid in the removal of suspended solids. The following concentrations are typical:

Sodium Aluminate:	10-20 ppm
Polymer:	0.25-2 ppm
Lime:	Amount controlled by pH.

Physical characteristics: Clarifier sediments look like water with a high turbidity. The cloudiness in the water arises from river silt and clay.

CHEMICAL AND PHYSICAL CHARACTERISTICS OF LIQUID WASTES COVERED UNDER LPDES

Cooling Tower Blowdowns
Chemical Characteristics: Cooling tower blowdown consists of water and chlorine when it is necessary to add to control biological growth. When chlorine is used the cooling tower blowdown is subject to the following chlorine limits:

Daily Average:	0.2 mg/l
Daily Maximum:	0.5 mg/l

Physical Characteristics: The water will have a slight turbidity caused by the residual silt and clay that was not removed to 65% of the total wastewater treated at the plant.

Chemical Storage Area Overflow
Chemical Characteristics: Rainwater with no contaminants.

Physical Characteristics: Clear water. This flow amounts to less than 0.2% of all wastewater.

Bottom ash Dewatering Bin:
This facility is not in use.

Bottom Ash Decant
Chemical Characteristics: Water that is very low in suspended solids. The pH typically ranges from 7.7 to 8.0

Physical Characteristics: Very clear water. The runoff accounts for about 2 to 6% of all wastewater and depends on the amount of rainfall.

Demineralizer Waste
Chemical Characteristics: Water with approximately 0.25% each of sulfuric acid and sodium hydroxide, which neutralize each other into water and various salts.

Physical characteristics: Clear water. This amounts to about 15% of all waste water treated.

Boiler Nos. 1 and 2 Blowdown
Chemical Characteristics: Boiler blowdown is highly purified water with extremely low levels of dissolved solids and virtually no suspended solids. Blowdown will have residual amount of treatment chemicals in the following approximate concentrations:

Trisodium and Disodium Phosphate: 2-5 ppm (combined)

Physical Characteristics: Clear water. Each boiler accounts for 3 to 4% of the total wastewater.

Boiler No. 3 Blowdown
Identical to Boiler Nos. 1&2

Miscellaneous Wastes
These waters come from a variety of sources and are transported in the stormwater drainage system to the Rainfall Surge Pond. Since this waste stream is essentially a

catchall in Big Cajun II's LPDES permit, it is impossible to give anything more than general physical characteristics. Since much of this water is used for wash down, it usually has significant amount of suspended solids such as dirt and dust. This source amounts to 7 to 10% of all wastewater.

SPCC Waste
Chemical Characteristics: Water with trace amounts of oil and grease.

Physical Characteristics: Fairly clear water. SPCC wastewater amounts to less than 0.1% of all wastewater.

Sewage Plant Discharge
Chemical Characteristics: Water. The following table lists typical values and the maximum value by Big Cajun II's LPDES permit:

BOD_5:	15-40 mg/l (45 mg/l)
TSS:	20-35 mg/l (45 mg/l)

Physical Characteristics: Water that may have a slight odor or taste. This discharge amounts to less than 1.0% of all waste water.

Coal Pile Runoff
Chemical Characteristics: The characteristics of coal pile runoff vary and depend on the preceding climatic conditions. During periods of no rainfall or light showers the runoff will have a minimal amount of suspended solids. However, after a severe thunderstorm the runoff will contain a significant amount of suspended solids in the form of powdered coal.

Physical Characteristic: The runoff water varies from slightly turbid under low rainfall conditions to very turbid following a severe storm. Turbidity would be dark from coal fines rather than cloudy. Turbidity is reduced to below LPDES limits by the wastewater treatment process. Coal pile runoff accounts for only about 2% of the total flow during dry months and up to 18% during exceptionally rainy months.

b. waste-handling procedures from entry to final disposition, which could include shipment of recovered materials to a user;

Fly Ash
Fly ash is a residue produced by the burning of finely pulverized coal in a high efficiency boiler. Particles of fly ash are fine enough to remain entrained in the flue gas. The ash is removed from the stack gas by electrostatic precipitators and is pneumatically transported to a storage silo. From there it can be sold as a pozzolan and shipped off site or hauled to the Fly Ash Basin for disposal. The storage silo has a capacity of 3,870 tons and is equipped with a closed system for loading the ash into trucks to be transported to market. During peak power-generating periods,

the production of fly ash may exceed the market demand. During such times, the excess fly ash is hauled by closed trucks to the Fly Ash Basin. At a later date, when the demand for ash exceeds production, the fly ash in the basin can be removed and sold. Marketing the fly ash is an attempt to meet the objectives of the Resource Conservative and Recovery Act (RCRA) and to obtain some economic benefit from the extensive pollution control facilities at Big Cajun II.

Units 1 and 2 share that above described fly ash handling system. Unit 3 has a separate but similar system.

Bottom Ash

Bottom ash is another residue of coal combustion which is generated in the boilers of the power plant. The ash is collected in hoppers at the base of the boilers of Units 1 and 2 then transported hydraulically through a pipe directly to the Bottom Ash Basin. An alternate method of transporting bottom ash from Units 1 and 2 can also be used. The ash can be sluiced to the bottom ash dewatering bin located at the ash handling area. The damp ash is then loaded into dump trucks while the decanted water discharged to the Rainfall Surge Pond for treatment.

Unit 3 utilizes a different bottom ash handling arrangement. Bottom ash is collected in hoppers at the base of the boiler. From there the damp ash is hauled by dump truck to the Bottom Ash Basin.

Clarifier and Softener Sediments

Clarifier and softner sediments are produced when water from the Mississippi River is clarified and softened for use as cooling water or boiler water. Three clarifiers remove suspended solids (turbidity) from the river water by settling. Sediment from the three clarifiers flows to a central sump in the pretreatment area while the clarified water is piped to the cooling towers.

The two softeners in the pretreatment area treat the river water with lime (CaOH) to precipitate and remove carbonate hardness. The treated water is piped to the gravity filter beds where residual suspended solids are removed. The softened water is pumped to the demineralizer building for further treatment prior to being used as boiler water. The sediments from the five filter beds are piped to the same central sump utilized by the clarifiers and softeners.

The combined clarifier and softener sediments are pumped directly from the central sump to the Bottom Ash Basin.

Cooling Tower Blowdown

Cooling tower blowdown is cooling water which is periodically removed from the normal cooling cycle. Since cooling tower blowdown is relatively clean, it is piped to the boiler area to be reused as bottom ash transport water.

Cooling Tower Chemical Storage Overflow

The bulk chemical storage area contains two tanks of sulfuric acid. Containment walls surround the tanks to prevent contamination of the surrounding area should a chemical spill or leak occur. In the event of such a release the liquid would be neutralized, removed, and disposed of in accordance with applicable regulations. The drains in this contained storage area are kept closed during normal operation. Although most of the precipitation which falls in this area evaporates naturally, it is occasionally necessary to open the drains to release any rainwater which has accumulated.

Bottom Ash Dewatering Bin

This is part of the alternate bottom ash handling system discussed previously.

Bottom Ash Storage Decant

This is the flow from the ash storage to the Rainfall Surge Pond. It consists of rainfall surface runoff from the ash facilities, bottom ash transport water, and the water from the clarifier and softener sediments. The water flows by gravity in a 30-inch Schedule 40 steel pipe. The flow is controlled by a 30-inch butterfly valve.

Demineralizer Waste

This waste stream is formed during the regeneration of the anion and cation exchange beds in the demineralizer building. These acidic and caustic waste streams generated during the regeneration are piped to a sump where the pH is adjusted prior to being pumped to the rainfall Surge Pond.

Boiler No. 1 and 2 Blowdown

Boiler blowdown is boiler water which is periodically released from the boiler drum in Units 1 and 2. This water is discharged into the drainage system where it flows into the Rainfall Surge Pond.

Miscellaneous Waste

This is water which comes from such sources as the ash surge tank overflow, the economizer hopper washdown, and the strainer washdown areas. These waters flow through the storm drainage system to the Rainfall Surge Pond.

SPCC Waste

All drainage in the fuel oil unloading area and the vehicle maintenance building leads to the Spill Prevention/Control and Countermeasures (SPCC) sump. The liquid in the sump is predominately rainfall runoff and is pumped through a 6-inch steel pipe to the Rainfall Surge Pond.

Sewage Plant Discharge

All sanitary wastes generated at the plant site is collected and processed through a conventional packaged sanitary wastewater treatment facility. This facility includes aeration, sedimentation, aerobic digestion, and a chlorine contact chamber. The treated effluent, which meets all EPA and state health guidelines, is pumped to the Rainfall Surge Pond.

Coal Pile Runoff
Rainfall runoff from the coal storage yards at Big Cajun II is kept isolated from the surrounding area by a ditch and levee system. These ditches carry all of the rainfall runoff from the storage areas directly to the Rainfall Surge Pond. Wastewater and runoff is then pumped into the Primary Treatment Pond by the Lift Station No.1 (see Section C.1.b). The pH of the wastewater can be adjusted during the pumping by the addition of treatment chemicals to the flow.

To raise the pH, a solution of caustic soda can be injected into the pipe carrying the wastewater from the Rainfall Surge Pond to the Primary Treatment Pond. If the pH of the wastewater is too high, the pH can be lowered by injecting sulfuric acid instead of caustic soda.

c. minimum equipment to be furnished at the facility;

Figure 13 is a plan view which shows the equipment used to collect and treat surface runoff from the Ash Basins. Figure 13 is not drawn to scale as it is intended only to illustrate the relative placement of the equipment in the runoff collection and treatment system. For additional information, please refer to the response given for LAC 33:VII.521.C.1.b.

d. plan to segregate wastes, if applicable;

All wastes disposed in the Solid Waste Facilities are compatible and segregation is not required. For more information, please refer to Big Cajun II's Facility Operational Plan (Appendix D).

e. procedures planned in case of breakdowns, inclement weather, and other abnormal conditions (including detailed plans for wet-weather access and operations);

All equipment utilized by Big Cajun II's Industrial Solid Waste Facilities are routinely inspected and maintained to prevent breakdown and ensure the containment of waste. In the event of equipment failure, repairs are either performed immediately on-site or equipment is leased until repairs can be completed. However, any breakdowns which results in the release of solid waste will be reported to the DEQ promptly by telephone. In the event of an emergency situation, normal operations of the Industrial Solid Waste Facilities will be shut down and wastewater discharges stopped during clean-up operations.

Operations at the plant continue as usual during most types of inclement weather. Severe weather conditions such as hurricanes and other violent storms may result in the temporary closure of the Industrial Solid Waste Facilities. Decisions to close the impoundments during inclement weather are made by the facility management personnel.

f. **procedures, equipment, and contingency plans for protecting employees and the general public from accidents, fires, explosions, etc., and provisions for emergency care should an accident occur (including proximity to a hospital, fire and emergency services, and training programs); and**

Emergency plans to deal with fire, including fire exits and established locations for fire extinguishers, are maintained in accordance with the Occupational Safety Health Administration requirements. The Plant also has emergency plans to deal with employee safety and health and medical treatment in case of accidental job-related injury. A copy of the Emergency Action Procedure can be found in Appendix E.

g. **provisions for controlling vectors, dust, litter, and odors.**

The physical nature of the solid waste generated and disposed of in the Industrial Solid Waste Facilities will not become air-born as dust nor trash requiring litter control. The type of waste disposed on the ponds does not attract vectors. Routine inspection of the Industrial Solid Waste Surface Impoundments monitors for potential odors. The solid waste ash to be stored within the solid waste facilities is a non-combustible, granular material that does not have the potential to generate litter or noxious odors.

2. **The following information on operational plans is required for Type I and II facilities:**

a. **a comprehensive operational plan describing the total operation, including (but not limited to) inspection of incoming waste to ensure that only permitted wastes are accepted (Type II landfills must provide a plan for random inspection of incoming waste loads to ensure that hazardous wastes or regulated PCB wastes are not disposed of in the facility.); traffic control; support facilities; equipment operation; personnel involvement; and day-to-day activities. A quality-assurance/quality-control [QA/QC] plan shall be provided for facilities receiving industrial waste; domestic-sewage sludge; incinerator ash; friable asbestos; nonhazardous petroleum-contaminated media; and debris generated from underground storage tanks [UST], corrective action, or other special wastes as determined by the administrative authority. The QA/QC plan shall include (but shall not be limited to) the necessary methodologies; analytical personnel; preacceptance and delivery restrictions; and appropriate responsibilities of the generator, transporter,**

processor, and disposer. The QA/QC plan shall ensure that only permitted, nonhazardous wastes are accepted;

The facility operational plan is included in Appendix D. The solid waste facilities located at Big Cajun II only accept onsite generated material consisting of fly ash and bottom ash.

b. salvaging procedures and control, if applicable; and

The salvage of any material from the plant site is not authorized at Big Cajun II. Fences surround the entire plant site and access is controlled by guards and a vehicle entry/exit log.

c. scavenging control.

Big Cajun II acknowledges the above citation: however scavenging of material contained within the Industrial Solid Waste Facilities is not allowed. Therefore, the above citation is not applicable.

3. The following information on operational plans is required for Type I and II landfarms:

a. items to be submitted regardless of land use:
i. a detailed analysis of waste, including (but not limited to) pH, phosphorus, nitrogen, potassium, sodium, calcium, magnesium, sodium-adsorption ratio, and total metals (as listed in LAC 33:VII.715.D.3.b);
ii. soil classification, cation-exchange capacity, organic matter, content in soil, soil pH, nitrogen, phosphorus, metals (as listed in LAC 33:VII.715.D.3.b), salts, sodium, calcium, magnesium, sodium-adsorption ratio, and PCB concentrations of the treatment zone;
iii. annual application rate (dry tons per acre) and weekly hydraulic loading (inches per acre); and
iv. an evaluation of the potential for nitrogen to enter the groundwater;

b. items to be submitted in order for landfarms to be used for food-chain cropland:
i. a description of the pathogen-reduction method for septage, domestic sewage sludges, and other sludges subject to pathogen production;
ii. crops to be grown and the dates for planting;
iii. PCB concentrations in waste;
iv. annual application rates of cadmium and PCBs; and
v. cumulative applications of cadmium and PCBs;
c. items to be submitted for landfarms to be used for nonfood-chain purposes:
i. description of the pathogen-reduction method in septage, domestic sewage sludges, and other sludges subject to pathogen production; and
ii. description of control of public and livestock access.

Big Cajun II acknowledges the above citation; however, the Industrial Solid Waste Facilities are not classified as Type I or Type II landfarms. Therefore, the above citation is not applicable.

4. **The following information on operational plans is required for Type I-A and II-A incinerator waste-handling facilities and refuse-derived energy facilities:**

   a. **a description of the method used to handle process waters and other water discharges which are subject to LPDES permit and state water discharge permit requirements and regulations; and**

   b. **a plan for the disposal and periodic testing of ash (all ash and residue must be disposed of in a permitted facility).**

   Big Cajun II acknowledges the above citation; however, the Industrial Solid Waste Facilities are Type I facilities. Therefore, the above citation is not applicable.

5. **The following information on operational plans is required for Type I-A and II-A refuse-derived fuel facilities and Type III separation and composting facilities:**

   a. **a description of the testing to be performed on the fuel or compost; and**
   b. **a description of the uses for and the types of fuel/compost to be produced.**

   Big Cajun II acknowledges the above citation; however, the Industrial Solid Waste Facilities are Type I facilities. Therefore, the above citation is not applicable.

6. **The operational plans for Type I-A and II-A refuse-derived fuel facilities and Type III separation and composting facilities must include a description of marketing procedures and control.**

   Big Cajun II acknowledges the above citation; however, the Industrial Solid Waste Facilities are Type I facilities. Therefore, the above citation is not applicable.

7. **The operational plans for Type I and II facilities receiving waste with a potential to produce gases must include a comprehensive air monitoring plan.**

   Not applicable. The facility will not receive wastes with potential to produce gases.

I. Implementation Plan. Standards governing implementation plans are contained in LAC 33:VII.709.D (Type I and II facilities), LAC 33:VII.717.H (Type I-A and II-A facilities), and LAC 33:VII.719.E (Type III facilities).

1. The implementation plans for all facilities must include the following:

a. a construction schedule for existing facilities which shall include beginning and ending time-frames and time-frames for the installation of all major features such as monitoring wells and liners. (Time-frames must be specified in days, with day one being the date of standard permit issuance); and

An Implementation plan for the installation of the proposed piezometers/monitoring wells is included in Appendix I.

b. details on phased implementation if any proposed facility is to be constructed in phases.

The expansion of the bottom ash basin will not be conducted in phases; therefore, this section is not applicable.

2. The implementation plans for Type I and II facilities must include a plan for closing and upgrading existing operating areas if the application is for expansion of a facility or construction of a replacement facility.

The vertical expansion of the bottom ash basin will consist of building up the existing levees; therefore, the construction of the expansion is not expected to impact the day to day operations of the bottom ash basin. Bottom ash from the units will continue to either be sluiced or trucked to the basin during the construction activities.

J. Facility Closure. Standards governing facility closure are contained in LAC 33:VII.711.E (Type I and II landfills), LAC 33:VII.713.E (Type I and II surface impoundments), LAC 33:VII.715.E (Type I and II landfarms), LAC 33:VII.717.I (Type I-A and II-A facilities), LAC 33:VII.721.D (construction and demolition debris and woodwaste landfills), LAC 33:VII.723.D (Type III composting facilities), and LAC 33:VII.725.D (Type III separation facilities).

1. The closure plan for all facilities must include the following:

a. the date of final closure;

As the use of the treatment ponds and Rainfall Surge pond are tied to the LPDES treatment train and are not limited in time of itself, it is expected that they will be used in excess of 20 years. Due to the beneficial reuse properties of the fly ash generated at the BCII facility, it is estimated that the Fly Ash Basin will operate until the year 2020, at a minimum.

The projected closure date for the Bottom Ash Basin, incorporating the proposed expansion, is estimated to be between 2011 and 2012.

b. the method to be used and steps necessary for closing the facility; and

Big Cajun II intends to close the Industrial Solid Waste Units on-site. The facilities will be closed in a manner that minimizes the need for further maintenance and minimizes the post-closure release of leachate to groundwater or surface waters to the extent necessary to protect human health and the environment. Quality-control procedures will be developed and implemented to ensure that final cover is designed, constructed, and installed properly.

At least 90 days to the initiation of closure procedures, Big Cajun II will notify DEQ-SWD in writing of the intent to close its Industrial Solid Waste Surface Impoundments. This notification will be a part of the closure plan which will include the date of planned closure; a drawing showing final contours of the area after closure, changes, if any requested in the approved closure plan; the closure cost schedule and estimate.cost; an estimate of the largest area ever requiring a final cover; and an estimate of the maximum inventory of solid waste ever on-site.

At the time of closure it is anticipated that the Fly Ash Basin will have ash depth of 10 feet. Based on the proposed expansion, at the time of closure the bottom ash basin will have an ash depth of approximately 23 feet. All facilities at the site will be drained and, if necessary, dewatered prior to final closure in accordance with the following plan.

Fly Ash Basin
Fly ash is transported in dry powdered form. Rainfall which falls on the deposited fly ash alters its physical nature and creates a crust of low permeability. Rainfall runoff is removed by the runoff collection system. Since the ash is transported dry and rainfall runoff will be removed throughout the lifetime of the facility, dewatering will not be necessary.

Bottom Ash Basin
Bottom ash is transported hydraulically, but due to its gravelly texture it does retain a significant amount of water. Clarifier and softener sediments are also hydraulically transported. The river clay and silt quickly settle out of the water into the basin. Since runoff water will be removed throughout the life of the facility, dewatering will not be necessary.

Rainfall Surge Pond
This pond will be pumped down as far as possible and water will be treated in the LPDES Treatment Ponds. Sediment in the bottom will be treated in accordance with the regulations in effect at the time of closure and will be stabilized to the point that they can be backfilled with heavy earth moving equipment.

LPDES Treatment
This facility will be the last to be closed in order to treat all wastewaters at the site. Wastewater will be pumped from the primary to secondary pond and then to the LPDES discharge point. Treatment of the sediments will depend on the regulations at the time of closure. It is anticipated that they will be stabilized so the facility can be backfilled with heavy machinery.

All impoundments containing waste will be covered with a layer of soil with an approximate permeability of 1 X 10^{-7} cm/sec. The soil cap will be a minimum of 24 inches thick and will be graded to facilitate runoff. For effective drainage, the side slopes will be at minimum a 4% slope. A Construction Quality Assurance Plan for the clay cover is included in Appendix R. Following inspection and approval of the earthwork by the DEQ, the facilities will be seeded and fertilized with a minimum 6-inch soil thickness to prevent erosion of the soil cap and return the area to a more natural appearance. The final cover installation will be initiated no later than 30 days after and will be completed no later than 90 days after final grades are reached in each unit of the facility or the date of known final receipt of solid waste in the unit, which ever comes first, unless the deadlines are extended by the Administrative Authority, as stated in LAC 33:VII.711.E.2.a. The type of solid waste contained within the facilities does not attract pathogen-transmitting organisms. Therefore, a rodent inspection prior to backfilling is not necessary.

c. **the estimated cost of closure of the facility, based on the cost of hiring a third party to close the facility at the point in the facility's operating life when the extent and manner of its operation would make closure the most expensive.**

The total cost of closure and post-closure care for the existing Fly Ash Basin, Bottom Ash Basin, Rainfall Surge Pond, and Treatment Ponds was estimated to be $3,900,000 as stated in Big Cajun II's 1986 permit application accepted and approved by the DEQ. This cost was adjusted to present day cost estimate by using inflation factors derived from the Implicit Price Deflator for the Gross Domestic Product as required in LAC 33:VII.727.A.b.2.iii. The present cost estimate for closure and post-closure care is calculated to be $6,269,599. The inflation factors derived from the Implicit Price Deflator for the Gross Domestic Product from 1986 to the present are listed below:

Year	Inflation
1987	1.032
1988	1.031
1989	1.041
1990	1.041
1991	1.040
1992	1.028

1993	1.023
1994	1.021
1995	1.020
1996	1.019
1997	1.015
1998	1.011
1999	1.015
2000	1.023
2001	1.032
2002	1.010
2003	1.020
2004	1.029
2005	1.031

The individual cost for closure of the Fly Ash and Bottom Ash Basin were itemized in 1998 by Burns and McDonnell, as shown below. The cost estimates were adjusted per the Implicit Price Deflator for the Gross Domestic Product, and was calculated to be $3,395,207 and $1,295,879, respectively.

Fly Ash Basin Closure Cost

Description	Quantity/Unit	Cost per Unit	Cost
Ash Grading	178000 cubic yards	2.00	356,000
Clay Cover	518,000 cubic yards	3.50	1,813,000.00
Topsoil	129,500 cubic yards	3.00	388,500.00
Culverts	600 linear feet	30.00	18,000.00
Trenching	300 cubic yards	10.00	3,000.00
Riprap	2,050 cubic yards	40.00	82,000.00
Seeding	160 acres	1,490.67	238,507.20
		Total:	**2,899,007.20**
		Total Costs Adjusted for 2005:	**$3,395,207**

Bottom Ash Basin Closure Cost

Description	Quantity/Unit	Cost per Unit	Cost
Ash Grading	67,000 cubic yards	2.00	134,000.00
Clay Cover	192,500 cubic yards	3.50	673,750.00
Topsoil	48,100 cubic yards	3.00	144,300.00
Culverts	200 linear feet	30.00	6,000.00
Trenching	100 cubic yards	10.00	1,000.00

Riprap	1,450 cubic yards	40.00	58,000.00
Seeding	60 acres	1,490.67	89,440.20
		Total:	**1,106,490.20**
		Total Costs Adjusted for 2005:	**$1,295,879**

A revised closure estimate for the bottom ash basin was calculated based on the proposed expansion and closure cap design depicted in Figure 28. The estimated cost of closing the expanded bottom ash basin was found to be $2,221,800, as shown below. Therefore, incorporating the revised cost of closing the expanded bottom ash basin, the total cost estimate for closure and post closure care would be $7,195,520.

Bottom Ash Pond
Vertical Expansion
ROM Closure Cost Estimate

Description of Activity	Number of Units	Unit	Cost per Unit	Cost
Installation of Cap System				
Mobilization				
Set Trailers/Site Facilities	1	LS	$ 20,000	$ 20,000
Mobilization of Crew	1	LS	$ 5,000	$ 5,000
Mobilization of Equipment	1	LS	$ 10,000	$ 10,000
Site Set Up - Const Erosion Control	1	LS	$ 5,000	$ 5,000
Site Set Up - Temp Roads	1,000	LF	$ 12.00	$ 12,000
Preparation of the landfill to receive cover (final grading)				
Assume add 4" soil over 5% of the area, regrade remainder				
Regrade Area	54	ACRE	$ 2,500.00	$ 135,000
Installation of Clay Cap				
Assume 2' thick clay cap only, no geosynthetic liner				
On-Site Borrow Clay Soil	173,200	CY	$ 6.00	$ 1,039,200
Vegetative soil layer with soil coming from off-site and seeding and mulching				
Assume 6" soil over entire capped area				
Import/Place Topsoil	43,300	CY	$ 9.00	$ 389,700
Hydromulch	54	ACRE	$ 850	45,900
Construction oversight and surveying cost				
Site Facilities & Oversight	160	Days	$ 3,500	$ 560,000
			Total	**$ 2,221,800**

2. **The closure plan for Type I and II landfills and surface impoundments must include:**

   a. **a description of the final cover and the methods and procedures used to install the cover.**

      Please refer to the response given for LAC 33:VII.521.J.1.b.

   b. **an estimate of the largest area of the facility ever requiring a final cover at any time during the active life;**

      The largest area of the facilities ever requiring a final cover at any time during their active life is estimated to be approximately 310 acres.

   c. **an estimate of the maximum inventory of solid waste ever on-site over the active life of the facility; and**

      An estimate of the maximum inventory of solid waste ever on site over the active life of the existing facilities was calculated to be approximately 6,040,000 cubic yards.

      The total storage of the bottom ash basin based on the proposed expansion was calculated to be 2,063,309 cubic yards. Incorporating the additional capacity of the proposed expansion, an estimate of the maximum inventory of solid waste ever on-site over the active life of the facilities was calculated to be approximately 6,578,300 cubic yards.

   d. **a schedule for completing all activities necessary for closure.**

      Please refer to the response given for LAC 33:VII.521.J.1.b.

3. **The closure plan for all Type I and II facilities and Type III woodwaste and construction/demolition debris facilities shall include the following:**

   a. **the sequence of final closure of each unit of the facility, as applicable;**

      Please refer to the response given for LAC 33:VII.521.J.1b.

   b. **a drawing showing final contours of the facility; and**

      Please refer to the response given for LAC 33:VII.521.J.1b. Final contours based on the proposed vertical expansion of the bottom ash basin are show in Figure 28a and Figure 28b.

c. a copy of the document that will be filed upon closure of the facility with the official parish record keeper indicating the location and use of the property for solid waste disposal, unless the closure plan specifies a clean closure.

Appendix J contains a copy of the Closure Document that will be filed with the official parish record keeper indicating the location and use of the property for solid waste disposal. The document will identify the name and address of the person with knowledge of the contents of the facility. A true copy of the document that is filed and certified by the parish clerk of court will be sent to the Administrative Authority.

K. Facility Post-Closure. Standards governing post-closure requirements are contained in LAC 33:VII.711.F (Type I and II landfills), LAC 33:VII.713.F (Type I and II surface impoundments), LAC 33:VII.715.F (Type I and II landfarms), and LAC 33:VII.721.E (Type III construction and demolition debris and woodwaste landfills).

1. The post-closure plan for all facilities must include the following:

a. specification of the long-term use of the facility after closure, as anticipated; and

Since Big Cajun II intends to close the Fly Ash Basin and Bottom Ash Basin on-site, the facilities must remain in post-closure care for 30 years after closure of the area, as required by LAC 33:VII.711.F.2.a. Therefore, Big Cajun II anticipates conducting post-closure care as described in LAC 33:VII.521.K.2.a

b. the cost of conducting post-closure of the facility, based on the estimated cost of hiring a third party to conduct post-closure activities in accordance with the closure plan.

The estimated cost of hiring a third party to conduct post-closure activities in accordance with the closure plan discussed above were estimated to be approximately $15,000 annually. This amount was adjusted over a 30 year period assuming an escalation rate of 2%. Based upon this calculation, the total cost of post closure activities were estimated to be approximately $608,521. This amount assumes biannual sampling of 15 wells for the parameters proposed in this application.

2. **The post-closure plan for Type I and II facilities must include the following:**

   a. **the method for conducting post-closure activities, including a description of the monitoring and maintenance activities and the frequency at which they will be performed;**

   The facilities' sites will be maintained until a good vegetative cover develops, after which they will be suitable for any intended purpose.

   Post-closure care activities for the Industrial Solid Waste Surface Impoundments will consist of maintaining and monitoring the groundwater monitoring system. Maintaining the integrity and effectiveness of the final cover will be performed to prevent run-on and runoff from eroding or otherwise damaging the final cover. Once every 3 months, the area will be mowed to control excessive vegetative growth. Repairs will be made as necessary to correct the effects of settling, subsidence, erosion, or other events. Big Cajun II estimates that these repairs will result in annual reseeding of approximately 10% of the area. Big Cajun II also estimates that precipitating the need to replace that amount of topsoil. Annual reports on the integrity of the final cover will be provided to the DEQ-SWD.

   The groundwater sampling and analysis program described in the Sampling and Analysis Plan (Appendix H) will continue for 30 years after closure to ensure that the site is properly sealed as required. Groundwater samples will be taken semiannually and tested for pH, specific conductance, temperature, TDS, selenium, magnesium, sulfate, chloride, calcium, and iron.

   b. **the method for abandonment of monitoring systems, leachate collection systems, gas-collection systems, etc.;**

   Big Cajun II will abandon the groundwater monitoring wells after receiving approval from the DEQ at the conclusion of the post-closure monitoring period. Abandonment will be as described in the Groundwater Monitoring Plan (Appendix H). If the land following closure is subject to farming, the abandonment plan will be changed to comply with applicable regulations. No leachate collection system or gas-collection systems are present at Big Cajun II.

   c. **measures planned to ensure public safety, including access control and gas control; and**

   The closure methodology of Big Cajun II's Industrial Solid Waste Facilities precludes the necessity for additional measures to ensure public safety. Perimeter barrier and control measures described in response to LAC 33:VII.521.B.1.b will be maintained. All waste will be inaccessible due to the cover, which will be maintained to prevent run-on and runoff from eroding or otherwise damaging it, as described in response to LAC 33:VII.521.K.2.a. Also monitoring of the groundwater will be maintained to detect detrimental impact to the environment at the earliest opportunity. Gas control is not a concern since the waste disposed in the facilities does not have the potential to produce gases.

d. **a description of the planned uses of the facility during the post-closure period.**

Based on current land use it is anticipated that the land will be used as pasture.

L. **Financial Responsibility. Standards governing financial responsibility are contained in LAC 33:VII.727. A section documenting financial responsibility according to LAC 33:VII.727 which contains the following information must be included for all facilities:**

1. **the name and address of the person who currently owns the land and the name and address of the person who will own the land if the standard permit is granted (if different from the permit holder, provide a copy of the lease or document which evidences the permit holder's authority to occupy the property); or**

Big Cajun II is owned and operated by Louisiana Generating, LLC, a wholly owned subsidiary of NRG Energy, Inc., which is a publicly traded company. The mailing address for Louisiana Generating is as follows:

Louisiana Generating, LLC
112 Telly Street
New Roads, LA 70760

2. **the name of the agency or other public body that is requesting the standard permit; or, if the agency is a public corporation, its published annual report; or, if otherwise, the names of the principal owners, stockholders, general partners, or officers;**

Big Cajun II is owned and operated by Louisiana Generating, LLC, a wholly owned subsidiary of NRG Energy, Inc., which is a publicly traded company. A copy of the most current published annual report for NRG Energy, Inc., is included in Appendix K.

3. **evidence of liability coverage, including:**

a. **personal injury, employees, and the public (coverage, carriers, and any exclusions or limitations);**

Appendix L contains a Certificate of Insurance which lists the types, amounts, and limitations of insurance coverage.

b. property damage (coverage and carrier);

Please refer to the response given for LAC 33: VII.521.L.3.a.

c. environmental risks; and

Please refer to the response given for LAC 33: VII.521.L.3.a.

4. evidence of a financial assurance mechanism for closure and/or post-closure care and corrective action for known releases when needed.

Big Cajun II utilizes a trust fund as its financial assurance mechanism for closure and/or post closure care (Appendix L). Also provided in Appendix L is a copy of the *Amendment to and Assignment of Trust Agreement* transferring the Solid Waste Trust Fund from Cajun Electric Power Cooperative, Inc., to Louisiana Generating, LLC. In addition, Big Cajun II maintains liability coverage as discussed in response given for LAC 33: VII.521.L.3.a.

M. Special Requirements. The administrative authority may require additional information for special processes or systems and for supplementary environmental analysis.

Big Cajun II acknowledges that the Administrative Authority may require process information for special process or systems and for supplementary environmental analysis.

Section 5.0

5.0 LAC 33:VII.523. Part III: Additional Supplementary Information

The following supplementary information is required for all solid waste processing and disposal facilities. All responses and exhibits must be identified in the following sequence to facilitate the evaluation:

A. a discussion demonstrating that the potential and real adverse environmental effects of the facility have been avoided to the maximum extent possible;

As discussed below, the potential and real adverse environmental effects of the facility and proposed vertical expansion have been avoided to the maximum extent possible. The existing facilities are located in a rural area primarily surrounded by other industrial property, or agricultural/forested properties. The proposed vertical expansion of the Bottom Ash Basin will be confined to the existing footprint and will not impact additional land. In addition, mitigating measures, such as clay liners, levee systems and groundwater monitoring programs, have been implemented at the facility to prevent potential impacts to soil, groundwater, and surface water.

The Big Cajun II Power Plant (Big Cajun II), located northeast of New Roads, Louisiana, includes five Industrial Solid Waste Facilities: Fly Ash Basin, Bottom Ash Basin, Rainfall Surge Pond, Primary Treatment Pond, and Secondary Treatment Pond. The Facility Operational Plan has been prepared according to LAC 33: VII.521.H and LAC 33: VII.713.D. The facility is currently owned and operated by Louisiana Generating, LLC (LaGen) and has been in operation for over 25 years without adverse environmental effects.

Big Cajun II operates on 1,740 acres. The solid waste facilities occupy approximately 295 acres of Big Cajun II's property and are located to the northwest of the three Boiler Units. The Fly Ash and Bottom Ash Basins are designed to store/dispose these two solid waste ash types. The stormwater and process wastewater that accumulates within the two Ash Basins is routed to the Treatment Ponds prior to discharge to the Mississippi River via LPDES Outfall 001.

Prior to construction of the Big Cajun II facility, many steps were taken to avoid potential and real adverse impacts to the environment. In March 1975, a full scale Environmental Impact Report (EIR), incorporated herein by reference, was prepared in accordance with the National Environmental Policy Act of 1969. Also, in June 1978 a second EIR, incorporated herein by reference, was prepared to investigate the alternatives and impacts of building a third power-generating unit at the Big Cajun II site. These reports thoroughly investigated the potential and real environmental impacts of the existing plant and its ancillary facilities. As stated in the 1975 and 1978 EIR's, the plant will incorporate all environmental and ecological safeguards required by the regulatory agencies in its design and construction, and is anticipated that it will be, in every way, a credit to the area that it serves. All available pollution control technologies and mitigative methods were evaluated in an effort to find the best methods of avoiding adverse effects. Alternate ways of providing electric power to their customers were also examined as a means of avoiding adverse environmental impacts. Drafts of the reports were sent to local, State, and Federal regulatory agencies for comments and approval. Any recommendations or requirements for additional environmental controls made by any of these agencies were incorporated into the plans. Any environmental concerns were properly addressed to the respective agency's satisfaction before construction commenced.

Big Cajun II plans to continue operating its surface impoundments as previously permitted with the exception of the proposed vertical expansion of the Bottom Ash Basin, which will increase the height of the existing basin levees from 18 feet to 28 feet. The existing Industrial Solid Waste Surface Impoundments utilized by Big Cajun II have proven to be a cost-effective method for the disposal of the wastes handled. The facilities are a key element in Big Cajun II's long-range plan of waste management as they play an essential role in their solid waste disposal operation. Vertical expansion of the Bottom Ash Basin will allow Big Cajun II to gain needed additional capacity for the disposal of the bottom ash generated onsite, while still minimizing adverse environmental impacts to the maximum extent possible.

The vertical expansion of the Bottom Ash Basin will consist of raising the height of the existing dikes by 10 feet with a slope configuration of 4:1 (horizontal:vertical). This proposed project will not affect the footprint of the basin, as the outer toe of the levee will not be affected; therefore, no additional land will be impacted by this expansion. Geotechnical investigations and a stability analysis were conducted to ensure that the infrastructure of the levees and underlying soils would not be compromised and would support the expansion as designed, and in fact, it does.

The vertical expansion of the Bottom Ash Basin is being proposed to gain additional disposal capacity for the bottom ash and clarifier sediment generated onsite at the Big Cajun II facility. This is the same material which has been historically disposed of in the Bottom Ash Basin. Bottom ash is formed in the boiler when particles of ash fuse together such that they are too large to remain in the flue gas and fall to the bottom of the boiler. Bottom ash is a granular material that is medium brown in color, with similar chemical consistency as fly ash.

Big Cajun II will continue to only dispose of previously permitted, onsite generated ash wastes in its surface impoundments. The Fly Ash Basin accepts fly ash; however, the majority of this is sold for beneficial reuse as a cement additive. The treatment ponds and rainfall surge pond receive wastewater from the Big Cajun II facility as permitted in their LPDES permit. These include cooling tower water blow down, cooling tower chemical storage runoff, boiler blow down, demineralizer wastewater, sanitary wastewater, SPCC runoff, and coal pile runoff.

Potential pathways of releases include groundwater, surface water, and soil. However, the potential of such releases is negligible, as the existing surface impoundments were designed to prevent the occurrence of such releases. The surface soils underlying the impoundments consist of a naturally occurring clay layer that is a minimum of 3 feet thick to over 10 feet thick in some areas. This clay layer acts as a liner which prevents releases into the underlying soil or groundwater. In addition, the solid waste facilities are surrounded by groundwater monitoring wells which are sampled and analyzed on a semi annual basis to ensure that groundwater has not been affected by the facilities. No significant change in groundwater quality has been detected during the length of the groundwater monitoring program.

Impacts to surface water and the surrounding area are prevented by the levee system which surrounds the surface impoundments. The levees are constructed of compacted clay and contain the contents of the impoundments, while a minimum 1.5-foot freeboard prevents overflowing, even during adverse weather conditions. The proposed vertical expansion of the levees surrounding the bottom ash basin has been designed to maintain adequate freeboard at all times to also prevent overflowing. Compacted clay material will also be used to build up the levees for the proposed vertical expansion.

As discussed, the existing solid waste facilities located at the Big Cajun II plant have been designed to minimize the potential and real adverse environmental effects to the maximum extent possible. Adverse environmental effects due to the expansion of the Bottom Ash Basin will be negligible, as the expansion will not impact additional land and has been designed to operate in an environmentally safe manner.

B. a cost-benefit analysis demonstrating that the social and economic benefits of the facility outweigh the environmental-impact costs;

Big Cajun II's Industrial Solid Waste Units consist of existing facilities which have proven to be a cost-effective method for the disposal of the fly and bottom ash wastes generated at the Big Cajun II plant. By utilizing onsite disposal units, costs associated with off site disposal, such as transportation and third-party disposal costs, are avoided. In addition, a large portion of the fly ash is sold for beneficial reuse for cement and soil stabilization applications.

The solid waste facilities are a key element in Big Cajun II's long-range plan of waste management as they play a major role in their solid waste disposal operation. LaGen supplies 100% of the power needs for 11 of Louisiana's electric cooperatives. Peak demand by the Louisiana electric cooperatives has increased by 23.8 percent from 1995 to 2000, and an additional 11.0 percent from 2000 to 2004. Due to increased energy production, additional disposal capacity is needed for bottom ash generated onsite. The proposed expansion will raise the available capacity of the existing Bottom Ash Basin by approximately 146,800 cubic yards. As the expansion of the Bottom Ash Basin will be conducted by raising the existing levees rather than horizontally expanding the basin, environmental impacts will be negligible. Big Cajun II will not have to prepare a new site or change operations to accommodate a new location for bottom ash disposal.

The proposed expansion will allow Big Cajun II to continue to operate its existing power plant to meet the needs of its customers. No negative economic impacts are anticipated from the proposed expansion of the bottom ash basin. The project will not have an affect on property values as the site is currently developed as a solid waste facility contained within a major existing industrial facility surrounded by agricultural land and forests. The Big Cajun II plant has operated and is located within a sparsely populated area.

Costs for public services are not expected to rise as a result of the proposed expansion, as it will not generate a need for additional police, fire, or medical facilities. Public roadways are not expected to be affected, as the bottom ash basin will still continue to only accept waste generated onsite at the Big Cajun II plant.

At the time that the surface impoundments are no longer viable, LaGen will properly close the impoundments in accordance with regulatory requirements. A closure plan has been developed for the solid waste facilities and is included in the solid waste permit application. LaGen owns the solid waste facilities located on the Big Cajun II site and has financial assurance on file at the LDEQ for closure and post closure care of the solid waste facilities.

Big Cajun II operations provide many social and economic benefits for the local community as well as for the state as a whole. LaGen is the largest private employer in Pointe Coupee Parish and has proven its value to the local economy, year after year. Big Cajun II has been in operation for over 25 years at the current site location and currently employs over 215 employees. In addition, the facility provides a reliable source of electricity for 11 of Louisiana's electric cooperatives, which serve individual customers statewide. The operation of Big Cajun II also provides economic benefit in the form of taxes which are paid by LaGen to the state and local government. Additional economic information regarding the Big Cajun II plant can be found in the response to the "IT Questions (revised February 2005)" included in the 2001 Title V Air application, incorporated herein by reference.

The social and economic benefits associated with the continued operation of the Big Cajun II plant far outweigh the environmental impacts resulting from the operation of the existing solid waste facilities and the expansion of the bottom ash basin. As discussed in Question 1, the existing facilities and the proposed expansion have been designed to prevent any adverse effects to the surrounding environment, while still allowing for a cost effective method of disposing of solid waste generated as a result of energy production at the Big Cajun II power plant.

C. a discussion and description of possible alternative projects which would offer more protection to the environment without unduly curtailing non-environmental benefits;

The vertical expansion of the existing Bottom Ash Basin was selected as an effective and environmentally protective method of gaining additional disposal capacity for the bottom ash generated at Big Cajun II. Alternative projects, such as offsite disposal or construction of a new solid waste facility, were not found to offer more protection to the environment than the proposed project.

As discussed, the existing solid waste impoundments have been proven to be an effective method of ash disposal with minimal environmental effects. In order to prevent adverse environmental effects, clay levees and drainage systems were constructed surrounding the existing solid waste facilities to control stormwater runoff and runon. A clay liner exists beneath the solid waste facilities to protect groundwater and underlying soil. By vertically expanding the Bottom Ash Basin, these existing structures can be utilized, rather than taking additional land out of use and constructing new facilities. Onsite disposal of the bottom ash prevents adverse environmental affects associated with transport of the bottom ash for offsite disposal, such as increased traffic and potential for accidental releases during transport.

The two Environmental Impact Reports that were prepared for Big Cajun II, prior to its construction, investigated several alternative methods of providing electric power to Big Cajun II's customers. Alternatives included doing without additional power (not viable), purchasing excess power from other utilities, sharing generating units, and using other fuels. The use of certain other fuels could have eliminated the need for additional ash disposal facilities but each of the alternate fuels had disadvantages or restrictions that ruled out their use. The EIR concluded, and time has proven, that a coal-fired power generating station had to be built to provide a reliable, reasonably priced supply of electric power.

Big Cajun II has and will continue to investigate alternative projects that could further reduce any potential impacts of the existing solid waste facilities on the environment. For example, in keeping with the objectives of RCRA, Big Cajun II has strived to develop markets for the use of fly ash and bottom ash. Big Cajun II's efforts with fly ash have been very successful. A majority of the fly ash generated at Big Cajun II is sold for beneficial reuse, as a pozzolan for a variety of uses, primarily as a substitute for Portland cement. The market for fly ash is so strong that the Fly Ash Basin, which was designed to hold all of the ash generated for 7 years, is now expected to handle all un-marketed ash for the entire 35-year life of the plant. Although a market for bottom ash has not been fully developed at this time, LaGen will continue to investigate this and other alternative beneficial use projects. Utilizing these materials conserves natural resources, preserves land that would otherwise be used for waste disposal and protects the environment from potential adverse impacts.

D. a discussion of possible alternative sites that would offer more protection to the environment without unduly curtailing non-environmental benefits; and

LaGen proposes to vertically expand its existing Bottom Ash Basin in order to gain additional capacity to dispose of the bottom ash produced by its power units. This site was selected as it appears to offer the most protection to the environment due to its location within the boundaries of the Big Cajun II power plant within an area currently utilized for solid waste disposal and the availability of existing infrastructure.

As previously stated, two environmental impact reports were prepared in conjunction with the construction of the Big Cajun II power plant and existing facilities. As part of the EIR, an extensive site-selection study was conducted to determine the best location for Big Cajun II. A number of potential sites were investigated; however, the Big Cajun II site was best suited on the basis of location, accessibility, and the limited potential for environmental impacts. This is further discussed in the "Response to IT Questions (revised February 2005)" included in the September 2001 Title V Permit application. There are several reasons why the selected site had the least potential for environmental impacts. These reasons include the fact that the site is located in an isolated point of land in a bend of the Mississippi River, which is far removed from any large population areas and large volume groundwater users. Also, the soils in this area were found to be well suited for use as liners in disposal areas. In addition, offsite disposal of the solid waste was evaluated and found not to be a viable option for a number of reasons. Any solid waste disposal site not co-located with the power plant would create additional risk of adverse environmental impact. Transporting the waste material to a disposal site poses risks associated with loading and unloading, fugitive emissions from trucks, potential breakdowns, and accidents and spills onto public highways or private land. Transporting ash even a short distance for disposal would also greatly increase the disposal costs to Big Cajun II and could cause power rates to rise. For these reasons, only locations within the Big Cajun II facility were considered.

Vertical expansion of the existing bottom ash pond, as compared to alternative sites, provides a number of benefits. It has been verified that a low permeability, natural clay liner, a minimum of 3 feet thick, is currently in place beneath the Bottom Ash Basin, which prevents adverse impacts to underlying soil and groundwater. Also, as the expansion will be confined to the current footprint of the Bottom Ash Basin, there will be no need to reroute the current drainage system or prepare new land for a new Bottom Ash Basin. Therefore, it has been concluded that no alternative sites would offer more protection to the environment without unduly curtailing non-environmental benefits.

E. a discussion and description of the mitigating measures which would offer more protection to the environment than the facility, as proposed, without unduly curtailing non-environmental benefits.

Big Cajun II believes that there are no other mitigating measures that would significantly further reduce the potential adverse environmental impacts. The existing solid waste facilities are well designed and constructed. The proper design, along with the suitability of the site and the nature of the wastes, ensures that the environment will be protected. The proposed Bottom Ash Basin expansion will be constructed within the footprint of the existing Bottom Ash Basin and will be designed in the same manner as the existing basin. The following is a very brief summary of the factors that work to prevent or mitigate adverse impacts on the environment. A complete discussion of each of these factors can be found in the Solid Waste Application for Big Cajun II.

Site: Big Cajun II is located on an isolated point of land in a bend of the Mississippi River. The river frontage comprises almost one-third of the plant's property length and effectively segregates the plant site from its neighbors on one of the three sides. The property to the northwest and to the south is either undeveloped woodlands or pasture. The nearest population center is New Roads which is located 3 miles southwest and has a population of about 4,000.

Soils and Construction: The surface soils at the plant site are heavy clays with permeabilities ranging from 0.69×10^{-7} cm/sec to virtually impermeable. The thickness of these surficial clays range from a minimum of 3 feet to 18 feet. Over 230 test holes were bored and analyzed to confirm thickness and permeability of the soils at the site of the impoundments. Any areas within the waste disposal impoundments that had a marginal thickness of clay was scarified and surfaced with recompacted clay meeting the permeability requirements. In order to ensure that the Bottom Ash Basin structure can accommodate the proposed expansion design, additional borings were conducted. Geotechnical analysis was conducted on the soil samples. The results of the evaluation indicate that the soils are sufficient to handle the proposed expansion.

The high Cation Exchange Capacity (CEC) of the clay soils found in the area attenuates potential pollutants from the Ash Basin. The soils' CEC is most effective on cations from inorganic heavy metals, which are the primary sources of concern in fly and bottom ashes. In summary, the thickness and tightness of the clay soils minimizes leachate flow while the CEC attenuates the inorganic pollutants.

The solid waste facilities are surrounded by clay levees to contain the waste material and also control stormwater runoff and runon. The proposed vertical expansion of the Bottom Ash Basin will also utilize recompacted clay to vertically expand the levees. The levees will be constructed at a 4H:1V slope in order to ensure stability and adequately contain the bottom ash material.

Hydrogeology: The soil strata below the plant area consists of alternating beds of clay/silt aquicludes and sand/gravel aquifers. The Alluvial Aquifer is the first permeable deposit below the surficial sediments. It is protected by approximately 35 feet of surface clay, silt, and fine sand. The quality of the water in the Alluvial Aquifer is marginal since it has a relatively high TDS content and high iron and manganese content. Because of this, the aquifer is not used except for a few small diameter, low yield stock wells.

The alluvium is in hydrologic communication with the Mississippi River and groundwater flow is from the plant site to the river. The Alluvial Aquifer is separated from the next deeper aquifer by about 100 feet of clay and silt with a very low permeability. This provides an effective barrier to the migration of groundwater between the two aquifers.

Therefore, the Alluvial Aquifer is the only water-bearing strata with any potential to receive any leachates from the waste disposal area. Its natural water quality is marginal and use of this water is minimal. Finally, any pollutants that did enter the alluvium would be confined to a small area by groundwater flow and confining aquicludes. Groundwater monitoring wells have been installed within this aquifer around the solid waste facilities and are sampled on a semiannual basis to identify any such impacts. During the length of the groundwater monitoring program, no significant changes in groundwater quality have been detected.

Nature of the waste: Fly ash is an effective pozzolan, that is, its silicon oxide and aluminum oxide components react with its calcium fraction in the presence of water to form a strong, slow hardening cement. This makes it a valuable resource as a substitute for Portland cement. LaGen currently sells the majority of the fly ash it produces for beneficial reuse. In addition, due to its pozzolan properties, the ash locks potential contaminants in a rock impermeable substrate and effectively isolates them from the environment.

The pH of both bottom and fly ash is in the neutral to slightly alkaline range. This buffers any water that comes in contact with the ash. The solubility of most inorganic materials is inversely proportional to rising pH, that is, solubility decreases as pH rises. Therefore, the neutral pH of the ashes ensures that the concentration of contaminants in the water will remain low. This increases the efficiency of attenuation mechanisms such as CEC that prevent the flow of contaminants out of the disposal areas. Further evidence of this can be seen in the laboratory analytical results from the semi-annual groundwater monitoring events, which are submitted to the LDEQ. Over the life of the groundwater monitoring program, no significant change in groundwater quality has been detected.

In summary, the existing solid waste facilities at the Big Cajun II plant have been designed, constructed, and sited to prevent, to the maximum extent possible, adverse impacts to the environment. The proposed vertical expansion of the bottom ash pond was selected as the best possible solution as it provides needed capacity while minimizing adverse impacts to the environment. No other project would offer more protection to the environment without unduly curtailing non-environmental benefits.

Tables

Table 1

DOTD Well Survey Information

TABLE 1
WATER WELL SURVEY
Louisiana Generating, LLC
Big Cajun II

Parish Number	Well Number	Owners Name	Well Depth	Well Use/Subuse	Date Completed	Geologic Unit
77	- 43	CALLICOTT, R	1610	Domestic	06/51	12228BR
77	- 65	NEW ROADS, LA	2058	Public Supply/Municipal	08/57	12228BR
77	- 122	M & S WTR SYS	1805	Public Supply/Inactive	01/48	12228BR
77	- 173	JAMES, T L	172	Power Generation	04/76	112MRVA
77	- 175	PC POLICE JURY	470	Public Supply/Institutional/Governmental	08/87	12101FP
77	- 180	CAJUN ELECTRIC	544	Power Generation	04/77	12112BR
77	- 181	CAJUN ELECTRIC	544	Power Generation	04/77	12112BR
77	- 217	HARREL, JOHN	2150	Public Supply/Plugged	1956	12228BR
77	- 245	CAJUN ELECTRIC	556	Power Generation	10/81	12101FP
77	- 257	M & S WTR SYS	1809	Public Supply/Rural	09/79	12228BR
77	- 295	PC POLICE JURY	1575	Public Supply/Institutional/Governmental	11/90	12203FP
77	- 314	CAJUN ELECTRIC	163	Industrial/Other	10/91	112MRVA
77	- 315	CAJUN ELECTRIC	163	Industrial/Other	10/91	112MRVA
77	- 333	SHIELDS, ROBERT	0	Irrigation/Plugged		11111111
77	-5012Z	TATHAM OIL-GAS	189	Rig Supply/Plugged	02/81	112MRVA
77	-5208Z	PECU, SIDNEY	128	Domestic	10/87	112MRVA
77	-5403Z	CAJUN ELECTRIC	16	Monitor	06/94	112MRVAC
77	-5404Z	CAJUN ELECTRIC	16	Monitor	06/94	112MRVAC
77	-5405Z	CAJUN ELECTRIC	16	Monitor	06/94	112MRVAC
77	-5483Z	MAJOR BROTHERS	200	Public Supply/Plugged		112MRVA
77	-5484Z	MAJOR BROTHERS	100	Irrigation	10/00	112MRVA
77	-5516Z	LA ENERGY & POW	13	Monitor	04/03	112MRVAC
77	-5517Z	LA ENERGY & POW	14	Monitor	04/03	112MRVAC
77	-5518Z	LA ENERGY & POW	14	Monitor	04/03	112MRVAC

TABLE 1
WATER WELL SURVEY
Louisiana Generating, LLC
Big Cajun II

77	-5521Z	LA ENGERY & POW	14	Monitor	04/03	00000000
77	-5523Z	LA ENERGY & POW	14	Monitor	04/03	112MRVAC
125	- 195	U S GEOL SURVEY	102	Test Hole/Plugged	06/60	112UPTC
125	- 275	GULF STATES UTL	135	Dewatering/Plugged	10/83	112UPTC
125	- 276	GULF STATES UTL	135	Dewatering/Plugged	10/83	112UPTC
125	- 277	GULF STATES UTL	135	Dewatering/Plugged	10/83	112UPTC
125	- 278	GULF STATES UTL	135	Dewatering/Plugged	10/83	112MRVA
125	- 279	GULF STATES UTL	135	Dewatering/Plugged	10/83	112UPTC
125	- 280	GULF STATES UTL	135	Dewatering/Plugged	10/83	112UPTC
125	-5001Z	GULF STATES UTL	100	Industrial/Destroyed	03/78	112MRVA
125	-5002Z	GULF STATES UTL	100	Industrial/Destroyed	03/78	112MRVA
125	-5015Z	GULF STATES UTL	255	Pilot Hole/Plugged	08/76	11200NWM
125	-5017Z	GULF STATES UTL	250	Pilot Hole/Plugged	08/76	11200NWM
125	-5018Z	GULF STATES UTL	250	Pilot Hole/Plugged	08/76	11200NWM
125	-5019Z	GULF STATES UTL	280	Pilot Hole/Plugged	08/76	11200NWM
125	-5020Z	GULF STATES UTL	250	Pilot Hole/Plugged	08/76	11200NWM
125	-5021Z	GULF STATES UTL	250	Pilot Hole/Plugged	08/76	11200NWM
125	-5022Z	GULF STATES UTL	200	Pilot Hole/Plugged	09/76	11200NWM
125	-5024Z	GULF STATES UTL	172	Pilot Hole/Plugged	09/76	11200NWM
125	-5025Z	GULF STATES UTL	177	Pilot Hole/Plugged	09/76	11200NWM
125	-5026Z	GULF STATES UTL	177	Pilot Hole/Plugged	09/76	11200NWM
125	-5027Z	GULF STATES UTL	172	Pilot Hole/Plugged	09/76	11200NWM
125	-5028Z	GULF STATES UTL	172	Pilot Hole/Plugged	09/76	11200NWM
125	-5029Z	GULF STATES UTL	172	Pilot Hole/Plugged	09/76	11200NWM
125	-5030Z	GULF STATES UTL	172	Pilot Hole/Plugged	09/76	11200NWM
125	-5031Z	GULF STATES UTL	172	Pilot Hole/Plugged	09/76	11200NWM
125	-5152Z	GULF STATES UTL	73	Piezometer	1983	112MRVA
125	-5153Z	GULF STATES UTL	110	Piezometer	1983	112MRVA
125	-5195Z	GULF STATES UTL	135	Dewatering/Plugged		112UPTC

Table 2

Generalized Quality of Water Characteristics of Aquifers Underlying Pointe Coupee Parish and Hydrologic Correlation Diagram for Pointe Coupee Parish and Adjacent Areas

Generalized hydrologic characteristics of aquifers underlying Pointe Coupee Parish

Zone or aquifer	Average sand thickness (feet)	Range of sand thickness (feet)	Average Coefficient of Transmissibility (gpd/ft)	Average Coefficient of Permeability (gpd/ft²)	Potential yield of wells (gpm)	1964 Water levels (feet above or below land surface)	Average[1] water-level decline rates (ft/yr)
Alluvial aquifer........	175	50–400	350,000	2,000	6,000	+ 5 to − 30	None
Zone 1 north of Morganza...........			Not Generally	Present			
"600-foot" sand.......	100	50–225	75,000	750	1,000–2,000	+ 5 to − 25	Not known
"800-foot" and (or) "1,000-foot" sands..	75	0–150	50,000	650	1,000	+ 5 to − 25	Not known
"1,200-foot" sand.....	100	0–250	100,000	1,000	2,000	+ 5 to − 25	½–1½
Zone 2 north of Morganza...........	75	25–125	50,000	650	1,000–2,000	+10 to − 5	½
"1,500-foot" sand.....	75	0–200	65,000	850	1,000–2,000	as much as +15	½
"1,700-foot" sand.....	100	0–200	100,000	1,000	2,000	as much as +25	½
"2,000-foot" sand.....	100	0–200	100,000	1,000	2,000	as much as +30	½–6½
Zone 3 north of Morganza...........	75	25–100	75,000	1,000	1,000–2,000	0 to +15	½
"2,400-foot" sand.....	150	50–200	225,000	1,500	2,000–3,000	as much as +50	1½
"2,800-foot" sand.....	200	50–400	300,000	1,500	2,000–3,000	as much as +60	1½–3½

[1]Based on pumping rates prior to 1964.

Hydrologic correlation diagram for Pointe Coupee Parish and adjacent areas

System	Series	St. Landry Parish (Jones and others, 1954) Formation	St. Landry Parish Aquifer	Pointe Coupee Parish Aquifer		West Baton Rouge Parish (Morgan, 1961) Aquifer	West Feliciana Parish (Morgan, 1964) Aquifer
Quaternary	Recent	Le Moyen: Lebeau Member	Atchafalaya	Alluvial aquifer		Alluvial deposits	Undifferentiated Quaternary alluvium
	Pleistocene	Prairie	Chicot				
		Montgomery					
		Bentley				"400-foot" sand	Undifferentiated Quaternary upland deposits
		Williana		"600-foot" sand	Zone 1	"600-foot" sand	
Tertiary	Pliocene	Foley: Mamou Member	Evangeline	"800-foot" and (or) "1,000-foot" sands		"800-foot" sand	
						"1,000-foot" sand	Zone 1
		Steep Gully Member		"1,200-foot" sand		"1,200-foot" sand	
				"1,500-foot" sand	Zone 2	"1,500-foot" sand	
	?			"1,700-foot" sand		"1,700-foot" sand	Zone 2
	Miocene	Fleming of Fisk (1940)	(Undifferentiated)	"2,000-foot" sand		"2,000-foot" sand	
				"2,400-foot" sand	Zone 3	"2,400-foot" sand	Zone 3
				"2,800-foot" sand		"2,800-foot" sand	

Table 3

Generalized Quality of Water Characteristics of the Aquifers Underlying Pointe Coupee Parish

Generalized quality-of-water characteristics of the aquifers underlying Pointe Coupee Parish

Zone or aquifer	Water types where fresh	Dissolved solids (ppm)	Hardness (ppm)	pH	Batchelor	Erwinville	Fordoche	Innis	Krotz Springs	Lettsworth	Livonia	Lottie	Maringouin	Melville	Morganza	New Roads	Simmesport
Alluvial aquifer..........	calcium bicarbonate....	200–600	200–400	6.5–7.0	F	F	S	F	S	F	S	S	S	S	F	F	F
Zone 1 north of Morganza.	Not	Generally	Present														
"600-foot" sand..........	calcium bicarbonate	Not known	Not known	Not known	—	F	S	—	S	—	S	S	?	—	—	F	—
"800-foot" and (or) "1,000-foot" sands......	calcium bicarbonate	Not known	Not known	Not known	—	F	?	—	S	—	S	S	?	?	—	F	—
"1,200-foot" sand........	calcium + sodium bicarbonate........	150–275	5–60	6.9–8.4	—	F	F	—	F	—	F	F	F	F	—	F	—
Zone 2 north of Morganza.	calcium + sodium bicarbonate........	175–450	5–85	7.2–8.6	F	—	—	F	—	F	—	—	—	—	F	—	F
"1,500-foot" sand........	sodium bicarbonate	Not known	8–10	7.0	—	F	S	—	S	—	F	S	F	F	—	F	—
"1,700-foot" sand........	sodium bicarbonate........	200–430	2–10	7.5–8.8	—	F	F	—	F	—	F	S	—	F	F	F	—
"2,000-foot" sand........	sodium bicarbonate........	200–350	3–10	7.5–8.9	F	F	F	F	S	—	F	S	F	F	F	F	F
Zone 3 north of Morganza.	sodium bicarbonate........	250–675	5–75	7.0–8.7	F	—	—	—	—	F	—	—	—	—	F	—	S
"2,400-foot" sand........	sodium bicarbonate........	325–1,250	0–10	7.2–9.2	—	F	F	—	S	—	F	S	F	F	F	F	—
"2,800-foot" sand........	sodium bicarbonate........	225–675	0–10	8.2–9.3	—	F	F	—	S	—	F	S	S	F	F	F	—

F, aquifer contains fresh water at or near.
S, aquifer contains salt water at or near.
—, aquifer not present.

Table 4

Soil Permeabilities

SOIL PERMEABILITIES

BORING NO.	DEPTH	CLASSIFICATION	PERMEABILITY (cm/s)
853	4 - 6	Silty Clay	0.1170×10^{-8}
854	6 - 8	Clayey Silt	0.6940×10^{-7}
855	6 - 8	Slightly Clayey Silt	0.1250×10^{-5}
855	8 - 10	Sandy Silt	0.8740×10^{-5}
855	18 - 20	Silty Fine Sand	0.5650×10^{-4}
837	8 - 10	Silt	0.2830×10^{-3}
840	22 - 24	Sandy Silt	0.2310×10^{-3}
845	26 - 28	Sand	0.1020×10^{-2}

Figures

FIGURE 1

AREA MASTER PLAN

OFFICE	DRAWN BY		CHECKED BY	APPROVED BY	DRAWING NUMBER
BTR	B. Holt	1/26/06	RT 4/31/06		5494007_AV-01

Map Document: (N:\DRAFTING\Big Cajun\ArcView\GIS_Documents\MXD\5494007_AV-01.mxd)
2/9/2006 -- 8:34:56 AM

REFERENCE:
USGS 7.5 Minute Topographic Quadrangle Maps
New Roads, Port Hudson, Elm Park, and St. Francisville, LA

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LOUISIANA GENERATING, LLC
NEW ROADS, LOUISIANA

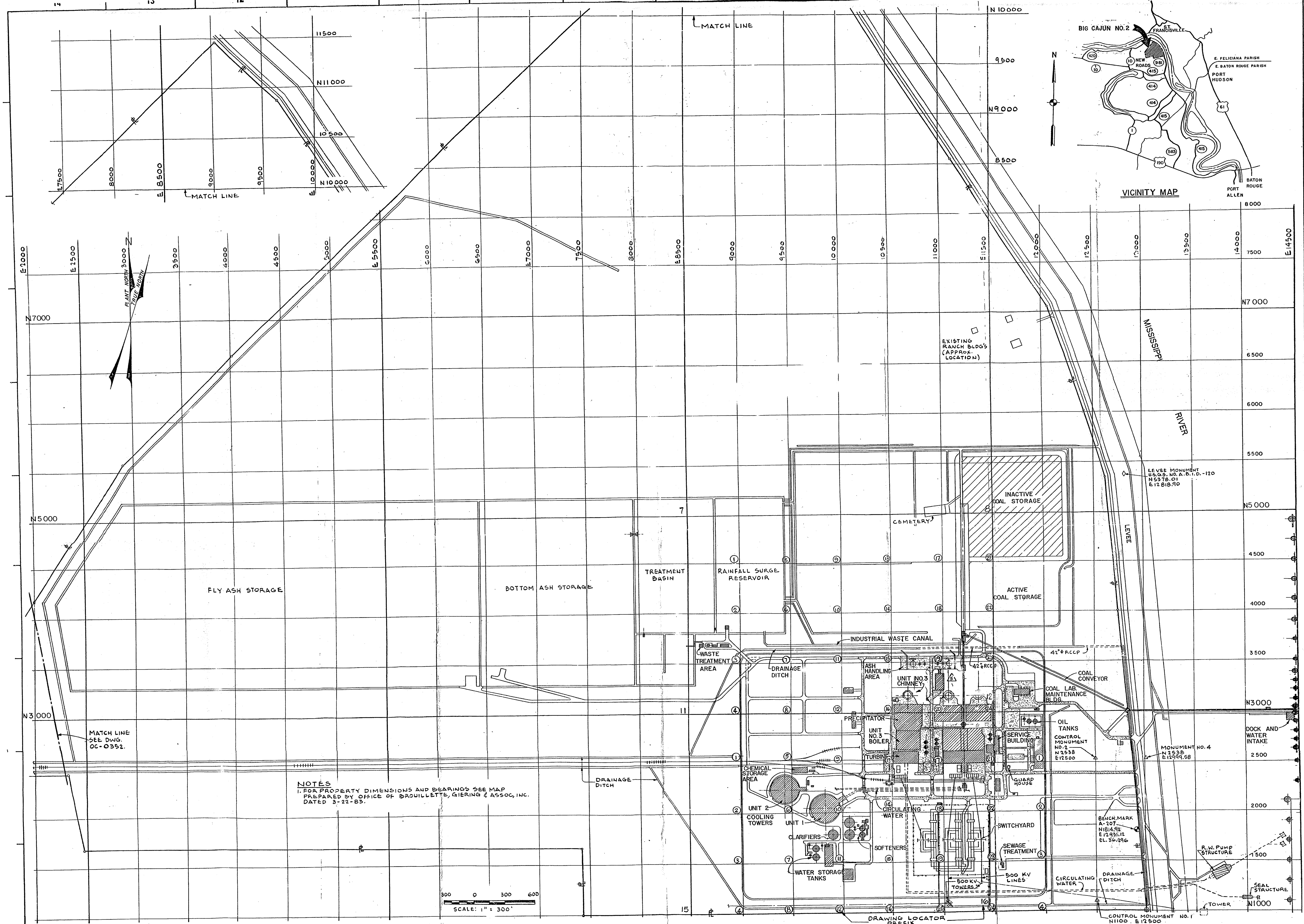
FIGURE 1

AREA MASTER PLAN

BIG CAJUN II
SOLID WASTE PERMIT APPLICATION

FIGURE 2

SITE MASTER PLAN



BIG CAJUN II POWER PLANT

SOLID WASTE STANDARD PERMIT APPLICATION

SITE MASTER PLAN

POINTE COUPEE PARISH

C-K ASSOCIATES INC.

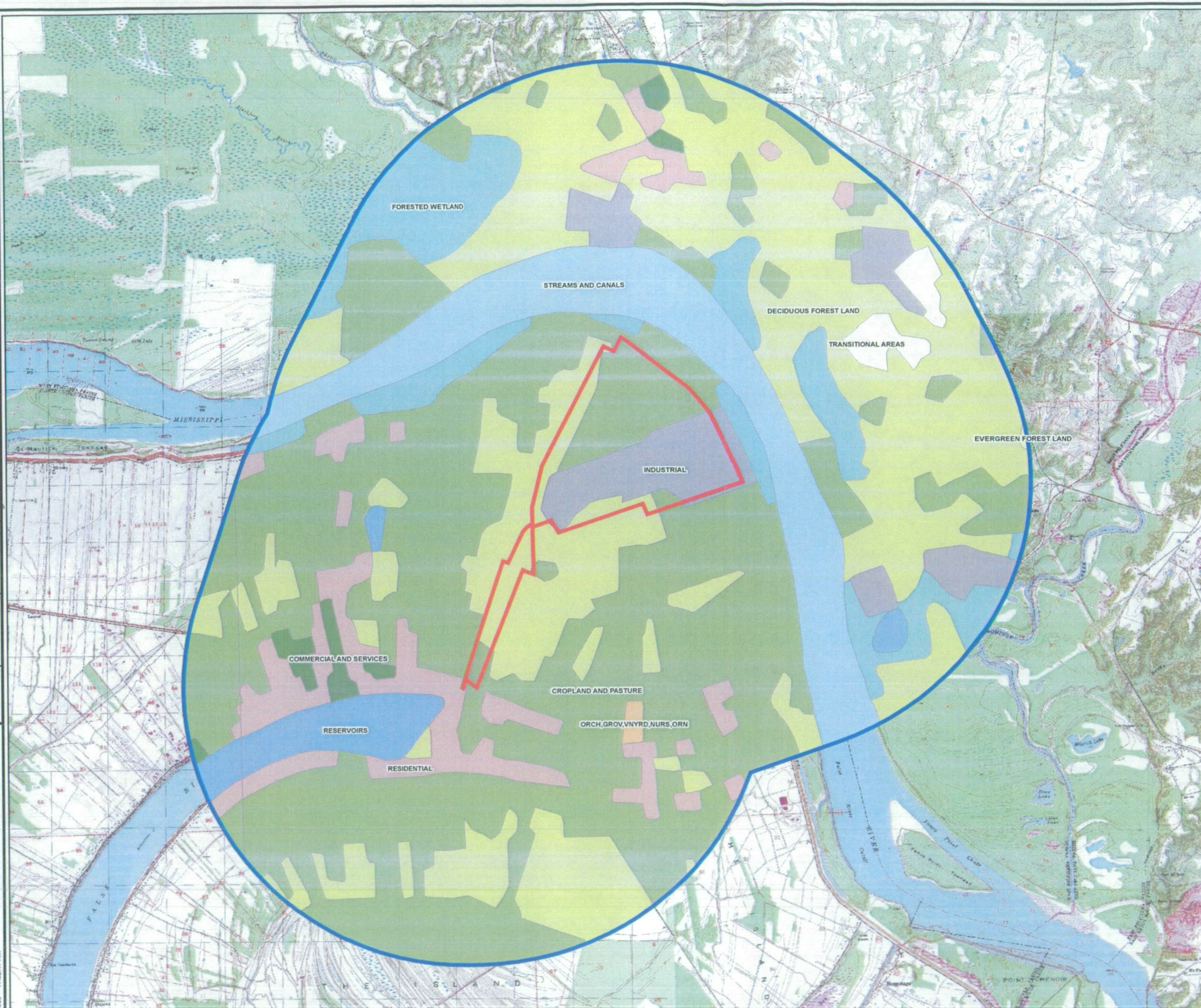
BATON ROUGE, LOUISIANA

DRAWN KWS	APPROVED KSB
CHECKED CJH	DATE JANUARY 27, 1994

NOTE:
BASE TAKEN FROM CAJUN ELECTRIC DRAWING NO. OC-0325, "KEY SITE PLAN & VICINITY PLAN", DATED 5/13/83.

FIGURE 3

LAND USE MAP



5,500 2,750 0 Feet

Legend

- Property Boundary
- 3-Mile Radius (Property Boundary)

Land Use Code

- Commercial and Services (1.00%)
- Cropland and Pasture (39.86%)
- Deciduous Forest Land (29.71%)
- Evergreen Forest Land (0.03%)
- Forested Wetland (7.15%)
- Industrial (4.38%)
- Orch,Grov,Vnyrd,Nurs,Orn (0.14%)
- Reservoirs (2.48%)
- Residential (5.97%)
- Streams and Canals (8.39%)
- Transitional Areas (0.88%)

REFERENCE:
USGS 100K Topographic Quadrangle Map
New Roads, Louisiana

Shaw®

LOUISIANA GENERATING, LLC
BIG CAJUN II POWER PLANT
NEW ROADS, LOUISIANA

FIGURE 3

LAND USE MAP

BIG CAJUN II POWER PLANT
SOLID WASTE PERMIT APPLICATION

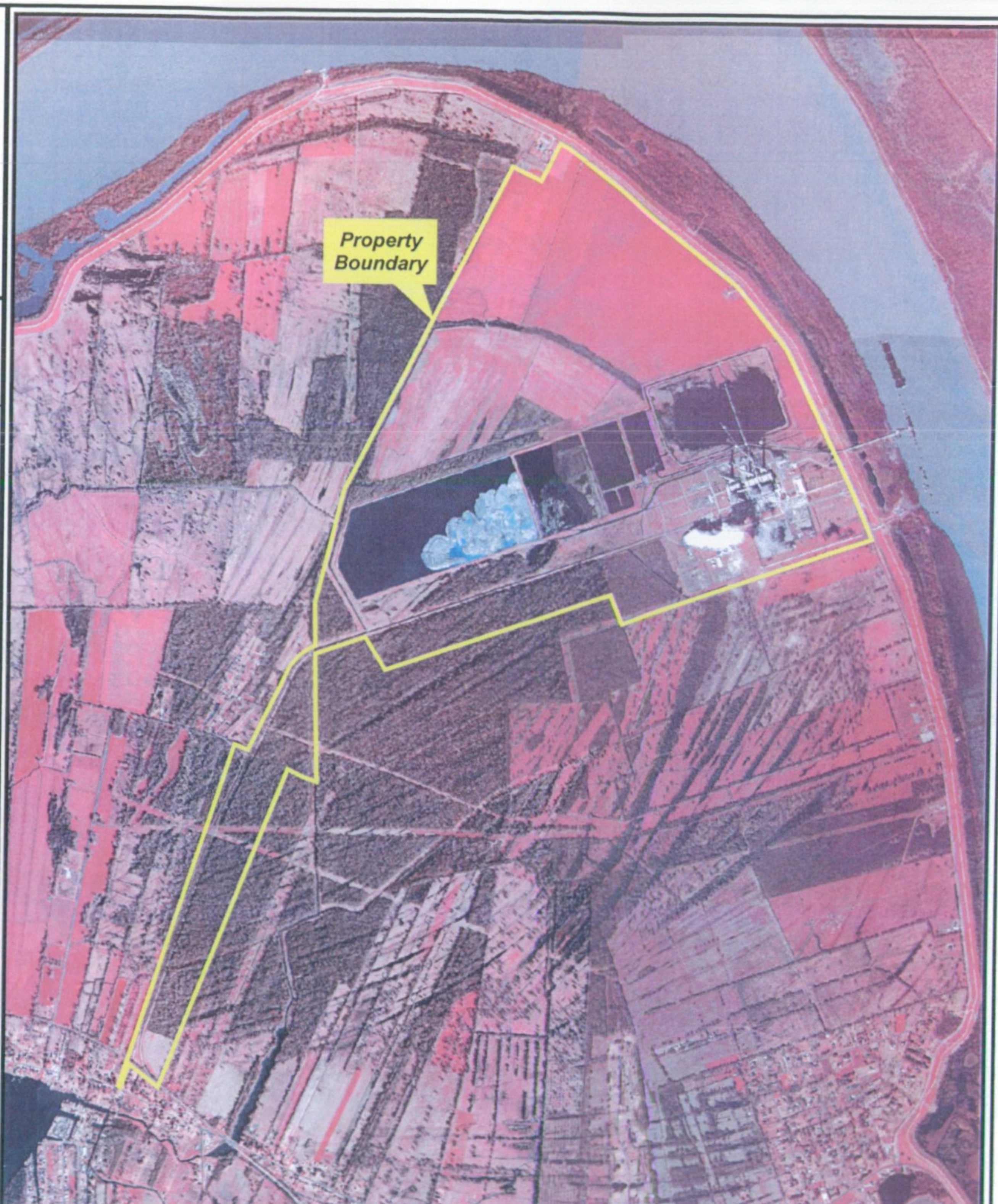
OFFICE	DRAWN BY		CHECKED BY	APPROVED BY	DRAWING NUMBER
BTR	B. Holt	1/26/06	SJ 4/27/06		5494010_AV-01

Map Document: (N:\DRAFTING\Big Cajun\ArcView\GIS_Documents\MXD\5494010_AV-01.mxd)
2/24/2006 -- 11:32:47 AM

FIGURE 4

2004 AERIAL PHOTOGRAPH

OFFICE	DRAWN BY		CHECKED BY	APPROVED BY	DRAWING NUMBER
BTR	B. Holt	1/26/06			5494007_AV-02



3,000 1,500 0 3,000
Feet

REFERENCE:
USGS Color Infrared Orthophotos
Quadrants of the New Roads, Port Hudson, Elm Park, and St. Francisville Quadrangles, LA (2004)

Map Document: (N:\DRAFTING\Big Cajun\ArcView\GIS_Documents\MXD\5494007_AV-02.mxd)
1/26/2006 -- 9:42:07 AM

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LOUISIANA GENERATING, LLC
NEW ROADS, LOUISIANA

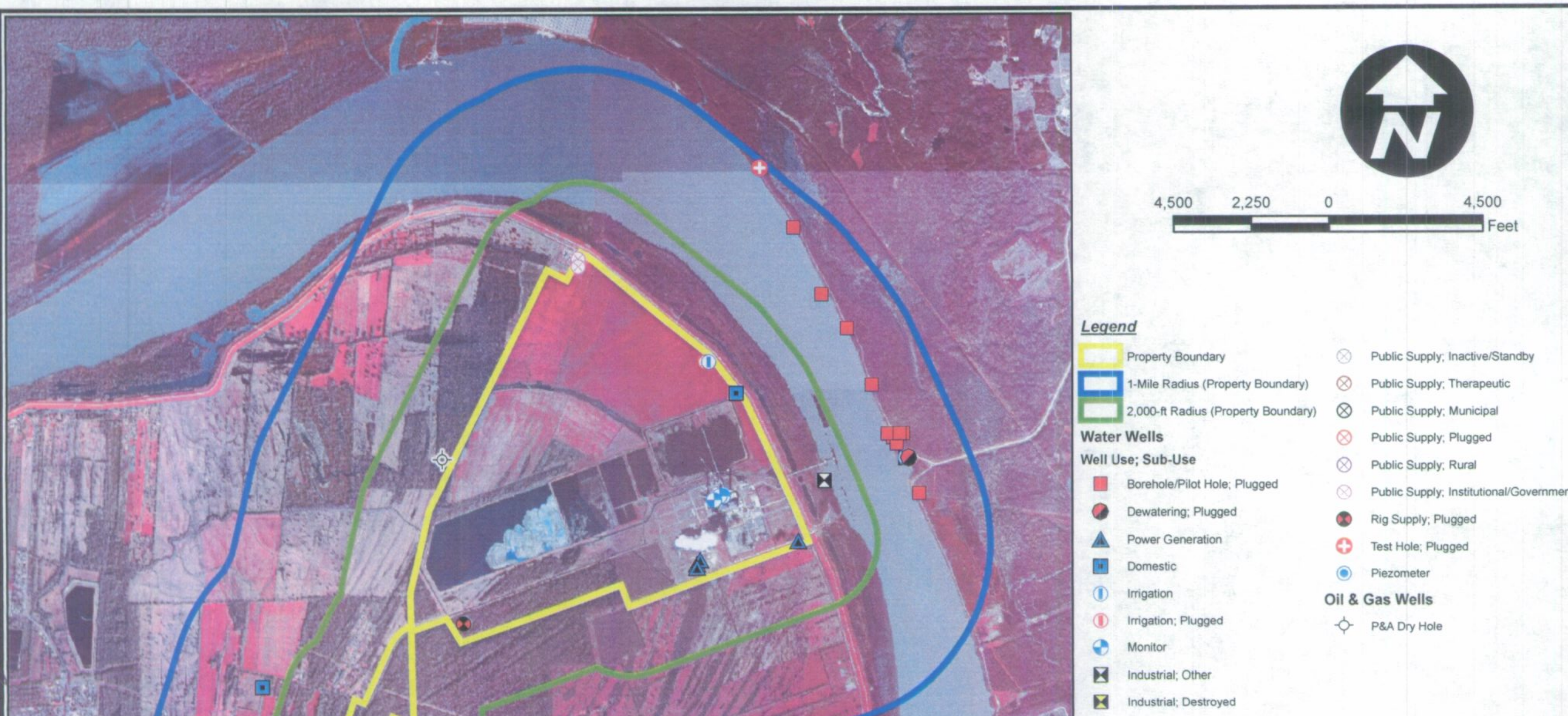
FIGURE 4

2004 AERIAL PHOTOGRAPH

BIG CAJUN II
SOLID WASTE PERMIT APPLICATION

FIGURE 5

OIL/GAS AND WATER WELL SURVEY



REFERENCE:
Well information obtained from Louisiana DOTD Water Well Website (1/26/06);
USGS Color Infrared Orthophotos
Quadrants of the New Roads, St. Francisville, Port Hudson, and
Elm Park Quadrangles, LA (2004)

Shaw®

LOUISIANA GENERATING, LLC
NEW ROADS, LOUISIANA

FIGURE 5

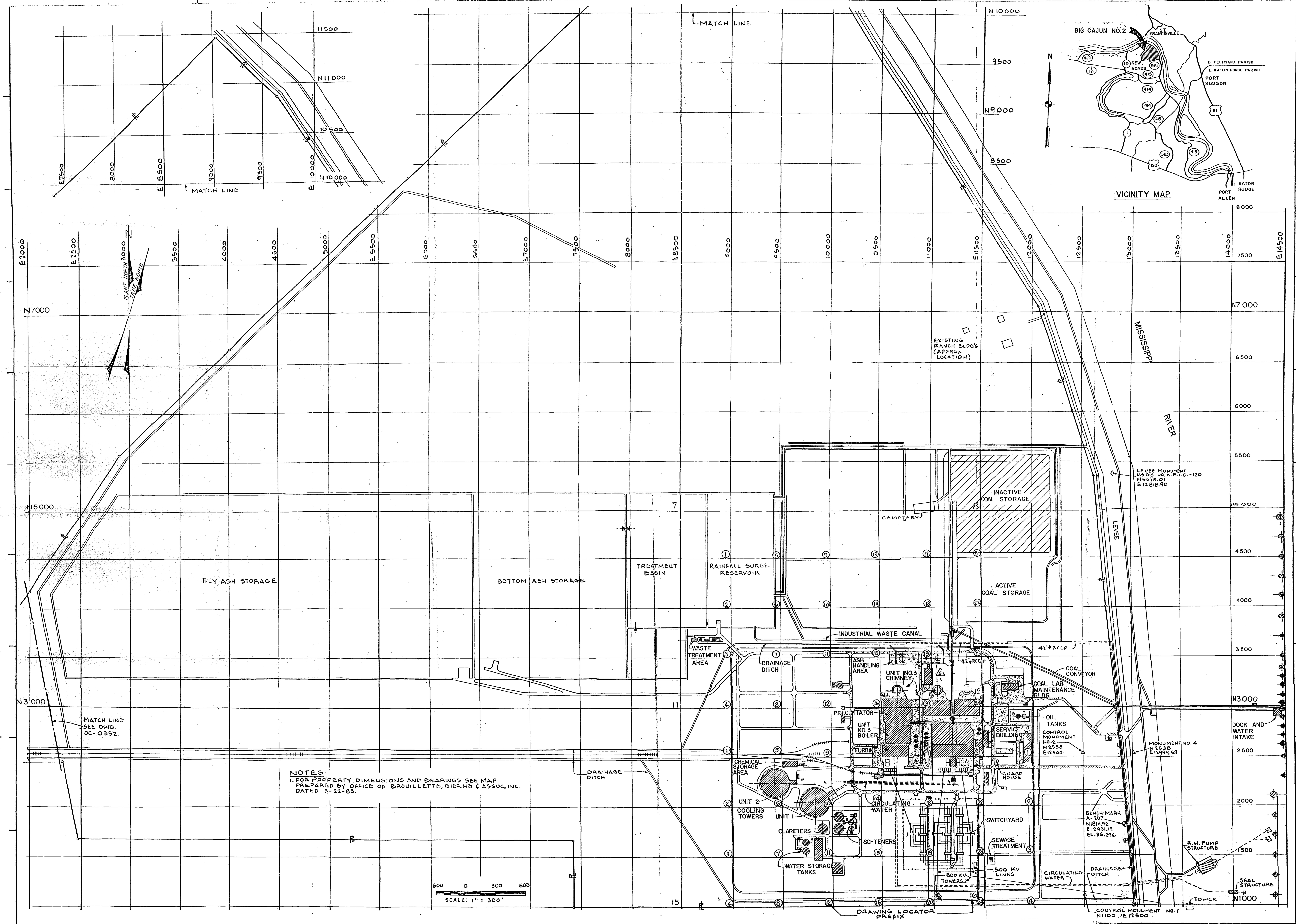
OIL/GAS AND WATER WELL SURVEY

BIG CAJUN II
SOLID WASTE PERMIT APPLICATION

OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
BTR	B. Holt 1/26/06	BT 4/27/06		5494007_AV-04

FIGURE 6

UTILITIES LOCATION MAP



NOTE:
BASE TAKEN FROM CAJUN ELECTRIC DRAWING NO. OC-0325, "KEY SITE PLAN & VICINITY PLAN", DATED 5/13/83.

BIG CAJUN II POWER PLANT
SOLID WASTE STANDARD PERMIT APPLICATION

UTILITIES LOCATION MAP

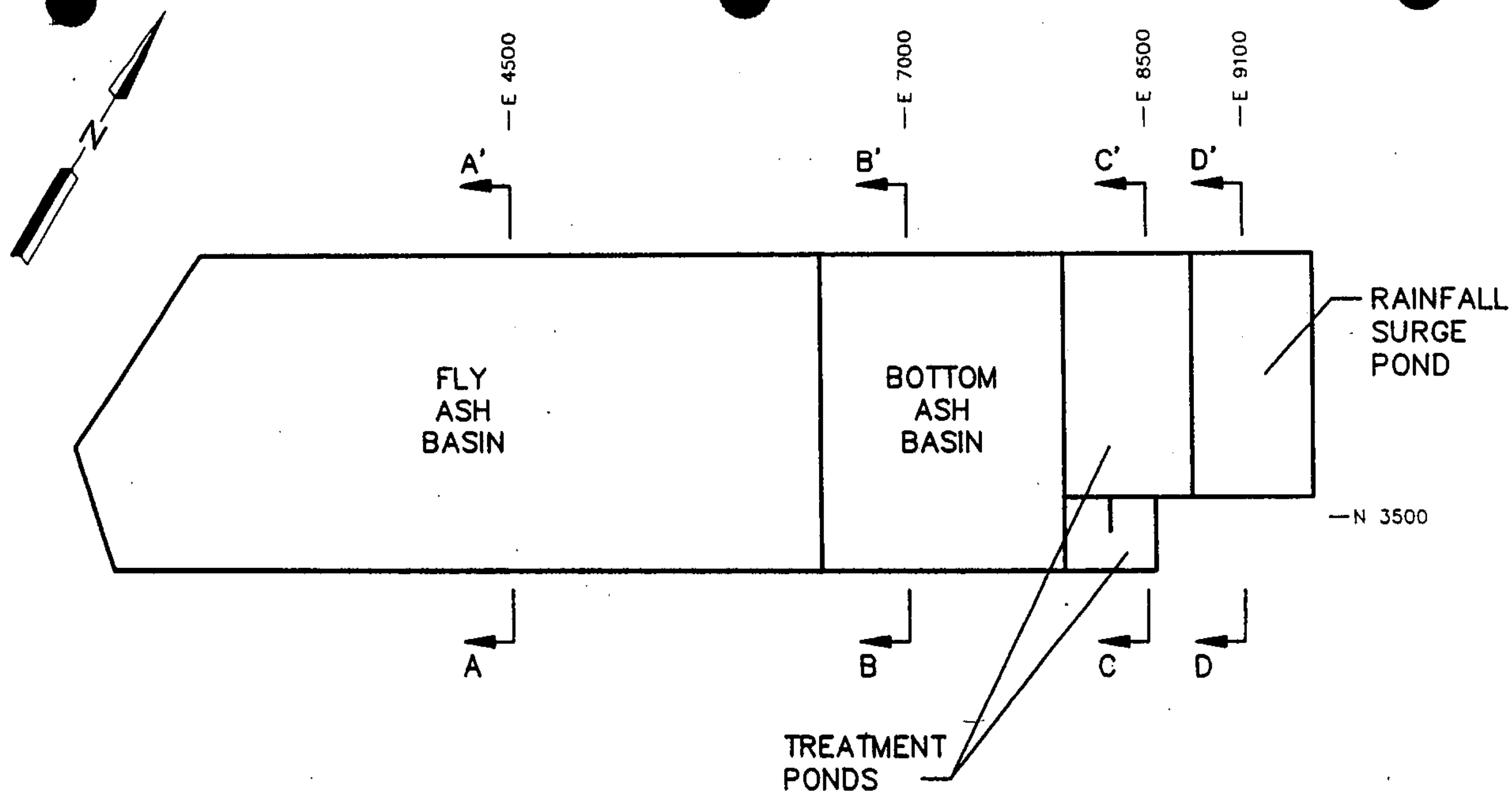
POINTE COUPEE PARISH

C·K ASSOCIATES INC.
BATON ROUGE, LOUISIANA

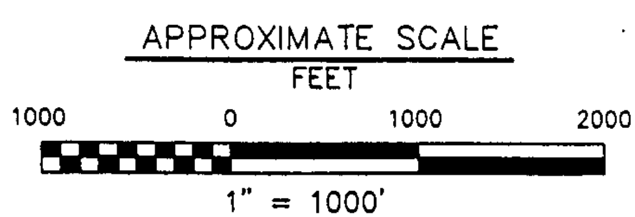
DRAWN KWS	APPROVED KSB

FIGURE 7

SURFACE IMPOUNDMENTS CROSS SECTION LOCATION MAP



NOTE:
BASE INFORMATION TAKEN FROM BIG CAJUN'S ORIGINAL PERMIT APPLICATION.



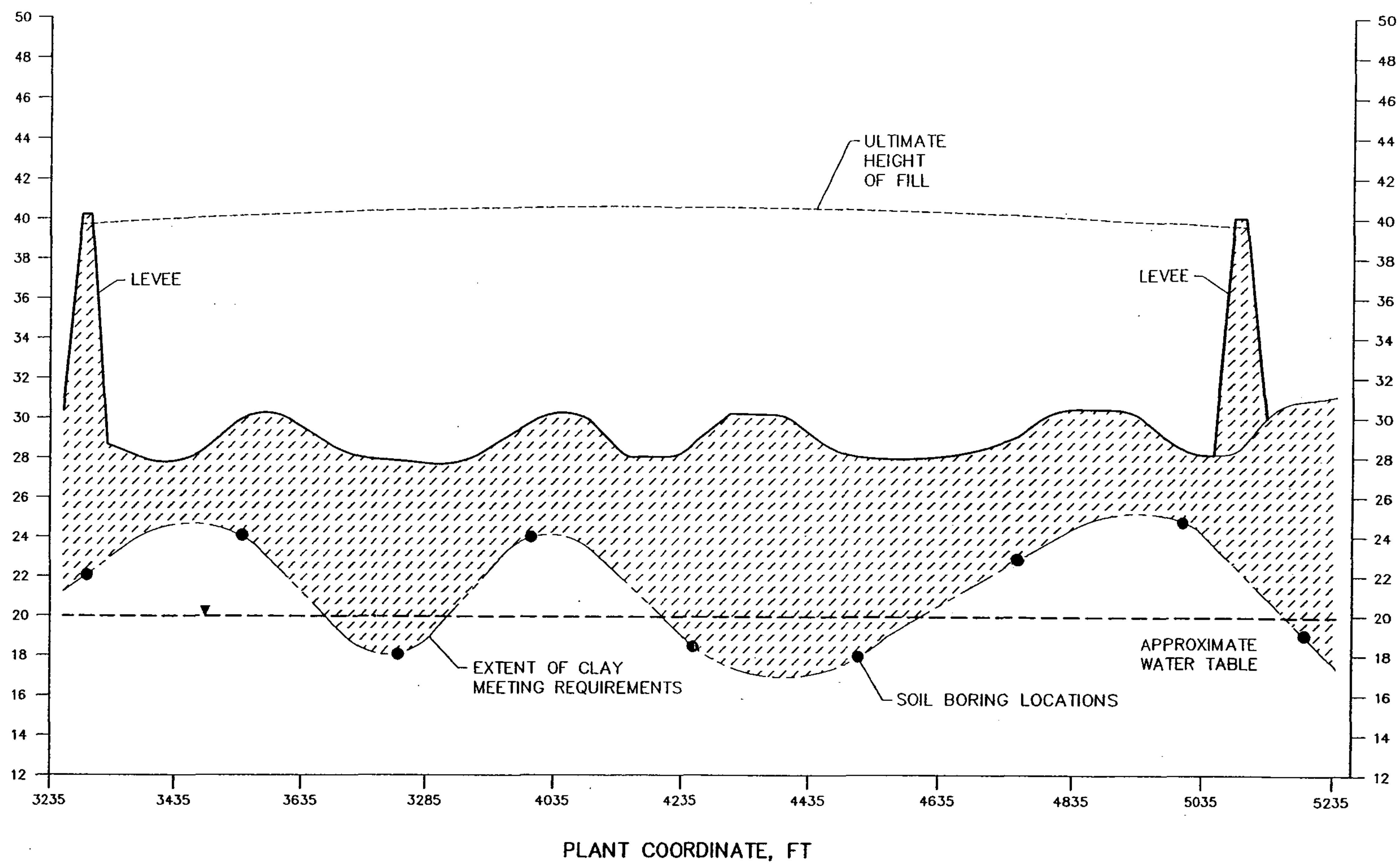
BY	CAJUN ELECTRIC POWER COOPERATIVE, INC. BIG CAJUN II POWER PLANT
DATE	SOLID WASTE STANDARD PERMIT APPLICATION SURFACE IMPOUNDMENT CROSS SECTIONS LOCATION MAP POINTE COUPEE PARISH
REVISION	C·K ASSOCIATES, INC. BATON ROUGE, LOUISIANA

NO.				
DRAWN	LMP/ACAD	APPROVED	KSB
CHECKED	CJH	DATE	JANUARY 20, 1994
SHEET		DWG. NO.	A05-268-02

01/23/948

FIGURE 8

FLY ASH BASIN CROSS SECTION A-A'



LEGEND:

CLAY

NOTE:

1. BASE INFORMATION TAKEN FROM BIG CAJUN'S ORIGINAL PERMIT APPLICATION.
2. SEE DRAWING No. 5 FOR LOCATION OF CROSS SECTION.

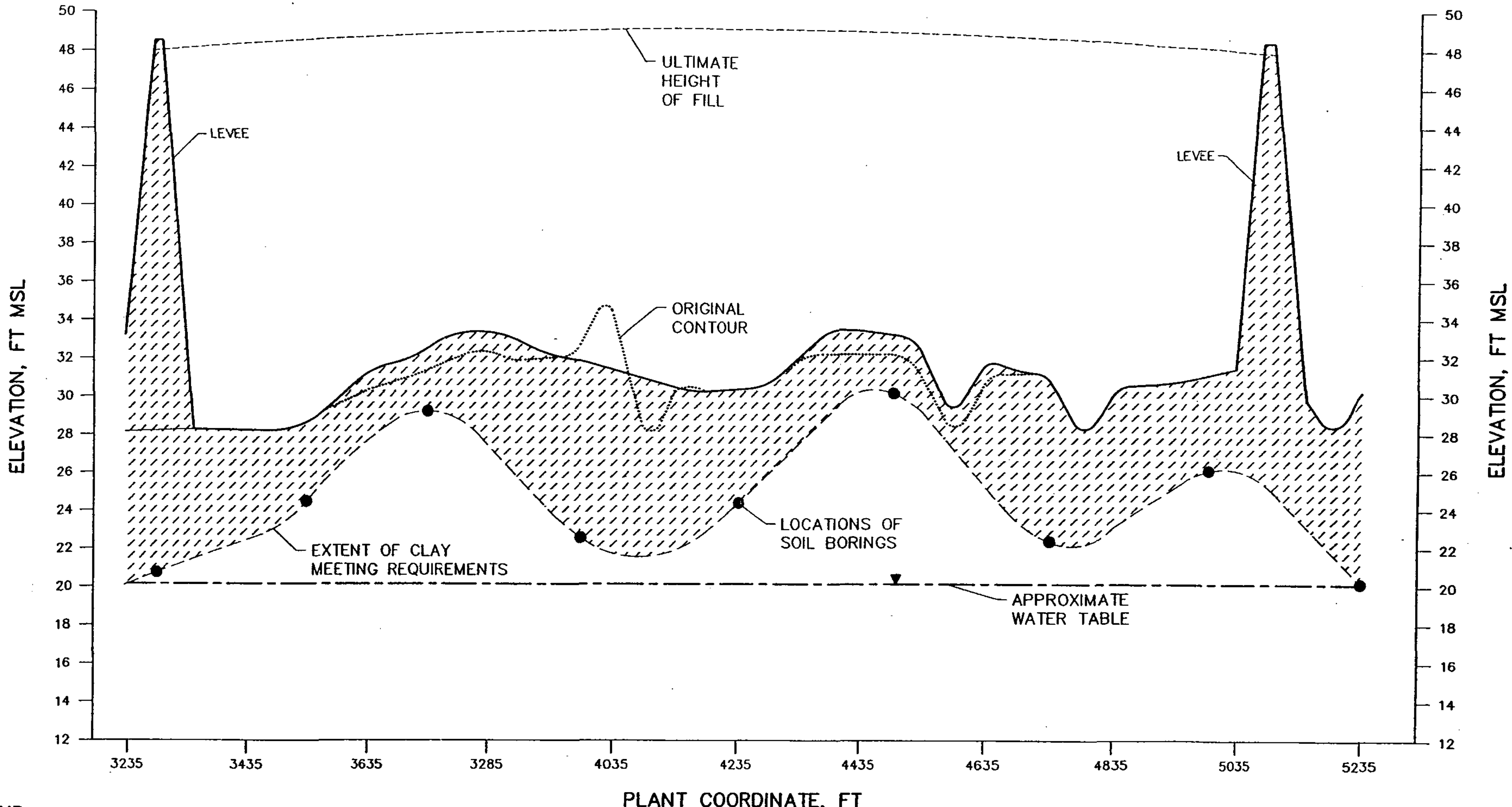
CAJUN ELECTRIC POWER COOPERATIVE, INC. BIG CAJUN II POWER PLANT	
SOLID WASTE STANDARD PERMIT APPLICATION	
FLY ASH BASIN CROSS SECTION A–A'	
POINTE COUPEE PARISH	
C·K ASSOCIATES, INC. BATON ROUGE, LOUISIANA	
DRAWN LMP/ACAD	APPROVED KSB
CHECKED CJH	DATE

REVISION DATE BY

3/948

FIGURE 9

BOTTOM ASH BASIN CROSS SECTION B-B'



LEGEND

CLAY

NOTE:

1) BASE INFORMATION TAKEN FROM BIG CAJUN'S ORIGINAL APPLICATION.
2) SEE DRAWING No. 5 FOR LOCATION OF CROSS SECTION.

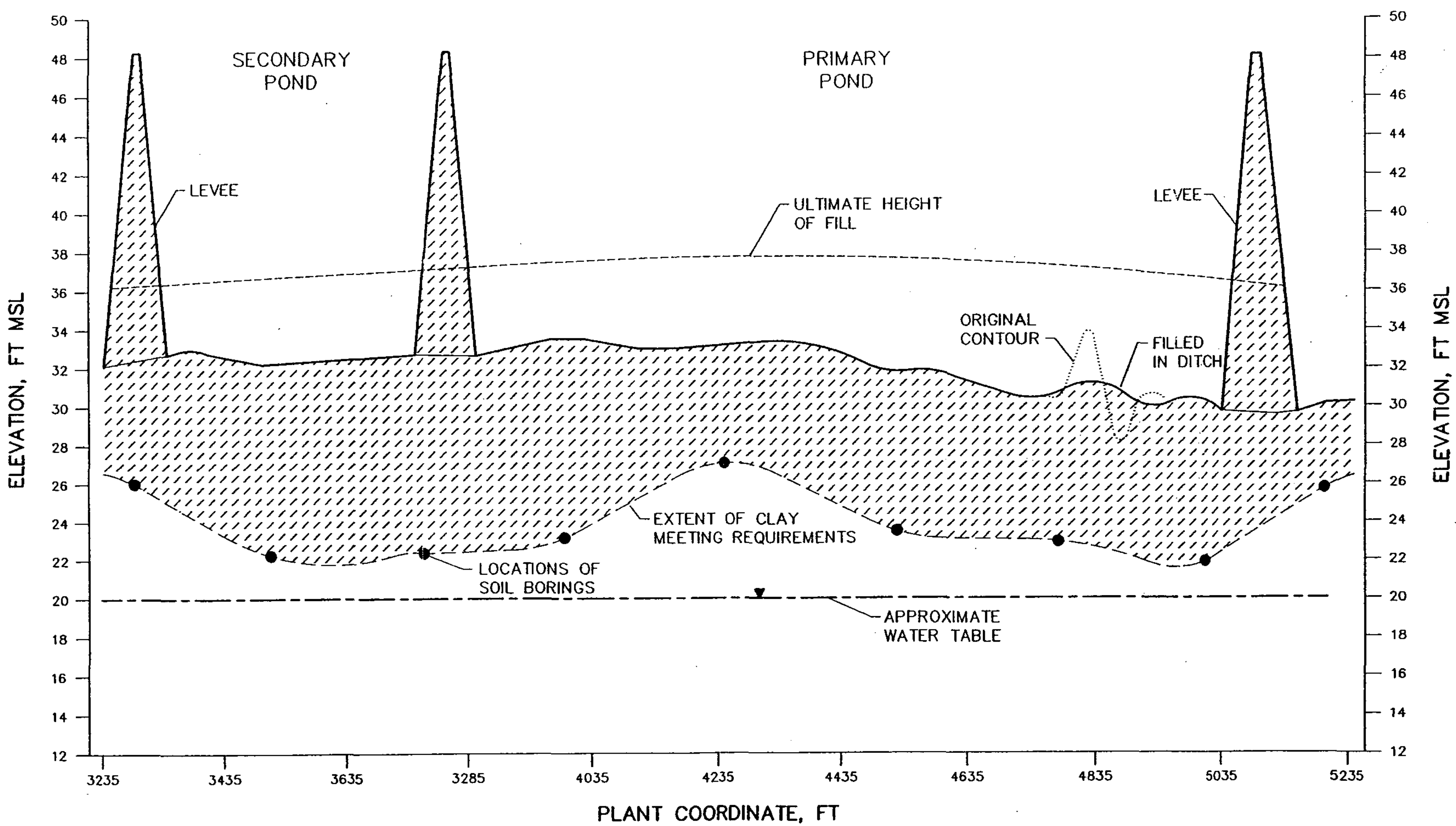
CAJUN ELECTRIC POWER COOPERATIVE, INC. BIG CAJUN II POWER PLANT	
SOLID WASTE STANDARD PERMIT APPLICATION	
BOTTOM ASH BASIN CROSS SECTION B–B'	
POINTE COUPEE PARISH	
C-K ASSOCIATES, INC. BATON ROUGE, LOUISIANA	
DRAWN LMP/ACAD	APPROVED KSB
CHECKED [illegible]	DATE [illegible]

REVISION | DATE | BY

3/94A

FIGURE 10

LPDES TREATMENT PONDS CROSS SECTION C-C'



LEGEND

CLAY

NOTE:

1) BASE INFORMATION TAKEN FROM BIG CAJUN'S ORIGINAL APPLICATION.

2) SEE DRAWING No. 5 FOR LOCATION OF CROSS SECTION.

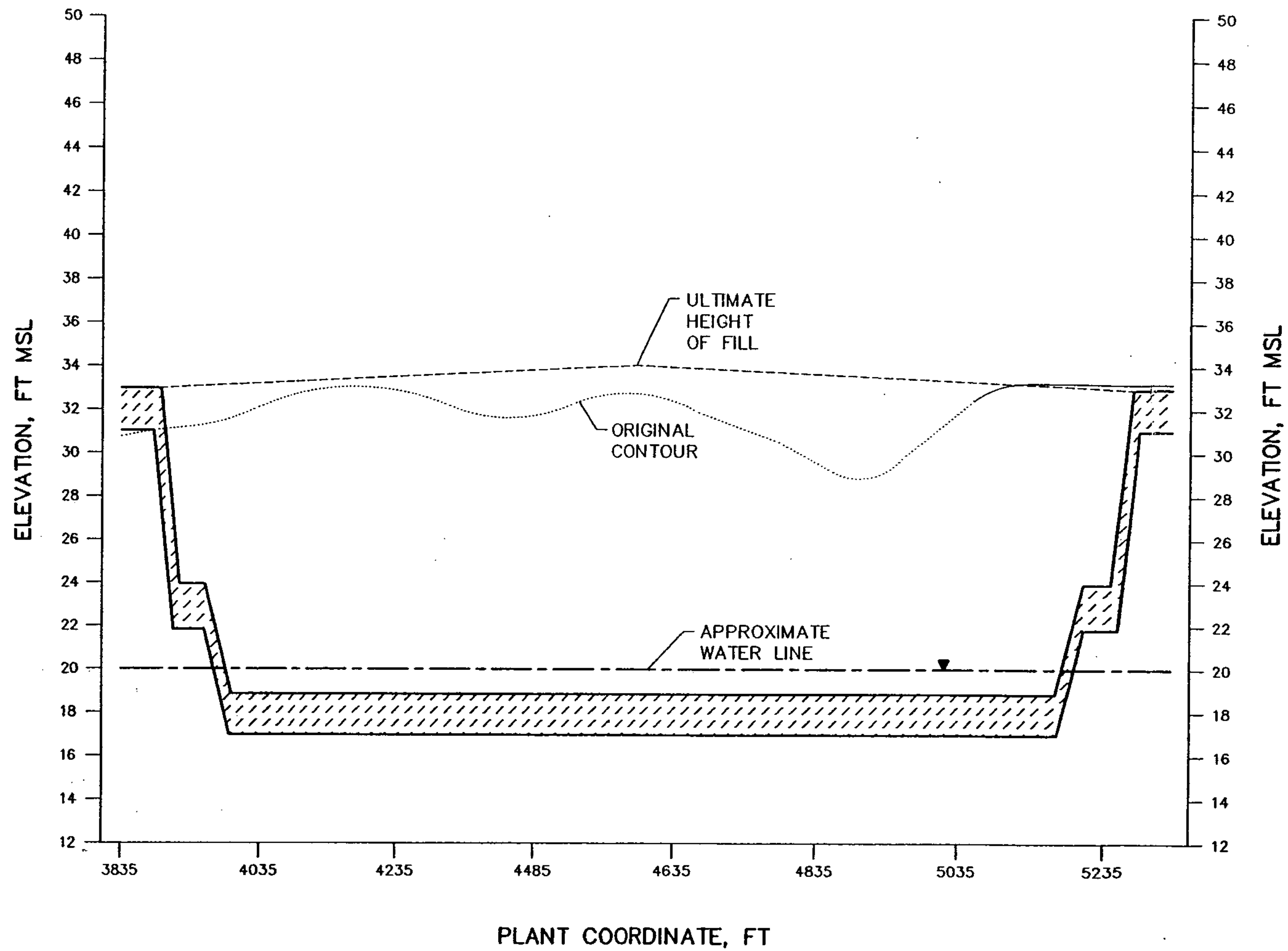
CAJUN ELECTRIC POWER COOPERATIVE, INC.	
BIG CAJUN II POWER PLANT	
SOLID WASTE STANDARD PERMIT APPLICATION	
NPDES TREATMENT PONDS CROSS SECTION C–C'	
POINTE COUPEE PARISH	
C·K ASSOCIATES, INC. BATON ROUGE, LOUISIANA	
DRAWN LMP/ACAD	APPROVED KSB
CHECKED CJH	DATE JANUARY 20, 1994

NO.	REVISION	DATE	BY

23/94A

FIGURE 11

RAINFALL SURGE POND CROSS SECTION D-D'



LEGEND

CLAY

NOTE:

1) BASE INFORMATION TAKEN FROM BIG CAJUN'S ORIGINAL APPLICATION.

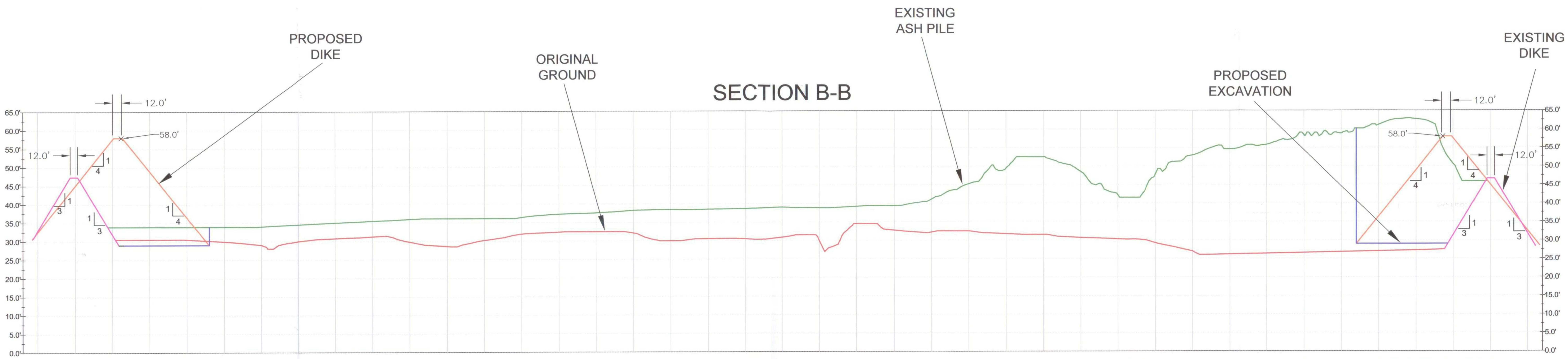
2) SEE DRAWING No. 5 FOR LOCATION OF CROSS SECTION.

BY	CAJUN ELECTRIC POWER COOPERATIVE, INC. BIG CAJUN II POWER PLANT
DATE	SOLID WASTE STANDARD PERMIT APPLICATION
	RAINFALL SURGE POND CROSS SECTION D–D'
REVISION	POINTE COUPEE PARISH
	C·K ASSOCIATES, INC. BATON ROUGE, LOUISIANA
DRAWN LMP/ACAD	APPROVED CJH
CHECKED KSB	DATE JANUARY 20, 1994

20/94A

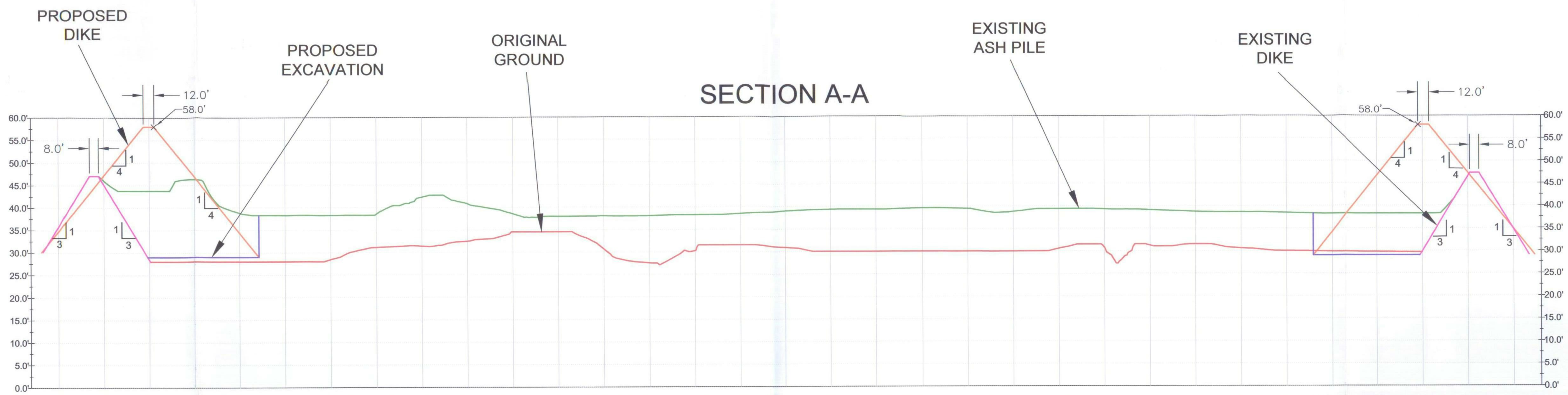
FIGURE 12

PROPOSED BOTTOM ASH POND EXPANSION CROSS SECTION



MAJOR OFFSETS	-950'	-900'	-850'	-800'	-750'	-700'	-650'	-600'	-550'	-500'	-450'	-400'	-350'	-300'	-250'	-200'	-150'	-100'	-50'
ASH PILE ELEVATIONS	-	33.9'	33.9'	33.9'	33.9'	34.0'	34.5'	35.0'	35.4'	35.9'	36.1'	36.1'	36.4'	37.2'	37.6'	38.3'	38.5'	38.5'	38.7'
ORIGINAL GROUND ELEVATIONS	-	-	30.5'	30.5'	29.9'	29.0'	30.0'	30.8'	31.2'	29.8'	28.6'	30.2'	31.9'	32.4'	32.5'	32.1'	30.0'	30.6'	30.5'

MAJOR OFFSETS	+50'	+100'	+150'	+200'	+250'	+300'	+350'	+400'	+450'	+500'	+550'	+600'	+650'	+700'	+750'	+800'	+850'	+900'	+950'
ASH PILE ELEVATIONS	38.8'	39.2'	39.4'	41.2'	45.3'	49.5'	52.5'	48.5'	42.2'	47.8'	52.9'	54.6'	55.8'	58.5'	58.8'	61.2'	62.7'	50.6'	-
ORIGINAL GROUND ELEVATIONS	29.9'	34.5'	32.7'	32.2'	32.5'	31.7'	31.5'	30.7'	30.3'	29.3'	27.0'	26.1'	26.4'	26.6'	26.8'	27.0'	27.2'	-	-



MAJOR OFFSETS	-750'	-700'	-650'	-600'	-550'	-500'	-450'	-400'	-350'	-300'	-250'	-200'	-150'	-100'	-50'
ASH PILE ELEVATIONS	46.0'	43.7'	46.3'	38.8'	38.3'	38.3'	38.5'	42.3'	40.8'	38.5'	37.9'	38.0'	38.1'	38.3'	38.5'
ORIGINAL GROUND ELEVATIONS	-	-	28.0'	28.0'	28.0'	28.5'	31.1'	31.3'	32.4'	34.5'	34.5'	30.6'	27.5'	30.3'	31.5'

MAJOR OFFSETS	+50'	+100'	+150'	+200'	+250'	+300'	+350'	+400'	+450'	+500'	+550'	+600'	+650'	+700'	+750'
ASH PILE ELEVATIONS	39.3'	39.4'	39.6'	39.5'	38.8'	39.4'	39.3'	39.1'	38.7'	38.6'	38.5'	38.3'	38.3'	38.3'	-
ORIGINAL GROUND ELEVATIONS	30.0'	30.0'	30.0'	30.0'	30.0'	30.6'	30.8'	31.2'	31.5'	30.6'	30.0'	29.9'	29.7'	-	-

NOTES:

- ALL ELEVATIONS ARE IN NGVD
- ORIGINAL GROUND ELEVATIONS BASED ON DRAWING NO. 0C-218,OC-217, OC-213 PREPARED BY BOVAY ENGINEERS, INC.

STATE OF LOUISIANA
ELIF ACAR
REG. No. 29852
REGISTERED PROFESSIONAL ENGINEER
IN CIVIL ENGINEERING

Elif Acar 4/28/06

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NO.	Revision	Drawn	Checked	Approved	NO.	Revision	Drawn	Checked	Approved	NO.	Revision	Drawn	Checked	Approved	NO.	Revision	Drawn	Checked	Approved
00	DRAFT ISSUE FOR PERMIT OF PROJECT 1005494008	4/12/06 ESK	4/27/06 EAC	4/27/06 EAC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
01	INITIAL ISSUE FOR PERMIT OF PROJECT 1005494008	4/26/06 ESK	4/27/06 EAC	4/27/06 EAC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

NRG

Shaw®

Baton Rouge (Office)	LOUISIANA GENERATING, LLC NEW ROADS, LOUISIANA
NEW ROADS, LOUISIANA (Site Location)	FIGURE - 12b
Proj. Mgr. RSS	PROPOSED DIKE CROSS-SECTIONS BC II BOTTOM ASH BASIN EXPANSION
Proj. Eng. EAC	
Design EAC	1005494008 (Project #) · 1005494008-D004 (Drawing #) · 01 (Rev)
Drawn ESK	UTM-15 NAD83 (Co-ordinate Base) · N/A (Scale) · ARCH D (Dwg Size) · 1 of 1 (Sheet)

STATE OF LOUISIANA
ELIF ACAR
REG. No. 29852
REGISTERED PROFESSIONAL ENGINEER
IN CIVIL ENGINEERING
4/27/06

NO.	Revision	Drawn	Checked	Approved	NO.	Revision	Drawn	Checked	Approved	NO.	Revision	Drawn	Checked	Approved	NO.	Revision	Drawn	Checked	Approved
00	DRAFT ISSUE FOR PERMIT OF PROJECT 1005494008	4/12/06 ESK	4/27/06 EAC	4/27/06 EAC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
01	INITIAL ISSUE FOR PERMIT OF PROJECT 1005494008	4/26/06 ESK	4/27/06 EAC	4/27/06 EAC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Office
NEW ROADS, LOUISIANA
Site Location
Proj. Mgr. RSS
Proj. Eng. EAC
Design EAC
Drawn ESK

LOUISIANA GENERATING, LLC
NEW ROADS, LOUISIANA

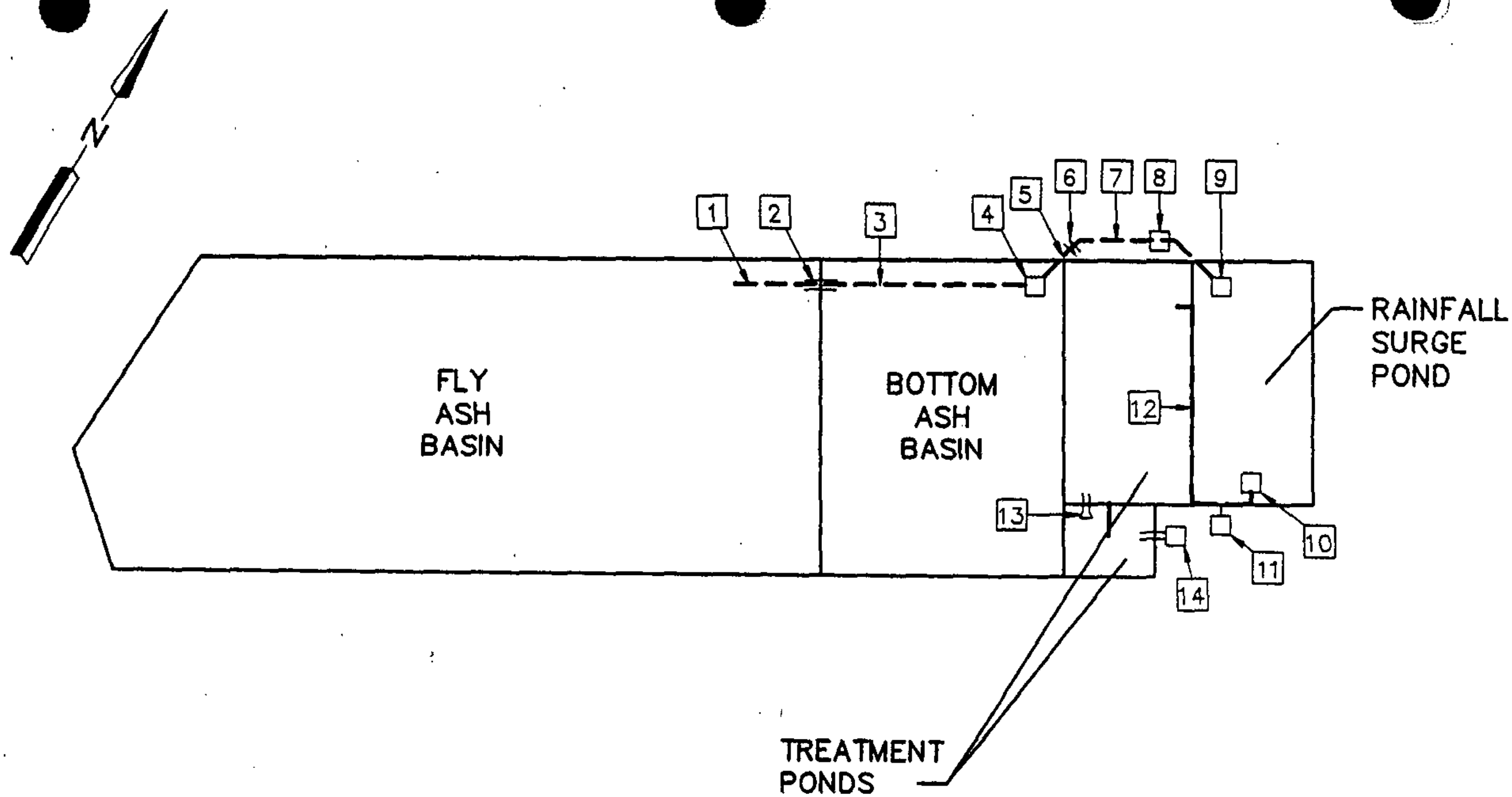
FIGURE - 12a
PROPOSED DIKE
PLAN VIEW
BC II BOTTOM ASH BASIN EXPANSION

Project #	Drawing #		Rev
1005494008	1005494008-D003		01

Co-ordinate Base	Scale	Dwg Size	Sheet
UTM-15 NAD83	1"=150'	ARCH D	1 of 1

FIGURE 13

SCHEMATIC OF RUNOFF COLLECTION AND TREATMENT FACILITIES



NOTES:

1) BASE INFORMATION TAKEN FROM BIG CAJUN'S ORIGINAL PERMIT APPLICATION.

2) REFER TO LAC 33:VII.521.C.1.b OF THIS DOCUMENT FOR DESCRIPTIONS.

APPROXIMATE SCALE

FEET

1000 0 1000 2000

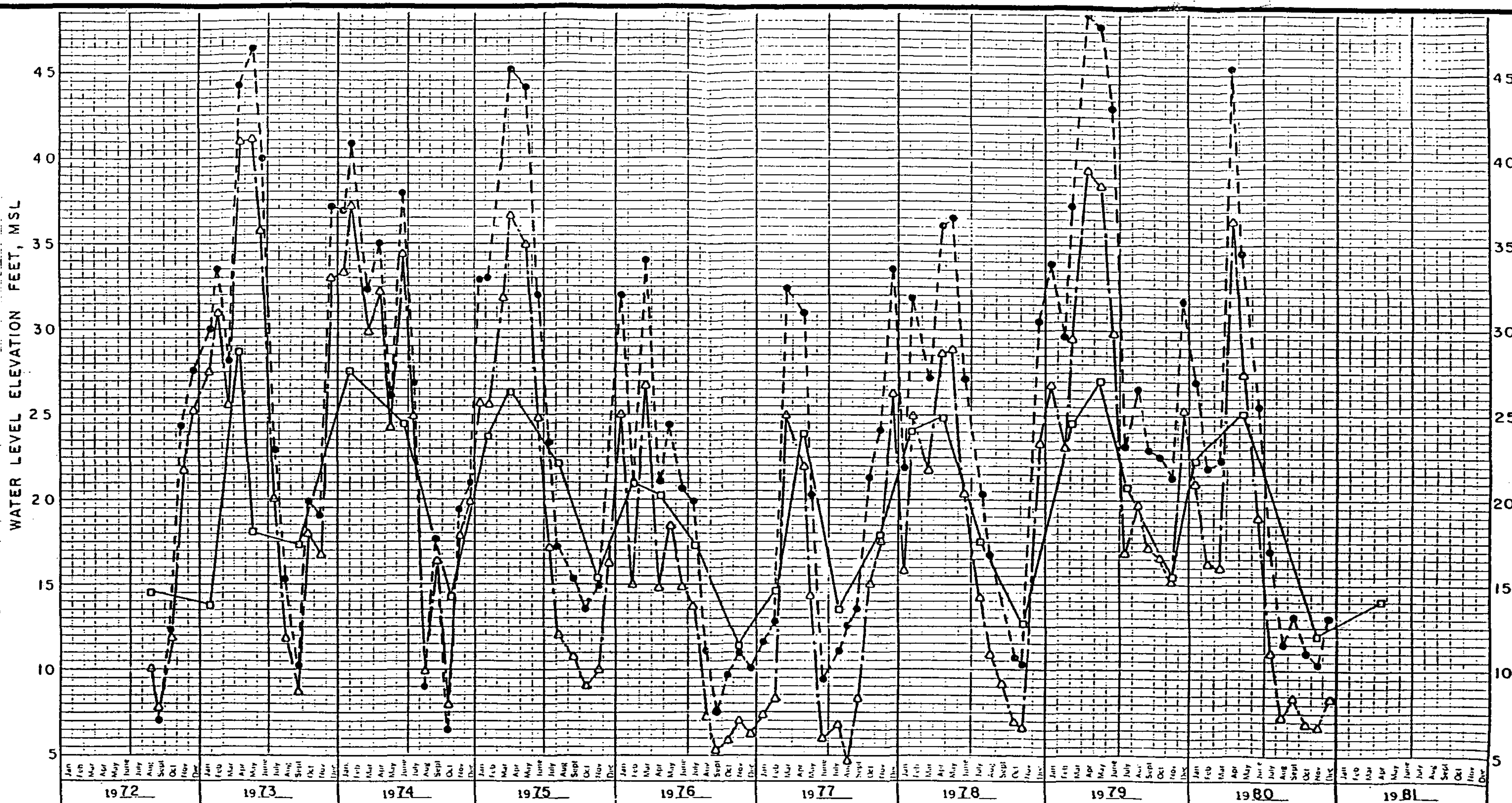
1" = 1000'

BY	**CAJUN ELECTRIC POWER COOPERATIVE, INC.** BIG CAJUN II POWER PLANT
DATE	SOLID WASTE STANDARD PERMIT APPLICATION SCHEMATIC OF THE RUNOFF COLLECTION AND TREATMENT FACILITIES POINTE COUPEE PARISH
REVISION	C·K ASSOCIATES, INC. BATON ROUGE, LOUISIANA
NO.	DRAWN LMP/ACAD — APPROVED KSB CHECKED CJH — DATE JANUARY 21, 1994 SHEET — DWG. NO. A05-268-12

01/23/948

FIGURE 14

HYDROGRAPHS OF THE MISSISSIPPI RIVER AND WELL PC-156



LEGEND

● - MISSISSIPPI RIVER AT BAYOU SARA, LA.

△ - MISSISSIPPI RIVER AT BATON ROUGE, LA.

□ - ALLUVIAL WELL (PC-156)

NOTE:

BASE INFORMATION TAKEN FROM BIG CAJUN ORIGINAL PERMIT APPLICATION.

CAJUN ELECTRIC POWER COOPERATIVE, INC.
BIG CAJUN II POWER PLANT
SOLID WASTE STANDARD PERMIT APPLICATION

HYDROGRAPHS OF MISSISSIPPI RIVER AND WELL PC-156

POINTE COUPEE PARISH

C·K ASSOCIATES, INC.
BATON ROUGE, LOUISIANA

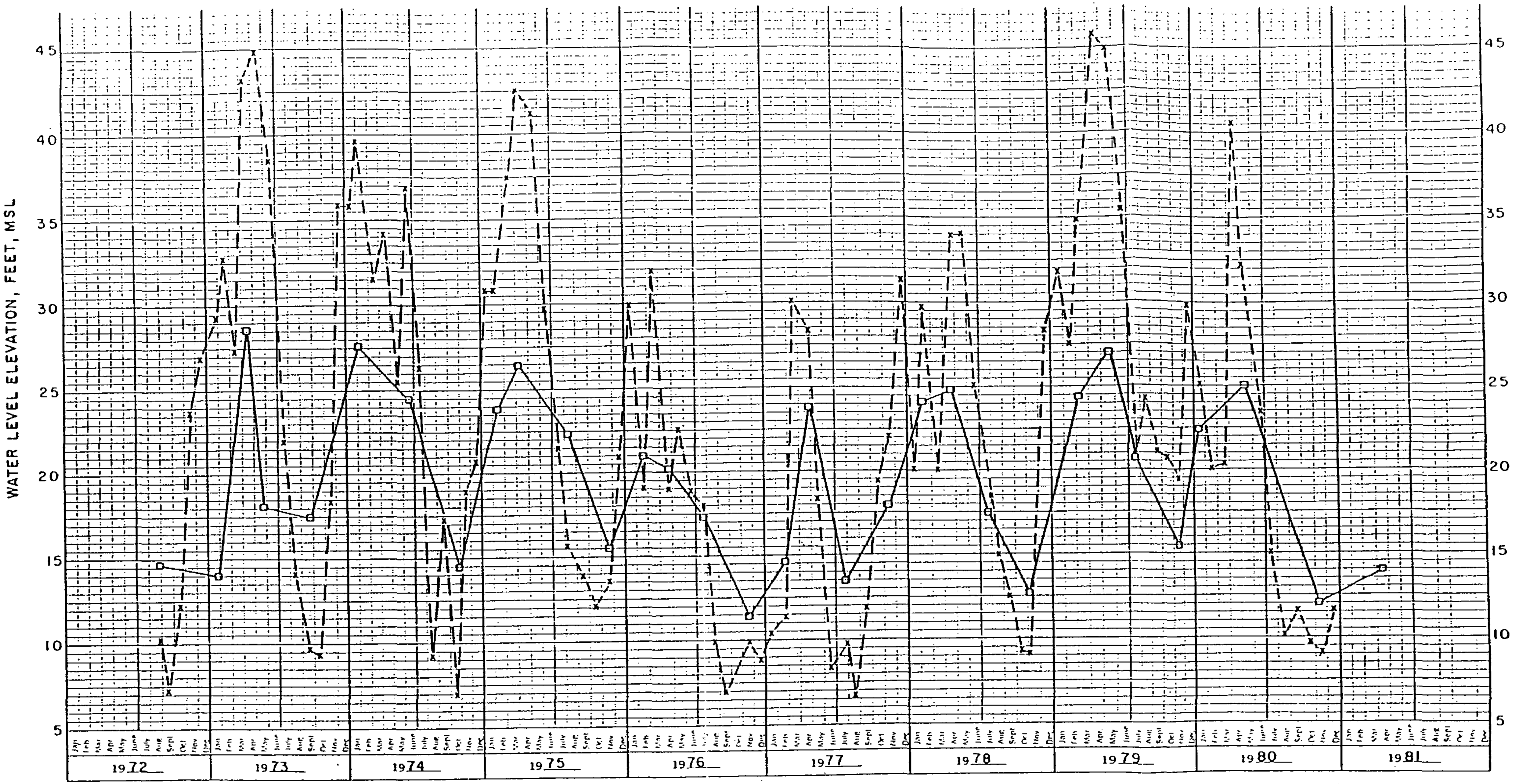
REVISION	DATE	BY

DRAWN	LMP	APPROVED	
CHECKED		DATE	JANUARY 21, 1994

0/84A

FIGURE 15

INTERPOLATED HYDROGRAPHS OF THE MISSISSIPPI RIVER AND WELL PC-156



LEGEND

X - INTERPOLATED MISSISSIPPI RIVER STAGE NEAR WELL PC-156

□ - ALLUVIAL WELL (PC-156)

NOTE:

BASE INFORMATION TAKEN FROM BIG CAJUN ORIGINAL PERMIT APPLICATION.

REVISION	DATE	BY

CAJUN ELECTRIC POWER COOPERATIVE, INC.
BIG CAJUN II POWER PLANT

SOLID WASTE STANDARD PERMIT APPLICATION

INTERPOLATED HYDROGRAPH OF MISSISSIPPI RIVER AND WELL PC-156

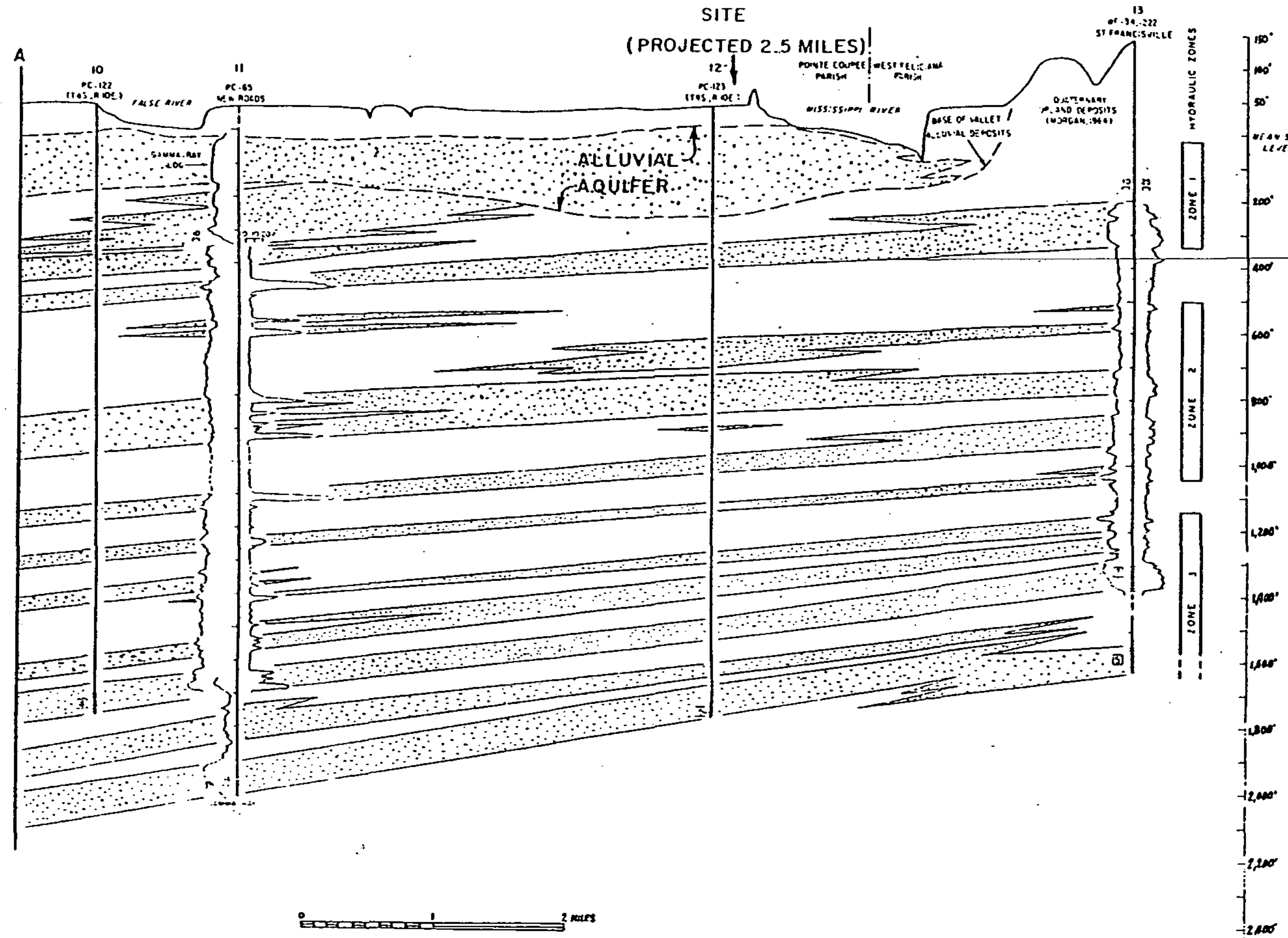
POINTE COUPEE PARISH

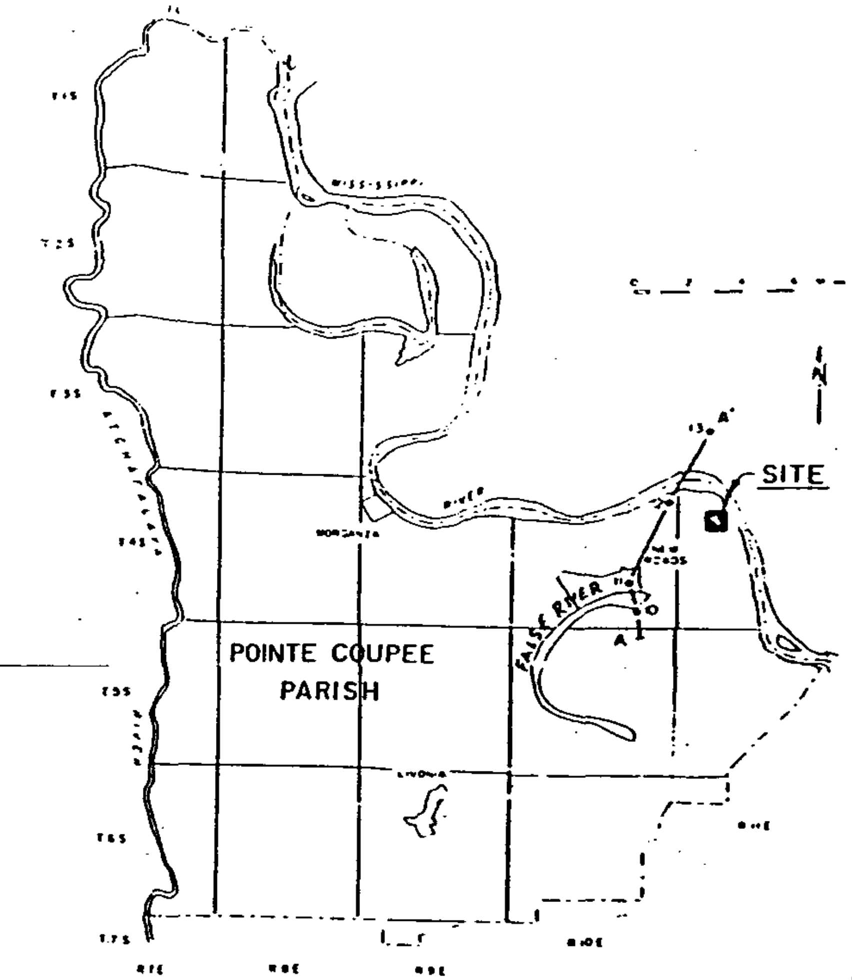
C-K ASSOCIATES, INC.
BATON ROUGE, LOUISIANA

DRAWN	LMP	APPROVED	KSB
CHECKED	CJH	DATE	JANUARY 21, 1994

FIGURE 16

HYDROGEOLOGIC SECTION





INDEX MAP

EXPLANATION

- FRESH WATER BEARING SAND
- CLAY OR SILT
- 5 CHLORIDE CONCENTRATION, PPM

NOTE:

BASE INFORMATION TAKEN FROM BIG CAJUN ORIGINAL PERMIT APPLICATION.

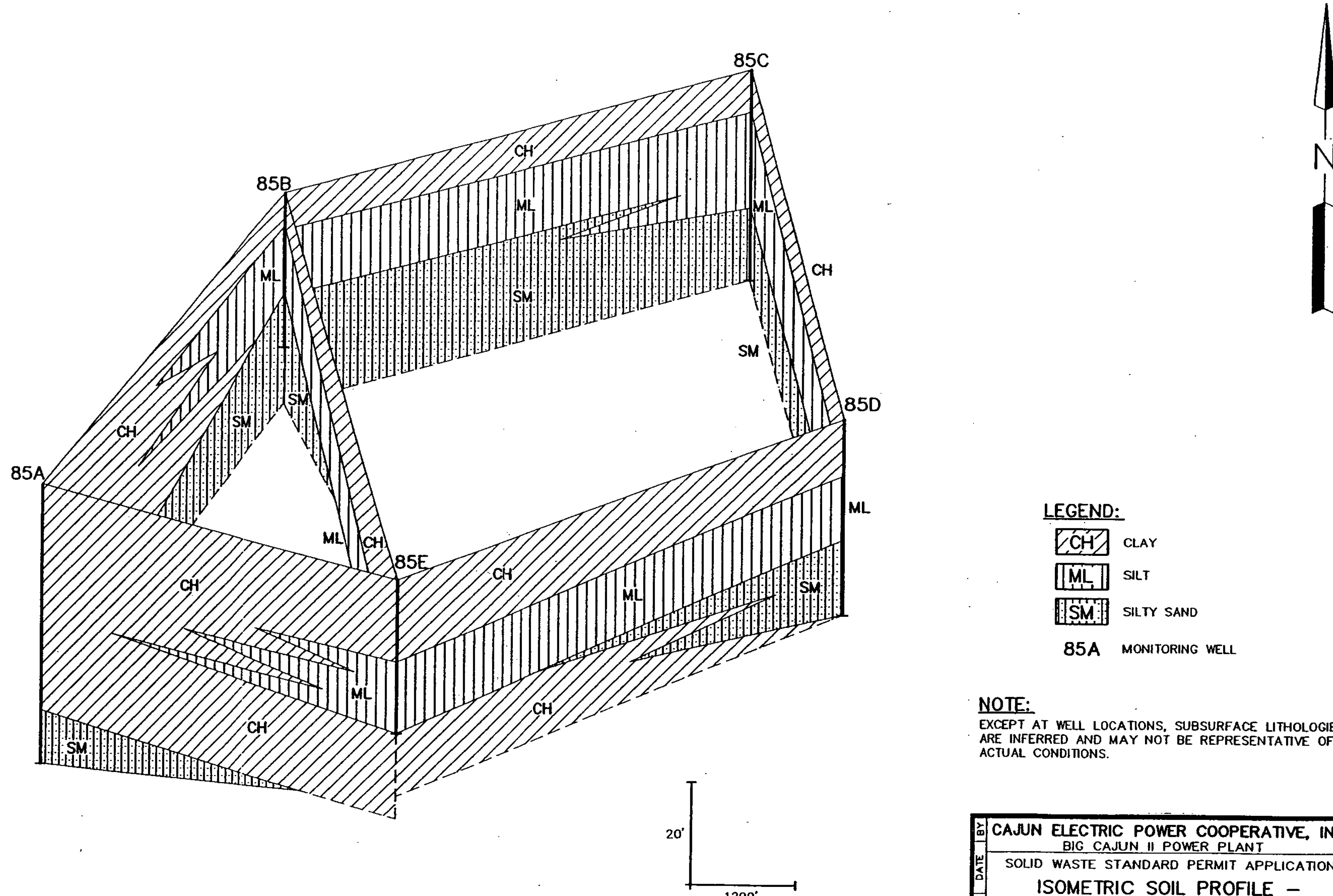
MODIFIED AFTER: LOUISIANA WATER RESOURCES BULLETIN NO. 11, 1968

CAJUN ELECTRIC POWER COOPERATIVE, INC. BIG CAJUN II POWER PLANT	
SOLID WASTE STANDARD PERMIT APPLICATION	
HYDROGEOLOGIC SECTION	
POINTE COUPEE PARISH	
C-K ASSOCIATES, INC. BATON ROUGE, LOUISIANA	
DRAWN LMP	APPROVED KSB
CHECKED CSM	DATE JANUARY 21, 1994

0/94A

FIGURE 17

ISOMETRIC SOIL PROFILE



LEGEND:

CH	CLAY
ML	SILT
SM	SILTY SAND
85A	MONITORING WELL

NOTE:
EXCEPT AT WELL LOCATIONS, SUBSURFACE LITHOLOGIES ARE INFERRED AND MAY NOT BE REPRESENTATIVE OF ACTUAL CONDITIONS.

APPROXIMATE SCALE

VERTICAL SCALE	1" = 20'
HORIZONTAL SCALE	1" = 1200'

CAJUN ELECTRIC POWER COOPERATIVE, INC.
BIG CAJUN II POWER PLANT
SOLID WASTE STANDARD PERMIT APPLICATION

ISOMETRIC SOIL PROFILE – INDUSTRIAL SOLID WASTE SURFACE IMPOUNDMENTS

POINTE COUPEE PARISH

C·K ASSOCIATES, INC.
BATON ROUGE, LOUISIANA

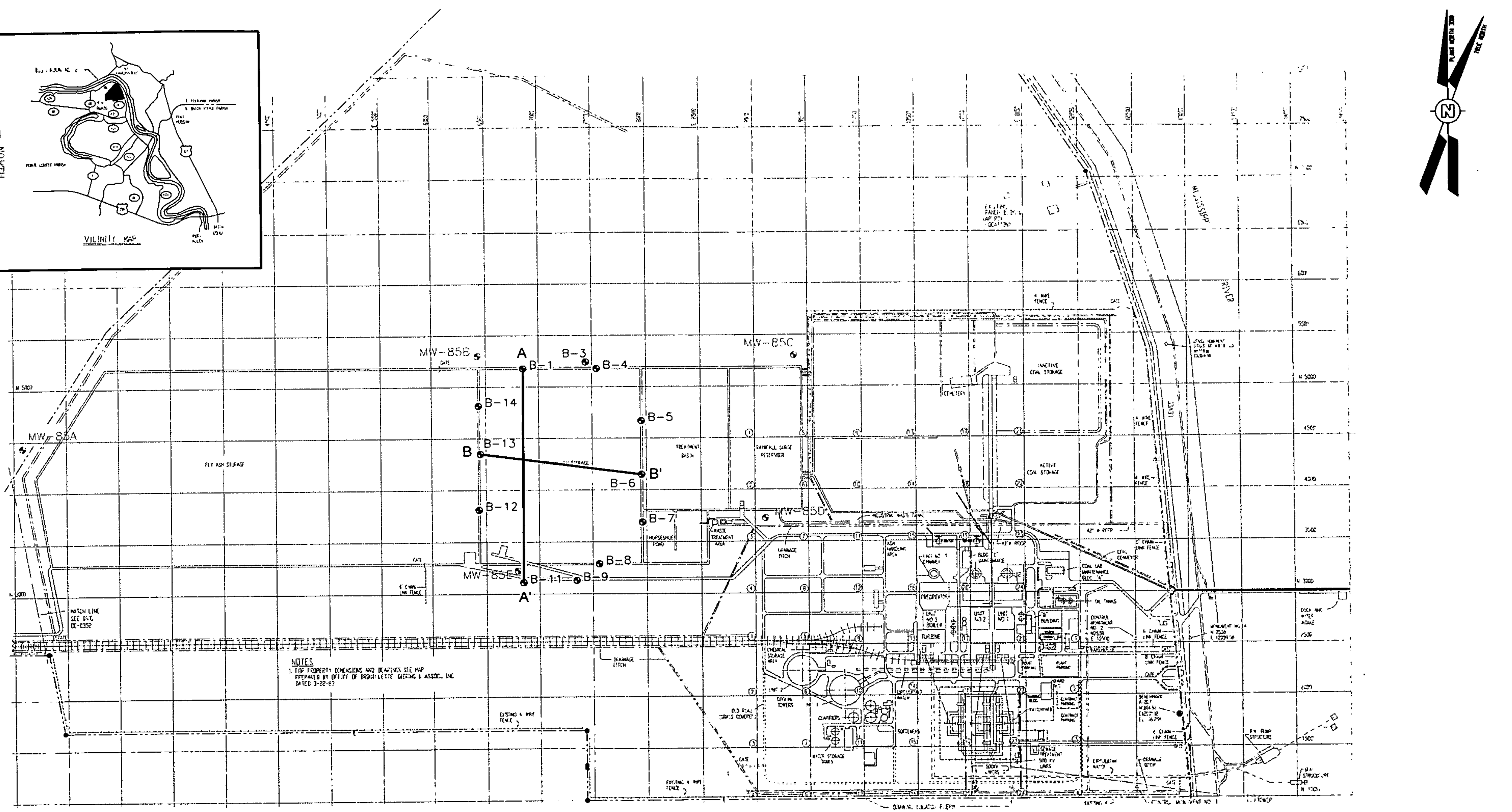
DRAWN	MPC/ACAD	APPROVED	SEW
CHECKED	AEW	DATE	JANUARY 14, 1994

REVISION | DATE | BY

13/94C

FIGURE 18

CROSS SECTION LOCATION MAP



LEGEND

— · · —	PROPERTY LINE
⊗	BORING LOCATIONS

SCALE 0 1000 2000 FEET

LOUISIANA GENERATING, L.L.C.
BIG CAJUN II POWER PLANT
NEW ROADS, LA

FIGURE 18

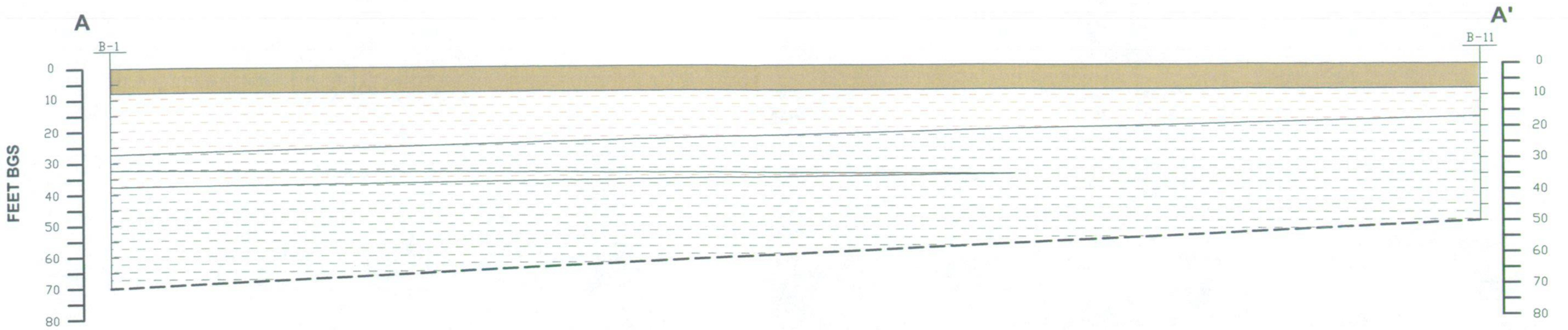
CROSS SECTION/ BORING LOCATION MAP

BIG CAJUN II POWER PLANT

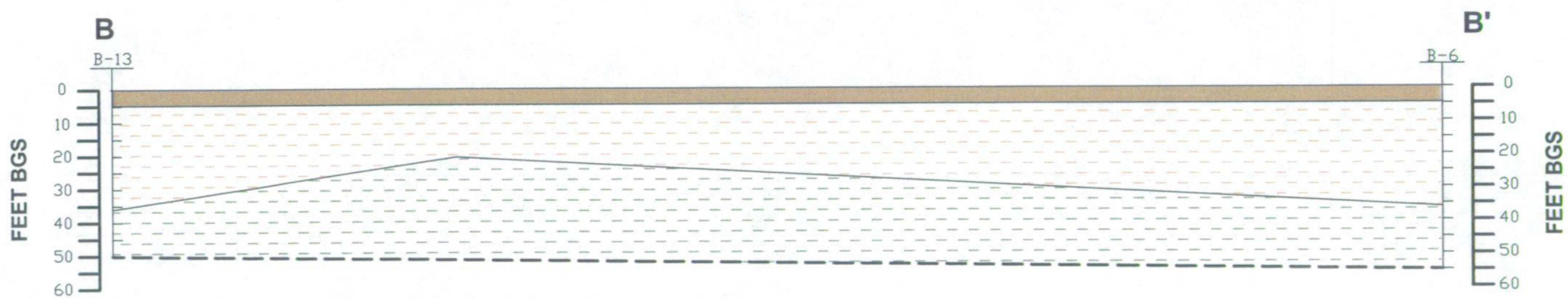
IMAGE	X-REF	OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
---	---	BTR	J.BOUDREAUX 02/23/06	JT 4/27/06		100549401O-B11

FIGURE 19

CROSS SECTIONS



CROSS SECTION A-A'
VERTICAL SCALE AS SHOWN
HORIZONTAL SCALE:
SCALE
0 150 300 FEET
APPROXIMATE HORIZONTAL SCALE



CROSS SECTION B-B'
VERTICAL SCALE AS SHOWN
HORIZONTAL SCALE:
SCALE
0 150 300 FEET
APPROXIMATE HORIZONTAL SCALE

LEGEND

- FILL MATERIAL
- SM — SILTY SAND OR SILT AND SAND MIXTURE
- CL — NON-HUMUS CLAY, SANDY CLAY, SILTY CLAY, LOW TO MEDIUM PLASTICITY

Shaw

LOUISIANA GENERATING, L.L.C.
BIG CAJUN II POWER PLANT
NEW ROADS, LA

FIGURE 19

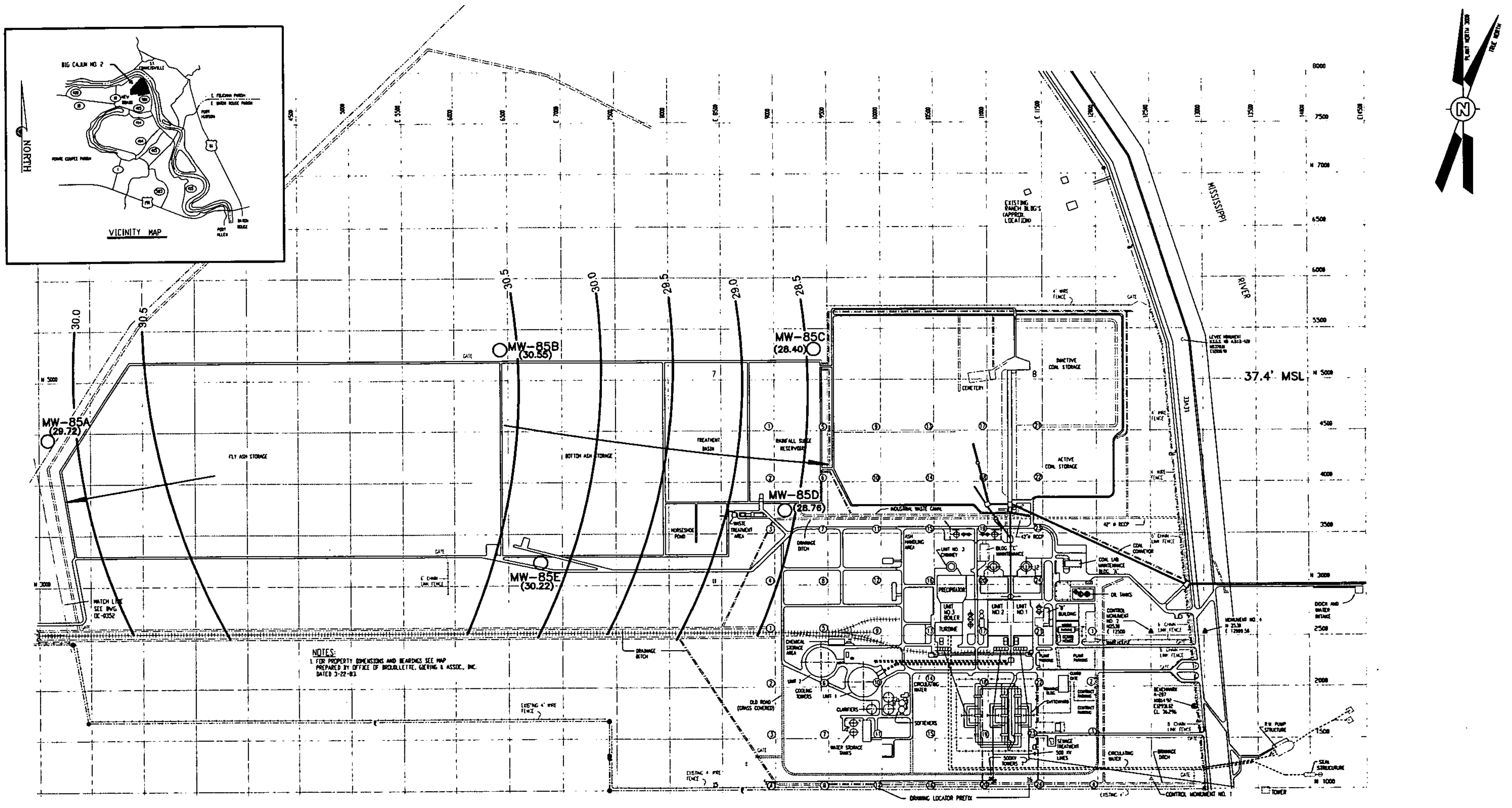
CROSS SECTIONS

BIG CAJUN II POWER PLANT

IMAGE	X-REF	OFFICE	DRAWN BY		CHECKED BY	APPROVED BY	DRAWING NUMBER
---	---	BTR	J.BOUDREAUX	02/23/06	9T 4/27/06		1005494010-B9

FIGURE 20

POTENTIOMETRIC SURFACE MAP
MARCH 25, 2004



LEGEND

....	PROPERTY LINE
30.0 ——	POTENTIOMETRIC SUFACE ELEVATION (feet, MSL)
○MW-85B	MONITORING WELL LOCATION
(29.72)	GROUNDWATER ELEVATION (feet, MSL)
←	GROUNDWATER FLOW DIRECTION

SCALE
0 1000 2000 FEET

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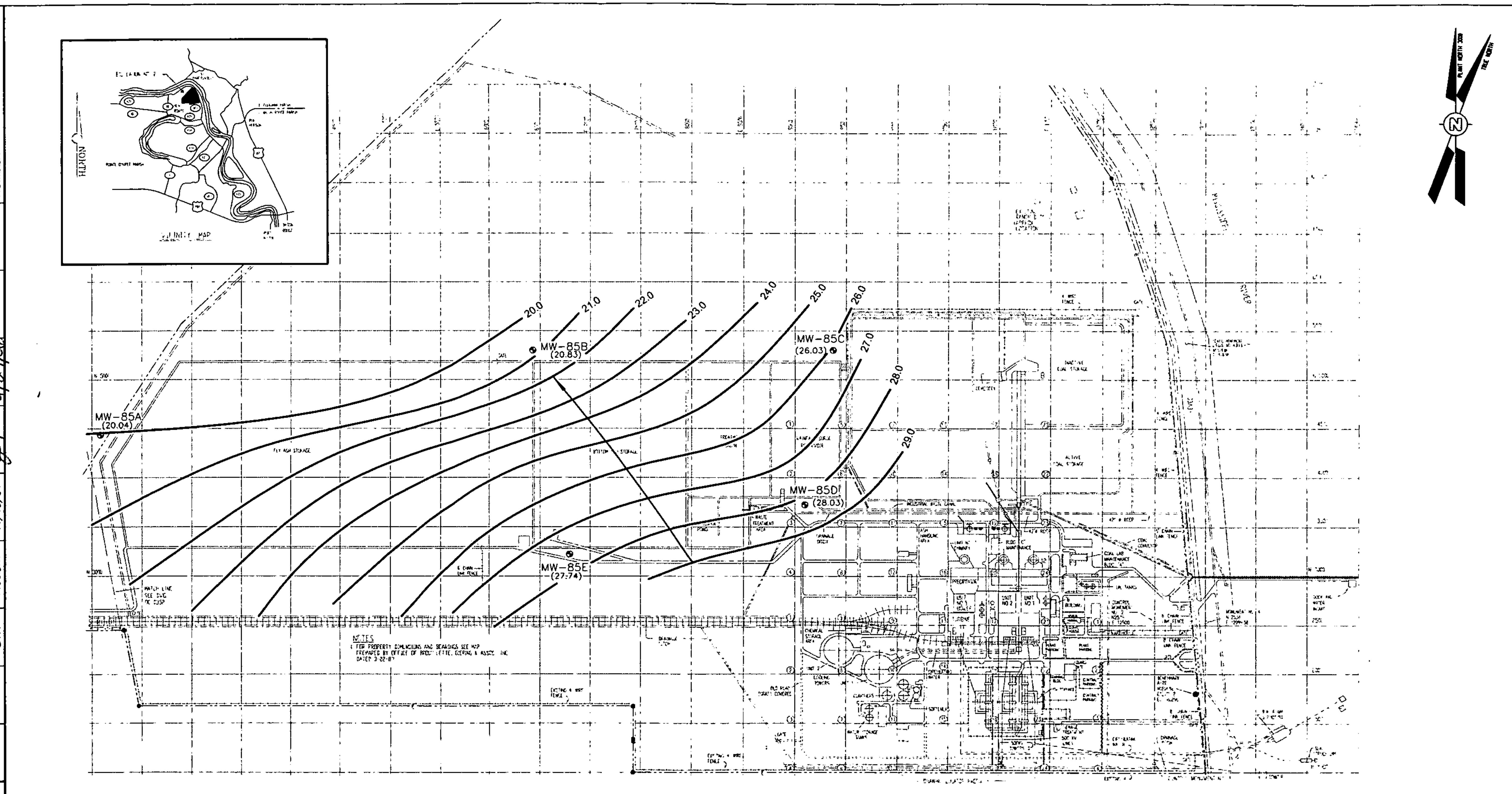
BIG CAJUN II POWER PLANT
NEW ROADS, LA

FIGURE 20
POTENTIOMETRIC SURFACE MAP
(MARCH 25, 2004)
BIG CAJUN II POWER PLANT
SOLID WASTE PERMIT APPLICATION

IMAGE	X-REF	OFFICE	DRAWN BY		CHECKED BY	APPROVED BY	DRAWING NUMBER
---	---	BTR	P.GUIDRY	5/12/04	DT 4/27/06		5494010-B1

FIGURE 21

POTENTIOMETRIC SURFACE MAP
SEPTEMBER 28, 2004



LEGEND

---- - ----	PROPERTY LINE
30.0 ———	POTENTIOMETRIC SUFACE ELEVATION (feet, MSL)
⊕ MW-85B	MONITORING WELL LOCATION
(29.72)	GROUNDWATER ELEVATION (feet, MSL)
←——	GROUNDWATER FLOW DIRECTION

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BIG CAJUN II POWER PLANT
NEW ROADS, LA

FIGURE 21

POTENTIONMETRIC SURFACE MAP
(SEPTEMBER 28, 2004)

BIG CAJUN II POWER PLANT
SOLID WASTE PERMIT APPLICATION

IMAGE	X-REF	OFFICE	DRAWN BY		CHECKED BY		APPROVED BY	DRAWING NUMBER
---	---	BTR	P.GUIDRY	11/10/04	JT	4/27/06		5494010-B2

FIGURE 22

POTENTIOMETRIC SURFACE MAP
MARCH 29, 2005

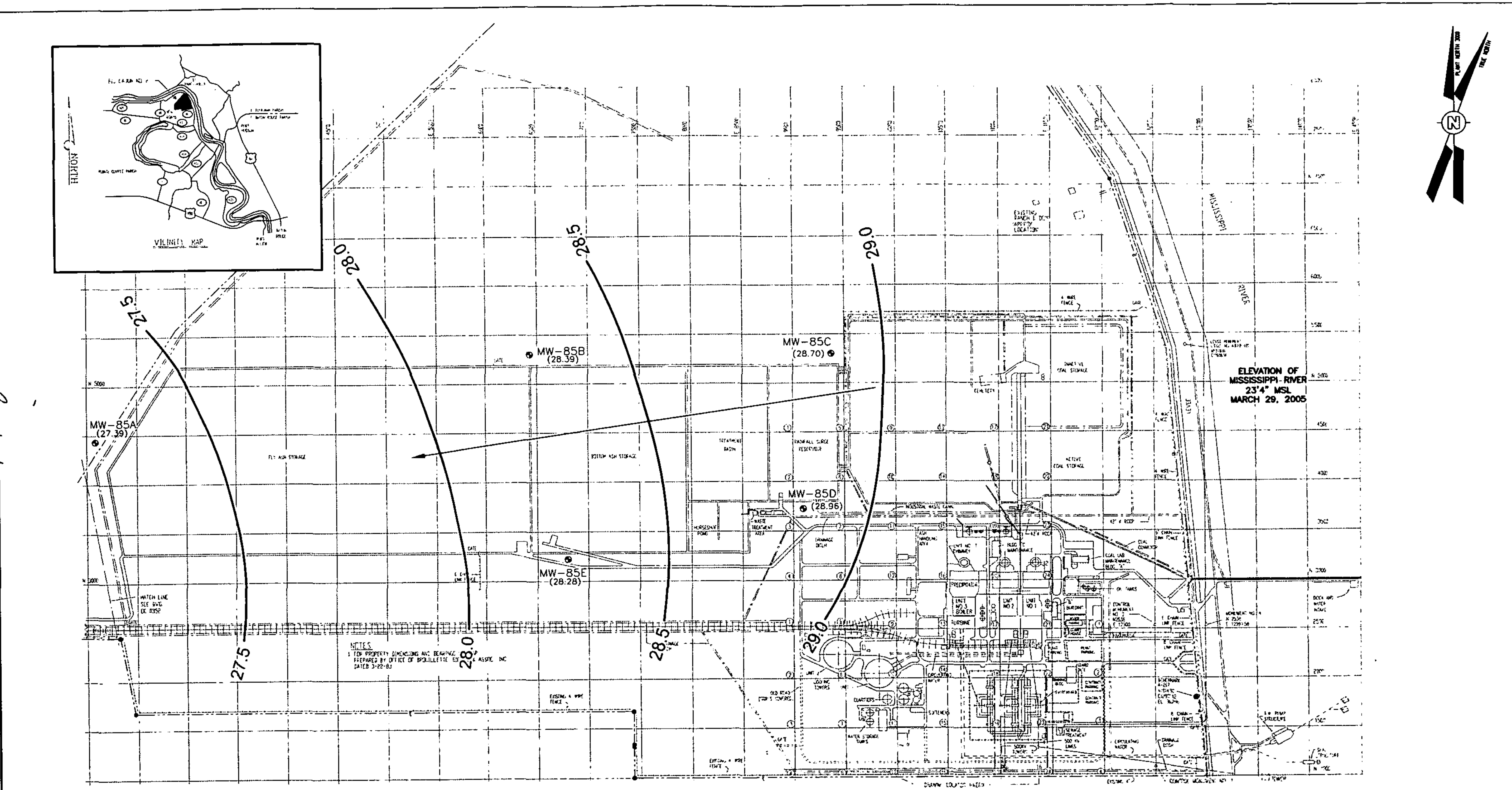

IMAGE	X-REF	OFFICE	DRAWN BY		CHECKED BY	APPROVED BY	DRAWING NUMBER
---	---	BTR	J.BOUDREAUX	05/05/05	4/27/06		5494010-B3

LEGEND

- PROPERTY LINE
- 30.0 — POTENTIOMETRIC SUFACE ELVATION (feet, MSL)
- ⊗ MW-85B — MONITORING WELL LOCATION
- (29.72) — GROUNDWATER ELEVATION (feet, MSL)
- ← GROUNDWATER FLOW DIRECTION

SCALE

0 1000 2000 FEET

LOUISIANA GENERATING, LLC
BIG CAJUN II POWER PLANT
NEW ROADS, LA

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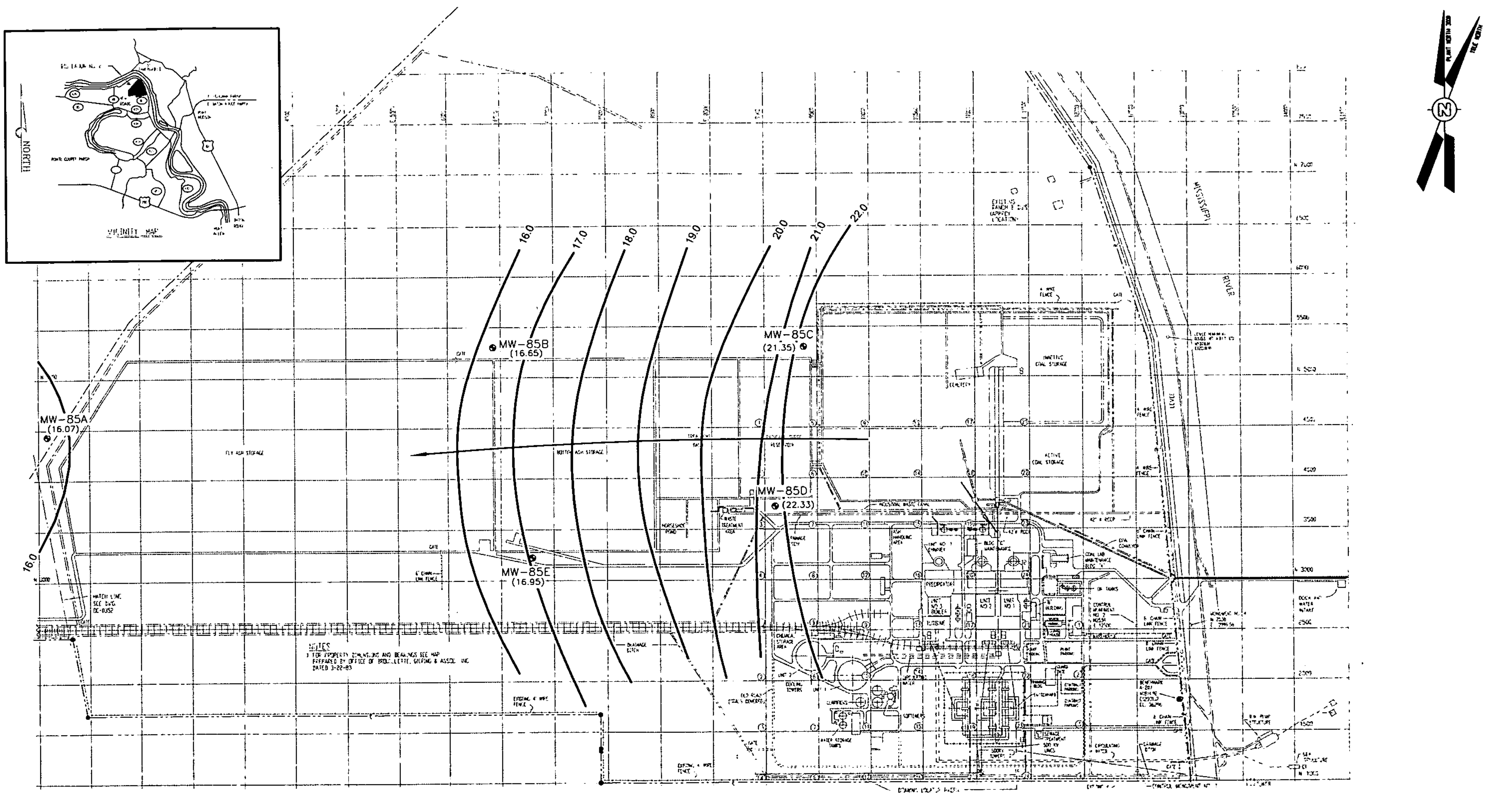
FIGURE 22

POTENTIONMETRIC SURFACE MAP
(MARCH 29, 2005)

BIG CAJUN II POWER PLANT
SOLID WASTE PERMIT APPLICATION

FIGURE 23

POTENTIOMETRIC SURFACE MAP
OCTOBER 20, 2005



LEGEND

PROPERTY LINE

30.0 POTENTIOMETRIC SUFACE ELVATION (feet, MSL)

MW-85B MONITORING WELL LOCATION

(29.72) GROUNDWATER ELEVATION (feet, MSL)

GROUNDWATER FLOW DIRECTION

SCALE

0 1000 2000 FEET

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LOUISIANA GENERATING, LLC
BIG CAJUN II POWER PLANT
NEW ROADS, LA

FIGURE 23

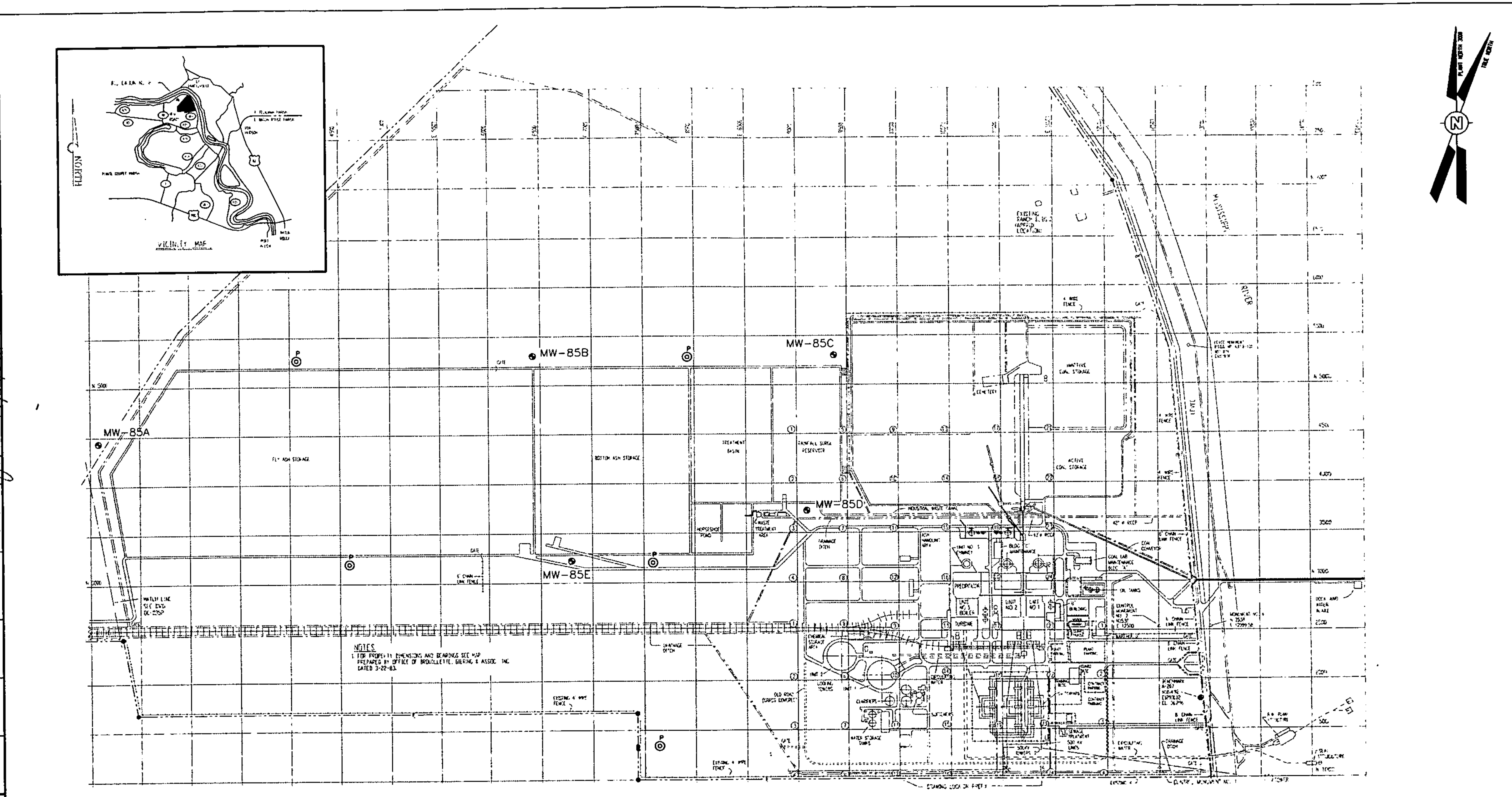
POTENTIONMETRIC SURFACE MAP
(OCTOBER 20, 2005)

BIG CAJUN II POWER PLANT
SOLID WASTE PERMIT APPLICATION

IMAGE	X-REF	OFFICE	DRAWN BY		CHECKED BY	APPROVED BY	DRAWING NUMBER
---	---	BTR	J.BOUDREAUX	11/14/05	QT 1/27/06		5494010-B4

FIGURE 24

PROPOSED PIEZOMETER LOCATIONS



LEGEND

—·—·—	PROPERTY LINE
⊗ MW-85B	MONITORING WELL LOCATION
◎ P	PROPOSED PIEZOMETER LOCATIONS

LOUISIANA GENERATING, L.L.C.
BIG CAJUN II POWER PLANT
NEW ROADS, LA

FIGURE 24

PROPOSED PIEZOMETERS FOR GROUNDWATER MONITORING

BIG CAJUN II POWER PLANT

IMAGE	X-REF	OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
---	---	BTR	J.BOUDREAUX 02/23/06	QT 4/27/06		100549010-B10

FIGURE 25

HISTORICAL BORING LOCATION MAP

NOTE:
BASE MAP TAKEN FROM "PRELIMINARY WASTE WATER TREATMENT AND FILE LAYOUT", DATED OCT. 11, 1975, PROVIDED BY CLIENT.

NO.	REVISION	DATE	BY

BIG CAJUN II POWER PLANT
SOLID WASTE STANDARD PERMIT APPLICATION

SOIL BORINGS LOCATION MAP

POINTE COUPEE PARISH

C·K ASSOCIATES INC.
BATON ROUGE, LOUISIANA

DRAWN KWS	APPROVED KSB
CHECKED CJH	DATE JANUARY 27, 1994
SHEET 1 OF 1	DWG. NO. C05-268-15

FIGURE 26
EXISTING CONDITIONS PLAN REVIEW

STATE OF LOUISIANA
ELIF ACAR
REG. No. 29852
REGISTERED PROFESSIONAL ENGINEER
IN
CIVIL ENGINEERING

Elif Acar 4/27/06

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Baton Rouge
Office
NEW ROADS, LOUISIANA
Site Location

Proj. Mgr.	RSS
Proj. Eng.	EAC
Design	EAC
Drawn	ESK

LOUISIANA GENERATING, LLC
NEW ROADS, LOUISIANA

FIGURE - 26

EXISTING CONDITIONS
PLAN VIEW
BC II BOTTOM ASH BASIN EXPANSION

1005494008	1005494008-D001		01
Project #	Drawing #		Rev
UTM-15 NAD83	1"=150'	ARCH D	1 of 1
Co-ordinate Base	Scale	Dwg Size	Sheet

00	DRAFT ISSUE FOR PERMIT OF PROJECT 1005494008	4/12/06 ESK	4/27/06 EAC	4/27/06 EAC	-	-	- -	- -	- -	-	-	- -	- -	- -	-	-	- -	- -	- -
01	INITIAL ISSUE FOR PERMIT OF PROJECT 1005494008	4/25/06 ESK	4/27/06 EAC	4/27/06 EAC	-	-	- -	- -	- -	-	-	- -	- -	- -	-	-	- -	- -	- -
NO.	Revision	Drawn	Checked	Approved	NO.	Revision	Drawn	Checked	Approved	NO.	Revision	Drawn	Checked	Approved	NO.	Revision	Drawn	Checked	Approved

FIGURE 27
INITIAL GRADING PLAN

STATE OF LOUISIANA
ELIF ACAR
REG. No. 29852
REGISTERED PROFESSIONAL ENGINEER
IN
CIVIL ENGINEERING

NO.	Revision	Drawn	Checked	Approved
00	DRAFT ISSUE FOR PERMIT OF PROJECT 1005494008	4/12/06 ESK	4/27/06 EAC	4/27/06 EAC
01	INITIAL ISSUE FOR PERMIT OF PROJECT 1005494008	4/26/06 ESK	4/27/06 EAC	4/27/06 EAC

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NEW ROADS, LOUISIANA
Site Location
Proj. Mgr. RSS
Proj. Eng. EAC
Design EAC
Drawn ESK

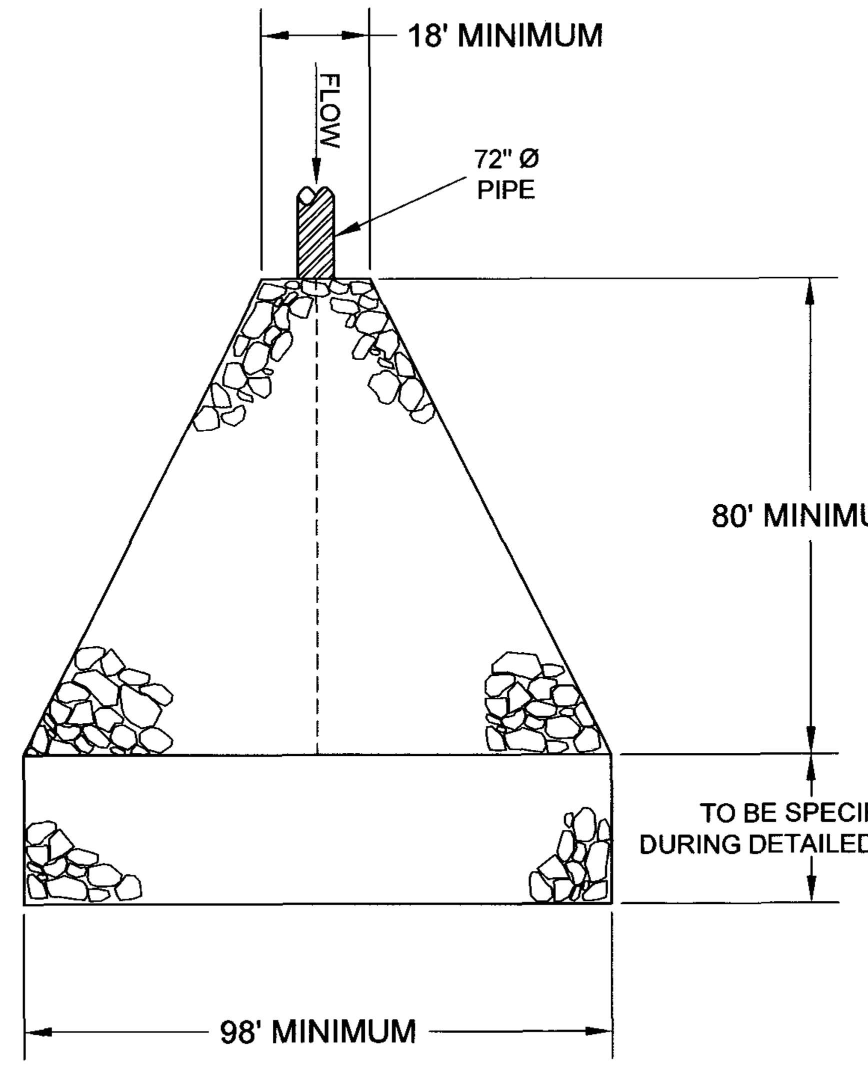
LOUISIANA GENERATING, LLC
NEW ROADS, LOUISIANA

FIGURE - 27

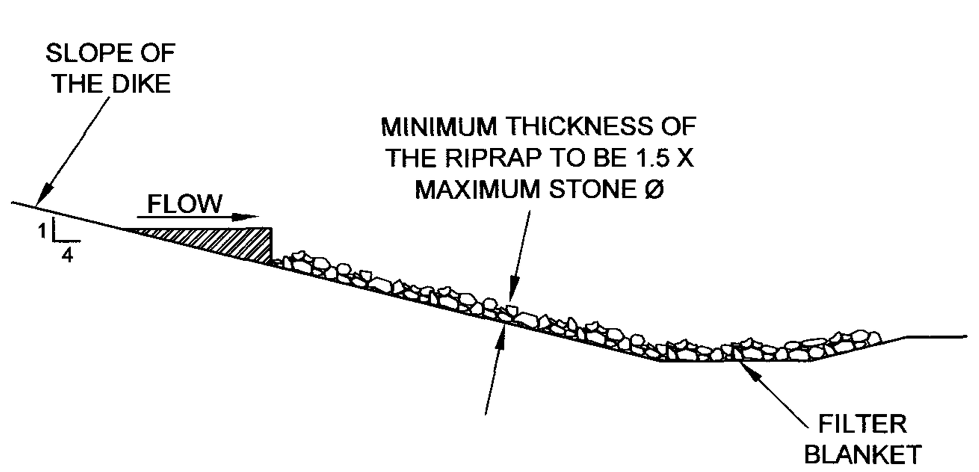
INITIAL GRADING
PLAN VIEW
BC II BOTTOM ASH BASIN EXPANSION

Project #	Drawing #	Rev
1005494008	1005494008-D002	01
UTM-15 NAD83	1"=150' ARCH D	1 of 1

FIGURE 28
BOTTOM ASH EXPANSION
FINAL CAP DESIGN

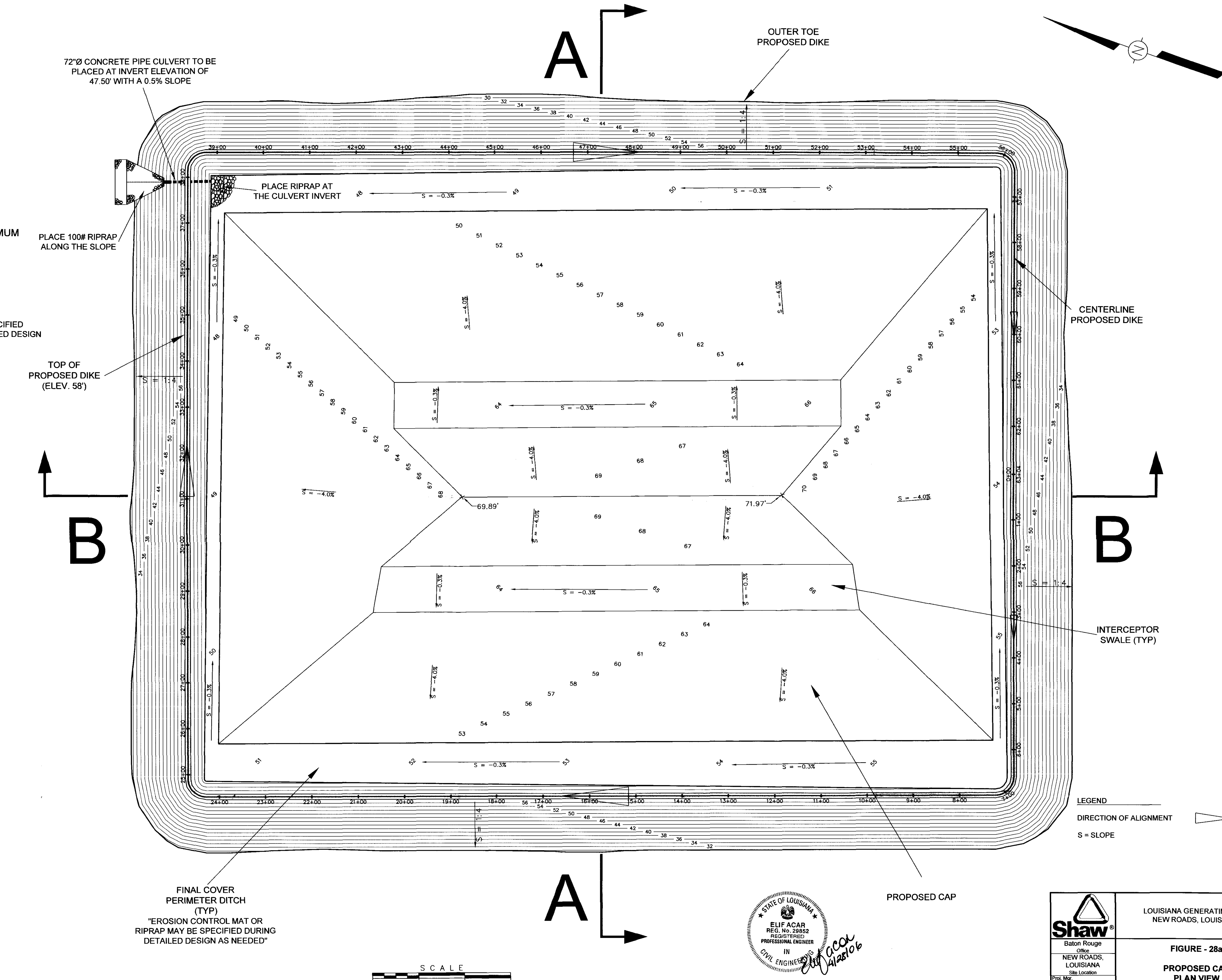


PLAN VIEW OF DISCHARGE PIPE
(NOT TO SCALE)



PROFILE VIEW OF DISCHARGE PIPE
(NOT TO SCALE)

DETAILS AND EXACT DIMENSIONS OF OUTLET EROSION PROTECTION WILL BE PROVIDED DURING DETAILED DESIGN



STATE OF LOUISIANA
ELIF ACAR
REG. No. 29852
REGISTERED PROFESSIONAL ENGINEER
IN
CIVIL ENGINEERING
4/28/06

THIS DESIGN AND PRINT ARE INTENDED FOR PERMIT APPLICATION ONLY AND SHALL NOT BE USED FOR CONSTRUCTION OR BIDDING PURPOSES.

NO.	Revision	Drawn	Checked	Approved
00	DRAFT ISSUE FOR PERMIT OF PROJECT 1005494008	4/14/06 ESK	4/27/06 EAC	4/27/06 EAC
01	INITIAL ISSUE FOR PERMIT OF PROJECT 1005494008	4/26/06 ESK	4/27/06 EAC	4/27/06 EAC

Shaw®
NRG

Office	Baton Rouge
Site Location	NEW ROADS, LOUISIANA
Proj. Mgr.	RSS
Proj. Eng.	EAC
Design	EAC
Drawn	ESK

LOUISIANA GENERATING, LLC
NEW ROADS, LOUISIANA

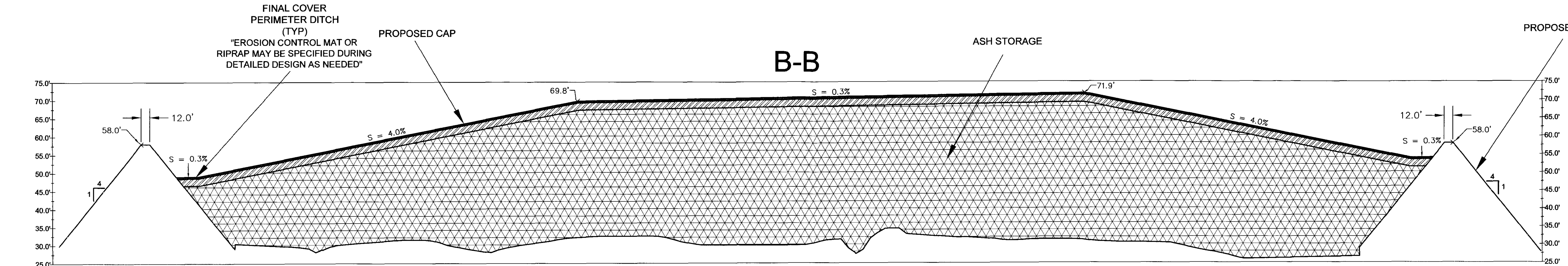
FIGURE - 28a

PROPOSED CAP
PLAN VIEW
BC II BOTTOM ASH BASIN EXPANSION

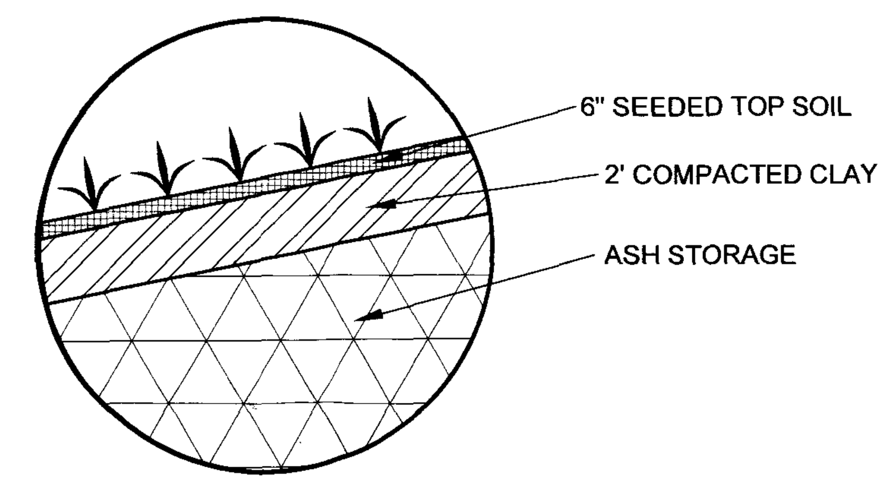
Project #	Drawing #	Rev
1005494008	1005494008-D005	01

Co-ordinate Base	Scale	Dwg Size	Sheet
UTM-15 NAD83	1"=100'	ARCH D	1 of 1

B-B

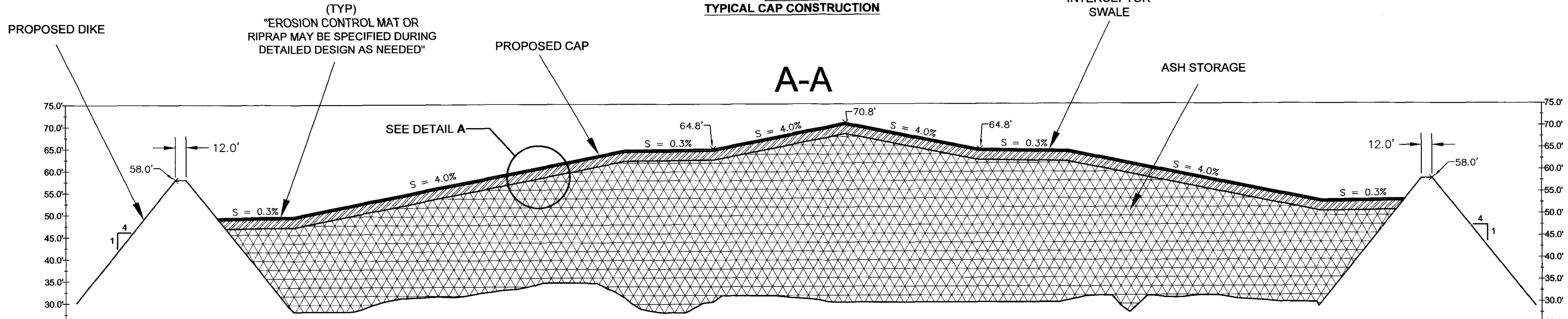


MAJOR OFFSETS (FEET)	CAP ELEVATIONS (FEET)	ORIGINAL GROUND ELEVATIONS (FEET)
-950		
-900		
-850	49.0	
-800	49.9	
-750	51.9	30.2
-700	53.9	29.7
-650	55.9	28.8
-600	57.8	30.6
-550	59.8	31.4
-500	61.8	31.3
-450	63.8	28.9
-400	65.8	29.2
-350	67.8	30.8
-300	69.8	32.2
-250	70.0	32.5
-200	70.1	32.5
-150	70.3	30.6
-100	70.5	30.0
-50	70.6	30.0
+50	70.9	31.5
+100	71.1	31.6
+150	71.2	33.0
+200	71.4	32.3
+250	71.5	31.9
+300	71.6	31.2
+350	71.8	31.5
+400	71.6	31.1
+450	69.6	30.7
+500	67.7	30.6
+550	65.7	28.6
+600	63.7	26.6
+650	61.7	26.2
+700	59.7	26.4
+750	57.7	26.6
+800	55.7	
+850	54.1	
+900		
+950		



DETAIL A
TYPICAL CAP CONSTRUCTION

A-A



MAJOR OFFSETS (FEET)	CAP ELEVATIONS (FEET)	ORIGINAL GROUND ELEVATIONS (FEET)
-750		
-700		
-650	49.4	
-600	49.6	
-550	50.6	28.0
-500	52.6	28.5
-450	54.6	31.1
-400	56.6	31.3
-350	58.6	32.5
-300	60.6	34.1
-250	62.6	34.5
-200	64.5	30.7
-150	64.7	27.7
-100	64.9	30.5
-50	66.9	31.5
+50	70.7	30.0
+100	68.7	30.0
+150	66.7	30.0
+200	64.8	30.0
+250	64.6	30.0
+300	64.4	30.6
+350	62.4	30.6
+400	60.4	31.3
+450	58.4	31.5
+500	56.4	30.6
+550	54.4	30.0
+600	53.2	
+650	53.3	
+700		
+750		

NOTES:
1) THE COMPACTED CLAY LINER SHALL CONSIST OF A MINIMUM THICKNESS OF 2 FEET WITH A PERMEABILTY OF LESS THAN OR EQUAL TO 1X10 -7 CM/SEC.

LEGEND

DIRECTION OF ALIGNMENT

SLOPE S =

STATE OF LOUISIANA
ELIF ACAR
REG. No. 29852
REGISTERED
PROFESSIONAL ENGINEER
IN
CIVIL ENGINEERING

Elif Acar 4/28/06

NO.	Revision	Drawn	Checked	Approved
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NRG

Shaw®

Baton Rouge
Office
NEW ROADS, LOUISIANA
Site Location

Proj. Mgr.	RSS
Proj. Eng.	EAC
Design	EAC
Drawn	ESK

LOUISIANA GENERATING, LLC
NEW ROADS, LOUISIANA

FIGURE - 28b

PROPOSED CAP
CROSS-SECTIONS
BC II BOTTOM ASH BASIN EXPANSION

Project #	Drawing #			Rev
1005494008	1005494008-D006			01
Co-ordinate Base	**Scale**	**Dwg Size**	**Sheet**	
UTM-15 NAD83	N/A	ARCH D	1 of 1	

Appendix A
Proof of Publication

BEST COPY OF THE NEXT 2 PAGES

CAPITAL CITY PRESS

Publisher of
THE ADVOCATE

PROOF OF PUBLICATION

The hereto attached notice was
published in THE ADVOCATE,
a daily newspaper of general circulation
published in Baton Rouge, Louisiana,
and the official Journal
of the State of Louisiana,
the City of Baton Rouge,
and the Parish of East Baton Rouge,
in the following issues:

04/04/06

Susan A. Bush
Susan A. Bush, Public Notices Clerk

Sworn and subscribed before me by the
person whose signature appears above:

April 4, 2006

Pegeen Singley
Pegeen Singley, Notary Public, #66565
My Commission Expires: Indefinite
Baton Rouge, Louisiana

SHAW ENVIRONMENTAL &		3298005
INFRASTRUCTURE		
4171 ESSEN LN 8TH FL		
BATON ROUGE	LA 70809	

Public Notice
Of
Intent to Submit Permit Application

Louisiana Generating LLC-Big Cajun II Power Plant
Industrial Solid Waste Surface Impoundments

New Roads, Pointe Coupee Parish, Louisiana

Notice is herby given that Louisiana Generating LLC-Big Cajun II Power Plant does intend to submit to the Department of Environmental Quality, Office of Environmental Services, Water and Waste Permits Division, an application for the renewal and modification of a permit to operate a Industrial Solid Waste Surface Impoundment in Point Coupee Parish, Range 10 and 11, Township AS, Section 37, which is approximately 3 miles north of the intersection of Highway 415 located in New Roads, Louisiana.

This application includes a modification request to vertically expand the existing Bottom Ash Basin surface impoundment.

Comments concerning the facility may be filed with the secretary of the Louisiana Department of Environmental Quality at the following address:

Louisiana Department of Environmental Quality
Office of Environmental Services
Permits Division
Post Office Box 4313
Baton Rouge, Louisiana 70821-4313

3298005-apr 4-1t

BEST COPY

STATE OF LOUISIANA

Parish of Pointe Coupee

BEFORE ME, the undersigned authority, personally appeared Mary Catherine Roy LaCour who declared that ~~he~~/she is publisher of THE POINTE COUPEE BANNER, and that the following notice was published in said newspaper on the following dates:

April 6, 2006.

PUBLIC NOTICE

OF

INTENT TO SUBMIT PERMIT APPLICATION

LOUISIANA GENERATING LLC BIG CAJUN II POWER PLANT

INDUSTRIAL SOLID WASTE SURFACE IMPOUNDMENTS

NEW ROADS, POINTE COUPEE PARISH, LOUISIANA

Notice is hereby given that Louisiana Generating LLC Big Cajun II Power Plant does intend to submit to the Department of Environmental Quality, Office of Environmental Services, Water and Waste Permits Division, an application for the renewal and modification of a permit to operate a Industrial Solid Waste Surface Impoundment in Pointe Coupee Parish, Range 10 and 11, Township 5 S, Section [illegible], which is approximately [illegible] north of the intersection of Highway 415, located in New Roads.

This application includes a modification request to vertically expand the existing Bottom Ash Basin surface impoundment [illegible]

Comments concerning the facility may be filed with the secretary of the Louisiana Department of Environmental Quality at the following address:

Louisiana Department of Environmental Quality

Office of Environmental Services

Permits Division

Post Office Box 4313

Baton Rouge, LA 70821-4313

STATE OF LOUISIANA

Parish of Pointe Coupee

BEFORE ME, the undersigned authority, personally appeared Mary Catherine Roy LaCour who declared that ~~he~~/she is publisher of THE POINTE COUPEE BANNER, and that the following notice was published in said newspaper on the following dates:

April 6, 2006.

PUBLIC NOTICE

OF

INTENT TO SUBMIT PERMIT APPLICATION
LOUISIANA GENERATING LLC-BIG CAJUN II POWER PLANT
INDUSTRIAL SOLID WASTE SURFACE IMPOUNDMENTS
NEW ROADS, POINTE COUPEE PARISH, LOUISIANA

Notice is hereby given that Louisiana Generating LLC-Big Cajun II Power Plant does intend to ... Office of Environmental Services, Water and Waste

Mary Catherine Roy LaCour

SWORN TO AND SUBSCRIBED before me this 11th day of April, 20 06, at New Roads, Louisiana.

Rosaline Christ Parks
Notary Public
LA Bar Roll No. 1119

Appendix B
Proof of Legal Authority

PROOF OF LEGAL SIGNATORY AUTHORITY

WHEREAS certain federal and state environmental law require certain permit applications, reports, or other documents to be executed on behalf of a corporation by a Principal Corporate Officer or by an official having significant policy or decision-making responsibility: and

WHEREAS Gary C. Ellender in the responsible charge of the Environmental Department of Louisiana Generating LLC, Big Cajun II Power Plant, New Roads, Louisiana, is an official having significant policy and decision-making responsibilities within the Company:

NOW, THEREFORE, I, William S. Day, Vice President of Louisiana Generating LLC, on this 5th day of April, 2006, do hereby authorize Gary C. Ellender of the Louisiana Generating LLC, Big Cajun II Power Plant, New Roads, Louisiana, to execute any such permit applications, reports, and other documents on behalf of Louisiana Generating LLC.

Witnesses:

Notary:

NOTARY ID No. 81918

Appendix C
Environmentally Sensitive Areas Documentation

04/05/2006 01:26PM

Shaw Environmental & Infrastructure, Inc.
4171 Essen Lane
Baton Rouge, LA
225 932-2500
FAX: 225-987-7300

Shaw™ Shaw Environmental & Infrastructure, Inc.

March 2, 2006

Date: 4/3/06
No known archaeological sites or historic properties will be affected by this undertaking. This effect determination could change should new information come to our attention.
Pam Breaux: Pam Breaux
State Historic Preservation Officer

Louisiana Department of Culture, Recreation and Tourism
Division of Archeology
P.O. Box 44247
Baton Rouge, Louisiana 70804
Attn: Ms. Pam Breaux

RE: Cultural Resources Review and Clearance Request
Louisiana Generating, LLC Big Cajun II
Highway 981, New Roads, LA

Dear Ms. Breaux:

Louisiana Generating, LLC, (LG) owns and operates the Big Cajun II power plant located in New Roads, Point Coupee Parish, Louisiana. Shaw Environmental Inc. will be preparing a solid waste permit renewal application for the solid waste facilities located at this plant. In addition, LG plans to vertically expand its existing Bottom Ash Solid Waste Impoundment. As this will be a vertical expansion, no additional land will be impacted. The land adjacent to the proposed expansion project is currently in agricultural use for farming operations.

A United States Geological Survey 7.5-minute topographic map excerpt from the Port Hudson, Louisiana quadrangle identifies the proposed project area and is enclosed for your review. All activities and project components associated with the existing impoundments and expansion project will be confined to the project boundary illustrated on the enclosed map.

On behalf of NRG, Shaw Environmental, Inc. respectfully requests a cultural resource review and written letter of findings regarding the potential location of historic or archeological sites on or within 1,000 feet of the solid waste facilities. We appreciate your attention in this matter and if you have any questions concerning this correspondence, please call Jennifer Tassin directly at (225) 987-7487.

Sincerely,
Shaw Environmental, Inc.

Jennifer Tassin

Jennifer Tassin
Environmental Scientist

Enclosure

MAR 8 2006

N:\CLIENT\NRG\working\Big Cajun II Solid Waste\Solid waste working Documents\NRG SHPO Clearance Request.doc

P.02/02 APR-05-2006 14:40

Shaw Environmental & Infrastructure, Inc.
4171 Essen Lane
Baton Rouge, LA
225 932-2500
FAX: 225-987-7300

Shaw™ Shaw Environmental & Infrastructure, Inc.

March 2, 2006

United States Fish and Wildlife Service
Ecological Services
646 Cajundome Blvd, Suite 400
Lafayette, Louisiana 70506
Attn: Ms. Angela Culpepper

RE: Threatened and Endangered Species Review and Clearance Request
Louisiana Generating, LLC, NRG Big Cajun II
Highway 981, New Roads, LA

Dear Ms. Culpepper:

Louisiana Generating, LLC, owns and operates the Big Cajun II power plant located in New Roads, Pointe Coupee Parish, Louisiana. Shaw Environmental Inc. will be preparing a solid waste permit renewal application for the surface impoundments located at the Big Cajun II. In addition, LG plans to vertically expand its existing Bottom Ash Solid Waste Impoundment. As this will be a vertical expansion, no additional land will be impacted. The land adjacent to the proposed expansion project is currently in agricultural use for farming operations.

A United States Geological Survey 7.5-minute topographic map excerpt from the Port Hudson, Louisiana quadrangle identifies the proposed project area and is enclosed for your review. All activities and project components associated with the existing impoundments and expansion project will be confined to the project boundary illustrated on the enclosed map.

On behalf of LG, Shaw Environmental, Inc. respectfully requests a protected species/critical habitat review and written letter of findings regarding compliance with the Endangered Species Act of 1973 for the above-referenced project and within 1,000 feet of the solid waste facilities. We appreciate your attention in this matter and if you have any questions concerning this correspondence, please call Jennifer Tassin directly at (225) 987-7487.

Sincerely,
Shaw Environmental, Inc.

Jennifer Tassin

Jennifer Tassin
Environmental Scientist

Enclosure

This project has been reviewed for effects to Federal trust resources under our jurisdiction and currently protected by the Endangered Species Act of 1973 (Act). The project, as proposed,
(✓) Will have no effect on those resources
( ) Is not likely to adversely affect those resources.
This finding fulfills the requirements under Section 7(a)(2) of the Act.

[signature] [date]

Acting Supervisor Date
Louisiana Field Office
U.S. Fish and Wildlife Service

RECEIVED
MAR 10 2006
FISH & WLDL. SERV
LAFAYETTE, LA.

N:\CLIENT\NRG\working\Big Cajun II Solid Waste\Solid waste working Documents\NRG USFWS Clearance Request.doc

State of Louisiana
DEPARTMENT OF WILDLIFE & FISHERIES
POST OFFICE BOX 98000
BATON ROUGE, LA 70898-9000
(225) 765-2800

DWIGHT LANDRENEAU
SECRETARY

KATHLEEN BABINEAUX BLANCO
GOVERNOR

Date	February 1, 2006
Name	Jennifer Tassin
Company	Shaw Environmental & Infrastructure, Inc.
Street Address	4171 Essen Ln.
City, State, Zip	Baton Rouge, LA
Project	NRG, Big Cajun II Power Plant: Solid Waste Permit Compliance and Expansion Request
Invoice Number	06020107

The pallid sturgeon (Scaphirhychus albus) may potentially be impacted by the proposed project. The pallid sturgeon is listed as endangered under the Endangered Species Act (16 U.S.C. 1531-1544). It is confined to the Mississippi and Atchafalaya rivers in southern Louisiana. This species requires large and free-flowing riverine habitat; it occurs in strong current over firm gravel or sandy substrate. Pallid sturgeons are adapted for living close to the bottom of large, shallow rivers with sand and gravel bars. The primary reason for their decline is believed to be loss of habitat caused by the construction of dams that have modified flows, reduced turbidity, and lowered water temperatures. We advise you to take the necessary measures in order to avoid any degradation of water quality in the Mississippi River. If you have any questions, please contact LNHP zoologist at 225-765-2821.

The Louisiana Natural Heritage Program has compiled data on rare, endangered, or otherwise significant plant and animal species, plant communities, and other natural features throughout the state of Louisiana. Heritage reports summarize the existing information known at the time of the request regarding the location in question. The quantity and quality of data collected by the LNHP are dependent on the research and observations of many individuals. In most cases, this information is not the result of comprehensive or site-specific field surveys; many natural areas in Louisiana have not been surveyed. This report does not address the occurrence of wetlands at the site in question. Heritage reports should not be considered final statements on the biological elements or areas being considered, nor should they be substituted for on-site surveys required for environmental assessments. The Louisiana Natural Heritage Program requires that this office be acknowledged in all reports as the source of all data provided here. If you have any questions or need additional information, please call Louisiana Natural Heritage Program at 225-765-2357.

Sincerely,

Gary Lester

Gary Lester, Coordinator
Natural Heritage Program

Appendix D
Facility Operational Plan

Louisiana Generating, LLC
Big Cajun II Power Plant New Roads, Louisiana

Facility Operational Plan

Fly Ash Basin
Bottom Ash Basin
Rainfall Surge Pond
LPDES Primary Treatment Pond
LPDES Secondary Treatment Pond

February 2006

Prepared by:

Shaw E &I
4171 Essen Lane
Baton Rouge, LA 70809

Table of Contents

1.0 Introduction

Louisiana Generating, LLC Big Cajun II Power Plant's (Big Cajun II's) Industrial Solid Waste Surface Impoundments /Landfills include five Industrial Solid Waste Surface Impoundments/Landfills: Single Fly Ash Management Area, Single Bottom Ash Management Area, Single Rainfall Surge Pond, and LPDES Treatment Ponds, which consist of a Primary and a Secondary Treatment Pond. This Facility Operational Plan has been prepared according to LAC 33: VII.521.H and LAC 33: VII.713. D. This document describes the operations of the entire Big Cajun II Generating Station, including plant and security, and a description of the wastewater treatment process.

The surface impoundments occupy approximately 295 acres of Big Cajun II's property and are located to the northwest of the three Boiler Units. Big Cajun II operates on 1,740 acres in Sections 37, in Township 4S, Ranges 10 and 11 East, of Pointe Coupee Parish. Big Cajun II is located on Louisiana Highway 981, 3 miles north of the intersection of Louisiana Highway 415, approximately 3 miles northeast of New Roads, Louisiana.

2.0 Facility Operations

2.1 *Surface Impoundments/Landfill Design*

The single Fly Ash and single Bottom Ash Basins are designed to collect the two ash types. The wastewater from the two Ash Basins is routed to the LPDES Treatment Ponds (Primary and Secondary Treatment Ponds) prior to discharge to the Mississippi River via LPDES Outfall 001. Once through non-contact cooling water from the Mississippi River is discharged directly back to the river through LPDES Outfall 003.

Because the fly ash and bottom ash are segregated, both the Fly Ash and the Bottom Ash Basins will be used throughout the life of plant. Water collected from stormwater runoff, bottom ash sluice, and clarifier underflow will be removed on a routine basis.

Fly Ash will initially be deposited in the southeast corner of the fly ash basin. As years pass, the filling will proceed westward along the south levee. After the southern half of the basin is full, filling will continue from the northwestern portions of the basin eastward along the north levee. The northeast corner of the Fly Ash Basin will be the last section to be filled.

Bottom Ash from Boiler Units No. 1 and No. 2 is currently sluiced to the south part of the Bottom Ash Basin. Since the bottom ash is carried by water, the filling will radiate from the pipe outlet in a delta-like fashion. The clarifier sediments are piped to the southeast corner of the Bottom Ash Basin. This flow is primarily Mississippi River water carrying naturally occurring silts and clays. These sediments settle out and form a similar delta-like deposit originating at the pipe outlet. Bottom Ash from Boiler Unit No. 3 is carried to the basin by dump trucks and deposited in the southwest corner. The filling of the basin will, therefore, start along the south levee and proceed northward.

The landfill surface in and surrounding the Ash Basins and LPDES Treatment Ponds were not excavated or altered significantly during construction. Levees to control runoff were constructed, existing ditches were filled, and some clay was added wherever it was necessary to supplement the natural clay liner. However, the surface contours of the land were essentially the same prior to construction and immediately after construction of these facilities. Clay dikes surround all of the surface impoundments with the exception of the Rainfall Surge Pond, which was designed to collect surface runoff from the plant site.

The site has an overall level topography with an elevation of approximately 6 feet mean sea level. Approximately 2 feet of elevation difference exists between the highest surface water elevation in the storm water runoff channels and the elevation of each of the surface impoundments. Positive drainage is maintained on-site due to its flat topography; therefore, no special dewatering plan, facilities, or control system is necessary.

The Rainfall Surge Pond and the two LPDES Treatment ponds were filled in 1979. The approximate capacities in acre-feet of the surface impoundments are as follows:

Single Fly Ash Basin	1,750.00
Single Bottom Ash Basin	1,188.00
Single Rainfall Surge Pond	331.30
LPDES Treatment Ponds	
Primary Treatment Pond	457.20
Secondary Treatment Pond	127.80

2.2 Wastewater Streams

Big Cajun II does not accept waste generated from off-site locations for treatment, storage, or disposal. Fly ash and the coarser sand-like bottom ash are removed from the three Boiler Unit's combustion exhausts during power generation. Fly ash is transported by truck to the Fly Ash Basin for disposal and potential beneficial reuse. The bottom ash from Units 1 and 2 is transported via a sluice to the Bottom Ash Basin for disposal. Bottom Ash from Unit 3 is trucked to the Bottom Ash Basin. The wastewater that collects in these basins from rainfall and the bottom ash sluice transport water undergo primary and secondary treatment prior to discharge to the river. Both ash types are essentially inert materials and are used as components of construction cement. The existing waste streams at Big Cajun II are described below.

2.2.1 Chemical and Physical Characteristics

Fly Ash:

Fly ash is composed primarily of oxides of silicon, aluminum, calcium, sulfur, and iron. A typical chemical analysis of coal from the Big Cajun II Stockpile showing the chemical composition of the ash is included as **Appendix P** of the surface impoundments' Solid Waste Standard Permit Renewal Application.

Fly ash is a tan color when it is collected from stack gas. It is a fine powdery substance with the consistency of talcum powder. Fly Ash undergoes a distinct change in physical characteristics when mixed with water. Fly Ash from western coal is a pozzolanic material, that is, its silicon oxide and aluminum oxide components react with its calcium fraction in the presence of water to form slow hardening cement. The result of this reaction produces a hard, structurally stable compound with very low permeability.

It is this characteristic that makes fly ash a valuable resource that can be used as cement substitute for a variety pf purposes. The John Hancock Center, the Sears Tower, and the Standard Oil Building are examples of high-rise buildings that were constructed with concrete utilizing fly ash.

Bottom Ash

Bottom ash is generated concurrently with fly ash during the combustion of coal. It is formed in the boilers when particles of ash fuse together. The fused particles become too large to remain entrained in the rising flue gas and fall to the bottom of the boilers. Due to their similar origins, bottom ash and fly ash have the same approximate chemical makeup.

Bottom ash is medium brown in color and has a sandy texture. Particles of bottom ash vary in diameter but are approximately the size of coarse sand.

Clarifier Sediment

Clarifier sediments consist primarily of Mississippi River water naturally occurring silts and clays. It also contains some lime, sodium aluminate, and trace amounts of an EPA-approved water treatment polymer. The lime, sodium aluminate, and polymer are used in the water treatment area to soften the water and aid in the removal of suspended solids. The following concentrations are typical:

Sodium Aluminate: 10-20 ppm

Polymer: 0.25-2 ppm
Lime: Amount controlled by pH

Clarifier sediments look like water with a high turbidity. The cloudiness in the water arises from river silt and clay.

2.2.2 Liquid Wastes Covered under LPDES

Cooling Tower Blowdowns:

Cooling tower blowdown is water. It is necessary to add chlorine at times to control biological growth. When chlorine is used the cooling tower blow down is subject to the following chlorine limits:

Daily Average: 0.2 mg/l
Daily Maximum: 0.5 mg/l

The water will have a slight turbidity. This is caused by the residual silt and clay that was removed during water treatment. Cooling tower blow down accounts for 55-65% of the total waste water treated at the plant. A portion of the blowdown is utilized in the Bottom Ash sluice system.

Chemical Storage Area Overflow:

Rain water with no contaminants. Clear water flow amounts to less than 0.2% of all waste water.

Bottom Ash Dewatering Bin:

This facility is not in use.

Bottom Ash Decant:

Water that is very low in suspended solids. The pH typically ranges from 7.7 to 8.0 standard units. Very clear water run off accounts for about 2-6% of all waste water and depends on the amount of rainfall.

Demineralizer wastes:

Chemical Characteristics of this water is 0.25% each of sulfuric acid and sodium hydroxide, which neutralize each other into water and various salts. This clear water amounts to15% of all wastewater treated.

Boiler Units No. 1 and No. 2 Blow down

Boiler blow down is highly purified water with extremely low levels of dissolved solids and virtually no suspended solids. Blow down will have residual amounts of treatment chemicals in the following approximate concentrations:

Trisodium Phosphate 2-5 ppm
Disodium Phosphate

The concentration of metals is limited by Big Cajun II's NPDES permit to 1 mg/l each of iron and copper. Each boiler accounts for 3-4% of the total wastewater.

The Blow down produced by Unit No. 3 is identical to the Blow down for Units 1 and 2.

Miscellaneous Wastes:

These waters come from a variety of sources and are transported in the storm water drainage system to the Rainfall Surge Pond. Since this waste stream is essentially a catchall in Big Cajun II's LPDES permit, it is impossible to give anything more than general physical characteristics. Since much of this water is used for wash down, it usually has a significant amount of suspended solids, such as dirt and dust. This source amounts to 7-10% of all waste water.

SPCC Waste:

Water with trace amounts of oil and grease (15 mg/l); fairly clear water that amounts to less than 0.1% of all waste water.

Sewage Plant Discharge

Water that may have a slight odor. This discharge amounts to less than 1.0% of all wastewater. The typical values and the maximum value allowed by Big Cajun II's LPDES permit are listed below:

BOD_5: 15-40 mg/l (45 mg/l)
TSS: 20-35 mg/l (45 mg/l)

Coal Pile Runoff

The characteristics of coal pile runoff vary and depend on the preceding climatic conditions. During periods of no rainfall or light showers, the runoff will have a minimal amount of suspended solids. However, after a severe thunderstorm, the runoff will contain a significant amount of suspended solids in the form of powdered coal

The runoff water could vary from slightly turbid under most conditions to very turbid following severe storms. Turbidity could be from coal fines rather than cloudy. This turbidity is reduced to below NPDES limits by the waste water treatment process. Coal pile runoff accounts for only about 2% of the total flow during dry months and up to 18% during exceptionally rainy months.

2.3 Waste water Treatment Process

Waste waters from each of the Ash Basins are routed to the Rainfall Surge Pond and then pumped to the Primary Treatment Pond which then flows by gravity into the Secondary Treatment Pond. Due to the nature of the waste streams, turbidity is an important concern. In accordance with LPDES limits, the turbidity is sufficiently reduced by the treatment process prior to discharge to the river.

The non-hazardous solid wastes (primarily coal fines) deposited in the surface impoundments are removed and reused on a routine basis. The accumulated, settled solids are periodically removed as needed. The sludge that accumulates in the surface impoundments is extracted through the pump-out sumps by portal pumps.

Big Cajun II does beneficially reuse materials associated with the surface impoundments. The commercial sale of fly ash meets requirements of all applicable regulations. Fly ash is removed from Boiler Units No. I and No. 2 stack gases by electrostatic precipitators and is pneumatically transported to a storage silo. Boiler No.3 has a separate but similar system. From the storage silo, the fly ash can be sold as a pozzolan and shipped offsite or hauled to the Fly Ash basin for disposal. The storage silo has a capacity of 3,870 tons and is equipped with a closed system for loading the ash into trucks to be transported to market. During peak power-generating periods, the production of fly ash may exceed the market demand. During such times, the excess fly ash is hauled by closed trucks to the Fly Ash basin. At a later date, when the demand for ash exceeds production, the fly ash in the basin can be removed and sold.

Bottom ash is collected in hoppers at the base of the Boiler No. 1 and No. 2. The ash is then transported hydraulically through a pipe directly to the Bottom Ash Basin. An alternate method of transporting bottom ash from Boiler Units No. 1 and No. 2 is also available. Bottom ash may be sluiced to the bottom ash dewatering bin located at the ash handling area. The damp ash is then loaded into dump trucks while the decanted water is discharged to the Rainfall Surge Pond for treatment.

Boiler No. 3 utilizes a different bottom ash handling arrangement. Bottom ash is collected in hoppers at the base of the boiler and is removed by a conveyor belt to a storage area. From there the damp ash is hauled by dump truck to the Bottom Ash Basin. Bottom ash from Unit 3 could alternately be sluiced to a dewatering bin located in the Ash Management Area.

Clarifier and Softener Sediments: These sediments are produced when water from the Mississippi River is clarified and softened for use as cooling water or boiler water. Three clarifiers remove suspended solids (turbidity) from the river water by settling. Sediment from the three clarifiers is pumped to a central sump in the pretreatment area while the clarified water is piped to the cooling towers.

The two softeners in the pretreatment area treat river water with lime (CaOH) to precipitate and remove carbonate hardness. The treated water is piped to the gravity filter beds where residual suspended solids are removed. The softened water is pumped to the demineralizer building for further treatment prior to being used as boiler water. The sediments from the five filter beds are piped to the same central sump utilized by the clarifiers and softeners.

The combined clarifier and softener sediments are pumped directly from the central sump to the Bottom Ash Basin.

Cooling Tower Blow down (101): Cooling tower blow down is cooling water which is periodically removed from the normal cooling cycle. Since cooling tower blow down is relatively clean, it is piped to the boiler area to be reused as bottom ash transport water.

Cooling Tower Chemical Storage Area Overflow: The bulk chemical storage area contains a tank of sulfuric acid. Containment walls surround the tank to prevent contamination of the surrounding area should a chemical spill or leak occur. In the event of such a release, the liquid would be neutralized, removed, and disposed in accordance with applicable regulations. The drains in this contained storage area are kept closed during normal operation. Although most of the precipitation which falls in this area evaporates naturally, it is occasionally necessary to open the drains to release any rainwater which has accumulated.

Bottom Ash Bin Dewatering Bin: This is an alternate bottom ash handling system discussed previously.

Bottom Ash Storage Decant: This is the flow from ash storage areas to the Rainfall Surge Pond. It consists of rainfall surface runoff from the ash facilities, bottom ash transport water, and the water from the clarifier and softener sediments. The water flows by gravity in a 30-inch Schedule 40 steel pipe. The flow is controlled by a 30-inch butterfly valve.

Demineralizer Wastes: This waste stream is formed during the regeneration of the anion and cation exchange beds in the demineralizer building. These acidic and caustic waste streams generated during the regeneration are piped to a sump where the pH is adjusted prior to being pumped to the Rainfall Surge pond.

Boiler Units No. 1 and No. 2 Blow down: Boiler blow down is boiler water which is periodically released from the boiler drum. This water is discharged into the drainage system where it flows into the Rainfall Surge Pond.

Boiler Unit No. 3: This is the same type of flow as Boiler Units No. 1 and No. 2 blow down.

Miscellaneous Waste: This is water which comes from such sources as the ash surge tank overflow, the economizer hopper wash down, and the strainer was down areas. These waters flow through the storm drainage system to the Rainfall Surge Pond.

SPCC Waste: All drainage in the fuel oil unloading area and the vehicle maintenance building leads to the Spill Prevention, Control and Counter measures (SPCC) sump. The liquid in the sump is predominantly rainfall runoff and is pumped through a gravity type oil-water separator.

Sewage Plant Discharge: All sanitary wastes generated at the plant site is collected and processed through a conventional packaged sanitary waste water treatment facility. This facility includes aeration, sedimentation aerobic digestion, and a chlorine contact chamber. The treated effluent, which meets all EPA and state health guidelines, pumped to the Rainfall Surge Pond.

Coal Pile Runoff: Rainfall runoff from the coal storage yards at Big Cajun II is kept isolated from the surrounding area by a ditch and levee system. These ditches carry all of the rainfall runoff from the storage areas directly to the Rainfall Surge pond. The amount of runoff discharged to the Surge Pond is estimated by the amount of rainfall occurring on that day. Waste water and runoff is then pumped into the Primary Treatment Pond by Lift Station No. 1. The pH of the waste water can be adjusted during the pumping by the addition of treatment chemicals to the flow.

To raise the pH, a solution of caustic soda can be injected into the pipe carrying the waste water from the Rainfall Surge Pond to the Primary Treatment Pond. Turbulent flow through the pipe insures that the pH adjustment chemicals are thoroughly mixed into waste water stream. If the pH of the waste water is too high, the pH can be brought down by injecting sulfuric acid instead of caustic soda.

2.4 Facility Record Keeping:

Big Cajun II performs daily inspections of its surface impoundments to detect evidence of leaks, odors, or structural failure, and to verify that a minimum 1.5-foot freeboard is maintained.

To ensure that the surface impoundments are operating properly, these facilities are inspected on a daily basis and after storms. If a leak in a surface impoundment is detected, the Department of Environmental Quality Solid Waste Division (DEQ-SWD) will be notified immediately.

The following records are maintained for the surface impoundments:

- Louisiana Waste Rules and Regulations
- Copy of the Existing Solid Waste Permit
- Permit Application
- Permit Modifications
- Operator Training Programs
- Daily Logs
- QA/QC Records
- Inspection Documentation
- Monitoring, Testing, and Analytical Data
- Groundwater Monitoring Plan
- Annual Solid Waste Disposer's Report.

All solid waste records shall be maintained on-site for the life of the facility and will be kept for at least 3 years after closure.

2.5 Vector, Dust, Litter, and Odor Control

The waste water streams and the type of deposits that collect in the surface impoundments do not attract pathogen-transmitting organisms; therefore, excessive vector control is not required. The physical nature of the solid waste generated and disposed in the surface impoundments and the presence of water in the system is such that the waste will not become airborne as dust nor trash which requires litter control. The characteristics of the waste streams do not generate odors.

3.0 Safety and Security

3.1 Plant Safety

The operational personnel at the site are required to wear protective equipment such as hard hats, safety glasses, gloves, and other equipment as necessary for protection against accidental injury as required by the Occupational Safety and Health Administration (OSHA). In the unlikely event a major incident arises due to the operation of the Industrial Solid Waste Surface Impoundments, elements of the Personnel Training Plan and the Emergency Action Procedure (Appendices Q and E, respectively, of Big Cajun

II's Solid Waste Standard Permit Mandatory modification for Industrial Solid Waste Surface Impoundments) will be activated. Point Coupee General Hospital, located with in 5 miles of the plant site, will be used if off-site medical services are required.

3.2 Fire Protection

The waste water addressed in this document is not flammable. No situations are known which might cause the surface impoundments to be the source of an emergency. Emergency plans to deal with fire, including fire exits and established locations for fire extinguishers, are maintained in accordance with the OSHA requirements. Although Big Cajun II is equipped to handle emergencies on-site, if outside assistance is required, the Pointe Coupee Volunteer Fire Department will be contacted. For additional information, please refer to Big Cajun II's Emergency Action Procedure included as Appendix E of Big Cajun II's Solid Waste Standard Permit Renewal and Modification for Industrial Solid Waste Surface Impoundments.

3.3 Safety Measures for Emergency Situations

All equipment utilized by Big Cajun II's surface impoundments is routinely inspected and maintained to prevent breakdown and ensure the containment of waste. In the event of equipment failure, repairs are either performed immediately on-site or equipment is leased until repairs are can be completed. However, any breakdowns which result in the release of solid waste will be reported to DEQ promptly by telephone. In the event of an emergency situation, normal operations of the surface impoundments will be shut down and waste water discharges stopped during clean-up operations.

Operations at the plant continue as usual during most types of inclement weather. Severe weather conditions such as hurricanes and other violent storms may result in the temporary closure of the surface impoundments. Decisions to close the impoundments during inclement weather are made by the facility management personnel. For additional information pertaining to emergency situations that may arise please refer to the Emergency Action Procedure included as Appendix E of Big Cajun II's Solid Waste Standard Permit Modification for Industrial Solid Waste Surface Impoundments.

3.4 Employee Safety Training

Big Cajun II requires all employees to undergo a rigorous safety training program as it relates to the overall safety requirements of the plant and the specific safety requirements dictated by the employee's job assignment, along with safety meetings held weekly. The plant also has emergency plans to deal with employee safety, health and medical treatment in case of accidental job-related injury.

Employees who are responsible for the operations of the surface impoundments are required to be knowledgeable of the safety requirements. Information regarding safety measures and emergency procedures is addressed in the Emergency Action Procedures which is included as **Appendix E** of Big Cajun II's Solid Waste Permit Renewal Application for Industrial Solid Waste Facilities.

3.5 *Plant Security*

Big Cajun II's site is completely surrounded by a chain link fence topped or barbed wire fencing to prevent unauthorized ingress or egress, except by willful entry, and to prevent entry by domestic livestock. The site's fenced perimeter is sufficiently cleared and lighted to allow access by contracted security patrol by vehicle or by foot.

Vehicles entering the facility must pass through the main or contractor's gate. Access to the site is through the main gate which is guarded 24 hours per day, 365 days per year by contracted security guards. The main access gate is a locking sliding security gate. If the security personnel must leave the guard house, the gate is closed and locked. The contractor's gate is manned during daylight hours except during turnarounds and outages. A visitor's parking lot is located outside of the main gate. The guard stops, documents, and inspects all vehicles, contractors, visitors, and plant personnel entering and exiting the facility. All other gates are closed and locked when not in use.

Manufacturing operations are also a continuous around-the-clock activity; hence the facility is always manned. Unauthorized persons may not gain entrance into the facility without being observed by plant personnel.

Appendix A
Document 4a: Emergency Action Plan

Appendix E
Emergency Action Procedures

OPERATING INSTRUCTION
Louisiana Generating LLC
Big Cajun 2

FOR: All Station Personnel DATE EFFECTIVE: 09/01/2000
DATE REVISED: 04/26/2006

Chad Helm/Joey Stonaker Hazardous Substances Key Safety Issue Advocate	Brian Bradley/Gerald Nichols Fire Fighting Key Safety Issue Advocate	Lanel Debetaz/Vernon Devillier Confined Spaces Key Safety Issue Advocate
Dean Lemoine/Winston Hunt Fire Protection Systems Key Safety Issue Advocate	Al Castille First Aid/CPR Key Safety Issue Advocate	John David Physical Security Key Safety Issue Advocate
Gerald Nichols Personnel Security Key Safety Issue Advocate		

APPROVED BY:
Rick Roberts
Plant Manager
Emergency Action Plan
Key Safety Issue Advocate

SUBJECT: ***Big Cajun 2 Station Emergency Action Plan***

Purpose

The Big Cajun 2 Station Emergency Action Plan provides detailed procedures to be followed in the event of possible emergencies at Big Cajun 2 Generating Station. These procedures are designed to:

- Maximize the safety of all employees, contractors and visitors at the station in the event of an emergency.
- Ensure a quick response to emergency events, which might occur at the plant.
- Guard against adverse environmental consequences.
- Protect the assets of Louisiana Generating LLC.

OPERATING INSTRUCTION

Louisiana Generating LLC

Big Cajun 2

FOR: All Station Personnel

DATE EFFECTIVE: 09/01/2000

DATE REVISED: 02/03/2006

Chad Helm/Joey Stonaker Hazardous Substances Key Safety Issue Advocate	Brian Bradley/Gerald Nichols Fire Fighting Key Safety Issue Advocate	Lanel Debetaz/Vernon Devillier Confined Spaces Key Safety Issue Advocate
Dean Lemoine/Winston Hunt Fire Protection Systems Key Safety Issue Advocate	Al Castille First Aid/CPR Key Safety Issue Advocate	John David Physical Security Key Safety Issue Advocate
Gerald Nichols Personnel Security Key Safety Issue Advocate		

APPROVED BY: ______________________

Rick Roberts
Plant Manager
Emergency Action Plan
Key Safety Issue Advocate

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Table of Contents

The Big Cajun 2 Station Emergency Action Plan is comprised of the following sections:

Appendices

Emergency Contacts

A. **Emergency Phone Numbers**

Outside Agencies	Phone
All Emergencies	**911**
Louisiana State Police	(225) 754-8500 or (800) 256-6901
Pointe Coupee Parish Sheriff's Office	(225) 694-3737
City of New Roads Police Department	(225) 638-9808
Pointe Coupee Parish Fire Department	911 – 694-3737
Acadian Ambulance	(800) 252-5522
Pointe Coupee Parish Hospital	(225) 638-6331
U.S. Coast Guard	(225) 389-0271
CSX Transportation Police (Railroad emergency)	(800) 232-0144
FBI	(225) 291-5159 or (504) 816-3000
Homeland Security Operations Center	(202) 282-8101
National Infrastructure Coordination Center	(202) 282-9201

Big Cajun 2 Key Numbers	Office Extension	[redacted]	[redacted]
Unit 1 Control Room	5655	[redacted]	[redacted]
Unit 2 Control Room	5659		
Unit 3 Control Room	5672		
Security Guard	5636/5723	[redacted]	

Contractors	Phone
Bayou Ash Dennis Kilbourn Marshall Gremillion	225.638.6373 225.405.4922 (cell) 225.939.7899 (cell)
Stone and Webster	225.296.1766
Tracer	225.769.6606
John River Cartage John Snyder Doug Toussaint	 225.389.1300 (office) 225.937.7728 (cell) 225.638.6690 (home) 225.933.3620 (cell) 225.627.5417 (home)
American Commercial Barge Line Bryan Christy	 504.736.1299 (office) 504.460.2228 (cell) 985.792.1177 (home)

Big Cajun 1 and 2 Key Contacts	Office Extension	Cell Phone Pager (All 225 AC)	Home Phone (All 225 AC)
Chad Helm Joey Stonaker (Hazardous Materials)	5656 5715	571-5225 N/A	638-6105 638-7749
Tracey Hudson Robert Roland (Fall Protection)	5633 5648	276-1960 938-5896	753-6197 767-5269
Brian Bradley Gerald Nichols (Fire Fighting)	5632 5667	572-7409 978-4302	627-4583 638-5095
Lanel Debetaz Vernon Devillier (Confined Spaces)	5657 5679	978-0025 936-0017	638-8043 638-6738
Dean Lemoine Winston Hunt (Fire Protection Systems)	5812 5643	978-0025 620-7229	638-7237 753-1398
Al Castille (First Aid, CPR, Blood Borne Pathogens)	5617	485-0696	638-7705
Marc Jones (LAN)	618-4444	603-5251	
John David (Physical Security)	5622	485-0695	627-6101
Gerald Nichols (Personnel Security)	5667	978-4302	638-4218
Rick Roberts (Emergency Action Plan)	5650/5651	614-7070	

B. **When calling 911 or other agencies for emergency assistance, provide:**

- Your name, title and phone number
- Name and address of Big Cajun 2 Station:

  10431 LA Hwy 981,

  New Roads, LA

  225.638.3773 or 800.256.6028

- Nature of the emergency
- Whether personnel injuries are involved and, if so, how many
- Directions to Big Cajun 2 Station

Should the emergency be severe enough, the outside agencies should be instructed to use the "construction gate" and proceed to the Training Center to set up a command station. The area east of the Training Center will be used for a staging area for equipment, supplies, etc.

C. Media Contacts

Media Contact Procedure
In the event of a plant emergency that may attract media attention: ***<u>Do not</u> communicate with the media before notifying the Plant Manager.*** The Plant Manager of Louisiana Generating will notify Meredith Moore, Director, Communications Office 609.524.4522 Mobile 609.977.2520

D. Communications from Outside Agencies

Occasionally, outside agencies, such as the Louisiana State Police or Federal Bureau of Investigation, receive from other sources information that may pertain to power plants. When a message is communicated to Big Cajun 2 from an outside agency:

1. Obtain the caller's name, title, and return phone number.
2. Write the message down for future reference and read it back to the caller to ensure it is accurate.
3. Notify the Shift Supervisor immediately and begin developing appropriate contingency plans.
4. Notify the Plant Manager and obtain approval to implement action plans.
5. The Plant Manager of Louisiana Generating shall determine whether contact with outside authorities and/or NRG Operations headquarters is appropriate.

Emergency Action Responsibilities

A. **Control Room Operators**

- Understand all procedures in the Big Cajun 2 Station Emergency Action Plan.
- Receive emergency calls.
- Notify Shift Supervisor.

A. Go to the vertical board between Units 1 and 2 and sound the YELP signal for ten seconds.

B. Wait for five seconds.

C. Sound the YELP signal for ten seconds.

D. Announce over the Gai-Tronics:

1. EMERGENCY, EMERGENCY.
2. Injury or Fire (state the emergency).
3. Give the location of the emergency.
4. Emergency Response Teams respond.
5. If the emergency is on the Units, announce that the respective elevators are to be used by the ERT only.

- Repeat steps A, B, C, D, 1, 2, 3, 4 and 5.

  After the YELP signal has been sounded, Line Five of the Gai-Tronic System is to be cleared of all plant personnel and is to be utilized only by members of the ERT. After the receiving CRO has announced the emergency over the Gai-Tronics, he is to pick up on Line Five and give the location and nature of the emergency to any ERT members that may have been in an area where they were prohibited from hearing the announcement.

  The Gai-Tronics Line Five clearance will remain in effect until the emergency is over. Also, once the YELP signal is given, the Guard will open the main gate to alleviate any time delays.

- Notify Security Guard.
- Then the CRO will initiate the ERT Response Report Sheet, Form 198. The CRO will record his information and forward to the Chief for completion after the emergency has been resolved.
- When the emergency has been mitigated, the CRO will announce that the emergency is over and the elevator is back in service.

B. **Shift Supervisors (Chief)**

- Understand all procedures in the Big Cajun 2 Station Emergency Action Plan.

- Assess emergency situations and provide direction to each of the ERT Leaders.
- Determine whether outside assistance is required and call for the assistance or delegate an available Team Leader to make phone calls for any assistance needed.
- Dispatch an employee to the gate to accompany the emergency crews at all times while they are on site.
- Inform Production Manager and Plant Manager of emergency situations.
- Prepare NRG Significant Event Report *(See Appendix C)*.

C. **Plant Manager**

- Develop/maintain and annually review/update the Emergency Action Plan.
- Coordinate annual drills and Emergency Action Plan training.
- Review emergency situations with Shift Supervisor.
- Provide guidance on how to precede with media contacts.

D. **Supervisors (Team Leaders)**

- Understand all procedures in the Big Cajun 2 Station Emergency Action Plan.
- Contact designated company personnel and report status of emergency as directed by Chief.
- Insure maximum safety of each team and equipment efficiency.
- May be required to lead individual teams.
- Know the whereabouts of contractors and visitors for which entry has been authorized in the event of a station emergency.
- Follow appropriate Emergency Action Plan procedures in the event of an emergency.
- Expedite plant evacuation in the event of an emergency.
- Participate fully in emergency drills.
- Critique drills and suggest improvements to minimize response time and maximize overall effectiveness.

E. **Primary ER Truck Driver and Alternate ER Truck Driver**

- Understand all procedures in the Big Cajun 2 Station Emergency Action Plan.
- Get the emergency vehicle to the scene.
- Should there be injuries above the ground floor on Units 1 and 2, report to Unit 1 passenger elevator and wait for further instruction. If the injuries are above ground on Unit 3, report to Unit 3 freight elevator and wait for further instruction.

F. **Team Members**

- Understand all procedures in the Big Cajun 2 Station Emergency Action Plan.

G. **Security Guard**

- Understand all procedures in the Big Cajun 2 Station Emergency Action Plan.
- Close all gates to visitors, except emergency crews from outside agencies, during emergencies when directed to do so by Shift Supervisor.
- Ensure all contractors and visitors sign in to facilitate headcounts during real or simulated plant evacuations.
- Participate in emergency drills as directed.

F. **All Big Cajun 2 Employees**

- Understand all procedures in the Big Cajun 2 Station Emergency Action Plan Reference Guide.
- Know the whereabouts of contractors and visitors for which entry has been authorized in the event of a station emergency.
- Follow appropriate Emergency Action Plan procedures in the event of an emergency.

  When reporting emergency state:

  1. Your name.
  2. Location.
  3. Emergency observed.
- Participate fully in emergency drills.
- Critique drills and suggest improvements to minimize response time and maximize overall effectiveness.

Bombs & Other Threats

Most bomb threats are made by telephone. If you receive a bomb threat by telephone:

A. *REMAIN CALM AND DO NOT DELAY.*

B. **Be sincere; do not take sides.**

C. **Collect Information** *(See Appendix A–Bomb & Other Threats Form.)*

1. Record the conversation, if possible. (Turn off periodic beep, if possible.)
2. Fill out the *Bomb & Other Threats Form* (see Appendix A). Obtain as much information from the caller as possible. This will assist in determining the course of action to be taken and will help the Pointe Coupee Parish Sheriff's Office with their investigation.
3. Keep the caller on the phone as long as possible while someone else calls 911. Let them hang up – never hang up on them. Ask questions or repeat what has been said to be sure you have the message.
4. Notify the Shift Supervisor.

D. **Keep the caller talking and complete the bomb threat form in Appendix A.**

1. Record every word.
2. Advise the caller that the building is occupied and detonation of the bomb could result in death or serious injury to many innocent people.
3. Note:
   a. Sex of caller.
   b. Age of caller.
   c. Race of caller.
   d. Accent (is voice native to the area?).
   e. Speech impediments or particular voice characteristics: normal, distinct, slurred, drunk, laughing, crying, nasal, stutter, lisp, raspy, deep, ragged, clearing throat, deep breathing, cracking voice, disguised, familiar, calm, angry, excited, slow, rapid, soft, loud.
   f. If voice sounded familiar, whom did it sound like?
4. Pay particular attention to any strange or peculiar background noises, such as street noise, motors running, music, television or radio programs, dishes rattling, babies crying and any other background noise, which might give even a remote clue as to the origin of the call.
5. Ask the caller what type of bomb it is.
6. Ask the caller where the bomb is located.
7. Ask the caller what time the bomb will detonate.
8. As the caller what the bomb looks like.
9. Ask the caller how the bomb can be set off.
10. Ask the caller why he/she is warning us.

11. Ask the caller how we can contact him/her.

12. Record time call is completed.

If the threat is in writing avoid handling the document in order to safeguard clues for police examination.

E. **<u>Notify only the Shift Supervisor or Plant Manager.</u>**

1. Do not communicate with the media. They should be referred to the Plant Manager of Louisiana Generating.

2. Do not discuss the call with anyone else unless authorized to do so.

3. Do not leave your assignment unless instructed to do so by the Shift Supervisor or Plant Manager.

F. **Determine whether the plant must be evacuated immediately.**

The decision to evacuate the plant shall be made by the Shift Supervisor or Plant Manager, in conjunction with the Pointe Coupee Parish Sheriff's Office, and shall be based on the following criteria:

1. The caller's credibility. What did the caller say? Did the caller sound serious? Were there people snickering in the background?

2. Frequency of similar threats.

3. The same employees absent from work during similar threats.

4. Links to news reports of similar threats.

5. Exposure of personnel to danger as a result of an evacuation.

6. Number of people involved.

G. **Undertake a search of the plant in conjunction with Pointe Coupee Parish Sheriff's Office who will determine whether to enlist the help of other agencies.**

Do not use two-way radios or cellular phones while searching the plant, since these devices could inadvertently trigger an explosive or incendiary device.

1. Clear the control room of non-essential personnel.

2. The control room operator shall set up a search progress log.

3. Key personnel within location will report to a central location. First they will search their central area interior and exterior. Search high-risk areas, heavy equipment, transformers, etc.

4. Working with the Pointe Coupee Parish Sheriff's Office's, Big Cajun 2 personnel shall search all areas of the plant. Only volunteers will be used in the search. If your area can be evacuated without an interruption of plant operations, all occupants should search their immediate surroundings and then evacuate to a safe area, i.e., the open area east of the parking lots.

5. Report findings to the control room as areas are completed. The operator shall keep a progress log.

6. Report, but DO NOT TOUCH any suspicious objects. Make a detailed description of the object's location.

7. At the discretion of the police person in charge, notify the 911 operator that a suspicious object has been identified.

8. If possible, place mattresses or sand bags around the suspicious object. Do not use metal shield plates and DO NOT COVER THE OBJECT.

9. Clearly identify and block off an area around the suspicious object of at least 300 feet, including floors above and below the object.

10. Open doors and windows in the area to minimize primary damage from the blast and secondary damage from fragmentation.

11. As the time for the bomb to go off nears, everyone will evacuate except people absolutely necessary to shut down the process or respond to emergencies. All people remaining in the location will assemble to respond to emergencies or until management gives the all clear.

12. After the explosive or incendiary device has been found, evacuate the danger area immediately except for the minimum personnel required to safely shut down the location. As quickly as a shutdown can be accomplished, everyone should evacuate to a safe area and stand by for further instructions.

H. **Evacuate the plant.** *(See Station Evacuation)*

1. Sound the station evacuation alarm and announce appropriate meeting locations for personnel.

2. Initiate the plant evacuation.

3. Implement appropriate unit shutdown procedures.

4. No one shall be permitted to re-enter the plant until the device has been removed/disarmed, and the plant is declared safe for re-entry by the Shift Supervisor or Plant Manager in consultation with the Pointe Coupee Parish Sheriff's Office.

I. The Plant Manager of Louisiana Generating will contact Glenn Sayger, Regional Manager Occupational Safety, Health and Security (cell phone) 225.603.0556 and Meredith Moore, Director, Communications (office) 609.524.4522 or (mobile) 609.977.2520.

Civil Unrest

When a group of people gather in front of the plant to demonstrate and/or picket, proceed as follows:

A. **Notify the Shift Supervisor** who shall:

1. Meet with the group:
   a. Introduce yourself: name and position within Big Cajun 2 Station.
   b. Ask demonstrators to introduce themselves and tell you why they are picketing against Big Cajun 2 Station.
   c. If they say they object to something Big Cajun 2 Station is doing or that the plant has other faults they have discovered, say "OK".
   d. Then tell them that you understand and agree with their right to assemble and protest. Inform them that they can exercise their rights on the public path only and that they may not impede traffic or enter company property.
2. If information is received about a pending demonstration, forward the information to the Plant Manager and Shift Supervisor.

B. **Notify the Plant Manager**:

1. If the Plant Manager has not already met with the protestors, inform them of your meeting as soon as possible.
2. Report the name of the group, their cause and their reaction to your instructions.

C. **Call the Pointe Coupee Parish Sheriff's Office at (225) 638-3737 and report the status of the situation. Request assistance, if necessary.**

D. The Plant Manager of Louisiana Generating will contact Glenn Sayger, Regional Manager Occupational Safety, Health and Security (cell phone) 225.603.0556 and Meredith Moore, Director, Communications (office) 609.524.4522 or (mobile) 609.977.2520.

Do not communicate with the media before discussing the situation with the Plant Manager.

Communications Outages

Caller's Responsibilities:

Report the communication system failure to your supervisor immediately. Begin use of alternative modes of communications, as directed, until further notice.

Control Room Operator's Responsibilities:

Normal plant communications include the use of regular telephones, cell phones, two-way radios, PA system, email, fax and electronic communications over the LAN. In the event one or more of these communication systems fail:

A. Report the system failure to the Shift Supervisor immediately.

B. Establish an alternate means of on-site communications with Operations personnel to ensure the safe and reliable operation of the units.

   1. Alternate modes of on-site communications could include: two-way radios, PA system or cell phones until the normal means of communication is re-established.

   2. Alternate modes of off-site communications could include: email, fax or cell phones until the normal means of communication is re-established.

C. If the outage impacts the ability to sound station alarms, the SHIFT SUPERVISOR shall determine what alternate system will be used for station alarms until the outage is ended.

D. Notify the Security Guard of the outage and alternate mode of communication. The Guard shall inform all subsequent personnel entering the site until the communication outage is ended.

E. The SHIFT SUPERVISOR or designee shall inform managers as soon as possible. These individuals shall inform their direct reports and, similarly their direct reports, until all on-site employees have been made aware of the situation.

F. Plant supervision responsible for contractor and/or visitor on-site activities shall notify those groups if the outage impacts the ability to communicate station emergencies.

G. The Shift Supervisor or designee shall notify NRG Marketing as soon as possible if the outage may impact communications with that group.

H. **Communications Outage Action Plan**

   1. If the outage is related to the **normal telephone system or fax**, notify David Breaux (225) 572-9428.

   2. If the outage is related to **two-way radios**, notify David Breaux (225) 572-9428.

   3. If the outage is related to the **LAN or email**, notify Marc Jones (225) 603-5251.

   4. If the outage is related to the **cellular phone system**, notify Marc Jones (225) 603-5251.

   5. If the outage is related to the **Plant PA or Station Alarm Systems**, notify the Maintenance Manager and I&E Department. The plant PA System is

the means of communicating station alarms and instructions on how to respond; therefore, repairs shall be given top priority.

I. When the defective system has been restored to normal operation, inform all on-site personnel that the outage has ended.

Elevator Emergencies

Caller's Responsibilities:

If you become trapped in an elevator:

A. Remain calm.

B. Push the "open door" button or push the button for another floor.

C. If the door does not open or move to another floor, try to open the door using firm hand pressure. Do not use tools such as a pry bar or screwdriver.

D. If the door opens, push the emergency stop before exiting the elevator.

E. If the door still fails to open, push the emergency alarm button to attract attention. If available, use a cell phone to call 638-3773. Inform the operator of your situation or use Line 5 of the Gai-Tronics to page for help.

F. Do not try to leave the elevator using the top hatch, as you will jeopardize your safety.

F. Wait until help arrives.

If you become trapped in a stack elevator:

A. Remain calm.

B. Push button to go in the opposite direction.

C. Use the hand radio to alert someone of the situation.

D. Inform the person which stack elevator you are in.

E. Wait for help to arrive.

Control Room Operator's Responsibilities:

If an elevator emergency alarm is received:

Calm the Trapped Person(s)

A. Summon help immediately and direct them to the appropriate elevator to provide instructions.

B. Using Line 5 of the Gai-Tronics, instruct the trapped person(s) to: "Remain calm; help is on the way".

C. Instruct them to push the "open door" button or push the button for another floor.

D. If the door does not open or move to another floor, instruct them to try to open the door using firm hand pressure. Do not use tools such as a pry bar or screwdriver.

E. If the door opens, push the emergency stop before exiting the elevator.

F. Instruct them not to try to leave the elevator through the top hatch since it is dangerous and would interfere with the rescue operation.

Note: It is safer to allow experts to rescue people trapped in an elevator (unless they are in immediate danger) rather than risk the safety of inexperienced would-be rescuers.

Call for Emergency Elevator Assistance

G. Call ThyssenKrupp Elevator Co. at 225-928-1120. ***Tell them you have a "person trapped" emergency.*** They will respond immediately once alerted.

H. If the cab is not at a floor level, determine which two floors the elevator cab is between.

I. Direct ThyssenKrupp Elevator personnel to the appropriate location.

J. Assign someone to talk with the trapped person(s) either on the phone, Gai-Tronics, or hand radio while waiting for ThyssenKrupp Elevator personnel to arrive.

Weekly Elevator Alarm Tests

K. Elevator alarms shall be tested and verified once per week by Operations personnel. ***Non-working elevator alarms shall be given top priority and repaired as soon as possible.***

Fire Emergencies

Caller's Responsibilities:

If a fire is discovered:

A. Move everyone away from the area.

B. ***Call 5655 or 5659 or use the Gai-Tronics to call Units 1 & 2 Control Room .*** Provide the following information:

1. Location of the fire
2. Type of fire and material being burned
3. If the fire will endanger personnel

C. If the fire is small and you are trained, use the appropriate fire extinguisher and attempt to extinguish it, only if:

1. It can be done safely
2. You have someone with you at all times
3. You are able to have your back towards an exit

Remember:

Use water on coal fires.

Use dry chemical or CO_2 on oil fires.

Use Halon, CO_2 or, in worse case, dry chemical on electrical fires.

Control Room Operator's Responsibilities:

A. **Collect Information**

When a caller reports a fire, request the caller's name, location of fire and any other information that will help personnel to respond as quickly as possible.

B. Go to the vertical board between Units 1 and 2 and sound the YELP signal for ten seconds.

C. Wait for five seconds.

D. Sound the YELP signal for ten seconds.

E. Announce over the Gai-Tronics:

1. EMERGENCY, EMERGENCY.
2. Fire (state the emergency).
3. Give the location of the fire.
4. Emergency Response Teams respond.
5. If the fire is on the Units, announce that the respective elevators are to be used by the ERT only.

Repeat steps A, B, C, D, 1, 2, 3, 4 and 5.

F. After the Y E L P signal has been sounded, Line 5 of the Gai-Tronic System is to be cleared of all plant personnel and is to be utilized only by members of the Fire Brigade. After the receiving CRO has announced the emergency over the Gai-

Tronics, he is to pick up on line 5 and give the location and nature of the emergency to any Fire Brigade members that may have been in an area where they were prohibited from hearing the announcement.

The Gai-Tronics Line Five clearance will remain in effect until the emergency is over. Also, once the YELP signal is given, the Guard will open the main gate to alleviate any time delays.

G. Notify Security Guard.

H. Then the CRO will initiate the Fire Brigade Emergency Report Sheet, Form 198A. The CRO will record his information and forward to the Shift Supervisor for completion after the emergency has been resolved.

I. When the emergency has been resolved, the CRO will announce that the emergency is over and the elevator is back in service.

Responsibilities:

1. Chief – It is the responsibility of the Fire Brigade Chief to provide direction to each of the Fire Brigade Leaders to insure maximum efficiency of the teams and equipment and the safety of both. The Chief will supervise each Emergency Scene or he will delegate the responsibility to a qualified Brigade Leader. It is also the chief's decision when or if to call outside assistance due to the complexity of the emergency. He can delegate an available brigade leader the authority to make phone calls for any assistance needed.

2. Brigade Leaders – It is the responsibility of the Brigade Leader to provide input to the chief. It is always their responsibility to insure maximum safety of each brigade and equipment efficiency. As directed by the chief, a brigade leader is to contact designated company personnel and report the status of the emergency. He is to stay in as close contact to the scene as possible. His communication within the plant will be to the Operations Supervisor. A brigade leader may also be required to go to the front gate to assist in obtaining outside assistance.

3. Special Fire Brigade Members – In an effort to save time and eliminate confusion, two Fire Brigade members will be appointed to drive the Fire Utility Truck. It is their responsibility to get the emergency vehicle to the emergency scene.

4. Fire Brigade Response:

   Upon receiving notification of the emergency, the Fire Brigade, and only the Fire Brigade, is to respond in the following manner:

   A. If the emergency is on the units or within close location to the units, the Operations Brigades are to go immediately to the location. If the emergency is a fire, pick up an extinguisher or a Scott air pack on the way to the emergency.

   B. If the emergency is in the fuels handling area the Fuels Handling Brigade is to proceed immediately to the location.

   C. If the emergency is in an outlying area, the following points will be pick-up points of the Fire Brigade:

      1. Operations Brigades, outside the south end of the D. I. Building.

      2. Fuels Handling Brigade, on the road between the crusher house and T-3.

3. Fire Brigade Chief, Shift Supervisor or Relief Shift Supervisor will report to the emergency scene to take charge.

4. Brigade Leader, Unit 3: If the response scene is on the Units, the leader would go directly to the scene. If the response scene is an outlying area, then the leader would go to the demineralizer building for transportation.

5. Brigade Leader, Units 1 and 2: If the response scene is on the units, the leader would go directly to the scene. If the response is in a outlying area, he would report to the demineralizer building for transportation.

6. Brigade Leader, Fuels Handling: If the response scene is in his area, the leader would go directly to the scene. If the response was in another area, the leader would pick up the Fire Brigade members waiting at the road between the crusher house and T-3 and transport to the scene.

7. Brigade Leader, Shift Maintenance: The Brigade Leader would take the shift maintenance truck and report to the road between the crusher house and T-3 and/or demineralizer building to transport personnel to the emergency scene. Upon arriving at the scene, and if there is a fire, he will check to be sure that all manual isolation valves and deluge valves that route water to the fire zone are open. If they are not open, and if the valves are not tagged, he will open the manual valves and/or trip the deluge valves to be sure that water is available. He would then report the valve position to the Chief/Brigade Leader that is directing the response.

8. Primary Fire Utility Truck Driver, E. O. Units 1 and 2: Reports to the utility truck and drives the utility truck to the scene.

9. Alternate Fire Utility Truck Driver, Fuels Department: If the primary fire utility truck driver has not reported to the utility truck, wait one minute then report to the emergency scene with the utility truck. If the primary driver has reported to the utility truck, then both Brigade Members will report to the scene with the utility truck.

10. Pretreatment (Lab Personnel - Fire Brigade member or not): If there is a fire, the operator will report to the fire pumps to observe and maintain proper operation until properly relieved.

11. Outside Water Tender (Fire Brigade member or not): The O.W.T. will report to the demineralizer building and/or the road between the crusher house and the T-3 building to transport Fire Brigade members to the scene of the emergency.

5. Chief's Report

After arriving at the scene and evaluating the emergency, the Fire Brigade Chief is to direct a Brigade Leader to report to the Production Manager and the Safety Department all pertinent information regarding the emergency:

A. Emergency condition

B. Injured parties, if any

C. If under control or if outside assistance is needed

D. If outside assistance is needed, the chief will direct the Brigade Leader to call the appropriate service.

If it appears outside help may be required, obtain permission from the Shift Supervisor or designee to call 911 and provide:

- Your name, title and phone number
- Name and address of Station
- Nature of the emergency
- Number of personnel involved, as applicable
- Type of emergency assistance required
- Directions to Station, if requested
- If further communication with E911 is necessary, call 638-7200. This will help the dispatcher keep the lines clear for other emergencies.

E. Inform the Security Guard

F. If someone has to be transported to Pointe Coupee General Hospital, call the hospital emergency room at 638-6331. The Chief will direct a Brigade Leader to accompany the patient to the hospital.

G. Conduct a role call to insure all personnel are accounted for after the emergency is concluded. Also, the chief, with the aid of the Brigade Leader, is to complete the report the CRO started on the details of the emergency

Security Guard Responsibilities

1. The Guard shall permit no one to enter the site except requested emergency crews and Louisiana Generating employees.

Most Probable Types of Fires at Big Cajun 2 Station

The most common types of fires encountered at Big Cajun 2 Station will be:

1. Coal – Class A fire, best fought with water or CO_2 fire extinguishers.
2. Fuel Oil – Class B fire, best fought with dry chemical or CO_2 fire extinguishers.
3. Electrical – Class C fire, best fought with Halon, CO_2, dry chemicals or fire extinguishers.

Fire Prevention

Fires can be prevented through good housekeeping; use of Hot Work Permits; diligent safety walkthroughs and inspections; test and maintenance programs for fire protection; detection and alarm equipment; and proper training of plant personnel.

A. **Good Housekeeping**

1. Storage of all materials and trash in proper containers.
2. Routine elimination of trash, clutter, combustibles and debris in all areas of the plant and related buildings.
3. Immediate containment and clean up of grease, oil, and coal leaks and spills.
4. Proper storage of oil, fuel, and other flammables and combustibles only in fireproof and/or fire-protected areas.
5. Immediate clean up of the work area after each job is completed.
6. Open pathways so as not to block access to operating or fire protection equipment.
7. Clean and properly lamped lighting fixtures.
8. Fully operating and routinely tested emergency lighting.
9. Fully operating and routinely tested station alarm system.
10. All control and electrical panel doors, junction boxes and cubicle doors in place and closed at all times, except when work is actually being performed.
11. Appropriate electrical and other devices and apparatus in hazardous locations.

B. **Hot Work Permits**

The appropriate use of Hot Work Permits ensures that reasonable precautions are taken to prevent fire or explosion while torch cutting, welding, grinding, working with chemicals and other hot processes. Detailed procedures and Fire Watch requirements, along with minimum requirements for welding booths, are provided in the Big Cajun 2 Procedures Manual.

1. <u>Hot Work Permits</u>

   Hot Work Permits shall be utilized for Big Cajun 2 Station maintenance work by employees or contractors. Whenever work requires torch cutting, welding, and other hot work, the crew shall utilize a Hot Work Permit with Instructions and Fire Safety Precautions.

2. <u>Welding Booths</u>

   A welding booth is considered to be a safe welding area. Specifically, it is a permanent location of non-combustible construction equipped with proper ventilation, having little or no combustibles in the booth and is surrounded by metal walls or approved welding curtains to keep sparks within the booth. An appropriate fire extinguisher must be provided at each booth. A Fire Watch and Hot Work Permit are generally not needed for hot work performed in a welding booth.

C. **Diligent Safety Walkthroughs and Inspections**

Big Cajun 2 Station management personnel are assigned areas of the plant for daily and weekly safety walkthroughs of which housekeeping and fire protection equipment are key components. Any required follow-up work is initiated through a Safety Action Item, which is documented and tracked through completion.

Key Safety Issue Advocates are responsible for periodic inspections (weekly, monthly, quarterly, semi-annually and annually) of key equipment and programs related to personnel safety, e.g., fixed and portable fire systems, and fire fighting.

D. **Fire Protection Equipment Inspections**

The "Fire Protection" Key Safety Issue Expert shall be responsible to:

1. Oversee the inspection and maintenance programs for fire protection systems and report to the Production and Maintenance Managers any deficiencies and major fire equipment out of service.
2. Ensure all fire systems are properly labeled and that instructions are conspicuously posted nearby.

E. **Periodic Fire Training for Plant Personnel**

The "Fire Fighting" Key Safety Issue Expert shall be responsible to:

1. Provide training in types, locations and proper use of fixed fire protection systems for members of the Fire Brigade.
2. Keep accurate records of all people attending the training.

A. **Cardox Systems**

General Description:

Fixed carbon dioxide (CO_2) systems only protect three areas of the plant – the relay room and the cable spreading room and the Unit 3 bunker room dust collection hoppers. The systems are low-pressure storage units of CO_2 – 7 1/2 tons. The steel housed storage unit consists of a pressure vessel, refrigeration system, gages, alarm system and a safety vent assembly all enclosed within a steel housing on a single all welded base.

The pressure vessel provides for the storage of 7 ½ tons of low-pressure carbon dioxide (CO_2). It is an all welded cylindrical steel tank covered with insulation. The tank shell is designed and tested to meet applicable code requirements.

The refrigeration system (using FREON-12) automatically maintains (-) 17.8°C (0°F) and corresponding vapor pressure of 300 psi by use of an expansion valve. The valve is set at approximately 5 psi to regulate the refrigerant flow through the system. The system consists of an air-cooled condensing unit and automatic refrigeration controls.

The automatic refrigeration controls start and stop the compressor thereby controlling the temperature of the carbon dioxide in order to maintain proper operating pressures. The controls consist of a tank pressure control switch, magnetic start switch, and high and low pressure compressor switches. An alarm circuit is provided and consists of an alarm bell and an alarm pressure switch. The alarm circuit is used to sound an audible warning in case of high or low tank pressure.

The storage unit is provided with a safety vent assembly, which provides relief if higher than normal operating pressures are present within the storage tank. There is also a 30 second delay from the time the alarm horn sounds to notify any personnel of the discharge of CO_2.

The system also feeds off of the tank to supply CO_2 for generator purge. This supply is either routed through a heater or it has the ability to flow around the heater through a bypass line/valve arrangement. The discharge piping exiting the heater is fitted with adequate pressure relief valving.

1. Relay Room 2nd Floor:
   Manual pushbutton actuation or automatic detection of fire in the Relay Room actuates the system. Two (2) manual pushbutton stations are provided; one each at the exterior of each entrance door. In addition, an automatic-abort-manual selector switch is provided on the hazard control panel.

2. Cable Spreading Room – 2.5 Floor:
   The same capabilities and actuation sequences apply to the cable spreading room. The switches are located in the same places as the relay room switches.

Big Cajun 2 Cardox System Units 1, 2 and 3		
	Description	**Operation / Trip Station Location**
	Unit 1 – 2nd Floor Relay Room	*Manual* - Exterior side of each entrance door (East and West sides)
	Unit 1 – 2.5 Floor Cable Spreader Room	*Manual* - Exterior side of entrance door. Automatic by smoke detectors on ceiling throughout cable room.
	Unit 3 – East and West Bunker Room Dust Collection Hopper	*Automatic*
	Same operation on Units 2 and 3 for the 2nd Floor Relay Rooms and 2.5 Floor Cable Spreader Rooms	*Manual* – Control Room and on the panel outside of Relay Room on the west side. Automatic by smoke detectors on ceiling.

B. **Automatic Sprinkler Deluge Systems**

Automatic sprinkler water deluge systems are used throughout the plant. Alarms are triggered by Heat Actuated Devices (HADs), rate of rise temperature sensors and Sudden Pressure Relays (on generating step-up transformers). Discharge can also be manually activated at manual control stations or at the deluge valve *(see instructions at valve location).* Alarms are sounded in the Units 1, 2 and 3 control rooms. Water is supplied by two diesel fire pumps that start when pressure drops below a set point during a discharge.

Routine system testing and maintenance are performed annually by a fire protection system specialist and appropriate plant personnel in accordance with National Fire Protection Association (NFPA) Codes.

C. **Hose Reels**

Hose reels are located throughout the plant and coal handling buildings and are connected to an electric fire pump that starts automatically when the nozzle is opened and the supervisory pressure is released. The electric fire pump is backed up by a diesel fire pump. Hose reels are inspected monthly in accordance with National Fire Protection (NFPA) Codes. Each hose reel has a tag affixed to it, which is initialed and dated after the inspection.

D. **Portable Fire Extinguishers**

Fire extinguishers are carbon dioxide and dry chemical and are located throughout the plant and ancillary buildings. Fire extinguishers are inspected monthly in accordance with National Fire Protection (NFPA) Codes. Each fire extinguisher has a tag affixed to it, which is initialed and dated after the inspection.

Spent fire extinguishers shall be placed in the empty rack to be picked up by the Vendor, recharged and replaced. The user of the extinguisher is responsible to report its use and location to the Shift Supervisor immediately.

E. **Fire Protection System Responsibility**

Responsibility for overseeing the Louisiana Generating fire protection systems is assigned to Gerald Nichols, Safety Advisor.

F. **Fire Protection Equipment Tagging and Testing Procedures**

1. Whenever any fire protection equipment (e.g. Cardox, Automatic Sprinkler or Halon) must be isolated for repairs, testing, or to prevent freezing, an impairment tag shall be obtained from the Shift Supervisor or the Safety Advisor. The Shift Supervisor and the Safety Advisor must be notified of all fire protection equipment tagging. The Shift Supervisor and the Safety Advisor shall review the tagging request to ensure the minimum fire protection equipment is removed from service for the required work.

2. Any requested tagging that will exceed 12 hours in duration must be approved by the Shift Supervisor, Operations Manager and Safety Advisor. If the equipment is removed from service, a continuous Fire Watch must be utilized to maintain surveillance over the affected area until it is returned to service.

3. The Safety Advisor is responsible to keep the insurer informed of repair or testing status of the fire equipment.

4. When any abnormality is found during routine fire inspections or testing, the Shift Supervisor must receive written notification by the end of the work period in which the problem was discovered.

G. **Fire Protection Monitoring Equipment**

Local alarm panels are located throughout the plant. These panels monitor and transfer alarms to computer screens located inside each control room and the fuels supervisor's office.

H. **Cable Penetration Procedure**

Any penetration to run cable through floors of relay room, cable spreader room, high voltage and medium voltage rooms require tracking via a Flame Seal Penetration Log. The penetration is given a unique tracking number as well as location. Resealing of the opening must be witnessed and signed off by the Maintenance Supervisor, person completing the seal and the Operations Shift Supervisor.

Hazardous Materials

Caller's Responsibilities:

If you discover a hazardous material incident:

A. Move everyone away from the danger area.

B. Restrict access so that no one enters into the hazard.

C. ***Call 5655 or 5659*** and give the following information:

- Location of the incident;
- Type of hazardous material involved and
- Whether the incident is controlled or getting larger.

D. If the incident is small and you have the proper training and equipment, attempt to contain the spill. Do this only if:

- It can be done safely;
- You have someone with you at all times and
- You are able to exit the area at all times if necessary.

E. After you have moved to a safe location, ***call 5655 or 5659*** to report the incident.

F. Call Chad Helm at extension 5656 (office) or (225) 571-5225 (cell phone) or Joey Stonaker at extension 5715 (office) for Material Safety Data Sheets. The MSDS sheets can also be found at the warehouse and on the internet.

Control Room Operator's Responsibilities:

If a caller reports a hazardous material incident – react immediately:

A. Instruct the caller to move everyone away from the danger area and to restrict access so that no one else enters into the hazard area.

B. **Collect Information:**

1. Location of the incident;
2. Type of hazardous material involved and
3. Whether the incident is controlled or getting worse;
4. If the incident is small and the person has the proper training and equipment, instruct them to attempt to contain the spill. They should do this only if:
   a. It can be done safely;
   b. They have someone with you at all times;
   c. They are able to exit the area at all times if necessary.

C. **Inform Shift Supervisor**

The Shift Supervisor shall assess the spill and determine whether that area of the plant must be evacuated. If so, follow the procedure in the Station Evacuation section of the Big Cajun 2 Station Emergency Action Plan.

D. **Inform the Environmental Compliance Coordinators**

Notify Chad Helm at extension 5656 (office) or (225) 571-5225 (cell phone) or Joey Stonaker at extension 5715 (office).

If a spill of any kind reaches off site, the Environmental Compliance Coordinators or Shift Supervisor must notify the Hazardous Materials Unit of the Office of State Police at (225) 754-8500 or (800) 256-6901 within 30 minutes of the spill and the National Response Center at (800) 424-8802.

E. If cleanup assistance is required and Chad Helm or Joey Stonaker, Environmental Compliance Coordinators, cannot be reached:

Call Robert Hendrix at extension 5708 or (225) 938-3863 (cell phone).

F. **Inform the Plant Manager**

Notify the Plant Manager at extension 5650/5651 or (225) 614-7070 (cell phone).

G. If the spill may attract media attention:

The Plant Manager of Louisiana Generating will contact Glenn Sayger, Regional Manager Occupational Safety, Health and Security (cell phone) 225.603.0556 and Meredith Moore, Director, Communications (office) 609.524.4522 or (mobile) 609.977.2520.

Do not communicate with the media before discussing the situation with the Plant Manager.

H. Prepare a Louisiana Generating Incident Report and an NRG Environmental Incident Report, if required. *(See Appendix C.)*

Intruders & Trespassers

Caller's Responsibilities:

If you discover a trespasser on the property, do not attempt to confront them. ***Call 5655 or 5659*** and describe the location and, if possible, the individual(s) involved. If it is safe to do so, maintain surveillance until security arrives.

Control Room Operator's Responsibilities:

Louisiana Generating property is private and is not open to the public for hunting, trapping, hiking, fishing, camping, off-the-road recreational vehicle use or other activities unless specific agreements are in effect between plant management and the outside agency or party.

A. If persons are reported to be trespassing on Big Cajun 2 property, notify the Shift Supervisor.

B. The Shift Supervisor or designee shall call Security at 5731 (Major's Office), 5681 (Construction Gate) or 5636/5723 (Main Gate). If help from the Sheriff's Department is needed, the Shift Supervisor or designee will call the Sheriff's Office to request back up.

   Do not confront the trespassers directly since it is not possible to know whether they are under the influence of drugs or alcohol, armed, etc.

   Louisiana Generating will prosecute habitual or uncooperative trespassers and those who damage property.

C. Dispatch an employee to the main gate to accompany police to the trespassers' location.

D. Report trespassing incidents on the Accident/Incident Report form <u>immediately after the incident</u>.

E. If outside assistance such as the Sheriff's Department was utilized, the Shift Supervisor is to notify the Production Manager.

F. The Plant Manager of Louisiana Generating will contact Glenn Sayger, Regional Manager Occupational Safety, Health and Security (cell phone) 225.603.0556.

Marine/Train Emergencies

Caller's Responsibilities:

In the event you witness a ship or boating accident:

A. ***Call 5655 or 5659*** and tell the Control Room Operator:

- Type of accident (i.e. collision, person overboard, fire);
- Type of vessel involved (i.e. power boat, sailboat, freighter, tanker, tugboat);
- Location of the accident and
- Whether serious injuries are involved.
- If there has been any type of spill.

B. If it can be done safely, offer assistance from the riverside using life rings or ladders.

In the event you witness a train derailment or accident:

A. Move everyone away from the danger area.

B. ***Call 5655 or 5659*** and tell the Control Room Operator:

- Location of the incident;
- Type of material or structures involved;
- Whether serious injuries are involved and
- Whether the incident is controlled or getting larger.
- If there has been any type of spill.
    1. If there has been a spill, follow the procedures covered in the Louisiana Generating SPCC plan.

Control Room Operator's Responsibilities:

A. **Collect Information**

Marine Emergency

When a caller reports a marine emergency, request the caller's name, location of accident, type of accident (e.g. collision, person overboard, fire), type of vessel involved (e.g. power boat, sailboat, freighter, tanker, tugboat), location of the accident, whether serious injuries are involved and any other information that will help to respond as quickly as possible.

Train Emergency

When a caller reports a train emergency, request the caller's name, location of accident, type of accident (e.g. derailment, type of material or structures involved), whether serious injuries are involved, whether the incident is controlled or getting worse and any other information that will help to respond as quickly as possible.

B. **First Response**

Marine Emergency

If it can be done safely, suggest that the caller offer assistance from the riverside using life rings or ladders.

Train Emergency

Suggest that the caller move everyone away from the danger area and provide first aid as required until assistance arrives.

C. **Inform the Shift Supervisor**

D. **Call 911**

1. If outside help is required, call 911 and provide:
   - Your name, title and phone number
   - Name and address of Big Cajun 2 Station
   - Nature of the emergency
   - Number of personnel involved, as applicable
   - Type of emergency assistance required
   - Directions to Big Cajun 2 Station, if requested
2. If CSX's assistance is needed, call (800) 232-0144.
3. If Coast Guard assistance is needed, call (225) 389-0271.

E. **Inform the Plant Manager**

F. If the accident may attract media attention:

The Plant Manager of Louisiana shall consult with Meredith Moore, Director, Communications (office) 609.524.4522 or (mobile) 609.977.2520.

Do not communicate with the media before discussing the situation with the Plant Manager.

G. **Prepare a Significant Event Report** *(See Appendix C)* **or Accident Report as appropriate.**

Medical Emergencies

Caller's Responsibilities:

In the event of a medical emergency:

A. Evaluate the situation for immediate danger.

B. *Call 5655 or 5659 or use the Gai-Tronics to call Units 1 and 2 Control Room* and provide the following information:

- Location and number of victims;
- Type of injuries;
- If victim is breathing, conscious;
- If victim has severe bleeding and
- If victim has a head injury.

C. Do not move victim unless life is in danger because of the situation (fire, smoke, hazardous chemicals, etc.).

D. If you have been trained, provide first aid / CPR and comfort to the victim until medical support arrives.

E. If transport to a hospital is necessary, utilize an ambulance for all but the simplest of injuries. Do not attempt to transport an injured person by company or personal vehicle.

First aid kits are located in the following areas:

Units 1 and 2 Control Room
Unit 3 Control Room
"A" Building
I/E Tool Room
Mechanical Maintenance Tool Room
Warehouse
"B" Building
All Company Vehicles

Control Room Operator's Responsibilities:

A. **Collect Information**

When a caller reports a first aid emergency, request the caller's name, nature of emergency, location of emergency and any other information that will help to respond as quickly as possible.

B. **Refer to Emergency Action Responsibilities for procedure to be followed.**

C. **Notify Safety Department**

Call Gerald Nichols, Safety/Program Coordinator, cell phone (225) 978-4302, immediately to report life-threatening emergencies. Gerald Nichols will report emergency to appropriate department manager, followed by contacting Glenn Sayger, Regional Manager Occupational Safety, Health and Security (cell phone) 225.603.0556.

D. **Prepare an Accident Report** as soon as possible after the incident while the facts are fresh in everyone's minds and forward to the NRG Safety Department.

E. **Inform NRG Communications/Public Relations**

The Plant Manager of Louisiana Generating will contact Meredith Moore, Director, Communications, if it appears the media has been informed:

Phone: 609.524.4522

Mobile: 609.977.2520

Do not communicate with the media before discussing the situation with the Plant Manager.

Station Alarms

The Gai-Tronics system will be used to sound station alarms. All alarms are sounded from Units 1 and 2 control room by the Control Room Operator.

A. **Collect Information**

When a caller reports an emergency, request the caller's name, nature of emergency, location of emergency, whether others are involved, and any other information that will help to respond as quickly as possible.

B. **Fire Alarm**

When a fire is reported to the control room, the Control Room Operator will sound the YELP signal for ten seconds. After five seconds, the YELP signal will be sounded again for ten seconds after which the Control Room Operator will announce the location of the fire. Refer to the Emergency Action Plan section on Fires for more details. If outside assistance is required, the Control Room Operator will call for assistance and an employee will be dispatched to the gate to accompany the emergency crews.

The office building ("B" building) has a separate fire alarm that will sound for evacuation. The control room will then be notified to sound the YELP signal.

C. **First Aid Alarm**

When a first aid emergency is reported to the control room, the Control Room Operator will sound the YELP signal for ten seconds. After five seconds, the YELP signal will be sounded again for ten seconds after which the Control Room Operator will announce the location of the emergency. Refer to the Emergency Action Plan section on Medical Emergencies for more details. If outside assistance is required, the Control Room Operator will call for assistance and an employee will be dispatched to the gate to accompany the emergency crews.

D. **Station Alarm**

When a mill is being placed in service or taken out of service, the Control Room Operator will sound the Station Alarm and will announce which mill is being placed in or removed from service.

E. **Station Evacuation Alarm**

When an emergency is reported to the control room that will require a station evacuation, the Control Room Operator will sound the Siren Tone Alarm. The Control Room Operator will then announce the nature and location of the emergency and direct personnel to appropriate meeting locations. Refer to the Emergency Action Plan section on Station Evacuations for more details.

F. **Weekly Testing**

The following alarms are to be checked on a weekly basis:

- Mill Warning Alarm (general plant)
- Mill Warning Lights Burner Deck U-1
- Mill Warning Lights Burner Deck U-2
- Mill Warning Lights Feeder Deck U-1 & 2
- Mill Warning Lights Crusher Deck U-1 & 2
- Emergency Response Alarm

The Nuclear Incident Siren is tested by Entergy on the first Wednesday of each month.

G. **PA System & Station Alarm Maintenance**

The plant Gai-Tronics System is the primary means of communicating station alarms and instructions on how to respond to the emergency. For this reason, it is imperative that the system be kept in full working order at all times.

Problems related to the plant Gai-Tronics and Station Alarm Systems shall be reported immediately to the Maintenance Department and followed up with a written work order.

Repairs to the station Gai-Tronics and alarm systems shall be given top priority.

A. **Preparing for and Conducting the Evacuation**

1. When word is received that a plant evacuation may be required, notify the Shift Supervisor.

2. If the Shift Supervisor agrees, the Unit 1 or 2 CRO will sound the siren tone alarm, activate the warning lights and notify the boat pilot on the company radio.

3. The CRO or his designee shall notify the following persons/companies of the evacuation:

   a. Security Guard (ext. 5731, 5636 or 5723 and 5681)

   b. Fuels Personnel (Fuels Supervisor's Cell Phone 933-3543)

   d. Rick Roberts, Plant Manager (614-7070)

   e. Ken Thompson, Production Manager (936-6651)

   f. Mark Robinson, Maintenance Manager (235-3192)

   g. Russ Welch, I/E Supervisor (936-1977)

   h. Abe Burrell, Fuels Manager (978-4303)

   i. Robert Roland, Technical Support Manager (938-5896)

   j. Bayou Ash (638-6373)

   k. Stone and Webster (ext. 5740)

4. The Warehouse personnel will open the gate at the NE end of the Visitors' Parking Lot by the Warehouse in order that Louisiana Generating employees may assemble in their crews.

5. The Security Guard shall immediately stop all entry to the site, except authorized emergency personnel. They will begin a tally of non-station personnel who are in the plant. In the event of a power loss, employees will use the gate located in front of "B" Building leading to the Visitors' Parking Lot.

5. The exact nature of the emergency will dictate which meeting areas are usable. If possible, the Shift Supervisor or Production Manager should determine which of the meeting areas will be used.

6. Immediately after sounding the station alarm, announce the gathering area(s) that will be used from the following:

   Locations *(See Appendix B– Station Evacuation Gathering Areas.)*

   a. Shelter in Place – all employees will report to their departmental shop or office building/trailer

   b. LaGen Personnel – Visitors' Parking Lot and the Levee for workers on the river

   c. Contractor Personnel – Field east of contractor parking lot

   d. Alternate Location for all personnel on site – West of Unit 2 Cooling Tower by railroad tracks

7. At the time of the evacuation, all plant personnel (with the exception of the operating shift on duty) will report to the designated evacuation meeting area.

8. Any employee working with or near contractors or visitors shall advise them of the emergency and guide them to their designated site.

9. All persons shall assemble in their respective crews. Their Supervisor will be responsible for accounting for each member of their crew. To facilitate this effort, crew listings will be supplied at the guardhouse. Every employee on the roster must be accounted for, specifically as present, sick, on vacation, etc. All contractor employees and visitors shall also be accounted for on the sheet by name.

10. The Supervisors shall meet and determine if all employees, visitors, and contractor employees are accounted for.

11. The Department Managers shall collect the check-off sheets and report to the Shift Supervisor the status of the evacuation site.

12. During the evacuation, all personnel shall refrain from using the elevators, the public address system and telephones, if not related to the emergency.

13. The operating shift shall continue under the direction of the Shift Supervisor. Depending upon the nature of the emergency, the Plant Manager, Production Manager, and/or the Shift Supervisor shall determine if the operating shift must also be evacuated.

14. If a complete evacuation of all personnel is necessary, the Plant Manager, Production Manager, and/or the Shift Supervisor shall determine how to shut down the units, the evacuation routes and whether any safety egress equipment is required.

15. Normally there are three shutdown procedures:

    Option 1: Normal, controlled unit shutdown

    Option 2: Trip boiler and turbines, purge boiler. Verify turbines on turning gear.

    Option 3: Trip boiler and turbines.

16. No one is to leave the site until released by the Shift Supervisor.

17. Operators shall be trained annually in the use of self-contained breathing apparatus that they may be required to use in leaving the plant during adverse emergency conditions. Operators shall use this apparatus in the event of an emergency that may jeopardize their safety as they secure equipment and during their emergency exit from the plant.

18. When the area is safe, operators shall re-enter the facility to check or place the turbines on turning gear and complete the cooling of the boilers per established operating procedures.

B. **ANNUAL EVACUATION DRILL**

1. The Plant Manager shall schedule and conduct a station evacuation drill at least once per year, following the above procedure.
2. The drill shall be initiated by the Shift Supervisor, and the announcement during the alarm will clearly state that it is ***"only a drill"***.
3. Department Managers shall be assigned observation posts by the Plant Manager. During the drill, they shall observe progress and record the time required to assemble employees at their assigned location.
4. Post-Drill Debriefing:
   a. Immediately following the drill, each Department Manager shall debrief their employees to discuss lessons learned, including: effectiveness of drill, response times, impediments, ability to hear the station alarm and/or announcement, ways to improve the evacuation, etc.
   b. Each manager shall report the results of their debriefing at a meeting with the Plant Manager. This meeting will be conducted as soon as possible after the drill.
   c. The Plant Manager shall determine whether the drill should be repeated to improve response and evacuation times.

C. **In the event of an actual station evacuation, prepare an NRG Significant Event Report** ***(See Appendix C).***

A. **Collect Information**

When an act of terrorism or kidnapping incident is reported, request the caller's name and any other information that will help to respond as quickly as possible.

B. **Notify the Shift Supervisor**

C. **Inform the Plant Manager**

Notify Rick Roberts, Plant Manager, at 800.256.6028 extension 5650 (office), or (225) 614-7070 (cell phone).

If the Plant Manager cannot be reached, call Production Manager at 800.256.6028 extension 5601 (office) or (225) 936-6651 (cell phone).

Plant Manager of Louisiana Generating will advise on how to proceed with potential media contacts.

D. **Call 911 and provide:**

- Your name, title and phone number
- Name and address of Big Cajun 2 Station
- Nature of the emergency
- Number of personnel involved, as applicable
- Type of emergency assistance required
- Directions to Big Cajun 2 Station, if requested

E. **Follow the instructions of the Pointe Coupee Parish Sheriff's Department.**

F. The Plant Manager of Louisiana Generating will contact Glenn Sayger, Regional Manager Occupational Safety, Health and Security (cell phone) 225.603.0556 and Meredith Moore, Director, Communications (office) 609.524.4522 or (mobile) 609.977.2520.

Do not communicate with the media before discussing the situation with the Plant Manager.

INTRODUCTION

Freeze protection is essential for our plant during the winter months.

All departments should start preparing in July of each year, and follow up will be done in October. Check heat trace for proper operations, and any insulation that might need to be replaced. All portable heaters need to be checked. Power sources should be available for heaters. All enclosed instrument rack heaters should be placed in working order.

a. Main instrument air supplies should be inspected to assure that all condensate and drain lines are properly drained. In addition, the instrument air unit should be inspected and verified that it is producing the lowest dew point air supplies that is recommended by the manufacturer's recommended procedures.

b. All heat tracing and insulation should be inspected in early fall to assure the equipment is in proper working order and all areas are properly insulated. The equipment should also be inspected just prior to a known "hard freeze" period.

c. Fire protection systems should be inspected and provided with adequate heating and insulation. This should include outside and exposed sprinkler riser trim, exposed wet-pipe systems and aboveground water mains. Fire pump rooms should be heated and the hose headers properly drained and insulated. Fire hydrants and fire hose stations should be inspected and assured that they have been properly drained. Any snow or ice accumulations around these fire systems should be kept clean. Impairing any fire systems should be avoided.

Operations will implement the freeze protection on the boilers, turbines and outlying areas, draining lines that can be drained (such as the wash down lines) making sure that there is flow on lines that cannot be drained, and making sure instrument cabinets are closed and heaters are in service. Insure that the power is on the heat trace. Water Lab will be responsible for the demineralizer and equipment associated with it. All electrical and instrument repair will be done by Technical Services. Portable enclosure(s) will be built by Maintenance or contractor. Department heads will be responsible for scheduling support help during freeze conditions.

Starting time to implement freeze protection is when the temperature is going to be 25°F or below for four (4) hours or more. If the unit is on a reserve outage, start all systems that can be started; use steam coils to heat boiler. If steam coils are not available, fire boiler to 250 to 300 degrees gas inlet temperature.

NOTE: Under these conditions, you can bring the unit on line in four (4) hours if the turbine is pre-warmed. If the unit is not pre-warmed, Louisiana Generating management will have to make the decision to fire the boiler for pressure and temperature to prewarm the turbine.

Boiler Tube Repair: If Maintenance is repairing a boiler leak, drain the boiler completely, use steam coils if available, use vents on superheater and reheat pendants. Keep all other systems in service, if possible.

Turbine and Generator Repair: Follow Freeze Protection Procedure.

Maintenance Outage: Systems that cannot be started: Drain all systems that are exposed to the weather, checking all low points.

This procedure is a guideline to use. You may have to deviate from time to time due to the particular situation of the weather or equipment status. In areas of concern, seek proper assistance.

CONTENTS

I. OUTSIDE AREAS

A. UNIT 3 INTAKE

1. Rotate screens and remove debris. General screen cleaning.
2. Isolate and drain screen flush water system.
3. Swap clean water system to well water supply.
4. Isolate and drain sparge water system.
5. Rotate screen as needed to keep differential down.
6. Make sure all lines are drained completely above cement level.

B. UNITS 1 & 2 INTAKE

1. Crack open river water pump seal water supply trap – blow down.
2. Open vent off emergency water supply to seal water.
3. Drain bearing water tank and pumps if system not in service.

C. PRETREATMENT

1. Put all gravity filters in service.
2. Back wash filters manually every hour for one (1) minute.

   (NOTE: Place heater in desludge pit and construct temporary scaffold tent.)
3. Standby Lime System - flush suction and discharge lines. Drain system completely.
4. Open all wash water outlets (wash down pump will be isolated).
5. Put both softeners in service and maintain minimum flow.
6. Keep all sample lines cracked open.

D. OUTLYING AREAS

1. Isolate and drain wash down pump.
   a. Notify Fuels Site Supervisor and Units 1 & 2 Shift Supervisor.
2. Isolate and drain all emergency wash stations.

E. SEWAGE TREATMENT STATION

1. Place the sewage treatment station anti-foam system in service.

II. UNITS 1 & 2 COOLING TOWERS

A. PUMP OPERATIONS

1. Maintain two (2) pumps in operation to establish full flow.

B. TEMPERATURES TO MAINTAIN

1. When ambient temperature reaches 35°F, as indicated by temperature point from the weather screen on each Unit DCIS, remove cooling tower fans from service on the upwind side to achieve and maintain 80°F circulating water inlet temperature to the condenser.

NOTE: Remove only those fans that are required to achieve the required 80°F. When intentionally increasing circulating water temperature by removing fans from service, the Unit Outside Operator is to make a visual inspection of the cooling tower at least once each hour. If ice accumulation occurs, frequency of visual inspection should be increased to ensure that equipment damage does not occur.

2. Monitor circulating water temperature closely. It may be necessary to remove additional fans from service if:

   a. Ambient temperature continues to drop;

   b. Wind speed increases or direction changes;

   c. Unit load is reduced. (Should the unit be removed from service intentionally, as with a tube leak, freeze precautions ***MUST BE TAKEN*** prior to the point when heat load on the condenser is completely lost.)

   CAUTION: Should the Unit be lost from service (trip), all fans should be secured and the tower should be placed in winter bypass, with at least one (1) circulator in service to prevent freeze damage. The actions ***must be taken promptly*** to prevent damage.

C. PROCEDURE IF A CIRCULATOR IS OUT OF SERVICE AND UNIT IS OFF LINE

1. If unit is off line, go to one (1) pump operation and go to winter bypass.

2. If any circulator is off, seal water flow must be maintained through normal and bypass feeds.

D. RESTORATION

1. When risk of freeze damage has passed (ambient temperature has risen about 35°F) promptly restore fans to service to reduce circulating water temperature and restore maximum Unit efficiency.

   NOTE: As conditions change, it may be possible to restore fans, one (1) at a time, and still maintain the required condenser inlet temperature of 80°F.

III. UNIT 1 – BOILER LEVELS

A. 10TH FLOOR

1. Close drum enclosure windows and turn off vent fans.

2. Ensure electric heaters are on in both drum enclosures.

3. Check 1 and 2 freeze protection panels "On" on the east and west side of 10th floor.

4. Bleed "Pet Cocks" on the final superheater spray valves and leave cracked open.

B. 9-1/2 FLOOR

1. Bleed "Pet Cocks" on the primary superheater spray valves and leave cracked open.

C. 9TH FLOOR

1. Check the Nelson Systems on the east and west sides.
2. Check the heater in Instrument Cabinet #104 east of the D. A.
3. Place a heater in the D. A. Room and close windows.

D. 7TH FLOOR

1. Place heat trace on the south side control air header at the bends and horizontal runs.

E. 5-1/2 FLOOR

1. Check the Nelson System and the BFPT 1-1 and 1-2 panels on the east and west sides.

F. 5TH FLOOR

1. Place the heat trace on the south side control air header at the bends and horizontal runs.
2. Check #3 freeze protection panel on the east side control air heater and the bends horizontal runs.
3. Place a 110-volt heater in Instrument Cabinet #110.

G. 4TH FLOOR

1. Check the Nelson System east and west side.

H. 3RD FLOOR

1. Bleed "Pet Cocks" on 1-2, 1-6 and 1-7 heaters and leave cracked open.
2. Close all turbine building doors and stop vent fans.
3. Check heater in each mill instrument cabinet.

I. MEZZANINE FLOOR

1. Check the Nelson System near the 850 and 851 MVV valves.
2. Check the #7 freeze protection panel just west of MCC 1A11.
3. Close all Mezzanine doors.
4. Turn off vent fans and check heater thermostats.

J. GROUND FLOOR

1. Check "Heaters On" on freeze protection panels:
    a. #5 east of bottom ash
    b. #4 west of bottom ash
    c. #6 west of 1-2 forced draft fan
2. Construct temporary tents over FDF and PAF oil skids.
3. Close all turbine building doors.
4. Turn off vent fans and check heater thermostats.
5. Check heater in diesel generator room. Make sure doors are closed.

6. Have diesel generator anti-freeze checked.

K. BOTTOM ASH

1. Keep the system pulling and rotate units hourly when temperature is 25°F or lower.

2. Run water over the air separator to prevent freezing.

3. Crack open hopper fill bypass VLV.

4. Before swapping units, operate seal trough flush system for five (5) minutes.

IV. UNIT 2 – BOILER LEVELS

A. 10th FLOOR

1. Close drum enclosure and turn off vent fans.

2. Ensure electric heater is on in both drum enclosures.

3. Check #11 and #12 freeze protection panels "Heat On" on the east and west sides.

4. Bleed the "Pet Cocks" on the final superheater spray valves and leave cracked open.

B. 9-1/2 FLOOR

1. Bleed the "Pet Cocks" on the primary superheater spray valves and leave cracked open.

C. 9TH FLOOR

1. Place a heater in the D. A. enclosure; close windows and doors.

2. Check heater on Instrument Cabinet #204.

D. 5-1/2 FLOOR

1. Check heat on BFPT'S 2-1 and 2-2 freeze protection panel east and west side.

E. 5TH FLOOR

1. Place a heater in Instrument Cabinet #210 on the northwest side of boiler.

2. Check #13 freeze protection panels "Heat On" on the west side.

F. 3RD FLOOR

1. Bleed "Pet Cocks" on 2-2, 2-6 and 2-7 feedwater heaters and leave crack open.

2. Close up Turbine Building and stop vent fans.

3. Check heaters in each mill transmitter cabinet.

G. MEZZAINE FLOOR

1. Check the #17 freeze protection "Heat On" near MCC 2A11.

2. Close all doors.

3. Turn off vent fans and check heater thermostats.

H. GROUND FLOOR

1. Check "Heat On" on freeze protection panels:

   a. #15 west of bottom ash.

   b. #16 east of 2-1 forced draft fan.

   c. #17 east of bottom ash.

2. Close all Turbine Building doors.

3. Construct temporary tent over PAF oil skids.

I. BOTTOM ASH

1. Keep the system pulling and rotate units hourly when temperature is 25°F or lower.

2. Run water over each air separator to prevent freezing.

3. Crack open hopper fill bypass VLV.

4. Before swapping units, operate seal through flush system for five (5) minutes.

V. UNITS 1, 2 AND 3 GENERATOR OFF LINE

A. STATOR SYSTEM

1. Keep stator pump in service; check heater in the system for proper operation.

2. If stator pumps are not available, use G. E. procedure to remove water from the stator.

B. CLOSED COOLING WATER TO HYDROGEN COOLERS AND ALTERNATOR

1. Isolate and drain (check tail-tail drains for gas leaks).

C. OIL SYSTEM AND TURBINE GENERATOR OPERATION

1. Leave oil system in service **(NOTE: If any work is to be done, use G. E. guidelines to take oil system out of service).**

2. Close all doors – turbine enclosure and all generator alterrex rectifier doors are closed.

VI. UNIT 3 BOILER LEVEL

A. TOP OF BOILER

1. Check IK's, IR's and air heater sootblowing enclosure to make sure they are closed.

B. DRUM ROOM

1. Check windows and doors that they are closed and ensure electric heaters are functional.

C. D. A. ROOM

1. Check windows and doors that they are closed and heater is in service.

D. HEAT TRACE

1. Check all heat trace that is in service (10^{th} Floor drum level transmitter) west side of boiler.

2. Check heat trace panel 5^{th} Floor east side.

E. INSTRUMENT RACKS

1. Close and insure heater in service.

2. 10^{th} Floor south side – make sure it is covered and torpedo heater in service.

3. Secondary airflow transmitter cabinet on "D" burner row should be covered and a heater placed inside.

F. FUEL OIL AIR SYSTEM

1. 4^{th} Floor east side of boiler lower point drain – make sure that it is cracked open to keep condensate out of lines.

G. BASEMENT

1. Ensure all fire protection valves are reset and pipes are dry.

2. Drain wash water system (See special note in belt conveyor system).

3. Put sluice system to bypass and leave in service; flush each pulverizer system for two (2) minutes every half hour. Leave drains cracked open.

4. Flush make-up line to deasher every half hour.

5. Monitor pulverizer lube oil system. **(NOTE: Taking mill out of service, empty feeder downspout.)**

6. Have three (3) heaters in service on the bottom of the deasher.

7. Place heater on BC-10 chute above BC-11. Construct temporary tent and install heater at BC-11 head chute.

   NOTE: If rollers on BC#11 freeze up, reverse BC#10 putting ash on floor. Keep the deasher in service, if possible.

8. Open drains on aux steam to steam coils and APH sootblowers.

9. Open igniter air supply drain on northeast side of deasher.

VII. UNITS 1, 2 AND 3 – BOILER OUT OF SERVICE AND UNABLE TO PUT A FIRE IN THE BOILER

A. USING STEAM COILS

1. Drain boiler completely. **(NOTE: Use air to blow out condensate from the superheater and R. H. pendant tubes.)**

2. Check that the secondary air dampers are open.

3. Make sure that the superheater and R. H. proportional dampers are open at least 35% and no more than 50%.

4. Use the induced draft fans control dampers to maintain the highest possible heat in the boiler, approximately 35% open. **(NOTE: All dampers will have to be open to maintain flow path out of the stack.)**

B. USING AUXILIARY STEAM TO PEG THE DRUM AND D. A.

1. Peg the drum and D. A. heaters with auxiliary steam and monitor drum differential and cycle drains as necessary.

C. NO AUXILIARY STEAM AVAILABLE

1. Bottle up boiler.

2. Drain completely using air to blow condensate from superheater and R. H. pendants.

3. Open all drains, vents, Yarways, transmitters, sight glasses and level transmitters on the continuous blow tank steam coil drain tank D. A. heater, #7 Heater, #6 Heater, #2 Heater and boiler drum.

4. Isolate and drain all bottom ash water.

5. Isolate and drain all pyrite sluice lines. **(NOTE: Maintenance to loosen flanges at low points and bends that don't have drains. See on pyrite and bottom ash system.)**

D. CLOSED COOLING WATER

1. If closed cooling water cannot be maintained, isolate each mill and forced draft fan lube oil cooler and have a low point union or flange broken to drain the cooler.

E. CONDENSATE AND FEEDWATER SYSTEM CANNOT BE MAINTAINED

1. Drain system, checking lower point drains.

2. Drain shell side of feedwater heaters.

VIII. FIRE SYSTEM

A. Check all vertical fire headers on the boilers dry.

B. Ensure all coal area fire headers are reset and dry..

C. Isolate and drain the mill deluge system (Units 1 and 2).

IX. POTABLE WATER BUILDING

A. Close doors and heater in service.

X. DEMINERALIZER BUILDING

A. Close doors and heaters in service.

B. Make-up water to all units at 30°F.

XI. COAL BELTS

A. At 30°F, all belts running **(NOTE: To keep rollers from freezing up).**

XII. DIESEL GENERATORS

A. Doors closed; heaters in service.

B. Run diesel generator periodically.

1. Main instrument air supplies should be inspected to assure that all condensate and drain lines are properly drained. In addition, the

instrument air unit should be inspected to verify that it is producing the lowest dew point air supplies that are recommended by the manufacturer's recommended procedures.

2. All heat tracing and insulation should be inspected in early fall to assure the equipment is in proper working order and all areas are properly insulated.

   The equipment should also be inspected just prior to a known "hard freeze" period.

3. Fire protection systems should be inspected and provided with adequate heating and insulation. This should include outside and exposed sprinkler riser trim, exposed wet pipe systems and above ground water mains. Fire hydrants and fire hose stations should be inspected and assured that they have been properly drained. Any snow or ice accumulations around these fire systems should be kept clean. Impairing any fire systems should be avoided.

Hurricanes

A. Administrative Staffing

1. Staffing will continue as normal.
2. Plant staffing will be evaluated as hurricane information is provided.
3. If weather conditions are anticipated to be severe in the New Roads area, plant management will implement an emergency staffing procedure, which requires all available management personnel to report to the plant site.
4. During severe weather conditions, the plant will afford working personnel an opportunity to have their families come to the plant for safety. Food will be provided during this time period for all personnel on site.
5. Communication will be available by radio from Cajun I, Cajun II, and ECC.
6. Warehouse personnel will ensure all needed items are stocked for this type of emergency.
7. Emergency information will be provided to all plant personnel, i.e., shelter locations, emergency check lists, etc.

B. General Preparation

1. Active coal storage will be increased for anticipated heavy rainfall.
2. Load rejection procedures will be reviewed with all operating personnel.
3. All emergency equipment will be tested.
4. Entire site will be inspected by areas.

C. Inspection Guidelines

The following guidelines are intended to be generic in nature. Use them as they apply to the area and/or responsibilities assigned to you.

1. Inspect the entire area assigned to you. Any objects not permanently affixed should be moved indoors or secured in place. Some options for securing objects may be rope, chain, cable or welding.
2. Close all doors and secure covers on all outdoor substations, MCC's, cable trays, electrical cabinets, junction boxes, equipment rooms and buildings.
3. Check all sump pumps and lift stations to verify proper operation.
4. Have diesel pumps serviced and standing by.
5. Park all vehicles indoors when not in service.

HURRICANE PREPARATION PLAN

SITE PREPARATION ASSIGNMENTS

1.	Unit 1 Boiler and Turbine Building	______
2.	Unit 1 Precip. and Stack Area	______
3.	Unit 2 Boiler and Turbine Building	______
4.	Unit 2 Precip. and Stack Area	______
5.	Unit 3 Boiler and Turbine Building	______
6.	Unit 3 Precip. and Stack Area	______
7.	Both Fly Ash Silos and Area	______
8.	Pretreatment Area	______
9.	Cooling Towers and Area	______
10.	Waste Pond Lift Station Area	______
11.	Fire Pump Building and Portable Water Area	______
12.	Coal Handling Structures and Area	______
13.	Unloader and Dock Area	______
14.	Unit 3 Intake and Area	______
15.	Warehouse and Laydown Yards	______
16.	Outage Warehouse and Area	______
17.	Shaw Building and Area	______
18.	Ignition Oil Pump and Tank Area	______
19.	"A" Building and Area	______
20.	"B" Building and Area	______
21.	"C" Building and Area	______
22.	Electrical Enclosure Doors	______
23.	All Open Areas and Roads	______

Flood Emergencies

The following scenarios have been identified as possible flood emergencies at the Big Cajun 2 facility.

Mississippi River Levee Failure

In the event that the Mississippi River levee should break north of the facility between the Big Cajun 2 facility and the Morganza Spillway, which is a control structure built by the Army Corp of Engineers to divert flood water from the Mississippi River; the local emergency preparedness office believes there would be little or no effect to the site. This is due to the site's location along the river and the elevation of the property. The Big Cajun 2 facility is located near a bend in the river and the natural flood plain lies well north of its location. But, if the Office of Emergency Preparedness calls for an evacuation of the site, this would be communicated via television, radio, sheriff's department, and/or two-way radio. Once the evacuation has been ordered, then our current evacuation procedures would be followed.

Coal Reclaim Tunnel Sump Pump Failure

If the tunnel sump pumps failed, the result would be high water levels in below grade coal reclaim areas and could possibly stop the flow of coal to the units. In this event, one or more of the many portable pumps on site would be installed to alleviate the situation.

Unit 3 Circulating Water Intake Sump Pump Failure

Level alarms and pump operations are checked each shift. Should these pumps fail, the lower levels of the intake structure could become flooded. This could cause electrical problems, loss of critical auxiliary equipment, and ultimately a shut down of Unit 3. Large electric portable pump on site is available and sufficient to control the level until repairs can be made to the normal pumping system.

Circulating Water Piping Failure

Should a failure in this piping system occur, the unit would be tripped and the pumps would be shut down by the Control Room Operator to prevent any flooding.

Station Blackout

Upon complete loss of switchyard and unable to hold station service:

IMMEDIATELY

A. Control Room Operators – visibly check all DC oil pumps for start. Lock out all auto start equipment in Foxboro, if operational. If Foxboro is not operational, pull to lock all equipment breakers.

  1. Basement and Turbine Operators – verify all main turbine DC emergency oil pumps, emergency seal oil pumps and both boiler feed pump DC emergency pumps are running and verify pump discharge pressure. Open all breakers (marked with blue reflective tape) for drains back to condenser.

B. Trip BFPT's.

C. Open vacuum breakers.

D. Open generator field breaker.

E. Line up cooling water to main turbine lube oil coolers from potable water.

F. Check that the emergency diesel generator is on and supplying essential service boards with power. (If so, the vacuum breakers will drive and the TGOP will run.)

  1. Outside Area Operator or Pretreatment Lab Personnel – verify diesel fire pump operation.

THEN

A. Send an operator to the switchyard with a radio.

B. The Shift Supervisor will contact the Control Room Operators to determine status of all three units. If more than one unit has remained on line, a decision will be made, based on the expected duration of the switchyard outage, to leave all units on line or remove all but one to hold station service. (Crosstie 6.9KV breakers prior to removing units from service.)

***NOTE:* OPERATORS MUST COMMUNICATE BETWEEN UNITS PRIOR TO STARTING OR STOPPING EQUIPMENT.**

C. Call ECC to see if the switchyard can be closed in. If so, close in under their direction. **(DON'T FORGET SYNC SWITCH, SET VOLTAGE AND SPEED TO MATCH THE SYSTEM.)** If the breakers will not close from the control room, the operator in the switchyard can close in locally by radio.

D. Once the switchyard is restored, close 6.9KV main breakers. (Check voltage.)

E. Close 6.9KV feeds to electrical feeds.

F. Close 480v USS main breakers.

G. Coordinate with ECC and other control room operators prior to energizing any equipment.

H. Proceed with unit start up.

<u>NOTE</u>: IN THE EVENT OF A TOTAL SYSTEM COLLAPSE, ALL RE-ENERGIZATIONS MUST BE FIRST COORDINATED THROUGH ECC AND WITH OTHER CONTROL ROOM OPERATORS. SYSTEM STABILITY WILL BE CRITICAL AT THIS TIME.

Appendix A

Document 4b: LPDES Permit

Appendix F
LPDES Permit

State of Louisiana

Department of Environmental Quality

M. J. "MIKE" FOSTER, JR.
GOVERNOR

SEP 1 2 2003

L. HALL BOHLINGER
SECRETARY

CERTIFIED MAIL 7002 2030 0002 8913 6935 **-RETURN RECEIPT REQUEST**

EPA CERTIFIED MAIL 7002 2030 0002 8913 6942 File No.: LA0054135
AI No.: 38867 Activity No.: PER19920002

Mr. Gary C. Ellender, Director of Environmental Affairs
Louisiana Generating LLC
Big Cajun II Power Station
112 Telly Street
New Roads, Louisiana 70760

RE: Louisiana Pollutant Discharge Elimination System (LPDES) permit to discharge cooling tower blowdown, once through non-contact cooling water, low volume wastewaters, metal cleaning wastewaters, maintenance wastewaters, treated sanitary wastewater, coal pile runoff, and stormwater runoff to the Mississippi River from an existing steam electric generating plant located on Louisiana Highway 981 near New Roads, Pointe Coupee Parish.

Dear Mr. Ellender:

This Office has received and evaluated comments submitted by Louisiana Generating LLC in response to the public notice published in the Office of Environmental Services Public Notice Mailing List and the POINTE COUPEE BANNER of New Roads on June 26, 2003. The Office's response to comments submitted by Louisiana Generating LLC are summarized below. No comments have been received from the general public.

Comment 1:

Under Part I - Outfall 001 - page 2 of 8:

For pH, under Outfall 001, Measurement Frequency should read "Continuous", and the Sample Type should read "Record".

Response to Comment 1:

The final permit incorporates that correction.

Comment 2:

Under Part II - Section K - page 6 of 22 (last sentence):

The minimum quantification levels......................are found in Part II, Paragraph H.

"Paragraph H" should be replaced with "Paragraph I".

Response to Comment 2:

The final permit incorporates that change.

Comment 3:

Under Part II - Section V. - STORMWATER DISCHARGES

The Big Cajun II plant presently discharges stormwater associated with industrial activity under Louisiana LPDES Multi-Sector General Permit (authorization number LAR05N202). This MSGP required implementation of a SWP3 concerning sheet runoff of stormwater.

Coal pile runoff, plant island runoff, tank storage areas and sumps discharge through Outfall 001 under the existing NPDES/draft LPDES permit LA0054135. The MSGP SWP3 is utilized to monitor ditches for runoff associated with sheet flow from roadways, material laydown areas etc.

Under Section V. of the draft LPDES permit LA0054135, a new requirement for a stormwater SWP3 and monitoring has been required.

Louisiana Generating, LLC requests that DEQ consider allowing the Big Cajun II Power Plant to continue to monitor stormwater associated with the sheet flow from roadways, material laydown areas, etc. under the terms of the MSGP while including the coal pile runoff, plant island runoff, tank storage areas and sumps as it is in the existing permit and draft renewal. If, however, DEQ chooses not to allow Big Cajun II to monitor the former areas under the terms of the MSGP, Louisiana Generating requests that DEQ eliminate the requirements of General Conditions, Part II, Section V. Louisiana Generating believes that coverage under both permits is not required and that, if stormwater is covered under the LPDES permit, then preparation of a SWP3 is not necessary, nor required. In fact, other states within EPA Region VI do not mandate such requirements as those included in Section V. Moreover, to Louisiana Generating's knowledge, EPA does not require same. The MSGP itself purports to automatically eliminate MSGP requirements when stormwater is covered under an LPDES permit. Absent MSGP coverage, Louisiana Generating is not aware of any mandate for the elements of Section V. Therefore, we respectfully request that Big Cajun II be allowed to maintain coverage under the MSGP as specified above and we also request that DEQ withdraw Part II, Section V from the draft and final permit.

If DEQ is unable to comply with this request, then Louisiana Generating LLC respectfully requests that DEQ confirm that MSGP coverage will terminate upon issuance of the new permit if Section V of the LPDES permit must be implemented. Also requested is that the existing MSGP SWP3 be utilized as the SWP3 under the requirements of Section V Part II of the draft LPDES permit LA0054135. This would eliminate any costs associated with completing a new SWP3.

Response to Comment 3:

Part II, Paragraph V addresses stormwater discharges from Louisiana Generating LLC, Big Cajun II Power Station. As stated, that section " applies to all stormwater discharges from the facility, either through permitted outfalls or through outfalls which are not listed in the permit or as sheet flow." In accordance with LAC 33:IX.2345.B.3.d, the MSGP (authorization number LAR05N202), issued to your facility is automatically terminated on the effective date of this LPDES permit.

Therefore, as requested, Part II Section V will cover all stormwater from your facility and the current MSGP coverage is terminated upon the **effective date**, not issued date, of this individual LPDES permit.

Pursuant to the Clean Water Act (33 U.S.C. 1251 et seq.), and the Louisiana Environmental Quality Act (La. R.S. 30:2001, et seq.), the attached LPDES permit has been issued. Provisions of this permit may be appealed in writing pursuant to La. R.S. 2024(A) within 30 days from receipt of the permit. Only those provisions specifically appealed will be suspended by a request for hearing unless the secretary or the assistant secretary elects to suspend other provision(s) as well. A request for hearing must be sent to the following:

Louisiana Department of Environmental Quality
Office of the Secretary
Attention: Hearings Clerk, Legal Division
Post Office Box 4302
Baton Rouge, Louisiana 70821-4302

This permit shall replace the previously effective EPA (NPDES) permit. All future correspondence regarding this permit shall use the Agency Interest (AI) number 38867 and LPDES permit number LA0054135.

Monitoring results should be reported on a Discharge Monitoring Report (DMR) form per the schedule specified. A copy of the form to be used is attached for your convenience. Copies to be submitted to the regional office should be sent to the Capital Regional Office, Office of Environmental Compliance, Post Office Box 4312, Baton Rouge, Louisiana 70821-4312.

Should you have any questions concerning any part of the permit, please feel free to contact Elizabeth A. Ballard of the Office of Environmental Services at the address on the preceding page or telephone (225) 219-3093.

Sincerely,

Linda Korn Levy
Assistant Secretary

eab

Attachments

c: cover letter and permit:

Ms. Evelyn Rosborough (6WQ-CA)
U. S. Environmental Protection
Agency, Region VI (by Certified Mail)

Permit Compliance Unit
Office of Environmental Compliance

Elizabeth A. Ballard
Celena Cage (route RO copy)
Permits Division

Mr. Douglas Vincent, P.E.
Public Health Chief Engineer
Office of Public Health
Department of Health and Hospitals

IO-W File

c: cover letter only:

Scott Guilliams
Permits Division

PERMIT NUMBER
LA0054135
AI No.: 38867
Activity No.: PER19920002

OFFICE OF ENVIRONMENTAL SERVICES
Water Discharge Permit

Pursuant to the Clean Water Act, as amended (33 U.S.C. 1251 et seq.), and the Louisiana Environmental Quality Act, as amended (La. R. S. 30:2001 et seq.), rules and regulations effective or promulgated under the authority of said Acts, and in reliance on statements and representations heretofore made in the application, a Louisiana Pollutant Discharge Elimination System permit is issued authorizing

Louisiana Generating LLC
Big Cajun II Power Station
112 Telly Street
New Roads, Louisiana 70760

Type Facility: Steam electric generating plant

Location: Louisiana Highway 981 near New Roads
Pointe Coupee Parish

Receiving Waters: Mississippi River

to discharge in accordance with effluent limitations, monitoring requirements, and other conditions set forth in Parts I, II, and III attached hereto.

This permit shall become effective on October 1, 2003

This permit and the authorization to discharge shall expire five (5) years from the effective date of the permit.

Issued on September 10, 2003

Linda Korn Levy
Assistant Secretary

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (Outfall 001)

During the period beginning the effective date and lasting through the expiration date the permittee is authorized to discharge from:

Outfall 001, the continuous combined wastewater treatment effluent consisting of: low volume wastewaters including, but not limited to: cooling tower chemical storage area drain, bottom/fly ash basins decant, demineralizer regeneration wastewaters, boiler blowdown from Unit 1, 2, and 3, Unit 1 and 2 bottom ash system surge tank overflow, hopper overflow, clarifier overflow waters, and wall cooling wastewaters; metal cleaning wastewater; storm water runoff from oil storage/SPCC area; plant service waters; process area runoff; coal pile runoff; previously monitored cooling tower blowdown from Units 1 and 2; previously monitored proposed cooling tower blowdown from a proposed Unit 4; and previously monitored treated sanitary wastewater.

Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic		Discharge Limitations				Monitoring Requirements	
		(lbs/day, UNLESS STATED)		Other Units (mg/L, UNLESS STATED)			
	STORET Code	Monthly Average	Daily Maximum	Monthly Average	Daily Maximum	Measurement Frequency	Sample Type
Flow-MGD	50050	Report	Report	---	---	Continuous	Record
Temperature (°F)	00011	90(*1)	95(*1)	---	---	Continuous	Record
TSS	00530	---	---	30	100	1/week	Grab
Oil & Grease	03582	---	---	15	20	1/week	Grab
Total Copper	01042	---	---	1.0	1.0	1/week(*2)	Grab
Total Iron	01045	---	---	1.0	1.0	1/week(*2)	Grab
TOC	00680	---	---	---	50	1/quarter	Grab
pH (Standard Units)	00400	---	---	6.0 (*3) (Min)	9.0 (*3) (Max)	Continuous	Record

WHOLE EFFLUENT (ACUTE) TOXICITY TESTING	STORET Code			(Percent %, UNLESS STATED) Monthly Avg Minimum	48-Hour Minimum	Measurement Frequency	Sample Type
NOEC, Pass/Fail [0/1], Lethality, Static Renewal, 48-Hour Acute, *Pimephales promelas*	TEM6C	---	---	Report	Report	1/year	24-hr. Composite
NOEC, Value [%], Lethality, Static Renewal, 48-Hour Acute, *Pimephales promelas*	TOM6C	---	---	Report	Report	1/year	24-hr. Composite

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (Outfall 001, continued)

Effluent Characteristic		Discharge Limitations				Monitoring Requirements	
				Other units (Percent %, UNLESS STATED)			
WHOLE EFFLUENT (ACUTE) TOXICITY TESTING	STORET Code			Monthly Avg Minimum	48-Hour Minimum	Measurement Frequency	Sample Type
NOEC, Value [%], Coefficient of Variation, Static Renewal, 48-Hour Acute, *Pimephales promelas*	TQM6C	---	---	Report	Report	1/year	24-hr. Composite
NOEC, Pass/Fail [0/1], Lethality, Static Renewal, 48-Hour Acute, *Daphnia pulex*	TEM3D	---	---	Report	Report	1/year	24-hr. Composite
NOEC, Value [%], Lethality, Static Renewal, 48-Hour Acute *Daphnia pulex*	TOM3D	---	---	Report	Report	1/year	24-hr. Composite
NOEC, Value [%], Coefficient of Variation, Static Renewal, 48-Hour Acute *Daphnia pulex*	TQM3D	---	---	Report	Report	1/year	24-hr. Composite

COAGULANTS:

The quantity and types of all coagulants (clarifying agents) used in the intake raw river water treatment clarification system during the sampling month shall be recorded. Records of the quantity and type of coagulants used shall be retained for three (3) years following Part III.C.3. No DMR reporting shall be required.

There shall be no discharge of floating solids or visible foam in other than trace amounts.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s):

Outfall 001, at the point of discharge from the secondary treatment pond prior to entering the Mississippi River.

FOOTNOTE(S):

(*1) See Part II.P.

(*2) When discharging metal cleaning wastewaters.

(*3) The permittee shall report on the Discharge Monitoring Reports both the minimum and maximum instantaneous ph values measured.

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (Internal Outfall 101)

During the period beginning the effective date and lasting through the expiration date the permittee is authorized to discharge from:

Internal Outfall 101, the discharge of cooling tower blowdown from Units 1 and 2.

Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic		Discharge Limitations		Other Units		Monitoring Requirements	
		(lbs/day, UNLESS STATED)		(mg/L, UNLESS STATED)			
	STORET Code	Monthly Average	Daily Maximum	Monthly Average	Daily Maximum	Measurement Frequency	Sample Type
Flow-MGD	50050	Report	Report	---	---	1/week	Estimate
Free Available Chlorine	50064	---	---	0.2	0.5	1/week	Grab (*1)
Total Chromium	01034	---	---	0.2	0.2	1/year	Grab
Total Zinc	01092	---	---	1.0	1.0	1/week	Grab

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s):

Internal Outfall 101, at the point of discharge from the cooling tower blowdown line prior to combining with other wastewaters in the Rainfall Surge Pond.

FOOTNOTE(S):

(*1) Sample shall be representative of any periodic episodes of chlorination, biocide usage, or other potentially toxic substance discharged on an intermittent basis.

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (Internal Outfall 201)

During the period beginning the effective date and lasting through the expiration date the permittee is authorized to discharge from:

Internal Outfall 201, the discharge of treated sanitary wastewater.

Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic		Discharge Limitations				Monitoring Requirements	
		(lbs/day, UNLESS STATED)		Other Units (mg/L, UNLESS STATED)			
	STORET Code	Monthly Average	Weekly Average	Monthly Average	Weekly Average	Measurement Frequency	Sample Type
Flow-MGD	50050	---	Report	---	---	1/3 months	Estimate
BOD_5	00310	---	---	30	45	1/3 months	Grab
TSS	00530	---	---	30	45	1/3 months	Grab
Fecal Coliform colonies/100 ml (*1)	74055	---	---	200	400	1/3 months	Grab

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s):

Internal Outfall 201, at the point of discharge from the sewage treatment plant prior to combining with other wastewaters in the Rainfall Surge Pond.

FOOTNOTE(S):

(*1) Future water quality studies may indicate potential toxicity from the presence of residual chlorine in the treatment facility's effluent. Therefore, the permittee is hereby advised that a future Total Residual Chlorine Limit may be required if chlorine is used as a method of disinfection. In many cases, this becomes a NO MEASURABLE Total Residual Chlorine Limit.

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (Proposed Internal Outfall 301)

During the period beginning upon startup of Unit 4 and commencement of discharge and lasting through the expiration date the permittee is authorized to discharge from:

Internal Outfall 301, the discharge of cooling tower blowdown from Unit 4.

Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic		Discharge Limitations				Monitoring Requirements	
		(lbs/day, UNLESS STATED)		Other Units (mg/L, UNLESS STATED)			
	STORET Code	Monthly Average	Daily Maximum	Monthly Average	Daily Maximum	Measurement Frequency	Sample Type
Flow-MGD	50050	Report	Report	---	---	1/week	Estimate
Free Available Chlorine	50064	---	---	0.2	0.5	1/week	Grab (*1)
Total Chromium	01034	---	---	0.2	0.2	1/year	Grab
Total Zinc	01092	---	---	1.0	1.0	1/week	Grab

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s):

Internal Outfall 301, at the point of discharge from the cooling tower blowdown line prior to combining with other wastewaters in the Rainfall Surge Pond.

FOOTNOTE(S):

(*1) Sample shall be representative of any periodic episodes of chlorination, biocide usage, or other potentially toxic substance discharged on an intermittent basis.

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (Outfall 003)

During the period beginning the effective date and lasting through the expiration date the permittee is authorized to discharge from:

Outfall 003, the continuous discharge of once through non-contact cooling water from Unit 3.

Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic		Discharge Limitations (lbs/day, UNLESS STATED)		Other Units (mg/L, UNLESS STATED)		Monitoring Requirements	
	STORET Code	Monthly Average	Daily Maximum	Monthly Average	Daily Maximum	Measurement Frequency	Sample Type
Flow-MGD	50050	Report	450	---	---	Continuous	Record
Temperature (°F)	00011	Report (*1)	113 (*1)	---	---	Continuous	Record
Total Residual Chlorine	50060	---	49.6	---	0.2	1/week	Grab (*2)

WHOLE EFFLUENT (ACUTE) TOXICITY TESTING	STORET Code			(Percent %, UNLESS STATED) Monthly Avg Minimum	48-Hour Minimum	Measurement Frequency (*2 & *3)	Sample Type
NOEC, Pass/Fail [0/1], Lethality, Static Renewal, 48-Hour Acute, *Pimephales promelas*	TEM6C	---	---	Report	Report	1/quarter	24-hr. Composite
NOEC, Value [%], Lethality, Static Renewal, 48-Hour Acute, *Pimephales promelas*	TOM6C	---	---	Report	Report	1/quarter	24-hr. Composite
NOEC, Value [%], Coefficient of Variation, Static Renewal, 48-Hour Acute, *Pimephales promelas*	TQM6C	---	---	Report	Report	1/quarter	24-hr. Composite
NOEC, Pass/Fail [0/1], Lethality, Static Renewal, 48-Hour Acute, *Daphnia pulex*	TEM3D	---	---	Report	Report	1/quarter	24-hr. Composite
NOEC, Value [%], Lethality, Static Renewal, 48-Hour Acute *Daphnia pulex*	TOM3D	---	---	Report	Report	1/quarter	24-hr. Composite
NOEC, Value [%], Coefficient of Variation, Static Renewal, 48-Hour Acute *Daphnia pulex*	TQM3D	---	---	Report	Report	1/quarter	24-hr. Composite

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (Outfall 003, continued)

There shall be no discharge of floating solids or visible foam in other than trace amounts.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s):

Outfall 003, at the point of discharge from the turbine condensor cooling system, prior to where the once through non-contact cooling water discharge enters the Mississippi River.

FOOTNOTE(S):

(*1) See Part II.P.

(*2) Sample shall be representative of any periodic episodes of chlorination, biocide usage, or other potentially toxic substance discharged on an intermittent basis.

(*3) If there are no significant lethal effects demonstrated to the species at or below the critical dilution during the first four quarters of testing, the permittee may certify fulfillment of the WET testing requirements in writing to the permitting authority and WET testing may be reduced to not less than once per six months for the more sensitive species (Daphnia pulex) and not less than once per year for the less sensitive species (Pimephales promelas) for the remainder of the life of the permit.

PART II

OTHER REQUIREMENTS

In addition to the standard conditions required in all permits and listed in Part III, the Office has established the following additional requirements in accordance with the Louisiana Water Quality Regulations.

A. The Department of Environmental Quality reserves the right to impose more stringent discharge limitations or additional restrictions, if necessary, to maintain the water quality integrity and the designated uses of the receiving water bodies.

B. This permit does not in any way authorize the permittee to discharge a pollutant not listed or quantified in the application or limited or monitored for in the permit.

C. Authorization to discharge pursuant to the conditions of this permit does not relieve the permittee of any liability for damages to state waters or private property. For discharges to private land, this permit does not relieve the permittee from obtaining proper approval from the landowner for appropriate easements and rights of way.

D. For definitions of monitoring and sampling terminology see Part III, Section F.

E. 24-HOUR ORAL REPORTING: DAILY MAXIMUM LIMITATION VIOLATIONS

Under the provisions of Part III.D.6.e.(3) of this permit, violations of daily maximum limitations for the following pollutants shall be reported orally to the Office of Environmental Compliance within 24 hours from the time the permittee became aware of the violation followed by a written report in five days.

Pollutant(s):

Total Chromium
Total Copper
Total Zinc

F. 40 CFR PART 136 (See LAC 33:IX.2531) ANALYTICAL REQUIREMENTS

Unless otherwise specified in this permit, monitoring shall be conducted according to analytical, apparatus and materials, sample collection, preservation, handling, etc., procedures listed at 40 CFR Part 136, and in particular, Appendices A, B, and C (See LAC 33:IX.2531).

G. FLOW MEASUREMENT "ESTIMATE" SAMPLE TYPE

If the flow measurement sample type in Part I is specified as "estimate", flow measurements shall not be subject to the accuracy provisions established at Part III.C.6 of this permit. The daily flow value may be estimated using best engineering judgement.

OTHER REQUIREMENTS (continued)

H. pH RANGE EXCURSION PROVISIONS

Where a permittee continuously measures the pH of wastewater as a requirement or option in a Louisiana Pollutant Discharge Elimination System (LPDES) permit, the permittee shall maintain the pH of such wastewater within the range set forth in the permit, except that excursions from the range are permitted, provided:

1. The total time during which the pH values are outside the required range of pH values shall not exceed 446 minutes in any calendar month; and

2. No individual excursion from the range of pH values shall exceed 60 minutes.

For the purposes of this section, an "excursion" is an unintentional and temporary incident in which the pH value of discharge wastewater exceeds the range set forth in the permit.

I. MINIMUM QUANTIFICATION LEVEL (MQL)

If any individual analytical test result is less than the minimum quantification level listed below, a value of zero (0) may be used for that individual result for the Discharge Monitoring Report (DMR) calculations and reporting requirements.

NONCONVENTIONAL	MQL (μg/L)
Phenolics, Total Recoverable (4AAP)	5
Chlorine (Total Residual)	100
3-Chlorophenol	10
4-Chlorophenol	10
2,3-Dichlorophenol	10
2,5-Dichlorophenol	10
2,6-Dichlorophenol	10
3,4-Dichlorophenol	10
2,4-D	10
2,4,5-TP (Silvex)	4

METALS AND CYANIDE	MQL (μg/L)
Antimony (Total)	60
Arsenic (Total)	10
Beryllium (Total)	5
Cadmium (Total)	1
Chromium (Total)	10
Chromium (3+)	10
Chromium (6+)	10
Copper (Total)	10
Lead (Total)	5
Mercury (Total)	0.2
Molybdenum (Total)	30
Nickel (Total) Freshwater	40
Nickel (Total) Marine	5

OTHER REQUIREMENTS (continued)

Selenium (Total)	5
Silver (Total)	2
Thallium (Total)	10
Zinc (Total)	20
Cyanide (Total)	20

DIOXIN	MQL (μg/L)
2,3,7,8-TCDD	0.00001

VOLATILE COMPOUNDS	MQL (μg/L)
Acrolein	50
Acrylonitrile	50
Benzene	10
Bromoform	10
Carbon Tetrachloride	10
Chlorobenzene	10
Chlorodibromomethane	10
Chloroethane	50
2-Chloroethylvinylether	10
Chloroform	10
Dichlorobromomethane	10
1,1-Dichloroethane	10
1,2-Dichloroethane	10
1,1-Dichloroethylene	10
1,2-Dichloropropane	10
1,3-Dichloropropylene	10
Ethylbenzene	10
Methyl Bromide [Bromomethane]	50
Methyl Chloride [Chloromethane]	50
Methylene Chloride	20
1,1,2,2-Tetrachloroethane	10
Tetrachloroethylene	10
Toluene	10
1,2-trans-Dichloroethylene	10
1,1,1-Trichloroethane	10
1,1,2-Trichloroethane	10
Trichloroethylene	10
Vinyl Chloride	10

ACID COMPOUNDS	MQL (μg/L)
2-Chlorophenol	10
2,4-Dichlorophenol	10
2,4-Dimethylphenol	10
4,6-Dinitro-o-Cresol [2-Methyl-4,6-Dinitrophenol]	50
2,4-Dinitrophenol	50
2-Nitrophenol	20
4-Nitrophenol	50
p-Chloro-m-Cresol [4-Chloro-3-Methylphenol]	10
Pentachlorophenol	50
Phenol	10
2,4,6-Trichlorophenol	10

OTHER REQUIREMENTS (continued)

BASE/NEUTRAL COMPOUNDS	MQL (µg/L)
Acenaphthene	10
Acenaphthylene	10
Anthracene	10
Benzidine	50
Benzo(a)anthracene	10
Benzo(a)pyrene	10
3,4-Benzofluoranthene	10
Benzo(ghi)perylene	20
Benzo(k)fluoranthene	10
Bis(2-chloroethoxy) Methane	10
Bis(2-chloroethyl) Ether	10
Bis(2-chloroisopropyl) Ether	10
Bis(2-ethylhexyl) Phthalate	10
4-Bromophenyl Phenyl Ether	10
Butylbenzyl Phthalate	10
2-Chloronapthalene	10
4-Chlorophenyl Phenyl Ether	10
Chrysene	10
Dibenzo(a,h)anthracene	20
1,2-Dichlorobenzene	10
1,3-Dichlorobenzene	10
1,4-Dichlorobenzene	10
3,3'-Dichlorobenzidine	50
Diethyl Phthalate	10
Dimethyl Phthalate	10
Di-n-Butyl Phthalate	10
2,4-Dinitrotoluene	10
2,6-Dinitrotoluene	10
Di-n-octyl Phthalate	10
1,2-Diphenylhydrazine	20
Fluoranthene	10
Fluorene	10
Hexachlorobenzene	10
Hexachlorobutadiene	10
Hexachlorocyclopentadiene	10
Hexachloroethane	20
Indeno(1,2,3-cd)pyrene [2,3-o-Phenylene Pyrene]	20
Isophorone	10
Naphthalene	10
Nitrobenzene	10
n-Nitrosodimethylamine	50
n-Nitrosodi-n-Propylamine	20
n-Nitrosodiphenylamine	20
Phenanthrene	10
Pyrene	10
1,2,4-Trichlorobenzene	10

PESTICIDES	MQL (µg/L)
Aldrin	0.05
Alpha-BHC	0.05
Beta-BHC	0.05

OTHER REQUIREMENTS (continued)

Gamma-BHC [Lindane]	0.05
Delta-BHC	0.05
Chlordane	0.2
4,4'-DDT	0.1
4,4'-DDE [p,p-DDX]	0.1
4,4'-DDD [p,p-TDE]	0.1
Dieldrin	0.1
Alpha-Endosulfan	0.1
Beta-Endosulfan	0.1
Endosulfan Sulfate	0.1
Endrin	0.1
Endrin Aldehyde	0.1
Heptachlor	0.05
Heptachlor Epoxide [BHC-Hexachlorocyclohexane]	0.05
PCB-1242	1.0
PCB-1254	1.0
PCB-1221	1.0
PCB-1232	1.0
PCB-1248	1.0
PCB-1260	1.0
PCB-1016	1.0
Toxaphene	5.0

The permittee may develop an effluent specific method detection limit (MDL) in accordance with Appendix B to 40 CFR Part 136 (See LAC 33:IX.2531). For any pollutant for which the permittee determines an effluent specific MDL, the permittee shall send to this Office a report containing QA/QC documentation, analytical results, and calculations necessary to demonstrate that the effluent specific MDL was correctly calculated. An effluent specific minimum quantification level (MQL) shall be determined in accordance with the following calculation:

$$MQL = 3.3 \times MDL$$

Upon written approval by this Office, the effluent specific MQL may be utilized by the permittee for all future Discharge Monitoring Report (DMR) calculations and reporting requirements.

J. Prohibition of PCB Discharges

There shall be no discharge of polychlorinated biphenyls (PCB's). The minimum quantification level for PCB's is 1.0 µg/l. If any individual analytical test result for PCB's is less than the minimum quantification level, then a value of zero (0) shall be used for the Discharge Monitoring Report (DMR) calculations and reporting requirements.

K. PROHIBITION OF 126 PRIORITY POLLUTANTS

There shall be no discharge of any 126 priority pollutants (40 CFR 423 Appendix A) associated with the chemicals added for cooling tower maintenance, except total chromium and total zinc. The minimum

OTHER REQUIREMENTS (continued)

quantification levels for the 126 priority pollutants are found in Part II, Paragraph I.

L. FREE AVAILABLE CHLORINE

The term *free available chlorine* shall mean the value obtained using the amperometric method for free available chlorine described in *Standard Methods for the Examination of Water and Wastewater*, page 112 (13th edition).

Neither free available chlorine nor total residual chlorine may be discharged from any unit for more than two hours in any one day and not more than one unit in any plant may discharge free available or total residual chlorine at any one time.

M. TOTAL RESIDUAL CHLORINE

The term *total residual chlorine* (or total residual oxidants for intake water with bromides) means the value obtained using the amperometric method for total residual chlorine described in 40 CFR Part 136.

Total residual chlorine may not be discharged from any single generating unit for more than two hours per day.

Simultaneous multi-unit chlorination is permitted.

N. CHLORINE AVERAGE CONCENTRATION

The term *average concentration* as it relates to chlorine discharge means the average of analyses made over a single period of chlorine release which does not exceed two hours.

O. LOW VOLUME WASTE SOURCES

The term *low volume waste sources* means, taken collectively as if from one source, wastewater from all sources except those for which specific limitations are otherwise established. Low volume waste sources include, but are not limited to: wastewaters from wet scrubber air pollution control systems, ion exchange water treatment systems, water treatment evaporator blowdown, laboratory and sampling streams, boiler blowdown, floor drains, cooling tower basin cleaning wastes, and recirculating house service water systems. Sanitary and air conditioning wastewaters are not included.

P. TEMPERATURE

Daily temperature discharge is defined as the flow-weighted average temperature (FWAT) and, on a daily basis, shall be monitored and recorded in accordance with Part I of this permit. FWAT shall be calculated at equal time intervals not greater than two hours. The method of calculating FWAT is as follows:

OTHER REQUIREMENTS (continued)

$$FWAT = \frac{\text{SUMMATION (INSTANTANEOUS FLOW X INSTANTANEOUS TEMPERATURE)}}{\text{SUMMATION (INSTANTANEOUS FLOW)}}$$

Monthly average temperature (also known as average monthly or maximum 30 day value) shall be the arithmetic average of all FWATs calculated during the calendar month.

Daily maximum temperature (also known as the maximum daily value) shall be the highest FWAT calculated during the calendar month.

Q. METAL CLEANING WASTE

The term *metal cleaning waste* means any wastewater resulting from cleaning (with or without chemical cleaning compounds) any metal process equipment including, but not limited to, boiler tube cleaning, boiler fireside cleaning, and air preheater cleaning.

R. The quantity and types of all coagulants (clarifying agents) used in the intake raw river water treatment clarification system during the sampling month shall be recorded. Records of the quantity and type of coagulants used shall be retained for three (3) years following Part III.C.3. No DMR reporting shall be required.

S. ZEBRA MUSSEL TREATMENT:

The terms and conditions of the zebra mussel treatment program submitted by Cajun Electric Power Cooperative, Inc., and transferred to Louisiana Generating LLC, Big Cajun II Power Station, and approved by this Office on September 16, 1996 shall be enforceable as if part of this permit.

According to section 3.d., "Samples and Composites", of the biomonitoring requirements paragraph of this permit, the permittee must collect composite samples that are "representative of any periodic episodes of chlorination, biocide usage, or other potentially toxic substance discharged on an intermittent basis". Anytime the treatment method involves an increase in the concentration of a treatment chemical, a change in type of treatment chemical used, or if any event occurs that creates the potential for an effluent with a higher toxic nature, additional biomonitoring according to the terms and conditions of the biomonitoring section of Part II of this permit shall be required.

The permittee must notify this Office if changes occur in the zebra mussel control plan and obtain approval prior to initiating the new treatment. If chlorine is applied to control zebra mussels, the permittee must comply with a daily maximum Total Residual Chlorine (TRC) concentration limit of 0.2 mg/L. Monitoring shall be performed at a frequency of 1/day, by grab sample, during periods of chlorine application.

OTHER REQUIREMENTS (continued)

T. The permittee shall achieve compliance with the effluent limitations and monitoring requirements specified for discharges in accordance with the following schedule:

Effective date of the permit

U. PERMIT REOPENER CLAUSE

In accordance with LAC 33:IX.2361.C.3, this permit may be modified, or alternatively, revoked and reissued, to comply with any applicable effluent standard or limitations issued or approved under sections 301(b)(2)(c) and (D); 304(b)(2); and 307(a)(2) of the Clean Water Act, if the effluent standard or limitations so issued or approved:

1. Contains different conditions or is otherwise more stringent than any effluent limitation in the permit; or

2. Controls any pollutant not limited in the permit; or

3. Require reassessment due to change in 303(d) status of waterbody; or

4. Incorporates the results of any total maximum daily load allocation, which may be approved for the receiving water body.

V. STORMWATER DISCHARGES

1. This section applies to all stormwater discharges from the facility, either through permitted outfalls or through outfalls which are not listed in the permit or as sheet flow.

2. Any runoff leaving the developed areas of the facility, other than the permitted outfall(s), exceeding 50 mg/L TOC, 15 mg/L Oil and Grease, or having a pH less than 6.0 or greater than 9.0 standard units shall be a violation of this permit. Any discharge in excess of these limitations, which is attributable to offsite contamination shall not be considered a violation of this permit. A visual inspection of the facility shall be conducted and a report made annually as described in Paragraph 4 below.

3. The permittee shall prepare, implement, and maintain a Storm Water Pollution Prevention Plan (SWP3) within six (6) months of the effective date of the final permit. The terms and conditions of the SWP3 shall be an enforceable Part of the permit. EPA document 833-R-92-002 (Storm Water Management for Industrial Activities) may be used as a guidance and may be obtained by writing to the U.S. Environmental Protection Agency, Office of Water Resources (RC-4100), 401 M Street, S.W., Washington D.C. 20460 or by calling (202) 260-7786.

4. The following conditions are applicable to all facilities and shall be included in the SWP3 for the facility.

OTHER REQUIREMENTS (continued)

a. The permittee shall conduct an annual inspection of the facility site to identify areas contributing to the storm water discharge from developed areas of the facility and evaluate whether measures to reduce pollutant loadings identified in the SWP3 are adequate and have been properly implemented in accordance with the terms of the permit or whether additional control measures are needed.

b. The permittee shall develop a site map which includes all areas where stormwater may contact potential pollutants or substances which can cause pollution. Any location where reportable quantities leaks or spills have previously occurred are to be documented in the SWP3. The SWP3 shall contain a description of the potential pollutant sources, including, the type and quantity of material present and what action has been taken to assure stormwater precipitation will not directly contact the substances and result in contaminated runoff.

c. Where experience indicates a reasonable potential for equipment failure (e.g. a tank overflow or leakage), natural condition of (e.g. precipitation), or other circumstances which result in significant amounts of pollutants reaching surface waters, the SWP3 should include a prediction of the direction, rate of flow and total quantity of pollutants which could be discharged from the facility as a result of each condition or circumstance.

d. The permittee shall maintain for a period of three years a record summarizing the results of the inspection and a certification that the facility is in compliance with the SWP3, and identifying any incidents of noncompliance. The summary report should contain, at a minimum, the date and time of inspection, name of inspector(s), conditions found, and changes to be made to the SWP3.

e. The summary report and the following certification shall be signed in accordance with LAC 33:IX.2333. The summary report is to be attached to the SWP3 and provided to the Department upon request.

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Signatory requirements for the certification may be found in Part III, Section D.10 of this permit.

OTHER REQUIREMENTS (continued)

f. The permittee shall make available to the Department, upon request, a copy of the SWP3 and any supporting documentation.

5. The following shall be included in the SWP3, if applicable.

a. The permittee shall utilize all reasonable methods to minimize any adverse impact on the drainage system including but not limited to:

i. maintaining adequate roads and driveway surfaces;
ii. removing debris and accumulated solids from the drainage system; and
iii. cleaning up immediately any spill by sweeping, absorbent pads, or other appropriate methods.

b. All spilled product and other spilled wastes shall be immediately cleaned up and disposed of according to all applicable regulations, Spill Prevention and Control (SPC) plans or Spill Prevention Control and Countermeasures (SPCC) plans. Use of detergents, emulsifiers, or dispersants to clean up spilled product is prohibited except where necessary to comply with State or Federal safety regulations (i.e., requirement for non-slippery work surface). In all such cases, initial cleanup shall be done by physical removal and chemical usage shall be minimized.

c. All equipment, parts, dumpsters, trash bins, petroleum products, chemical solvents, detergents, or other materials exposed to stormwater shall be maintained in a manner which prevents contamination of stormwater by pollutants.

d. All waste fuel, lubricants, coolants, solvents, or other fluids used in the repair or maintenance of vehicles or equipment shall be recycled or contained for proper disposal. Spills of these materials are to be cleaned up by dry means whenever possible.

e. All storage tank installations (with a capacity greater than 660 gallons for an individual container, or 1,320 gallons for two or more containers in aggregate within a common storage area) shall be constructed so that a secondary means of containment is provided for the entire contents of the largest tank plus sufficient freeboard to allow for precipitation. Diked areas should be sufficiently impervious to contain spills.

f. All diked areas surrounding storage tanks or stormwater collection basins shall be free of residual oil or other contaminants so as to prevent the accidental discharge of these materials in the event of flooding, dike failure, or improper draining of the diked area. All drains from diked areas shall be equipped with valves which shall be kept in the closed condition except during periods of supervised discharge.

OTHER REQUIREMENTS (continued)

g. All check valves, tanks, drains, or other potential sources of pollutant releases shall be inspected and maintained on a regular basis to assure their proper operation and to prevent the discharge of pollutants.

h. The permittee shall assure compliance with all applicable regulations promulgated under the Louisiana Solid Waste and Resource Recovery Law and the Hazardous Waste Management Law (L.R.S. 30:2151, etc.). Management practices required under above regulations shall be referenced in the SWP3.

i. The permittee shall amend the SWP3 whenever there is a change in the facility or change in the operation of the facility which materially increases the potential for the ancillary activities to result in a discharge of significant amounts of pollutants.

j. If the SWP3 proves to be ineffective in achieving the general objectives of preventing the release of significant amounts of pollutants to water of the state, then the specific objectives and requirements of the SWP3 shall be subject to modification to incorporate revised SWP3 requirements.

6. Facility Specific SWP3 Conditions:

None

W. <u>DISCHARGE MONITORING REPORTS</u>

Monitoring results must be reported on a Discharge Monitoring Report (DMR) form (EPA No. 3320-1 or an approved substitute). All monitoring reports must be retained for a period of at least three (3) years from the date of the sample measurement. The permittee shall make available to this Department, upon request, copies of all monitoring data required by this permit.

If there is a no discharge event at any of the monitored outfall(s) during the reporting period, place an "X" in the <u>NO DISCHARGE</u> box located in the upper right corner of the Discharge Monitoring Report.

Reporting periods shall end on the last day of the month. Monitoring results for each month shall be summarized on a Discharge Monitoring Report (DMR) Form and submitted to this Department per schedule below, postmarked no later than the 15th day of the month following each reporting period.

Permittees shall be required to submit DMR's according to the following schedule or as established in the permit:

For parameter(s) with monitoring frequency(ies) of 1/month or more frequent:

Submit DMR by the 15th day of the following month.

OTHER REQUIREMENTS (continued)

For parameter(s) with monitoring frequency(ies) of 1/quarter:

Monitoring Period	DMR Due Date
January 1 - March 30	April 15th
April 1 - June 30	July 15th
July 1 - September 30	October 15th
October 1 - December 30	January 15th

For parameter(s) with monitoring frequency(ies) of semi-annual:

Monitoring Period	DMR Due Date
January 1 - June 30	July 15th
July 1 - December 31	January 15th

For parameter(s) with monitoring frequency(ies) of 1/year:

Monitoring Period	DMR Due Date
January 1 - December 31	January 15th

Duplicate copies of DMR's (one set of originals and one set of copies) signed and certified as required by LAC 33:IX.2333.B, and all other reports (one set of originals) required by this permit shall be submitted to the Permit Compliance Unit, and the appropriate DEQ regional office (one set of copies) at the following addresses:

Department of Environmental Quality
Office of Environmental Compliance
Permit Compliance Unit
Post Office Box 4312
Baton Rouge, Louisiana 70821-4312

Capital Regional Office
Office of Environmental Compliance
Surveillance Division
Post Office Box 4312
Baton Rouge, Louisiana 70821-4312

X. 48 HR ACUTE BIOMONITORING REQUIREMENTS: FRESHWATER

1. SCOPE AND METHODOLOGY

a. The permittee shall test the effluent for toxicity in accordance with the provisions in this section.

OTHER REQUIREMENTS (continued)

APPLICABLE TO OUTFALL:	001
REPORTED ON DMR AS FINAL OUTFALL:	TXY1
CRITICAL DILUTION:	0.17%
EFFLUENT DILUTION SERIES:	0.23%, 0.17%, 0.13%, 0.10%, and 0.07%
APPLICABLE TO OUTFALL:	003
REPORTED ON DMR AS FINAL OUTFALL:	TXQ3
CRITICAL DILUTION:	11.54%
EFFLUENT DILUTION SERIES:	15.39%, 11.54%, 8.66%, 6.49%, and 4.87%
COMPOSITE SAMPLE TYPE:	Defined at PART I
TEST SPECIES/METHODS:	40 CFR Part 136 (See LAC 33:IX.2531)

Daphnia pulex acute static renewal 48-hour definitive toxicity test using EPA/600/4-90/027F, or the latest update thereof. A minimum of five (5) replicates with eight (8) organisms per replicate must be used in the control and in each effluent dilution of this test.

Pimephales promelas (Fathead minnow) acute static renewal 48-hour definitive toxicity test using EPA/600/4-90/027F, or the latest update thereof. A minimum of five (5) replicates with eight (8) organisms per replicate must be used in the control and in each effluent dilution of this test.

b. The NOEC (No Observed Effect Concentration) is defined as the greatest effluent dilution at and below which lethality that is statistically different from the control (0% effluent) at the 95% confidence level does not occur.

c. This permit may be reopened to require whole effluent toxicity limits, chemical specific effluent limits, additional testing, and/or other appropriate actions to address toxicity.

d. Test failure is defined as a demonstration of statistically significant sub-lethal or lethal effects to a test species at or below the effluent critical dilution.

OTHER REQUIREMENTS (continued)

2. PERSISTENT LETHALITY

The requirements of this subsection apply only when a toxicity test demonstrates significant lethal effects at or below the critical dilution. Significant lethal effects are herein defined as a statistically significant difference at the 95% confidence level between the survival of the appropriate test organism in a specified effluent dilution and the control (0% effluent).

a. Part I Testing Frequency Other Than Monthly

i. The permittee shall conduct a total of two (2) additional tests for any species that demonstrates significant lethal effects at the critical dilution. The two additional tests shall be conducted monthly during the next two consecutive months. The permittee shall not substitute either of the two additional tests in lieu of routine toxicity testing, unless the specified testing frequency for the species demonstrating significant lethal effects is monthly. The full report shall be prepared for each test required by this section in accordance with procedures outlined in item 4 of this section and submitted with the period discharge monitoring report (DMR) to the permitting authority for review.

ii. If one or both of the two additional tests demonstrates significant lethal effects at or below the critical dilution, the permittee shall initiate Toxicity Reduction Evaluation (TRE) requirements as specified in item 5 of this section. The permittee shall notify this Office in writing within 5 days of the failure in any retest, and the TRE initiation date will be the test completion date of the first failed retest. A TRE may also be required due to a demonstration of intermittent lethal effects at or below the critical dilution, or for failure to perform the required retests.

iii. If one or both of the two additional tests demonstrates significant lethal effects at or below the critical dilution, the frequency of testing for this species shall be once per quarter for the life of the permit.

iv. The provisions of item 2.a are suspended upon submittal of the TRE Action Plan.

b. Part I Testing Frequency of Monthly

The permittee shall initiate the Toxicity Reduction Evaluation (TRE) requirements as specified in item 5 of this section when any two of three consecutive monthly toxicity tests exhibit significant lethal effects at the critical dilution. A TRE may be also required due to demonstration of intermittent lethal effects

OTHER REQUIREMENTS (continued)

at or below the critical dilution, or for failure to perform the required retests.

3. REQUIRED TOXICITY TESTING CONDITIONS

a. Test Acceptance

The permittee shall repeat a test, including the control and all effluent dilutions, if the procedures and quality assurance requirements defined in the test methods or in this permit are not satisfied, including the following additional criteria:

i. Each toxicity test control (0% effluent) must have a survival equal to or greater than 90%.

ii. The percent coefficient of variation between replicates shall be 40% or less in the control (0% effluent) for: Daphnia pulex survival test; and Fathead minnow survival test.

iii. The percent coefficient of variation between replicates shall be 40% or less in the critical dilution, unless significant lethal effects are exhibited for: Daphnia pulex survival test; and Fathead minnow survival test.

Test failure may not be construed or reported as invalid due to a coefficient of variation value of greater than 40%. A repeat test shall be conducted within the required reporting period of any test determined to be invalid.

b. Statistical Interpretation

For the Daphnia pulex survival test and the Fathead minnow survival test, the statistical analyses used to determine if there is a statistically significant difference between the control and the critical dilution shall be in accordance with the methods for determining the No Observed Effect Concentration (NOEC) as described in EPA/600/4-90/027F, or the most recent update thereof.

If the conditions of Test Acceptability are met in Item 3.a above and the percent survival of the test organism is equal to or greater than 90% in the critical dilution concentration and all lower dilution concentrations, the test shall be considered to be a passing test regardless of the NOEC, and the permittee shall report a NOEC of not less than the critical dilution for the DMR reporting requirements found in Item 4 below.

c. Dilution Water

i. Dilution water used in the toxicity tests will be receiving water collected as close to the point of discharge as possible but unaffected by the discharge. The permittee shall substitute synthetic dilution water of similar pH,

OTHER REQUIREMENTS (continued)

hardness and alkalinity to the closest downstream perennial water for:

(A) toxicity tests conducted on effluent discharges to receiving water classified as intermittent streams; and

(B) toxicity tests conducted on effluent discharges where no receiving water is available due to zero flow conditions.

ii. If the receiving water is unsatisfactory as a result of instream toxicity (fails to fulfill the test acceptance criteria of item 3.a), the permittee may substitute synthetic dilution water for the receiving water in all subsequent tests provided the unacceptable receiving water test met the following stipulations:

(A) a synthetic dilution water control which fulfills the test acceptance requirements of item 3.a was run concurrently with the receiving water control;

(B) the test indicating receiving water toxicity has been carried out to completion (i.e., 48 hours);

(C) the permittee includes all test results indicating receiving water toxicity with the full report and information required by item 4 below; and

(D) the synthetic dilution water shall have a pH, hardness and alkalinity similar to that of the receiving water or closest downstream perennial water not adversely affected by the discharge, provided the magnitude of these parameters will not cause toxicity in the synthetic dilution water.

d. Samples and Composites

i. The permittee shall collect two flow-weighted composite samples from the outfall(s) listed at item 1.a above.

ii. The permittee shall collect a second composite sample for use during the 24-hour renewal of each dilution concentration for both tests. The permittee must collect the composite samples so that the maximum holding time for any effluent sample shall not exceed 36 hours. The permittee must have initiated the toxicity test within 36 hours after the collection of the last portion of the first composite sample. Samples shall be chilled to 4 degrees Centigrade during collection, shipping and/or storage.

iii. The permittee must collect the composite samples such that the effluent samples are representative of any periodic

OTHER REQUIREMENTS (continued)

episode of chlorination, biocide usage or other potentially toxic substance discharged on an intermittent basis.

iv. If the flow from the outfall(s) being tested ceases during the collection of effluent samples, the requirements for the minimum number of effluent samples, the minimum number of effluent portions and the sample holding time are waived during that sampling period. However, the permittee must collect an effluent composite sample volume during the period of discharge that is sufficient to complete the required toxicity tests with daily renewal of effluent. When possible, the effluent samples used for the toxicity tests shall be collected on separate days. The effluent composite sample collection duration and the static renewal protocol associated with the abbreviated sample collection must be documented in the full report required in item 4. of this section.

v. MULTIPLE OUTFALLS: If the provisions of this section are applicable to multiple outfalls, the permittee shall combine the composite effluent samples in proportion to the average flow from the outfalls listed in item 1.a above for the day the sample was collected. The permittee shall perform the toxicity test on the flow-weighted composite of the outfall samples.

4. REPORTING

a. The permittee shall prepare a full report of the results of all tests conducted pursuant to this Part in accordance with the Report Preparation Section of EPA/600/4-90/027F, for every valid or invalid toxicity test initiated, whether carried to completion or not. The permittee shall retain each full report pursuant to the provisions of Part III.C.3 of this permit. For any test which fails, is considered invalid or which is terminated early for any reason, the full report must be submitted for agency review. The permittee shall submit the first full report to:

Department of Environmental Quality
Office of Environmental Compliance
Enforcement Division
P.O. Box 82215
Baton Rouge, Louisiana 70884-2215
Attn: Permit Compliance Unit

b. A valid test for each species must be reported on the DMR during each reporting period specified in Part I of this permit unless the permittee is performing a TRE which may increase the frequency of testing and reporting. Only ONE set of biomonitoring data for each species is to be recorded on the DMR for each reporting period. The data submitted should reflect the LOWEST Survival results for each species during the reporting period. All invalid

OTHER REQUIREMENTS (continued)

tests, repeat tests (for invalid tests), and retests (for tests previously failed) performed during the reporting period must be attached to the DMR for this Office to review.

If a test failure has occurred and the required retests have been performed, the test results are to be reported on the DMR as follows:

Parameter Code	Report
Retest #1 22415	0 Pass, or, 1 Fail
Retest #2 22416	0 Pass, or, 1 Fail

c. The permittee shall report the following results of each valid toxicity test on the subsequent monthly DMR for that reporting period in accordance with Part III.D.4 of this permit. Submit retest information clearly marked as such with the following month's DMR. Only results of valid tests are to be reported on the DMR. The permittee shall submit the Table I summary sheet with each valid test.

i. Pimephales promelas (Fathead minnow)

(A) If the No Observed Effect Concentration (NOEC) for survival is less than the critical dilution, enter a "1"; otherwise, enter a "0" for Parameter No. TEM6C.

(B) Report the NOEC value for survival, Parameter No. TOM6C.

(C) Report the highest (critical dilution or control) Coefficient of Variation, Parameter No. TQM6C.

ii. Daphnia pulex

(A) If the NOEC for survival is less than the critical dilution, enter a "1"; otherwise, enter a "0" for Parameter No. TEM3D.

(B) Report the NOEC value for survival, Parameter No. TOM3D.

(C) Report the highest (critical dilution or control) Coefficient of Variation, Parameter No. TQM3D.

The permittee shall submit the toxicity testing information contained in Table 1 of this permit with the DMR subsequent to each and every toxicity test reporting period. The DMR and the summary table should be sent to the address indicated in 4.a. The permittee is not required to send the first complete report nor summary tables to EPA.

OTHER REQUIREMENTS (continued)

Monitoring Frequency Reduction

i. The permittee may apply for a testing frequency reduction upon the successful completion of the first four consecutive quarters of testing for one or both test species, with no lethal or sub-lethal effects demonstrated at or below the critical dilution. If granted, the monitoring frequency for that test species may be reduced to not less than once per year for the less sensitive species (usually the Fathead minnow) and not less than once per six months for the more sensitive test species (usually the Daphnia pulex). Monitoring frequency reduction shall not apply to monitoring frequencies of once per year.

ii. CERTIFICATION - The permittee must certify in writing that no test failures have occurred and that all tests meet all test acceptability criteria in item 3.a. above. In addition, the permittee must provide a list with each test performed including test initiation date, species, NOEC's for lethal and sub-lethal effects and the maximum coefficient of variation for the controls. Upon review and acceptance of this information the agency will issue a letter of confirmation of the monitoring frequency reduction. A copy of the letter will be forwarded to the agency's Permit Compliance Unit to update the permit reporting requirements.

iii. SURVIVAL FAILURES - If any test fails the survival endpoint at any time during the life of this permit, two monthly retests are required and the monitoring frequency for the affected test species shall be increased to once per quarter until the permit is reissued. Monthly retesting is not required if the permittee is performing a TRE.

iv. This monitoring frequency reduction applies only until the expiration date of this permit, at which time the monitoring frequency for both test species reverts to once per quarter until the permit is reissued.

5. TOXICITY REDUCTION EVALUATION (TRE)

a. Within ninety (90) days of confirming lethality in the retests, the permittee shall submit a Toxicity Reduction Evaluation (TRE) Action Plan and Schedule for conducting a TRE. The TRE Action Plan shall specify the approach and methodology to be used in performing the TRE. A Toxicity Reduction Evaluation is an investigation intended to determine those actions necessary to achieve compliance with water quality-based effluent limits by reducing an effluent's toxicity to an acceptable level. A TRE is defined as a step-wise process which combines toxicity testing and analyses of the physical and chemical characteristics of a toxic

OTHER REQUIREMENTS (continued)

effluent to identify the constituents causing effluent toxicity and/or treatment methods which will reduce the effluent toxicity. The TRE Action Plan shall lead to the successful elimination of effluent toxicity at the critical dilution and include the following:

i. Specific Activities. The plan shall detail the specific approach the permittee intends to utilize in conducting the TRE. The approach may include toxicity characterizations, identifications and confirmation activities, source evaluation, treatability studies, or alternative approaches. When the permittee conducts Toxicity Characterization Procedures the permittee shall perform multiple characterizations and follow the procedures specified in the document "Methods for Aquatic Toxicity Identification Evaluations: Phase I Toxicity Characterization Procedures" (EPA-600/6-91/003) or alternate procedures. When the permittee conducts Toxicity Identification Evaluations and Confirmations, the permittee shall perform multiple identifications and follow the methods specified in the documents "Methods for Aquatic Toxicity Identification Evaluations, Phase II Toxicity Identification Procedures for Samples Exhibiting Acute and Chronic Toxicity" (EPA/600/R-92/080) and "Methods for Aquatic Toxicity Identification Evaluations, Phase III Toxicity Confirmation Procedures for Samples Exhibiting Acute and Chronic Toxicity" (EPA/600/R-92/081), as appropriate.

The documents referenced above may be obtained through the National Technical Information Service (NTIS) by phone at (703) 487-4650, or by writing:

U.S. Department of Commerce
National Technical Information Service
5285 Port Royal Road
Springfield, Va. 22161

ii. Sampling Plan (e.g., locations, methods, holding times, chain of custody, preservation, etc.). The effluent sample volume collected for all tests shall be adequate to perform the toxicity test, toxicity characterization, identification and confirmation procedures, and conduct chemical specific analyses when a probable toxicant has been identified;

Where the permittee has identified or suspects specific pollutant(s) and/or source(s) of effluent toxicity, the permittee shall conduct, concurrent with toxicity testing, chemical specific analyses for the identified and/or suspected pollutant(s) and/or source(s) of effluent toxicity. Where lethality was demonstrated within 24 hours of test initiation, each composite sample shall be analyzed independently. Otherwise the permittee may substitute a

OTHER REQUIREMENTS (continued)

composite sample, comprised of equal portions of the individual composite samples, for the chemical specific analysis;

iii. Quality Assurance Plan (e.g., QA/QC implementation, corrective actions, etc.); and

iv. Project Organization (e.g., project staff, project manager, consulting services, etc.).

b. The permittee shall initiate the TRE Action Plan within thirty (30) days of plan and schedule submittal. The permittee shall assume all risks for failure to achieve the required toxicity reduction.

c. The permittee shall submit a quarterly TRE Activities Report, with the Discharge Monitoring Report in the months of January, April, July and October, containing information on toxicity reduction evaluation activities including:

i. any data and/or substantiating documentation which identifies the pollutant(s) and/or source(s) of effluent toxicity;

ii. any studies/evaluations and results on the treatability of the facility's effluent toxicity; and

iii. any data which identifies effluent toxicity control mechanisms that will reduce effluent toxicity to the level necessary to meet no significant lethality at the critical dilution.

The TRE Activities Report shall be submitted to the following addresses:

Department of Environmental Quality
Office of Environmental Compliance
Enforcement Division
P.O. Box 82215
Baton Rouge, Louisiana 70884-2215
Attn: Permit Compliance Unit

U.S. Environmental Protection Agency, Region 6
Water Enforcement Branch, 6 EN-WC
1445 Ross Avenue
Dallas, Texas 75202

d. The permittee shall submit a Final Report on Toxicity Reduction Evaluation Activities no later than twenty-eight (28) months from confirming lethality in the retests, which provides information pertaining to the specific control mechanism selected that will, when implemented, result in reduction of effluent toxicity to no

OTHER REQUIREMENTS (continued)

significant lethality at the critical dilution. The report will also provide a specific corrective action schedule for implementing the selected control mechanism.

, A copy of the Final Report on Toxicity Reduction Evaluation Activities shall also be submitted to the above addresses.

e. Quarterly testing during the TRE is a minimum monitoring requirement. LDEQ recommends that permittees required to perform a TRE not rely on quarterly testing alone to ensure success in the TRE, and that additional screening tests be performed to capture toxic samples for identification of toxicants. Failure to identify the specific chemical compound causing toxicity test failure will normally result in a permit limit for whole effluent toxicity limits per federal regulations at 40 CFR 122.44(d)(1)(v) and state regulations at LAC 33:IX.2361.D.1.e.

TABLE 1
SUMMARY SHEET

Daphnia pulex ACUTE SURVIVAL TEST RESULTS

PERMITTEE: Louisiana Generating LLC
FACILITY SITE: Big Cajun II Power Station
LPDES PERMIT NUMBER: LA0054135, 38867
OUTFALL IDENTIFICATION: 001
OUTFALL SAMPLE IS FROM _______ SINGLE _______ MULTIPLE DISCHARGES
BIOMONITORING LABORATORY: ____________
DILUTION WATER USED: _________ RECEIVING WATER ______ LAB WATER
CRITICAL DILUTION 0.17% DATE TEST INITIATED ____________

Are the test results to be considered valid? ____yes ____no
If __X__no (test invalid), what are the reasons for invalidity?

Is this a retest of a previous invalid test? ____ yes____no
Is this a retest of a previous test failure? ____ yes____no

NOEC = ____% effluent
$LC_{50}48$ = ____% effluent

DILUTION SERIES RESULTS
percent survival

TIME OF READING	REP	0%	0.23%	0.17%	0.13%	0.10%	0.07%
24-HOUR	A						
	B						
	C						
	D						
	E						
48-HOUR	A						
	B						
	C						
	D						
	E						
MEAN							

Is the mean survival at 48 hours significantly less (p=0.05) than the control survival for the low flow or critical dilution?
_______yes _______no

TABLE 2
SUMMARY SHEET

Pimephales promelas ACUTE SURVIVAL TEST RESULTS

PERMITTEE: Louisiana Generating LLC
FACILITY SITE: Big Cajun II Power Station
LPDES PERMIT NUMBER: LA0054135, 38867
OUTFALL IDENTIFICATION: 001
OUTFALL SAMPLE IS FROM _______ SINGLE ______ MULTIPLE DISCHARGES
BIOMONITORING LABORATORY: ________________
DILUTION WATER USED: _________ RECEIVING WATER ______ LAB WATER
CRITICAL DILUTION 0.17% DATE TEST INITIATED____________

Are the test results to be considered valid? ____yes ____no
If X no (test invalid), what are the reasons for invalidity?

Is this a retest of a previous invalid test? ____ yes____no
Is this a retest of a previous test failure? ____ yes____no

NOEC = ____% effluent
$LC_{50}48$ = ____% effluent

DILUTION SERIES RESULTS
percent survival

TIME OF READING	REP	0%	0.23%	0.17%	0.13%	0.10%	0.07%
24-HOUR	A						
	B						
	C						
	D						
	E						
48-HOUR	A						
	B						
	C						
	D						
	E						
MEAN							

Is the mean survival at 48 hours significantly less (p=0.05) than the control survival for the low flow or critical dilution?
_______yes _______no

TABLE 1
SUMMARY SHEET

Daphnia pulex ACUTE SURVIVAL TEST RESULTS

PERMITTEE: Louisiana Generating LLC
FACILITY SITE: Big Cajun II Power Station
LPDES PERMIT NUMBER: LA0054135, 38867
OUTFALL IDENTIFICATION: 003
OUTFALL SAMPLE IS FROM _______ SINGLE _______ MULTIPLE DISCHARGES
BIOMONITORING LABORATORY: ________
DILUTION WATER USED: _________ RECEIVING WATER ______ LAB WATER
CRITICAL DILUTION 11.54% DATE TEST INITIATED ________

Are the test results to be considered valid? ____yes ____no
If X no (test invalid), what are the reasons for invalidity?

Is this a retest of a previous invalid test? ____ yes____no
Is this a retest of a previous test failure? ____ yes____no

NOEC = ____% effluent
$LC_{50}48$ = ____% effluent

DILUTION SERIES RESULTS
percent survival

TIME OF READING	REP	0%	15.39%	11.54%	8.66%	6.49%	4.87%
24-HOUR	A						
	B						
	C						
	D						
	E						
48-HOUR	A						
	B						
	C						
	D						
	E						
MEAN							

Is the mean survival at 48 hours significantly less (p=0.05) than the control survival for the low flow or critical dilution?
_______yes _______no

TABLE 2
SUMMARY SHEET

Pimephales promelas ACUTE SURVIVAL TEST RESULTS

PERMITTEE: Louisiana Generating LLC
FACILITY SITE: Big Cajun II Power Station
LPDES PERMIT NUMBER: LA0054135, 38867
OUTFALL IDENTIFICATION: 003
OUTFALL SAMPLE IS FROM _______ SINGLE _______ MULTIPLE DISCHARGES
BIOMONITORING LABORATORY: ____________________
DILUTION WATER USED: _________ RECEIVING WATER _______ LAB WATER
CRITICAL DILUTION 11.54% DATE TEST INITIATED ____________

Are the test results to be considered valid? ____yes ____no
If X no (test invalid), what are the reasons for invalidity?

Is this a retest of a previous invalid test? ____ yes____no
Is this a retest of a previous test failure? ____ yes____no

NOEC = ____% effluent
$LC_{50}48$ = ____% effluent

DILUTION SERIES RESULTS
percent survival

TIME OF READING	REP	0%	15.39%	11.54%	8.66%	6.49%	4.87%
24-HOUR	A						
	B						
	C						
	D						
	E						
48-HOUR	A						
	B						
	C						
	D						
	E						
MEAN							

Is the mean survival at 48 hours significantly less (p=0.05) than the control survival for the low flow or critical dilution?
_______yes _______no

PART III
STANDARD CONDITIONS FOR LPDES PERMITS

SECTION A. GENERAL CONDITIONS

1. Introduction
In accordance with the provisions of LAC 33:IX.2355, et. seq., this permit incorporates either expressly or by reference ALL conditions and requirements applicable to Louisiana Pollutant Discharge Elimination System Permits (LPDES) set forth in the Louisiana Environmental Quality Act (LEQA), as amended, as well as ALL applicable regulations.

2. Duty to Comply
The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act (CWA) and the Louisiana Environmental Quality Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.

3. Penalties for Violation of Permit Conditions
   a. LA. R. S. 30:2025 provides for civil penalties for violations of these regulations and the Louisiana Environmental Quality Act. LA. R. S. 30:2076.2 provides for criminal penalties for violation of any provisions of the LPDES or any order or any permit condition or limitation issued under or implementing any provisions of the LPDES program. (See Section E. Penalties for Violation of Permit Conditions for additional details).

   b. Any person may be assessed an administrative penalty by the State Administrative Authority under LA. R. S. 30:2025 for violating a permit condition or limitation implementing any of the requirements of the LPDES program in a permit issued under the regulations or the Louisiana Environmental Quality Act.

4. *Toxic Pollutants*
   a. Other effluent limitations and standards under Sections 301, 302, 303, 307, 318, and 405 of the Clean Water Act. If any applicable toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is promulgated under Section 307(a) of the Clean Water Act for a toxic pollutant and that standard or prohibition is more stringent than any limitation on the pollutant in this permit, the state administrative authority shall institute proceedings under these regulations to modify or revoke and reissue the permit to conform to the toxic effluent standard or prohibition.

   b. The permittee shall comply with effluent standards or prohibitions established under Section 307(a) of the Clean Water Act for toxic pollutants and with standards for sewage sludge use or disposal established under Section 405(d) of the Clean Water Act within the time provided in the regulations that establish these standards or prohibitions, or standards for sewage sludge use or disposal even if the permit has not yet been modified to incorporate the requirement.

5. Duty to Reapply
If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit. The new application shall be submitted at least 180 days before the expiration date of the existing permit, unless permission for a later date has been granted by the state administrative authority. (The state administrative authority shall not grant permission for applications to be submitted later than the expiration date of the existing permit.) *Continuation of expiring permits shall be governed* by regulations promulgated at LAC 33:IX.2321 and any subsequent amendments.

6. Permit Action
This permit may be modified, revoked and reissued, or terminated for cause in accordance with LAC 33:IX.2383, 2385, 2387, 2407 and 2769. The causes may include, but are not limited to, the following:

a. Noncompliance by the permittee with any condition of the permit;

b. The permittee's failure in the application or during the permit issuance process to disclose fully all relevant acts, or the permittee's misrepresentation of any relevant facts at any time;

c. A determination that the permitted activity endangers human health or the environment and can only be regulated to acceptable levels by permit modification or termination;

d. A change in any condition that requires either a temporary or a permanent reduction or elimination of any discharge; or

e. Failure to pay applicable fees under the provisions of LAC 33: IX. Chapter 13.

The filing of a request for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

7. Property Rights
This permit does not convey any property rights of any sort, or any exclusive privilege.

8. Duty to Provide Information
The permittee shall furnish to the state administrative authority, within a reasonable time, any information which the administrative authority may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the state administrative authority, upon request, copies of records required to be kept by this permit.

9. Criminal and Civil Liability
Except as provided in permit conditions on "Bypassing" and "Upsets", nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance. Any false or materially misleading representation or concealment of information required to be reported by the provisions of the permit, the Act, or applicable regulations, which avoids or effectively defeats the regulatory purpose of the Permit may subject the Permittee to criminal enforcement pursuant to La. R.S. 30:2025.

10. Oil and Hazardous Substance Liability
Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the Clean Water Act.

11. State Laws
Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State law or regulation under authority preserved by Section 510 of the Clean Water Act.

12. Severability
If any provision of these rules and regulations, or the application thereof, is held to be invalid, the remaining provisions of these rules and regulations shall not be affected, so long as they can be given effect without the invalid provision. To this end, the provisions of these rules and regulations are declared to be severable.

13. Dilution
A permittee shall not achieve any effluent concentration by dilution unless specifically authorized in the permit. A permittee shall not increase the use of process water or cooling water or otherwise attempt to dilute a discharge as a partial or complete substitute for adequate treatment to achieve permit limitations or water quality.

SECTION B. PROPER OPERATION AND MAINTENANCE

1. Need to Halt or Reduce not a Defense
It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

2. Duty to Mitigate
The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.
The permittee shall also take all reasonable steps to minimize or correct any adverse impact on the environment resulting from noncompliance with the permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

3. Proper Operation and Maintenance

   a. The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit.

   b. The permittee shall provide an adequate operating staff which is duly qualified to carry out operation, maintenance and other functions necessary to ensure compliance with the conditions of this permit.

4. Bypass of Treatment Facilities

   a. ***Bypass***. the intentional diversion of waste streams from any portion of a treatment facility.

   b. Bypass not exceeding limitations. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of Section B.4.c. and 4.d of these standard conditions.

   c. Notice

      (1) Anticipated bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior notice to the Office of Environmental Services, Permits Division, if possible at least ten days before the date of the bypass.

      (2) Unanticipated bypass. The permittee shall submit notice of an unanticipated bypass as required in LAC 33:IX.2355.L.6, (24-hour notice) and Section D.6.e. of these standard conditions.

   d. Prohibition of bypass

      (1) Bypass is prohibited, and the state administrative authority may take enforcement action against a permittee for bypass, unless:

         (a) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

         (b) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and,

(c) The permittee submitted notices as required by Section B.4.c of these standard conditions.

(2) The state administrative authority may approve an anticipated bypass after considering its adverse effects, if the state administrative authority determines that it will meet the three conditions listed in Section B.4.d(1) of these standard conditions.

5. Upset Conditions

a. Upset. an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

b. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the requirements of Section B.5.c. are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

c. Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

(1) An upset occurred and that the permittee can identify the cause(s) of the upset;

(2) The permitted facility was at the time being properly operated; and

(3) The permittee submitted notice of the upset as required by LAC 33:IX.2355.L.6.b.ii.and Section D.6.e.(2) of these standard conditions; and

(4) The permittee complied with any remedial measures required by Section B.2 of these standard conditions.

d. Burden of proof. In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.

6. Removed Substances
Solids, sewage sludges, filter backwash, or other pollutants removed in the course of treatment or wastewater control shall be disposed of in a manner such as to prevent any pollutant from such materials from entering waters of the state.

7. Percent Removal
For publicly owned treatment works, the 30-day average percent removal for Biochemical Oxygen Demand and Total Suspended Solids shall not be less than 85 percent in accordance with LAC 33:IX.2645.A.3. and B.3.

SECTION C. MONITORING AND RECORDS

1. Inspection and Entry
The permittee shall allow the state administrative authority, or an authorized representative (including an authorized contractor acting as a representative of the Administrator), upon the presentation of credentials and other documents as may be required by the law to:

a. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit.

Enter upon the permittee's premises where a discharge source is or might be located or in which monitoring equipment or records required by a permit are kept for inspection or sampling purposes. Most inspections will be unannounced and should be allowed to begin immediately, but in no case shall begin more than thirty (30) minutes after the time the inspector presents his/her credentials and announces the purpose(s) of the inspection. Delay in excess of thirty (30) minutes shall constitute a violation of these regulations. However, additional time can be granted if the inspector or the Administrative Authority determines that the circumstances warrant such action.

b. Have access to and copy, at reasonable times, any records that the department or its authorized representative determines are necessary for the enforcement of these regulations. For records maintained in either a central or private office that is open only during normal office hours and is closed at the time of inspection, the records shall be made available as soon as the office is open, but in no case later than the close of business the next working day;

c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices or operations regulated or required under this permit; and

d. Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by the Clean Water Act or the Louisiana Environmental Quality Act, any substances or parameters at any location.

e. Sample Collection

(1) When the inspector announces that samples will be collected, the permittee will be given an additional thirty (30) minutes to prepare containers in order to collect duplicates. If the permittee cannot obtain and prepare sample containers within this time, he is considered to have waived his right to collect duplicate samples and the sampling will proceed immediately. Further delay on the part of the permittee in allowing initiation of the sampling will constitute a violation of these regulations.

(2) At the discretion of the administrative authority, sample collection shall proceed immediately (without the additional 30 minutes described in Section C.1.a. above) and the inspector shall supply the permittee with a duplicate sample.

f. It shall be the responsibility of the permittee to ensure that a facility representative familiar with provision of its wastewater discharge permit, including any other conditions or limitations, be available either by phone or in person at the facility during all hours of operation. The absence of such personnel on-site who are familiar with the permit shall not be grounds for delaying the initiation of an inspection except in situations as described in Section C.1.b. of these standard conditions. The permittee shall be responsible for providing witnesses/escorts during inspections. Inspectors shall abide by all company safety rules and shall be equipped with standard safety equipment (hard hat, safety shoes, safety glasses) normally required by industrial facilities.

g. Upon written request copies of field notes, drawings, etc., taken by department personnel during an inspection shall be provided to the permittee after the final inspection report has been completed.

2. Representative Sampling
Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. All samples shall be taken at the outfall location(s) indicated in the permit. The state administrative authority shall be notified prior to any changes in the outfall location(s). Any changes in the outfall location(s) will be subject to modification, revocation and reissuance in accordance with LAC 33:IX.2383.

3. Retention of Records
Except for records of monitoring information required by this permit related to the permittee's sewage sludge use and disposal activities, which shall be retained for a period of at least five years (or longer as required by 40 CFR 503), the permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least 3 years from the date of the sample, measurement, report, or application. This period may be extended by request of the state administrative authority at any time.

4. Record Contents
Records of monitoring information shall include:

a. The date, exact place, and time of sampling or measurements;
b. The individual(s) who performed the sampling or measurements;
c. The date(s) analyses were performed;
d. The time(s) analyses were begun;
e. The individual(s) who performed the analyses;
f. The analytical techniques or methods used;
g. The results of such analyses; and
h. The results of all quality control procedures.

5. Monitoring Procedures
a. Monitoring results must be conducted according to test procedures approved under 40 CFR Part 136 (See LAC 33:IX.2531) or, in the case of sludge use or disposal, approved under 40 CFR part 136 (See LAC 33:IX.2531) unless otherwise specified in 40 CFR part 503, unless other test procedures have been specified in this permit. This includes procedures contained in the latest EPA approved edition of the following publications:

(1) "Standard Methods for the Examination of Water and Waste Water". This publication is available from the American Public Health Association, Publication Sales, P. O. Box 753, Waldorf, MD 20604-0573, Phone number (301) 893-1894, Fax number (301) 843-0159.

(2) "Annual Book of Standards, Vols 1101-1103, Water I, Water II, and Atmospheric Analysis". This publication is available from the American Society for Testing Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, Phone number (610) 832-9500.

(3) "Methods for Chemical Analysis of Water and Wastes, Revised, March 1983," U.S. Environmental Protection Agency, Analytical Quality Control Laboratory, Cincinnati, Ohio. This publication is available from the National Technical Information Service (NTIS), Springfield, VA 22161, Phone number (800) 553-6847. Order by NTIS publication number PB-84-128677.

b. The permittee shall calibrate and perform maintenance procedures on all monitoring and analytical instruments at intervals frequent enough to insure accuracy of measurements and shall maintain appropriate records of such activities.

c. An adequate analytical quality control program, including the analyses of sufficient standards, spikes, and duplicate samples to insure the accuracy of all required analytical results shall be maintained by the permittee or designated commercial laboratory. General sampling protocol shall follow guidelines established in the "Handbook for Sampling and Sample Preservation of Water and Wastewater, 1982" U.S. Environmental Protection Agency. This publication is available from the National Technical Information Service (NTIS), Springfield, VA 22161. Phone number (800) 553-6847. Order by NTIS publication number PB-83-124503. General laboratory procedures including glassware cleaning, etc. can be found in the "Handbook for Analytical Quality Control in Water and Wastewater Laboratories, 1979," U.S. Environmental Protection Agency, Environmental Monitoring and Support Laboratory. This publication is available from the Environmental Protection Agency, Phone number (513) 569-7562. Order by EPA publication number EPA-600/4-79-019.

6. Flow Measurements

Appropriate flow measurement devices and methods consistent with accepted scientific practices shall be selected and used to ensure the accuracy and reliability of measurements of the volume of monitored discharges. The devices shall be installed, calibrated, and maintained to insure that the accuracy of the measurements are consistent with the accepted capability of that type of device. Devices selected shall be capable of measuring flows with a maximum deviation of less than 10% from true discharge rates throughout the range of expected discharge volumes. Guidance in selection, installation, calibration and operation of acceptable flow measurement devices can be obtained from the following references:

a. "A Guide to Methods and Standards for the Measurement of Water Flow, 1975," U.S. Department of Commerce, National Bureau of Standards. This publication is available from the National Technical Information Service (NTIS), Springfield, VA 22161, phone number (800) 553-6847. Order by NTIS publication number COM-75-10683.

b. "Flow Measurement in Open Channels and Closed Conduits, Volumes 1 and 2," U.S. Department of Commerce, National Bureau of Standards. This publication is available from the National Technical Service (NTIS), Springfield, VA, 22161, Phone number (800) 553-6847. Order by NTIS publication number PB-273 535.

c. "NPDES Compliance Flow Measurement Manual," U.S. Environmental Protection Agency, Office of Water Enforcement. This publication is available from the National Technical Information Service (NTIS), Springfield, VA 22161, Phone number (800) 553-6847. Order by NTIS publication number PB-82-131178.

7. Prohibition for Tampering: Penalties

a. LA R.S. 30:2025 provides for punishment of any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit.

b. LA R.S. 30:2076.2 provides for penalties for any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or non compliance.

8. Additional Monitoring by the Permittee

If the Permittee monitors any pollutant more frequently than required by the permit using test procedures approved under 40 CFR Part 136 (See LAC 33:IX.2531) or, in the case of sludge use and disposal, approved under 40 CFR part 136 (See LAC 33:IX.2531) unless otherwise specified in 40 CFR part 503, or as specified in the permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR or sludge reporting form specified by the state administrative authority.

9. Averaging of Measurements

Calculations for all limitations which require averaging of measurements shall utilize an arithmetic mean unless otherwise specified by the state administrative authority in the permit.

10. Laboratory Accreditation

a. LAC 33:I.Subpart 3, Chapters 45-59 provide requirements for an accreditation program specifically applicable to commercial laboratories, wherever located, that provide chemical analyses, analytical results, or other test data to the department, by contract or by agreement, and the data is:

(1) Submitted on behalf of any facility, as defined in R.S.30:2004;
(2) Required as part of any permit application;
(3) Required by order of the department;
(4) Required to be included on any monitoring reports submitted to the department;
(5) Required to be submitted by contract;or
(6) Otherwise required by department regulations.

b. The department laboratory accreditation program is designed to ensure the accuracy, precision, and reliability of the data generated, as well as the use of department-approved methodologies in generation of that data. Laboratory data generated by commercial environmental laboratories that are not accredited under these regulations will not be accepted by the department. Retesting of analysis will be required by an accredited commercial laboratory.

Where retesting of effluent is not possible (i.e. data reported on DMRs for prior month's sampling), the data generated will be considered invalid and in violation of the LPDES permit.

c. Regulations on the Environmental Laboratory Accreditation Program and a list of labs that have applied for accreditation, are available on the department website located at:

http://www.deq.state.la.us/laboratory/index.htm.

Questions concerning the program may be directed to (225) 765-0582.

SECTION D. REPORTING REQUIREMENTS

1. Facility Changes
The permittee shall give notice to the state administrative authority as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when:

   a. The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 CFR 122.29(b); or

   b. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations in the permit, nor to notification requirements under LAC 33:IX.2357.A.1.

   c. For Municipal Permits. Any new introduction of pollutants into the POTW from an indirect discharger which would be subject to Section 301, or 306 of the CWA if it were directly discharging those pollutants; and any substantial change in the volume or character of pollutants being introduced into that POTW by a source introducing pollutants into the POTW at the time of issuance of the permit. In no case are any new connections, increased flows, or significant changes in influent quality permitted that will cause violation of the effluent limitations specified herein.

2. Anticipated Noncompliance
The permittee shall give advance notice to the state administrative authority of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

3. Transfers
This permit is not transferable to any person except after notice to the state administrative authority. The state administrative authority may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under the Clean Water Act or the Louisiana Environmental Quality Act. (See LAC 33:IX.2381; in some cases, modification or revocation and reissuance is mandatory.)

   a. Transfers by modification. Except as provided in LAC 33: IX.2381.B, a permit may be transferred by the permittee to a new owner or operator only if the permit has been modified or revoked and reissued (under LAC 33:IX.2383.B.2), or a minor modification made (under LAC 33:IX.2385) to identify the new permittee and incorporate such other requirements as may be necessary under the Clean Water Act and the Louisiana Environmental Quality Act.

   b. Automatic transfers. As an alternative to transfers under LAC 33:IX.2381.A., any LPDES permit may be automatically transferred to a new permittee if:

      (1) The current permittee notifies the administrative authority at least 30 days in advance of the proposed transfer date in Section D.3.b.(2) below;

      (2) The notice includes a written agreement between the existing and new permittees containing a specific date for transfer of permit responsibility, coverage, and liability between them; and

      (3) The state administrative authority does not notify the existing permittee and the proposed new permittee of his or her intent to modify or revoke and reissue the permit. A modification under this subsection may also be a minor modification under LAC 33:IX.2385. If this notice is not received, the transfer is effective on the date specified in the agreement mentioned in Section D.3.b.(2) of these standard conditions.

4. Monitoring Reports
Monitoring results shall be reported at the intervals and in the form specified in Part II.

5. Compliance Schedules
Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit shall be submitted no later than 14 days following each schedule date.

6. Requirements for Notification

a. Emergency Notification
As required by LAC 33.I.3915, in the event of an unauthorized discharge that does cause an emergency condition, the discharger shall notify the hotline (DPS 24-hour Louisiana Emergency Hazardous Materials Hotline) by telephone at (225) 925-6595 (collect calls accepted 24 hours a day) immediately (a reasonable period of time after taking prompt measures to determine the nature, quantity, and potential off-site impact of a release, considering the exigency of the circumstances), but in no case later than one hour after learning of the discharge. (An emergency condition is any condition which could reasonably be expected to endanger the health and safety of the public, cause significant adverse impact to the land, water, or air environment, or cause severe damage to property.) Notification required by this section will be made regardless of the amount of discharge. Verbal Notification Procedures are listed in Section D.6.c. of these standard conditions.

A written report shall be provided within seven calendar days after the telephone notification. The report shall contain the information listed in Section D.6.d. of these standard conditions and any additional information in LAC 33:I.3925.B.

b. Prompt Notification

As required by LAC 33:I.3917, in the event of an unauthorized discharge which exceeds reportable quantity specified in LAC 33:I.Subchapter E, but does not cause an emergency condition, the discharger shall notify the Office of Environmental Compliance by e-mail utilizing the Incident Report Form and procedures found at www.deq.state.la.us/surveillance or by telephone within 24 hours after learning of the discharge. Otherwise, verbal notification should be made to the Office of Environmental Compliance at (225) 763-3908 during office hours or (225) 342-1234 after hours, weekends, and holidays.

c. Information for Verbal Notifications. The following guidelines will be utilized as appropriate, based on the conditions and circumstances surrounding any unauthorized discharge, to provide relevant information regarding the nature of the discharge:

(1) name of person making the notification and telephone number where any return calls from response agencies can be placed;

(2) name and location of facility or site where the unauthorized discharge is imminent or has occurred using common landmarks. In the event of an incident involving transport, include the name and address of transporter and generator;

(3) date and time the incident began and ended, or estimated time of continuation if discharge is continuing;

(4) extent of any injuries and identification of any known personnel hazards which response agencies may face;

(5) common or scientific chemical name, U.S. Department of Transporatation hazard classification, and best estimate of amounts of any and all discharged pollutants;

(6) brief description of the incident sufficient to allow response agencies to formulate level and extent of response activity.

d. Written Notification Procedures. Written reports for any unauthorized discharge that requires verbal notification under Section D.6.a. or 6.b., or that requires written notification under LAC 33:I.3919, will be submitted by the discharger to the department in accordance with this section within seven calendar days after the telephone notification. Written notification reports will include, but are not limited to, the following information:

(1) name of person, company, or other party who is filing the written report;

(2) time and date of verbal notification, name of person making the notification, and identification of the site or facility, vessel, transport vehicle, or storage area from which the unauthorized discharge occurred;

(3) date(s), time(s), and duration of the unauthorized discharge and, if not corrected, the anticipated time it is expected to continue;

(4) details of the circumstances and events leading to any emergency condition, including incidents of loss of sources of radiation;

(5) common or scientific chemical name, the CAS number, U.S. Department of Transportation hazard classification, and best estimate of amounts of any and all discharge pollutants, including methodology for calculations and estimates;

(6) statement of actual or probable fate or disposition of the pollutant or source of radiation;

(7) remedial actions taken, or to be taken, to stop unauthorized discharges or to recover pollutants or sources of radiation.

Please see LAC 33:I.3925.B for additional written notification procedures.

e. Twenty-four Hour Reporting. The permittee shall report any noncompliance which may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the permittee becomes aware of the circumstances. A written submission shall also be provided within five days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and; steps being taken to reduce, eliminate, and prevent recurrence of the noncompliance. The following shall be included as information which must be reported within 24hours:

(1) Any unanticipated bypass which exceeds any effluent limitation in the permit (see LAC 33:IX.2355.M.3.b.);

(2) Any upset which exceeds any effluent limitation in the permit;

(3) Violation of a maximum daily discharge limitation for any of the pollutants listed by the administrative authority in Part II of the permit to be reported within 24 hours (LAC 33:IX.2361.G.).

7. Other Noncompliance
The permittee shall report all instances of noncompliance not reported under Section D.4., 5., and 6., at the time monitoring reports are submitted. The reports shall contain the information listed in Section D.6.e.

8. Other Information
Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the state administrative authority, it shall promptly submit such facts or information.

9. Discharges of Toxic Substances
In addition to the reporting requirements under Section D.1-8, all existing manufacturing, commercial, mining, and silvicultural dischargers must notify the Office of Environmental Services, Permits Division as soon as they know or have reason to believe:

a. That any activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any toxic pollutant:

   i. listed at Chapter 23, Appendix D, Tables II and III (excluding Total Phenols) which is not limited in the permit, if that discharge will exceed the highest of the following notification levels:

      (1) One hundred micrograms per liter (100 g/L);
      (2) Two hundred micrograms per liter (200 g/L) for acrolein and acrylonitrile; five hundred micro-grams per liter (500 g/L) for 2,4 -dinitro-phenol and for 2-methyl-4,6-dinitrophenol; and one milligram per liter (1 mg/L) for antimony;
      (3) Five (5) times the maximum concentration value reported for that pollutant in the permit application in accordance with LAC33:IX.2331.G.7; or
      (4) The level established by the state administrative authority in accordance with LAC 33:IX.2361.F.; or

   ii. which exceeds the reportable quantity levels for pollutants at LAC 33:I. Subchapter E.

b. That any activity has occurred or will occur which would result in any discharge, on a non-routine or infrequent basis, of a toxic pollutant:

   i. listed at Chapter 23, Appendix D, Tables II and III (excluding Total Phenols) which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

      (1) Five hundred micrograms per liter (500 g/L);
      (2) One milligram per liter (1 mg/L) for antimony;
      (3) Ten (10) times the maximum concentration value reported for that pollutant in the permit application in accordance with LAC 33:IX.2331.G.7; or
      (4) The level established by the state administrative authority in accordance with LAC 33:IX.2361.F.; or

   ii. which exceeds the reportable quantity levels for pollutants at LAC 33:I. Subchapter E.

10. Signatory Requirements
All applications, reports, or information submitted to the state administrative authority shall be signed and certified.

a. All permit applications shall be signed as follows:

   (1) For a corporation - by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:

      (a) A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision making functions for the corporation; or,

      (b) The manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25 million (in second-quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

NOTE: DEQ does not require specific assignments or delegations of authority to responsible corporate officers identified in Section D.10.a.(1)(a). The agency will presume that these responsible corporate officers have the requisite authority to sign permit applications unless the corporation has notified the state administrative authority to the contrary. Corporate procedures governing authority to sign permit applications may provide for assignment or delegation to applicable corporate positions under Section D.10.a.(1)(b). rather than to specific individuals.

(2) For a partnership or sole proprietorship - by a general partner or the proprietor, respectively; or

(3) For a municipality, state, federal, or other public agency - by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a federal agency includes:

(a) The chief executive officer of the agency, or

(b) A senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of EPA).

b. All reports required by permits and other information requested by the state administrative authority shall be signed by a person described in Section D.10.a., or by a duly authorized representative of that person. A person is a duly authorized representative only if:

(1) The authorization is made in writing by a person described in Section D.10.a. of these standard conditions;
(2) The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company, (a duly authorized representative may thus be either a named individual or an individual occupying a named position; and,
(3) The written authorization is submitted to the state administrative authority.

c. Changes to authorization. If an authorization under Section D.10.b. is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Section D.10.b. must be submitted to the state administrative authority prior to or together with any reports, information, or applications to be signed by an authorized representative.

d. Certification. Any person signing a document under Section D.10. a. or b. above, shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

11. Availability of Reports
All recorded information (completed permit application forms, fact sheets, draft permits, or any public document) not classified as confidential information under R.S. 30:2030(A) and 30:2074(D) and designated as such in accordance with these regulations (LAC 33:IX.2323 and LAC 33:IX.2763) shall be made available to the public for inspection and copying during normal working hours in accordance with the Public Records Act, R.S. 44:1 et seq.

Claims of confidentiality for the following will be denied:

a. The name and address of any permit applicant or permittee;
b. Permit applications, permits, and effluent data.
c. Information required by LPDES application forms provided by the state administrative authority under LAC 33:IX.2331 may not be claimed confidential. This includes information submitted on the forms themselves and any attachments used to supply information required by the forms.

SECTION E. PENALTIES FOR VIOLATIONS OF PERMIT CONDITION

1. Criminal

   a. Negligent Violations
   The Louisiana Revised Statutes LA. R. S. 30:2076.2 provides that any person who negligently violates any provision of the LPDES, or any order issued by the secretary under the LPDES, or any permit condition or limitation implementing any such provision in a permit issued under the LPDES by the secretary, or any requirement imposed in a pretreatment program approved under the LPDES is subject to a fine of not less than $2,500 nor more than $25,000 per day of violation, or by imprisonment for not more than 1 year, or both. If a conviction of a person is for a violation committed after a first conviction of such person, he shall be subject to a fine of not more than $50,000 per day of violation, or imprisonment of not more than two years, or both.

   b. Knowing Violations
   The Louisiana Revised Statutes LA. R. S. 30:2076.2 provides that any person who knowingly violates any provision of the LPDES, or any permit condition or limitation implementing any such provisions in a permit issued under the LPDES, or any requirement imposed in a pretreatment program approved under the LPDES is subject to a fine of not less than $5,000 nor more than $50,000 per day of violation, or imprisonment for not more than 3 years, or both. If a conviction of a person is for a violation committed after a first conviction of such person, he shall be subject to a fine of not more than $100,000 per day of violation, or imprisonment of not more than six years, or both.

   c. Knowing Endangerment
   The Louisiana Revised Statutes LA. R. S. 30:2076.2 provides that any person who knowingly violates any provision of the LPDES, or any order issued by the secretary under the LPDES, or any permit condition or limitation implementing any such provisions in a permit issued under the LPDES by the secretary, and who knows at that time that he thereby places another person in imminent danger of death or serious bodily injury, shall, upon conviction, be subject to a fine of not more than $250,000, or by imprisonment for not more than 15 years, or both. A person which is an organization shall, upon conviction of violating this Paragraph, be subject to a fine of not more than one million dollars. If a conviction of a person is for a violation committed after a first conviction of such person under this Paragraph, the maximum punishment shall be doubled with respect to both fine and imprisonment.

   d. False Statements
   The Louisiana Revised Statutes LA. R. S. 30:2076.2 provides that any person who knowingly makes any false material statement, representation, or certification in any application, record, report, plan, or other document filed or required to be maintained under the LPDES or who knowingly falsifies, tampers with, or renders inaccurate, any monitoring device or method required to be maintained under the LPDES, shall, upon conviction, be subject to a fine of not more than $10,000, or imprisonment for not more than 2 years, or both. If a conviction of a person is for a violation committed after a first conviction of such person under this Subsection, he shall be subject to a fine of not more than $20,000 per day of violation, or by imprisonment of not more than 4 years, or both.

2. Civil Penalties
The Louisiana Revised Statutes LA. R. S. 30:2025 provides that any person found to be in violation of any requirement of this Subtitle may be liable for a civil penalty, to be assessed by the secretary, an assistant secretary, or the court, of not more than the cost to the state of any response action made necessary by such violation which is not voluntarily paid by the violator, and a penalty of not more than $27,500 for each day of violation. However, when any such violation is done intentionally, willfully, or knowingly, or results in a discharge or disposal which causes irreparable or severe damage to the environment or if the substance discharge is one which endangers human life or health, such person may be liable for an additional penalty of not more than one million dollars.

(PLEASE NOTE: These penalties are listed in their entirety in Subtitle II of Title 30 of the Louisiana Revised Statutes.)

SECTION F. DEFINITIONS

All definitions contained in Section 502 of the Clean Water Act shall apply to this permit and are incorporated herein by reference. Unless otherwise specified in this permit, additional definitions of words or phrases used in this permit are as follows:

1. "Clean Water Act" means the Clean Water Act (formerly referred to as the Federal Water Pollution Control Act or the Federal Water Pollution Control Act Amendments of 1972) Pub.L.92-500, as amended by Pub.L. 95-217, Pub.L. 95-576, Pub.L. 96-483 and Pub.L. 97-117, 33 U.S.C. 1251 et. seq.).

2. "Accreditation" means the formal recognition by the department of a laboratory's competence wherein specific tests or types of tests can be accurately and successfully performed in compliance with all minimum requirements set forth in the regulations regarding laboratory accreditation.

3. "Administrator" means the Administrator of the U.S. Environmental Protection Agency, or an authorized representative.

4. "Applicable effluent standards and limitations" means all state and Federal effluent standards and limitations to which a discharge is subject under the Clean Water Act, including, but not limited to, effluent limitations, standards or performance, toxic effluent standards and prohibitions, and pretreatment standards.

5. "Applicable water quality standards" means all water quality standards to which a discharge is subject under the Clean Water Act.

6. "Bypass" means the intentional diversion of waste streams from any portion of a treatment facility.

7. "Commercial Laboratory" means any laboratory that performs analyses or tests for third parties for a fee or other compensation, except those commercial laboratories accredited by the Department of Health and Hospitals in accordance with R.S.49:1001 et seq.

8. "Daily Discharge" means the discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in terms of mass, the daily discharge is calculated as the total mass of the pollutant discharged over the sampling day. For pollutants with limitations expressed in other units of measurement, the daily discharge is calculated as the average measurement of the pollutant over the sampling day. Daily discharge determination of concentration made using a composite sample shall be the concentration of the composite sample. When grab samples are used, the daily discharge determination of concentration shall be arithmetic average (weighted by flow value) of all samples collected during that sampling day.

9. "Daily Maximum" discharge limitation means the highest allowable "daily discharge" during the calendar month.

10. "Director" means the U.S. Environmental Protection Agency Regional Administrator or an authorized representative.

11. "Environmental Protection Agency" means the U.S. Environmental Protection Agency.

12. "Grab sample" means an individual sample collected in less than 15 minutes.

13. "Industrial user" means a nondomestic discharger, as identified in 40 CFR 403, introducing pollutants to a publicly

owned treatment works.

14. "LEQA" means the Louisiana Environmental Quality Act.

15. "Louisiana Pollutant Discharge Elimination System (LPDES)" means those portions of the Louisiana Environmental Quality Act and the Louisiana Water Control Law and all regulations promulgated under their authority which are deemed equivalent to the National Pollutant Discharge Elimination System (NPDES) under the Clean Water Act in accordance with Section 402 of the Clean Water Act and all applicable federal regulations.

16. "Monthly Average" (also known as Daily Average), other than for fecal coliform bacteria, discharge limitations means the highest allowable average of "daily discharge(s)" over a calendar month, calculated as the sum of all "daily discharge(s)" measured during a calendar month divided by the number of "daily discharge(s)" measured during that month. When the permit establishes monthly average concentration effluent limitations or conditions, the monthly average concentration means the arithmetic average (weighted by flow) of all "daily discharge(s)" of concentration determined during the calendar month where C = daily discharge concentration, F = daily flow and n = number of daily samples; monthly average discharge =

$$\frac{C_1F_1 + C_2F_2 + \ldots + C_nF_n}{F_1 + F_2 + \ldots + F_n}$$

The monthly average for fecal coliform bacteria is the geometric mean of the values for all effluent samples collected during a calendar month.

17. "National Pollutant Discharge Elimination System" means the national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under Sections 307, 318, 402, and 405 of the Clean Water Act.

18. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

19. "Sewage sludge" means the solids, residues, and precipitates separated from or created in sewage by the unit processes of a publicly owned treatment works. Sewage as used in this definition means any wastes, including wastes from humans, households, commercial establishments, industries, and storm water runoff, that are discharged to or otherwise enter a publicly owned treatment works.

20. "Treatment works" means any devices and systems used in the storage, treatment, recycling and reclamation of municipal sewage and industrial wastes of a liquid nature to implement Section 201 of the Clean Water Act, or necessary to recycle or reuse water at the most economical cost over the estimated life of the works, including intercepting sewers, sewage collection systems, pumping, power and other equipment, and their appurtenances, extension, improvement, remodeling, additions, and alterations thereof.

21. "Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

22. For fecal coliform bacteria, a sample consists of one effluent grab portion collected during a 24-hour period at peak loads.

23. The term "MGD" shall mean million gallons per day.

24. The term "mg/L" shall mean milligrams per liter or parts per million (ppm).

25. The term "g/L" shall mean micrograms per liter or parts per billion (ppb).

26. "Weekly average", other than for fecal coliform bacteria, is the highest allowable arithmetic mean of the daily discharges over a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week. The weekly average for fecal coliform bacteria is the geometric mean of the daily discharges over a calendar week.

27. "12-hour composite sample" consists of 12 effluent portions collected no closer together than one hour and composited according to flow. The daily sampling intervals shall include the highest flow periods.

28. "6-hour composite sample" consists of six effluent portions collected no closer together than one hour (with the first portion collected no earlier than 10:00 a.m.) and composited according to flow.

29. "3-hour composite sample" consists of three effluent portions collected no closer together than one hour (with the first portion collected no earlier than 10:00 a.m.) and composited according to flow.

30. Sanitary Wastewater Term(s):

    a. "24-hour composite sample" consists of a minimum of 12 effluent portions collected at equal time intervals over the 24-hour period and combined proportional to flow or a sample collected at frequent intervals proportional to flow over the 24-hour period.

Appendix A
Document 4c: Boring Logs

Appendix G
Boring Logs

LOG OF BORING

PROJECT Big Cajun No. 2, Site C-2
New Roads, Louisiana
Cajun Electric Power Cooperative, Inc.

FOR Bovay Engineers, Inc., Consulting Engineers
Burns and Roe, Inc., Consulting Engineers

BORING 1
FILE 74-30
DATE 16 May 1974
TECHNICIAN MJK

UNDISTURBED SAMPLE — STANDARD PENETRATION TEST — BORING DEPTH 195 feet

DEPTH FEET	SAMPLES	Description	Blows	Count
0				
5	Undisturbed sample	Stiff brown and light gray clay		
10	Standard penetration test	Soft brown silty clay with 3 inch layer slightly clayey silt Penetration resistance	3 blows for 1 foot	(1/1/2)
15	Undisturbed sample	Loose brown silt with 6 inch layer brown very clayey silt		
20	Standard penetration test	Loose gray and brown clayey silt Penetration resistance	3 blows for 1 foot	(1/1/2)
25	Undisturbed sample	Soft gray silty clay with 8 inch layer loose gray silt and 5 inch layer loose fine gray sand and traces of organic matter		
30	Standard penetration test	Firm gray clayey silt with traces of organic matter Penetration resistance	15 blows for 1 foot	(3/6/9)
35	Undisturbed sample	Medium gray silty clay with ¼ to 4 inch silt layer and organic matter		
40	Standard penetration test	Firm gray sand with 8 inch layer very clayey silt Penetration resistance	19 blows for 1 foot	(3/9/10)
	Standard penetration test	No recovery		
45	Standard penetration test	Firm brown sandy silt Penetration resistance	22 blows for 1 foot	(11/11/11)
50	Standard penetration test	Dense gray sand with 2 inch sandy clay layer Penetration resistance	30 blows for 1 foot	(12/12/18)

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Consulting Engineers

LOG OF BORING

PROJECT Big Cajun No. 2, Site C-2
New Roads, Louisiana
Cajun Electric Power Cooperative, Inc.
FOR Bovay Engineers, Inc., Consulting Engineers
Burns and Roe, Inc., Consulting Engineers

BORING 1
FILE 74-30
DATE 17 May 1974
TECHNICIAN TZ

UNDISTURBED SAMPLE — STANDARD PENETRATION TEST — BORING DEPTH 195 feet

DEPTH FEET			
50			
55	Dense gray clayey sand Penetration resistance	33 blows for 1 foot	(7/10/23)
60	Very dense gray sand with clay traces Penetration resistance	25 blows for 6 inches	(25/25)
65	Very dense gray sand Penetration resistance	25 blows for 6 inches	(20/25)
70	Very dense gray fine sand Penetration resistance	35 blows for 6 inches	
75	Very dense gray sand with clay traces Penetration resistance	33 blows for 6 inches	
80	Very dense gray sand Penetration resistance	32 blows for 1 foot	(12/14/18)
85	Very dense gray sand Penetration resistance	25 blows for 6 inches	(14/25)
90	Very dense dark gray fine sand Penetration resistance	25 blows for 6 inches	(20/25)
95	Very dense gray fine sand Penetration resistance	35 blows for 5 inches	
100	Very dense gray sand Penetration resistance	30 blows for 5 inches	

LOG OF BORING

PROJECT Big Cajun No. 2, Site C-2
New Roads, Louisiana
Cajun Electric Power Cooperative, Inc.

FOR Bovay Engineers, Inc., Consulting Engineers
Burns and Roe, Inc., Consulting Engineers

BORING 1
FILE 74-30
DATE 17 May 1974
TECHNICIAN MJK

UNDISTURBED SAMPLE — STANDARD PENETRATION TEST — BORING DEPTH 195 feet

DEPTH FEET			
100			
	No recovery		
	Penetration resistance	30 blows for 4 inches	
105	Dense gray sand		
	Penetration resistance	43 blows for 1 foot	(13/16/27)
	Very dense gray sand		
110	Penetration resistance	32 blows for 5 inches	
	No recovery		
	Penetration resistance	31 blows for 6 inches	
115	Dense gray sand		
	Penetration resistance	46 blows for 1 foot	(16/20/26)
	Very dense gray sand		
120	Penetration resistance	25 blows for 4 inches	(24/25 for 4")
	Very dense gray sand		
125	Penetration resistance	30 blows for 4 inches	
	Dense gray sand with gravel traces		
130	Penetration resistance	36 blows for 1 foot	(16/19/17)
	Dense gray sand		
135	Penetration resistance	42 blows for 1 foot	(13/17/25)
	Very dense gray sand		
140	Penetration resistance	25 blows for 4½ inches	(27/25 for 4½")
	Dense gray coarse sand with gravel traces		
145	Penetration resistance	32 blows for 1 foot	(14/15/17)
	Dense sandy gravel		
150	Penetration resistance	33 blows for 1 foot	(15/15/18)

LOG OF BORING

PROJECT Big Cajun No. 2, Site C-2
New Roads, Louisiana
Cajun Electric Power Cooperative, Inc.
FOR Bovay Engineers, Inc., Consulting Engineers
Burns and Roe, Inc., Consulting Engineers

BORING 1
FILE 74-30
DATE 17 May 1974
TECHNICIAN MJK

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 195 feet

Depth (feet)	Description	Penetration resistance	
150			
155	Very dense slightly sandy gravel Penetration resistance	36 blows for 5 inches	
160	Very dense gray slightly sandy gravel Penetration resistance	35 blows for 5 inches	
165	Very dense gray slightly sandy gravel Penetration resistance	35 blows for 5 inches	
170	Very dense gray fine sand Penetration resistance	35 blows for 5 inches	
175	Very dense tan and gray sand with gravel Penetration resistance	26 blows for 5 inches	(17/26 for 5")
180	Very dense tan sand with traces of gravel Penetration resistance	25 blows for 2½ inches	(15/25 for 2½")
185	Very dense light gray sand with gravel and clay traces Penetration resistance	32 blows for 6 inches	
190	Very dense light gray sand with gravel and clay traces Penetration resistance	30 blows for 4 inches	
195	Hard tan and light gray clay Penetration resistance	25 blows for 4½ inches	(27/25 for 4½")
200			

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Consulting Engineers

LOG OF BORING

PROJECT	Big Cajun No. 2, Site C-2 New Roads, Louisiana	BORING NO.	2
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Consulting Engineers Burns and Roe, Inc., Consulting Engineers	DATE	9 May 1974
		TECHNICIAN	TZ

DEPTH FEET | SAMPLES | ■ UNDISTURBED SAMPLE | ☒ STANDARD PENETRATION TEST | BORING DEPTH 150 feet

Depth (feet)	Description		
0			
5	Medium tan and light gray clay with silt traces Penetration resistance	5 blows for 1 foot	(1/2/3)
10	Stiff tan and gray clay		
15	Soft brown clay Penetration resistance	2 blows for 1 foot	(1/1/1)
20	Soft gray very silty clay		
25	Dense gray slightly silty coarse sand Penetration resistance	39 blows for 1 foot	(6/19/20)
30	No recovery Medium gray silty clay Penetration resistance	6 blows for 1 foot	(1/2/4)
35	Firm gray very silty sand with clay traces Penetration resistance	17 blows for 1 foot	(4/5/12)
40	Firm gray silty coarse sand Penetration resistance	25 blows for 1 foot	(7/8/17)
45	Dense gray coarse sand Penetration resistance	32 blows for 1 foot	(8/18/14)
50	Dense gray coarse sand Penetration resistance	38 blows for 1 foot	(9/14/24)

LOG OF BORING

PROJECT	Big Cajun No. 2, Site C-2 New Roads, Louisiana Cajun Electric Power Cooperative, Inc.	BORING	2
		FILE	74-30
FOR	Bovay Engineers, Inc., Consulting Engineers Burns and Roe, Inc., Consulting Engineers	DATE	9 May 1974
		TECHNICIAN	MJK

DEPTH FEET | SAMPLES | ■ UNDISTURBED SAMPLE | ☒ STANDARD PENETRATION TEST | BORING DEPTH 150 feet

Depth (feet)	Description	Penetration	Blows
50			
55	Firm gray coarse sand Penetration resistance	26 blows for 1 foot	(7/11/15)
60	Very dense gray coarse sand Penetration resistance	42 blows for 6 inches	(27/42)
65	Dense gray coarse sand with clay traces Penetration resistance	42 blows for 1 foot	(11/19/23)
70	Dense gray coarse sand Penetration resistance	25 blows for 6 inches	(24/25)
75	Very dense gray coarse sand with traces of clay and silt Penetration resistance	26 blows for 3 inches	(22/26 for 3")
80	Very dense gray coarse sand Penetration resistance	25 blows for 5 inches	(16/25 for 5")
85	Very dense gray coarse sand Penetration resistance	25 blows for 5 inches	(21/25 for 5")
90	Very dense gray sand Penetration resistance	25 blows for 5 inches	(26/25 for 5")
95	Dense gray sand Penetration resistance	41 blows for 10 inches	(18/16/25 for 4")
100	Dense gray sand with wood traces Penetration resistance	36 blows for 1 foot	(9/14/22)

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Consulting Engineers

LOG OF BORING

PROJECT Big Cajun No. 2, Site C-2
New Roads, Louisiana
Cajun Electric Power Cooperative, Inc.
FOR Bovay Engineers, Inc., Consulting Engineers
Burns and Roe, Inc., Consulting Engineers

BORING 2
FILE 74-30
DATE 9 May 1974
TECHNICIAN MJK

UNDISTURBED SAMPLE ☒ STANDARD PENETRATION TEST BORING DEPTH 150 feet

DEPTH FEET	SAMPLES	Description		
100				
105	☒	Very dense gray coarse sand Penetration resistance	26 blows for 6 inches	(19/25 for 6")
110	☒	Very dense gray coarse sand Penetration resistance	26 blows for 4½ inches	(22/26 for 4½")
115	☒	Very dense gray sand Penetration resistance	31 blows for 3½ inches	
120	☒	Dense gray coarse sand Penetration resistance	39 blows for 1 foot	(17/17/22)
125	☒	Dense gray coarse sand with gravel and silt traces Penetration resistance	39 blows for 1 foot	(15/19/20)
130	☒	Firm gray coarse sand Penetration resistance	29 blows for 1 foot	(20/15/14)
135	☒	Firm gray coarse sand with gravel Penetration resistance	20 blows for 1 foot	(10/10/10)
140	☒	Very dense brown coarse sand Penetration resistance	25 blows for 6 inches	(10/25)
145	☒	Very dense gray coarse sand Penetration resistance	25 blows for 6 inches	(11/25)
150	☒	Firm gray coarse sandy gravel Penetration resistance	18 blows for 1 foot	(9/9/9)

LOG OF BORING

PROJECT	Big Cajun No. 2, Site C-2 New Roads, Louisiana Cajun Electric Power Cooperative, Inc.	BORING	3
		FILE	74-30
FOR	Bovay Engineers, Inc., Consulting Engineers Burns and Roe, Inc., Consulting Engineers	DATE	14 May 1974
		TECHNICIAN	MJK

■ UNDISTURBED SAMPLE ☒ STANDARD PENETRATION TEST BORING DEPTH 200 feet

DEPTH FEET	Description		
0			
5	Soft brown silty clay with 10 inch layer loose brown clayey silt		
10	Medium gray clay with silt traces Penetration resistance	5 blows for 1 foot	(2/2/3)
15	Soft gray slightly silty clay		
20	Medium gray clay Penetration resistance	5 blows for 1 foot	(3/2/3)
25	No recovery Firm gray sand with 8 inch layer very loose gray sand		
30	Firm gray clayey silt with traces of organic material Penetration resistance	12 blows for 1 foot	(5/5/7)
35	No recovery Loose gray sand		
40	Firm gray sand Penetration resistance	27 blows for 1 foot	(8/9/18)
45	Dense gray sand Penetration resistance	44 blows for 1 foot	(17/21/23)
50	Dense gray sand with clay traces Penetration resistance	39 blows for 1 foot	(16/20/19)

LOG OF BORING

PROJECT	Big Cajun No. 2, Site C-2 New Roads, Louisiana Cajun Electric Power Cooperative, Inc.
FOR	Bovay Engineers, Inc., Consulting Engineers Burns and Roe, Inc., Consulting Engineers
BORING	3
FILE	74-30
DATE	14 May 1974
TECHNICIAN	MJK

■ UNDISTURBED SAMPLE ☒ STANDARD PENETRATION TEST BORING DEPTH 200 feet

DEPTH FEET	SAMPLES	Description		
50				
55	☒	Dense gray slightly clayey sand Penetration resistance	41 blows for 1 foot	(13/19/22)
60	☒	Very dense gray clayey sand Penetration resistance	26 blows for 6 inches	(18/26)
65	☒	Very dense gray sand Penetration resistance	33 blows for 6 inches	
70	☒	Very dense gray sand Penetration resistance	26 blows for 4 inches	(28/26 for 4")
75	☒	Very dense gray sand Penetration resistance	36 blows for 6 inches	
80	☒	Very dense gray sand Penetration resistance	32 blows for 6 inches	
85	☒	Very dense gray sand with clay traces Penetration resistance	25 blows for 4 inches	(25/25 for 4")
90	☒	Very dense gray sand with clay traces Penetration resistance	50 blows for 6 inches	
95	☒	Very dense gray sand Penetration resistance	70 blows for 6 inches	
100	☒	Very dense gray sand Penetration resistance	25 blows for 4 inches	(28/25 for 4")

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Consulting Engineers

LOG OF BORING

PROJECT Big Cajun No. 2, Site C-2
New Roads, Louisiana
Cajun Electric Power Cooperative, Inc.

FOR Bovay Engineers, Inc., Consulting Engineers
Burns and Roe, Inc., Consulting Engineers

BORING 3
FILE 74-30
DATE 14 May 1974
TECHNICIAN TZ

UNDISTURBED SAMPLE ■   STANDARD PENETRATION TEST ☒   BORING DEPTH 200 feet

DEPTH FEET	SAMPLES	Description	Penetration	
100				
105	☒	Very dense gray sand Penetration resistance	25 blows for 4 inches	(20/25 for 4")
110	☒	Very dense gray sand Penetration resistance	25 blows for 6 inches	(29/25)
115	☒	Very dense gray sand Penetration resistance	36 blows for 6 inches	
120	☒	Very dense gray sand Penetration resistance	32 blows for 4 inches	
125	☒	Very dense gray coarse sand with gravel Penetration resistance	33 blows for 6 inches	
130	☒	Very dense gray coarse sand with gravel Penetration resistance	26 blows for 6 inches	(22/26)
135	☒	Very dense gray coarse sand and gravel Penetration resistance	31 blows for 6 inches	
140	☒	Very dense gray coarse sand with gravel Penetration resistance	35 blows for 6 inches	
145	☒	Very dense gray sand with gravel Penetration resistance	30 blows for 5 inches	
150	☒	Dense gray sand and traces of gravel Penetration resistance	32 blows for 1 foot	(21/17/15)

LOG OF BORING

PROJECT	Big Cajun No. 2, Site C-2 New Roads, Louisiana Cajun Electric Power Cooperative, Inc.
FOR	Bovay Engineers, Inc., Consulting Engineers Burns and Roe, Inc., Consulting Engineers
BORING	3
FILE	74-30
DATE	15 May 1974
TECHNICIAN	MJK

UNDISTURBED SAMPLE — STANDARD PENETRATION TEST — BORING DEPTH 200 feet

DEPTH FEET	SAMPLES	Description	Penetration	
150				
155	SPT	No recovery Penetration resistance	25 blows for 4 inches	(28/25 for 4")
160	SPT	Very dense gray coarse sand Penetration resistance	35 blows for 4 inches	
165	SPT	Very dense gray coarse sand Penetration resistance	35 blows for 4 inches	
170	SPT	Hard tan clay Penetration resistance	44 blows for 1 foot	(9/19/25)
175	SPT	Hard tan clay Penetration resistance	39 blows for 1 foot	(11/14/25)
180	Undisturbed	Very stiff light gray sandy clay		
185	Undisturbed	Very stiff light gray sandy clay		
190	SPT	Hard green marine clay Penetration resistance	53 blows for 1 foot	(13/22/31)
195	Undisturbed	Hard light gray sandy clay		
200	SPT	Hard green marine clay Penetration resistance	37 blows for 1 foot	(11/15/22)

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Consulting Engineers

LOG OF BORING

PROJECT	Big Cajun No. 2, Site C-2 New Roads, Louisiana	BORING	4
	Cajun Electric Power Cooperative, Inc.	FILE	74-30
FOR	Bovay Engineers, Inc., Consulting Engineers	DATE	13 May 1974
	Burns and Roe, Inc., Consulting Engineers	TECHNICIAN	MJK

DEPTH FEET — SAMPLES — UNDISTURBED SAMPLE — STANDARD PENETRATION TEST — BORING DEPTH 150 feet

Firm brown clayey silt with 2 inch layer firm brown silt with clay streaks

Medium gray clay
Penetration resistance 5 blows for 1 foot (1/2/3)

Loose brown clayey silt

Soft gray clay with 12 inch very loose clayey silt layer
Penetration resistance 2 blows for 1 foot (2/1/1)

Firm gray silt with ½ inch layer clay and traces of wood

Loose gray clayey silt
Penetration resistance 8 blows for 1 foot (3/2/6)

Loose gray silt with 3 inch layer firm gray silt and clay traces with
4 inches layer very silty clay

Medium gray slightly silty clay
Penetration resistance 8 blows for 1 foot (3/4/4)

Medium gray clay with 1/8 inch sand lenses and 1/8 inch silt lenses and
traces organic matter

Stiff gray clay with 5 inch layer loose gray silt and traces organic matter
Penetration resistance 14 blows for 1 foot (8/7/7)

LOG OF BORING

PROJECT Big Cajun No. 2, Site C-2
New Roads, Louisiana
Cajun Electric Power Cooperative, Inc.

FOR Bovay Engineers, Inc., Consulting Engineers
Burns and Roe, Inc., Consulting Engineers

BORING 4
FILE 74-30
DATE 13 May 1974
TECHNICIAN MJK

DEPTH FEET | SAMPLES | ■ UNDISTURBED SAMPLE | ☒ STANDARD PENETRATION TEST | BORING DEPTH 150 feet

DEPTH FEET			
50			
	No recovery		
55	Dense gray coarse sand Penetration resistance	37 blows for 1 foot	(10/15/22)
60	Very dense gray sand Penetration resistance	51 blows for 1 foot	(18/24/27)
65	Very dense gray sand Penetration resistance	26 blows for 6 inches	(15/26)
70	Very dense gray coarse sand Penetration resistance	26 blows for 5 inches	(27/26 for 5")
75	Very dense gray sand Penetration resistance	32 blows for 6 inches	
80	Very dense gray sand Penetration resistance	29 blows for 6 inches	(19/29)
85	Very dense gray sand Penetration resistance	32 blows for 6 inches	-
90	Dense gray sand Penetration resistance	38 blows for 1 foot	(10/18/20)
95	Dense gray coarse sand with brown organic matter Penetration resistance	43 blows for 1 foot	(15/18/25)
100	Very dense gray sand Penetration resistance	32 blows for 6 inches	

LOG OF BORING

PROJECT Big Cajun No. 2, Site C-2
New Roads, Louisiana
Cajun Electric Power Cooperative, Inc.
FOR Bovay Engineers, Inc., Consulting Engineers
Burns and Roe, Inc., Consulting Engineers

BORING 4
FILE 74-30
DATE 14 May 1974
TECHNICIAN MJK

■ UNDISTURBED SAMPLE ☒ STANDARD PENETRATION TEST BORING DEPTH 150 feet

DEPTH FEET	SAMPLES	Description		
100				
105	☒	Very dense gray sand Penetration resistance	25 blows for 4 inches	(18/25 for 4")
110	☒	Very dense sand Penetration resistance	38 blows for 6 inches	
115	☒	Very dense gray coarse sand with gravel traces Penetration resistance	32 blows for 6 inches	
120	☒	Very dense gray coarse sand with gravel traces Penetration resistance	26 blows for 6 inches	(24/26)
125	☒	Very dense gray coarse sand with pea gravel Penetration resistance	26 blows for 4 inches	(28/26 for 4")
130	☒	Very dense gray coarse sand with gravel traces Penetration resistance	36 blows for 6 inches	
135	☒	Very dense gray coarse sand with traces of gravel Penetration resistance	38 blows for 6 inches	
140	☒	Very dense gray coarse sand with gravel traces Penetration resistance	32 blows for 6 inches	
145	☒	Firm gray coarse sand with gravel traces Penetration resistance	22 blows for 1 foot	(11/11/11)
150	☒	Dense gray coarse sand with gravel traces Penetration resistance	36 blows for 1 foot	(14/16/20)

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LOUIS J. CAPOZZOLI & ASSOCIATES, INC.

LOG OF BORING

PROJECT	Big Cajun No. 2, Site C-2 New Roads, Louisiana	BORING	5
	Cajun Electric Power Cooperative, Inc.	FILE	74-30
FOR	Bovay Engineers, Inc., Consulting Engineers	DATE	10 May 1974
	Burns and Roe, Inc., Consulting Engineers	TECHNICIAN	MJK

■ UNDISTURBED SAMPLE ☒ STANDARD PENETRATION TEST BORING DEPTH 150 feet

DEPTH FEET	Description		
0			
5	Soft brown clay with silt traces		
10	Medium brown light gray clay with silt traces Penetration resistance	5 blows for 1 foot	(2/2/3)
15	Loose brown slightly clayey silt		
20	Firm gray slightly clayey silt Penetration resistance	10 blows for 1 foot	(3/4/6)
25	No recovery Loose gray sand with clay traces Penetration resistance	7 blows for 1 foot	(2/2/5)
30	Firm gray fine sand		
35	Firm gray sand with 3 inch layer gray clay Penetration resistance	28 blows for 1 foot	(6/10/18)
40	Dense gray sand Penetration resistance	32 blows for 1 foot	(9/15/17)
45	Dense gray sand with wood traces Penetration resistance	34 blows for 1 foot	(9/14/20)
50	No recovery Penetration resistance	6 blows for 1 foot	(3/3/3)

LOG OF BORING

PROJECT	Big Cajun No. 2, Site C-2 New Roads, Louisiana Cajun Electric Power Cooperative, Inc.	BORING	5
		FILE	74-30
FOR	Bovay Engineers, Inc., Consulting Engineers Burns and Roe, Inc., Consulting Engineers	DATE	10 May 1974
		TECHNICIAN	MJK

UNDISTURBED SAMPLE   STANDARD PENETRATION TEST   BORING DEPTH 150 feet

DEPTH FEET	Description		
50	Firm gray sand		
	Firm gray sand with 4 inch gray sandy clay layer Penetration resistance	21 blows for 1 foot	(7/7/14)
55	Firm gray silt		
	Dense gray coarse sand Penetration resistance	44 blows for 1 foot	(10/20/24)
60			
	Dense gray sand Penetration resistance	42 blows for 1 foot	(15/20/22)
65			
	Dense gray coarse sand Penetration resistance	47 blows for 1 foot	(12/23/24)
70			
	Very dense gray coarse sand Penetration resistance	32 blows for 6 inches	
75			
	Very dense gray sand Penetration resistance	26 blows for 4 inches	(14/26 for 4")
80			
	Very dense gray fine sand Penetration resistance	28 blow for 6 inches	(-18/28)
85			
	Dense gray sand Penetration resistance	48 blows for 1 foot	(15/20/28)
90			
	Very dense gray sand Penetration resistance	25 blows for 6 inches	(15/25)
95			
	Very dense gray coarse sand Penetration resistance	25 blows for 3 inches	(15/25 for 3")
100			

LOG OF BORING

PROJECT Big Cajun No.2, Site C-2
New Roads, Louisiana

FOR Cajun Electric Power Cooperative, Inc.
Bovay Engineers, Inc., Consulting Engineers
Burns and Roe, Inc., Consulting Engineers

BORING 5
FILE 74-30
DATE 13 May 1974
TECHNICIAN MJK

UNDISTURBED SAMPLE — STANDARD PENETRATION TEST — BORING DEPTH 150 feet

DEPTH FEET	SAMPLES	Description		
100				
105	X	Very dense gray coarse sand Penetration resistance	25 blows for 6 inches	(15/25)
110	X	Very dense gray sand Penetration resistance	25 blows for 3 inches	(15/25 for 3")
115	X	Very dense gray sand Penetration resistance	25 blows for 4 inches	(29/25 for 4")
120	X	Very dense gray coarse sand Penetration resistance	30 blows for 4 inches	
125	X	Very dense gray fine sand with gravel traces Penetration resistance	25 blows for 6 inches	(20/25)
130	X	Dense gray coarse sand Penetration resistance	30 blows for 1 foot	(25/14/16)
135	X	Very dense gray and fine sand with traces gravel and 1 inch sand clay layer Penetration resistance	25 blows for 6 inches	(15/25)
140	X	Very dense gray sand Penetration resistance	50 blows for 1 foot	(15/25/25)
145	X	Very dense gray sand with gravel traces Penetration resistance	30 blows for 6 inches	
150	X	Very dense gray sand Penetration resistance	25 blows for 6 inches	(11/25)

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Consulting Engineers

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LOG OF BORING

PROJECT	Big Cajun No. 2, Site C-2 New Roads, Louisiana Cajun Electric Power Cooperative, Inc.
FOR	Bovay Engineers, Inc., Consulting Engineers Burns and Roe, Inc., Consulting Engineers
BORING	6
FILE	74-30
DATE	24 May 1974
TECHNICIAN	MD

UNDISTURBED SAMPLE — STANDARD PENETRATION TEST — BORING DEPTH 151½ feet

DEPTH FEET	SAMPLES	Description	Penetration	Blows
0				
5	Standard penetration test	Medium tan and gray clay Penetration resistance	5 blows for 1 foot	(2/2/3)
10	Undisturbed sample	Loose gray silt with clay traces		
15	Standard penetration test	Medium tan silty clay Penetration resistance	6 blows for 1 foot	(3/3/3)
20	Undisturbed sample	Firm gray sandy silt		
25	Standard penetration test	Medium gray silty clay with traces of organic matter Penetration resistance	7 blows for 1 foot	(2/2/5)
30	Undisturbed sample	Medium gray silty clay with 2 inch very silty clay layer		
35	Standard penetration test	Firm gray silty sand Penetration resistance	18 blows for 1 foot	(7/8/10)
40	Undisturbed sample	Dense gray silty sand		
	Standard penetration test	Dense gray silty sand Penetration resistance	41 blows for 1 foot	(11/20/21)
45	Standard penetration test	Very stiff gray slightly silty clay Penetration resistance	19 blows for 1 foot	(6/10/9)
50	Undisturbed sample	Medium gray silty clay with silt lenses		

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.

LOG OF BORING

PROJECT Big Cajun No. 2, Site C-2
New Roads, Louisiana
Cajun Electric Power Cooperative, Inc.
FOR Bovay Engineers, Inc., Consulting Engineers
Burns and Roe, Inc., Consulting Engineers

BORING 6
FILE 74-30
DATE 24 May 1974
TECHNICIAN MD

UNDISTURBED SAMPLE — STANDARD PENETRATION TEST — BORING DEPTH 151½ feet

DEPTH FEET	Description	Penetration	Blows
50			
55	Firm gray sand Penetration resistance	25 blows for 1 foot	(8/12/13)
60	Stiff gray clay with 4 inch sandy silt layer Penetration resistance	11 blows for 1 foot	(3/6/5)
	Medium gray clay with silt lenses and sand streaks		
65	Stiff gray clay with 6 inch very dense gray sand layer Penetration resistance	26 blows for 6 inches	
70	Dense gray sand Penetration resistance	37 blows for 1 foot	(25/21/16)
75	Very stiff gray slightly silty clay Penetration resistance	25 blows for 1 foot	(8/11/14)
80	Loose gray coarse sand		
	Dense gray coarse sand Penetration resistance	45 blows for 1 foot	(10/22/23)
85	Very dense gray sand Penetration resistance	28 blows for 6 inches	(14/28)
90	Very dense gray coarse sand Penetration resistance	25 blows for 5 inches	(24/25 for 5")
95	Dense gray fine sand Penetration resistance	27 blows for 1 foot	(15/11/16)
100	Dense gray fine sand Penetration resistance	25 blows for 5 inches	(15/25 for 5")

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Consulting Engineers

LOG OF BORING

PROJECT	Big Cajun No. 2, Site C-2 New Roads, Louisiana Cajun Electric Power Cooperative, Inc.	BORING	6
		FILE	74-30
FOR	Bovay Engineers, Inc., Consulting Engineers Burns and Roe, Inc., Consulting Engineers	DATE	27 May 1974
		TECHNICIAN	TZ

UNDISTURBED SAMPLE — STANDARD PENETRATION TEST — BORING DEPTH 151½ feet

DEPTH FEET	SAMPLES	Description	Penetration	Notes
100				
105	☒	Very dense gray fine sand with gravel traces Penetration resistance	25 blows for 5 inches	(15/25 for 5")
110	☒	Dense gray fine sand with gravel Penetration resistance	40 blows for 1 foot	(15/20/25)
115	☒	Very dense gray fine sand with gravel traces Penetration resistance	25 blows for 3 inches	(30/25 for 3")
120	☒	Very dense gray fine sand Penetration resistance	25 blows for 4 inches	(25/25/4")
125	☒	Very dense gray fine sand Penetration resistance	25 blows for 4 inches	(25/25 for 4")
130	☒	Very dense gray fine sand Penetration resistance	36 blows for 6 inches	
135	☒	Very dense fine sand with gravel Penetration resistance	36 blows for 6 inches	
140	☒	Very dense fine sand with gravel traces Penetration resistance	35 blows for 5 inches	
145	☒	Very dense fine sand Penetration resistance	40 blows for 6 inches	(25/40)
150	☒	No recovery Penetration resistance	36 blows for 5 inches	

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Consulting Engineers

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LOG OF BORING

PROJECT	Big Cajun No. 2, Site C-2 New Roads, Louisiana Cajun Electric Power Cooperative, Inc.	BORING	6
		FILE	74-30
FOR	Bovay Engineers, Inc., Consulting Engineers Burns and Roe, Inc., Consulting Engineers	DATE	27 May 1974
		TECHNICIAN	TZ

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 151½ feet

DEPTH FEET	SAMPLES	
150	X	No recovery Penetration resistance 36 blows for 5 inches
155		

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Consulting Engineers

LOG OF BORING

PROJECT	Big Cajun No. 2, Site C-2 New Roads, Louisiana Cajun Electric Power Cooperative, Inc.	BORING	7
FOR	Bovay Engineers, Inc., Consulting Engineers Burns and Roe, Inc., Consulting Engineers	FILE	74-30
		DATE	22 May 1974
		TECHNICIAN	TZ

■ UNDISTURBED SAMPLE ☒ STANDARD PENETRATION TEST BORING DEPTH 150 feet

DEPTH FEET	SAMPLES	Description		
0				
5	☒	Medium brown slightly silty clay Penetration resistance	6 blows for 1 foot	(3/3/3)
10	■	Soft tan and gray clay with silt pockets and lenses		
15	☒	Medium brown slightly silty clay with 4 inch clayey silt layer Penetration resistance	4 blows for 1 foot	(2/2/2)
20	■	Firm tan clayey silt with 1 inch silty clay layer		
25	☒	Soft gray silty clay with 4 inch clayey sand layer Penetration resistance	13 blows for 1 foot	(6/6/7)
30	■	Very dense slightly clayey sandy silt with 3 inch silt layer		
35	☒	Firm gray slightly clayey sand with 3 inch clayey sand layer Penetration resistance	24 blows for 1 foot	(10/12/12)
40	☒	Firm gray slightly silty fine sand Penetration resistance	29 blows for 1 foot	(13/13/16)
45	☒	Dense gray sand with 5 inch sandy clay layer Penetration resistance	37 blows for 1 foot	(15/18/19)
50	☒	Hard gray sandy clay Penetration resistance	30 blows for 1 foot	(10/10/20)

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.

LOG OF BORING

PROJECT Big Cajun No. 2, Site C-2
New Roads, Louisiana
Cajun Electric Power Cooperative, Inc.

FOR Bovay Engineers, Inc., Consulting Engineers
Burns and Roe, Inc., Consulting Engineers

BORING 7
FILE 74-30
DATE 22 May 1974
TECHNICIAN TZ

UNDISTURBED SAMPLE — STANDARD PENETRATION TEST — BORING DEPTH 150 feet

DEPTH FEET	Description	Penetration	
50			
55	Very dense gray silty sand		
60	Very dense gray fine sand Penetration resistance	35 blows for 5 inches	(35 for 5")
65	Very dense gray fine sand Penetration resistance	25 blows for 6 inches	(5/25)
70	Very dense gray sand Penetration resistance	40 blows for 1 foot	(20/20/20)
75	Firm gray sand Penetration resistance	17 blows for 1 foot	(6/6/11)
80	Very dense gray fine sand Penetration resistance	32 blows for 6 inches	
85	Very dense gray fine sand Penetration resistance	32 blows for 6 inches	
90	No recovery		
95	Very dense gray sand Penetration resistance	25 blows for 5 inches	(22/25 for 5")
100	Very dense gray sand Penetration resistance	26 blows for 6 inches	(20/26)

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Consulting Engineers

LOG OF BORING

PROJECT Big Cajun No. 2, Site C-2
New Roads, Louisiana
Cajun Electric Power Cooperative, Inc.

FOR Bovay Engineers, Inc., Consulting Engineers
Burns and Roe, Inc., Consulting Engineers

BORING NO. 7
FILE 74-30
DATE 22 May 1974
TECHNICIAN MD

■ UNDISTURBED SAMPLE ☒ STANDARD PENETRATION TEST BORING DEPTH 150 feet

DEPTH FEET	SAMPLES	Description		
100				
105	☒	Very dense gray sand Penetration resistance	30 blows for 5 inches	
110	☒	Very dense gray sand Penetration resistance	33 blows for 6 inches	
115	☒	Very dense gray sand Penetration resistance	30 blows for 5 inches	
120	☒	Very dense gray sand Penetration resistance	34 blows for 5 inches	
125	☒	Very dense gray sand Penetration resistance	27 blows for 6 inches	(22/27)
130	☒	Very dense gray sand with organic matter and wood pieces Penetration resistance	28 blows for 6 inches	(13/28)
135		No recovery Penetration resistance	30 blows for 3 inches	
140	☒	Very dense coarse sand gravel Penetration resistance	34 blows for 5 inches	
145	☒	Firm coarse gravel with sand Penetration resistance	24 blows for 1 foot	(26/12/12)
150	☒	Dense coarse gravel with sand Penetration resistance	40 blows for 1 foot	(15/15/25)

LOG OF BORING

PROJECT	Big Cajun No. 2, Site C-2 New Roads, Louisiana Cajun Electric Power Cooperative, Inc.	BORING	8
		FILE	74-30
FOR	Bovay Engineers, Inc., Consulting Engineers Burns and Roe, Inc., Consulting Engineers	DATE	23 May 1974
		TECHNICIAN	MD

UNDISTURBED SAMPLE — STANDARD PENETRATION TEST — BORING DEPTH 150 feet

DEPTH FEET	Description	Penetration	Blows
0			
	Very loose brown clayey silt Penetration resistance	3 blows for 1 foot	(2/1/2)
5			
	Very loose brown slightly clayey silt		
10			
	Loose brown clayey silt Penetration resistance	4 blows for 1 foot	(2/2/2)
15			
	Soft gray very silty clay with 3 inch sand layer		
20			
	Firm gray sandy silt Penetration resistance	20 blows for 1 foot	(7/7/13)
25			
	Soft gray clay with silt streaks and ¼ to 4 inch silt layer		
30			
	Dense gray sand with ¼ inch clay layer Penetration resistance	38 blows for 1 foot	(10/18/20)
35			
	No recovery Firm gray fine sand Penetration resistance	25 blows for 1 foot	(6/9/16)
40			
45	Dense gray fine sand Penetration resistance	32 blows for 1 foot	(12/15/17)
50	Dense gray fine sand Penetration resistance	33 blows for 1 foot	(12/16/17)

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Consulting Engineers

LOG OF BORING

PROJECT	Big Cajun No. 2, Site C-2 New Roads, Louisiana	BORING	8
	Cajun Electric Power Cooperative, Inc.	FILE	74-30
FOR	Bovay Engineers, Inc., Consulting Engineers	DATE	23 May 1974
	Burns and Roe, Inc., Consulting Engineers	TECHNICIAN	MD

UNDISTURBED SAMPLE — STANDARD PENETRATION TEST — BORING DEPTH 150 feet

DEPTH FEET	SAMPLES	Description	Penetration	
50				
55	☒	Dense gray fine sand Penetration resistance	38 blows for 1 foot	(9/18/20)
60	☒	Very dense gray fine sand Penetration resistance	28 blows for 6 inches	(17/28 for 6")
65	☒	Dense gray fine sand Penetration resistance	36 blows for 1 foot	(19/17/19)
70	☒	Dense gray fine sand Penetration resistance	46 blows for 1 foot	(14/20/26)
75	☒	Dense gray fine sand Penetration resistance	41 blows for 1 foot	(15/19/22)
80	☒	Very dense gray sand with traces of organic matter Penetration resistance	32 blows for 6 inches	
85	☒	Very dense gray sand Penetration resistance	32 blows for 5 inches	
90	☒	Very dense gray sand Penetration resistance	27 blows for 5 inches	(23/27 for 5")
95	☒	Very dense gray sand Penetration resistance	26 blows for 6 inches	(20/26)
100	☒	Very dense gray sand Penetration resistance	30 blows for 5 inches	

LOG OF BORING

PROJECT Big Cajun No. 2, Site C-2
New Roads, Louisiana

FOR Cajun Electric Power Cooperative, Inc.
Bovay Engineers, Inc., Consulting Engineers
Burns and Roe, Inc., Consulting Engineers

BORING 3
FILE 74-30
DATE 23 May 1974
TECHNICIAN MD

UNDISTURBED SAMPLE — STANDARD PENETRATION TEST — BORING DEPTH 150 feet

DEPTH FEET	SAMPLES	Description	Penetration	
100				
105	☒	Very dense gray sand Penetration resistance	32 blows for 5 inches	
110	☒	Very dense gray sand with organic matter Penetration resistance	33 blows for 5 inches	
115	☒	Very dense gray sand Penetration resistance	35 blows for 6 inches	
120	☒	Very dense gray sand Penetration resistance	35 blows for 6 inches	
125	☒	Very dense gray sand Penetration resistance	35 blows for 6 inches	
130	☒	Very dense sand and gravel Penetration resistance	35 blows for 5 inches	
135	☒	Very dense slightly sandy gravel Penetration resistance	28 blows for 6 inches	(19/28)
140	☒	Dense slightly sandy gravel Penetration resistance	34 blows for 1 foot	(11/15/19)
145	☒	Dense slightly sandy gravel Penetration resistance	34 blows for 1 foot	(11/15/19)
150	☒	Dense slightly sandy gravel Penetration resistance	32 blows for 1 foot	(24/15/17)

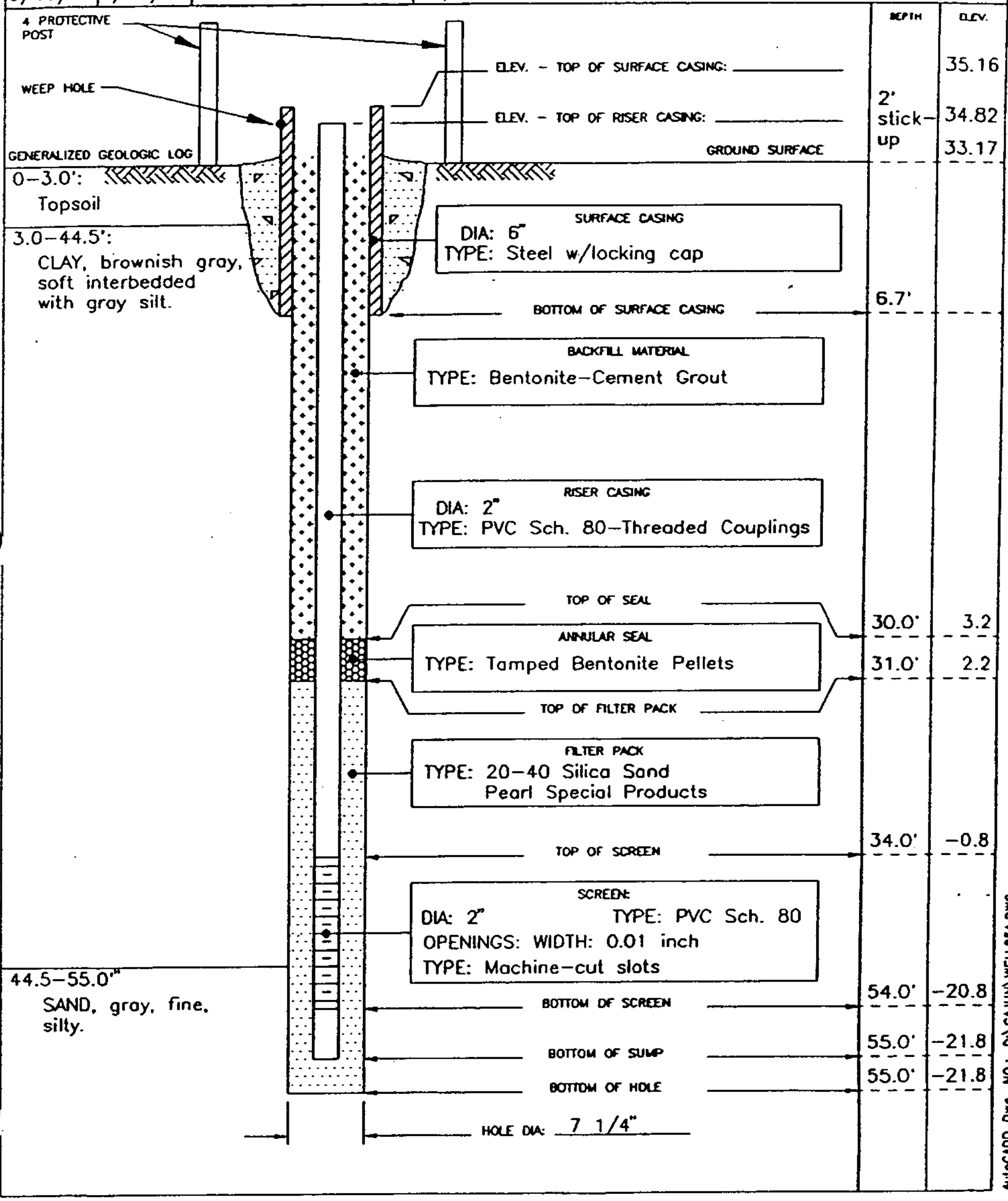
LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Consulting Engineers

OBSERVATION WELL

PROJECT	WELL NO.
CEPCO – BIG CAJUN II	85A

JOB NO.	SITE	COORDINATES
14630	Fly Ash Pond	E 2030, N 4190

BEGUN	COMPLETED	PREPARED BY	REFERENCE POINT FOR MEASUREMENTS
6/18/85	6/18/85	D. R. Beissel	Top of PVC

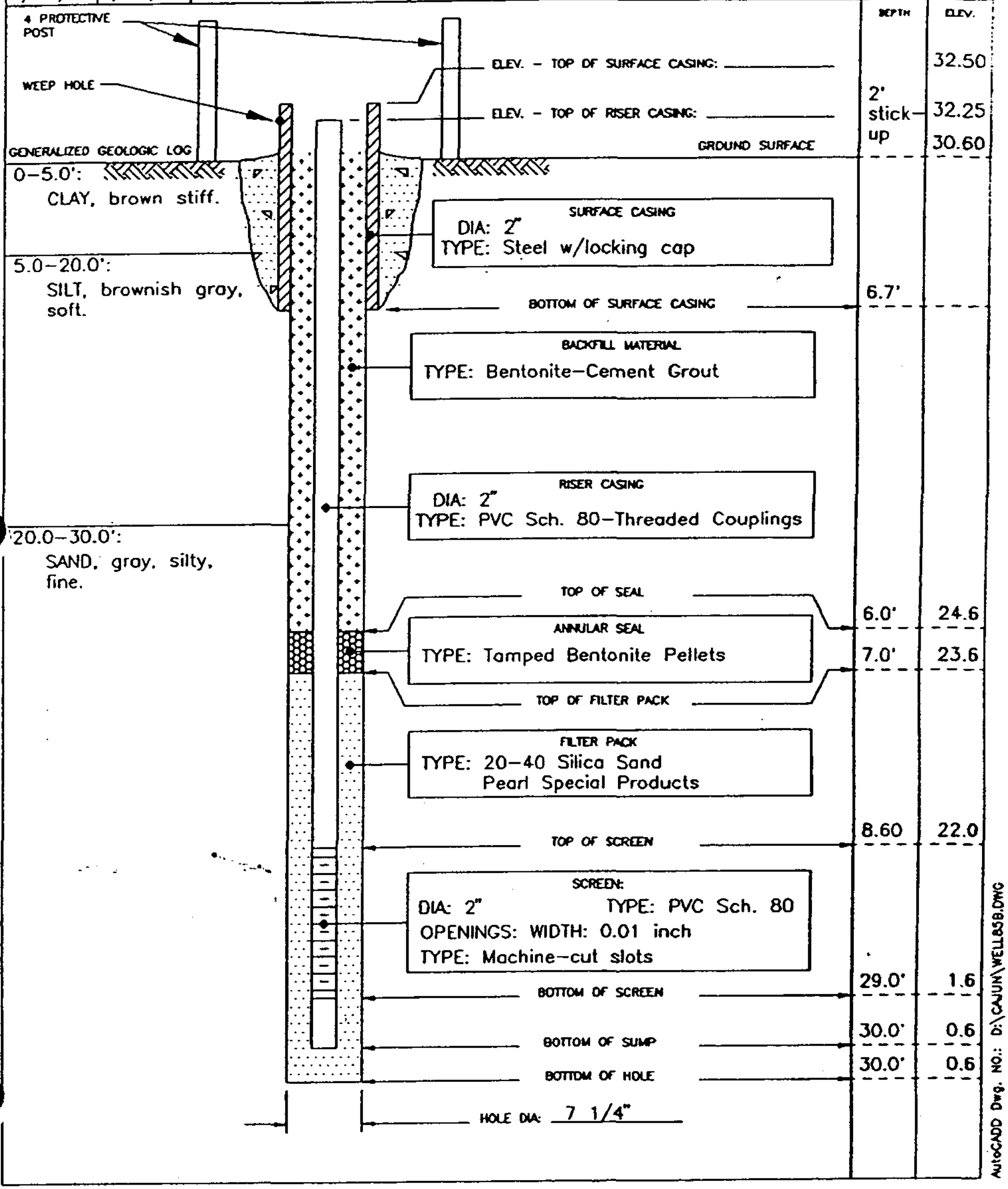


OBSERVATION WELL

PROJECT			WELL NO.
CEPCO – BIG CAJUN II			85B

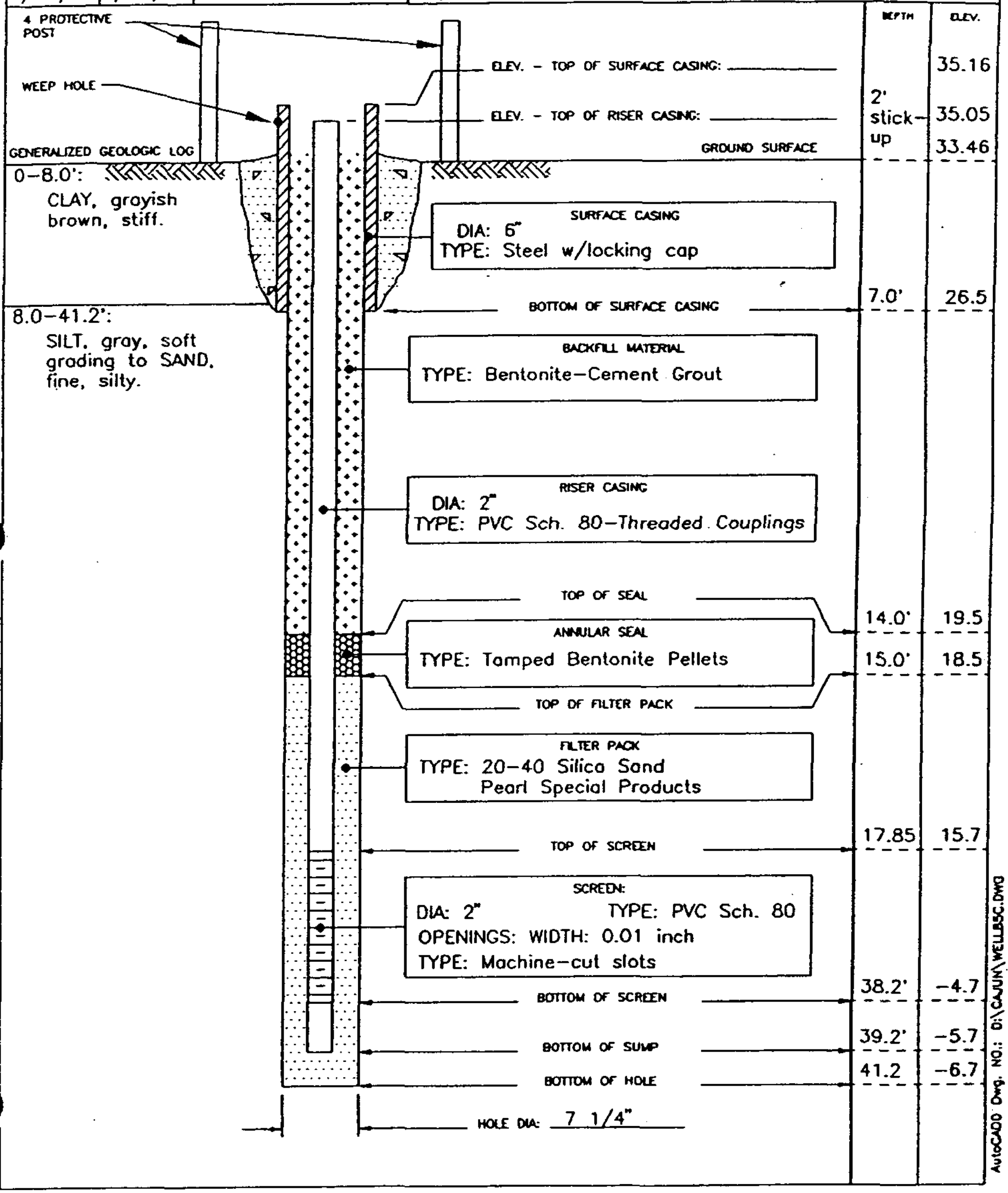
JOB NO.	SITE	COORDINATES
14630	North Bottom Ash Pond	E 6449, N 5262

BEGUN	COMPLETED	PREPARED BY	REFERENCE POINT FOR MEASUREMENTS
6/20/85	6/20/85	D. R. Beissel	Top of PVC



OBSERVATION WELL

PROJECT	CEPCO – BIG CAJUN II	WELL NO.	85C
JOB NO. 14630	SITE North Rainfall Pond	COORDINATES	E 9490, N 5167
BEGUN 6/20/85	COMPLETED 6/20/85	PREPARED BY D. R. Beissel	REFERENCE POINT FOR MEASUREMENTS Top of PVC

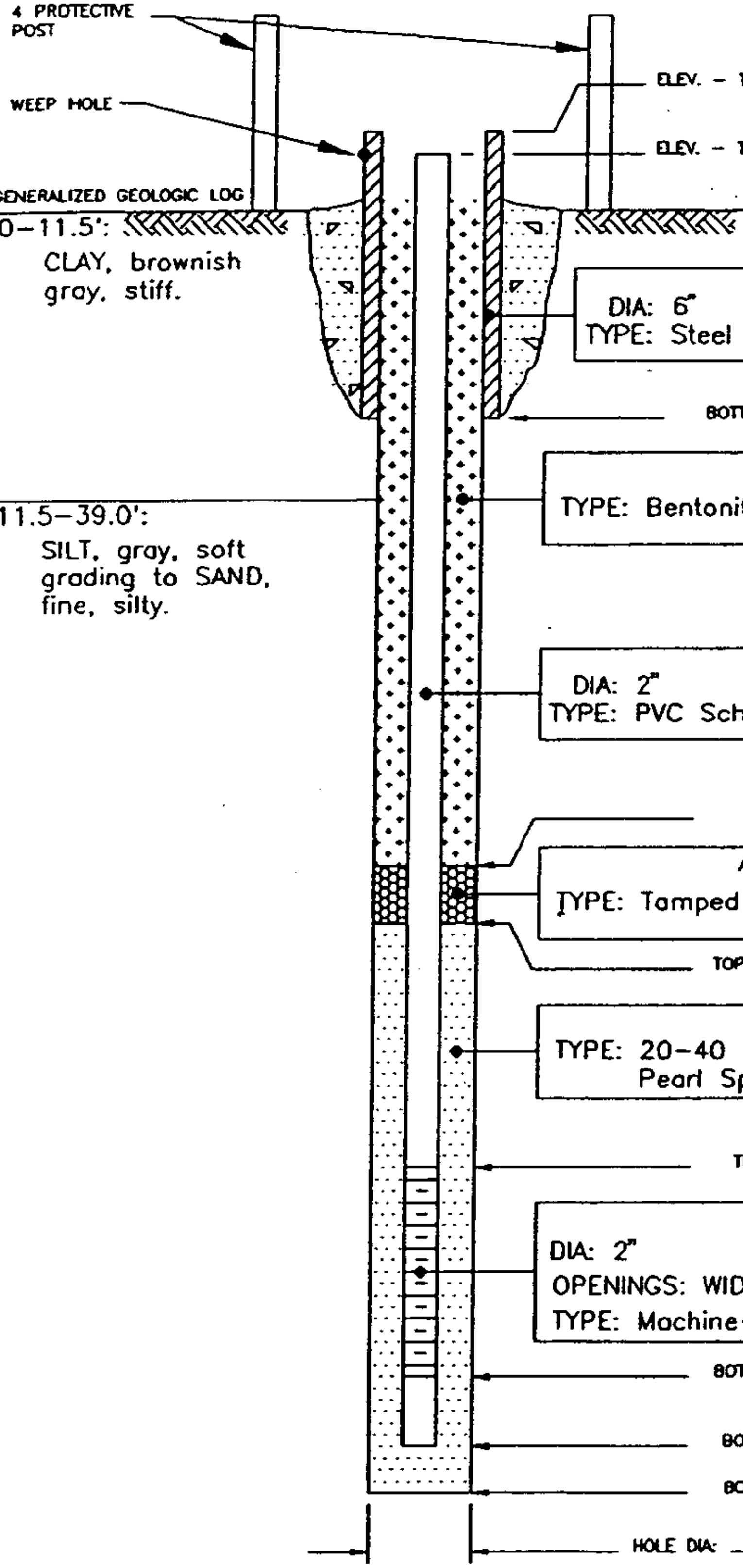


OBSERVATION WELL

PROJECT			WELL NO.
CEPCO – BIG CAJUN II			85D

JOB NO.	SITE	COORDINATES
14630	South Rainfall Pond	E 9210, N 3780

BEGUN	COMPLETED	PREPARED BY	REFERENCE POINT FOR MEASUREMENTS
6/20/85	6/20/85	D. R. Beissel	Top of PVC



GENERALIZED GEOLOGIC LOG

0–11.5': CLAY, brownish gray, stiff.

11.5–39.0': SILT, gray, soft grading to SAND, fine, silty.

	DEPTH	ELEV.
ELEV. – TOP OF SURFACE CASING:		36.00
ELEV. – TOP OF RISER CASING:	2' stick-up	35.71
GROUND SURFACE		34.20
BOTTOM OF SURFACE CASING	6.7'	27.5
TOP OF SEAL	14.0'	20.2
TOP OF FILTER PACK	15.0'	19.2
TOP OF SCREEN	18.0'	16.2
BOTTOM OF SCREEN	38.0'	-3.8
BOTTOM OF SUMP	39.0'	-4.8
BOTTOM OF HOLE	39.0'	-4.8

SURFACE CASING
DIA: 6"
TYPE: Steel w/locking cap

BACKFILL MATERIAL
TYPE: Bentonite–Cement Grout

RISER CASING
DIA: 2"
TYPE: PVC Sch. 80–Threaded Couplings

ANNULAR SEAL
TYPE: Tamped Bentonite Pellets

FILTER PACK
TYPE: 20–40 Silica Sand
Pearl Special Products

SCREEN:
DIA: 2" TYPE: PVC Sch. 80
OPENINGS: WIDTH: 0.01 inch
TYPE: Machine–cut slots

HOLE DIA: 7 1/4"

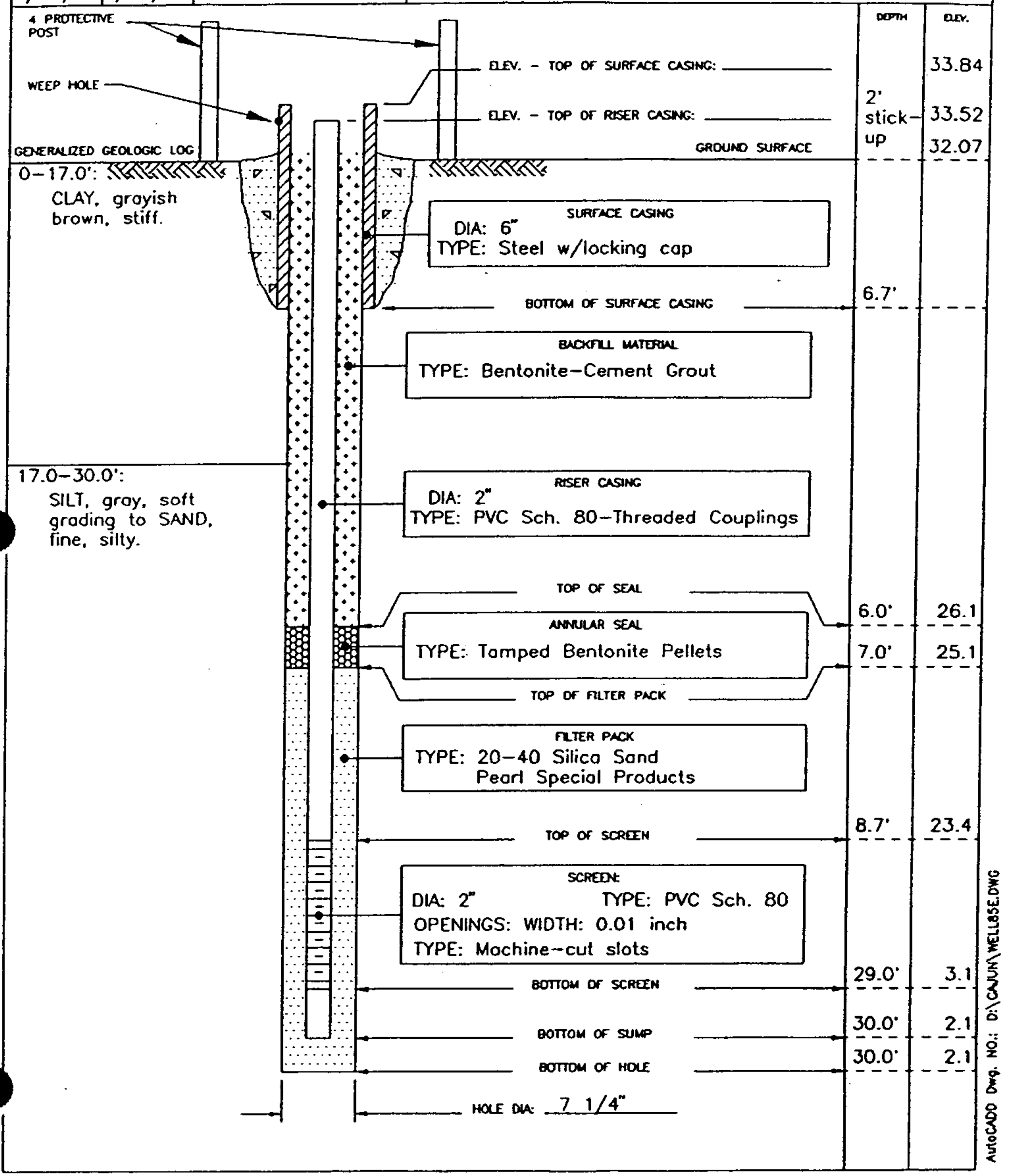
AutoCAD Dwg. NO.: D:\CAJUN\WELL85D.DWG

OBSERVATION WELL

PROJECT	WELL NO.
CEPCO – BIG CAJUN II	85E

JOB NO.	SITE	COORDINATES
14630	South Bottom Ash Pond	E 6550, N 3245

BEGUN	COMPLETED	PREPARED BY	REFERENCE POINT FOR MEASUREMENTS
6/19/85	6/19/85	D. R. Beissel	Top of PVC



LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	100
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	8 Apr. 1977
		TECHNICIAN	MJK

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0

Soft tan and gray clay with traces of silt and grass roots

Soft tan and gray clay

5

Soft tan and gray slightly silty clay with silt pockets and one ½ inch layer of silt

Soft tan and gray silty clay with 2 inches of clayey silt layers

Soft tan and gray silty clay with 2 inches of clayey silt layers

Loose tan and gray clay with clay streaks

10

Boring 101

Boring Depth 10 feet

0

Soft tan and gray clay with traces of silt and grass roots

Medium tan and gray clay

Medium tan and gray clay with silt pockets

5

Loose tan and gray slightly clayey silt with clay pockets

Loose tan silt with clay traces

10

Loose tan silt with clay traces

Boring 102

Boring Depth 10 feet

0

Soft tan and gray clay with traces of grass roots

Soft tan and gray slightly silty clay

5

Very loose tan and gray clayey silt

Loose tan silt with traces of sand and clay

10

Loose tan silt with clay pockets

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	109
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	8 Apr. 1977
		TECHNICIAN	MJK

DEPTH FEET | SAMPLES | ■ UNDISTURBED SAMPLE | ☒ STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0

Soft tan and gray clay with traces of grass roots

Soft tan and gray clay

5

Soft tan and gray clay

Soft tan and gray clay

Loose tan silt with traces of sand and clay

10

Boring 110

Boring Depth 10 feet

0

Soft tan and gray clay with traces of grass roots

Soft tan and gray clay

5

Loose tan and gray very clayey silt

Loose tan and gray very clayey silt

Loose tan and gray very clayey silt

10

0

5

10

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	111
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	11 Apr. 1977
		TECHNICIAN	MJK

DEPTH FEET | SAMPLES | ■ UNDISTURBED SAMPLE | ☒ STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0

Medium tan and gray clay with traces of grass roots
Soft tan and gray very silty clay
Loose tan and gray silt with clay traces

5 Loose tan silt with traces of sand and clay

Loose tan silt with traces of sand and clay

10 Loose tan silt with traces of sand and clay

Boring 112
Boring Depth 10 feet

0

Soft tan and gray clay with silt pockets and traces of grass roots

Soft tan and gray clay

5 Soft tan and gray clay with silt traces

Soft tan and gray slightly silty clay with silt traces
Loose gray slightly clayey silt
10 Soft tan and gray slightly silty clay

Boring 113
Boring Depth 10 feet

0

Medium tan and gray clay with traces of silt and grass roots

Loose tan and gray silt

5 Loose tan and gray clayey silt with clay traces

Loose tan and gray clayey silt with clay traces

Loose tan silt with sand traces

10

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. Plant No. 2 New Roads, Louisiana	BORING	114
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	11 April 1977
		TECHNICIAN	MJK

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0

Soft tan and gray clay with silt traces and grass roots

Soft tan and gray clay

5 Soft tan and gray slightly silty clay with silt pockets

Loose tan and gray slightly clayey silt with 1" clay layer

Loose tan and gray silt with clay streaks

10

Boring 115
Boring Depth 10 feet

0 Medium tan and gray clay with traces silt and grass roots

Soft tan and gray slightly silty clay with silt pockets

5 Loose tan silt with 4" top layer silty clay

Loose tan and gray slightly clayey silt

Loose tan silt with clay traces

10

Boring 116
Boring Depth 10 feet

0 Soft tan and gray clay with silt streaks and traces grass roots

Soft tan and gray clay

5 Loose tan silt with clay traces
Soft tan and gray clay with silt pockets
Soft tan and gray silty clay with 3" bottom layer silt

Soft tan and gray clay with silt pockets

10

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.

Geotechnical Engineers

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. Plant No. 2 New Roads, Louisiana	BORING	117
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc. Burns and Roe, Inc.	DATE	11 April 1977
		TECHNICIAN	MJK

DEPTH FEET | SAMPLES | ■ UNDISTURBED SAMPLE | ☒ STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0

Medium tan and gray clay with traces grass roots

Soft tan and gray slightly silty clay

5

Loose tan and gray slightly clayey silt

Loose tan and gray slightly clayey silt

Loose tan silt with traces sand

Soft tan and gray very silty clay with silt pockets

10

Boring 118
Boring Depth 10 feet

0

Medium tan and gray clay with traces silt and grass roots

Medium tan and gray clay with silt traces

Soft tan and gray clay

5

Loose tan slightly clayey silt

Soft tan and gray slightly silty clay with silt streaks

Soft tan and gray slightly silty clay with silt stresks

10

Boring 119
Boring Depth 10 feet

0

Soft tan and gray clay with silt streaks and traces grass roots

Soft tan and gray clay

Soft tan and gray clay with silt streaks

5

Soft tan and gray slightly silty clay with silt pockets

Loose tan and gray slightly clayey silt with clay streaks

10

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING NO.	103
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	8 Apr. 1977
		TECHNICIAN	MJK

DEPTH FEET | SAMPLES | ■ UNDISTURBED SAMPLE | ☒ STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0
Soft tan and gray clay with 2 inch top layer of brown silt and grass roots

Soft tan and gray clay with silt traces

Soft tan and gray silty clay

5
Soft tan and gray very silty clay with silt streaks

Soft tan and gray clay with silt traces

Soft tan and gray clay with silt pockets, streaks and 1 inch layer

10

Boring 104

Boring Depth 10 feet

0

Soft tan and gray clay with grass root traces

Soft tan and gray clay

5
Medium tan and gray clay with silt traces

Soft tan and gray clay with 1½ inch of very silty clay layers

Soft tan and gray clay with silt pockets

10

Boring 105

Boring Depth 10 feet

0

Soft tan and gray clay with traces of grass roots

Soft tan and gray clay

5
Soft tan and gray clay with silt pockets

Loose tan and gray silt

Loose tan and gray silt

10

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	106
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	8 Apr. 1977
		TECHNICIAN	MJK

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0

Medium tan and gray clay with traces of silt and grass roots

Soft tan and gray slightly silty clay with silt pockets

5 Top 4 inch soft tan and gray silty clay, middle 6 inches of loose tan and and gray clayey silt, bottom 12 inches loose tan and gray silt

Soft tan and gray silty clay

Loose tan silt with clay traces

Loose tan silt with clay traces

Soft tan and gray clay with silt traces

10

Boring 107

Boring Depth 10 feet

0

Medium tan and gray clay with traces of grass roots

Soft tan and gray clay with silt traces

5 Soft tan and gray clay with silt traces

Loose tan and gray slightly clayey silt with clay streaks

Very soft gray very silty clay

10

Boring 108

Boring Depth 10 feet

0

Soft tan and gray clay with traces of grass roots

Soft tan and gray clay

5 Soft tan and gray clay

Loose tan and gray silt

Loose tan and gray silt

Loose tan and gray silt with sand traces

10

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.

Geotechnical Engineers

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. Plant No. 2 New Roads, Louisiana	BORING	120
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	12 April 1977
		TECHNICIAN	MJK

DEPTH FEET | SAMPLES | ■ UNDISTURBED SAMPLE | ☒ STANDARD PENETRATION TEST | BORING DEPTH 10 feet

DEPTH FEET	
0	Soft tan and gray clay with traces silt and grass roots
	Soft tan and gray clay with silt pockets
5	Loose tan and gray silt with traces sand and clay
	Loose tan and gray silt with traces sand and clay
	Loose tan and gray silt with traces sand and clay
10	

Boring 121
Boring Depth 10 feet

DEPTH FEET	
0	Soft tan and gray clay with traces silt and grass roots
	Soft tan and gray clay
5	Soft tan and gray clay with silt pockets
	Loose tan and gray slightly clayey silt
	Loose tan and gray slightly clayey silt
10	

Boring 122
Boring Depth 10 feet

DEPTH FEET	
0	Soft tan and gray clay with traces silt and grass roots
	Soft tan and gray clay with silt pockets
5	Soft tan and gray slightly silty clay with silt pockets
	Soft tan and gray clay with silt pockets
	Soft tan and gray clay with silt pockets
	Loose tan and gray clayey silt
10	

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.

LOG OF BORING

PROJECT: Cajun Electric Power Cooperative, Inc. Plant No. 2
New Roads, Louisiana

FOR: Cajun Electric Power Cooperative, Inc.
Bovay Engineers, Inc., Burns and Roe, Inc.

BORING 123
FILE 74-30
DATE 13 April 1977
TECHNICIAN MJK

DEPTH FEET | SAMPLES | ■ UNDISTURBED SAMPLE | ☒ STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0
Medium tan and gray clay with traces grass roots
Soft tan and gray clay with silt pockets and traces organic matter
5
Soft tan and gray slightly silty clay
Loose tan and gray clayey silt
Soft tan and gray silty clay with silt streaks
Loose tan silt with some sand
10

Boring 124
Boring Depth 10 feet

0
Soft tan and gray clay with traces grass roots
Soft tan and gray clay with traces organic matter
Medium tan and gray clay
5
Medium tan and gray clay
Soft tan and gray clay with silt pockets
10

Boring 125
Boring Depth 10 feet

0
Stiff tan and gray clay with traces grass roots
Soft tan and gray clay
5
Soft tan and gray clay with silt pockets
Soft tan and gray clay with silt pockets and streaks
Soft tan and gray clay with silt pockets and streaks
10

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. Plant No. 2 New Roads, Louisiana	BORING NO.	126
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	14 April 1977
		TECHNICIAN	MJK

UNDISTURBED SAMPLE ☒ STANDARD PENETRATION TEST BORING DEPTH 10 feet

DEPTH FEET	SAMPLES	
0	■	Medium tan and gray clay with traces grass roots
	■	Soft tan and gray clay
5	■	Soft tan and gray clay with silt pockets and streaks
	■	Soft tan and gray clay with silt pockets and streaks
10	■	Medium tan and gray clay with silt streaks and pockets

Boring 127
Boring Depth 10 feet

DEPTH FEET	SAMPLES	
0	■	Stiff gray clay
	■	Stiff gray clay
5	■	Stiff gray clay
	■	Stiff gray clay
10	■	Stiff gray clay

Boring 128
Boring Depth 10 feet

DEPTH FEET	SAMPLES	
0	■	Stiff gray clay
	■	Stiff gray clay
5	■	Soft gray slightly silty clay
	■	Soft gray clay with silt traces
10	■	Loose gray slightly clayey silt with ½ inch clay layer

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. Plant No. 2 New Roads, Louisiana
BORING	129
FILE	74-30
DATE	14 April 1977
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.
TECHNICIAN	MJK

UNDISTURBED SAMPLE — STANDARD PENETRATION TEST — BORING DEPTH 10 feet

DEPTH FEET	Description
0	
	Stiff gray clay
	Stiff gray clay
5	Soft gray very silty clay with silt traces
	Loose gray silt
10	Soft gray silty clay

Boring 130
Boring Depth 10 feet

DEPTH FEET	Description
0	
	Stiff gray clay
	Stiff gray clay with silt traces
5	Soft gray very silty clay
	Very loose gray silt with clay traces
10	Very loose gray silt with clay traces

Boring 131
Boring Depth 10 feet

DEPTH FEET	Description
0	
	Stiff gray clay
	Stiff gray clay
5	Stiff gray clay
	Soft gray silty clay
10	Loose gray clayey silt

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. Plant No. 2 New Roads, Louisiana	BORING	132
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	16 May 1977
		TECHNICIAN	CCN

DEPTH FEET | SAMPLES | ■ UNDISTURBED SAMPLE | ☒ STANDARD PENETRATION TEST | BORING DEPTH 10 feet

Depth (feet)	Description
0	
	Medium gray clay
	Medium gray clay
5	Medium gray clay
	Medium gray clay
	Medium gray clay
10	

Boring 133
Boring Depth 10 feet

Depth (feet)	Description
0	
	Stiff gray clay
	Medium gray clay with silt traces
5	Medium gray clay with silt traces
	Medium gray clay with silt traces
	Medium gray very silty clay with silt pockets
10	

Boring 134
Boring Depth 10 feet

Depth (feet)	Description
0	
	Medium gray clay
	Medium gray clay
5	Medium gray very silty clay
	Medium gray slightly silty clay
10	Medium gray silty clay with silt streaks

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. Plant No. 2 New Roads, Louisiana	BORING	135
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	13 May 1977
		TECHNICIAN	CCN

UNDISTURBED SAMPLE — STANDARD PENETRATION TEST — BORING DEPTH 10 feet

DEPTH FEET	DESCRIPTION
0	Stiff gray clay
	Stiff gray clay
5	Very loose gray clay with 6 inch clay layer
	Very loose gray silt
10	Very loose gray clayey silt with sand traces

Boring 136
Boring Depth 10 feet

DEPTH FEET	DESCRIPTION
0	Medium gray clay
	Medium gray clay
5	Very loose gray slightly clayey silt with sand traces
	Very loose gray slightly clayey sandy silt
10	Very loose gray clayey silt

Boring 137
Boring Depth 10 feet

DEPTH FEET	DESCRIPTION
0	Medium tan and gray clay with silt pockets and traces grass roots and wood
	Soft tan and gray slightly silty clay with silt traces
5	Soft tan and gray very silty clay
	Loose tan silt with sand traces
10	Loose tan silt with sand traces

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. Plant No. 2 New Roads, Louisiana	BORING	138
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	12 Apr. 1977
		TECHNICIAN	MJK

DEPTH FEET | SAMPLES | ■ UNDISTURBED SAMPLE | ☒ STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0

Medium tan and gray clay with traces silt and grass roots

Loose tan and gray silt with clay pockets

5 Loose tan silt with traces sand and clay

Loose tan silt with traces sand and clay

Loose tan silt with traces sand and clay

10

Boring 139
Boring Depth 10 feet

0 Soft tan and gray clay with traces grass roots and silt streaks

Soft tan and gray clay

5 Soft tan and gray silty clay

Loose tan and gray very clayey silt
Soft tan and gray clay with silt traces
Soft tan and gray slightly silty clay

10

Boring 140
Boring Depth 10 feet

0

Medium tan and gray clay with traces grass roots, silt and organic matter

Soft tan and gray clay

5 Soft tan and gray slightly silty clay with silt streaks
Soft tan and gray slightly silty clay with silt streaks
Soft tan and gray silty clay with silt streaks
Loose tan silt with some clay
Loose tan and gray clayey silt

10

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. Plant No. 2 New Roads, Louisiana	BORING	141
		FILE	74-30
		DATE	13 Apr. 1977
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc. Burns and Roe, Inc.	TECHNICIAN	MJK

DEPTH FEET | SAMPLES

UNDISTURBED SAMPLE — STANDARD PENETRATION TEST — BORING DEPTH 10 feet

0
Medium tan and gray clay with traces grass roots

Medium tan and gray clay with silt pockets

5
Loose tan and gray slightly clayey silt

Loose tan and gray slightly clayey silt

Soft tan and gray very silty clay
Loose tan silt with sand traces
10

Boring 142
Boring Depth 10 feet

0
Medium tan and gray clay with traces grass roots

Soft tan and gray clay with silt pockets

5
Loose tan and gray slightly clayey silt

Loose tan and gray slightly clayey silt

Loose tan silt with sand and clay traces
10

Boring 143
Boring Depth 10 feet

0
Soft tan and gray clay with traces silt and grass roots

Soft tan and gray clay

5
Soft tan and gray silty clay with silt streaks

Soft tan and gray clay

Soft tan and gray silty clay with silt pockets
10

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. Plant No. 2 New Roads, Louisiana	BORING	144
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc. Burns and Roe, Inc.	DATE	11 April 1977
		TECHNICIAN	MJK

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0

Medium brown, tan and light gray clay with traces grass roots and silt pockets

Soft tan and gray clay with silt streaks

5

Soft tan and gray slightly clayey silt with clay streaks

Soft tan and gray very silty clay with 4" clayey silt layer

Soft tan and gray silty clay with silt pockets and streaks

10

Boring 145
Boring Depth 10 feet

0

Soft tan and gray clay with traces grass roots

Soft tan and gray clay

5

Soft tan and gray clay

Soft tan and gray clay with silt pockets and streaks

Soft tan and gray clay with silt pockets and streaks

10

Boring 146
Boring Depth 10 feet

0

Stiff gray clay

Soft gray silty clay

5

Loose gray silt

Loose gray silt

Loose gray silt

10

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. Plant No. 2 New Roads, Louisiana
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.
BORING	147
FILE	74-30
DATE	14 April 1977
TECHNICIAN	MJK

DEPTH FEET | SAMPLES | ■ UNDISTURBED SAMPLE | ☒ STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0	Stiff gray clay
	Stiff gray clay
5	Soft gray very silty clay
	Loose gray slightly clayey silt
10	Loose gray silt with clay layers

Boring 148
Boring Depth 10 feet

0	Stiff gray clay
	Stiff gray clay
5	Soft gray clay with silt traces
	Soft gray silty clay
10	Soft gray slightly silty clay with silt layers

Boring 149
Boring Depth 10 feet

0	Stiff gray clay with silt lenses
	Soft gray silty clay
5	Loose gray silt
	Loose gray silt with 2 inch clay layer
10	Loose gray silt with clay traces

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LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. Plant No. 2 New Roads, Louisiana	BORING	150
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	13 May 1977
		TECHNICIAN	MJK

DEPTH FEET | SAMPLES | ■ UNDISTURBED SAMPLE | ☒ STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0
Stiff brown and gray clay
Stiff brown and gray clay
5
Medium gray clay
Loose gray slightly clayey silt
Loose gray silt with clay traces
10

Boring 151
Boring Depth 10 feet

0
Medium gray clay
Stiff gray clay
5
Stiff gray clay
Stiff gray clay
Stiff gray clay
10

Boring 152
Boring Depth 10 feet

0
Medium gray clay
Medium gray and tan clay
5
Medium gray clay
Very loose gray slightly clayey silt with 3 inches of clay layers
Very loose gray very silty clay
10

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LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. Plant No. 2 New Roads, Louisiana	BORING	153
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	16 May 1977
		TECHNICIAN	CCH

DEPTH FEET | SAMPLES — UNDISTURBED SAMPLE — STANDARD PENETRATION TEST — BORING DEPTH 10 feet

0
Medium gray clay
Medium gray clay
5
Medium gray clay with silt traces
Soft gray very silty clay
10
Soft gray slightly silty clay

Boring 154
Boring Depth 10 feet

0
Stiff gray clay
Medium gray clay
5
Medium gray clay
Medium gray slightly silty clay
Loose gray slightly clayey silt
10

Boring 155
Boring Depth 10 feet

0
Stiff gray clay
Medium gray clay
5
Very loose gray clayey silt
Very loose gray clayey silt with clay traces
Very loose gray silt with clay traces
10

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LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. Plant No. 2 New Roads, Louisiana	BORING	156
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	11 Apr. 1977
		TECHNICIAN	MJK

DEPTH FEET | SAMPLES | ■ UNDISTURBED SAMPLE | ⊠ STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0

Medium tan and gray clay with silt pockets and traces grass roots

Soft tan and gray slightly silty clay with silt pockets
Soft tan and gray silty clay
5 Loose tan and gray slightly clayey silt

Loose tan and gray slightly clayey silt

Loose tan silt with clay and sand traces

10

Boring 157
Boring Depth 10 feet

0

Soft tan and gray clay with traces silt and grass roots

Soft tan and gray clay

5 Soft tan and gray clay with silt pockets

Loose tan and gray slightly clayey silt

Loose tan and gray silt with traces sand and clay

10

Boring 158
Boring Depth 10 feet

0

Soft tan and gray clay with silt and grass root traces
Soft tan and gray silty clay

5 Loose tan slightly clayey silt with sand traces

Loose tan slightly clayey silt with sand traces

Loose tan slightly clayey silt with sand traces

10

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LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. Plant No. 2 New Roads, Louisiana	BORING	159
		FILE	74-30
		DATE	11 April 1977
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	TECHNICIAN	MJK

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 10 feet

DEPTH FEET	DESCRIPTION
0	Medium tan and gray clay with silt and grass root traces
	Soft tan and gray clay with silt pockets
5	Soft tan and gray clay with silt pockets
	Loose tan and gray slightly clayey silt
	Soft tan and gray slightly silty clay with silt traces
10	

Boring 160
Boring Depth 10 feet

DEPTH FEET	DESCRIPTION
0	Medium tan and gray clay with traces silt and grass roots
	Soft tan and gray clay with silt traces
5	Soft tan and gray clay
	Soft tan and gray clay with silt pockets and streaks
	Soft tan and gray clay with silt pockets and streaks
10	

Boring 161
Boring Depth 10 feet

DEPTH FEET	DESCRIPTION
0	Medium tan and gray clay with traces grass roots
	Soft tan and gray clay with silt pockets
5	Soft tan and gray silty clay with silt pockets
	Loose tan and gray very clayey silt
	Loose tan and gray clayey silt
10	

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. Plant No. 2 New Roads, Louisiana
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.
BORING	162
FILE	74-30
DATE	13 April 1977
TECHNICIAN	MJK

UNDISTURBED SAMPLE ■ STANDARD PENETRATION TEST ☒ BORING DEPTH 10 feet

DEPTH FEET / SAMPLES

Depth	Description
0	Soft tan and gray clay with traces silt and grass roots
	Soft tan and gray clay
	Loose tan and gray silt
5	Soft tan and gray silty clay with silt pockets
	Loose tan and gray clayey silt
	Loose tan and gray clayey silt
10	Soft tan and gray clay with silt streaks

Boring 163
Boring Depth 10 feet

Depth	Description
0	Stiff tan and gray clay with silt streaks and traces grass roots
	Firm tan silt with clay and sand traces
5	Firm tan silt with clay and sand traces
	Firm tan silt with clay and sand traces
	Firm tan silt with clay and sand traces
10	

Boring 164
Boring Depth 10 feet

Depth	Description
0	Medium tan and gray clay with silt and grass root traces
	Soft tan and gray clay
5	Soft tan and gray slightly silty clay with silt pockets and streaks
	Soft tan and gray clay
	Soft tan and gray clay
10	

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. Plant No. 2 New Roads, Louisiana	BORING	165
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	14 Apr. 1977
		TECHNICIAN	MJK

DEPTH FEET — SAMPLES — ■ UNDISTURBED SAMPLE — ☒ STANDARD PENETRATION TEST — BORING DEPTH 10 feet

0
Soft tan and gray clay with traces silt and grass roots

Soft tan and gray clay

5
Soft tan and gray slightly silty clay with silt pockets and streaks

Loose tan and gray clayey silt

Soft tan and gray clay with silt pockets and streaks

10

Boring 166
Boring Depth 10 feet

0
Stiff dark gray clay

Stiff gray clay

5
Stiff gray clay

Medium gray clay with silt traces

Medium gray clay with silt traces

10

Boring 167
Boring Depth 10 feet

0
Stiff gray clay

Stiff gray clay

5
Medium gray clay with silt pockets

Medium gray clay with silt lenses and silt pockets

Medium gray clay

10

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	168
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	19 May 1977
		TECHNICIAN	CCN

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0

Stiff gray clay

Stiff gray clay

5

Stiff gray clay with silt traces

Stiff gray clay

Medium gray clay with silt lenses

10

Boring 169
Boring Depth 10 feet

0

Soft tan and gray clay with traces grass roots and other organic matter

Soft tan and gray clay with traces organic matter

5

Soft tan and gray clay with silt pockets

Soft tan and gray clay with silt pockets

Loose tan and gray silt with clay pockets and traces sand

10

Boring 170
Boring Depth 10 feet

0

Stiff gray clay

Medium gray clay with silt streaks and lenses

5

Soft gray slightly silty clay

Loose gray silt

Soft gray silty clay

10

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LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	171
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	19 May 1977
		TECHNICIAN	CCN

DEPTH FEET | SAMPLES | ■ UNDISTURBED SAMPLE | ☒ STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0
Stiff gray clay
Stiff gray clay
5
Soft gray slightly silty clay
Soft gray clay with silt traces
Soft gray slightly silty clay
10

Boring 172
Boring Depth 10 feet

0
Stiff gray clay
Stiff gray clay
5
Stiff gray slightly silty clay with silt traces
Soft gray clay with silt traces
Soft gray clay with silt traces
10

Boring 173
Boring Depth 10 feet

0
Stiff gray clay
Medium gray silty clay
5
Medium gray clay with silt traces and 1 inch clayey silt layers
Very loose gray silt with clay traces
Very loose gray clayey silt
10

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LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	174
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	14 April 1977
		TECHNICIAN	MJK

DEPTH FEET | SAMPLES | ■ UNDISTURBED SAMPLE | ☒ STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0
Medium gray clay
Medium gray clay
5
Medium gray clay
Medium gray clay
Medium gray clay with silt traces
10

Boring 175
Boring Depth 10 feet

0
Medium gray clay
Medium gray clay
5
Loose gray slightly clayey sand with clay traces
Very loose gray clayey silt with clay traces
Very loose gray clayey silt
10

Boring 176
Boring Depth 10 feet

0
Very stiff tan and gray clay with roots and organic traces
Stiff tan and gray slightly silty clay with organic traces
5
Loose tan and gray slightly clayey silt with organic traces
Loose tan and gray silt with clay traces
Loose tan silt with sand traces
10

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LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	177
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	16 June 1977
		TECHNICIAN	CCN

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 10 feet

DEPTH FEET	DESCRIPTION
0	Stiff tan and gray clay with silt lenses and roots
	Loose tan and gray silt with roots
5	Loose tan and gray silt
	Medium tan and gray slightly silty clay with organic traces
	Soft tan and gray silty clay with organic traces
10	

Boring 178
Boring Depth 10 feet

DEPTH FEET	DESCRIPTION
0	Stiff tan and gray clay with traces silt and roots
	Soft tan and gray clay with traces silt
5	Soft tan and gray slightly silty clay
	Loose tan and gray slightly clayey silt
	Loose tan silt with some sand and traces clay
10	

Boring 179
Boring Depth 10 feet

DEPTH FEET	DESCRIPTION
0	Soft gray clay with traces of grass roots
	Soft tan and gray clay with silt pockets
5	Loose tan and gray silt with clay and sand traces
	Loose tan and gray silt with clay and sand traces
	Loose tan and gray silt with clay and sand traces
10	

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	180
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	12 April 1977
		TECHNICIAN	MJK

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0

Medium tan and gray clay with traces grass roots, silt and organic matter

Soft tan and gray clay with silt pockets

5

Soft tan and gray very silty clay with silt pockets

Loose tan and gray very clayey silt

Loose tan and gray silt with sand and clay traces

10

Boring 181
Boring Depths 10 feet

0

Soft tan and gray clay with traces grass roots

Soft tan and gray clay

5

Soft tan and gray clay with silt pockets and clayey silt streaks

Soft tan and gray clay with silt pockets

Loose tan silt with 4" top clay layer

10

Boring 182
Boring Depth 10 feet

0

Medium tan and gray clay with traces silt and grass roots

Soft tan and gray clay

5

Soft tan and gray slightly silty clay with silt streaks

Soft tan and gray clay with silt pockets and streaks

Loose tan silt with clay pockets and traces of sand

10

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LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING NO.	183
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	13 April 1977
		TECHNICIAN	MJK

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0
Soft tan and gray clay with traces grass roots
Soft tan and gray clay with traces silt
5 Soft tan and gray slightly silty clay with silt pockets and streaks
Soft tan and gray clay
Loose tan and gray very clayey silt
10

Boring 184
Boring Depth 10 feet

0
Medium tan and gray clay with traces grass roots
Soft tan and gray clay
5 Loose tan and gray silt
Loose tan and gray silt
Soft tan and gray silty clay with silt pockets
Loose tan silt with traces clay and sand
10

Boring 185
Boring Depth 10 feet

0
Loose tan and gray clayey silt with roots
Loose tan and gray very clayey silt
5 Loose tan and gray very clayey silt
Loose tan and gray very clayey silt
Soft tan and gray clay with silt pockets
Soft tan and gray clay with silt pockets
10

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LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	186
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc. Burns and Roe, Inc.	DATE	14 April 1977
		TECHNICIAN	MJK

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0
Medium tan and gray clay with traces grass roots
Soft tan and gray clay
5
Soft tan and gray clay
Loose tan silt with traces sand and 3" silty clay layer
Loose tan silt with traces sand and clay
10

Boring 187
Boring Depth 10 feet

0
Medium tan and gray clay with traces grass roots and silt pockets
Soft tan and gray clay with silt pockets
5
Soft tan and gray clay with silt streaks
Loose tan silt with traces clay and sand
Loose tan silt with traces clay and sand
10

Boring 188
Boring Depth 10 feet

0
Medium tan and gray slightly silty clay with silt streaks
Soft tan and gray clay with silt pockets and peat pocket
5
Soft gray clay with wood
Loose tan and gray slightly clayey silt with sand traces
Loose tan and gray slightly clayey silt with sand traces
10

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LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	189
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	14 April 1977
		TECHNICIAN	MJK

DEPTH FEET | SAMPLES | ■ UNDISTURBED SAMPLE | ⊠ STANDARD PENETRATION TEST | BORING DEPTH 10 feet

Depth (feet)	Description
0	Soft gray clay with silt pockets and traces grass roots
	Soft tan and gray clay with traces organic matter
5	Soft tan and gray clay with silt pockets and 1½" clayey silt layer
	Soft tan and gray clay with silt pockets
	Soft tan and gray very silty clay
10	

Boring 190
Boring Depth 10 feet

Depth (feet)	Description
0	Medium tan and gray clay with traces grass roots
	Soft tan and gray clay
5	Soft tan and gray slightly silty clay with silt pockets
	Soft tan and gray clay with silt pockets and streaks
	Very soft tan and gray clay with silt pockets and streaks
10	

Boring 191
Boring Depth 10 feet

Depth (feet)	Description
0	Medium gray clay
	Medium gray clay
5	Medium gray clay with silt traces
	Loose gray clayey silt
10	Loose gray silt with clay traces

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LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	195
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	13 May 1977
		TECHNICIAN	CCN

DEPTH FEET | SAMPLES | ■ UNDISTURBED SAMPLE | ☒ STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0

Medium gray clay

Medium gray clay

5 Medium gray very silty clay

Very loose gray clayey silt

Very loose gray silt with clay layers

10

Boring 196
Boring Depth 10 feet

0

Stiff gray clay with roots

Stiff tan and gray clay with organic traces

5 Soft tan and gray silty clay with ferrous traces

Very loose tan and gray slightly clayey silt with organic and ferrous traces

Very loose tan and gray slightly clayey silt with ferrous traces

10

Boring 197
Boring Depth 10 feet

0

Stiff tan and gray slightly silty clay with roots

Loose tan and gray clayey silt with roots

5 Very loose tan and gray clayey silt with organic traces

Very loose tan silt

Very loose tan and gray silt with organic traces

10

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	198
	Cajun Electric Power Cooperative, Inc.	FILE	74-30
FOR	Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	16 June 1977
		TECHNICIAN	CCN

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0	Stiff tan and gray clay with organic traces and roots
	Very loose tan and gray silt
5	Very loose tan and gray clayey silt with organic traces
	Very loose tan and gray silt
	Very loose tan and gray silt with clay and sand traces
10	

Boring 199
Boring Depth 10 feet

0	Stiff tan and gray clay with roots
	Medium tan and gray clay with silt lenses and organic traces
5	Firm tan and gray slightly clayey silt with organic traces and roots
	Very loose tan and gray silt
	Very loose tan and gray silt with clay and sand traces and roots
10	

Boring 200
Boring Depth 10 feet

0	Medium gray clay with roots
	Stiff tan and gray clay with silt and organic traces
5	Stiff tan and gray clay with silt and organic traces
	Medium tan and gray clay with silt pockets and organic and ferrous traces
	Soft tan and gray slightly silty clay
10	

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LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	201
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	9 June 1977
		TECHNICIAN	DPS

DEPTH FEET | SAMPLES | ■ UNDISTURBED SAMPLE | ☒ STANDARD PENETRATION TEST | BORING DEPTH 10 feet

Depth	Description
0	Stiff gray clay with ferrous traces
	Medium gray clay with 1 inch tan silt layer on bottom
	Loose gray clayey silt
5	Stiff gray clay
	Loose gray very clayey silt with 2 inch silty clay layer on top
	Loose gray clayey silt with 2 inch clay layer in middle
10	

Boring 202
Boring Depth 10 feet

Depth	Description
0	Stiff gray clay with silt streaks
	Loose gray clayey silt
5	Stiff gray clay with silt lenses
	Soft gray clay with 4 inch loose sand layer
10	Loose gray clayey silt

Boring 203
Boring Depth 10 feet

Depth	Description
0	Medium gray clay
	Medium gray clay
5	Medium gray clay
	Medium gray clay with silt traces
10	Soft tan and gray slightly silty clay - Loose tan and gray slightly silty sand

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LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	204
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	20 May 1977
		TECHNICIAN	CCN

UNDISTURBED SAMPLE ☒ STANDARD PENETRATION TEST BORING DEPTH 10 feet

DEPTH FEET	SAMPLES	
0		Medium gray clay with silt streaks
		Loose gray silt
5		Soft gray slightly silty clay
		Soft gray silty clay
10		Soft gray clay with silt traces

Boring 205
Boring Depth 10 feet

DEPTH FEET	SAMPLES	
0		Medium gray clay
		Medium gray clay
5		Medium gray clay
		Medium gray clay
10		Soft gray clay with silt traces

Boring 206
Boring Depth 10 feet

DEPTH FEET	SAMPLES	
0		Stiff gray clay
		Stiff gray clay with silt traces
5		Medium gray silty clay
		Soft gray slightly silty clay
10		Loose gray silt with sand traces

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	207
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	20 May 1977
		TECHNICIAN	CCN

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0
Stiff gray clay
Medium gray clay
5 Medium gray clay with silt traces
Soft gray clay with silt traces
Medium gray clay with silt traces
10

Boring 208
Boring Depth 10 feet

0
Stiff gray clay
Stiff gray clay with silt traces
5 Soft gray slightly silty clay with 7 inch clay layer with silt pockets
Soft gray clay
Soft gray slightly silty clay
10

Boring 209
Boring Depth 10 feet

0
Stiff gray clay
Stiff gray clay
5 Stiff gray clay with silt lenses
Medium gray clay with silt traces
Soft gray slightly silty clay
10

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	210
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	31 May 1977
		TECHNICIAN	NLT

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0

Stiff brown gray clay

Stiff gray clay

5

Stiff gray clay with silt lenses and pockets

Soft gray silty clay

Soft gray slightly silty clay

10

Boring 211
Boring Depth 10 feet

0

Soft gray clay with organic traces and wood traces

Soft gray clay with organic traces and wood traces

5

Soft gray clay with organic and wood traces

Soft gray clay with organic traces

Soft gray clay with organic traces

10

Boring 212
Boring Depth 10 feet

0

Medium gray clay with root traces

Medium gray slightly silty clay with silt traces

5

Loose gray slightly clayey silt with root traces

Loose light gray silty sand

Loose light gray very clayey silt

10

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.

Geotechnical Engineers

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	213
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc. , Burns and Roe, Inc.	DATE	31 May 1977
		TECHNICIAN	NLT

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0

Soft gray clay with roots

Soft gray clay with organic and wood traces and roots

5 Soft gray clay with silt traces

Loose gray slightly clayey silty sand with organic traces

10 Loose gray clayey silt

Boring 214
Boring Depth 10 feet

0

Medium gray clay with organic traces and roots

Medium tan and gray clay with organic traces

5 Loose light gray clayey silt with organic traces

Loose light gray clayey silt

10 Loose light gray clayey silt

Boring 215
Boring Depth 10 feet

0

Medium gray clay with organic traces and wood traces

Medium gray clay with ferrous traces

5 Medium gray clay with ferrous traces

Soft gray clay with ferrous traces

10 Firm gray clayey silt with 3 inch layer of gray clay at 10 feet

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	216
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	1 June 1977
		TECHNICIAN	NLT

DEPTH FEET | SAMPLE | ■ UNDISTURBED SAMPLE | ☒ STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0
Medium gray clay with silt traces and roots
Medium gray clay with silt traces
5
Medium gray clay with silt traces
Soft gray silty clay
Firm gray silt with 2 inch silty clay layer
10

Boring 217
Boring Depth 10 feet

0
Stiff gray clay with silt traces and roots
Medium gray clay with silt traces and pockets
5
Loose gray clayey silt with clay pockets
Soft gray slightly silty clay
Firm gray slightly clayey silt
10

Boring 218
Boring Depth 10 feet

0
Stiff gray clay with silt traces and roots
Medium gray slightly silty clay with silt traces
5
Medium gray clay with ½ inch silty clay layer
Soft gray slightly silty clay
Medium gray clay
10

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	219
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	1 June 1977
		TECHNICIAN	NLT

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0

Stiff gray clay with silt traces

Medium gray silty clay with silt pockets and wood traces

5

Loose light gray clayey silt

Loose light gray clayey silt

10

Loose light gray silty sand

Boring 220
Boring Depth 10 feet

0

Stiff gray clay with silt traces

Stiff gray clay with silt traces

5

Medium gray clay with silt traces

Soft gray very silty clay

10

Loose gray silt with clay traces

Boring 221
Boring Depth 10 feet

0

Stiff gray clay with silt traces and roots

Stiff gray clay with silt traces

5

Soft gray slightly silty clay

Loose gray sandy silt

10

Loose gray sandy silt

LOUIS J. CAPOZZOLI & ASSOCIATES. INC.

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	222
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	1 June 1977
		TECHNICIAN	NLT

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0
Stiff gray clay
Medium gray very silty clay
5 Medium gray clay
Loose gray silty sand
Loose gray clayey silt with $1\frac{1}{2}$ inch very silty clay layer
10

Boring 223
Boring Depth 10 feet

0
Stiff gray clay with silt traces
Stiff gray clay with silt traces
5 Medium gray clay with silt traces
Medium gray very silty clay
Loose gray silt
10

Boring 224
Boring Depth 10 feet

0
Stiff gray clay with silt traces
Stiff gray clay with silt traces
5 Firm gray clayey silt
Firm gray slightly clayey silt
Firm gray silt
10

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	225
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	2 June 1977
		TECHNICIAN	NLT

DEPTH FEET | SAMPLES | ■ UNDISTURBED SAMPLE | ☒ STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0
Stiff gray clay with silt traces and roots
Stiff gray clay with silt traces and roots
5
Stiff gray clay with silt traces and roots
Medium gray clay with silt traces
Medium gray slightly silty clay
10

Boring 226
Boring Depth 10 feet

0
Stiff gray clay with silt traces
Medium gray clay with silt pockets
5
Firm gray silt with clay layers
Loose gray clayey silt
Firm gray sandy silt
10

Boring 227
Boring Depth 10 feet

0
Stiff gray clay with silt traces and roots
Stiff gray clay with silt traces and roots
5
Soft gray silty clay
Loose brown sandy silt
Loose brown sandy silt
10

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	228
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	2 June 1977
		TECHNICIAN	NLT

DEPTH FEET | SAMPLES | ■ UNDISTURBED SAMPLE | ☒ STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0

Stiff gray clay with silt traces

Medium gray clay with silt traces

5 Soft gray silty clay

Firm gray silty sand

Firm gray silty sand

10

Boring 229
Boring Depth 10 feet

0

Very stiff tan and gray clay with roots

Very stiff tan and gray clay with root traces

5 Medium gray silty clay with silt pockets

Loose tan and gray silt with clay pockets

Very loose tan silt

10

Boring 230
Boring Depth 10 feet

0

Stiff gray clay

Stiff tan and gray clay with wood and root traces

5 Stiff tan and gray clay with large amounts of wood

Medium tan and gray clay with wood traces

Loose gray and light gray clay silt with 2 inch clay layer in middle

10

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING NO.	231
	Cajun Electric Power Cooperative, Inc.	FILE	74-30
FOR	Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	16 June 1977
		TECHNICIAN	CCN

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0
Stiff gray clay with roots

Very stiff tan and gray clay

Medium tan and gray slightly silty clay with silt lenses and silt pockets and 1 inch silt layer in middle

5

Medium tan and gray silty clay with silt lenses and pockets

Medium tan and gray silty clay with silt pockets

10

Boring 232
Boring Depth 10 feet

0
Stiff gray clay with roots and ferrous traces and organic traces

Stiff gray and tan clay with organic and ferrous traces and silt pockets

5
Stiff tan and gray clay with organic and ferrous traces and silt traces

Loose tan and gray slightly clayey silt

Soft tan and gray slightly silty clay with organic traces

10

Boring 233
Boring Depth 10 feet

0
Stiff tan and gray clay with organic traces and roots

Stiff tan and gray clay with silt lenses and organic traces

Medium tan and gray slightly silty clay

5
Soft tan and gray slightly clayey silt with organic traces

Soft tan and gray silty clay

10

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	234
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	16 June 1977
		TECHNICIAN	CCN

DEPTH FEET | SAMPLES | ■ UNDISTURBED SAMPLE | ☒ STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0

Stiff tan and gray clay with roots

Stiff gray clay with silt lenses and roots

5

Loose tan and gray clayey silt with organic traces

Very loose brown and gray slightly clayey silt

Very loose brown silt with clay traces

10

Boring 235
Boring Depth 10 feet

0

Stiff gray clay with root traces

Stiff tan and gray clay

5

Stiff tan and gray clay with silt traces

Medium tan and gray clay

Medium tan and gray slightly silty clay with silt lenses and silt pockets

10

Boring 236
Boring Depth 10 feet

0

Very stiff gray clay with roots

Very stiff tan and gray clay

Loose tan and gray slightly clayey silt with 3 inch silt layer on bottom

5

Medium tan and gray silty clay with silt pockets and lenses

Loose tan and gray slightly clayey silt with clay pockets and lenses and 2½ inch clay layer on bottom

10

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	237
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	22 June 1977
		TECHNICIAN	DPS

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0

Stiff tan and gray clay with root traces

Stiff tan and gray clay

5

Medium tan and gray silty clay with silt lenses and pockets

Soft tan and gray silty clay with silt lenses and pockets

Medium tan and gray silty clay with silt pockets

10

Boring 238
Boring Depth 10 feet

0

Stiff tan and gray clay with root traces

Medium tan and gray slightly silty clay with silt traces

5

Medium tan and gray slightly silty clay with silt pockets

Soft tan and gray slightly silty clay with silt pockets

Loose tan and gray clayey silt with clay pockets

10

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	239
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	June 14
		TECHNICIAN	ccn

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0

Stiff tan and gray clay

Medium tan and gray silty clay with silt pockets

5

Medium tan and gray clay with silt pockets

Loose tan and gray slightly clayey silt with sand traces
Loose tan clayey silt
Medium tan and gray slightly silty clay

10

Boring 240
Boring Depth 10 feet

0

Stiff tan and gray clay

Medium tan and gray clay with silt lenses and 2 inch silt layer

5

Loose tan and gray silt

Loose tan and gray silt with clay traces

Loost tan and gray sandy silt

10

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	241
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	29 June 1977
		TECHNICIAN	CCN

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0
Stiff tan and gray clay

Medium tan and gray clay with wilt traces

5
Loose tan and gray slightly clayey silt

Loose tan and gray slightly clayey silt with sand traces

Very loose tan silt

Soft tan and gray very silty clay with silt pockets

10

Boring 242
Boring Depth 10 feet

0
Stiff tan and dark gray slightly silty clay with roots and organic matter

Loose tan and gray silt with organic matter and 3 inch dry crusty organic clay on top

Medium tan and gray clay with silt pockets

5
Soft gray slightly silty clay with silt pockets and 2 inch layers in middle

Very loose tan and gray silt

Loose gray clayey silt with clay pockets

10

Boring 243
Boring Depth 10 feet

0
Soft gray clay with organic traces

Medium gray clay with organic traces

5
Medium gray clay with organic traces

Medium gray clay

Medium gray clay

10

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	244
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	29 June 1977
		TECHNICIAN	CCN

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0
Stiff tan and gray clay with roots
Stiff gray clay with silt pockets
5
Loose tan and gray slightly clayey silt with clay pockets
Loose tan and gray silt with sand traces
Loose tan and gray silt with sand traces
10

Boring 245
Boring Depth 10 feet

0
Stiff tan and gray clay with roots
Stiff tan and gray slightly silty clay with silt pockets
5
Medium tan and gray very silty clay with silt pockets
Loose tan and gray slightly clayey silt with clay pockets
Very loose tan and gray dry silt
10

Boring 246
Boring Depth 10 feet

0
Stiff gray clay with large roots
Medium tan and gray silty clay with silt pockets
5
Medium tan and gray clay
Medium tan and gray slightly silty clay
Medium tan and gray clay
10

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	247
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	26 June 1977
		TECHNICIAN	CCN

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 70 feet

0
Stiff tan and gray clay with roots
Loose tan and gray dry clayey silt
5
Medium tan and gray silty clay with clay pockets
Loose tan and gray clayey silt with clay traces
Loose tan and gray clayey silt with clay pockets
10

Boring 248
Boring Depth 10 feet

0
Stiff gray silty clay with silt and sand layers and streaks
Stiff gray clay with silt pockets
Loose gray silt with clay pockets
5
Loose gray silt with clay traces
Loose gray clayey silt with clay and sand traces
10

Boring 249
Boring Depth 10 feet

0
Stiff tan and gray clay with roots
Stiff tan and gray clay with silt traces and 1 inch silt layer on bottom
Medium tan and gray clay with silt pockets
5
Soft silty clay with silt pockets
Soft very silty clay with silt pockets
10

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	Boring	250
		File	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	Date	16 June 1977
		Technician	CCN

DEPTH FEET — SAMPLES — UNDISTURBED SAMPLE — STANDARD PENETRATION TEST — BORING DEPTH 10 feet

Stiff tan and gray clay with organic traces and roots

Stiff tan and gray clay with organic traces

Stiff tan and gray silty clay with organic traces

Loose tan and gray silt

Loose tan and gray silt with clay and organic traces

Boring 251
Boring Depth 10 feet

Stiff tan and gray clay with roots

Stiff tan and gray clay with organic and silt traces

Loose tan and gray silt with organic traces

Soft tan and gray slightly silty clay with ferrous traces

Loose tan and gray silt

Boring 252
Boring Depth 10 feet

Stiff brown and gray clay with roots

Stiff tan and gray clay with silt pockets

Stiff tan and gray clay with silt and organic traces

Medium tan and gray clay with silt, ferrous, and organic traces

Soft tan and gray slightly silty clay with ferrous traces

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.

BORING 253
FILE 74-30
DATE 15 June 1977
TECHNICIAN CCN

DEPTH FEET | SAMPLES | ■ UNDISTURBED SAMPLE | ☒ STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0
Stiff tan and gray clay with roots

Stiff tan and gray clay with silt and sand traces and silt lenses and organic traces

5
Loose tan and gray slightly clayey silt

Soft tan and gray silty clay

10
Soft tan and gray silty clay with organic traces

Boring 254
Boring Depth 10 feet

0
Stiff tan and gray clay with roots

Stiff tan and gray clay with organic traces and silt lenses

5
Medium tan and gray clay with silt pockets and organic traces

Loose tan and gray silt with organic traces

10
Loose tan and gray silt

Boring 255
Borind Depth 10 feet

0
Stiff tan and gray clay with roots

Stiff tan and gray clay with organic traces

5
Stiff tan and gray clay with silt and organic traces

Stiff tan and gray clay with silt traces and organic traces

10
Soft slightly silty clay with organic and ferrous traces

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	256
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	15 June 1977
		TECHNICIAN	CCN

UNDISTURBED SAMPLE   STANDARD PENETRATION TEST   BORING DEPTH 10 feet

DEPTH FEET	
0	Stiff tan and gray clay with roots
	Stiff tan and gray clay with organic traces
5	Stiff tan and gray clay with silt pockets and organic traces
	Stiff tan and gray clay with organic traces
10	Stiff tan and gray clay with silt lenses and ferrous and organic traces

Boring 257
Boring Depth 10 feet

DEPTH FEET	
0	Stiff tan and gray clay with organic traces and roots
	Stiff tan and gray clay with organic traces
5	Stiff tan and gray clay with silt lenses and organic traces
	Loose tan and gray clayey silt with organic traces
10	Soft tan and gray slightly silty clay with organic traces

Boring 258
Boring Depth 10 feet

DEPTH FEET	
0	Stiff tan and gray clay with organic and root traces
	Stiff tan and gray clay with organic traces
5	Stiff tan and gray clay with silt lenses and organic traces
	Soft tan and gray slightly silty clay with organic traces
10	Very loose tan and gray silt with organic and clay traces

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	259
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	14 June 1977
		TECHNICIAN	CCN

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0
Stiff tan and gray clay with root traces

Stiff tan and gray clay with root and organic traces and ferrous traces

5
Stiff tan and gray clay with silt lenses and ferrous traces

Medium tan and gray clay with silt and ferrous traces

Soft tan and gray slightly clayey silt with ferrous traces

Stiff tan and gray clay with organic traces
10

Boring 260
Boring Depth 10 feet

0
Stiff tan and gray clay with wood and root traces

Stiff gray clay with silt pockets and traces and organic and ferrous traces

Stiff gray slightly silty clay with organic traces
5

Soft tan and gray clay with silt and organic traces

Loose tan and gray silt with organic traces
10

Boring 261
Boring Depth 10 feet

0
Stiff tan and gray clay with roots and organic traces

Stiff tan and gray clay with ferrous traces

Medium tan and gray clay with silt and sand traces
5

Soft tan and gray slightly silty clay with sand traces and organic traces

Very loose tan silt
10

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Consulting Engineers

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	262
	Cajun Electric Power Cooperative, Inc.	FILE	74-30
FOR	Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	14 June 1977
		TECHNICIAN	CCN

DEPTH FEET | SAMPLES | ■ UNDISTURBED SAMPLE | ☒ STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0

Stiff tan and gray clay with silt pockets and roots

Stiff tan and gray clay with ferrous traces and silt pockets and lenses

5

Medium tan and gray clay with silt traces and ferrous traces and organic traces

Firm tan and gray silt

Soft tan and gray silty clay with 4 inch clay layer and ferrous streaks and organic traces

10

Boring 263

Boring Depth 10 feet

0

Dense tan and gray clayey silt

Stiff tan and gray clay with silt traces

Medium tan and gray clay with silt traces

5

Soft tan and gray clay with silt traces

Medium tan and gray clay with silt traces

10

Boring 264

Boring Depth 10 feet

0

Stiff tan and gray clay

Stiff tan and gray clay

5

Medium tan and gray silty clay with roots

Medium tan and gray slightly silty clay

Medium tan and gray slightly silty clay

10

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	265
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	5 July 1977
		TECHNICIAN	CCN

DEPTH FEET | SAMPLES | ■ UNDISTURBED SAMPLE | ☒ STANDARD PENETRATION TEST | BORING DEPTH 10 feet

Depth (feet)	Description
0	Very stiff tan and gray clay
	Stiff tan and gray clay
5	Firm tan and gray slightly clayey silt
	Soft tan and gray clay with silt traces
10	Medium tan and gray clay

Boring 266
Boring Depth 10 feet

Depth (feet)	Description
0	Very stiff tan and gray clay
	Medium tan and gray silty clay
5	Loose tan and gray silt
	Loose tan and gray silt with clay traces
10	Loose tan silt

Boring 267
Boring Depth 10 feet

Depth (feet)	Description
0	Stiff tan and gray clay with roots
	Stiff tan and gray clay with silt traces
	Medium tan and gray clay with silt pockets and lenses
5	Firm tan and gray silt
	Loose tan and gray silt with clay traces
10	

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

LOG OF BORING

PROJECT: Cajun Electric Power Cooperative, Inc.
New Roads, Louisiana

FOR: Cajun Electric Power Cooperative, Inc.
Bovay Engineers, Inc., Burns and Roe, Inc.

BORING NO. 268
FILE 74-30
DATE 5 July 1977
TECHNICIAN CCN

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0
Very stiff tan and gray clay
Stiff tan and gray slightly silty clay
5
Loose tan and gray slightly clayey silt
Soft tan and gray clay with silt traces
Medium tan and gray clay
10

Boring 269
Boring Depth 10 feet

0
Very stiff tan and gray clay
Firm tan slightly clayey silt
5
Firm tan and gray slightly clayey silt
Stiff tan and gray clay
Loose tan and gray slightly clayey silt
10

Boring 270
Boring Depth 10 feet

0
Stiff tan and gray clay with root traces
Stiff tan and gray silty clay
5
Medium tan and gray slightly silty clay
Firm tan and gray clayey silt
Loose tan and gray silt
10

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	271
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	30 June 1977
		TECHNICIAN	CCN

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0
Very stiff tan and gray clay with organic traces

Stiff tan and gray clay

5 Medium tan and gray slightly silty clay

Loose brown and gray silt

Soft brown and gray silty clay

10

Boring 272
Boring Depth 10 feet

0

Stiff tan and gray clay

Stiff tan and gray clay with organic traces

5 Medium tan and gray clay with organic traces

Medium gray clay

Soft gray clay with silt

10

Boring 273
Boring Depth 10 feet

0

Very stiff tan and gray clay with silt lenses

Soft tan and gray very silty clay

5 Firm tan and gray silt

Loose tan and gray silt with clay traces

Loose tan and gray silt with clay traces

10

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	274
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	30 June 1977
		TECHNICIAN	CCN

UNDISTURBED SAMPLE — STANDARD PENETRATION TEST — BORING DEPTH 10 feet

DEPTH FEET / SAMPLES

0

Stiff dark gray clay with roots

Very stiff tan and gray clay

5

Stiff tan and gray clay

Stiff tan and gray clay

Medium gray clay with silt traces

10

Boring 275

Boring Depth 10 feet

0

Medium gray clay

Stiff gray clay with organic traces

Stiff gray clay

5

Medium gray clay

Stiff gray clay

10

Boring 276

Boring Depth 10 feet

0

Stiff tan and gray clay

Stiff gray clay

5

Soft gray clay with organic and silt traces

Loose gray silt

Soft gray silty clay

10

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.

Geotechnical Engineers

LOG OF BORING

PROJECT: Cajun Electric Power Cooperative, Inc.
New Roads, Louisiana

FOR: Cajun Electric Power Cooperative, Inc.
Bovay Engineers, Inc., Burns and Roe, Inc.

BORING: 277
FILE: 74-30
DATE: 30 June 1977
TECHNICIAN: CCH

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 10 feet

Depth (feet)	Description
0	Stiff tan and gray clay
	Stiff tan and gray clay with silt traces
5	Soft tan and gray very silty clay
	Loose tan and gray slightly clayey silt
10	Soft tan and gray silty clay

Boring 278
Boring Depth 10 feet

Depth (feet)	Description
0	Very stiff tan and gray clay
	Stiff tan and gray clay with silt traces
5	Stiff gray clay
	Loose gray silt
10	Soft gray clay with silt traces

Boring 279
Boring Depth 10 feet

Depth (feet)	Description
0	Stiff tan and gray clay
	Medium tan and gray clay with silt and wood traces
5	Firm tan and gray silt
	Soft tan and gray slightly silty clay
10	Loose tan and gray silt

LOG OF BORING

PROJECT Cajun Electric Power Cooperative, Inc.
New Roads, Louisiana

FOR Cajun Electric Power Cooperative, Inc.
Bovay Engineers, Inc., Burns and Roe, Inc.

BORING 280
FILE 74-30
DATE 5 July 1977
TECHNICIAN CCN

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0
Very stiff tan and gray clay
Stiff tan and gray clay
5 Soft tan and gray clay with silt traces
Loose tan and gray silt
Soft tan and gray slightly silty clay
10

Boring 281
Boring Depth 10 feet

0 Medium brown and gray clay with root traces
Medium tan and gray clay
Medium gray clay
Medium tan and gray clay
Stiff tan and gray clay
5 Stiff tan and gray clay
Soft gray clay
Soft gray clay with silt traces
Loose gray clayey silt
10 Loose gray silt with clay traces

Boring 282
Boring Depth 10 feet

0
Stiff tan and gray clay with organic and root traces
Stiff tan and gray clay
5 Loose tan and gray silt
Loose tan and gray clayey silt
Soft tan and gray silty clay
10

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

LOG OF BORING

PROJECT: Cajun Electric Power Cooperative, Inc.
New Roads, Louisiana

FOR: Cajun Electric Power Cooperative, Inc.
Bovay Engineers, Inc., Burns and Roe, Inc.

BORING 283
FILE 74-30
DATE 30 June 1977
TECHNICIAN CCN

DEPTH FEET | SAMPLES | ■ UNDISTURBED SAMPLE | ☒ STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0
Stiff gray clay
Stiff tan and gray clay
5
Medium tan and gray clay with silt pockets
Stiff tan and gray clay
Stiff tan and gray clay with silt layers
10

Boring 284
Boring Depth 10 feet

0
Very stiff tan and gray clay with roots
Very stiff tan and gray clay with silt traces
5
Firm tan and gray clayey silt
Medium tan and gray silty clay
Medium tan and gray silty clay
10

Boring 285
Boring Depth 10 feet

0
Very stiff tan and gray clay
Stiff tan and gray clay
5
Stiff tan and gray clay
Medium tan and gray clay with silt traces
Stiff tan and gray clay with silt traces
10

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LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	286
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	29 June 1977
		TECHNICIAN	CCN

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0

Stiff tan and gray clay with silt traces

Soft tan and gray slightly silty clay

5 Loose tan and gray silt

Loose tan and gray silt with clay traces

Soft tan and gray silty clay

10

Boring 287

Boring Depth 10 feet

0

Stiff tan and gray clay with silt pockets and roots

Stiff tan and gray slightly silty clay

5 Loose tan and gray clayey silt

Loose tan and gray clayey silt

Medium tan and gray clay with silt traces

10

Boring 288

Boring Depth 10 feet

0

Stiff tan and gray clay with silt pockets

Stiff tan and gray very silty clay

5 Medium tan and gray silty clay

Loose tan and gray clayey silt

Loose tan and gray slightly clayey silt

10

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.
BOR. NO.	289
FILE	74-30
DATE	30 June 1977
TECHNICIAN	CCN

DEPTH FEET | SAMPLES | ■ UNDISTURBED SAMPLE | ☒ STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0
Stiff tan and gray clay
Stiff tan and gray clay with silt lenses
5
Stiff tan and gray clay with silt lenses
Stiff tan and gray clay
10
Medium tan and gray slightly silty clay

Boring 290
Boring Depth 10 feet

0
Stiff tan and gray clay
Medium tan and gray very silty clay
5
Medium tan and gray clay with silt pockets
Loose tan and gray silt with sand traces
Loose tan silt with sand traces
10

Boring 291
Boring Depth 10 feet

0
Stiff tan and gray clay with silt traces and roots
Stiff tan and gray silty clay
5
Loose tan and gray slightly clayey silt
Loose tan and gray silt
Loose tan and gray clayey silt
10

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LOG OF BORING

PROJECT Cajun Electric Power Cooperative, Inc.
New Roads, Louisjana

FOR Cajun Electric Power Cooperative, Inc.
Bovay Engineers, Inc., Burns and Roe, Inc.

BORING 292
FILE 74-30
DATE 29 June 1977
TECHNICIAN CCN

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 10 feet

Depth (feet)	Description
0	
	Stiff tan and gray clay with roots
	Stiff tan and gray clay
5	Loose tan and gray silt with clay traces
	Loose tan and gray silt
	Soft tan and gray slightly silty clay
10	

Boring 293
Boring Depth 10 feet

Depth (feet)	Description
0	
	Stiff dark gray clay with roots
	Stiff gray clay
5	Medium tan and gray clay with silt traces
	Loose tan and gray silt
	Loose tan and gray slightly clayey silt
10	

Boring 294
Boring Depth 10 feet

Depth (feet)	Description
0	
	Very stiff tan and gray clay with roots
	Stiff tan and gray clay with roots
5	Soft tan and gray clay with silt traces
	Loose tan and gray silt with clay traces
	Loose tan and gray silt
10	

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	295
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	29 June 1977
		TECHNICIAN	CCN

DEPTH FEET | SAMPLES | ■ UNDISTURBED SAMPLE | ☒ STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0

Stiff tan and gray clay with silt traces

Firm tan and gray clayey silt

5

Loose tan and gray silt

Soft tan and gray clay with silt traces

Soft tan and gray slightly silty clay

10

Boring 296

Boring Depth 10 feet

0

Very stiff tan and gray clay with roots

Stiff tan and gray clay with silt traces

Firm tan and gray clayey silt

5

Loose tan and gray silt with clay traces

Loose tan and gray silt with clay traces

10

Boring 297

Boring Depth 10 feet

0

Very stiff gray clay with root traces

Very stiff tan and gray clay with silt traces

Firm tan and gray silt

5

Loose tan and gray silt with clay traces

Loose tan and gray silt

10

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LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.
BORING	298
FILE	74-30
DATE	28 June 1977
TECHNICIAN	CCN

UNDISTURBED SAMPLE — STANDARD PENETRATION TEST — BORING DEPTH 10 feet

DEPTH FEET	Description
0	Stiff gray clay with roots
	Stiff tan and gray clay with silt pockets
5	Medium tan and gray clay with silt traces
	Medium tan and gray clay with silt traces
10	Very loose tan and gray silt

Boring 299
Boring Depth 10 feet

DEPTH FEET	Description
0	Loose tan and gray clayey silt
	Loose tan and gray silt
5	Loose tan and gray silt
	Loose tan and gray silt
10	Loose tan and gray silt

Boring 300
Boring Depth 10 feet

DEPTH FEET	Description
0	Stiff tan and gray clay
	Soft tan and gray very silty clay
5	Loose tan and gray silt with clay traces
	Loose tan and gray clayey silt
10	Loose tan and gray silt with clay traces

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LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	301
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	28 June 1977
		TECHNICIAN	CCN

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0

Stiff tan and gray clay with silt and root traces

Loose tan and gray silt with clay traces

5

Loose tan and gray silt with clay traces

Loose tan and gray silt

Loose tan and gray silt

10

Boring 302
Boring Depth 10 feet

0

Loose tan and gray slightly clayey silt with roots

Loose tan and gray silt with clay traces

5

Loose tan and gray silt

Loose tan and gray silt with clay traces

Loose tan and gray silt

10

Boring 303
Boring Depth 10 feet

0

Stiff tan and gray clay

Firm tan and gray clayey silt with root traces

5

Loose tan and gray silt

Loose tan and gray silt

10

Loose tan and gray silt

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LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING NO.	304
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	29 June 1977
		TECHNICIAN	CCN

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0

Very stiff tan and gray clay

Firm tan and gray slightly clayey silt

5

Medium tan and gray silty clay

Medium tan and gray clay with silt traces

Soft tan and gray very silty clay

10

Boring 305
Boring Depth 10 feet

0

Stiff tan and gray slightly silty clay with roots

Loose tan and gray silt

5

Loose tan and gray silt

Loose tan and gray silt with clay traces

Loose tan and gray silt

10

Boring 306
Boring Depth 10 feet

0

Stiff tan and gray silty clay with wood traces

Medium tan and gray slightly silty clay

5

Firm tan and gray clayey silt

Loose tan and gray silt with clay traces

Loose tan and gray silt

10

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LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.
BORING	307
FILE	74-30
DATE	29 June 1977
TECHNICIAN	CCN

UNDISTURBED SAMPLE ⊠ STANDARD PENETRATION TEST BORING DEPTH 10 feet

DEPTH FEET	SAMPLES	
0		Very stiff tan and gray clay with silt lenses
		Stiff tan and gray slightly silty clay
5		Loose tan and gray slightly clayey silt
		Loose tan and gray slightly clayey silt
10		Loose tan and gray silt

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LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.
BORING	805
FILE	74-30
DATE	1 June 1977
TECHNICIAN	NLT

DEPTH FEET | SAMPLES | ▮ UNDISTURBED SAMPLE | ☒ STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0
Stiff dark-gray clay with silt traces and roots
Medium gray clay with silt traces
5
Medium gray slightly silty clay
Medium gray clay with silt traces
Loose gray clayey silt
10

Boring 806
Boring Depth 10 feet

0
Stiff gray clay with silt traces
Stiff gray clay with silt traces
5
Soft gray very silty clay
Soft gray very silty clay
Loose gray silt with 2 inch silty clay layer
10

Boring 807
Boring Depth 10 feet

0
Stiff gray clay with silt traces and pockets
Stiff gray very silty clay
5
Firm gray silty sand
Loose gray clayey silt
Loose gray sandy silt with clay traces
10

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LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	808
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	1 June 1977
		TECHNICIAN	NLT

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0

Stiff gray clay with silt traces

Medium gray silty clay with silt pockets

5 Firm gray sandy silt

Firm gray sandy silt

10 Firm gray clayey silt

Boring 809
Boring Depth 10 feet

0

Stiff gray clay with root traces

Stiff tan and gray slightly silty clay

5 Loose gray silt

Loose tan and gray slightly clayey silt

Loose tan and gray slightly clayey silt

10

Boring 810
Boring Depth 10 feet

0

Stiff gray clay with ferrous and organic traces and roots

Stiff tan and gray clay with ferrous and organic traces and roots

5 Stiff tan and gray clay with organic traces and roots

Soft gray very silty clay with roots and ferrous traces

Soft gray silty clay with ferrous and organic traces

10

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LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	811
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	26 June 1977
		TECHNICIAN	CCN

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH

0

Medium gray clay with roots

Medium tan and gray clay

5

Medium tan and gray clay with silt traces

Medium tan and gray clay with silt pockets

10

Very loose gray clayey silt with clay traces

Boring 812

Boring Depth 10 feet

0

Medium gray silty clay with silt traces and roots

Medium tan and gray clay with roots

5

Soft tan and gray clay with silt traces

Loose tan and gray clayey silt with roots

Loose gray clayey silt

Very loose gray clayey silt with clay pockets and 2½ inch medium gray clay layer on bottom

10

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FF18125

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	814
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	9 June 1977
		TECHNICIAN	DPS

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0

Stiff gray clay with organic matter and roots

Stiff gray clay
5 Stiff gray clay
Loose gray silt

Loose gray clayey silt
Loose gray clayey silt with clay traces
10 Medium gray slightly silty clay

Boring 815
Boring Depth 10 feet

0

Stiff gray clay with roots

Very stiff gray slightly silty clay

5 Loose gray slightly clayey silt

Loose gray clayey silt
Loose gray clayey silt
10 Loose gray sandy silt

Boring 816
Boring Depth 10 feet

0

Very stiff gray clay with roots

Loose gray clayey silt

5 Loose gray clayey silt

Loose gray clayey silt

10 Firm gray very silty clay

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	-612
		FILE	74-30
FOR:	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	9 June 1977
		TECHNICIAN	DPS

DEPTH FEET | SAMPLES | ■ UNDISTURBED SAMPLE | ☒ STANDARD PENETRATION TEST | BORING DEPTH 10 feet

DEPTH FEET	
0	Stiff gray clay
	Stiff gray clay
5	Medium gray slightly silty clay with organic traces
	Medium gray slightly silty clay
10	Loose gray silt

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FF18125

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	819
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	13 June 1977
		TECHNICIAN	CCN

UNDISTURBED SAMPLE — STANDARD PENETRATION TEST — BORING DEPTH $35\frac{1}{2}$

DEPTH FEET	Description		
0	Stiff brown clay with roots		
	Soft tan and gray silty clay		
5	Firm tan and gray clayey silt		
	Firm tan and gray silt with clay traces		
	Very loose tan clayey silt with clay traces and 1 inch clay layer		
10	Penetration Resistance	2 blows per foot	(1/1/1)
	Loose tan and gray slightly clayey silt.		
15	Loose tan and gray silt with clay traces and 3 inch sand layer and 4 inch silty clay layer		
	Loose tan sand with silt traces		
	Penetration Resistance	4 blows per foot	(1/2/2)
	Firm tan slightly sandy silt with 1/2 clay layer		
20	Firm tan silt with clay traces		
	Firm tan sand		
	Penetration resistance	11 blows per foot	(2/4/7)
25	Firm tan silt with sand and clay traces		
	Firm brown sand with 1/4 inch gray silt layer		
	Firm tan silty sand with clay traces		
	Penetration resistance	21 blows per foot	(4/7/14)
30	Refusal No Recovery		
	Firm gray sand		
	Penetration Resistance	28 blows per foot	(6/11/17)
	Dense gray sand with organic traces		
	Penetration Resistance	44 blows per foot	(13/20/24)
35	Very dense gray sand with organic traces		
	Penetration Resistance	25 blows per 6 inches	(10/25)

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LOG OF BORING

PROJECT Cajun Electric Power Cooperative, Inc.
New Roads, Louisiana

FOR Cajun Electric Power Cooperative, Inc.
Bovay Engineers, Inc., Burns and Roe, Inc.

BORING 819
FILE 74-30
DATE 13 June 1977
TECHNICIAN CCN

UNDISTURBED SAMPLE ☒ STANDARD PENETRATION TEST BORING DEPTH 31½

DEPTH FEET	DESCRIPTION		
0	Stiff tan and light gray clay with silt pockets and traces		
	Stiff tan and gray slightly silty clay		
5	Medium tan and gray silty clay with silt layers		
	Loose tan fine sandy silt with 1/4 inch silty clay layer		
	Loose tan slightly clayey silt		
10	Loose tan slightly clayey silt		
	Penetration Resistance	4 blows per foot	(1/1/3)
	Soft gray silty clay with silt layers		
15	Loose tan silt with sand traces		
	Firm tan sandy silt		
	Penetration Resistance	15 blows per foot	(1/6/9)
20	Firm tan silt with ferrous traces and clay pockets		
	Firm tan sandy silt with ferrous traces		
	Firm tan sandy silt		
	Penetration Resistance	14 blows per foot	(4/6/8)
25	Firm tan and gray sandy silt		
	Firm gray sandy silt with organic traces		
	Dense gray sand		
	Penetration Resistance	40 blows per foot	(11/21/19)
30	Dense gray sand		
	Penetration Resistance	38 blows per foot	(12/20/18)

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LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	820
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	14 June 1977
		TECHNICIAN	CCN

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 37½

Depth (ft)	Description	Penetration
0	Medium gray clay with ferrous, wood and organic traces and roots	
	Stiff tan clay with ferrous and organic traces and silt pockets	
5	Medium tan and gray slightly silty clay with silt, ferrous and organic traces and silt pockets	
	Medium tan clay with silt traces	
	Loose tan clayey silt with gray clay pockets	
10	Loose tan clayey silt with clay traces	
	Soft tan silty clay with organic and ferrous traces and silt layers	
15	Firm brown and gray slightly clayey silt with clay and organic traces	
	Firm tan and gray slightly sandy silt with 3 inch clay layer	
	Firm tan slightly sandy silt	
	Penetration Resistance	18 blows per foot (5/8/10)
20	Firm tan sandy silt	
	6 inch Push refusal	
	Firm gray sandy silt	
	Penetration Resistance	15 blows per foot (4/7/8)
25	Firm gray sand with 1/8 inch clay layer	
	Firm gray sandy silt with clay traces	
	Firm gray sandy silt with organic traces	
30	Penetration Resistance	15 blows per foot (4/5/10)
	Loose gray sand	
	Firm gray sand	
	Penetration Resistance	19 blows per foot (5/8/11)
35	Dense gray sand	
	Penetration Resistance	37 blows per foot (14/16/21)
	Dense gray sand	
	Penetration Resistance	37 blows per foot (15/17/20)
40		

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LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	821
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	9 June 1977
		TECHNICIAN	DPS

■ UNDISTURBED SAMPLE ☒ STANDARD PENETRATION TEST BORING DEPTH 43½

DEPTH FEET	Description		
0			
	Medium tan and gray clay with silt traces and pockets		
	Stiff light gray clay with organic matter and roots		
5	Stiff tan and gray clay with gray slightly silty clay layer		
	Soft brown slightly silty clay with silt traces and pockets		
10	Stiff tan clay with silt traces and 4 inch silt and sand layer on bottom		
	Firm brown slightly clayey silt with 1 inch slightly silt layer		
	Loose tan and gray silt		
	Loose tan silt with clay traces at top		
15	Penetration Resistance	4 blows per foot	(1/2/2)
	Loose brown slightly clayey silt with sand traces		
	Loose tan and gray sandy clayey silt with sand traces and clay pockets		
20	Loose tan and gray silt		
	Penetration Resistance	9 blows per foot	(3/3/6)
	Loose gray sand with silt traces		
25	Loose tan and gray slightly silty sand		
	Firm gray sand		
	Penetration Resistance	15 blows per foot	(2/6/9)
	Very dense gray sand with 2 inch slightly sandy clay layer and organic sand traces		
30			
	Firm gray sand		
	Firm tan and gray sand		
	Penetration Resistance	11 blows per foot	(4/5/6)
35	Very dense gray sand with 1 inch tan clay streak and ½ inch clay layer		
	Firm gray sand		
	Penetration Resistance	14 blows per foot	(6/7/7)
	Firm gray sand with organic matter and gray clay in middle		
	Penetration Resistance	28 blows per foot	(9/13/15)
40	Dense gray sand with organic matter		
	Penetration Resistance	4 blows per foot	(7/21/20)
	Dense gray sand with organic matter		
	Penetration Resistance	32 blows per foot	(10/15/17)

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LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	-822
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	8 June 1977
		TECHNICIAN	DPS

UNDISTURBED SAMPLE STANDARD PENETRATION TEST BORING DEPTH 41½

DEPTH FEET	DESCRIPTION		
0	Stiff tan and gray clay with root traces		
	Stiff tan and gray slightly silty clay		
5	Loose tan and light gray slightly clayey silt with silt lenses and silt pockets		
	Soft tan and gray clay with silt lenses and roots		
	Loose tan silt		
10	Loose tan and gray clayey silt		
	Loose tan clayey silt with 1 inch sand layer and ferrous traces		
	Penetration Resistance	2 blows per foot	(1/1/1)
15	Loose gray slightly clayey silt with clay traces		
	Firm gray silt		
	Loose gray silt		
	Penetration Resistance	10 blows per foot	(3/5/5)
20	Loose gray silt with 1 inch clay layer and ¼ inch silt layers and lenses		
	Loose gray slightly sandy silt		
25	Loose gray silt		
	Penetration Resistance	5 blows per foot	(2/2/3)
	Firm gray sand with 1½ inch gray clay layer and clay pockets ¼ inch silt layer		
	Firm gray sand		
30	Penetration Resistance	12 blows per foot	(1/4/8)
	Firm gray sand with ¼ inch clay pockets and 3/4 inch gray silt layers		
	Firm gray sand with clay traces		
35	Firm tan and gray sand with ¼ inch gray clay streaks		
	Firm gray sand with 2 inch clay layer in middle		
	Penetration Resistance	16 blows per foot	(5/6/10)
	Dense gray sand		
	Penetration Resistance	40 blows per foot	(12/19/21)
40	Dense gray sand		
	Penetration Resistance	33 blows per foot	(6/16/17)

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LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING NO.	823
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	7 June 1977
		TECHNICIAN	NLT

UNDISTURBED SAMPLE — STANDARD PENETRATION TEST — BORING DEPTH $45\frac{1}{2}$

DEPTH FEET	Description	Penetration	Blows
0	Stiff tan clay with root traces and silt traces		
	Soft tan silty clay with silt pockets		
5	Soft tan and gray slightly silty clay with silt pockets		
	Loose tan clayey silt with clay pockets		
10	Very soft tan very silty clay		
	Loose tan clayey silt		
	Medium tan and gray clay with $2\frac{1}{2}$ inches silt layer		
15	Firm gray clayey silt with 12 inch layer of gray very silty clay		
	Firm gray silty clayey sand		
	Very soft gray silty clay Penetration Resistance	2 blows per foot	(1/1/1)
20	Firm gray slightly clayey silt		
	Firm gray clayey silt		
25	Firm gray silty sand with 5 inch silty clay Penetration Resistance	12 blows per foot	(1/3/9)
	Firm gray slightly clayey silt with 1 inch clay layer		
	Soft gray clay with sand pockets and layers		
30	Light gray sand Penetration Resistance	7 blows per foot	(2/2/5)
	Firm gray sand with silt traces Refusal		
35	Firm gray sand Penetration Resistance	19 blows per foot	(5/9/10)
	Medium gray clay with 3 inch silt layer and silt traces		
	Firm gray sand with 2 inch clay layer in middle Penetration Resistance	23 blows per foot	(10/11/12)
40	Firm gray sand Penetration Resistance	28 blows per foot	(12/14/14)
	Dense gray sand Penetration Resistance	33 blows per foot	(9/11/22)
45	Dense gray sand Penetration Resistance	32 blows per foot	(8/14/18)

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LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	824
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	7 June 1977
		TECHNICIAN	NLT

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 41½

Depth (feet)	Description	Blows per foot	
0	Very stiff tan and gray clay with silt traces with roots		
	Stiff tan and gray clay with silt traces		
5	Medium tan and gray silty clay with silt pockets		
	Firm tan and gray clayey silt with clay pockets		
	Very soft tan very silty clay with 1 inch layer of tan and light gray clay		
10	Very soft tan very silty clay		
	Loose brown slightly clayey silt		
	Loose gray slightly clayey silt		
15	Penetration Resistance	4 blows per foot	(1/2/2)
	Sample fell out of barrel		
	Very loose gray silt		
	Penetration Resistance	5 blows per foot	(1/3/2)
20	Firm gray silt with 4 inch clay layer		
	Firm gray sandy silt with clay pockets		
	Firm gray slightly sandy silt		
25	Penetration Resistance	21 blows per foot	(6/8/13)
	Medium gray silty clay with 4 inch silt layer		
	Firm gray silt with 1 inch layer of soft gray slightly sandy clay		
30	Soft gray slightly silty clay with 1/2 inch silt layer		
	Loose gray silt		
35	Medium gray clay with silt pockets and very soft gray very silty clay upper 8 inches of sample		
	Stiff gray silty clay with 4 inch layer silt		
	Penetration resistance	12 blows per foot	(3/4/8)
	Very stiff gray sand		
	Penetration Resistance	31 blows per foot	(8/14/17)
40	Very stiff gray sand		
	Penetration Resistance	38 blows per foot	(16/17/21)

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING NO.	C-825
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	6 June 1977
		TECHNICIAN	CCP

■ UNDISTURBED SAMPLE ☒ STANDARD PENETRATION TEST BORING DEPTH 41½

DEPTH FEET	DESCRIPTION		
0	Stiff brown and gray clay with silt pockets and grass roots		
	Stiff tan and gray clay with silt traces and grass roots		
5	Soft tan silty clay with 5 inches of very silty clay layer		
	Soft tan clay with 4 inch silt layer		
	Very loose brown silt with clay pockets		
10	Firm gray sand Penetration Resistance	2 blows per foot	(1/1/1)
	Loose tan silt with 2 inch silty clay layer and ¼ inch sandy layer		
15	Firm gray silt with clay lenses		
	Loose gray clayey sand Penetration Resistance	2 blows per foot	(1/1/1)
20	Soft gray very silty clay with silt pockets		
	Firm gray silt with clay traces		
	Firm gray clayey sand Penetration Resistance	10 blows per foot	(4/4/6)
25	Firm gray silt with clay traces and organic matter		
	Firm gray silt with organic and clay lenses		
	Firm gray sandy silt Penetration Resistance	18 blows per foot	(5/10/8)
30	Firm gray sand with 4 inch clay layer		
	Firm gray clayey sand with 4 inch sand clay layer		
35	Firm gray sand Penetration Resistance	23 blows per foot	(5/9/14)
	Medium gray clay with 1 inch silt layer and 4 inch sand layer		
	Dense gray sand Penetration Resistance	40 blows per foot	(11/18/22)
40	Very dense gray sand Penetration Resistance	41 blows per foot	(10/18/23)

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	C-826
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	2 June 1977
		TECHNICIAN	CCN

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 49½

Depth (feet)	Description	Penetration
0	Very stiff tan and gray clay with root traces	
	Stiff tan and light gray clay with organic traces	
5	Medium tan and gray silty clay with silt pockets	
	Firm tan and gray clayey silt with clay pockets	
	Firm brown and gray clayey silt	
10	1st 12 inches soft tan and gray slightly silty clay - 2nd 12 inches loose brown and gray clayey silt	
	Soft tan clay with ferrous traces	
	Medium gray slightly silty clay	
15	Penetration Resistance	4 blows per foot (1/2/2)
	Firm gray silt with organic lenses	
	Firm gray clayey silt with organic traces	
20	Stiff gray clay with 1/2 inch sand layer	
	Penetration Resistance	14 blows per foot (4/8/6)
	Medium gray clay with sand traces	
25	Firm gray silt with 8 inch sand layer and 1/8 inch clay layers	
	Firm gray sand with 1 inch clay layer	
	Penetration resistance	15 blows per foot (5/7/8)
	Firm gray sand with clay traces	
30	Firm gray sand with clay layers	
	Firm gray sand with 3 inch clay layer	
	Penetration resistance	11 blows per foot (4/3/8)
35	Firm gray sand with clay traces	
	Firm gray sand with 4 inch clay layer	
	Very stiff gray clay with 2 inch sand layer	
	Penetration resistance	25 blows per foot (5/8/17)
40	Stiff gray clay with 1/2 inch sand layer	
	Penetration resistance	11 blows per foot (5/4/7)
	Medium gray clay with silt layer and lenses	
45	Firm gray sand with 2 inch organic sand and clay pockets	
	Dense gray sand	
	Penetration resistance	30 blows per foot (18/6/12/18)
	Dense gray sand	
50	Penetration resistance	35 blows per foot (15/19/16)

FF18120

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

LOG OF BORING

PROJECT: Cajun Electric Power Cooperative, Inc.
New Roads, Louisiana

FOR: Cajun Electric Power Cooperative, Inc.
Bovay Engineers, Inc., Burns and Roe, Inc.

BOR No. L-827
FILE 74-30
DATE 2 June 1977
TECHNICIAN CCN

UNDISTURBED SAMPLE — STANDARD PENETRATION TEST — BORING DEPTH 41½

DEPTH FEET	Description		
0			
	Very stiff dark gray clay with root traces		
	Medium gray and brown clay with organic traces		
5	Medium tan and light gray clay with silt streaks and pockets		
	Soft brown and gray clay with silt and organic traces		
	Soft tan and gray slightly silty clay		
10			
	Loose tan and gray slightly clayey silt with 4 inch clay layer and ferrous traces		
	Soft gray clay with silt traces		
15	Soft gray clay Penetration resistance	2 blows per foot	(1/1/1)
	Soft gray very silty clay		
	Soft gray slightly silty clay with 4 inch gray silty sand layer		
20	Loose gray clayey silt Penetration resistance	5 blows per foot	(2/2/3)
	Soft gray clay with silt traces and 4 inch gray sand layer		
25	Firm gray sand with organic traces		
	Firm gray sand with clay and organic traces Penetration resistance	15 blows per foot	(3/6/9)
30	Firm gray sand with 2 inch silt layer and clay traces Firm gray sand with 2 and 3 inch clay layers		
	Firm gray sand with 6 inch clay layer Penetration resistance	21 blows per foot	(4/6/15)
35	Medium gray clay with 1/4 inch sand layer		
	8 inch loose gray sand, 16 inch medium gray clay		
	Dense gray sand Penetration resistance	35 blows per foot	(3/16/19)
40	Very dense gray sand Penetration resistance	50 blows per foot	(10/25)

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	820
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	1 June 1977
		TECHNICIAN	CCN

DEPTH FEET | SAMPLES | ■ UNDISTURBED SAMPLE | ☒ STANDARD PENETRATION TEST | BORING DEPTH 45½ feet

Depth (feet)	Description		
0	Stiff dark tan and gray clay with organic traces and roots		
	Medium tan and gray clay with silt traces		
5	Medium brown and gray clay silt traces		
	Very soft gray and tan clay with silt traces		
	Loose tan and silt with clay traces		
10	Very loose tan and gray clayey silt		
	Penetration resistance	3 blows per foot	(1/1/2)
	Very loose tan and gray silt		
15	Firm gray and clayey silt		
	Soft gray silty clay		
	Penetration resistance	3 blows per foot	(1/2/1)
	Firm gray clayey silt with organic and silt traces		
20	Loose gray silt with clay traces		
	Very loose gray silt with organic traces		
	Penetration resistance	2 blows per foot	(1/1/1)
25	Loose gray silt with clay traces		
	Loose gray slightly clayey silt with organic traces		
	Loose gray silt with clay traces and 8 inch gray clay layer		
	Penetration resistance	4 blows per foot	(2/2/2)
30	Firm gray silt with clay traces		
	Loose gray very clayey silt with 5 inch slightly sandy & silty clay layer		
	Stiff gray slightly silty clay		
35	Penetration resistance	8 blows per foot	(2/4/4)
	Soft gray slightly silty clay with 6 inch clay layer		
	Firm gray clayey silt with 8 inch clay layer and clay traces		
40	Firm gray sand with 1/2 inch clay layer		
	Penetration resistance	25 blows per foot	(10/13/12)
	Dense gray sand with 2 inch clay layer		
	Penetration resistance	35 blows per foot	(12/19/16)
	Very dense gray sand with 5 inch clay layer		
45	Penetration resistance	52 blows per foot	(19/26)

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.
BORING	2-329
FILE	74-30
DATE	1 June 1977
TECHNICIAN	CCN

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 39½ feet

4 inch sample stiff brown clay with root traces

Stiff tan and gray clay with silt lenses and streaks

Medium brown and gray clay with organic and silt traces

Soft brown and gray clay with organic traces and silt lenses

Loose brown and gray clayey silt

Loose gray and brown silt with 12 inches soft brown and gray slightly silty clay with organic traces

Medium gray clay with ferrous traces

Penetration resistance 6 blows per foot (2/2/4)

Loose gray clayey silt with ferrous and organic traces

Firm gray clayey silt

Loose gray silt

Penetration resistance 4 blows per foot (1/2/2)

Loose gray slightly clayey silt

Firm gray silt with clay layers

Loose gray silt with sand traces

Penetration resistance 7 blows per foot (2/3/4)

Loose gray slightly clayey silt with 1 inch clay layer

Loose gray slightly clayey silt

Loose gray slightly clayey silt

Penetration resistance 6 blows per foot (2/3/3)

Loose gray slightly clayey silt with 2 inch clay layer

Loose gray clayey silt with sand traces

Dense gray sand

Penetration resistance 40 blows per foot (7/18/22)

Very dense gray sand

Penetration resistance 25 blows per 6 inches (12/25)

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.

cc18125

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.
BORING	C-330
FILE	74-30
DATE	31 May 1977
TECHNICIAN	CCN

DEPTH FEET | SAMPLES | ■ UNDISTURBED SAMPLE | ☒ STANDARD PENETRATION TEST | BORING DEPTH 39½ feet

DEPTH FEET	Description
0	
	Medium tan and light gray clay with silt traces
	Medium brown and gray clay
5	Soft tan and light gray clay with silt traces
	Loose tan and gray slightly clayey silt
10	Soft tan and gray clay with 8 inch loose gray silty layers and clay pockets
	Firm gray slightly clayey silt and 8 inch loose gray slightly clayey silt
	Soft gray clay with silt traces
15	Loose gray clayey silt with clay traces and sand traces
	Firm gray slightly clayey silt
	Very loose gray silt with 5 inches of slightly clayey silt layer
20	Penetration Resistance 3 blows per foot (1/1/2)
	Medium gray silty clay
	Medium gray clay with 1/8 inch silt layer
25	Loose gray silt Penetration Resistance 9 blows per foot (2/3/6)
	2 inch firm gray clayey silt, 3 inch soft gray clay, 1 inch gray silty sand
30	Firm gray clayey silt with silt traces Firm gray silt with 3 inch slightly clayey silt Penetration Resistance 10 blows per foot (2/3/7)
	Medium gray clay with 3 inch sandy layer and sand lenses
35	Firm slightly silty sand with silt traces and clay streaks
	Dense gray sand with 4 inch clay layer Penetration Resistance 31 blows per foot (4/6/25)
	Dense gray sand with 4 inch gray clay layer Penetration Resistance 33 blows per foot (12/18/15)
40	

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.

FF1912

LOG OF BORING

PROJECT: Cajun Electric Power Cooperative, Inc.
New Roads, Louisiana

FOR: Cajun Electric Power Cooperative, Inc.
Bovay Engineers, Inc., Burns and Roe, Inc.

BORING: 831
FILE: 74-30
DATE: 31 May 1977
TECHNICIAN: CCH

DEPTH FEET | SAMPLES | ■ UNDISTURBED SAMPLE | ⊠ STANDARD PENETRATION TEST | BORING DEPTH 41½ feet

Depth (feet)	Description		
0	Stiff brown and gray clay		
	Medium tan and gray clay with silt pockets and streaks		
5	Medium brown and gray clay with silt traces		
	Medium tan and gray slightly silty clay		
10	Loose tan and gray silt with clay traces		
	Loose tan and gray slightly clayey silt		
	Very loose tan and gray silt		
15	Very loose gray silt Penetration Resistance	2 blows per foot	(1/1/1)
	Very loose gray silt		
20	Loose gray silt with clay traces		
	Loose gray silt Penetration Resistance	6 blows per foot	(3/2/4)
	Firm gray silt with clay and organic traces		
25	Loose gray silt with clay traces		
	Very stiff gray clay with silt traces Penetration Resistance	16 blows per foot	(2/7/9)
30	Loose gray silt with sand and clay traces and 4 inch gray sand layer		
	Firm gray sandy silt with clay traces		
	Firm gray sand with 6 inch slightly silty clay layer Penetration Resistance	13 blows per foot	(3/6/7)
35	Loose gray silt with tan and gray silt and clay traces		
	Firm gray sand with clay traces		
	Dense gray sand Penetration Resistance	39 blows per foot	(7/18/21)
40	Dense gray sand with 6 inch clay layer Penetration Resistance	32 blows per foot	(7/11/21)

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	832
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	12 May 1977
		TECHNICIAN	CCN

UNDISTURBED SAMPLE ☒ STANDARD PENETRATION TEST BORING DEPTH 41½ feet

DEPTH FEET	Description	Penetration	Blows
0	Stiff tan and gray clay		
	Medium tan and gray clay with silt traces		
5	Loose tan and gray silt with clay pockets		
	Very loose tan and gray silt Loose tan and gray silt Penetration Resistance	5 blows per foot	(2/2/3)
10	Firm tan and gray clayey silt		
	Loose gray silt Very loose gray silt Penetration Resistance	2 blows per foot	(1/1/1)
15	Firm gray very clayey silt		
	Firm gray slightly clayey sand		
20	Very loose gray silt Penetration Resistance	3 blows per foot	(1/1/2)
	Loose gray slightly sandy silt		
25	Firm gray silty sand Loose gray silt with sand traces Penetration Resistance	6 blows per foot	(1/3/3)
30	Firm gray silty fine sand		
	Firm gray sandy silt with organic traces Firm gray silt with sand traces Penetration Resistance	11 blows per foot	(2/5/6)
35	Loose gray sand with silt traces		
	Loose gray slightly silty sand with 1 inch clay layer Very dense gray silty sand Penetration Resistance	25 blows per 6 inches	(12/25)
40	Dense gray silty sand Penetration Resistance	36 blows per foot	(7/15/21)

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.

LOG OF BORING

PROJECT Cajun Electric Power Cooperative, Inc.
New Roads, Louisiana

FOR Cajun Electric Power Cooperative, Inc.
Bovay Engineers, Inc., Burns and Roe, Inc.

BORING 833
FILE 74-30
DATE 11 May 1977
TECHNICIAN CCN

■ UNDISTURBED SAMPLE ☒ STANDARD PENETRATION TEST BORING DEPTH 53½ feet

DEPTH FEET	Description		
0			
	Stiff tan and gray clay		
	Medium tan and gray clay		
5	Medium tan and gray clay		
	Medium tan and gray silty clay		
10	Stiff tan and gray clay with silt pockets		
	Loose tan and gray silt		
	Loose g[illegible] silt		
15	Loose t[illegible] gray silt		
	Penetrat[illegible]sistance	5 blows per foot	(1/2/3)
	Firm gr[illegible]y silt with clay traces		
20	Soft gra[illegible]ilty clay with 2 inches of firm gray sand layers		
	Loose gray silt with clay traces		
	Penetration Resistance	4 blows per foot	(1/2/2)
	Loose gray slightly clayey silt		
25	Firm gray clayey silt with sand traces and clay pockets		
	Loose gray clayey silt		
	Penetration Resistance	5 blows per foot	(1/2/3)
30	Firm gray very clayey silt with ¼ inch sand layers		
	Firm gray sandy silt with clay streaks and ¼ inch layer		
	Firm gray silt		
	Penetration Resistance	11 blows per foot	(4/5/6)
35	Firm gray silty sand with ½ inch clay layer and clay streaks		
	Very loose gray sandy silt with 2 inch gray clay layer		
	Very stiff gray clay with silt traces		
40	Penetration Resistance	17 blows per foot	(8/8/9)
	Firm gray silty sand with clay and silt traces and clay lenses		
	Loose gray sandy silt with clay traces and pockets		
45	Firm gray sand with 1 inch clay layer		
	Penetration Resistance	22 blows per foot	(7/12/10)
	Firm gray silt with sand traces		
	Penetration Resistance	26 blows per foot	(6/10/16)
	Firm gray sand		
50	Penetration Resistance	26 blows per foot	(6/11/15)

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.
BORING	833
FILE	74-30
DATE	12 May 1977
TECHNICIAN	CCN

UNDISTURBED SAMPLE ☒ STANDARD PENETRATION TEST BORING DEPTH 53½ feet

DEPTH FEET	SAMPLES			
50	☒	Dense gray sand		
		Penetration Resistance	30 blows per foot	(9/12/18)
	☒	Hard gray clay with sand traces		
		Penetration Resistance	38 blows per foot	(10/15/23)
55				
60				

LOG OF BORING

PROJECT Cajun Electric Power Cooperative, Inc.
New Roads, Louisiana
Cajun Electric Power Cooperative, Inc.
FOR: Bovay Engineers, Inc., Burns and Roe, Inc.

BORING 834
FILE 74-30
DATE 10 May 1977
TECHNICIAN CCN

DEPTH FEET | SAMPLES | ■ UNDISTURBED SAMPLE | ☒ STANDARD PENETRATION TEST | BORING DEPTH 41½ feet

Stiff tan and gray clay with silt and organic matter

Medium gray clay with silt traces

Medium tan and gray clay with organic traces and silt traces

Firm brown clayey silt

Firm gray sandy silt

Loose tan and gray silt

Loose tan sandy silt with 2 inch clay layer and ferrous traces
Very loose tan and gray silt
Penetration Resistance 3 blows per foot (1/2/1)

Loose gray slightly clayey silt

Loose gray slightly sandy silt with 1 inch sand layer
Loose gray silt with sand traces
Penetration Resistance 4 blows per foot (1/1/3)

Firm gray silt with clay pockets

Firm gray clayey silt
Loose gray silt with clay traces
Penetration Resistance 7 blows per foot (2/3/4)

Loose gray slightly clayey silt

Firm gray silt with sand lenses and streaks
Firm gray silt
Penetration Resistance 17 blows per foot (5/7/10)

Stiff gray silty clay with 3 inch clay layer

Loose gray silt with sand traces
Dense gray sand
Penetration Resistance 38 blows per foot (6/16/22)
Dense gray sand
Penetration Resistance 31 blows per foot (6/11/20)

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	835
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	10 May 1977
		TECHNICIAN	CCN

UNDISTURBED SAMPLE — STANDARD PENETRATION TEST — BORING DEPTH 43½ feet

DEPTH FEET	Description		
0			
	Stiff tan and gray clay		
	Stiff tan and gray clay		
5	Medium tan and gray slightly silty clay		
	Very loose tan silt		
	Very loose tan and gray silt		
10	Very loose tan silt		
	Penetration Resistance	2 blows per foot	(1/1/1)
	Loose tan slightly sandy silt		
15	Loose gray silt		
	Very loose gray silt		
	Penetration Resistance	3 blows per foot	(1/1/2)
	Firm gray silt with sand traces		
20	Loose gray silt		
	Medium gray slightly silty clay		
	Penetration Resistance	4 blows per foot	(1/2/2)
25	Firm gray sand with clay streaks		
	Medium gray silty clay with 4 inch clay layers		
	Firm gray silt with clay traces		
	Penetration Resistance	12 blows per foot	(2/4/8)
30	Loose gray silt with 2 inch clay layer		
	Loose gray sand with clay and silt traces		
	Medium gray clay with sand traces		
35	Penetration Resistance	5 blows per foot	(2/1/4)
	Medium gray slightly silty clay		
	Loose gray sand		
40	Dense gray sand with 2 inch clay layer		
	Penetration Resistance	32 blows per foot	(6/17/15)
	Dense gray sand with 1 inch clay layer		
	Penetration Resistance	35 blows per foot	(10/18/17)
45			

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc.
	New Roads, Louisiana
FOR	Cajun Electric Power Cooperative, Inc.
	Bovay Engineers, Inc., Burns and Roe, Inc.

BORING 836
FILE 74-30
DATE 9 May 1977
TECHNICIAN CCN

UNDISTURBED SAMPLE ☒ STANDARD PENETRATION TEST BORING DEPTH 41½ feet

DEPTH FEET	SAMPLES	DESCRIPTION		
0		Stiff brown and gray clay with root traces		
		Stiff tan and gray clay		
5		Medium brown and gray clay with organic, ferrous and silt traces		
		Loose tan and gray silt		
		Loose gray silt		
10	☒	Loose gray silt with 2 inch clay layer		
		Penetration Resistance	2 blows per foot	(1/1/1)
		Loose gray silt		
15		Loose gray silt		
	☒	Very loose gray silt		
		Penetration Resistance	3 blows per foot	(1/1/2)
20		Loose gray silt with sand traces and 1 inch clay layer		
		Very loose gray silt		
	☒	Firm gray silt with sand and clay traces		
		Penetration Resistance	10 blows per foot	(1/4/6)
25		Loose gray silt with sand traces and clay traces		
		Loose gray silt		
	☒	Firm gray sand and silt		
30		Penetration Resistance	22 blows per foot	(2/8/14)
		Loose gray clayey silt with sand streaks		
		Loose gray sand with silt traces		
	☒	Loose gray sandy silt		
35		Penetration Resistance	7 blows per foot	(2/3/4)
		Loose gray silty sand with 4 inch clay layer		
	☒	Dense gray sand		
40		Penetration Resistance	30 blows per foot	(6/11/19)
	☒	Dense gray sand		
		Penetration Resistance	32 blows per foot	(7/13/19)

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.

LOG OF BORING

PROJECT:	Cajun Electric Power Cooperative, Inc.
	New Roads, Louisiana
FOR:	Cajun Electric Power Cooperative, Inc.
	Bovay Engineers, Inc., Burns and Roe, Inc.

BORING 837
FILE 74-30
DATE 6 May 1977
TECHNICIAN CCN

UNDISTURBED SAMPLE — STANDARD PENETRATION TEST — BORING DEPTH 43½ feet

DEPTH FEET	Description		
0	Stiff tan and gray clay		
	Stiff tan clay with silt and ferrous traces		
5	Soft tan and gray clay		
	Loose tan and silt with clay traces		
10	Loose tan and gray silt		
	Loose tan and gray silt Penetration Resistance	5 blows per foot	(1/2/3)
	Very loose tan silt		
15	Loose gray silt		
	Very loose gray silt Penetration Resistance	2 blows per foot	(1/1/1)
20	Firm gray sandy silt with T inch sand layer		
	Medium gray silty clay		
	Soft gray slightly silty clay Penetration Resistance	5 blows per foot	(2/2/3)
25	Medium gray silty clay with silt pockets		
	Loose gray silt with clay traces		
	Firm gray clayey silt Penetration Resistance	21 blows per foot	(7/9/12)
30	Firm gray silty sand with clay streaks		
	Loose gray slightly sandy silt		
35	Stiff gray clay with silt traces Penetration Resistance	21 blows per foot	(7/10/11)
	Firm gray silty sand with ½ inch clay layer and silt traces		
	N/R and refusal		
40	Dense gray sand Penetration Resistance	30 blows per foot	(10/10/20)
	Dense gray sand Penetration Resistance	45 blows per foot	(10/20/25)

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc., Plant No. 2 New Roads, Louisiana	BORING	838
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	6 May 1977
		TECHNICIAN	CCN

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 39½ Feet

Depth (feet)	Description		
0	Medium brown and gray clay with silt pocket		
	Stiff tan and gray clay		
5	Soft brown and gray clay with silt traces		
	Medium brown and gray clay		
	Soft gray clay with silt pockets and streaks		
10	Loose gray slightly clayey silt with 3 inch clay layer		
	Very loose gray silt		
	Very loose gray silt with ½ inch clay layer		
15	Penetration resistance	3 blows per foot	(1/2/1)
	Loose gray clayey silt		
	Medium gray silty clay		
20	Loose gray clayey silt		
	Penetration resistance	4 blows per foot	(1/2/2)
	Firm gray sandy silt with 4 inch clay layer and clay lenses		
25	Loose gray silt with 3 inch clay layer		
	Firm gray clayey sand		
	Penetration resistance	13 blows per foot	(4/4/9)
	Loose gray sand		
30	Loose gray sand		
	Loose gray sand		
	Penetration resistance	11 blows per foot	(3/4/7)
35	Firm gray sand with 1 inch clay layer		
	Refusal		
	Very dense gray sand		
	Penetration resistance	52 blows per foot	(9/22/30)
	Dense gray sand		
40	Penetration resistance	42 blows per foot	(17/22/20)
45			
50			

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. Plant No. 2 New Roads, Louisiana	BORING	839
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	5 May 1977
		TECHNICIAN	CCN

DEPTH FEET | SAMPLES | ■ UNDISTURBED SAMPLE | ☒ STANDARD PENETRATION TEST | BORING DEPTH 51½ Feet

Depth (feet)	Description		
0	Stiff brown and gray clay		
	Very stiff gray clay with silt pockets		
5	Medium tan and gray clay with silt traces		
	Soft tan slightly silty clay		
	Stiff tan and gray clay with silt traces		
10	Loose tan and gray clayey silt with 5 inch clay layer		
	Loose brown sandy silt		
	Loose tan silt with clay traces		
15	Penetration resistance	4 blows per foot	(1/2/2)
	Loose tan and gray silt		
	Loose tan and gray silt with sand traces		
20	Very loose gray silt		
	Penetration resistance	3 blows per foot	(2/1/2)
	Loose gray silt		
25	Loose gray silt		
	Loose gray silt with 1 inch clay layer		
	Penetration resistance	6 blows per foot	(1/3/3)
	Loose tan and gray slightly clayey silt		
30	Medium gray silt with 8 inch clay layer with silt lenses and pockets		
	Loose gray silt		
	Penetration resistance	6 blows per foot	(3/3/3)
35	Medium gray clay with sand traces and ½ inch clay layers		
	Loose gray silt with 8 inch clay layer		
	Firm gray sand with 2 inch clay layer		
	Penetration resistance	26 blows per foot	(5/11/15)
40	Firm gray sand		
	Penetration resistance	19 blows per foot	(6/10/9)
	Dense gray sand		
	Penetration resistance	30 blows per foot	(10/14/16)
45	Firm gray sand with 4 inch clay layer		
	Penetration resistance	26 blows per foot	(8/11/15)
	Firm gray sand with 7 inch clay layer		
	Dense gray sand		
	Penetration resistance	38 blows per foot	(11/18/20)
50			

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.

PP18125

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. Plant No. 2 New Roads, Louisiana
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.
BORING	839
FILE	74-30
DATE	5 May 1977
TECHNICIAN	CCN

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 51½ Feet

DEPTH FEET	SAMPLES	
50	☒	Dense gray sand Penetration resistance 48 blows per foot (18/22/26)
55		

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Geotechnical Engineers

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. Plant No. 2 New Roads, Louisiana	BORING	840
		FILE	74-30
FOR.	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	4 May 1977
		TECHNICIAN	CCN

UNDISTURBED SAMPLE — STANDARD PENETRATION TEST — BORING DEPTH 39½ Feet

DEPTH FEET	Description	Penetration	Blows
0	Stiff brown and gray clay with roots and silt traces		
	Loose tan and gray clayey silt		
5	Loose tan and gray silt with 1½ inch silty clay layer		
	Loose tan silt Penetration resistance	4 blows per foot	(1/2/2)
	Loose tan silt with sand traces		
10	Loose tan silt with sand traces		
	Loose tan sandy silt Penetration resistance	4 blows per foot	(2/2/2)
15	Loose tan silt with sand traces		
	Loose tan and gray silt with 3 inch clay layer		
20	Loose gray silt Penetration resistance	4 blows per foot	(2/2/2)
	Loose gray sandy silt with clay traces		
	Loose gray sandy silt		
25	No Recovery Penetration resistance	15 blows per foot	(2/5/10)
	Loose gray slightly sandy silt		
	Loose gray slightly sandy silt		
30	Firm gray silt Penetration resistance	12 blows per foot	(4/5/7)
	Firm gray sand with clay lenses		
35	Firm gray silty sand		
	Dense gray slightly silty sand Penetration resistance	32 blows per foot	(5/15/17)
40	Dense gray slightly silty sand Penetration resistance	35 blows per foot	(5/13/22)

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. Plant No. 2 New Roads, Louisiana	BORING	841
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	4 May 1977
		TECHNICIAN	CCN

UNDISTURBED SAMPLE — STANDARD PENETRATION TEST — BORING DEPTH 43½ Feet

DEPTH FEET	Description		
0	Medium tan clay with root traces		
	Stiff tan clay		
5	Medium brown and gray clay with silt pockets		
	Medium tan and gray clay with silt traces		
	Stiff brown and gray slightly silty clay		
10	Very loose tan silt with clay traces		
	Very loose tan and gray silt		
15	Very loose tan and gray silt Penetration resistance	2 blows per foot	(1/1/1)
	Firm tan very silty fine sand with 6 inch clay layer		
	Loose tan and gray silty sand		
20	Loose gray sandy silt Penetration resistance	4 blows per foot	(2/2/2)
	Loose gray sandy silt with 3 inch clay layer		
25	Medium gray very silty clay and sandy silt with 2 inch clay layers and 1 inch silt layer 6 inch sample		
	Loose gray slightly sandy silt Penetration resistance	6 blows per foot	(2/3/3)
	Loose gray slightly sandy silt with ¼ inch clay layers		
30	Loose gray slightly sandy silt		
	Firm gray silty sand Penetration resistance	17 blows per foot	(7/8/9)
35	Loose gray silty sand		
	Firm gray sand with 1 inch clay layer		
	No recovery Penetration resistance	24 blows per foot	(10/14/10)
40	Dense gray sand with 4 inch clay layer Penetration resistance	30 blows per foot	(5/13/17)
	Dense gray silty sand Penetration resistance	32 blows per foot	(9/13/18)

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. Plant No. 2 New Roads, Louisiana
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.
BORING	✓842
FILE	74-30
DATE	3 May 1977
TECHNICIAN	CCN

■ UNDISTURBED SAMPLE ☒ STANDARD PENETRATION TEST BORING DEPTH 37½ Feet

DEPTH FEET	Description		
0	Medium yellow and gray clay with root traces		
	Medium tan and gray slightly silty clay		
5	Very soft tan and gray silty clay		
	Loose tan and gray silt with 2 inch clay layer		
	Loose tan and gray silt		
10	Very loose tan and gray clayey silt with ½ inch clay layer		
	Penetration resistance	2 blow per foot	(1/1/1)
	Loose gray silt		
15	Loose brown silt with clay pockets		
	Very loose gray silt with sand and clay traces		
	Penetration resistance	3 blows per foot	(1/1/2)
20	Loose gray clayey silt		
	Loose gray silt with clayey silt lenses		
	Loose gray sandy silt		
	Penetration resistance	9 blows per foot	(1/3/6)
25	Loose gray silty sand		
	Firm gray sandy silt with clay lenses		
	Firm gray sand		
	Penetration resistance	26 blows per foot	(7/9/10)
30	Firm gray sand		
	Loose gray silt with ½ inch sand layer and lenses		
35	Dense gray silty sand		
	Penetration resistance	32 blows per foot	(13/16/16)
	Dense gray silty sand		
	Penetration resistance	35 blows per foot	(10/18/17)
40			

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. Plant No. 2 New Roads, Louisiana	BORING	✓843
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	3 May 1977
		TECHNICIAN	CCN

■ UNDISTURBED SAMPLE ☒ STANDARD PENETRATION TEST BORING DEPTH 39½ Feet

DEPTH FEET	SAMPLES	DESCRIPTION		
0		Medium brown and gray clay with silt traces		
		Stiff tan and gray clay		
5		Medium brown and gray clay with silt pockets		
		Very soft tan and gray slightly silty clay		
		Loose gray and tan silt with ½ inch silty clay layer		
10		Loose tan and gray silt		
	☒	Very loose tan and gray clayey silt Penetration resistance	2 blows per foot	(1/1/1)
15		Very loose tan and gray silt		
		Loose tan slightly clayey silt with 1½ inch silty sand layer		
	☒	Loose gray silt Penetration resistance	5 blows per foot	(1/2/3)
20		Loose gray sandy silt		
		Loose gray sand		
25	☒	Loose gray slightly silty sand Penetration resistnace	4 blows per foot	(2/2/2)
		Loose gray sand with 6 inch clay layer		
30		Firm gray sand with 1 inch gray clay layer		
	☒	Firm gray sand Penetration resistance	20 blows per foot	(4/9/11)
		Firm gray sand		
35		Firm gray slightly silty sand with clay pockets		
	☒	Dense gray sand Penetration resistance	30 blows per foot	(6/13/17)
40	☒	Dense gray sand Penetration resistance	32 blows per foot	(10/15/17)

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Geotechnical Engineers

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. Plant No. 2 New Roads, Louisiana
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.
BORING	844
FILE	74-30
DATE	1 May 1977
TECHNICIAN	CCN

UNDISTURBED SAMPLE — STANDARD PENETRATION TEST — BORING DEPTH 47½ Feet

DEPTH FEET	Description		
0	Medium gray and tan clay with root traces		
	Medium gray and tan clay with silt pockets		
5	Loose tan silt with ¼ inch clay layer		
	Loose tan and gray sandy silt		
	Very loose tan and gray silt Penetration resistance	1 blow per foot	(1/1/1)
10	Loose gray slightly clayey silt with clay pockets		
	Very loose tan and gray slightly clayey silt		
15	Very loose tan slightly clayey silt Penetration resistance	3 blows per foot	(1/1/2)
	Loose gray silt		
	Loose brown silt		
20	Loose gray sandy silt Penetration resistance	4 blows per foot	(1/2/2)
	Loose gray sandy silt		
25	Loose gray silt with ¼ inch clay layers		
	Firm gray sand Penetration resistance	11 blows per foot	(2/3/8)
	Firm gray sand with ¼ inch clay layer		
30	Firm gray sand		
	Firm gray sand Penetration resistance	15 blows per foot	(6/6/9)
35	Firm gray sand		
	Firm gray sand		
	Firm gray sand Penetration resistance	14 blows per foot	(4/4/10)
40	Firm gray sand Penetration resistance	28 blows per foot	(4/6/12)
	Sample fell out of bucket Penetration resistance	24 blows per foot	(6/10/14)
45	Dense gray sand Penetration resistance	37 blows per foot	(8/13/24)
	Dense gray sand Penetration resistance	30 blows per foot	(10/14/16)

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

LOG OF BORING

PROJECT: Cajun Electric Power Cooperative, Inc. Plant No. 2
New Roads, Louisiana

BORING 845
FILE 74-30
DATE 24 Apr. 1977
TECHNICIAN GLP

FOR: Cajun Electric Power Cooperative, Inc.
Bovay Engineers, Inc., Burns and Roe, Inc.

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 43½ Feet

Depth (feet)	Description	Penetration	Count
0	Medium tan and gray clay with root traces		
	Medium tan and brown clay with silt traces and root traces		
5	Soft very silty clay		
	Loose tan and gray slightly clayey silt with clay lumps and sand traces		
	Loose tan clayey silt		
10	Very loose tan clayey silt with 1 inch clay Penetration resistance	2 blows per foot	(1/1/1)
	Very loose tan sandy silt with some clay		
15	Firm tan and gray silty sand with 1½ inch silty clay layer and clay pockets		
	Very loose gray silt with 4 inch layer Penetration resistance	2 blows per foot	(1/1/1)
	Very loose gray slightly silt on ½ inch clay at bottom		
20	Loose gray fine sand 7 inch sample bag		
	Firm gray fine sand Penetration resistance	22 blows per foot	(1/5/6)
25	Firm gray sand with 4 inch clay layer at bottom		
	Firm gray fine sand with ½ inch clay layer at bottom		
	Firm gray fine sand Penetration resistance	20 blows per foot	(1/4/6)
30	Dense gray fine sand		
	No recovery		
35	Firm gray fine sand Penetration resistance	15 blows per foot	(1/3/12)
	Firm gray fine sand		
	Firm tan and grey fine sand with ½ inch slightly clayey silt layers		
40	Dense gray fine sand Penetration resistance	34 blows per foot	(13/17/17)
	Dense gray fine sand Penetration resistance	30 blows per foot	(7/13/17)
45			

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. Plant No. 2 New Roads, Louisiana
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc:
BORING	846
FILE	74-30
DATE	29 Apr. 1977
TECHNICIAN	GLP

UNDISTURBED SAMPLE   ☒ STANDARD PENETRATION TEST   BORING DEPTH 43½ Feet

DEPTH FEET	Description		
0	Medium tan and gray clay with traces of wood		
	Very soft tan and gray clay with silt streaks		
5	Soft tan very silty clay		
	Loose tan and gray silt with clay traces		
	Loose brown very clayey silt with 2 inch silty clay layer at top		
10	Loose tan slightly clayey silt wtih clay Penetration resistance	2 blows per foot	(1/1/1)
	Loose tan slightly sandy silt with some clay		
15	Loose tan slightly sandy silt		
	Loose tan fine sand with 3 inch slightly clay Penetration resistance	10 blows per foot	(1/5/5)
20	Firm gray siltyfine sand and silty clay layer		
	Firm tan and light gray sandy silt with ¼ inch and ½ inch layer		
	Loose tan fine sand Penetration resistance	7 blows per foot	(2/2/5)
25	Loose gray silty fine sand with 2 inch clay layer at bottom		
	Firm gray fine sand with clay pockets		
	Loose gray fine sand with 3 inch layer clay Penetration resistance	7 blows per foot	(4/3/4)
30	Firm gray fine sand		
	Firm gray fine sand		
35	Firm gray fine sand Penetration resistance	16 blows per foot	(6/5/11)
	Firm gray fine sand		
	Firm gray fine sand with clay lenses and pockets		
40	Dense gray sand Penetration resistance	41 blows per foot	(9/19/22)
	Dense gray sand Penetration resistance	32 blows per foot	(10/14/18)
45			

PP18185

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. Plant No. 2 New Roads, Louisiana
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.
BORING	847
FILE	74-30
DATE	28 Apr. 1977
TECHNICIAN	GLP

UNDISTURBED SAMPLE — STANDARD PENETRATION TEST — BORING DEPTH 43½ Feet

DEPTH FEET	Description		
0	Medium tan and gray clay		
	Medium tan and gray clay		
5	Soft gray and tan silty clay		
	Loose tan and gray sandy silt		
	Loose tan slightly clayey silt with some clay		
10	Very loose tan silt with 3 inch slightly silty clay		
	Penetration resistance	1 blow for 18 inches	
	Soft tan clay with silt pockets		
15	Very soft gray very silty clayey silt		
	Loose gray silt with 3 inch clay in center		
	Loose gray sandy silt with 3 inch clay layer		
20	Penetration resistance	5 blows per foot	(2/2/3)
	Loose gray slightly sandy silt with some clay		
	Firm gray silty fine sand with clay pocket		
	Sample fell out of barrel		
25	Penetration resistance	1 blow for 18 inches	
	Firm gray fine sand		
	Firm gray fine sand		
30	Loose gray fine sand		
	Penetration resistance	11 blows per foot	(1/3/8)
	Dense gray fine sand with clay pockets		
35	Firm gray fine sand with ¼ inch clay layer in center		
	Firm gray fine sand		
	Penetration resistance (Refusal)	20 blows per foot	(5/8/12)
	Firm gray fine sand		
40	Penetration resistance	21 blows per foot	(6/9/12)
	Dense gray fine sand		
	Penetration resistance	31 blows per foot	(9/14/17)
	Dense gray fine sand		
	Penetration resistance	36 blows per foot	(11/16/20)
45			

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.

Geotechnical Engineers

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc., Plant No. 2 New Roads, Louisiana	BORING	853
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	18 Apr. 1977
		TECHNICIAN	MN

UNDISTURBED SAMPLE — STANDARD PENETRATION TEST — BORING DEPTH 43½ Feet

DEPTH FEET	Description		
0	Stiff tan and gray clay with roots and silt traces		
	Medium tan and gray clay with silt pockets		
5	Very soft tan and gray very silty clay with silt pockets		
	Soft tan and gray silty clay with 4 inch silt layer on bottom		
	Firm tan sandy silt with clay traces		
10	Very loose tan silt with clay pockets and sand traces		
	Loose tan sandy silt with clay traces Penetration resistance	8 blows per foot	(2/3/5)
15	Soft gray very silty clay		
	Soft tan and gray very silty clay with silt lenses and 1" silt layer on bottom		
	Firm brown and gray sandy silt with clay pockets, lenses and ½" clay layer		
	Firm brown silty sand		
20	Firm brown silty sand Penetration resistance	12 blows per foot	(3/5/7)
	Medium gray clay with silt traces and silt lenses		
25	Firm gray silty sand with clay pockets and silt streaks		
	Firm gray silty sand		
	Loose gray silty sand Penetration resistance	9 blows per foot	(2/3/6)
30	Firm gray silty sand		
	Firm gray silty sand		
35	Firm gray silty sand Penetration resistance	15 blows per foot	(2/6/9)
	Firm gray silty sand		
	Firm gray silty sand with clay streaks		
40	Dense gray silty sand Penetration resistance	32 blows per foot	(9/14/18)
	Dense gray silty sand Penetration resistance	31 blows per foot	(7/13/18)

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.

Geotechnical Engineers

LOG OF BORING

PROJECT: Cajun Electric Power Cooperative, Inc. Plant No. 2
New Roads, Louisiana

FOR: Cajun Electric Power Cooperative, Inc.
Bovay Engineers, Inc., Burns and Roe, Inc.

BORING: 854
FILE: 74-30
DATE: 18 Apr. 1977
TECHNICIAN: MN

DEPTH FEET | SAMPLES | ■ UNDISTURBED SAMPLE | ☒ STANDARD PENETRATION TEST | BORING DEPTH 41½ Feet

0

Medium tan and gray clay with roots

Medium tan and gray clay with silt traces

5 Medium tan and gray clay with silt pockets in bottom of sample

Loose tan and gray clayey silt with 3 inch medium clay layer on bottom

Soft tan and gray silty clay with two 1 inch silt layers

10 Medium tan slightly silty clay with silt pockets and lenses

Firm tan and gray slightly sandy slightly clayey silt

Very loose tan and gray slightly sandy slightly clayey silt

Very loose tan and gray very clayey silt with 3 inch very silty clayey layer on bottom

15 Penetration resistance 3 blows per foot (1/1/2)

Loose tan and gray slightly sandy silt with 1½ inch and 3¼ inch clay layer on bottom

Loose gray slightly sandy silt with ½ inch clay layer on bottom

20 Very soft gray silty clay with silt lenses, sand lenses and 2 inch sand layer on bottom

Penetration resistance 6 blows per foot (2/2/4)

Soft gray slightly silty slightly sandy clay with silt streaks and sand pockets

Firm gray slightly silty sand with 1 inch clay layer

25 Very loose gray silty sand with clay pockets

Loose gray silty sand

Penetration resistance 8 blows per foot (2/3/5)

Firm gray silty sand

30

Loose gray silty sand with silt streaks, pockets, and clay streaks and layers

Loose gray silty sand

Penetration resistance 4 blows per foot (1/2/2)

35 Firm gray silty sand

Firm gray silty sand with organic traces

Dense gray silty sand

Penetration resistance 43 blows per foot (12/21/22)

40 Dense gray silty sand

Penetration resistance 34 blows per foot (10/17/17)

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

LOG OF BORING

PROJECT Cajun Electric Power Cooperative, Inc. Plant No. 2
New Roads, Louisiana

FOR Cajun Electric Power Cooperative, Inc.
Bovay Engineers, Inc., Burns and Roe, Inc.

BORING 855
FILE 74-30
DATE 15 Apr. 1977
TECHNICIAN MJK

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 41½ Feet

Depth (ft)	Description		
0	Very stiff tan and gray clay with silt pockets and traces of grass roots		
	Stiff tan and gray clay with silt traces		
5	Loose tan silt with traces of clay and sand		
	Loose tan slightly clayey silt with sand traces		
	Loose tan sandy silt with clay streaks		
10	Firm tan sandy silt Penetration resistance	13 blows per foot	(3/6/7)
	Firm tan sandy silt with 5½ inch layer silty clay		
15	Loose tan sandy silt with clay traces		
	Loose tan fine sandy silt Penetration resistance	8 blows per foot	(2/3/5)
	Firm tan silty fine sand with clay pockets		
20	Loose tan silty fine sand with clay lumps		
	Loose tan silty fine sand Penetration resistance	9 blows per foot	(3/4/5)
25	Loose gray silty fine sand with clay traces		
	Loose gray silty fine sand		
	Loose gray silty fine sand with slightly clayey silt layers and traces of organic matter Penetration resistance	9 blows per foot	(4/4/5)
30	Firm gray very silty fine sand Penetration resistance	20 blows per foot	(4/7/13)
	Dense gray fine sand Penetration resistance	32 blows per foot	(7/14/17)
35	Soft gray clay with silt lenses and 4 inch bottom layer very silty fine sand Penetration resistance	17 blows per foot	(4/7/10)
	Firm gray fine sand Penetration resistance	24 blows per foot	(7/12/12)
	Dense gray fine sand with clay traces Penetration resistance	30 blows per foot	(5/13/17)
40	Dense gray fine sand Penetration resistance	32 blows per foot	(5/10/22)

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.
BORING	856
FILE	74-30
DATE	31 May 1977
TECHNICIAN	NLT

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 10 feet

Depth (feet)	Description
0	Stiff gray clay with silt traces and roots
	Stiff gray clay with silt pockets
5	Firm gray clayey silt with roots
	Firm gray clayey silt
10	Firm gray slightly clayey silt

Boring 857
Boring Depth 10 feet

Depth (feet)	Description
0	Medium dark gray clay with roots
	Medium gray clay
5	Medium gray slightly silty clay
	Medium gray clay with silt pockets
10	Soft gray very silty clay with roots

Boring 858
Boring Depth 10 feet

Depth (feet)	Description
0	Stiff gray clay with silt traces
	Medium gray clay with silt traces
5	Loose gray slightly clayey silt
	Soft gray very silty clay
10	Firm gray silt

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	859
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	2 June 1977
		TECHNICIAN	NLT

DEPTH FEET | SAMPLES | ■ UNDISTURBED SAMPLE | ☒ STANDARD PENETRATION TEST | BORING DEPTH 10 feet

Depth (feet)	Description
0	
	Stiff gray clay with silt traces and roots
	Stiff gray clay with silt traces
5	Loose gray slightly clayey silt
	Soft gray very silty clay
10	Firm gray silt

Boring 860
Boring Depth 10 feet

Depth (feet)	Description
0	
	Stiff gray clay with silt traces and roots
	Medium gray clay with silt traces and roots
5	Soft gray silty clay
	Soft gray slightly silty clay
10	Very loose gray clayey silt

Boring 861
Boring Depth 10 feet

Depth (feet)	Description
0	
	Medium gray clay with silt traces
	Medium gray clay with silt traces
5	Medium gray clay with silt traces
	Medium gray slightly silty clay
10	Loose gray clayey silt

FF18125

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	862
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	2 June 1977
		TECHNICIAN	NLT

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0
Stiff gray clay with silt traces and roots
Stiff gray clay with silt traces
5
Medium gray clay with silt traces
Medium gray clay
Medium gray slightly silty clay with organic traces
10

Boring 863
Boring Depth 10 feet

0
Stiff gray clay with silt traces
Medium gray clay with silt traces
5
Medium gray clay with silt traces
Medium gray clay with silt traces
Soft gray clay with silt traces
10

Boring 864
Boring Depth 10 feet

0
Stiff tan and gray clay with root traces
Stiff tan and gray clay
5
Stiff tan and gray slightly silty clay with silt traces
Medium tan and gray clay with silt traces
Stiff tan and gray clay
10

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.
BORING	865
FILE	74-30
DATE	22 June 1977
TECHNICIAN	DPS

DEPTH FEET | SAMPLES | ■ UNDISTURBED SAMPLE | ☒ STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0
Stiff gray clay with root traces
Stiff tan and gray clay
5
Medium tan and gray clay
Medium tan and gray clay
Medium tan and gray slightly silty clay
10

Boring 866
Boring Depth 10 feet

0
Stiff tan and gray clay with roots
Stiff tan and gray clay with silt traces
5
Medium tan and gray silty clay with silt pockets
Medium tan and gray silty clay
Medium tan and gray silty clay with silt pockets
10

Boring 867
Boring Depth 10 feet

0
Stiff tan and gray slightly silty clay
Very stiff tan and gray silty clay with silt lenses
Loose tan and gray silt with clay pockets
5
Loose tan silt with clay pockets
Very loose tan silt
10

FP18125

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

LOG OF BORING

PROJECT: Cajun Electric Power Cooperative, Inc.
New Roads, Louisiana

FOR: Cajun Electric Power Cooperative, Inc.
Bovay Engineers, Inc., Burns and Roe, Inc.

BORING 868
FILE 74-30
DATE 22 June 1977
TECHNICIAN DPS

DEPTH FEET | SAMPLES | ■ UNDISTURBED SAMPLE | ☒ STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0

Stiff gray clay with roots

Very stiff tan and gray slightly silty clay

5

Medium tan and gray very silty clay with silt pockets

Loose tan and gray silt with clay traces and sand traces

Very loose tan and gray silt with sand traces

10

Boring 869
Boring Depth 10 feet

0

Stiff tan and gray clay with root traces

Stiff tan and gray slightly silty clay

5

Medium tan and gray clayey silt

Loose tan and gray silt with clay traces

Very loose tan silt

10

Boring 870
Boring Depth 10 feet

0

Stiff gray clay with roots

Stiff tan and gray clay

5

Stiff tan and gray clay with silt pockets

Loose tan and gray slightly clayey silt with 2 inch clay on top

Loose tan and gray silt with clay pockets

10

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	871
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	20 June 1977
		TECHNICIAN	OPS

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0

Very stiff tan and gray clay

Stiff tan and gray slightly silty clay with silt pockets

5

Loose tan silt with clay pockets

Loose tan and gray slightly clayey silt with clay pockets

Very loose tan and gray silt with 2 inch clay layer in middle

10

Boring 872

Boring Depth 10 feet

0

Very stiff gray clay

Very stiff tan and gray clay

Stiff tan and gray clay with silt pockets

5

Medium tan and gray slightly silty clay with silt pockets

Soft tan and gray silty clay with 2 inch gray clay on bottom

10

Boring 873

Boring Depth 10 feet

0

Very stiff gray clay with root traces

Very stiff tan and gray slightly silty clay

Stiff tan and gray clay with silt lenses and pockets

5

Medium tan and gray silty clay

Medium tan and gray silty clay with silt pockets and lenses and 2 inch silt layer in middle

10

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	374
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	20 June 1977
		TECHNICIAN	DPS

DEPTH FEET | SAMPLES | ■ UNDISTURBED SAMPLE | ☒ STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0

Very stiff gray clay with root traces

Very stiff tan and gray clay with root traces

5

Stiff tan and gray clay with 2 inch silt layer on bottom

Loose tan and gray silt

Very loose tan and gray silt with clay pockets

10

Boring 875

Boring Depth 10 feet

0

Very stiff gray clay

Stiff tan and gray silty clay

Stiff tan and gray silty clay with 3 inch loose tan silt layer in middle

5

Stiff tan and gray clay with silt pockets and lenses

Medium tan and gray silty clay with silt pockets and lenses and 3 inch silt layer on top

10

Boring 876

Boring Depth 10 feet

0

Stiff tan and gray clay with root traces

Medium tan and gray silty clay

Medium tan and gray silty clay

5

Loose tan and gray slightly clayey silt with sand traces and clay pockets

Loose tan clayey silt with sand traces

10

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

LOG OF BORING

PROJECT: Cajun Electric Power Cooperative, Inc.
New Roads, Louisiana

FOR: Cajun Electric Power Cooperative, Inc.
Bovay Engineers, Inc., Burns and Roe, Inc.

BORING 877
FILE 74-30
DATE 22 June 1977
TECHNICIAN DPS

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 10 feet

Depth (feet)	Description
0	Stiff tan and gray clay with roots
	Medium tan and gray clay
5	Medium tan and gray clay
	Loose tan and gray clayey silt
	Very loose tan silt
10	

Boring 878
Boring Depth 10 feet

Depth (feet)	Description
0	Stiff tan and gray clay with roots
	Stiff tan and gray slightly silty clay
5	Soft tan and gray silty clay
	Loose tan and gray silt with clay and sand traces
	Very loose tan and gray silt
10	

Boring 879
Boring Depth 10 feet

Depth (feet)	Description
0	Stiff tan and gray clay with roots
	Medium tan and gray silty clay
5	Loose slightly clayey silt with clay pockets
	Medium tan and gray silty clay with silt pockets
	Loose tan and gray clayey silt with clay pockets and 2 inch silt layer in middle
10	

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	880
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	23 June 1977
		TECHNICIAN	DPS

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0

Stiff tan and gray clay with root traces

Medium tan and gray clay

5

Soft tan and gray clay

Soft tan and gray silty clay with silt pockets

Loose tan and gray slightly clayey silt with clay pockets

10

Boring 881

Boring Depth 10 feet

0

Stiff tan and gray clay with roots

Stiff tan and gray slightly silty clay

5

Soft tan and gray silty clay with silt pockets

Loose tan and gray slightly clayey silt

Loose tan and gray slightly clayey silt

10

Boring 882

Boring Depth 10 feet

0

Stiff tan and gray clay with root and silt traces

Stiff gray silty clay

5

Medium gray silty clay with ferrous matter

Loose tan and gray slightly clayey silt

Very loose tan and gray silt with clay and sand traces

10

RP18123

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.
BORING	883
FILE	74-30
DATE	23 June 1977
TECHNICIAN	DPS

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH

Stiff tan and gray clay

Firm tan and gray clayey silt with silt pockets

Medium tan and gray silt clay with silt pockets

Medium tan and gray slightly silty clay

Medium tan and gray silty clay with silt pockets

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

FF1A125

LOG OF BORING

Cajun Electric Power Cooperative, Inc.
New Roads, Louisiana
Cajun Electric Power Cooperative, Inc.
Bovay Engineers, Inc., Burns and Roe, Inc.

BORING 837
FILE 74-30
DATE 6 May 1977
TECHNICIAN CCN

UNDISTURBED SAMPLE STANDARD PENETRATION TEST BORING DEPTH 43½ feet

	Stiff tan and gray clay		
	Stiff tan clay with silt and ferrous traces		
	Soft tan and gray clay		
	Loose tan and silt with clay traces		
	Loose tan and gray silt		
	Loose tan and gray silt Penetration Resistance	5 blows per foot	(1/2/3)
	Very loose tan silt		
15	Loose gray silt		
	Very loose gray silt Penetration Resistance	2 blows per foot	(1/1/1)
20	Firm gray sandy silt with 1 inch sand layer		
	Medium gray silty clay		
	Soft gray slightly silty clay Penetration Resistance	5 blows per foot	(2/2/3)
25	Medium gray silty clay with silt pockets		
	Loose gray silt with clay traces		
30	Firm gray clayey silt Penetration Resistance	21 blows per foot	(7/9/12)
	Firm gray silty sand with clay streaks		
	Loose gray slightly sandy silt		
35	Stiff gray clay with silt traces Penetration Resistance	21 blows per foot	(7/10/11)
	Firm gray silty sand with ½ inch clay layer and silt traces		
	N/R and refusal		
40	Dense gray sand Penetration Resistance	30 blows per foot	(10/10/20)
	Dense gray sand Penetration Resistance	45 blows per foot	(10/20/25)

LOG OF BORING

Cajun Electric Power Cooperative, Inc. Plant No. 2
New Roads, Louisiana

Cajun Electric Power Cooperative, Inc.
Bovay Engineers, Inc., Burns and Roe, Inc.

840
74-30
4 May 1977
CCN

UNDISTURBED SAMPLE — STANDARD PENETRATION TEST — BORING DEPTH 39½ Feet

Depth	Description	Blows	Count
0	Stiff brown and gray clay with roots and silt traces		
	Loose tan and gray clayey silt		
5	Loose tan and gray silt with 1½ inch silty clay layer		
	Loose tan silt Penetration resistance	4 blows per foot	(1/2/2)
	Loose tan silt with sand traces		
10	Loose tan silt with sand traces		
	Loose tan sandy silt Penetration resistance	4 blows per foot	(2/2/2)
15	Loose tan silt with sand traces		
	Loose tan and gray silt with 3 inch clay layer		
	Loose gray silt Penetration resistance	4 blows per foot	(2/2/2)
20	Loose gray sandy silt with clay traces		
	Loose gray sandy silt		
25	No Recovery Penetration resistance	15 blows per foot	(2/5/10)
	Loose gray slightly sandy silt		
	Loose gray slightly sandy silt		
30	Firm gray silt Penetration resistance	12 blows per foot	(4/5/7)
	Firm gray sand with clay lenses		
35	Firm gray silty sand		
	Dense gray slightly silty sand Penetration resistance	32 blows per foot	(5/15/17)
	Dense gray slightly silty sand Penetration resistance	35 blows per foot	(5/13/22)
40			

LOG OF BORING

Cajun Electric Power Cooperative, Inc. Plant No. 2
New Roads, Louisiana

Cajun Electric Power Cooperative, Inc.
Bovay Engineers, Inc., Burns and Roe, Inc.

BORING 845
FILE 74-30
DATE 24 Apr. 1977
TECHNICIAN GLP

UNDISTURBED SAMPLE ☒ STANDARD PENETRATION TEST BORING DEPTH 43½ Feet

	Medium tan and gray clay with root traces		
	Medium tan and brown clay with silt traces and root traces		
5	Soft very silty clay		
	Loose tan and gray slightly clayey silt with clay lumps and sand traces		
	Loose tan clayey silt		
10	Very loose tan clayey silt with 1 inch clay Penetration resistance	2 blows per foot	(1/1/1)
	Very loose tan sandy silt with some clay		
15	Firm tan and gray silty sand with 1½ inch silty clay layer and clay pockets		
	Very loose gray silt with 4 inch layer Penetration resistance	2 blows per foot	(1/1/1)
	Very loose gray slightly silt on ½ inch clay at bottom		
20	Loose gray fine sand 7 inch sample bag		
	Firm gray fine sand Penetration resistance	22 blows per foot	(1/5/6)
25	Firm gray sand with 4 inch clay layer at bottom		
	Firm gray fine sand with ½ inch clay layer at bottom		
	Firm gray fine sand Penetration resistance	20 blows per foot	(1/4/6)
30	Dense gray fine sand		
	No recovery		
35	Firm gray fine sand Penetration resistance	15 blows per foot	(1/3/12)
	Firm gray fine sand		
	Firm tan and gray fine sand with ½ inch slightly clayey silt layers		
40	Dense gray fine sand Penetration resistance	34 blows per foot	(13/17/17)
	Dense gray fine sand Penetration resistance	30 blows per foot	(7/13/17)
45			

LOG OF BORING

Cajun Electric Power Cooperative, Inc., Plant No. 2
New Roads, Louisiana
Cajun Electric Power Cooperative, Inc.
Bovay Engineers, Inc., Burns and Roe, Inc.

BORING 353
JOB 74-30
DATE 18 Apr. 1977
TECHNICIAN MN

■ UNDISTURBED SAMPLE ☒ STANDARD PENETRATION TEST BORING DEPTH 43' Feet

	Stiff tan and gray clay with roots and silt traces		
	Medium tan and gray clay with silt pockets		
5	Very soft tan and gray very silty clay with silt pockets		
	Soft tan and gray silty clay with 4 inch silt layer on bottom		
	Firm tan sandy silt with clay traces		
10	Very loose tan silt with clay pockets and sand traces		
	Loose tan sandy silt with clay traces Penetration resistance	8 blows per foot	(2/3/5)
15	Soft gray very silty clay		
	Soft tan and gray very silty clay with silt lenses and 1" silt layer on bottom		
	Firm brown and gray sandy silt with clay pockets, lenses and ½" clay layer		
	Firm brown silty sand		
20	Firm brown silty sand Penetration resistance	12 blows per foot	(3/5/7)
	Medium gray clay with silt traces and silt lenses		
25	Firm gray silty sand with clay pockets and silt streaks		
	Firm gray silty sand		
	Loose gray silty sand		
30	Penetration resistance	9 blows per foot	(2/3/6)
	Firm gray silty sand		
	Firm gray silty sand		
35	Firm gray silty sand Penetration resistance	15 blows per foot	(2/6/9)
	Firm gray silty sand		
	Firm gray silty sand with clay streaks		
40	Dense gray silty sand Penetration resistance	32 blows per foot	(9/14/18)
	Dense gray silty sand Penetration resistance	31 blows per foot	(7/13/18)

LOG OF BORING

Cajun Electric Power Cooperative, Inc. Plant No. 2	BORING 854
New Roads, Louisiana	FILE 74-30
Cajun Electric Power Cooperative, Inc.	DATE 18 Apr. 1977
Bovay Engineers, Inc., Burns and Roe, Inc.	TECHNICIAN MR

SAMPLE ■ NO STUBBED SAMPLE ☒ STANDARD PENETRATION TEST BORING DEPTH 41'. Feet

Medium tan and gray clay with roots

Medium tan and gray clay with silt traces

Medium tan and gray clay with silt pockets in bottom of sample

Loose tan and gray clayey silt with 3 inch medium clay layer on bottom

Soft tan and gray silty clay with two 1 inch silt layers

Medium tan slightly silty clay with silt pockets and lenses

Firm tan and gray slightly sandy slightly clayey silt

Very loose tan and gray slightly sandy slightly clayey silt

Very loose tan and gray very clayey silt with 3 inch very silty clayey layer on bottom

Penetration resistance 3 blows per foot (1/1/2)

Loose tan and gray slightly sandy silt with 1½ inch and 3½ inch clay layer on bottom

Loose gray slightly sandy silt with ½ inch clay layer on bottom

Very soft gray silty clay with silt lenses, sand lenses and 2 inch sand layer on bottom

Penetration resistance 6 blows per foot (2/2/4)

Soft gray slightly silty slightly sandy clay with silt streaks and sand pockets

Firm gray slightly silty sand with 1 inch clay layer

Very loose gray silty sand with clay pockets

Loose gray silty sand

Penetration resistance 8 blows per foot (2/3/5)

Firm gray silty sand

Loose gray silty sand with silt streaks, pockets, and clay streaks and layers

Loose gray silty sand

Penetration resistance 4 blows per foot (1/2/2)

Firm gray silty sand

Firm gray silty sand with organic traces

Dense gray silty sand

Penetration resistance 43 blows per foot (12/21/22)

Dense gray silty sand

Penetration resistance 34 blows per foot (10/17/17)

LOG OF BORING

Cajun Electric Power Cooperative, Inc. Plant No. 2
New Roads, Louisiana

Cajun Electric Power Cooperative, Inc.
Bovay Engineers, Inc., Burns and Roe, Inc.

BORING 855
FILE 74-30
DATE 15 Apr. 1977
TECHNICIAN MJK

UNDISTURBED SAMPLE   STANDARD PENETRATION TEST   BORING DEPTH 41' Feet

Very stiff tan and gray clay with silt pockets and traces of grass roots

Stiff tan and gray clay with silt traces

5 Loose tan silt with traces of clay and sand

Loose tan slightly clayey silt with sand traces

Loose tan sandy silt with clay streaks

10 Firm tan sandy silt
Penetration resistance   13 blows per foot   (3/6/7)

Firm tan sandy silt with 5½ inch layer silty clay

15 Loose tan sandy silt with clay traces

Loose tan fine sandy silt
Penetration resistance   8 blows per foot   (2/3/5)

Firm tan silty fine sand with clay pockets

20 Loose tan silty fine sand with clay lumps

Loose tan silty fine sand
Penetration resistance   9 blows per foot   (3/4/5)

25 Loose gray silty fine sand with clay traces

Loose gray silty fine sand

Loose gray silty fine sand with slightly clayey silt layers and traces of organic matter
30 Penetration resistance   9 blows per foot   (4/4/5)

Firm gray very silty fine sand
Penetration resistance   20 blows per foot   (4/7/13)

Dense gray fine sand
Penetration resistance   32 blows per foot   (7/14/17)

35 Soft gray clay with silt lenses and 4 inch bottom layer very silty fine sand
Penetration resistance   17 blows per foot   (4/7/10)

Firm gray fine sand
Penetration resistance   24 blows per foot   (7/12/12)

Dense gray fine sand with clay traces
Penetration resistance   30 blows per foot   (5/13/17)

40 Dense gray fine sand
Penetration resistance   32 blows per foot   (5/10/22)

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.
BORING	856
FILE	74-30
DATE	31 May 1977
TECHNICIAN	NLT

UNDISTURBED SAMPLE ■ STANDARD PENETRATION TEST ☒ BORING DEPTH 10 feet

DEPTH FEET	DESCRIPTION
0	Stiff gray clay with silt traces and roots
	Stiff gray clay with silt pockets
5	Firm gray clayey silt with roots
	Firm gray clayey silt
10	Firm gray slightly clayey silt

Boring 857
Boring Depth 10 feet

DEPTH FEET	DESCRIPTION
0	Medium dark gray clay with roots
	Medium gray clay
5	Medium gray slightly silty clay
	Medium gray clay with silt pockets
10	Soft gray very silty clay with roots

Boring 858
Boring Depth 10 feet

DEPTH FEET	DESCRIPTION
0	Stiff gray clay with silt traces
	Medium gray clay with silt traces
5	Loose gray slightly clayey silt
	Soft gray very silty clay
10	Firm gray silt

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

FF18125

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.

BORING 859
FILE 74-30
DATE 2 June 1977
TECHNICIAN NLT

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 10 feet

DEPTH FEET	Description
0	
	Stiff gray clay with silt traces and roots
	Stiff gray clay with silt traces
5	Loose gray slightly clayey silt
	Soft gray very silty clay
10	Firm gray silt

Boring 860
Boring Depth 10 feet

DEPTH FEET	Description
0	
	Stiff gray clay with silt traces and roots
	Medium gray clay with silt traces and roots
5	Soft gray silty clay
	Soft gray slightly silty clay
10	Very loose gray clayey silt

Boring 861
Boring Depth 10 feet

DEPTH FEET	Description
0	
	Medium gray clay with silt traces
	Medium gray clay with silt traces
5	Medium gray clay with silt traces
	Medium gray slightly silty clay
10	Loose gray clayey silt

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.

FF18125

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	862
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	2 June 1977
		TECHNICIAN	NLT

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0

Stiff gray clay with silt traces and roots

Stiff gray clay with silt traces

5

Medium gray clay with silt traces

Medium gray clay

Medium gray slightly silty clay with organic traces

10

Boring 863

Boring Depth 10 feet

0

Stiff gray clay with silt traces

Medium gray clay with silt traces

5

Medium gray clay with silt traces

Medium gray clay with silt traces

Soft gray clay with silt traces

10

Boring 864

Boring Depth 10 feet

0

Stiff tan and gray clay with root traces

Stiff tan and gray clay

5

Stiff tan and gray slightly silty clay with silt traces

Medium tan and gray clay with silt traces

Stiff tan and gray clay

10

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.

Geotechnical Engineers

FF18125

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	865
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	22 June 1977
		TECHNICIAN	DPS

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0

Stiff gray clay with root traces

Stiff tan and gray clay

5

Medium tan and gray clay

Medium tan and gray clay

Medium tan and gray slightly silty clay

10

Boring 866

Boring Depth 10 feet

0

Stiff tan and gray clay with roots

Stiff tan and gray clay with silt traces

5

Medium tan and gray silty clay with silt pockets

Medium tan and gray silty clay

Medium tan and gray silty clay with silt pockets

10

Boring 867

Boring Depth 10 feet

0

Stiff tan and gray slightly silty clay

Very stiff tan and gray silty clay with silt lenses

5

Loose tan and gray silt with clay pockets

Loose tan silt with clay pockets

Very loose tan silt

10

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

LOG OF BORING

PROJECT: Cajun Electric Power Cooperative, Inc.
New Roads, Louisiana

FOR: Cajun Electric Power Cooperative, Inc.
Bovay Engineers, Inc., Burns and Roe, Inc.

BORING 868
FILE 74-30
DATE 22 June 1977
TECHNICIAN DPS

DEPTH FEET | SAMPLES | ■ UNDISTURBED SAMPLE | ☒ STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0
Stiff gray clay with roots
Very stiff tan and gray slightly silty clay
5
Medium tan and gray very silty clay with silt pockets
Loose tan and gray silt with clay traces and sand traces
Very loose tan and gray silt with sand traces
10

Boring 869
Boring Depth 10 feet

0
Stiff tan and gray clay with root traces
Stiff tan and gray slightly silty clay
5
Medium tan and gray clayey silt
Loose tan and gray silt with clay traces
Very loose tan silt
10

Boring 870
Boring Depth 10 feet

0
Stiff gray clay with roots
Stiff tan and gray clay
5
Stiff tan and gray clay with silt pockets
Loose tan and gray slightly clayey silt with 2 inch clay on top
Loose tan and gray silt with clay pockets
10

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

FF18125

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	371
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	20 June 1977
		TECHNICIAN	DPS

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 10 feet

Depth	Description
0	Very stiff tan and gray clay
	Stiff tan and gray slightly silty clay with silt pockets
5	Loose tan silt with clay pockets
	Loose tan and gray slightly clayey silt with clay pockets
10	Very loose tan and gray silt with 2 inch clay layer in middle

Boring 872

Boring Depth 10 feet

Depth	Description
0	Very stiff gray clay
	Very stiff tan and gray clay
	Stiff tan and gray clay with silt pockets
5	Medium tan and gray slightly silty clay with silt pockets
10	Soft tan and gray silty clay with 2 inch gray clay on bottom

Boring 873

Boring Depth 10 feet

Depth	Description
0	Very stiff gray clay with root traces
	Very stiff tan and gray slightly silty clay
5	Stiff tan and gray clay with silt lenses and pockets
	Medium tan and gray silty clay
10	Medium tan and gray silty clay with silt pockets and lenses and 2 inch silt layer in middle

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	374
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	20 June 1977
		TECHNICIAN	DPS

DEPTH FEET | SAMPLES | ■ UNDISTURBED SAMPLE | ☒ STANDARD PENETRATION TEST | BORING DEPTH 10 feet

Depth (feet)	Description
0	Very stiff gray clay with root traces
	Very stiff tan and gray clay with root traces
5	Stiff tan and gray clay with 2 inch silt layer on bottom
	Loose tan and gray silt
	Very loose tan and gray silt with clay pockets
10	

Boring 875

Boring Depth 10 feet

Depth (feet)	Description
0	Very stiff gray clay
	Stiff tan and gray silty clay
	Stiff tan and gray silty clay with 3 inch loose tan silt layer in middle
5	Stiff tan and gray clay with silt pockets and lenses
	Medium tan and gray silty clay with silt pockets and lenses and 3 inch silt layer on top
10	

Boring 876

Boring Depth 10 feet

Depth (feet)	Description
0	Stiff tan and gray clay with root traces
	Medium tan and gray silty clay
5	Medium tan and gray silty clay
	Loose tan and gray slightly clayey silt with sand traces and clay pockets
	Loose tan clayey silt with sand traces
10	

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.

Geotechnical Engineers

LOG OF BORING

PROJECT: Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING 877
	FILE 74-30
FOR: Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE 22 June 1977
	TECHNICIAN DPS

DEPTH FEET | SAMPLES | ■ UNDISTURBED SAMPLE | ☒ STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0
Stiff tan and gray clay with roots

Medium tan and gray clay

5
Medium tan and gray clay

Loose tan and gray clayey silt

Very loose tan silt
10

Boring 878
Boring Depth 10 feet

0
Stiff tan and gray clay with roots

Stiff tan and gray slightly silty clay

5
Soft tan and gray silty clay

Loose tan and gray silt with clay and sand traces

Very loose tan and gray silt
10

Boring 879
Boring Depth 10 feet

0
Stiff tan and gray clay with roots

Medium tan and gray silty clay

5
Loose slightly clayey silt with clay pockets

Medium tan and gray silty clay with silt pockets

Loose tan and gray clayey silt with clay pockets and 2 inch silt layer in middle
10

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Geotechnical Engineers

FP18125

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	880
		FILE	74-30
FOR	Cajun Electric Power Cooperative, Inc. Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	23 June 1977
		TECHNICIAN	DPS

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH 10 feet

0

Stiff tan and gray clay with root traces

Medium tan and gray clay

5

Soft tan and gray clay

Soft tan and gray silty clay with silt pockets

Loose tan and gray slightly clayey silt with clay pockets

10

Boring 881

Boring Depth 10 feet

0

Stiff tan and gray clay with roots

Stiff tan and gray slightly silty clay

5

Soft tan and gray silty clay with silt pockets

Loose tan and gray slightly clayey silt

Loose tan and gray slightly clayey silt

10

Boring 882

Boring Depth 10 feet

0

Stiff tan and gray clay with root and silt traces

Stiff gray silty clay

5

Medium gray silty clay with ferrous matter

Loose tan and gray slightly clayey silt

Very loose tan and gray silt with clay and sand traces

10

KP18123

LOG OF BORING

PROJECT	Cajun Electric Power Cooperative, Inc. New Roads, Louisiana	BORING	883
	Cajun Electric Power Cooperative, Inc.	FILE	74-30
FOR	Bovay Engineers, Inc., Burns and Roe, Inc.	DATE	23 June 1977
		TECHNICIAN	DPS

DEPTH FEET | SAMPLES | UNDISTURBED SAMPLE | STANDARD PENETRATION TEST | BORING DEPTH

Stiff tan and gray clay

Firm tan and gray clayey silt with silt pockets

Medium tan and gray silt clay with silt pockets

Medium tan and gray slightly silty clay

Medium tan and gray silty clay with silt pockets

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

LOG OF BORING

Project:	Bottom Ash Storage Pond Expansion	Boring:	1
	Big Cajun II, Pointe Coupee Parish, Louisiana	File:	05-58
For:	Shaw Environmental & Infrastructure, Inc.	Date:	24-Aug-05
	Baton Rouge, Louisiana	Technician:	PN

Undisturbed Sample
Standard Penetration Test
Classification Sample
(SLS) Slickensided

Boring Depth: 70 Feet

Depth Feet	SAMPLES	Description	Remarks
0	Classification Sample	Fly ash and gravel with clay traces	Cement-bentonite grout backfill full depth
5	Undisturbed Sample	Stiff gray clay with gravel and fly ash	
10	Undisturbed Sample	Very stiff gray clay	
15	Undisturbed Sample	Stiff tan and gray clay	
20	Undisturbed Sample	Stiff tan and gray clay	
25	Undisturbed Sample	Soft gray silty clay	
30	Undisturbed Sample	Firm brown silty fine sand	
35	Undisturbed Sample	Soft gray slightly silty clay	
40	Standard Penetration Test	Firm gray fine sand with silt traces	19 blows per foot (11/11/8)
45	Standard Penetration Test	Firm gray silty fine sand	24 blows per foot (10/11/13)
50	Standard Penetration Test	Firm gray fine sand with silt traces	25 blows per foot (10/12/13)

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

LOG OF BORING

Project:	Bottom Ash Storage Pond Expansion	Boring:	1
	Big Cajun II, Pointe Coupee Parish, Louisiana	File:	05-58
For:	Shaw Environmental & Infrastructure, Inc.	Date:	24-Aug-05
	Baton Rouge, Louisiana	Technician:	PN

■ Undisturbed Sample
☒ Standard Penetration Test
◫ Classification Sample
(SLS) Slickensided

Boring Depth: 70 Feet

Depth Feet	SAMPLES	Description	Blows
50			
55	☒	Firm gray fine sand with silt traces	21 blows per foot (6/9/12)
60	☒	Firm light gray fine sand with silt traces	23 blows per foot (7/12/11)
65	☒	Firm light gray fine sand with silt traces	20 blows per foot (9/5/15)
70	☒	Dense light gray fine sand with silt traces	37 blows per foot (12/17/20)

LOG OF BORING

Project:	Bottom Ash Storage Pond Expansion	Boring:	3
	Big Cajun II, Pointe Coupee Parish, Louisiana	File:	05-58
For:	Shaw Environmental & Infrastructure, Inc.	Date:	24-Aug-05
	Baton Rouge, Louisiana	Technician:	PN

■ Undisturbed Sample
☒ Standard Penetration Test
◫ Classification Sample
(SLS) Slickensided

Boring Depth: 50 Feet

Depth Feet	SAMPLES	Description	
0		Hard tan and gray clay with roots	Cement-bentonite grout backfill full depth
		Very stiff tan and gray clay with ferrous nodules	
5		Very stiff tan and gray clay with sand streaks and pockets	
		Soft tan sandy clay with sand pockets	
		Very soft tan and gray very sandy clay	
10			
		Tan silty fine sand with clay traces	
15			
		Loose brown sandy silt	8 blows per foot (2/2/6)
		No sample recovered	
20			
		Firm brown fine sand with silt traces	14 blows per foot (6/8/6)
		Dense light gray fine sand with silt traces	31 blows per foot (5/15/16)
25			
		Firm light gray silty fine sand	23 blows per foot (9/11/12)
30			
		Dense light gray fine sand with silt traces	46 blows per foot (16/24/22)
35			
		Dense light gray fine sand with silt traces	34 blows per foot (11/17/17)
40			
		Very dense light gray fine sand with silt traces	40 blows per foot (15/19/21)
45			
		Dense light gray fine sand	34 blows per foot (17/18/16)
50			

LOG OF BORING

Project:	Bottom Ash Storage Pond Expansion	Boring:	4
	Big Cajun II, Pointe Coupee Parish, Louisiana	File:	05-58
For:	Shaw Environmental & Infrastructure, Inc.	Date:	24-Aug-05
	Baton Rouge, Louisiana	Technician:	JP

Depth Feet | SAMPLES

■ Undisturbed Sample
☒ Standard Penetration Test
◫ Classification Sample
(SLS) Slickensided

Boring Depth: 70 Feet

Depth (Feet)	Description	Remarks
0	Tan and gray fly ash and sand	Cement-bentonite grout backfill full depth
	Hard brown, tan, and gray clay	
5		
	Stiff tan and gray slightly sandy clay	
10		
	Very stiff tan and gray clay with sand streaks and pockets	
15		
	Stiff gray clay	
20		
	Stiff tan and gray clay	
25		
	Very soft tan and gray silty clay with 3 inch clayey silt layer	
30		
	Soft tan and gray very silty clay with 1 inch clayey silt layer	
35		
	Firm tan silty fine sand	
40	Firm tan and gray silty fine sand	11 blows per foot (7/5/6)
45		
	Firm gray fine sand with silt traces	26 blows per foot (11/13/13)
50		

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

LOG OF BORING

Project:	Bottom Ash Storage Pond Expansion	Boring:	4
	Big Cajun II, Pointe Coupee Parish, Louisiana	File:	05-58
For:	Shaw Environmental & Infrastructure, Inc.	Date:	25-Aug-05
	Baton Rouge, Louisiana	Technician:	JP

Undisturbed Sample
Standard Penetration Test
Classification Sample
(SLS) Slickensided

Boring Depth: 70 Feet

Depth Feet	SAMPLES	Description	Remarks
50			
55			
60	Standard Penetration Test	Dense gray fine sand with silt traces	34 blows per foot (15/16/18)
65			
70	Standard Penetration Test	Dense gray fine sand with silt traces	36 blows per foot (16/17/19)

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Geotechnical Engineers

LOG OF BORING

Project:	Bottom Ash Storage Pond Expansion Big Cajun II, Pointe Coupee Parish, Louisiana	Boring:	5
		File:	05-58
For:	Shaw Environmental & Infrastructure, Inc. Baton Rouge, Louisiana	Date:	25-Aug-05
		Technician:	JP

Undisturbed Sample
Standard Penetration Test
Classification Sample
(SLS) Slickensided

Boring Depth: 70 Feet

Depth Feet	SAMPLES	Description	Remarks
0	Undisturbed	Very stiff brown slightly silty clay with fly ash	Cement-bentonite grout backfill full depth
5	Undisturbed	Very stiff brown silty clay	
10	Undisturbed	Stiff tan and gray clay	
15	Undisturbed	Stiff tan and gray clay with ferrous nodules	
20	Undisturbed	Medium tan and gray slightly silty clay	
25	Undisturbed	Medium gray silty clay	
30	Undisturbed	Loose tan and gray clayey silt	
35	Undisturbed	Soft tan and gray very silty clay	
40	Undisturbed	Loose gray silty fine sand with clay lenses	
45	Undisturbed	Medium gray slightly sandy clay with sand lenses	
50	Standard Penetration Test	Firm gray sandy silt	12 blows per foot (3/6/6)

LOG OF BORING

Project:	Bottom Ash Storage Pond Expansion	Boring:	5
	Big Cajun II, Pointe Coupee Parish, Louisiana	File:	05-58
For:	Shaw Environmental & Infrastructure, Inc.	Date:	25-Aug-05
	Baton Rouge, Louisiana	Technician:	JP

Undisturbed Sample
Standard Penetration Test
Classification Sample
(SLS) Slickensided

Boring Depth: 70 Feet

Depth Feet	SAMPLES	Description	
50			
55			
60	☒	Dense gray fine sand with silt traces	35 blows per foot (15/17/18)
65			
70	☒	Dense gray fine sand with silt traces	36 blows per foot (14/18/18)

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Geotechnical Engineers

LOG OF BORING

Project:	Bottom Ash Storage Pond Expansion	Boring:	6
	Big Cajun II, Pointe Coupee Parish, Louisiana	File:	05-58
For:	Shaw Environmental & Infrastructure, Inc.	Date:	26-Aug-05
	Baton Rouge, Louisiana	Technician:	JP

Legend: ■ Undisturbed Sample; ☒ Standard Penetration Test; ▯ Classification Sample; (SLS) Slickensided

Boring Depth: 55 Feet

Depth Feet	SAMPLES	Description	Remarks
0	Classification Sample	Brown fly ash with clayey sand pockets and roots	Cement-bentonite grout backfill full depth
5	Undisturbed Sample	Hard tan and gray slightly silty clay	
10	Undisturbed Sample	Stiff tan and gray clay	
15	Undisturbed Sample	Stiff tan and gray clay	
20	Undisturbed Sample	Stiff gray clay	
25	Undisturbed Sample	Stiff tan and gray clay	
30	Undisturbed Sample	Very soft tan and gray very silty clay with 3 inch clayey silt layer	
35	Undisturbed Sample	Loose tan and gray clayey silt	
40		No sample recovered	
	Standard Penetration Test	Dense tan and gray fine sand with silt and clay traces	39 blows per foot (13/13/26)
45	Standard Penetration Test	Very dense tan and gray fine sand with silt traces	53 blows per foot (12/22/31)
50	Standard Penetration Test	Dense gray fine sand with silt traces	43 blows per foot (17/21/22)

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Geotechnical Engineers

LOG OF BORING

Project:	Bottom Ash Storage Pond Expansion	Boring:	6
	Big Cajun II, Pointe Coupee Parish, Louisiana	File:	05-58
For:	Shaw Environmental & Infrastructure, Inc.	Date:	26-Aug-05
	Baton Rouge, Louisiana	Technician:	JP

Undisturbed Sample
Standard Penetration Test
Classification Sample
(SLS) Slickensided

Boring Depth: 55 Feet

Depth Feet	SAMPLES	Description	
50			
	☒	Dense gray fine sand with silt traces	45 blows per foot (20/18/27)
55			

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LOG OF BORING

Project:	Bottom Ash Storage Pond Expansion	Boring:	7
	Big Cajun II, Pointe Coupee Parish, Louisiana	File:	05-58
For:	Shaw Environmental & Infrastructure, Inc.	Date:	26-Aug-05
	Baton Rouge, Louisiana	Technician:	JP

Legend: ■ Undisturbed Sample; ☒ Standard Penetration Test; ▯ Classification Sample; (SLS) Slickensided

Boring Depth: 70 Feet

Depth Feet	SAMPLES	Description	Remarks
0–2	Classification Sample	Black and brown fly ash	Cement-bentonite grout backfill full depth
3–5	Undisturbed Sample	Hard tan and gray clay	
8–10	Undisturbed Sample	Very stiff tan and gray slightly silty clay	
13–15	Undisturbed Sample	Very stiff tan and gray clay with silt pockets	
18–20	Undisturbed Sample	Stiff gray clay	
23–25	Undisturbed Sample	Stiff tan and gray clay with silt pockets	
28–30	Undisturbed Sample	Medium tan and gray clay with ferrous nodules	
33–35	Undisturbed Sample	Very soft tan and gray very silty clay with ferrous nodules	
38–40		No sample recovered	
40–42	Standard Penetration Test	Very stiff gray silty clay	17 blows per foot (4/7/10)
48–50	Undisturbed Sample	Medium gray very silty clay	

LOG OF BORING

Project:	Bottom Ash Storage Pond Expansion	Boring:	7
	Big Cajun II, Pointe Coupee Parish, Louisiana	File:	05-58
For:	Shaw Environmental & Infrastructure, Inc.	Date:	26-Aug-05
	Baton Rouge, Louisiana	Technician:	JP

Depth Feet | SAMPLES

■ Undisturbed Sample
☒ Standard Penetration Test
◫ Classification Sample
(SLS) Slickensided

Boring Depth: 70 Feet

Depth Feet	Samples	Description	
50			
55			
60	☒	Dense gray fine sand with silt traces	34 blows per foot (10/16/18)
65			
70	☒	Very dense gray sand with silt traces	78 blows per foot (18/36/42)

LOG OF BORING

Project:	Bottom Ash Storage Pond Expansion	Boring:	8
	Big Cajun II, Pointe Coupee Parish, Louisiana	File:	05-58
For:	Shaw Environmental & Infrastructure, Inc.	Date:	1-Sep-05
	Baton Rouge, Louisiana	Technician:	PN

Undisturbed Sample
Standard Penetration Test
Classification Sample
(SLS) Slickensided

Boring Depth: 55 Feet

Depth Feet	SAMPLES	Description	Remarks
0	Classification Sample	Brown and black coal and fly ash	Cement-bentonite grout backfill full depth
5	Undisturbed Sample	Brown and black fly ash with clay pockets	
10	Undisturbed Sample	Stiff tan and gray slightly sandy clay	
15	Undisturbed Sample	Stiff tan and gray clay	
20	Undisturbed Sample	Stiff tan and gray clay	
25	Undisturbed Sample	Soft tan and gray very silty clay	
30	Undisturbed Sample	Loose tan and gray clayey sand	
35	Undisturbed Sample	Loose tan sandy silt	
40	Classification Sample	Gray silty fine sand	
	Standard Penetration Test	Firm light gray silty fine sand	23 blows per foot (7/10/13)
45	Standard Penetration Test	Dense light gray silty fine sand	34 blows per foot (10/17/17)
50	Standard Penetration Test	Dense light gray fine sand with silt traces	35 blows per foot (7/17/18)

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

LOG OF BORING

Project:	Bottom Ash Storage Pond Expansion	Boring:	8
	Big Cajun II, Pointe Coupee Parish, Louisiana	File:	05-58
For:	Shaw Environmental & Infrastructure, Inc.	Date:	1-Sep-05
	Baton Rouge, Louisiana	Technician:	PN

Depth Feet | SAMPLES

■ Undisturbed Sample
☒ Standard Penetration Test
◫ Classification Sample
(SLS) Slickensided

Boring Depth: 55 Feet

Depth (Feet)	Samples	Description	Remarks
50			
	☒	Dense light gray fine sand with silt traces	32 blows per foot (10/15/17)
55			

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Geotechnical Engineers

LOG OF BORING

Project:	Bottom Ash Storage Pond Expansion	Boring:	9
	Big Cajun II, Pointe Coupee Parish, Louisiana	File:	05-58
For:	Shaw Environmental & Infrastructure, Inc.	Date:	1-Sep-05
	Baton Rouge, Louisiana	Technician:	PN

Undisturbed Sample
Standard Penetration Test
Classification Sample
(SLS) Slickensided

Boring Depth: 50 Feet

Depth Feet	SAMPLES	Description	
0	Classification	Brown sand with roots	Cement-bentonite grout backfill full depth
	Undisturbed	Very stiff gray sandy clay	
5	Undisturbed	Stiff tan and gray clay	
	Undisturbed	Medium tan and gray clay with ferrous nodules	
10	Undisturbed	Stiff tan and gray silty clay with ferrous nodules	
15	Undisturbed	Loose tan and gray silty fine sand with clay pockets	
20		No sample recovered	
	SPT	Loose light gray sandy silt	6 blows per foot (4/4/2)
25	SPT	Firm light gray silty fine sand with clay traces	18 blows per foot (8/10/8)
30		No sample recovered	
	SPT	Firm light gray silty fine sand	11 blows per foot (4/5/6)
35	SPT	Firm light gray clayey fine sand with organic matter traces	18 blows per foot (4/9/9)
40	SPT	Firm light gray clayey fine sand	28 blows per foot (7/14/14)
45	SPT	Dense light gray fine sand with silt traces	30 blows per foot (10/12/18)
50	SPT	Firm light gray fine sand with silt traces	27 blows per foot (9/13/14)

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

LOG OF BORING

Project:	Bottom Ash Storage Pond Expansion	Boring:	11
	Big Cajun II, Pointe Coupee Parish, Louisiana	File:	05-58
For:	Shaw Environmental & Infrastructure, Inc.	Date:	23-Aug-05
	Baton Rouge, Louisiana	Technician:	JP

■ Undisturbed Sample
☒ Standard Penetration Test
◫ Classification Sample
(SLS) Slickensided

Boring Depth: 50 Feet

Depth Feet	SAMPLES	Description	Remarks
0	Undisturbed	Hard brown and gray clay with ferrous nodules	Cement-bentonite grout backfill full depth
	Undisturbed	Hard brown clay	
5	Undisturbed	Very stiff brown and gray clay with silt streaks and organic matter	
	Undisturbed	Medium gray clay	
	Undisturbed	Medium gray clay	
10			
	Undisturbed	Medium gray clay	(SLS)
15			
	Undisturbed	Loose gray clayey sand	
20			
		No sample recovered	
25	SPT	Firm gray silty fine sand	28 blows per foot (7/12/16)
	SPT	Firm gray fine sand with silt traces	15 blows per foot (5/7/8)
30			
	SPT	Dense gray fine sand with silt traces	37 blows per foot (18/18/19)
35			
	SPT	Dense gray fine sand with silt traces	36 blows per foot (17/19/17)
40			
	SPT	Dense gray fine sand	37 blows per foot (13/17/20)
45			
	SPT	Dense gray fine sand	37 blows per foot (16/18/21)
50			

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

LOG OF BORING

Project:	Bottom Ash Storage Pond Expansion	Boring:	12
	Big Cajun II, Pointe Coupee Parish, Louisiana	File:	05-58
For:	Shaw Environmental & Infrastructure, Inc.	Date:	22-Aug-05
	Baton Rouge, Louisiana	Technician:	JP

Legend: ■ Undisturbed Sample; ⊠ Standard Penetration Test; ◫ Classification Sample; (SLS) Stickensided

Boring Depth: 70 Feet

Depth Feet	Samples	Description	Remarks
0–2	Classification Sample	Black fly ash	Cement-bentonite grout backfill full depth
3–5	Undisturbed Sample	Very stiff brown clay with fly ash	
8–10	Undisturbed Sample	Stiff tan and gray clay	
13–15	Undisturbed Sample	Stiff tan and gray clay with silt streaks and ferrous nodules	
18–20	Undisturbed Sample	Stiff gray clay	
23–25	Undisturbed Sample	Soft gray very silty clay	
28–30	Undisturbed Sample	Soft tan and gray silty clay	
33–35		No sample recovered	
35–37	Standard Penetration Test	Firm tan and gray fine sand with silt traces	29 blows per foot (10/10/19)
38–40	Standard Penetration Test	Firm tan and gray fine sand with silt traces	16 blows per foot (8/8/8)
43–45	Standard Penetration Test	Firm gray silty fine sand with clay traces	11 blows per foot (6/3/8)
48–50	Standard Penetration Test	Firm gray silty fine sand with clay traces	22 blows per foot (10/16/16)

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

LOG OF BORING

Project:	Bottom Ash Storage Pond Expansion	Boring:	12
	Big Cajun II, Pointe Coupee Parish, Louisiana	File:	05-58
For:	Shaw Environmental & Infrastructure, Inc.	Date:	22-Aug-05
	Baton Rouge, Louisiana	Technician:	JP

■ Undisturbed Sample
☒ Standard Penetration Test
◫ Classification Sample
(SLS) Slickensided

Boring Depth: 70 Feet

Depth Feet	SAMPLES	Description	Blows
50			
55	☒	Dense gray fine sand with shells and silt traces	30 blows per foot (15/14/16)
60	☒	Dense gray fine sand with shells and silt traces	30 blows per foot (15/13/17)
65	☒	Dense gray fine sand with silt traces	30 blows per foot (12/14/16)
70	☒	Dense gray fine sand with silt traces	43 blows per foot (17/20/23)

LOG OF BORING

Project:	Bottom Ash Storage Pond Expansion	Boring:	13
	Big Cajun II, Pointe Coupee Parish, Louisiana	File:	05-58
For:	Shaw Environmental & Infrastructure, Inc.	Date:	23-Aug-05
	Baton Rouge, Louisiana	Technician:	JP

■ Undisturbed Sample
☒ Standard Penetration Test
◫ Classification Sample
(SLS) Slickensided

Boring Depth: 50 Feet

Depth Feet	SAMPLES	Description	Remarks
0–2	Undisturbed	Black and brown fly ash and sand	Cement-bentonite grout backfill full depth
3–5	Undisturbed	Soft black and brown fly ash and clay	
5		← Fly ash/soil interference at 5 feet	
8–10	Undisturbed	Stiff tan and gray clay	
13–15	Undisturbed	Stiff tan and gray silty clay with ferrous nodules	
18–20	Undisturbed	Stiff tan and gray clay	
23–25	Undisturbed	Medium tan and gray clay with ferrous nodules	
28–30	Undisturbed	Medium tan and gray clay with ferrous nodules	
33–35	Undisturbed	Medium tan and gray very sandy clay	
38–40		No sample recovered	
40–42	SPT	Firm tan and gray silty fine sand	25 blows per foot (9/11/14)
48–50	SPT	Dense gray fine sand with silt traces	31 blows per foot (12/16/15)

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

LOG OF BORING

Project:	Bottom Ash Storage Pond Expansion	Boring:	14
	Big Cajun II, Pointe Coupee Parish, Louisiana	File:	05-58
For:	Shaw Environmental & Infrastructure, Inc.	Date:	23-Aug-05
	Baton Rouge, Louisiana	Technician:	JP

Depth Feet | SAMPLES

- Undisturbed Sample
- Standard Penetration Test
- Classification Sample
- (SLS) Slickensided

Boring Depth: 60 Feet

Depth (Feet)	Description	Remarks
0	Black and brown fly ash	Cement-bentonite grout backfill full depth
	Brown fly ash with clay pockets	
5	← Fly ash/clay interference at 5 feet	
10	Stiff tan and gray clay	
15	Medium tan and gray silty clay	
20	Very stiff tan and gray clay with sand streaks	
25	Stiff tan and gray clay	
30	Soft tan and gray very silty clay	
35	Soft tan and gray very sandy clay	
40	Loose tan and gray silty fine sand	4 blows per foot (6/2/2)
45	Loose gray fine sand with silt traces	
	Firm gray fine sand with silt traces	25 blows per foot (12/12/13)
50	Dense gray fine sand with silt traces	32 blows per foot (15/16/16)

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

LOG OF BORING

Project:	Bottom Ash Storage Pond Expansion	Boring:	14
	Big Cajun II, Pointe Coupee Parish, Louisiana	File:	05-58
For:	Shaw Environmental & Infrastructure, Inc.	Date:	23-Aug-05
	Baton Rouge, Louisiana	Technician:	JP

Undisturbed Sample
Standard Penetration Test
Classification Sample
(SLS) Slickensided

Boring Depth: 60 Feet

Depth Feet	SAMPLES	Description	Blows
50			
55	Standard Penetration Test	Dense gray fine sand with silt traces	31 blows per foot (12/16/15)
60	Standard Penetration Test	Dense gray fine sand with silt traces	46 blows per foot (22/24/22)

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

Appendix A
Document 4d: Sampling and Analysis Plan

Appendix H
Sampling and Analysis Plan

LOUISIANA GENERATING, LLC
BIG CAJUN II
NEW ROADS, POINTE COUPEE PARISH, LOUISIANA

SAMPLING AND ANALYSIS PLAN

Fly Ash Basin
Bottom Ash Basin
Rainfall Surge Pond
Primary Treatment Pond
Secondary Treatment Pond

April 2006

Prepared for:
Louisiana Generating, LLC
112 Telly Street
New Roads, Louisiana

Prepared by:
Shaw Environmental and Infrastructure, Inc.
4171 Essen Lane
Baton Rouge, Louisiana 70809

Table of Contents

List of Exhibits

1.0 Introduction

This document has been developed to describe the Groundwater Sampling and Analysis Plan designed to conduct detection monitoring of the groundwater in the upper most aquifer underlying the Louisiana Generating, LLC, Big Cajun II Power Plant Industrial Solid Waste Surface Impoundments according to LAC 33: VII.521.F.5 as well as LAC33:VII.709.E.1, 2, 3, and 4. The facility is located in Pointe Coupee Parish near New Roads, Louisiana. The five facilities that this plan covers include: the Fly Ash Basin, the Bottom Ash Basin, the Primary Treatment Pond, the Secondary Treatment Pond, and the Rainfall Surge Pond. This Groundwater Sampling and Analysis Plan describes the consistent sampling and analysis procedures which are implemented to ensure that results from detection monitoring sampling events are representative of groundwater quality at the background and downgradient well locations. This Groundwater Sampling and Analysis Plan also describes the procedures to detect, report, and verify changes in the groundwater.

2.0 Groundwater Monitoring System

The groundwater monitoring system for the Big Cajun II impoundments currently consists of five groundwater monitoring wells, 85A through 85E. Specific data for each monitoring well is included as Exhibit 1. All five wells are screened in the uppermost permeable zone, the Alluvial Aquifer, which is a complex series of southerly dipping clay, silt, sand and gravel deposits. The sediment layers dip at the rate of 20 feet per mile. The Alluvial Aquifer is as thick as 200 feet in the site area and is covered by as much as 35 feet of surficial silt, clay, and fine sand. The direction of the regional groundwater flow fluctuates with the level of the Mississippi River.

Potentiometric data from the most recent groundwater monitoring events (included in Exhibit 2), indicate that the groundwater flow direction in the area of the impoundments varies. Potentiometric data from additional points in the area are necessary to better understand the groundwater flow in the area and accurately identify background/upgradient and/or downgradient wells. The location and vicinity of the Big Cajun II facility with respect to the Mississippi River and its associated meander at this location, historical water level measurements in groundwater monitoring wells, Mississippi River elevations, and area precipitation are all factors that need to be considered to better understand the groundwater flow in the area.

Upon DEQ's approval of this groundwater monitoring plan, a minimum of five piezometers will be installed in the locations shown in Exhibit 8. Potentiometric data will be collected from the piezometers, as well as the existing wells, on a monthly basis, for a period of one year. At this point, the data will be evaluated to identify background/upgradient wells or downgradient monitoring wells. Upon review of this data, additional wells will be proposed in order to meet the location requirements of LAC 33:VII.709.E.b.

2.1 Upgradient Groundwater Monitoring

As stated previously, further information is necessary to determine the direction of groundwater flow. Once the additional information is evaluated, an upgradient/ background monitoring well will be identified to represent the quality of background groundwater that has not been affected by leakage from the impoundments.

2.2 Downgradient Groundwater Monitoring

Again, upon evaluation of additional potentiometric data, downgradient monitoring wells will be identified to yield samples that are representative of groundwater passing the relevant point of compliance. Additional wells will be installed as necessary to ensure that the spacing between the downgradient wells does not exceed 800 feet.

3.0 Detection Monitoring Parameters

As required in LAC 33:VII.709.E.3.g, the inorganic and organic parameters selected by Big Cajun II for detection monitoring are indicator parameters or reaction products of water placed in the impoundment. Monitoring these parameters will provide a reliable indication of the presence of contaminants in the groundwater. The detection monitoring parameters are:

- pH
- specific conductance
- temperature
- total dissolved solids
- selenium
- magnesium
- sulfate
- chloride
- calcium
- iron

These parameters were selected based on several factors, and monitoring the selected parameters will provide a reliable indication of the presence of contaminants in the groundwater underlying the impoundments. The parameters ph, specific conductance, temperature, and TDS are widely accepted general groundwater quality indicators. The remaining parameters will enable effective monitoring of the groundwater quality beneath the impoundments since they are the major constituents of the fly ash.

4.0 Sampling and Analysis Plan

Sampling and analysis of the Big Cajun II groundwater wells will be conducted every 6 months for the life of the impoundments and the duration of the post-closure care period, as required by LAC 33:VII.709.E.c and d.

The initial sampling for detection monitoring will occur after receipt of DEQ-SWD approval of this Groundwater Monitoring Plan. The initial sampling will include independent samples collected from each well for analysis of the detection monitoring parameters.

This sampling and analysis plan explains procedures and techniques for:

- sample collection which ensures that collected samples are representative of the zone being monitored and which prevents cross-contamination of or tampering with samples;
- sample preservation and shipment which ensures the integrity and reliability of the sample collected for analysis; and
- chain-of-custody control.

4.1 Sample Collection Procedures

4.1.1 Preparation

To ensure that sample collection procedures provide groundwater samples representative of the zone monitored and to prevent cross-contamination of or tampering with the groundwater samples, Big Cajun II, or its contracted personnel, thoroughly prepares prior to sampling events. Supplies are collected prior to mobilization to the sampling site, to confirm that all necessary sampling equipment will be available at the sampling site. In addition, a review of the Detection Monitoring Parameter Specifications (Exhibit 3) is performed to determine if any chemical preservatives are needed for the sample containers.

4.1.2 Water Elevation Data

Prior to well evacuation or sampling, the water elevation in each well is measured and recorded. The initial water elevation is recorded to the nearest 0.1-foot increment with a water level indicator. The probe is lowered into each well until the buzzer sounds indicating that contact of the probe with the water surface has occurred. Three replicate measurements are made to ensure reproducibility. The depth of water is referenced to the top of the monitoring well casing. This measurement is converted to water elevation in feet above National Geodetic Vertical Datum (NGVD) from the surveyed elevation of the top of the casing. The data is recorded on the Field Data Collection Forms (an example of which is included as Exhibit 4) with date, time, monitoring well number, depth of water, and the name of the person recording the data. The probe is rinsed with deionized water after each use.

4.1.3 Well Evacuation

After water level measurements are taken, a volume of water equal to at least three times the volume of water initially contained in each well is purged to remove stagnant water in the well. If at least three well volumes of water cannot be removed, the well will be purged dry.

4.1.4 Sample Collection

Wells are initially purged and after sufficient time has been allowed for the monitoring wells to recharge (24 hours if the wells are purged to dryness) samples are then collected from the wells. Samples are collected for each well by use of bailers. Care is taken to collect an undisturbed sample to the extent practicable. All sample bottles are pre-washed in accordance with EPA Handbook for Analytical Quality Control in Water and Waste water Laboratories, 1979. A water-resistant marker is used to label the sample bottles, and the container label is checked for proper markings. The sample bottles are sealed using labels or tape to preserve the integrity of the sample until it is analyzed.

4.1.5 Field Measurements

Field measurements of temperature, conductivity, and pH are taken and recorded on the Groundwater Sampling Data Form, and the appearance of the ground water is also noted. The instruments are properly calibrated and calibration data is recorded in the field log book prior to collection of groundwater samples.

4.1.6 Well Maintenance

During sampling events, wells will be inspected for signs of tampering, damage, corrosion, faulty locking devices, etc. Any areas of concern will be noted in the field log book, reported to DEQ-SWD and promptly corrected upon receipt of DEQ-SWD approval.

4.2 Sampling Preservation, Shipment, and Chain-of-Custody

This section provides procedures for sample preservation, shipment, and chain-of-custody control which ensure the integrity and reliability of the samples collected for analysis.

4.2.1 Sample Preservation

Samples collected are immediately preserved in the field by placing them in an insulated ice chest containing ice. Sample bottles provided by the contract laboratory are prepared with the proper preservatives, if necessary.

4.2.2 Sample Shipment

Prior to shipment, sample bottles are double-checked for leaks, cracks, and proper labeling. The samples are then logged by the Field Supervisor on the Chain –of-Custody form (Exhibit 5) and transported, with as few transfers as possible, immediately to the independent analytical laboratory, and the samples are rechecked for breakage or leakage that may have occurred during transport. Samples are then signed over to laboratory personnel according to chain-of-custody procedures. No samples are accepted that are not properly labeled and sealed. Upon receipt, the authorized laboratory personnel stores and/or prepare the samples for analysis, taking into consideration sample holding times for the parameters for which they will be analyzed.

4.2.3 Chain-of-Custody Control

Documentation of responsibility for the sample collected is provided by completing the Chain-of-Custody form (Exhibit 5). The Chain-of-Custody form is initiated in the field at the time of sample collection. The original accompanies the samples through contract laboratory analysis, with copies retained at any intermediate step.

Upon completion of the analysis, the custodian responsible for the analysis completes the Chain-of Custody form, files a copy, and sends a copy to the appropriate Big Cajun II representative along with the analytical results.

5.0 Analytical Procedures

Groundwater monitoring samples will be analyzed using laboratory methods which conform to test methods outlined in U.S. EPA Test Methods for Evaluating Solid Waste, Third Edition (SW-846) or Standard Methods for the Examination of Water and Wastewater, 21st Edition. The test method, method detection limit, and practical quantitation limit for each parameter are included as Exhibit 3 (Detection Monitoring Parameter Specifications).

6.0 Quality Assurance/Quality Control (QA/QC)

This section describes the procedures Big Cajun II implements for quality assurance/quality control, including detection limits, precision and accuracy of analyses, field blanks, and laboratory spikes and blanks.

6.1 Field Quality Control

Field quality control measures, as described earlier in this document, are proven procedures for collecting representative samples, calibrating field testing equipment, preserving samples for analysis, and documenting chain-of-custody. These measures contribute to sampling events producing monitoring results that are reliable indications of groundwater quality.

6.1.1 Field Blank

A field blank is collected to determine potential absorption of volatile organics from the air into a sample. The field blank is collected at the sampling site by filling a container received from the laboratory with deionized water and without the use of any intermediary tubes or vessels. The field blank is labeled with a unique identification number, and standard chain-of-custody procedures are followed. The field blank is subjected to the same laboratory analysis as the samples. The concentration levels of any contaminant found in the field blank will be noted and compared to sample results.

6.1.2 Trip Blank

A trip blank, also known as a laboratory blank, is furnished by the contract laboratory to detect and quantify potential chemical artifacts originating from sample containers, deionized water, or laboratory handling procedures. The trip blank is produced by the laboratory prior to field mobilization. The trip blank is transported to the sampling location and returned to the laboratory with the samples. The trip blank is not opened in the field but is subjected to the same laboratory analysis as the samples. The concentration levels of any contaminant found in the trip blank will be noted and compared to sample results.

6.2 *Laboratory Quality Control*

Big Cajun II submits all groundwater samples to a qualified independent laboratory which performs testing according to documented and approved procedures by trained personnel using calibrated equipment. QA/QC procedures, including field blanks, laboratory spikes and blanks, precision and accuracy of analyses, and detection limits, conform to those specified in SW-846.

7.0 Evaluating Groundwater Data

Within 90 days after the date of sampling, Big Cajun II compares the background groundwater quality of each detection monitoring parameter at each monitoring well and determines whether there has been a statistically significant increase over the background value. Selection of the statistical method used by Big Cajun II is according to the Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Final Guidance, EPA 530-SW-89-026, April 1989.

The statistical method used in evaluating the groundwater monitoring data for each parameter sampled and analyzed is either a parametric analysis of variance (ANOVA) or an ANOVA based on ranks, followed by a multiple comparisons procedures to identify statistically significant evidence of contamination. If a parametric ANOVA is used, it includes estimation and testing of the contrasts between each compliance well's mean and the background mean levels for each parameter. If an ANOVA based on ranks is used, it includes estimation and testing of the contrasts between each compliance well's median and the background median levels for each parameter or constituent. The multiple comparisons procedure has a Type I experiment-wise error rate of no less than 0.005 for each testing period and the individual well comparison procedure maintains a Type I error rate of no less than 0.01 for each testing period. If possible, the method includes procedures to control or correct for seasonal and spatial variability as well as temporal correlation in the data.

Since the proportion of non-detected concentrations and the distribution of data for each parameter may differ, more than one method is occasionally needed so that each parameter is evaluated using the most appropriate method. In the event that the most appropriate method is not readily identifiable, a qualified statistician is consulted for guidance in choosing the most appropriate method. However, the majority of cases are handled by the following guidelines in choosing the most appropriate method.

In determining the most appropriate method for each parameter, the first step is to assess the proportion of non-detected concentrations. If the proportion of non-detects in the data set is greater than 50% but not greater than 90%, then a test of proportions is used since it is appropriate for data sets with approximately that proportion of non-detects. If the proportion of non-detects in the data set is greater than or equal to 15% but not greater than 50%, then the ANOVA based on ranks is used since it is appropriate for data sets with approximately that proportion of non-detects. However, if the proportion of non-detected concentrations is not greater than or equal to 15% of the data set, then the non-detects are replaced with a value that is half of the non-detect level. Please note that if the proportion of non-detected concentrations is greater than 90%, or if some feature of the data is questionable, a qualified statistician is consulted for guidance in choosing the most appropriate method.

The second step in determining the most appropriate method is to determine whether or not the distribution of data for each parameter is normal using a normal theory test. If a normal theory test indicates that the distribution of the data is not normal, the data is mathematically transformed to approximate a normal distribution, if possible. If the data is normally distributed or can be mathematically transformed to approximate a normal distribution, then the parametric ANOVA is used; if not, the ANOVA based on ranks is used since it is a distribution-free method.

Should a statistically significant increase over background values for one or more parameter be determined, Big Cajun II will notify DEQ-SWD according to the Notification Regulations and Procedures for Unauthorized Discharge (LAC 33:I.Subpart 2) and, within 14 days after the determination is made, submit to DEQ-SWD a report that identifies which parameters were determined to have shown statistically significant changes from background levels. Within 90 days after the determination is made, Big Cajun II will initiate an assessment monitoring program as described in LAC 33:VII.709.E.8, or Big Cajun II will submit a report to DEQ-SWD demonstrating that a source other than Big Cajun II impoundments caused the statistically significant increase or that the statistically significant increase resulted from an error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality.

Upon evaluation of the data from the newly proposed monitoring wells, a new statistical method may be imposed.

8.0 Reporting and Recordkeeping

Within 90 days after each detection monitoring sampling event, Big Cajun II submits to DEQ-SWD four bound copies (81/2 inches by 11 inches) of a report that includes:

- Analytical results of groundwater samples;
- Documentation of the chain-of-custody of sampling and analyses;
- A scaled potentiometric surface map showing monitoring well locations, groundwater elevations with respect to mean sea level or equivalent for the stratum monitored;
- An isopleth map for each well of all detection monitoring parameters, or plots by well, of concentration of parameters or constituents versus time; and
- A statement of whether a statistically significant difference in concentration over background concentrations is detected.

Big Cajun II maintains on site a copy of each report for the life of the facility, as required by LAC 33:VII.713.C.1.b.

9.0 Plugging and Abandonment Plan

This Plugging and Abandonment Plan has been developed to describe the procedures which are implemented for plugging and abandonment of groundwater monitoring wells at Big Cajun II. As mandated by LAC 33:VII.709.E.1.e.i, the plugging and abandonment of the Big Cajun II wells is in accordance with "Water Well Rules, Regulations, and Standards, State of Louisiana," (LAC 70:XIII) as adopted by the Louisiana Department of Transportation and Development (DOTD), Water Resources Section.

9.1 Pre-Abandonment Requirements

The abandonment activities of groundwater monitoring wells at Big Cajun II are performed and certified by a licensed water well contractor. The contractor prevents any known loss of grease, hydraulic fluids, oils, fuels, and/or transmission oil from equipment and uses only potable water in abandonment operations. Prior to any well abandonment activities, Big Cajun II notifies DEQ-SWD in writing of the intent to abandon any of the groundwater monitoring wells and awaits approval from DEQ-SWD. After receiving approval from DEQ-SWD, Big Cajun II commences with well abandonment procedures. A Guidance Checklist for Well Abandonment is utilized to ensure that the wells are properly abandoned (a copy of the Guidance Check List for Well Abandonment is included as Exhibit 6). In addition, a field log book is used to record pertinent details of abandonment operations.

9.2 Abandonment Procedures

Each monitoring well protective concrete pad, guard posts, and protective casing are dismantled. Each monitoring well casing and other components are removed from the borehole by pulling with a drilling rig. If the casing cannot be removed by pulling, it is over drilled with hollow stem augers and extracted from the borehole. The open borehole is flushed with potable water to remove any residual cuttings. The steel, concrete, and other well components are stockpiled for recycling and disposed in an environmentally sound manner.

If overhead restrictions preclude the use of a drilling rig to remove the well casing and well packing material, the casing is cut off 2 feet bgs and the remaining casing will be plugged with a cement/bentonite grout from the bottom of the well to the ground surface, providing an adequate seal of the annular space. In addition, Big Cajun II submits to

DEQ-SWD certification and supporting documentation by the licensed contractor that shows that removal of the well casing was attempted and that continued attempts to remove all or a part of the well casing and other components of the well would have been detrimental to the environment.

Each well is plugged with a cement/bentonite grout from the bottom of the well to the ground surface using the tremie method. Grouting continues until the unit weight of the grout exiting the borehole at the ground surface is equal to that of the original unit weight. Twenty-four hours after grouting, each borehole is inspected and, if necessary additional grout is added.

The cement/grout is blended slurry of Type I Portland cement, bentonite powder, and potable water and will be mixed until a smooth lump-free consistency is achieved. Slurry balance weight is recorded in the field log book for each batch prepared. There is a definite relationship between the amounts of each component of the cement/bentonite grout. Based on one 94-pound sack of Type I Portland cement, the cement/bentonite grout will be mixed to one of the proportions in the following table:

Percent Bentonite	Maximum Water Requirements (gallons/sack)	Expected Slurry (Pounds/Gallon)
2	6.5	14.7
4	7.8	14.1
6	9.1	13.5
8	10.4	13.1

9.3 Post-Abandonment Requirements

Upon completion of the plugging and abandonment of monitoring wells, Big Cajun II prepares and submits to DEQ-SWD a report that contains a description of field activities, a monitoring well location map, a completed Guidance Check List for Well Abandonment, and a completed DOTD Water Well Plugging and Abandonment Form (a copy of which is included as Exhibit 7). In addition, completed DOTD Water Well Plugging and Abandonment Forms are submitted to DOTD. A copy of all reports and forms are maintained on site by Big Cajun II.

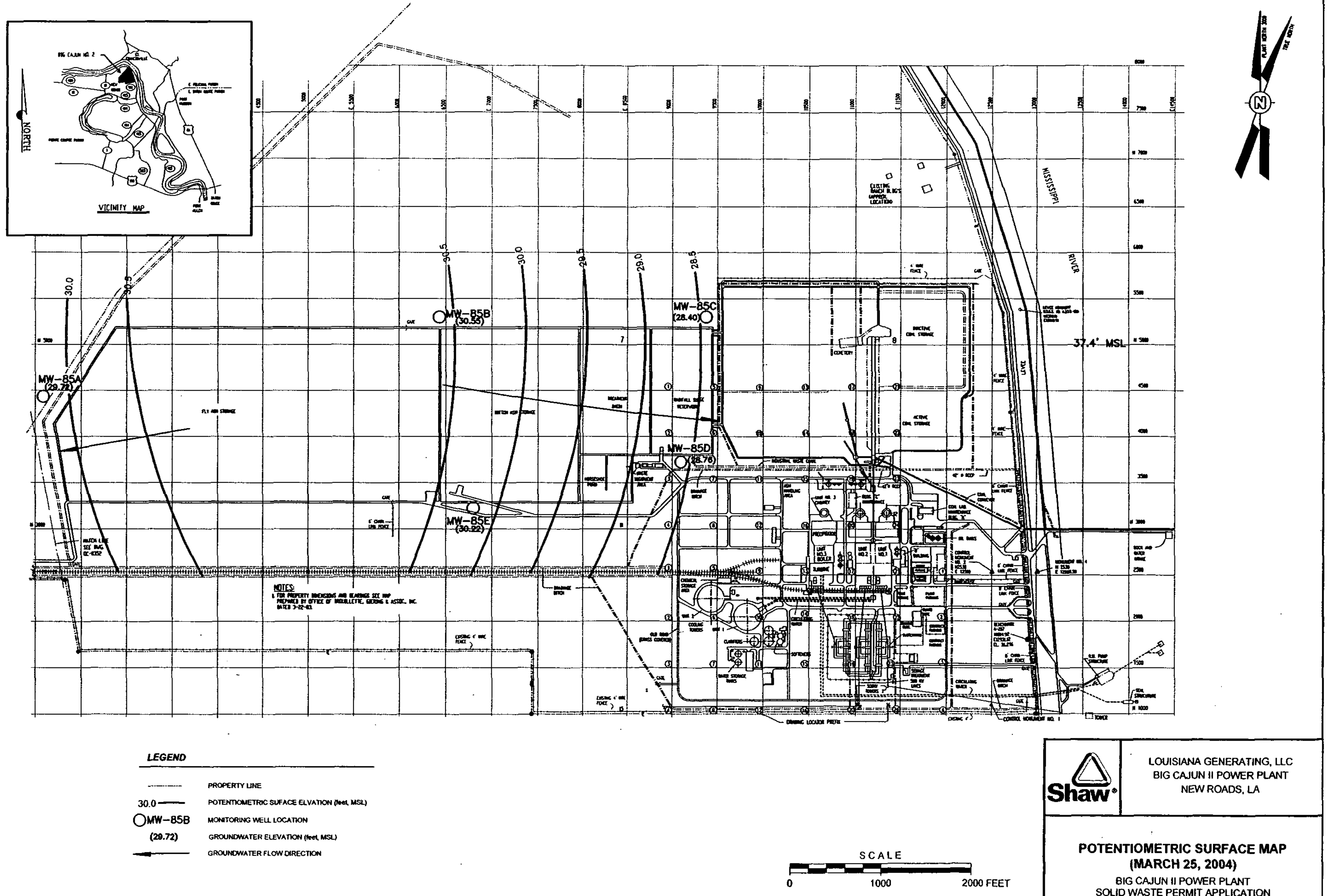
EXHIBIT 1
GROUNDWATER MONITORING WELL DATA

GROUNDWATER MONITORING WELL DATA

Well Number	85A	85B	85C	85D	85E
Up or Down Gradient	TBD	TBD	TBD	TBD	TBD
Date Installed	6/18/1985	6/20/1985	6/20/1985	6/20/1985	6/19/1985
Latitude	30° 43' 44"	30° 43' 47"	30° 43' 57"	30° 43' 44"	30° 43' 30"
Longitude	91° 23' 50"	91° 22' 37"	91° 22' 37"	91° 22' 25"	91°23' 01"
Well Casing Elevation (feet NGVD)	34.82	32.25	35.05	35.71	33.52
Ground Surface Elevation(feet NGVD)	33.17	30.6	33.48	34.2	32.07
Drilled Depth (feet bgs)	55	30	39	39	30
Well Casing Depth (feet bgs)	57	32	41	41	32
Screen Length (ft.) & Interval (from _ to_ feet bgs)	20 34 to 54	20 9.0 to 29	20 18 to 38	20 18 to 38	20 9.0 to 29
Screen Slot Size (inches)	0.1	0.1	0.1	0.1	0.1
Well Casing Diameter (inches) & Material	2 Sch. 80 PVC	2 Sch. 80 PVC	2 Sch. 80 PVC	2 Sch. 80 PVC	2 Sch. 80 PVC
Borehole Diameter (inches)	6	6	6	6	6
Type of Grout	Cement-Betonite	Cement-Betonite	Cement-Betonite	Cement-Betonite	Cement-Betonite

Note: Latitude and Longitude data approximated.
TBD: To Be Determined

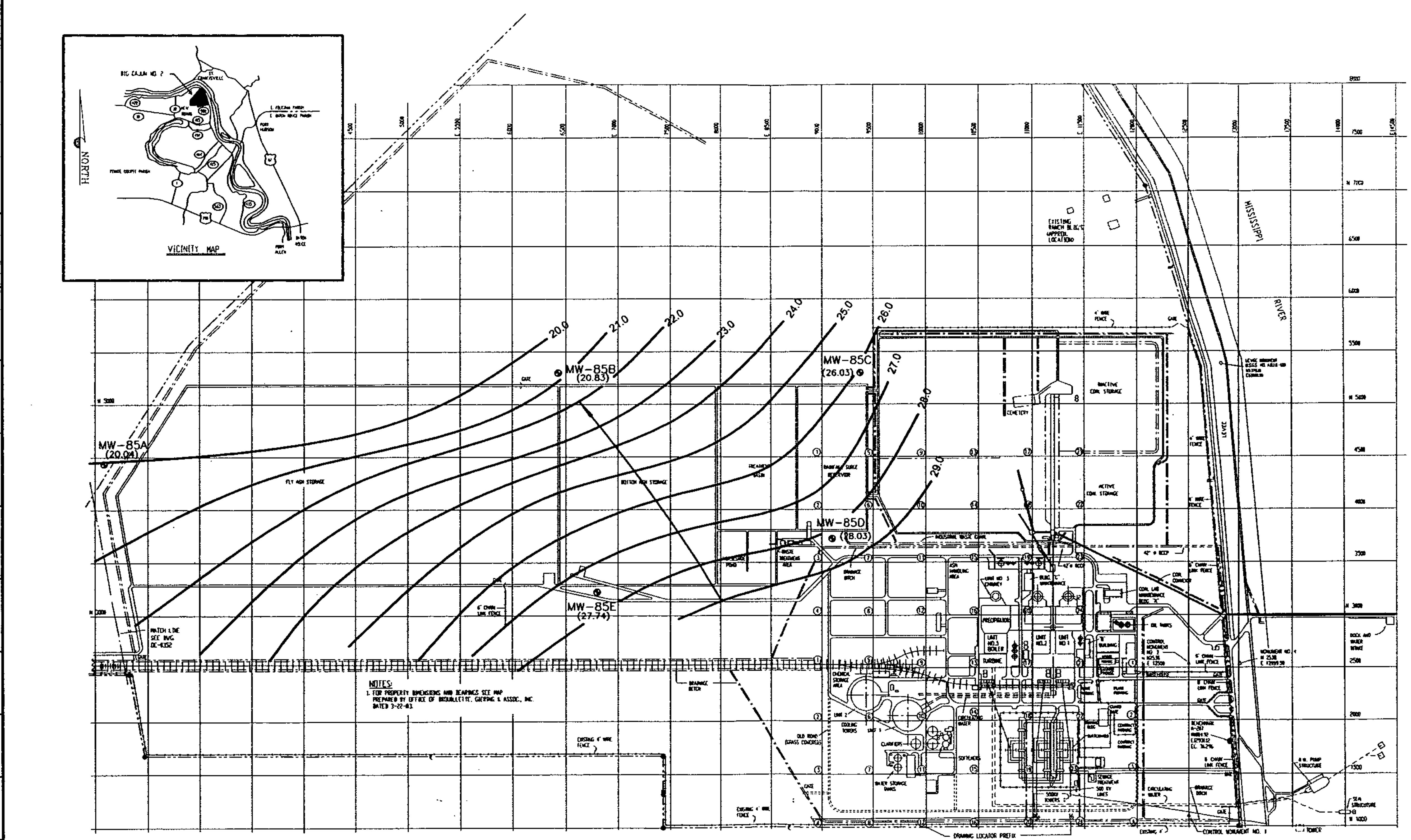
EXHIBIT 2
POTENTIOMETRIC MAPS



LOUISIANA GENERATING, LLC
BIG CAJUN II POWER PLANT
NEW ROADS, LA

POTENTIOMETRIC SURFACE MAP
(MARCH 25, 2004)
BIG CAJUN II POWER PLANT
SOLID WASTE PERMIT APPLICATION

IMAGE	X-REF	OFFICE	DRAWN BY		CHECKED BY	APPROVED BY	DRAWING NUMBER
---	---	BTR	P.GUIDRY	5/12/04			5494010-B1



LEGEND

— - - —	PROPERTY LINE
30.0 ———	POTENTIOMETRIC SUFACE ELVATION (feet, MSL)
⊗ MW-85B	MONITORING WELL LOCATION
(29.72)	GROUNDWATER ELEVATION (feet, MSL)
←———	GROUNDWATER FLOW DIRECTION

SCALE

0 1000 2000 FEET

Shaw®

LOUISIANA GENERATING, LLC
BIG CAJUN II POWER PLANT
NEW ROADS, LA

POTENTIONMETRIC SURFACE MAP
(SEPTEMBER 28, 2004)
BIG CAJUN II POWER PLANT
SOLID WASTE PERMIT APPLICATION

IMAGE	X-REF	OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
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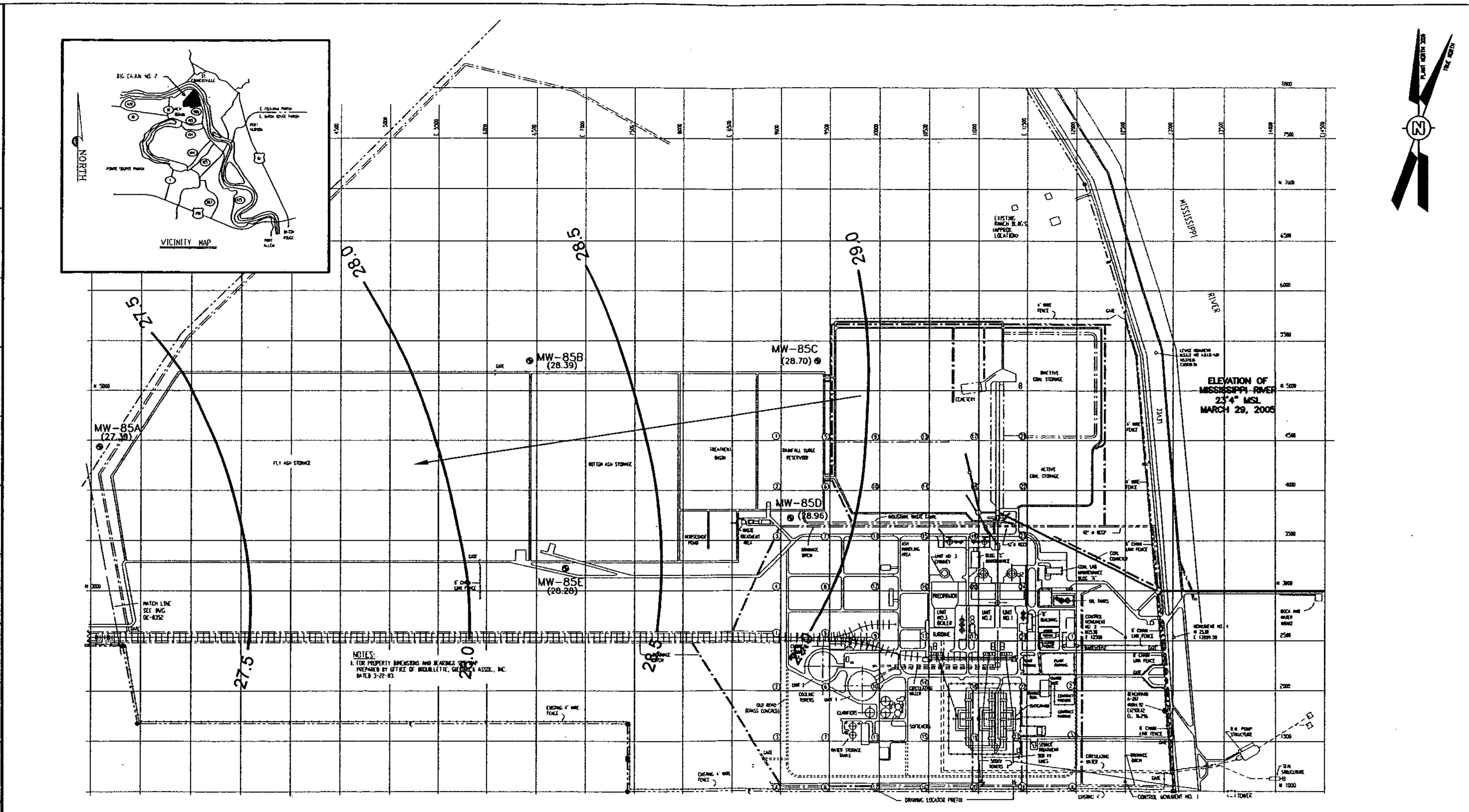


LEGEND

—··—	PROPERTY LINE
30.0 ——	POTENTIOMETRIC SUFACE ELEVATION (feet, MSL)
⊕ MW-85B	MONITORING WELL LOCATION
(29.72)	GROUNDWATER ELEVATION (feet, MSL)
←——	GROUNDWATER FLOW DIRECTION

SCALE

0 1000 2000 FEET

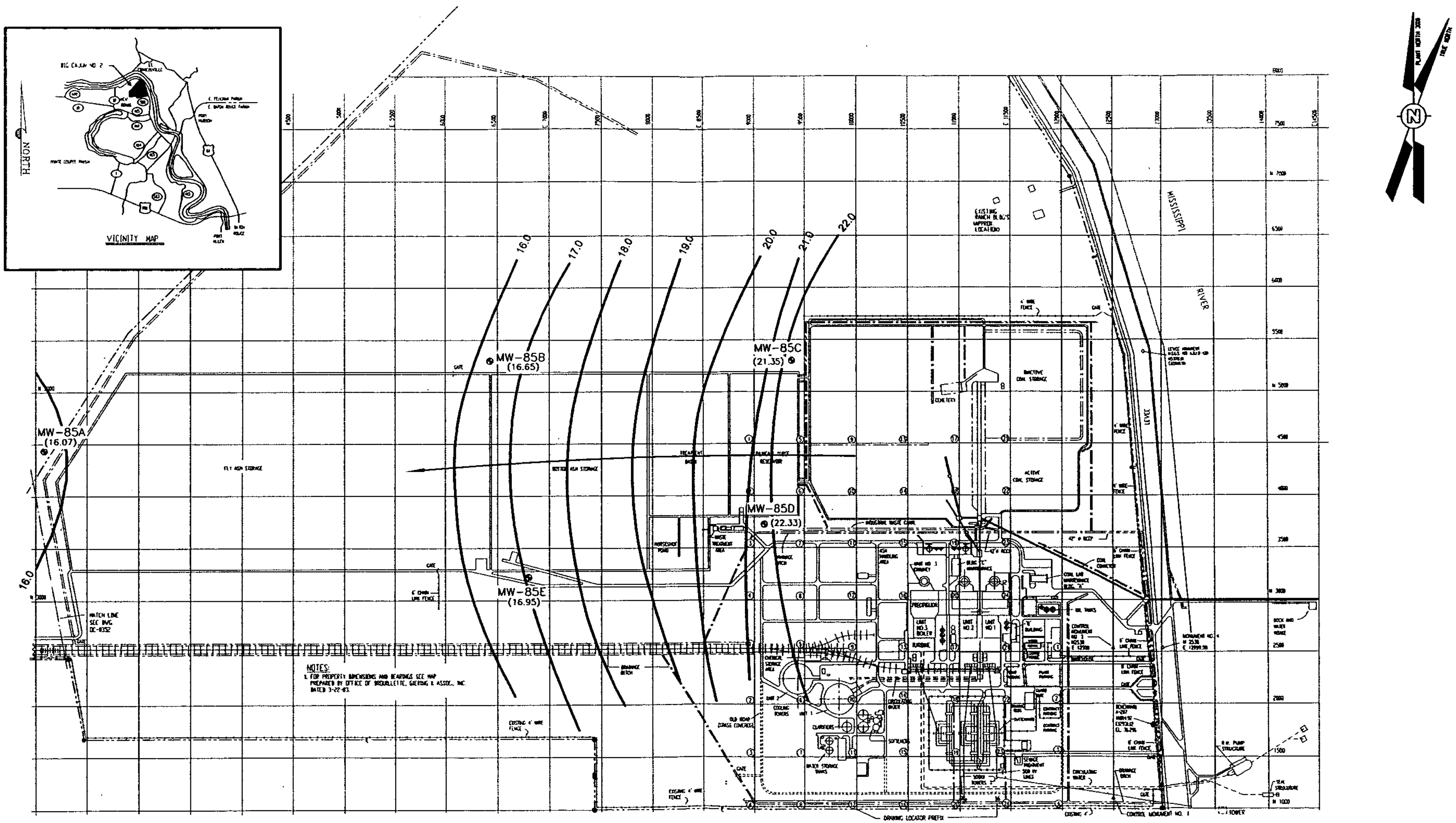
Shaw

LOUISIANA GENERATING, LLC
BIG CAJUN II POWER PLANT
NEW ROADS, LA

POTENTIONMETRIC SURFACE MAP
(MARCH 29, 2005)

BIG CAJUN II POWER PLANT
SOLID WASTE PERMIT APPLICATION

IMAGE	X-REF	OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
---	---	BTR	J.BOUDREAUX 05/05/05			5494010-B3



LEGEND

—·—·—	PROPERTY LINE
30.0 ———	POTENTIOMETRIC SUFACE ELEVATION (feet, MSL)
⊗ MW-85B	MONITORING WELL LOCATION
(29.72)	GROUNDWATER ELEVATION (feet, MSL)
←——	GROUNDWATER FLOW DIRECTION

SCALE

0 1000 2000 FEET

Shaw®

LOUISIANA GENERATING, LLC
BIG CAJUN II POWER PLANT
NEW ROADS, LA

POTENTIONMETRIC SURFACE MAP
(OCTOBER 20, 2005)
BIG CAJUN II POWER PLANT
SOLID WASTE PERMIT APPLICATION

IMAGE	X-REF	OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
---	---	BTR	J.BOUDREAUX 11/14/05			5494010-B4

EXHIBIT 3
DETECTION MONITORING PARAMETER SPECIFICATIONS

DETECTION MONITORING PARAMETER SPECIFICATIONS

PARAMETER	CONTAINER[1]	PRESERVATION METHOD	MAXIMUM HOLDING TIME	ANALYTICAL METHOD	METHOD DETECTION LIMIT	PRACTICAL QUANTITATION LIMIT
pH	P, G	NA	Immed.	150.1[3]	.01 s.u.	0.1 s.u.
Specific Conductance	P, G	NA	Immed.	120.1[3]	.01 µmhos/cm	0.1 µmhos/cm
Temperature	P, G	NA	Immed.	170.1[3]	.01 °C	0.1 °C
Total Dissolved Solids (TDS)	P	Cool to 4°C	7 days	160.1[3]	10 mg/l	100 mg/l
Selenium	P, G	Cool to 4°C H_2SO_4 to pH <2	28 days	6010[2]	2 µg/l	20 µg/l
Chloride	P	Cool to 4°C	28 days	325.3[4]	1.0 mg/l	10 mg/l
Sulfate	P, G	Cool to 4°C	28 days	375.4[4]	1.0 mg/l	10 mg/l
Calcium	P, G	HNO_3 to pH <2	6 months	6010[2]	0.01 mg/l	0.1 mg/l
Magnesium	P, G	HNO_3 to pH <2	6 months	6010[2]	0.01 mg/l	0.1 mg/l
Iron	P, G	HNO_3 to pH <2	6 months	6010[2]	0.03 mg/l	0.3 mg/l

1 P=Polyethylene; G=Glass.
2 Test Methods for Evaluating Solid Waste, Third Edition, SW-846.
3 Standard Methods for the Examination of Wter and Wastewater, 17th Edition.
4 Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020.

EXHIBIT 4
FIELD DATA COLLECTION FORM

Shaw™ Shaw Environmental, Inc.

Well Purging Log

Project Name: NRG Big Cajun II
Project Number:
Form Completed by:

Well No.:
Date Started:
Date Completed:

Well Information

Casing Diameter "d" (inch):
Depth to Water (ft):
Total depth of Well (ft):
Water Column (ft):

Purging Method:
Purging Equipment:

Well Purge Calculations

Casing Diameter (in)	Water Column (ft)	(gal/ft)		Well Volume (gal)		Number of Volumes (gal)		Purge Volume (gal)		Volume Purged (gal)	Purged Dry? (Y/N)
1		x	0.041	=		x	3	=			
2		x	0.164	=		x	3	=			
3		x	0.369	=		x	3	=			
4		x	0.656	=		x	3	=			

Well Purge Record

Time (24 hrs)	Purge Volume (gal)	Temp. (°C)	pH (Std Units)	Conductivity (µS/cm)	TDS (ppm)	ORP (mV)	DO (mg/L)	COMMENTS

EXHIBIT 5
CHAIN-OF-CUSTODY FORM

[redacted] AS[redacted]ATES · INC
ENVIR[redacted]NTAL & ENGINEERING
CONSULTANTS

CHAIN OF CUSTODY AND A[redacted]YTICAL REQUEST RECORD

17170 PERKINS ROAD · [redacted]ON ROUGE, LA 70810
PH (504) 755-1000 · FAX (504) 751-2010

CLIENT: ______ P.O. NUMBER: ______ SAMPLED BY: ______
PROJECT NO.: ______ LABORATORY*: ______ DATE: ______

SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	NO. OF CONTAINERS	PRESERVATIVE	ANALYSES AND INSTRUCTIONS

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Collection witnessed by: (Signature, if required)	Date	Time	Method of Shipment:		Date
Relinquished by: (Signature)	Date	Time	Received for Laboratory by: (Signature)	Date	Time

*Please send results and invoice to the attention of ______ in our ☐ Baton Rouge, ☐ Lake Charles, ☐ Shreveport office.

EXHIBIT 6

GUIDANCE CHECKLIST FOR WELL ABANDONMENT

GUIDANCE CHECK LIST FOR
WELL ABANDONMENT

SITE: ______________________________

SITE NUMBER: ______________________________

PERMIT NUMBER: ______________________________

REVIEWED BY: ______________________________

DATE REVIEWED: ______________________________

<u>All wells</u> will be abandoned by overdrilling except under certain conditions where overdrilling can not be performed. these abandonments will be approved on a case by case study.

______1.) Is well or boring to be abandoned in area of future construction?

______2.) If yes to above question is blended bentonite grout used?

______3.) Has permission to abandon been requested for in writing?

______4.) Are cuttings from drilling to be disposed of in an environmentally sound manner?

______5.) Is the entire bore hole to be grouted from bottom to top?

______6.) Are all grout materials placed by a rigid side discharge tremie pipe?

______7.) Does submitted grout mix follow ratio listed below?

I. Cement/Bentonite Grout (based on 1 sack of Type I 94/lbs. cement).

______A.) Amount cement, 1 sack.
______B.) Amount of bentonite, 5% 4.7 lbs.
______C.) Amount of water, 8.5 gal.
______D.) Expected mud balance weight, 13.8.

II. Blended Bentonite Grout (based on 1 sack of 50/lbs. bentonite and follows manufacturers recommendations.)

______A.) Amount of bentonite, 1 sack.
______B.) Amount of water.
______C.) Expected mud balance weight.
______D.) Amount of inhibitor.
______E.) Mix ratio follows manufacturers recommendations. (yes or no)

______8.) Is grout to continue mixing until a smooth lump free consistency is achieved.

______9.) Is water used in all drilling and grouting potable.

______10.) Are mud balance readings to be taken with each mix?

______11.) Is grouting to continue until the unit weight of the grout exiting the well annulus at the ground surface is equal to that of the original unit weight?

______12.) Is the annular seal to be inspected after a 24-hour period and additional grout added until firm grout is at or within one foot of the ground surface?

______13.) Once firm grout is achieved, does the facility ask for final inspection approval?

______14.) After final inspection approval, is remaining annulus to be backfilled with recompacted clay?

______15.) Does the site address provisions notifying the Solid Waste Division inspector of construction date?

EXHIBIT 7
WATER WELL PLUGGING AND ABANDONMENT FORM

PLEASE PRINT IN INK OR TYPE WHEN COMPLETING THIS FORM

LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT

WATER RESOURCES SECTION

WATER WELL PLUGGING AND ABANDONMENT FORM (DOTD-GW-2)

MAIL ORIGINAL TO
Department of
Transportation and Development
Attn: Chief - Water Resources Section
P.O. BOX 94245
Baton Rouge, LA 70804-9245
(504) 379-1434

1. WELL OWNER: (If different from owner when drilled, note in item 5) ____________

ADDRESS: ____________

OWNERS WELL NUMBER (If any) ____________

2. LOCATION OF WELL: Parish: ____________, Well is Near, ____________

Approximately ____________ miles from ____________
(Crossroads, Town, City, Railroad, Any Landmark, etc.)

(Please draw sketch on back of Original)

3. WELL INFO: Casing material ____________, Diameter of casing ____________ in.,

Depth of well ____________ ft., Date drilled ____________ by (give name of water well contractor who installed well or hole): ____________

4. Describe in detail how well or hole was plugged: (materials used, amount of casing and/or screen removed, or left in hole, etc.) ____________

5. REMARKS: ____________

I certify that this work was done and completed in accordance with Rules and Regulations of the State on ____________, 19 ____ by (name and no. of contractor) ____________ WWC- ____________

Authorized Signature: ____________ Date: ____________

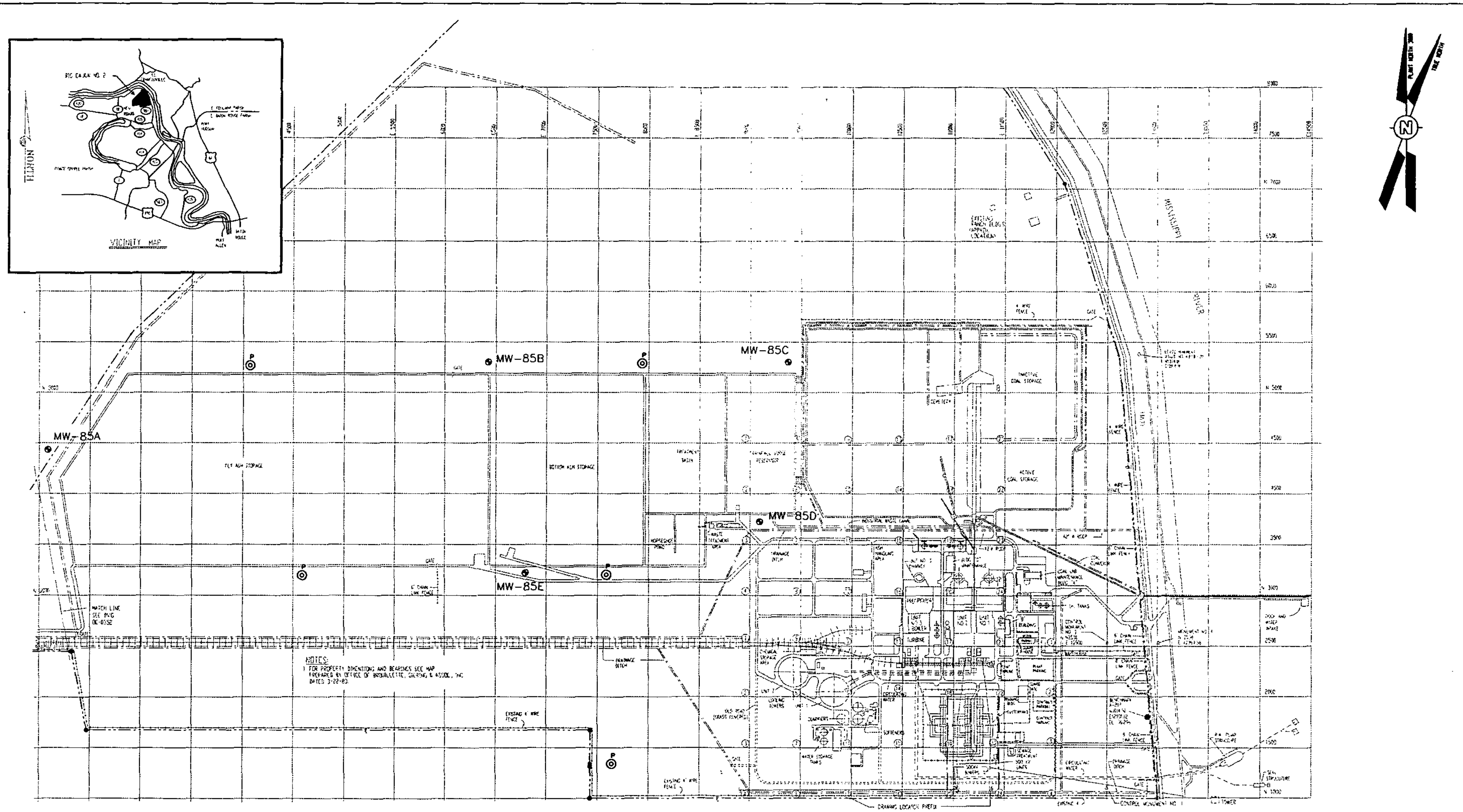
OFFICE USE ONLY

State	Parish	Local Well No.	Identification Number			Section	Township	Range	Quad. No.
2 2		-		0					

(REV. 6/82)

DOTD'S COPY

EXHIBIT 8
PROPOSED PIEZOMETER LOCATIONS



LEGEND

— · · —	PROPERTY LINE
⊙ MW-85B	MONITORING WELL LOCATION
◎ P	PROPOSED PIEZOMETER LOCATIONS

Shaw®

LOUISIANA GENERATING, L.L.C.
BIG CAJUN II POWER PLANT
NEW ROADS, LA

FIGURE 24

PROPOSED PIEZOMETERS FOR GROUNDWATER MONITORING

BIG CAJUN II POWER PLANT

IMAGE	X-REF	OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
---	---	BTR	J.BOUDREAUX 02/23/06			1005494010-B10

Appendix A
Document 4e: Implementation Plans

Appendix I
Implementation Plans

IMPLEMENTATION PLAN
GROUNDWATER MONITORING SYSTEM

In order to meet the location and spacing requirements of LAC 33:VII.709.E.1, Louisiana Generating proposes to install additional monitoring wells surrounding their solid waste facilities at the Big Cajun II power generating plant in New Roads, Louisiana.

Potentiometric data from the most recent groundwater monitoring events indicate that the groundwater flow direction in the area of the impoundment varies. In order to better understand the groundwater flow in the area and accurately identify background/upgradient and/or downgradient wells, additional potentiometric data points are needed. Therefore, upon LDEQ's approval, a minimum of five piezometers will be installed surrounding the solid waste facilities. Potentiometric information will be collected from the piezometers, as well as the existing wells, on a monthly basis, for a period of one year. Upon completion of this data collection period, the data will be evaluated to identify background/upgradient and downgradient wells, and determine locations for additional monitoring wells as necessary. A construction schedule for the installation of monitoring wells is proposed as follows:

Day 1 - Issuance of standard permit.

Day 1 through 60 – Installation of piezometers.

Day 60 through 425 – Monthly potentiometric data collection.

Day 425 through 485 – Data evaluation and submittal of proposed monitoring well locations to LDEQ.

Additional monitoring wells will be installed within 60 days of LDEQ approval of the final groundwater monitoring system plan. For the updated groundwater monitoring system, Louisiana Generating will complete an initial sampling event that will consist of four independent samples from each well. The analytical data will be submitted to the Office of Environmental Assessment, Environmental Technology Division, within 90 days after the installation of the monitoring wells. Subsequent to this initial event, sampling events will be conducted every six months with at least one sample being collected and analyzed at each well for each sampling event.

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GROUNDWATER MONITORING SYSTEM

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Appendix A
Document 4f: Closure Plans

Appendix J
Closure Document

DOCUMENT TO BE FILED IN THE PARISH RECORDS UPON FINAL CLOSURE OF A SOLID WASTE DISPOSAL FACILITY

Louisiana Generating, LLC, Big Cajun II Power Plant, Parish of Pointe Coupee, Louisiana, hereby notifies the public that the following described property was used for the disposal of solid waste. This site was closed on (date facility was closed) in accordance with the Louisiana Administrative Code, Title 33, Part VII. Inquiries regarding the contents of the Solid Waste Landfill may be directed to (name of person with knowledge of the contents of the facility) at (address of person with knowledge of the contents of the facility).

The Industrial Solid Waste Surface Impoundments are located in Pointe Coupee Parish, Township 4 South, Section 37 of Range 11 East, and Section 4 of Range 10 East, Highway 981, approximately 3 miles north of the intersection of Highway 415.

____

Signature of Person Filing Parish Record

____

Typed Name and Title of Person Filing Parish Record

____

Date

(A true copy of the document certified by the parish Clerk of court must be sent to the Water and Waste Permits Division, Post Office Box 4313, Baton Rouge, Louisiana 70821-4313.)

Appendix A
Document 5: Geotechnical Reports and Slope Stability Analysis

Appendix N
Geotechnical Reports and Slope Stability Analysis

LOUIS J. CAPOZZOLI & ASSOCIATES, INC. Geotechnical Engineers

James M. Aronstein, Jr. P.E.
Charles L. Eustis, P.E.
David P. Sauls, P.E.

Louis J. Capozzoli, ScD, P.E.
Consultant

19 December 2005

Shaw Environmental & Infrastructure, Inc.
4171 Essen Lane
Baton Rouge, Louisiana 70809

Attention: Ms. Elif Chiasson, P.E., Project Manager

Re: Geotechnical Investigation
Bottom Ash Storage Pond Expansion
Big Cajun No. II
Pointe Coupee Parish, Louisiana
LJC&A File: 05-58

Gentlemen:

This report presents the geotechnical basis for expanding your existing bottom ash storage facility. Geotechnically based design particulars plus construction recommendations – stemming from analysis of both furnished/published data as well as field exploration and laboratory testing results – constitute the text. Supporting details including laboratory and field work phase specifics are presented in the enclosures. Under auspices of your 1 August 2005 authorization, this study was initiated per our 13 July 2005 *Geotechnical Investigation proposal.*

PROJECT DESCRIPTION

Facilities. The existing bottom ash pond is nominally 1950 feet by 1500 feet in plan dimension. The existing perimeter dike height is 18 feet and the planned vertical expansion will be to raise the dike height to 38 feet. This will add nominally 86,571,228 cubic feet of additional storage volume. The anticipated bottom ash load will be 5,265,035 tons. A variety of geotechnical engineering factors are required for this vertical expansion, primarily the slope stability of the surrounding levee system, both internal stability into the pond and external outside (levee slopes). Also the analysis of pond settlement due to the increased load of the bottom ash stacking operation will be required. These two factors will also contribute to the overall selection of alternatives to increase the levee height configuration.

Numerous soil borings were drilled by our firm for the original plant in this area under job number LJC&A File No. 74-30. The nature of our engagement under that commission was to provide field and laboratory data to in-house engineers for Cajun Electric. We do not have engineering analyses related to the original slope stability analysis and/or settlement computations in our files. Of the approximately 60 borings in the vicinity of the bottom ash pond, only 4 extend beyond the 10 foot depth. Four borings along the northwestern levee line, nominally along North 6000 between W4000 and N5300, extend to the 50 foot depth.

INVESTIGATION OBJECTIVES

The geotechnical investigations recently conducted were to:

1) Characterize the underlying stratigraphy of the bottom ash area to assess the viability of bottom ash expansion in the described location.

2) Recommend bottom ash embankment geometry, operational conduct, and earthwork construction procedures to insure surface and subsurface containment.

The remainder of this report's text presents geotechnical findings, conclusions and recommendations for accomplishing the above investigation goals.

SITE CONDITONS

Geology. Site formation characteristics for the bottom ash storage pond are related to an alluvial deposit of point bar origin. Point bar deposits flank the present river or abandoned courses of the river and normally occur on the insides of bends to which the sandy deposits accretes as the bends grow. Typically consisting of bedded top stratum of 25 to 75 foot thick layers of silty sands, sandy silts, and sand coarsening with depth. The substratum consists of essentially clean sand. The underlying Tertiary deposit is encountered at approximately 150 to 200 foot depth below original ground surface.

Surface. The existing ground surface of the bottom ash storage was originally near elevation 30 feet, National Geodetic Vertical Datum (NGVD). Existing containment levees were built up 18 feet to elevation 48 feet, NGVD. The new expansion plan would include increasing the height of the levees 38 feet high to elevation 68 feet, NGVD.

Subsurface. Subsurface profiles cut through the soil borings as shown by the plan on sheet 1 are also presented on sheet 1. For more details, see the soil profiles and individual boring logs. For this investigation, 14 borings were conducted ranging between 50 and 70 feet in depth.

The subsurface underlying the area of the existing bottom ash storage pond consists of 20 feet of very loose to loose clayey silt overlying alternate 5 foot strata of soft silty clay and firm to dense sand and silty sand to approximately the 40 foot depth. The strata are underlain by dense to very dense sand and gravel to the bottom of the explored boring depth at 70 foot depth.

Groundwater. The groundwater table is typically within 3 feet of the site surface, as indicated by water levels in area ditches. The groundwater table will rise to the ground surface during periods of rain or high river stage. Since the underlying granular soils are hydraulically connected to the Mississippi River, groundwater flow will be away from the river, west during high stages, and toward the river (east during normal and low stages).

GEOTECHNICAL ENGINEERING

Primary consideration for the expansion of existing bottom ash is overall slope geometry. Confinement is dependent on structural soundness as well - land slides, slope failures, etc. must be prevented.

Subsoil Strength. The in situ clays beneath the existing bottom ash storage have been subjected to surcharge loading over the last quarter century and have experienced the strength gain due to imposed stress regime. Native soil lying outside the levee embankment area is at the original native strength level and can be the governing factor for outward lateral slope stability. The additional stacking height of the bottom ash will create additional strength gains and imperviousness will improve with time as the overlying bottom ash weight squeezes out water from the soil pores. The site has the structural ability to support the selected bottom ash successfully as has been experienced previously.

Bottom Ash. For the purposes of this study, the bottom ash was assigned a granular internal friction angle with no internal cohesion value. We used bottom ash weights of 110 pcf total weight; 48 pcf submerged with an internal angle of friction of 30 degrees.

Slope Stability. Described in the attached appendix, *Embankment Integrity*, the slope factor of safety of sliding will vary with the height of bottom ash. Table 1, presents the specifics of the analysis. The computed factors of safety will increase with time as the foundation soils consolidate and strengthen.

The analyses of the increased ash storage stacking for the global slope stability considered a variety of conditions. Primary variables addressed can be grouped into the following factors:

- Perimeter embankment configuration
- Water level in the embankment/ash stack, and
- Soil strength parameters

In the consideration of various perimeter dike geometry, initial configuration of one large perimeter berm up to elevation 38 feet high was evaluated. The outside slope of this berm had a 3H:1V side slope. The interior face towards the bottom ash stack had a 2H:1V side slope. We evaluated the slope stability of the 3H:1V outward facing slope as well as the inward facing 2H:1V side slope. We then evaluated a 2 berm geometry configuration. The outside perimeter berm would be the existing 18 foot high embankment with a 38 foot high embankment built at the interior toe of this existing embankment. The side slopes of the new 38 foot high embankment would be 2H:1V. We also evaluated a 2 berm system using a 3H:1V outside slope for the 38 foot tall embankment and a 2H:1V interior side slopes. This geometry of 2 berms and 3H:1V exterior side slope was evaluated with the full 38 foot high ash stack interior load as well as a half embankment height (19 foot high ash stack on the interior) of ash.

We evaluated the water level for all of the geometry scenarios with both a horizontal water level surface equal to the existing ground water surface as well as a fully saturated groundwater equal to the embankment/ash stack height.

Soil strength conditions were evaluated using both the native soil strength determined from borings conducted from the native ground surface elevation. These soil strengths are lower than the soil strengths measured under the existing perimeter embankment and most certainly underneath the ash stack load. We also used a 25 percent increase in these native soil strengths to represent the shear strength increase as a result of the ash stack loading for slopes on the interior of the stack following consolidation. The 25 percent increase in soil strength was reflected of the soil conditions encountered underneath the existing 18 foot levee embankment. Soil strengths would increase with higher ash stack loads and earthen embankments.

Table 1 summarizes the 13 cases analyzed for the global slope stability analyses. The attached sheets 4 through 16 illustrate the individual analyses. The first five runs shown on sheets 4 through 8 address the analyses of 1 berm to 38 feet above existing ground surface. For exterior side slope of 3H:1V with an interior slope of 2H:1V for the fully saturated groundwater condition and the unimproved native soil strength, the global stability factor of safety is 1.22 (as shown on sheet 4). If there were a level water condition underneath the embankment and through the stack, the factor of safety would increase to 1.31. Sheet 6 shows a 2H:1V slope with the native soil strength and a factor of safety of 1.15 which would be inadequate. Sheet 8 shows a 2H:1V side slope if placed on the strength gain under ash load with level water condition would have a factor safety of 1.32.

Because of these relatively low factors of safety, we then addressed a 2 berm system with the interior berm to 38 foot height built inside of the existing 18 foot high embankment. We initially evaluated a 38 foot high interior berm with 2H:1V side slopes on both the exterior and interior faces. These factors of safety shown on sheets 9 through 12 likewise show low factors of safety. The approach using 2 berms with the interior berm to 38 foot height and the exterior face of this berm being built with a 3H:1V side slope and an interior face of 2H:1V produced suitable factors of safety even under extreme loadings of the full 38 foot ash stack height as well as fully saturated conditions. Sheet 15 shows the scenario with a fully saturated condition and no increase in native soil strength still provides a factor of safety of 1.24 for a 19 foot high ash stack. The soil strengths underneath the ash stack have increased beyond those measured under the perimeter and the factor of safety would be higher.

<u>Subsoil Deformation.</u> The stress/strain characteristics of these point bar deposits as well as the moduli for the more rigid silts and sands developed from detailed strength and deformation testing depicted in the field and laboratory appendix. The soils potential for settlement as load pressurized pure water is squeezed from the clay was measured via consolidation tests also included in the field and laboratory appendix.

The cohesive strata underlying the Bottom Ash Storage Pad site are susceptible to volume changes from net changes in stress applied at foundation level. Before construction, the foundation soils are, for practical purposes, in equilibrium under a state known as overburden pressure (the effective weight of the soil itself). Activities such as adding the weight of the new ash stack make positive changes in the applied stress that cause volume changes in the compressible strata, resulting in settlement at the foundation level. The net pressure (the positive change in applied stress) applied at foundation level is defined as the difference between the total applied pressure (gross pressure) and the previously existing overburden pressure at that level.

The movement responses associated with stress changes have both short term (elastic) and long term (consolidation/swell) components. The elastic movements occur almost immediately, while consolidation movements generally occur over many months or years. The compressible soils at this particular site include silt partings and seams that promote drainage and increase the rate of settlement (consolidation). In our analyses of settlement, short-term elastic movements have been discounted because the accuracy with which they can be estimated is usually within the range of error for our estimates of long-term consolidation movements, and because elastic settlements will occur rapidly at this site.

This Ash stack with all of its load cannot be wished into place. Therefore, movements caused by different loading sequences are computed separately and then combined. The first movements in the sequence are the result of excavation for construction of the embankment. The weight of the overburden removed is treated as a negative load (where downward loads and movements are considered positive). This condition produces an upward movement (heave) at foundation level. The next movements in the sequence are associated with the filling of the Ash pad, which generally results a net increase in load and a downward movement (settlement). This condition is modelled by applying the area load at appropriate depths and computing the associated settlement. Because the structure will produce a net increase in load in an excavation that has experienced some heave, the total "observable" movement that the foundation will experience will be the recompression of the heave that occurs during construction plus the settlement caused by the structural load.

We estimated long term heave and settlement of the foundation soil resulting from change sin stresses caused by applied loads using an in-house computer program. This program first computes net stress changes at selected locations and depths using Boussinesq theories of stress distribution. The program then uses soil compressibility parameters developed by applying one-dimensional consolidation theory to field and laboratory test results to evaluate the change in thickness of individual layers and compute the overall movement of the foundation level at selected locations.

Settlement analyses were performed for three major loading conditions. Consolidation settlement analysis for spread footings and drilled shaft foundation elements were performed for the following range of sustained column loads.

Feature	Description	Center Settlement, Feet	Edge Settlement, Feet
Perimeter Embankment	38 feet high	1½ - 2	1 - 1½
Ash stack	19 feet high	3 feet	1½ feet
Ash stack	38 feet high	6 feet	3 feet

A rectangular stack of uniform ash height will experience a dishing or tilting shape: perimeter will settle less than the center. This would amount to less than ¼ (center settlement) at the corners, less than ½ (center settlement) at the perimeter.

FACILITY DESIGN

A design of the new containment dikes for the bottom ash storage have been developed by Shaw Environmental & Infrastructure, Inc. The following paragraphs provide relevant geotechnical comments for these facilities.

Bottom Ash Plan. The footprint of the original bottom ash storage pond will be maintained and any additional expansion will be inside the existing levee system.

Impermeability. Based on previous borings in 1977 for the existing bottom ash storage facility documented the sites overall impervious nature. The increased loading from additional stacking of raising the height of the impounded bottom ash will further improve the impermeability of the underlying native subsurface soils.

Dikes. If interior interceptor dikes are set inside the existing levee system, dike construction can be of semi-compacted-non-organic clay. Semi-compaction is defined as a minimum of three passes per lift by the tracks of a D-6 or equivalent or larger bulldozer. Loose lift can be a maximum of 12 inches thick. The objective is to remove the air spaces, which will result in a relatively impervious clay layer.

Construction inspection should entail full time observation by a qualified soil technician who will also conduct field density testing and sample collection. Periodic samples collected will be subjected to Atterberg limit determinations for material classification.

Operation. The bottom ash stack should consider leveling out the existing deposition of bottom ash to provide a more uniform stress distribution. Obviously downslope geometry will result eventually from the discharge spout northward across the pond. This will likely result in the northern end perpetually being above the southern end of the bottom ash storage bed as is currently observed. While there are no specific geotechnical integrity requirements, operation to maintain a somewhat uniform surface loading would seem prudent.

Monitoring. With the overall slope stability in a stable analyzed condition, it would not appear warranted to install inclinometers to read lateral deformations for containment embankments. However, they can be used for documenting performance.

Site Suitability. The previous work at the bottom ash storage facility has proven adequate to meet the current and anticipated regulations of the State of Louisiana. The new bottom ash storage expansion will likewise provide geotechnical requirements for permitting agencies. The site as planned and geometry is suitable for bottom ash expansion.

Very truly yours,

Louis J. Capozzoli & Associates, Inc.

David P. Sauls

DPS/cc

Enclosures: Appendix A, Field and Laboratory Analyses
Appendix B, Embankment Integrity
Sheet 1, Site Location
Sheet 2, Site Vicinity
Sheet 3, Site Plan and Subsurface Profile
Table 1, Global Stability Analyses Summary
Sheets 4 through 16, Individual Stability Cases

FIELD AND LABORATORY ANALYSES

As-executed particulars of the site-specific reconnaissance, field exploration, and laboratory testing program performed by us to support this project are discussed below. Bases for such work was several telephone conversations, our 13 July 2005 *Geotechnical Investigation* proposal letter, and the *Shaw Environmental, Inc. Work Agreement, Attachment* 12.3.1B.

Site Reconnaissance. On 12 August 2005, our chief engineer and driller made a site reconnaissance prior to beginning the field exploration phase of our work. The purpose of the visit was to determine borehole accessibility and coordinate drilling activities. On 16 August 2005, our Engineer Assistant and Chief Driller staked borehole locations at site.

Field Exploration. Fourteen soil sample borings - ranging from 50 to 70 feet in depth - were site-specifically performed by our drill crew utilizing our all-terrain vehicle-mounted rotary washbore drilling equipment between 22 August and 1 September 2005. Borehole positioning was by our field crew. Your personnel assisted in locating underground utilities. Relatively hard soil conditions produced adequate traction for our highway type vehicles throughout the entire site. Approximate as-drilled borehole locations are graphically depicted on the *sheet* 3 enclosure.

Full depth advancement of the 4 inch nominal diameter borings was via rotary washbore methodology applicable to non-lithified (non-rock) earth materials. Borehole footage was measured from ground level. The holes were terminated upon penetrating to a predetermined depth. Such a drilling extent resulted in exploration of stratification relevant to bottom ash storage pond expansion foundation design/construction. Surface casing requirements/drilling mud usages were commensurate with what would normally be expected of the inplace stratification - i.e. abnormally high volumes of mud and extensive casing were not necessary for drill-hole maintenance. Immediately upon completion, the borings were sealed as per statutory requirements. Prior to departure, our crew performed a thorough clean-up of each drill site.

Borehole sampling was conducted in accordance with applicable ASTM specifications. High quality undisturbed cohesive (clay) specimens - suitable for laboratory strength testing - were obtained using a 30 inch long, 3.0 inch O.D. tube system. The sampler was hydraulically pushed into the ground a distance not exceeding 24 inches per specimen. Cohesive/semi-cohesive/cohesionless soils were also sampled via the Standard Penetration Test (SPT). This consists of driving a 24 inch long, 2 inch O.D. splitspoon sampler with blows from a 140 pound hammer falling 30 inches per blow. The penetration resistance (N) is the number of blows required to drive the sampler 12 inches after first seating it for 6 inches. Sampling frequency of each boring was on 5 foot and 10 foot centers to borehole termination, except borings 3, 9, and 11 which were sampled continuously in the top 10 feet.

Tabularized field work particulars are:

Boring Number	Total Depth (Feet)	Sampling: Continuous (Feet)	Sampling: On 5 Ft. Centers (Feet)	Sampling: On 10 Ft. Centers (Feet)	Sampling: Below 50 Ft. (Feet)	Grout Plug Depth (Feet)
1	70	--	70	--	20	70
3	50	10	40	--	--	50
4	70	--	40	30	20	70
5	70	--	50	20	20	70
6	55	--	55	--	5	55
7	70	--	40	30	20	70
8	55	--	55	--	5	55

Boring Number	Total Depth (Feet)	Sampling: Continuous (Feet)	Sampling: On 5 Ft. Centers (Feet)	Sampling: On 10 Ft. Centers (Feet)	Sampling: Below 50 Ft. (Feet)	Grout Plug Depth (Feet)
9	50	10	40	–	–	50
11	50	10	40	–	–	50
12	70	–	70	–	20	50
13	50	–	40	10	–	50
14	60	–	60	–	10	60
Totals	720	30	600	90	120	720

Detailed boring logs are a part of this appendix. The resultant subsurface profile is portrayed by the *sheet 3* enclosure.

Laboratory Testing. Immediately upon recovery; each sample was removed from its' sampling device, field classified by our technician, and then prepared for transport to our Baton Rouge laboratory. There; the undisturbed specimens and testable SPT plugs were lab classified plus subjected to strength and unit weight/moisture content determinations. In sum, laboratory efforts encompassed: 69 unconfined and 14 unconsolidated, drained/undrained triaxial compression tests (each with a unit weight/moisture content determination); 65 dry sieve analyses; 6 moisture content determinations, 6 consolidation tests with rebound, plus 26 Atterberg limit determinations. As per the borehole sampling techniques, all laboratory procedures conformed to appropriate ASTM standards. Detailed test results are presented by the tables, sheets, and figures attached to this appendix.

Compression testing yielded soil shear strength values. Unit weight/moisture content, Atterberg limit, and sieve data provided earth material identification plus produced more precise material classifications than obtainable through field methods. Deformation under load data was obtained from consolidation tests. Taken together, results of all laboratory evaluations were used to delineate the in situ stratigraphy's origins as well as its' relationship to the bottom ash storage pond expansion foundation design/construction.

Attachments: Tables 1 through 5, Laboratory Data
Figures 1 through 65, Grain Size Curves
Figures 66 through 71, Consolidation Test Curves
Log of Borings 1 through 14

BOTTOM ASH STORAGE POND EXPANSION

LABORATORY DATA

TABLE 1

FILE NO: 05-58

BORING NUMBER	DEPTH FEET	MOISTURE %	UNIT WEIGHT		ATTERBERG LIMITS			COMPRESSION TEST				TEST TYPE
			WET PCF	DRY PCF	LL	PL	PI	TSF	% STRAIN	START PRESSURE KSF	TYPE FAILURE	
1	0.0 - 2.0											Dry Sieve
1	3.0 - 5.0	22	118.3	96.9				1.60	6		Multiple Shear	U
1	8.0 - 10.0	30	122.7	94.2	60	24	36	2.76	10		Multiple Shear	U
1	13.0 - 15.0	26	122.5	97.4				1.37	15		Yield	U
1	18.0 - 20.0	28	122.3	95.4				1.92	15		Yield	U
1	23.0 - 25.0	34	120.5	90.0				0.49	15		Yield	U
1	28.0 - 30.0	30	119.6	92.1				0.93	4	1.68	Bulge	QD
1	33.0 - 35.0	34	121.0	90.2	43	23	20	0.45	15		Yield	U
1	38.5 - 40.0											Dry Sieve
1	43.5 - 45.0											Dry Sieve
1	48.5 - 50.0											Dry Sieve
1	53.5 - 55.0											Dry Sieve
1	58.5 - 60.0											Dry Sieve
1	63.5 - 65.0											Dry Sieve
1	68.5 - 70.0											Dry Sieve
3	0.0 - 2.0	22	124.5	102.4				5.65	4		Multiple Shear	U
3	2.0 - 4.0	20	122.1	101.9				3.47	10		Multiple Shear	U
3	4.0 - 6.0	18	122.2	103.2				2.34	8		Multiple Shear	U
3	6.0 - 8.0	28	118.0	92.5				0.42	10		Multiple Shear	U
3	8.0 - 10.0	26	118.0	93.8				0.33	10	.52	Multiple Shear	QD
3	13.0 - 15.0	31			27	24	3					MC
3	13.0 - 15.0											Dry Sieve
3	15.5 - 17.0											Dry Sieve
3	20.5 - 22.0											Dry Sieve
3	23.5 - 25.0											Dry Sieve
3	28.5 - 30.0											Dry Sieve
3	33.5 - 35.0											Dry Sieve
3	38.5 - 40.0											Dry Sieve
3	43.5 - 45.0											Dry Sieve
3	48.5 - 50.0											Dry Sieve
4	0.0 - 2.0	13										MC
4	3.0 - 5.0	23	123.2	100.1				5.84	7		Multiple Shear	U
4	8.0 - 10.0	22	125.1	102.1	46	20	26	1.78	12		Multiple Shear	U
4	13.0 - 15.0	31	126.8	97.2				2.31	12		Multiple Shear	U
4	18.0 - 20.0	31	120.4	92.0				1.48	11		Multiple Shear	U
4	23.0 - 25.0	34	120.1	89.5				1.53	14		Multiple Shear	U

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.

BOTTOM ASH STORAGE POND EXPANSION

LABORATORY DATA

TABLE 2

FILE NO: 05-58

BORING NUMBER	DEPTH FEET	MOISTURE %	UNIT WEIGHT		ATTERBERG LIMITS			COMPRESSION TEST				TEST TYPE
			WET PCF	DRY PCF	LL	PL	PI	TSF	% STRAIN	START PRESSURE KSF	TYPE FAILURE	
4	28.0 - 30.0	36	118.9	87.1	36	21	15	0.21	15		Yield	U
4	33.0 - 35.0	36	116.3	85.6				0.32	15		Yield	U
4	38.0 - 40.0	35	120.7	89.5	28	21	7	0.71	12	2.26	Bulge	QD
4	40.5 - 42.0											Dry Sieve
4	48.5 - 50.0											Dry Sieve
4	58.5 - 60.0											Dry Sieve
4	68.5 - 70.0											Dry Sieve
5	0.0 - 2.0	17	118.9	101.8				3.39	8		Multiple Shear	U
5	3.0 - 5.0	17	120.4	103.3				2.13	5		Multiple Shear	U
5	8.0 - 10.0	30	118.6	91.5				1.83	15		Yield	U
5	13.0 - 15.0	31	115.8	88.3				1.25	15		Yield	U
5	18.0 - 20.0	29	116.8	90.3	48	24	24	0.72	15		Yield	U
5	23.0 - 25.0	32	117.2	89.0				0.62	15		Yield	U
5	28.0 - 30.0	33	116.5	87.8				0.16	5	1.68	Bulge	QD
5	33.0 - 35.0	33	117.6	88.3	32	18	14	0.44	14	1.97	Bulge	QD
5	38.0 - 40.0	33	119.2	89.5				0.58	13	2.26	Bulge	QD
5	43.0 - 45.0	42	117.4	82.7	45	22	23	0.55	15		Yield	U
5	48.5 - 50.0											Dry Sieve
5	58.5 - 60.0											Dry Sieve
5	68.5 - 70.0											Dry Sieve
6	3.0 - 5.0	18	120.6	102.5	48	25	23	5.18	6		Multiple Shear	U
6	8.0 - 10.0	30	122.4	93.8				1.95	14		Multiple Shear	U
6	13.0 - 15.0	31	121.8	92.7				1.53	15		Yield	U
6	18.0 - 20.0	34	117.4	87.4				1.46	13		Multiple Shear	U
6	23.0 - 25.0	33	117.4	88.2	74	26	48	1.13	14		Multiple Shear	U
6	28.0 - 30.0	35	122.1	90.6				0.17	13		Multiple Shear	U
6	33.0 - 35.0	31	119.4	91.3				0.58	15	1.97	Yield	QD
6	40.5 - 42.0											Dry Sieve
6	43.5 - 45.0											Dry Sieve
6	48.5 - 50.0											Dry Sieve
6	53.5 - 55.0											Dry Sieve
7	3.0 - 5.0	19	128.1	107.7				4.36	9		Multiple Shear	U
7	8.0 - 10.0	23	129.7	105.5				2.36	15		Yield	U
7	13.0 - 15.0	23	125.4	101.8	57	24	33	1.79	8		Multiple Shear	U
7	18.0 - 20.0	33	119.0	89.6				1.73	11		Multiple Shear	U
7	23.0 - 25.0	33	59.7	44.9				0.60	3		Multiple Shear	U

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.

LABORATORY DATA

BORING NUMBER	DEPTH FEET	MOISTURE %	UNIT WEIGHT		ATTERBERG LIMITS			COMPRESSION TEST				TEST TYPE
			WET PCF	DRY PCF	LL	PL	PI	TSF	% STRAIN	START PRESSURE KSF	TYPE FAILURE	
7	28.0 - 30.0	36	117.9	87.0	55	24	31	0.69	11		Multiple Shear	U
7	33.0 - 35.0	35	113.9	84.2				0.41	8	1.97	Bulge	QD
7	40.5 - 42.0	34										MC
7	48.0 - 50.0	37	117.5	85.9				0.86	12		Multiple Shear	U
7	60.5 - 62.0											Dry Sieve
7	68.5 - 70.0											Dry Sieve
8	3.0 - 5.0	20										MC
8	8.0 - 10.0	32	123.2	93.4	44	18	26	1.35	11		Multiple Shear	U
8	13.0 - 15.0	41	110.0	78.0				1.25	15		Yield	U
8	18.0 - 20.0	35	114.3	84.6				1.26	15		Yield	U
8	23.0 - 25.0	34	117.9	87.7	31	18	13	0.44	9		Multiple Shear	U
8	28.0 - 30.0	32	119.1	90.0				0.29	7	1.68	Bulge	QD
8	33.0 - 35.0	36	106.2	78.4				0.97	10	1.97	Bulge	QD
8	38.0 - 40.0											Dry Sieve
8	40.5 - 42.0											Dry Sieve
8	43.5 - 45.0											Dry Sieve
8	48.5 - 50.0											Dry Sieve
8	53.5 - 55.0											Dry Sieve
9	0.0 - 2.0	9										MC
9	2.0 - 4.0	24	117.7	95.2				2.07	6		Multiple Shear	U
9	4.0 - 6.0	19	119.1	100.0				1.47	14		Multiple Shear	U
9	6.0 - 8.0	23	126.4	102.4				0.71	6		Multiple Shear	U
9	8.0 - 10.0	24	116.1	93.8	35	18	17	1.08	14		Multiple Shear	U
9	13.0 - 15.0	31	124.9	95.0	26	25	1	0.25	5	.82	Bulge	QD
9	20.5 - 22.0											Dry Sieve
9	23.5 - 25.0											Dry Sieve
9	30.5 - 32.0											Dry Sieve
9	33.5 - 35.0											Dry Sieve
9	38.5 - 40.0											Dry Sieve
9	43.5 - 45.0											Dry Sieve
9	48.5 - 50.0											Dry Sieve
11	0.0 - 2.0	25	118.1	94.6				4.43	5		Multiple Shear	U
11	2.0 - 4.0	24	120.7	97.7	75	22	53	5.12	5		Multiple Shear	U
11	4.0 - 6.0	26	119.2	94.7				2.38	10		Multiple Shear	U
11	6.0 - 8.0	29	112.4	86.9				0.54	10		Multiple Shear	U
11	8.0 - 10.0	38	112.4	81.6				0.93	13		Multiple Shear	U

LABORATORY DATA

TABLE 4

FILE NO: 05-58

BORING NUMBER	DEPTH FEET	MOISTURE %	UNIT WEIGHT		ATTERBERG LIMITS			COMPRESSION TEST				TEST TYPE
			WET PCF	DRY PCF	LL	PL	PI	TSF	% STRAIN	START PRESSURE KSF	TYPE FAILURE	
11	13.0 - 15.0	45	110.2	76.1	102	32	70	0.80	6		SLS (45 Degrees)	U
11	18.0 - 20.0	28	115.1	89.7				0.18	5	1.09	Bulge	QD
11	25.5 - 27.0											Dry Sieve
11	28.5 - 30.0											Dry Sieve
11	33.5 - 35.0											Dry Sieve
11	38.5 - 40.0											Dry Sieve
11	43.5 - 45.0											Dry Sieve
11	48.5 - 50.0											Dry Sieve
12	3.0 - 5.0	19	130.2	109.6				2.16	6		Multiple Shear	U
12	8.0 - 10.0	30	119.2	91.6	54	18	36	1.10	9		Multiple Shear	U
12	13.0 - 15.0	33	119.1	89.6				1.42	15		Yield	U
12	18.0 - 20.0	33	116.5	87.8				1.13	5		Multiple Shear	U
12	23.0 - 25.0	32	108.8	82.2	34	20	14	0.38	15		Yield	U
12	28.0 - 30.0	32	118.9	90.0				0.31	15		Yield	U
12	35.5 - 37.0											Dry Sieve
12	38.5 - 40.0											Dry Sieve
12	43.5 - 45.0											Dry Sieve
12	48.5 - 50.0											Dry Sieve
12	53.5 - 55.0											Dry Sieve
12	58.5 - 60.0											Dry Sieve
12	63.5 - 65.0											Dry Sieve
12	68.5 - 70.0											Dry Sieve
13	0.0 - 2.0											Dry Sieve
13	3.0 - 5.0											Dry Sieve
13	8.0 - 10.0	14	115.5	101.3				1.16	6		Multiple Shear	U
13	13.0 - 15.0	30	119.4	91.9				1.50	15		Multiple Shear	U
13	18.0 - 20.0	37	116.9	85.5				1.40	8		Multiple Shear	U
13	23.0 - 25.0	39	114.3	82.2				0.92	7		Multiple Shear	U
13	28.0 - 30.0	36	115.8	84.9				0.84	15		Multiple Shear	U
13	33.0 - 35.0	30	120.6	92.6	30	18	12	0.64	8	1.97	Bulge	QD
13	40.5 - 42.0											Dry Sieve
13	48.5 - 50.0											Dry Sieve
14	3.0 - 5.0	15										MC
14	8.0 - 10.0	29	117.8	91.3	78	27	51	1.27	13		Multiple Shear	U
14	13.0 - 15.0	32	118.2	89.8				0.85	15		Yield	U
14	18.0 - 20.0	26	130.3	103.2	61	22	39	2.13	6		Multiple Shear	U

BOTTOM ASH STORAGE POND EXPANSION

LABORATORY DATA

TABLE 5

FILE NO: 05-58

BORING NUMBER	DEPTH FEET	MOISTURE %	UNIT WEIGHT		ATTERBERG LIMITS			COMPRESSION TEST				TEST TYPE
			WET PCF	DRY PCF	LL	PL	PI	TSF	% STRAIN	START PRESSURE KSF	TYPE FAILURE	
14	23.0 - 25.0	25	120.4	96.2				1.09	15		Yield	U
14	28.0 - 30.0	36	119.2	87.8	32	20	12	0.27	8		Bulge	U
14	33.0 - 35.0	30	118.9	91.5	29	18	11	0.44	5		Bulge	U
14	38.5 - 40.0											Dry Sieve
14	43.0 - 45.0	26	120.4	95.2				0.41	7	2.56	Bulge	QD
14	45.5 - 47.0											Dry Sieve
14	48.5 - 50.0											Dry Sieve
14	53.5 - 55.0											Dry Sieve
14	58.5 - 60.0											Dry Sieve

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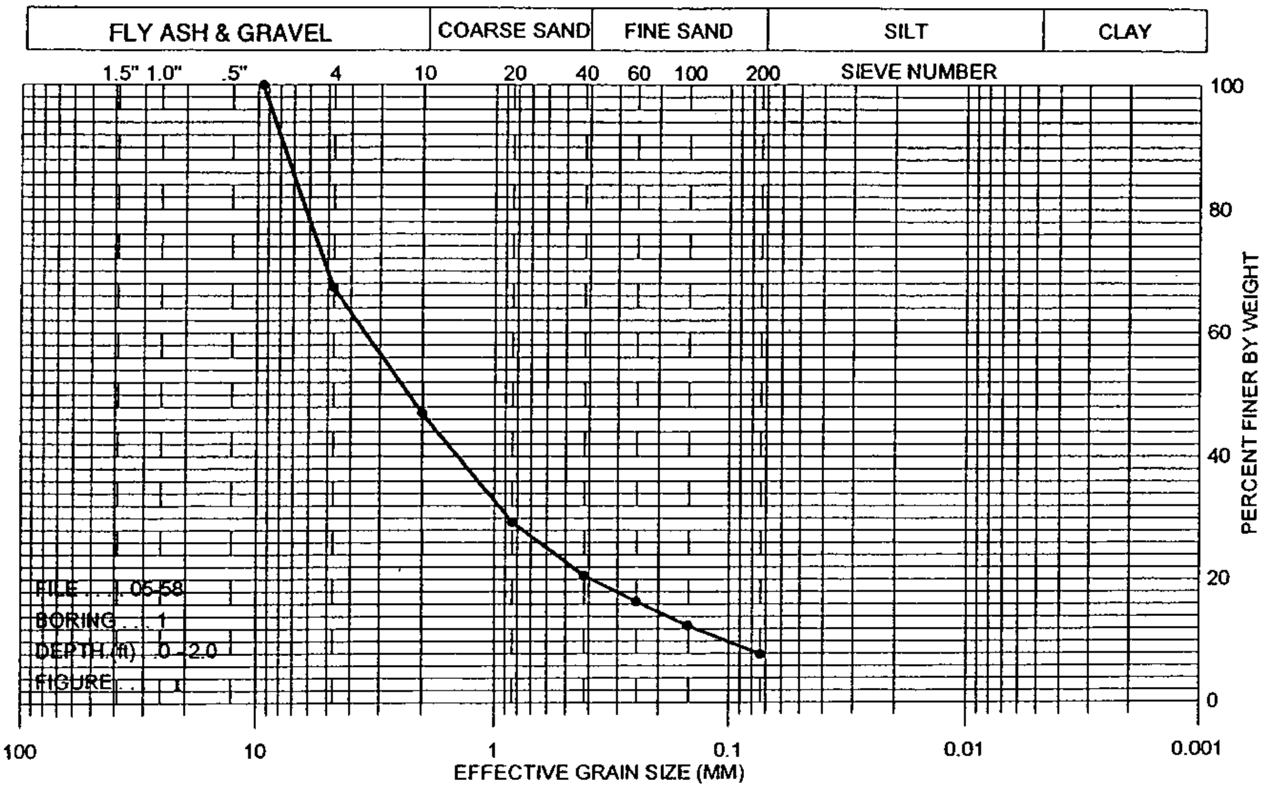
GRAIN SIZE CURVE



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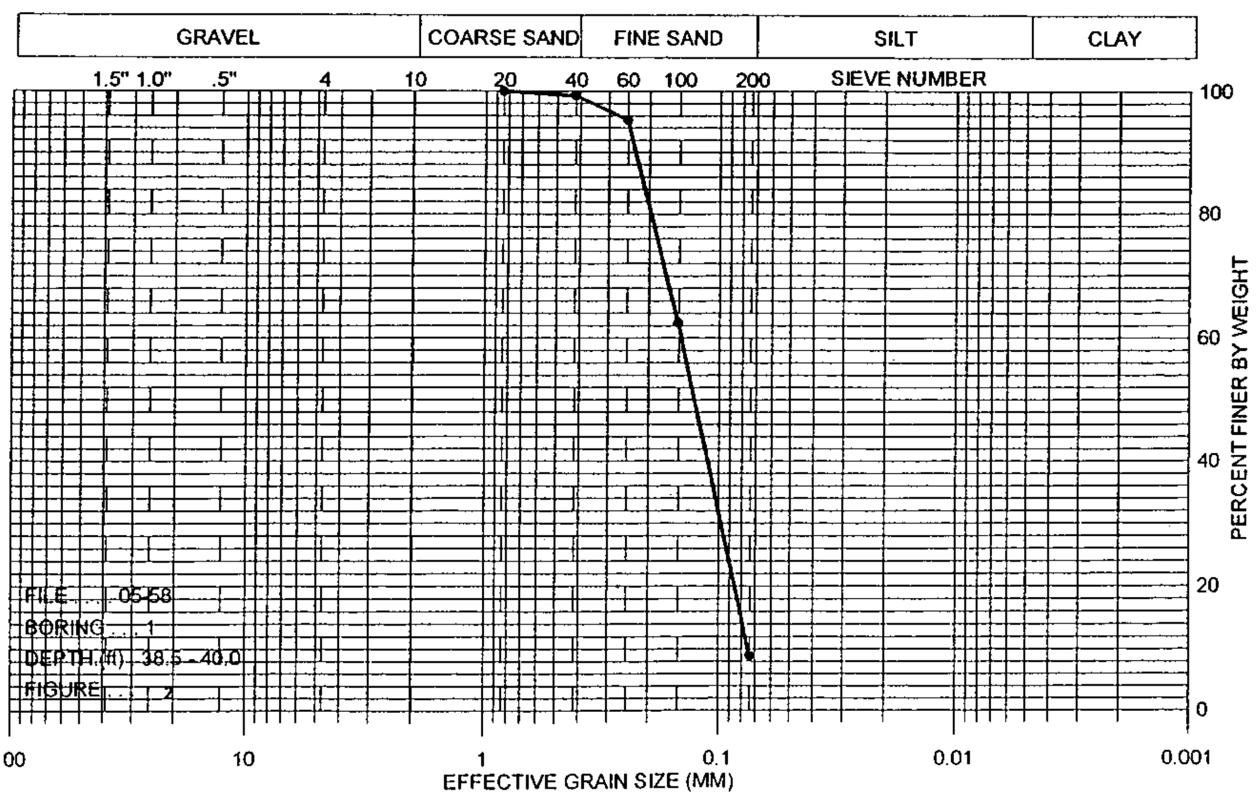

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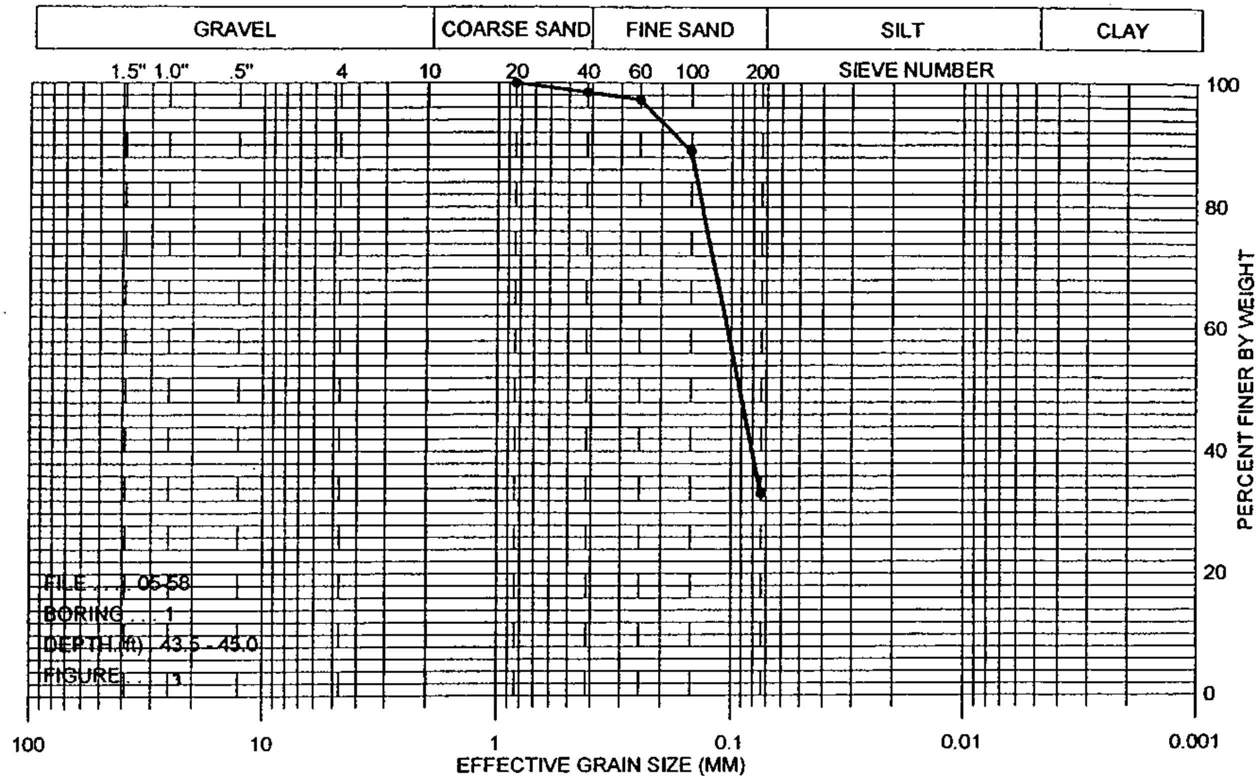

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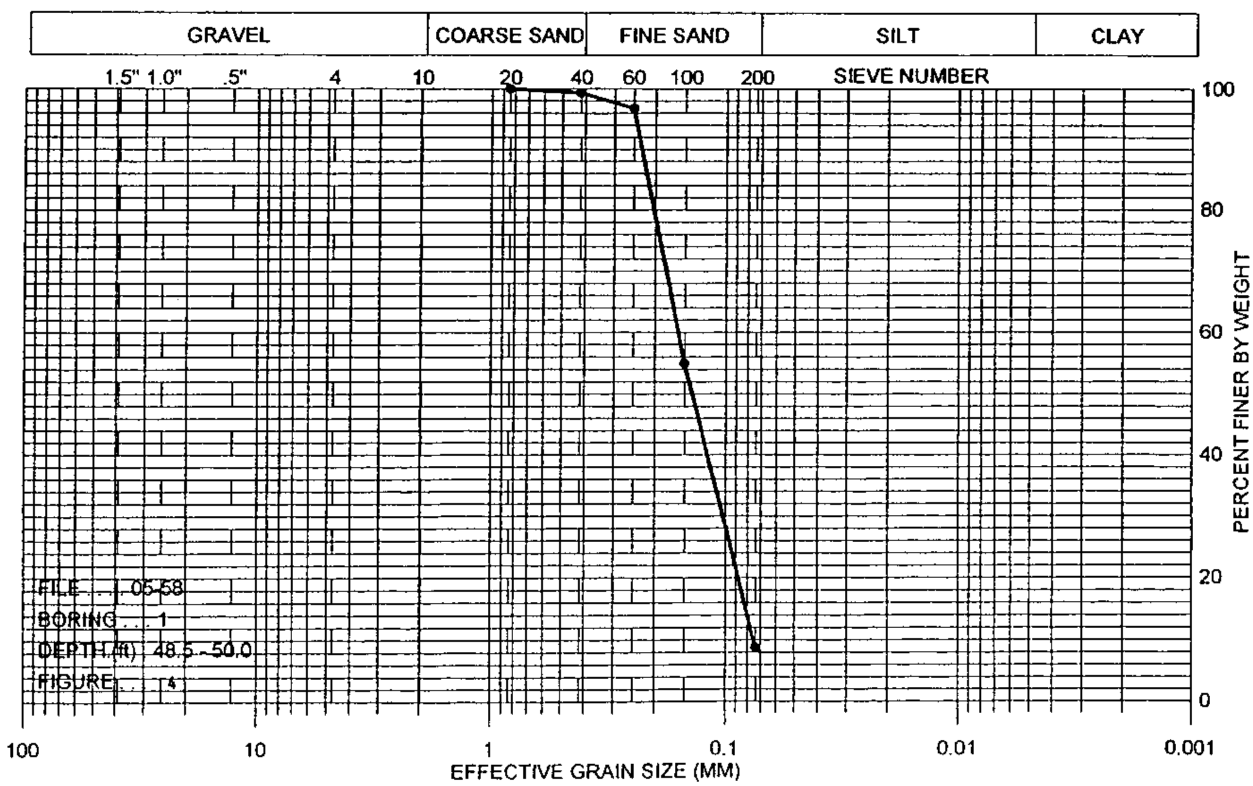

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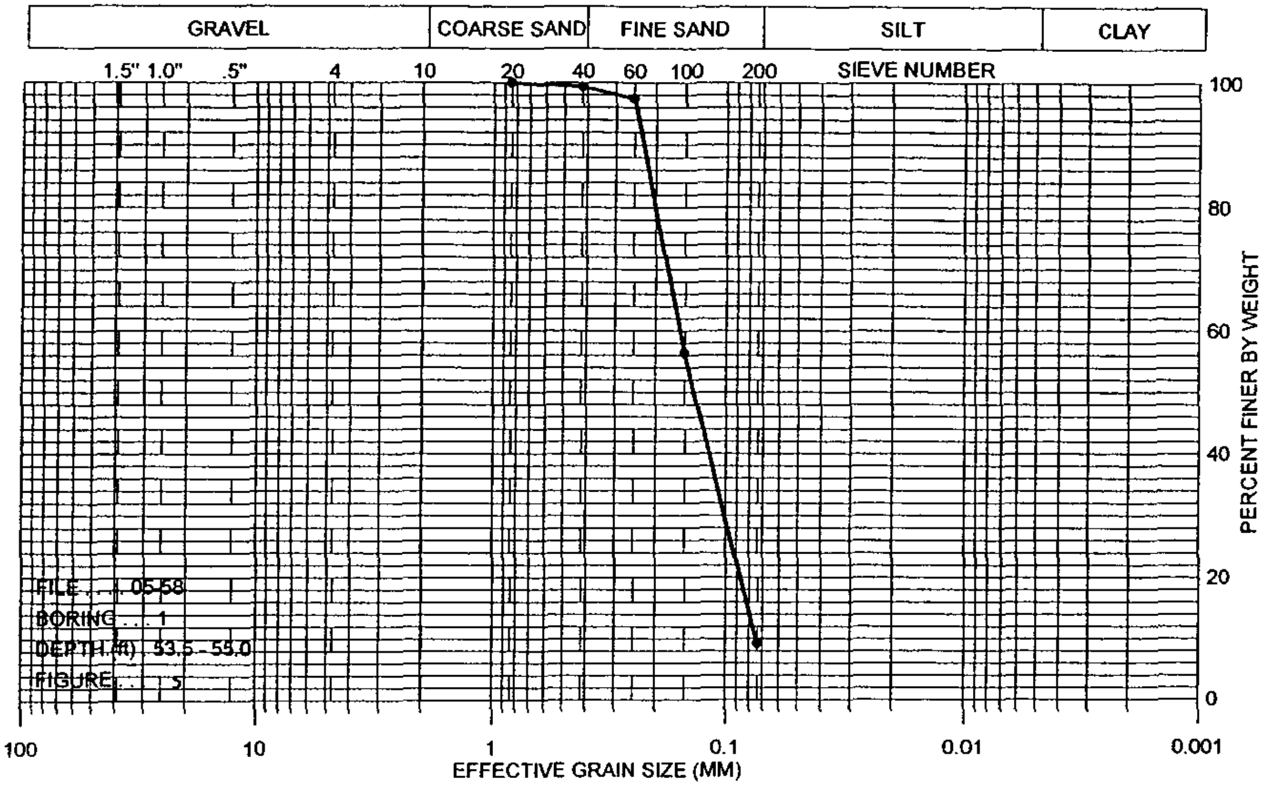

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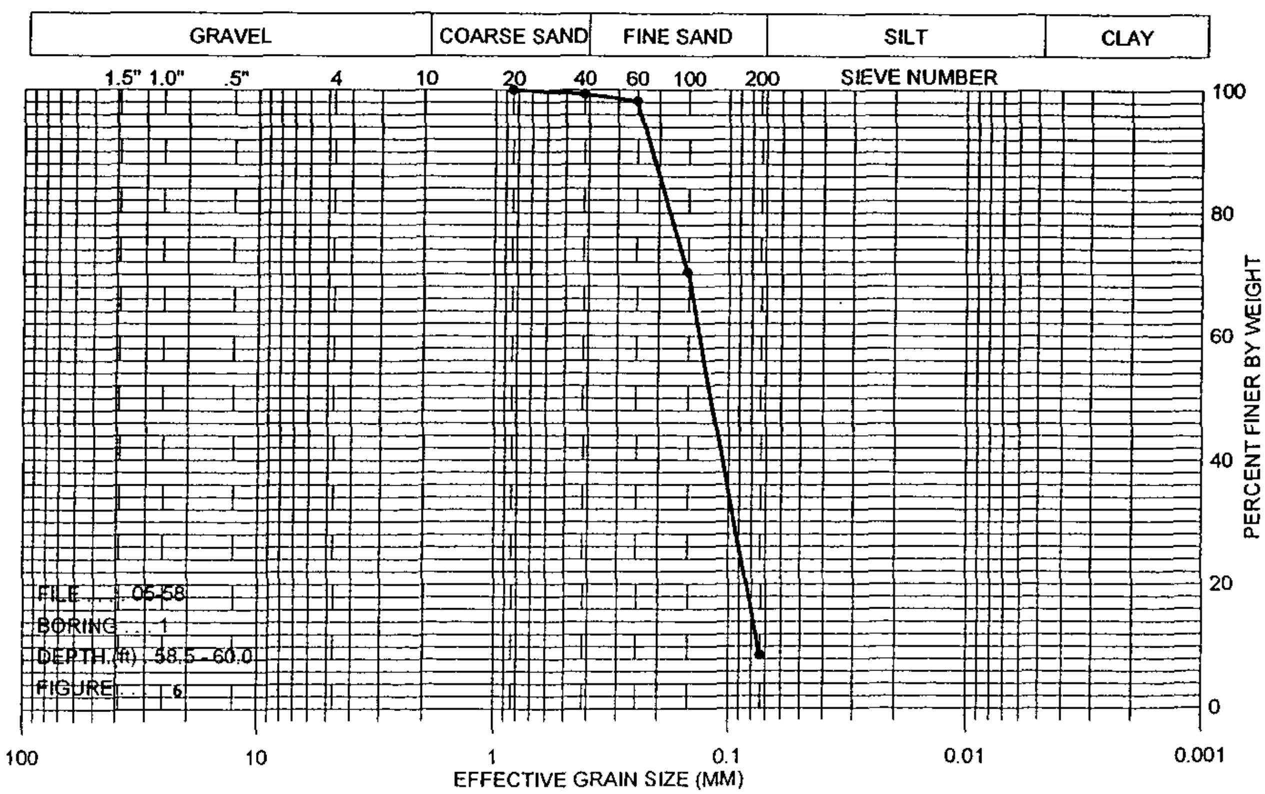

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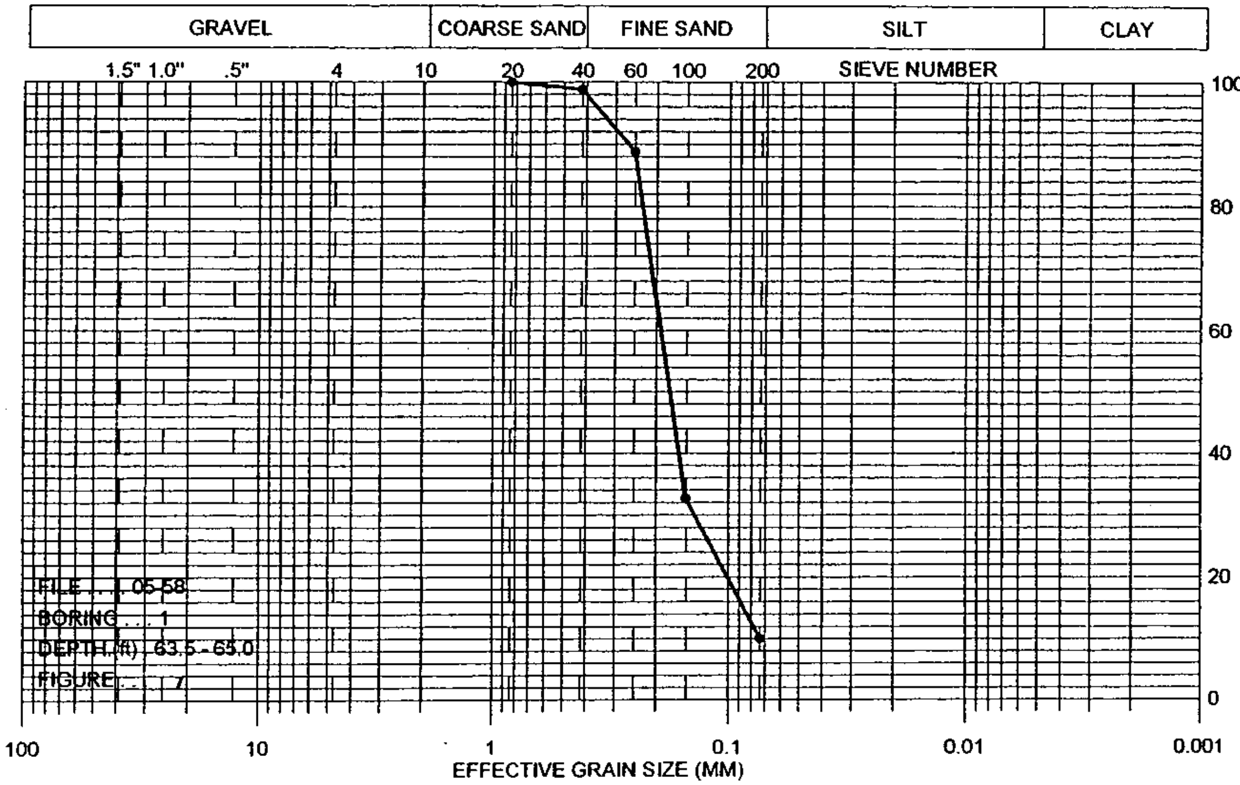

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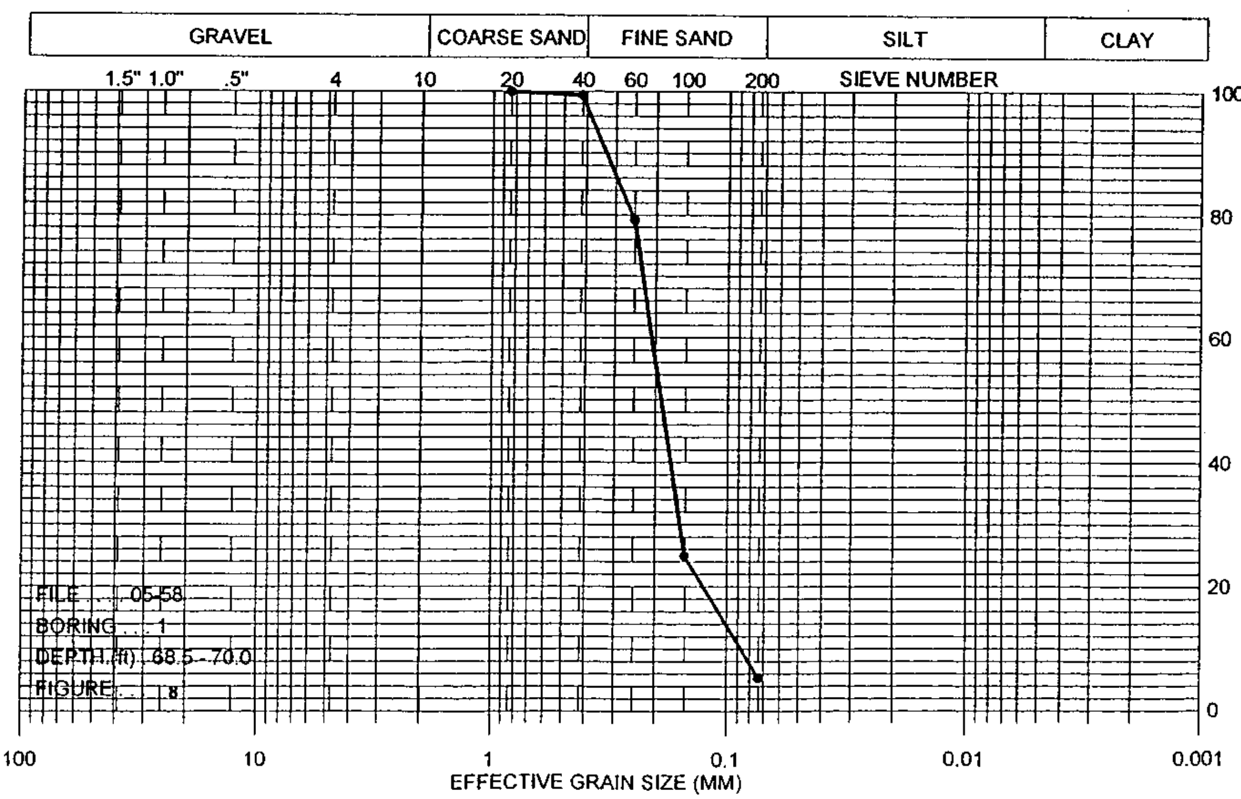

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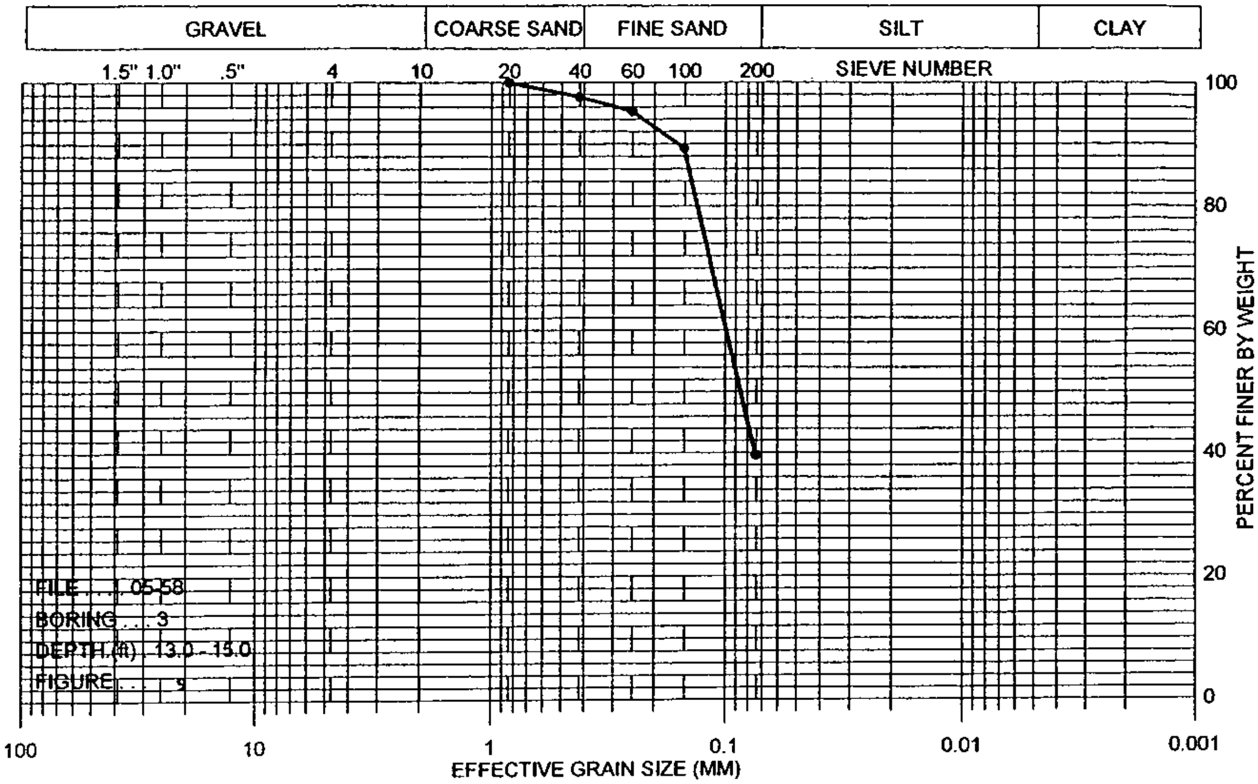

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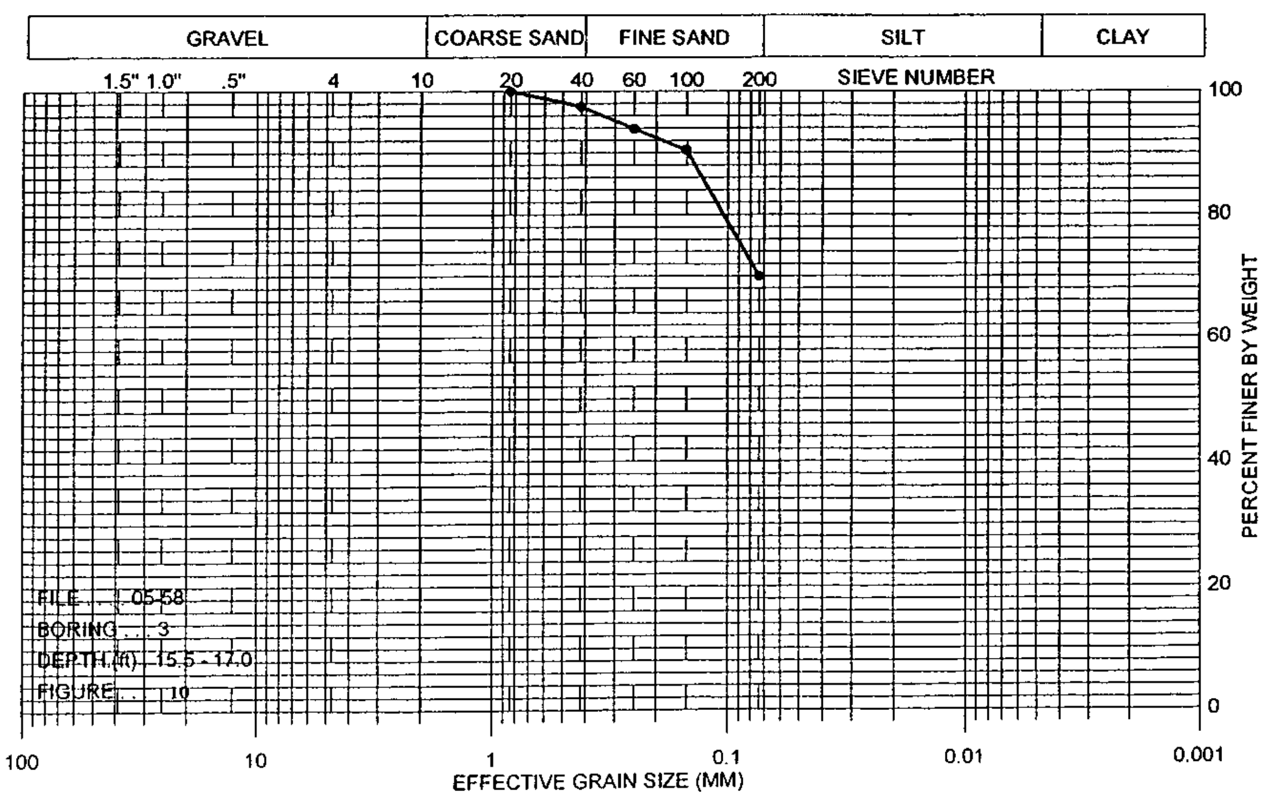

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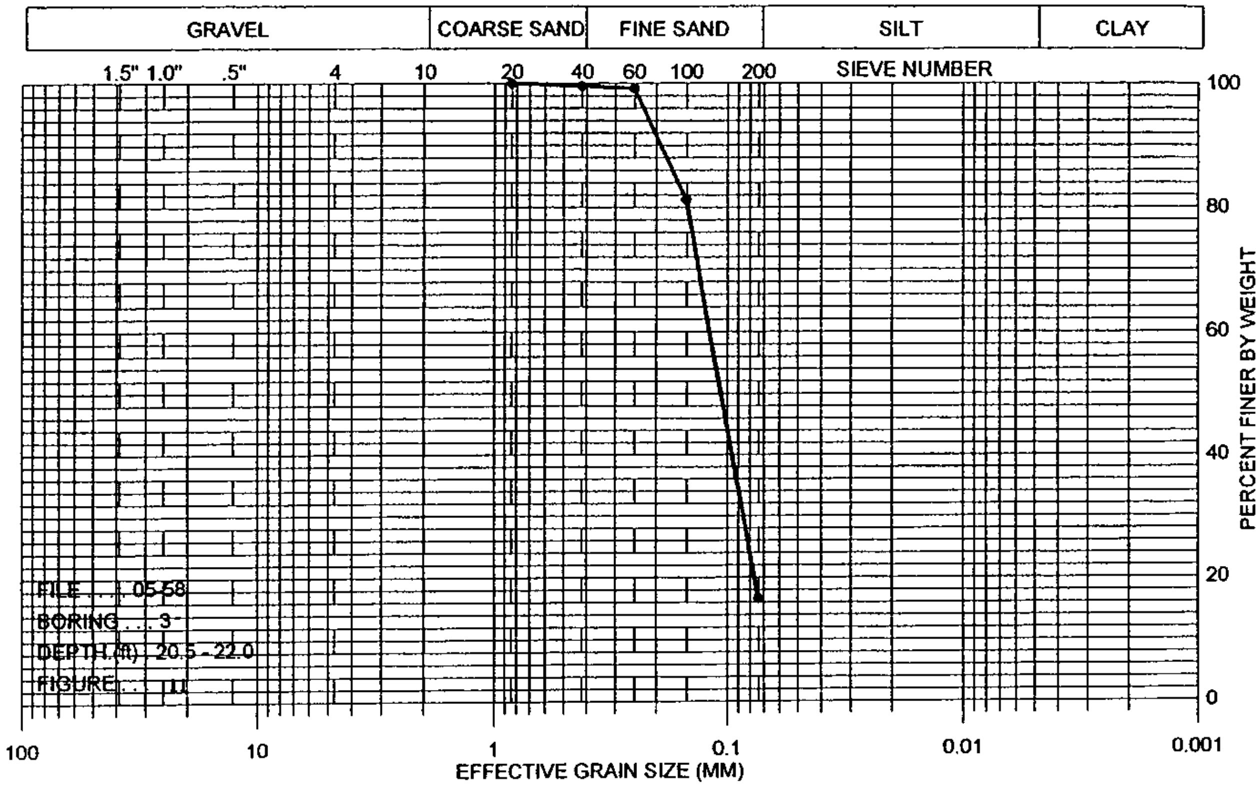

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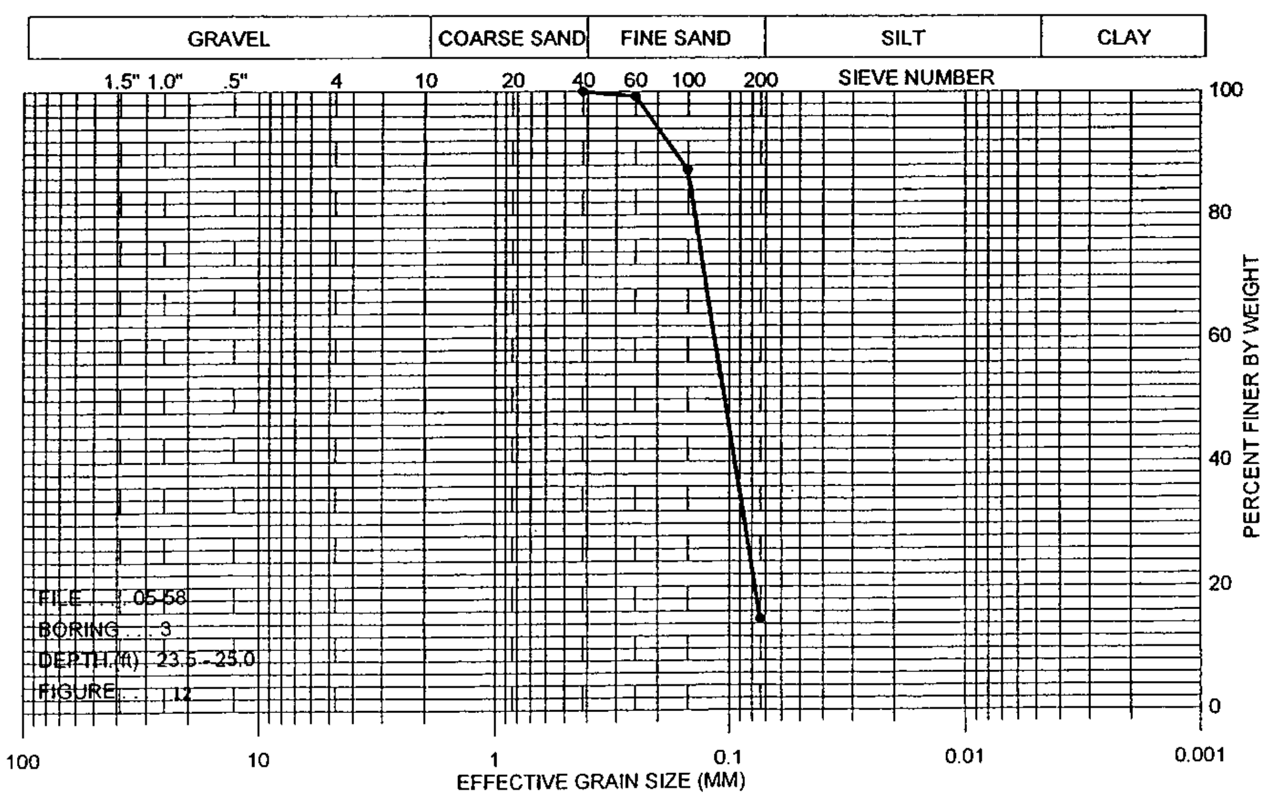

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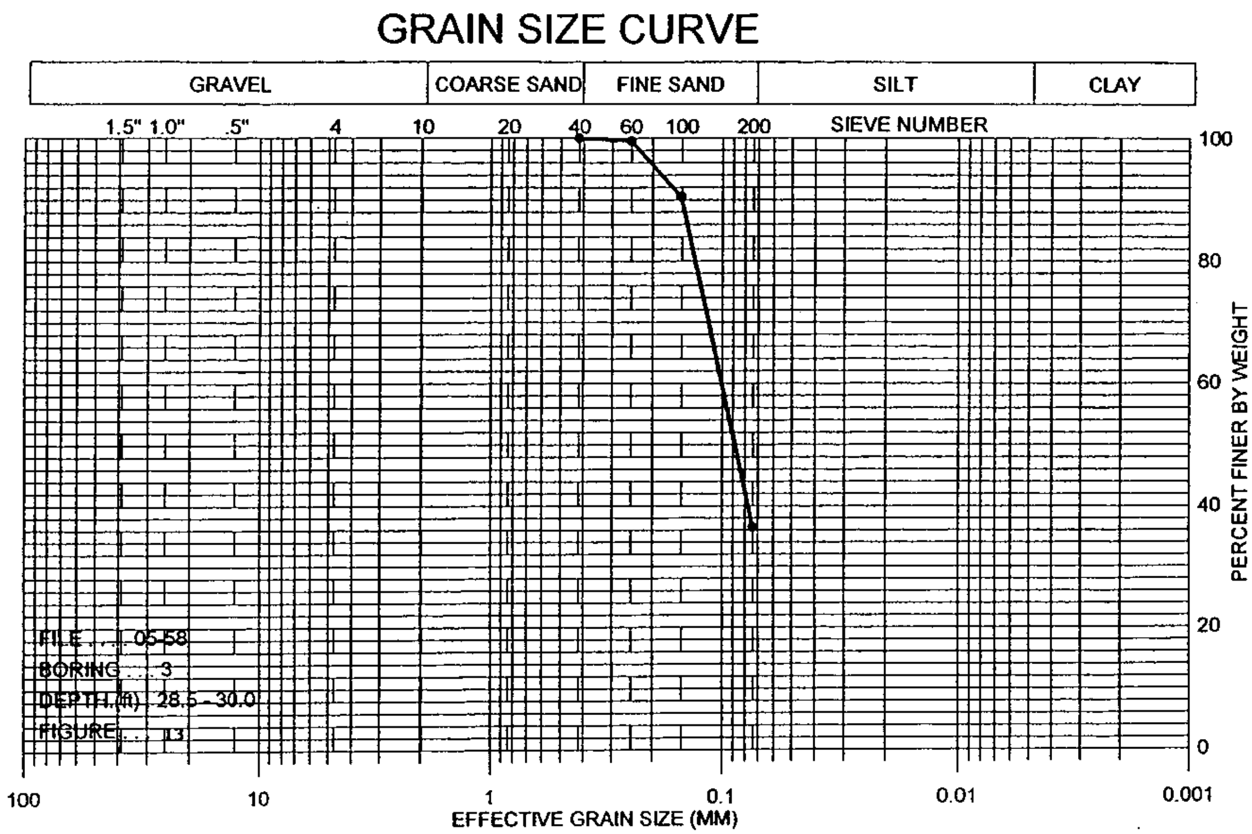

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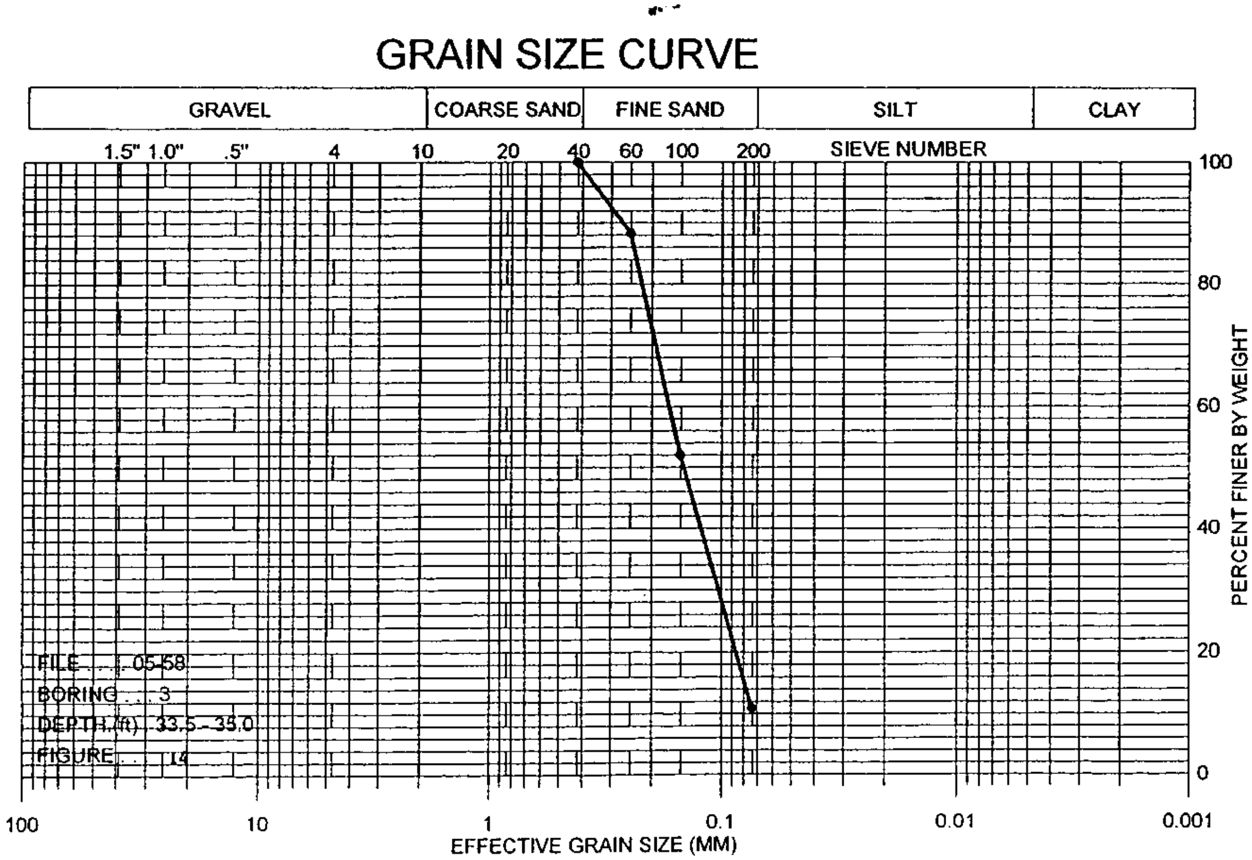

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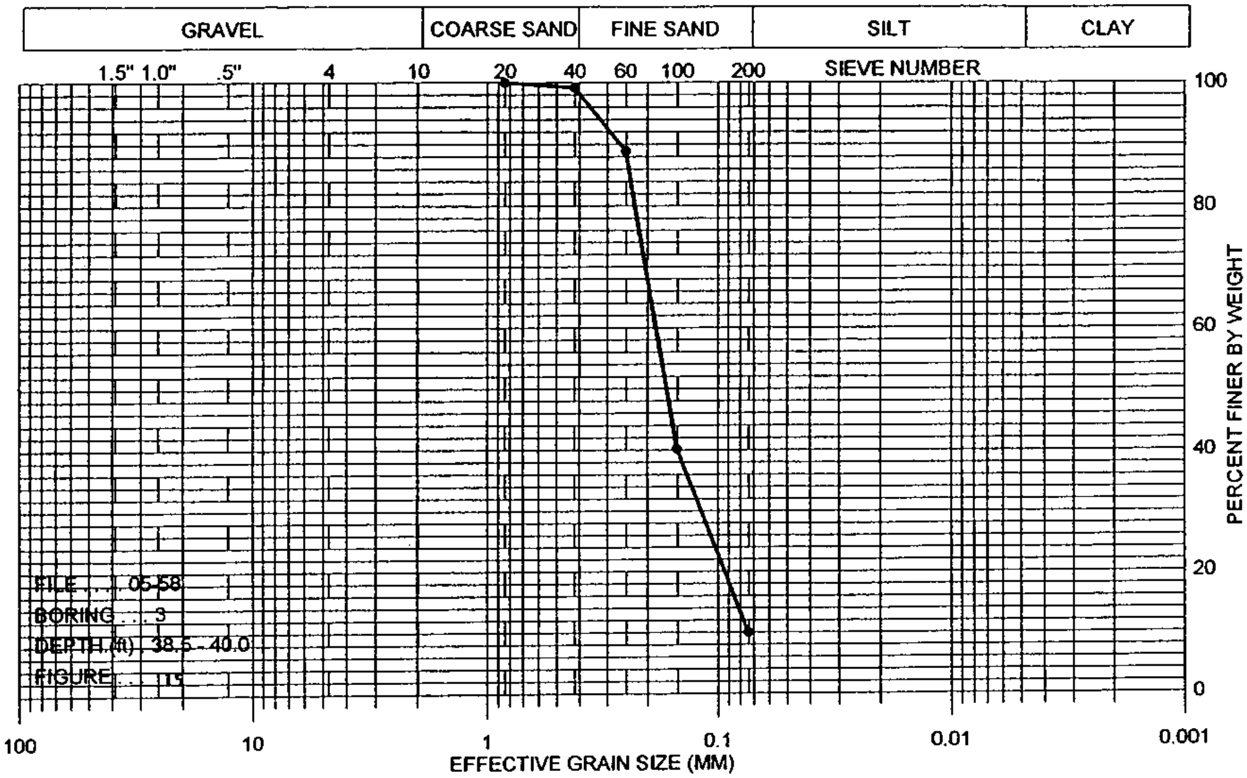

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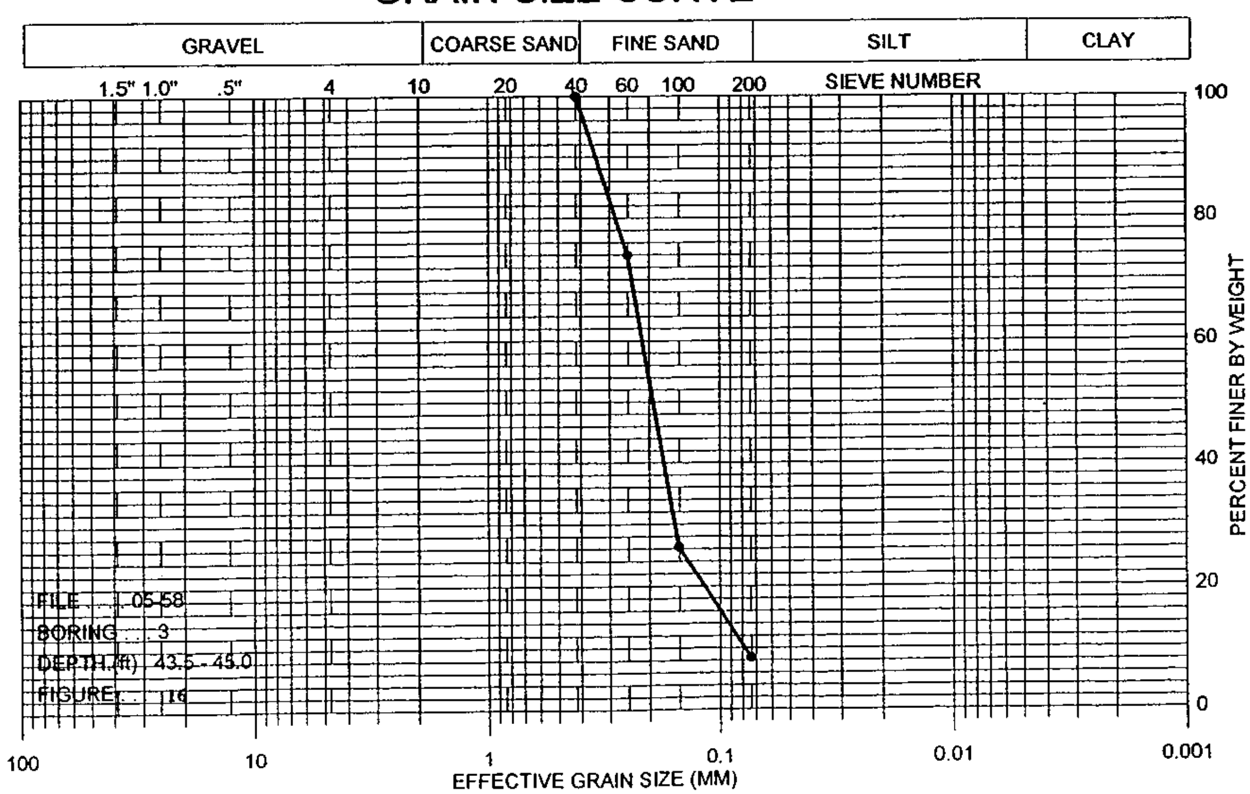

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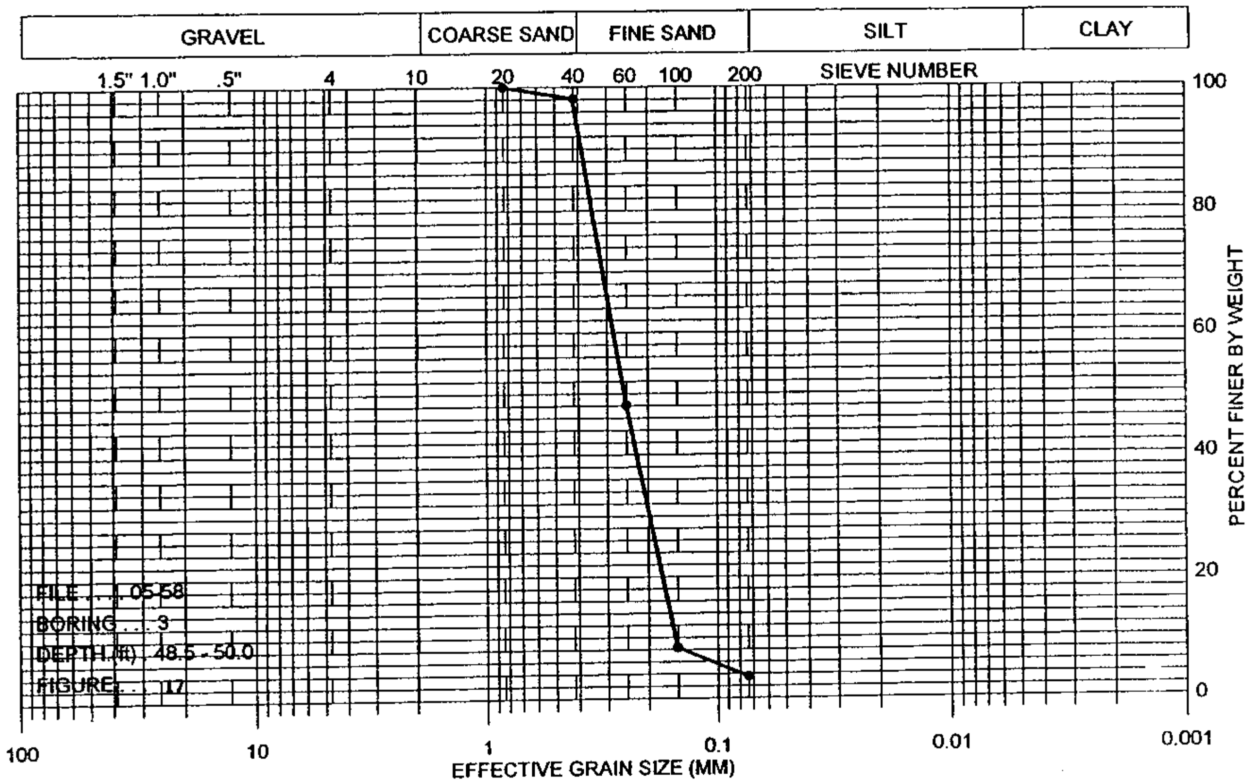

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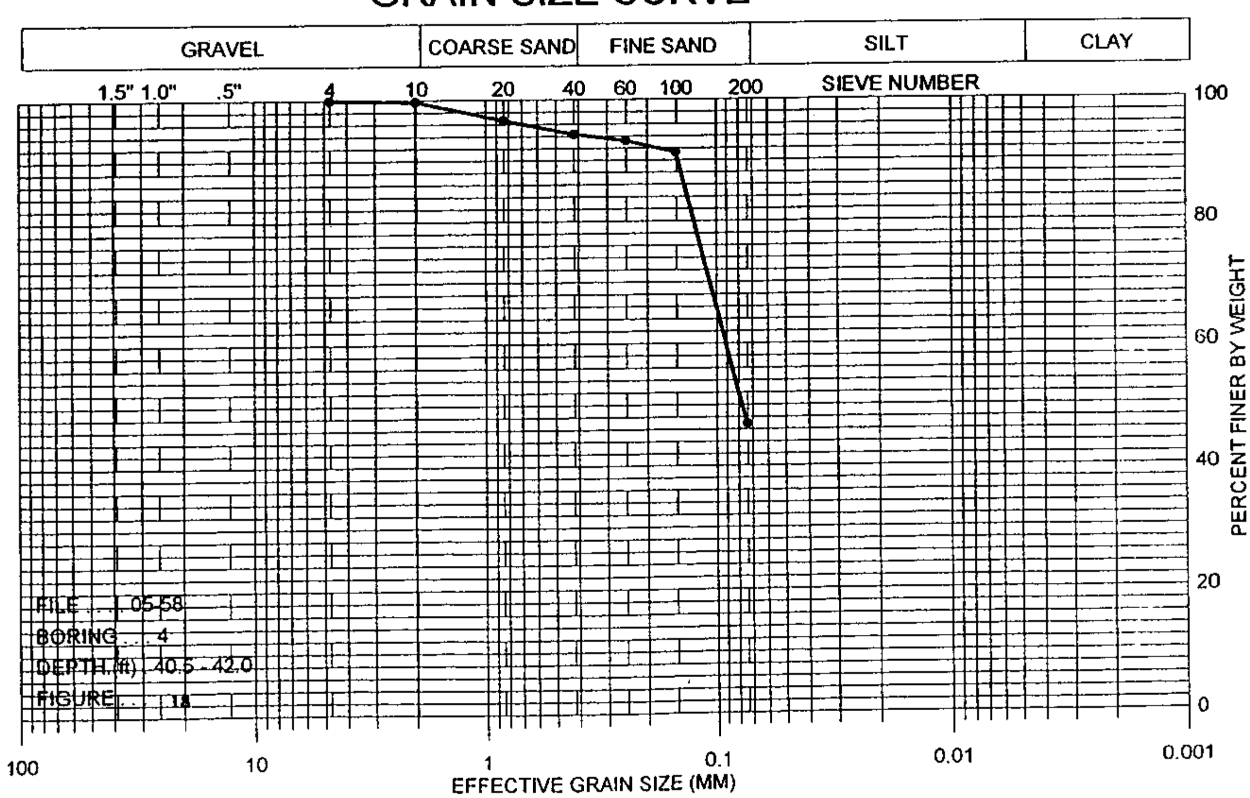

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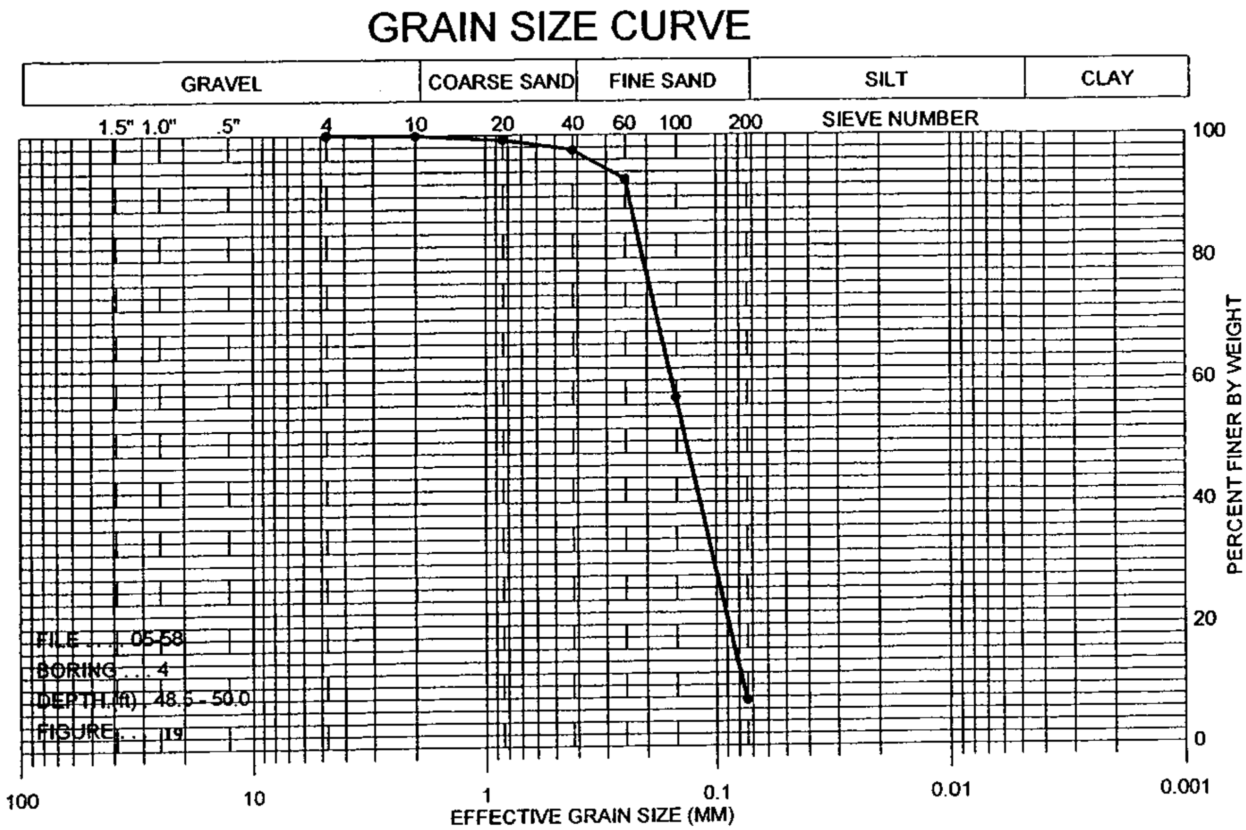

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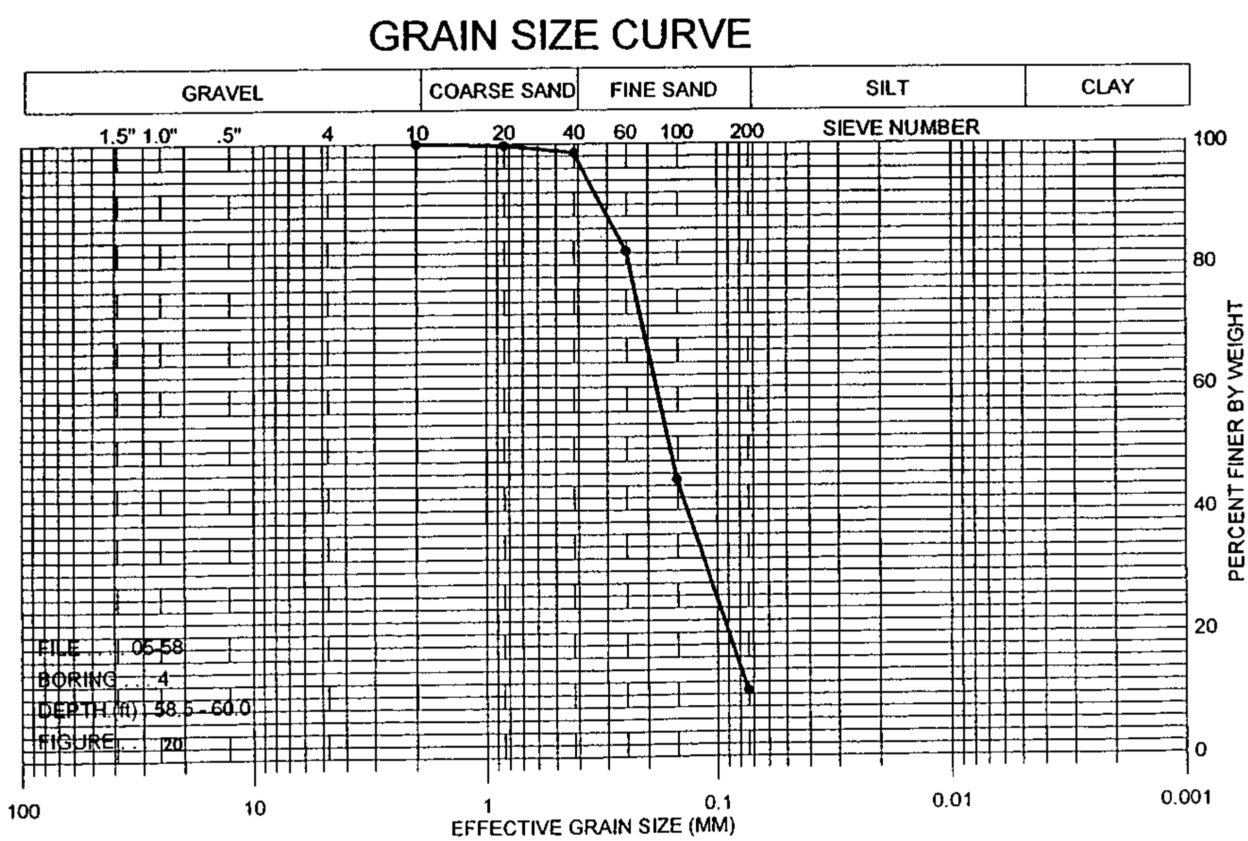

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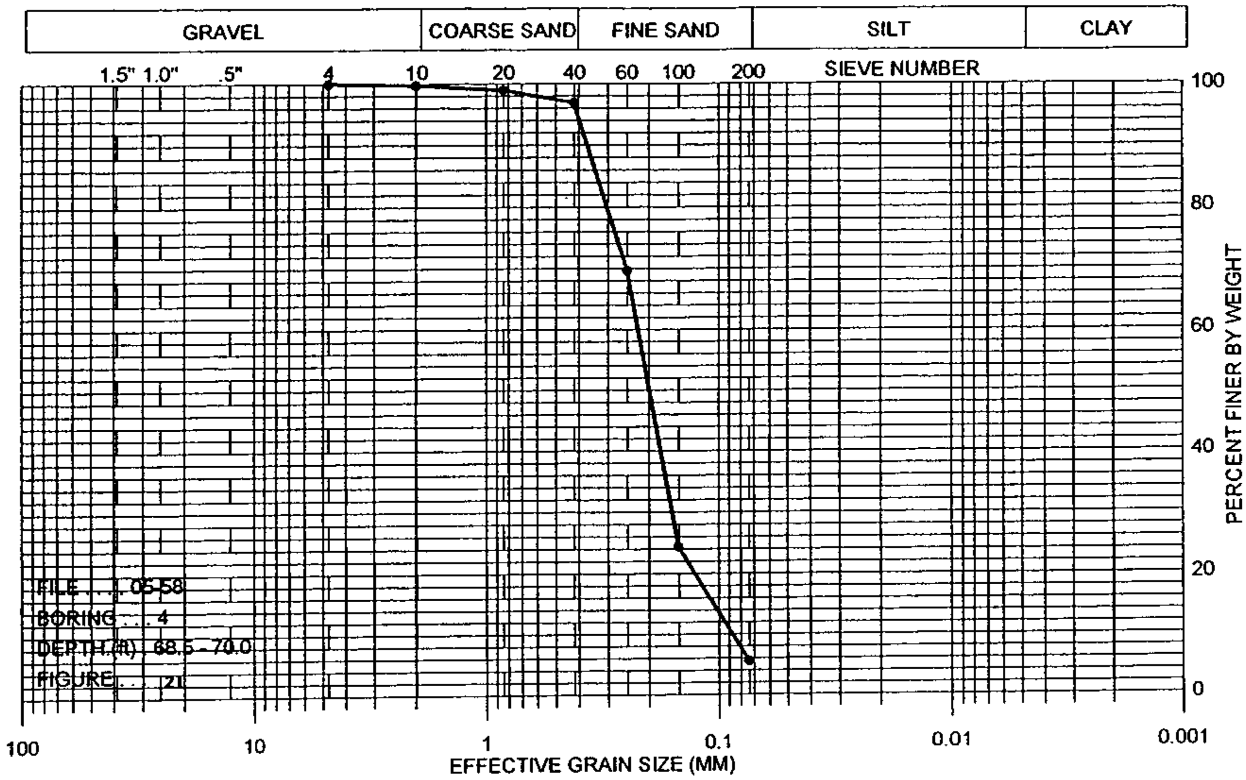

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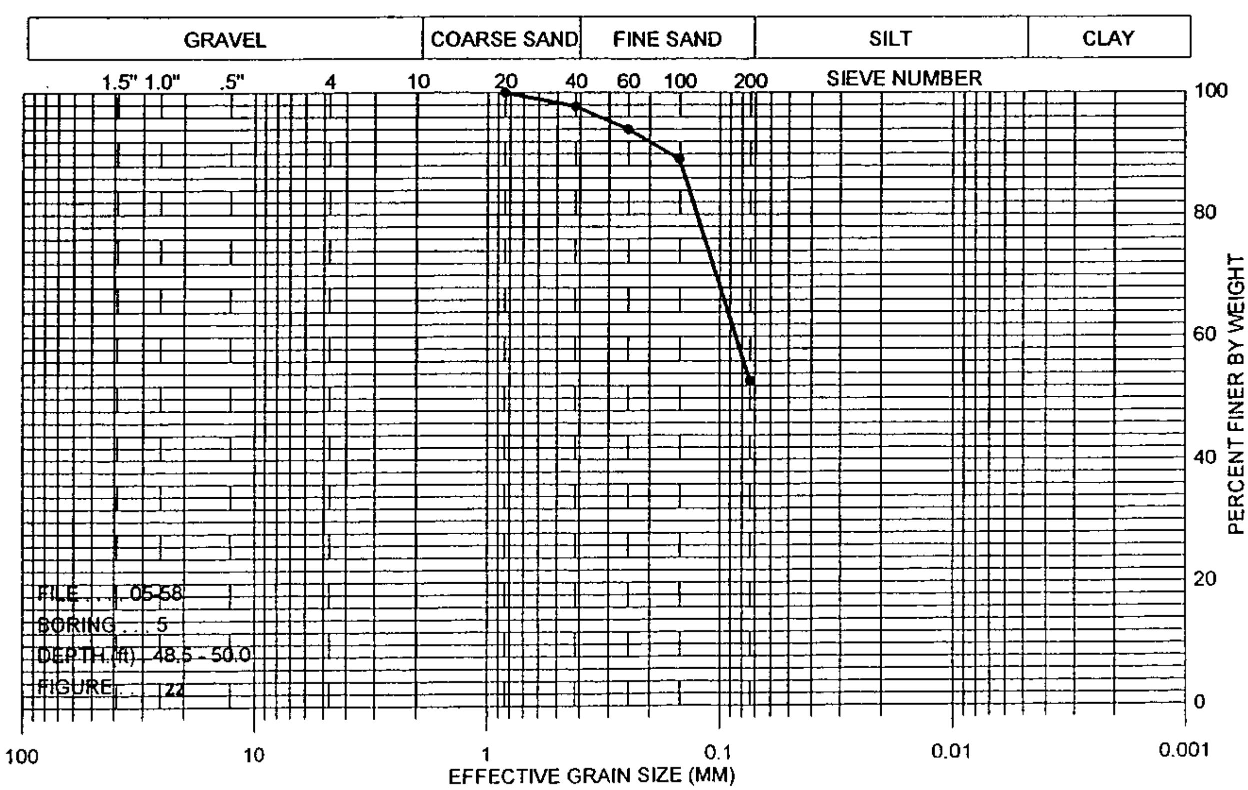

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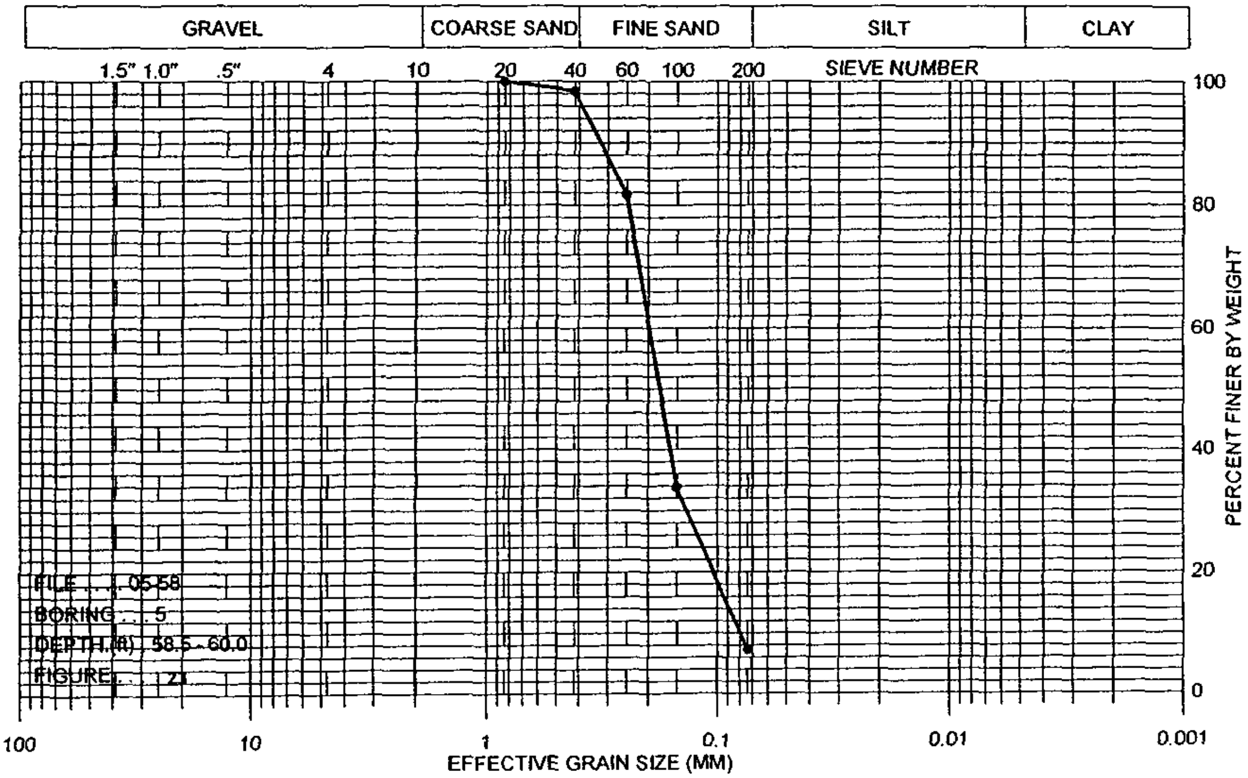

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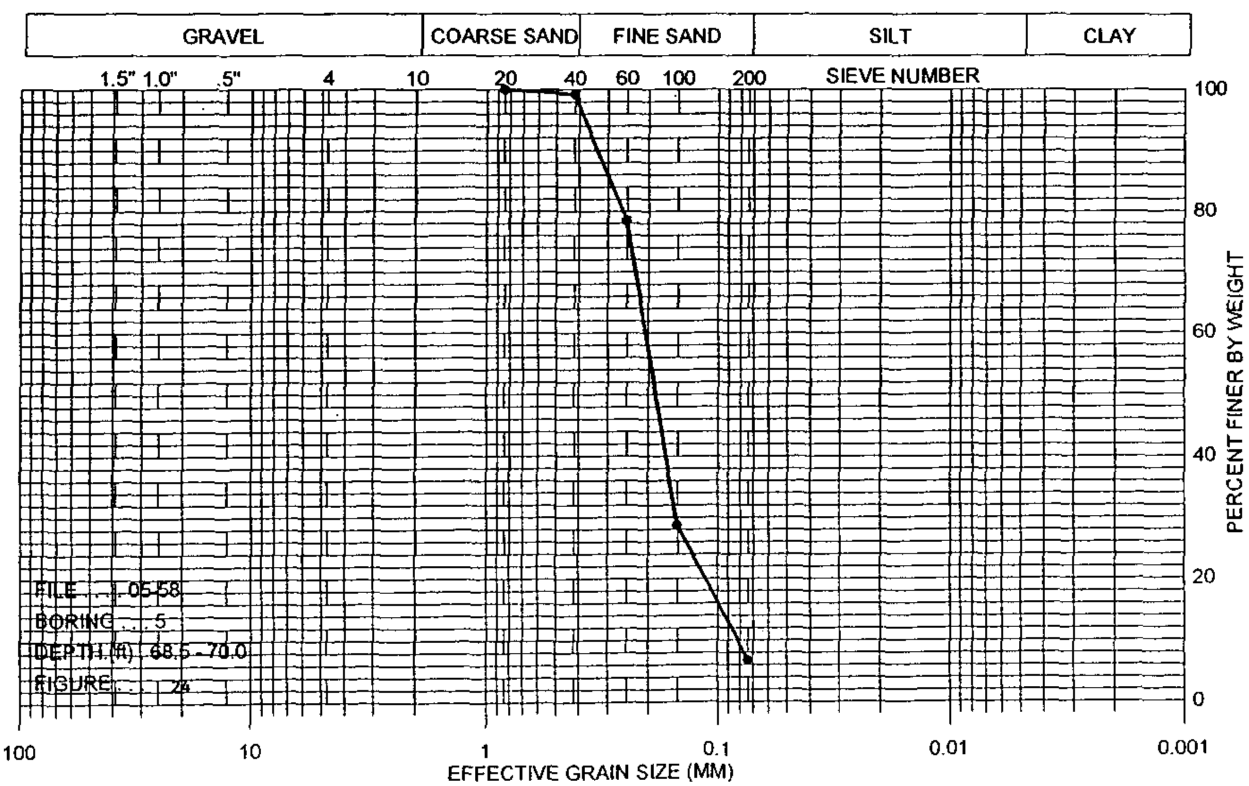

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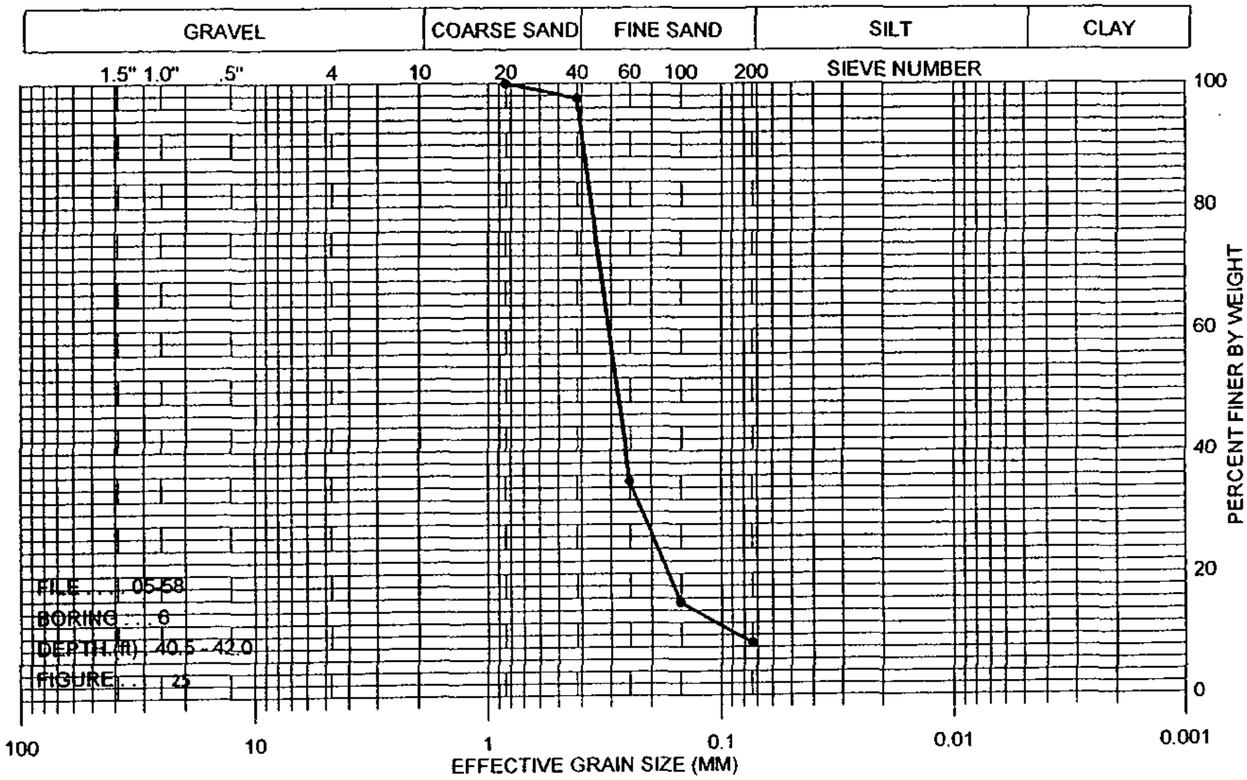

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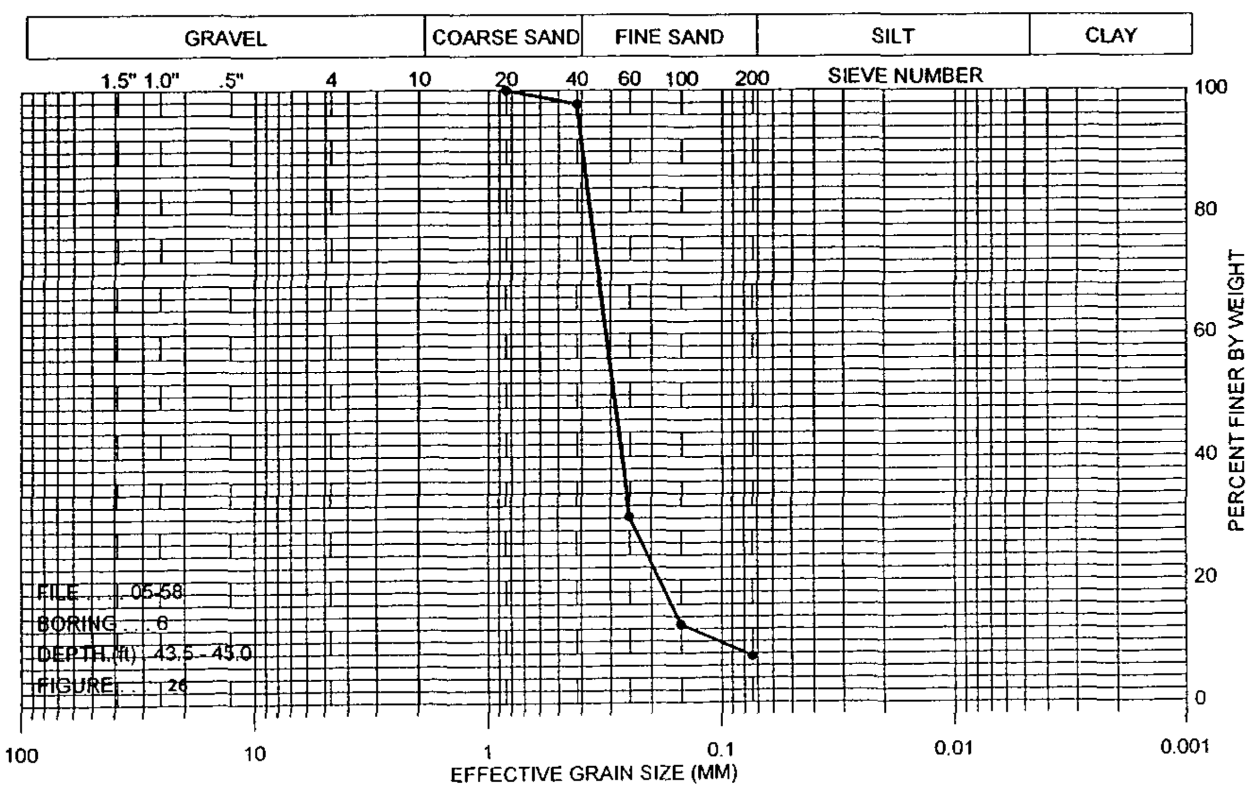
GRAIN SIZE CURVE



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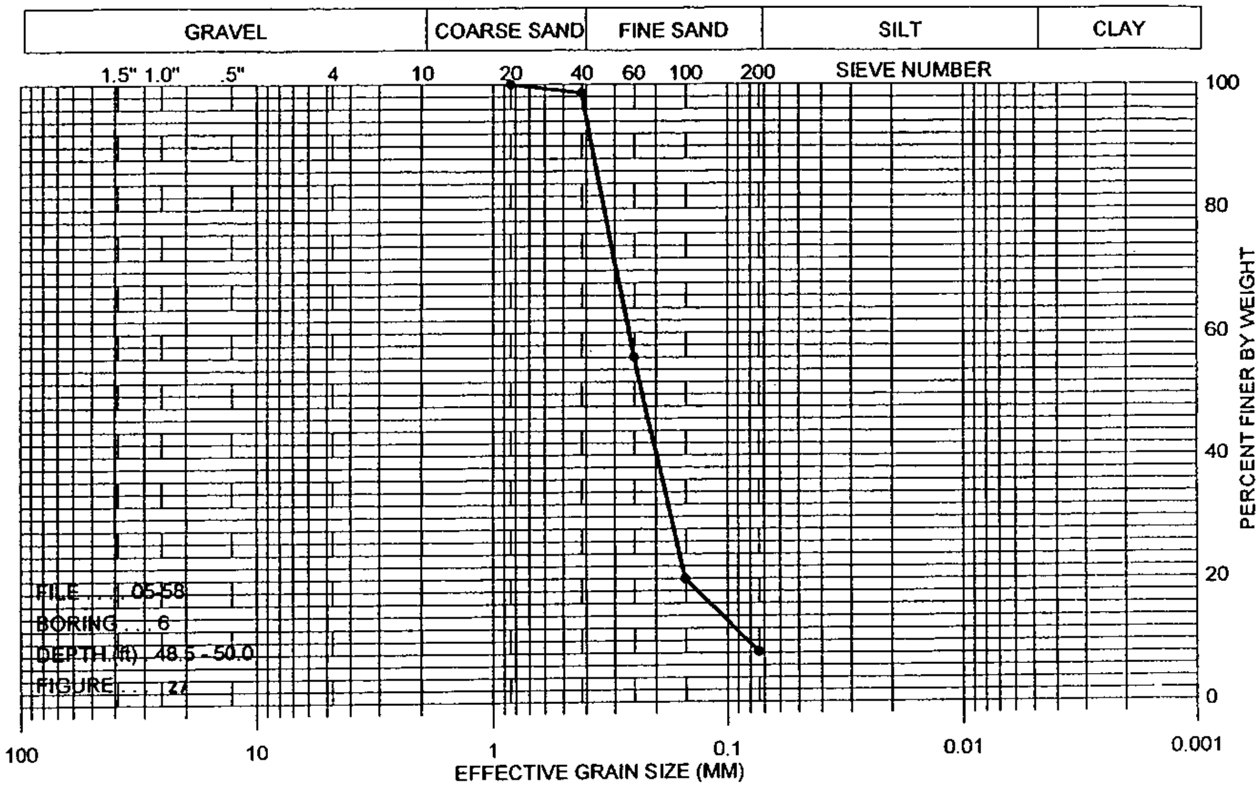

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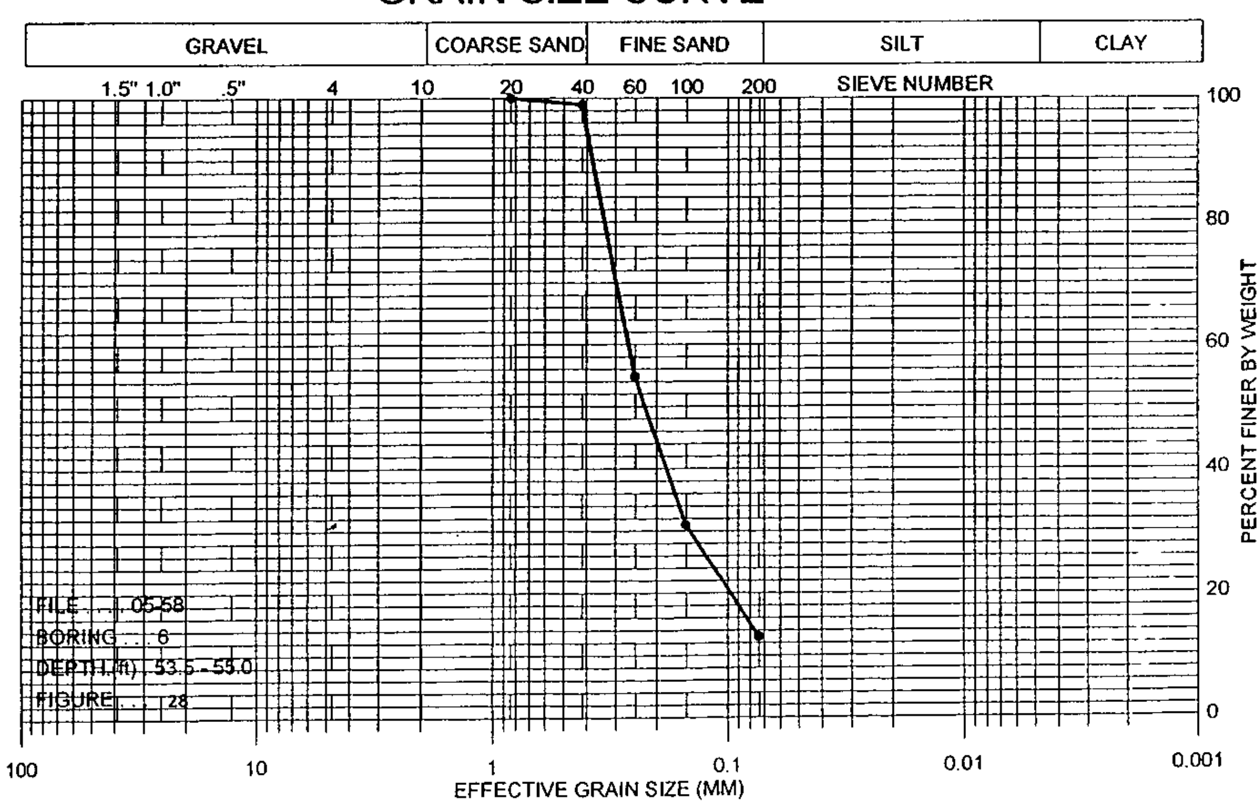
GRAIN SIZE CURVE



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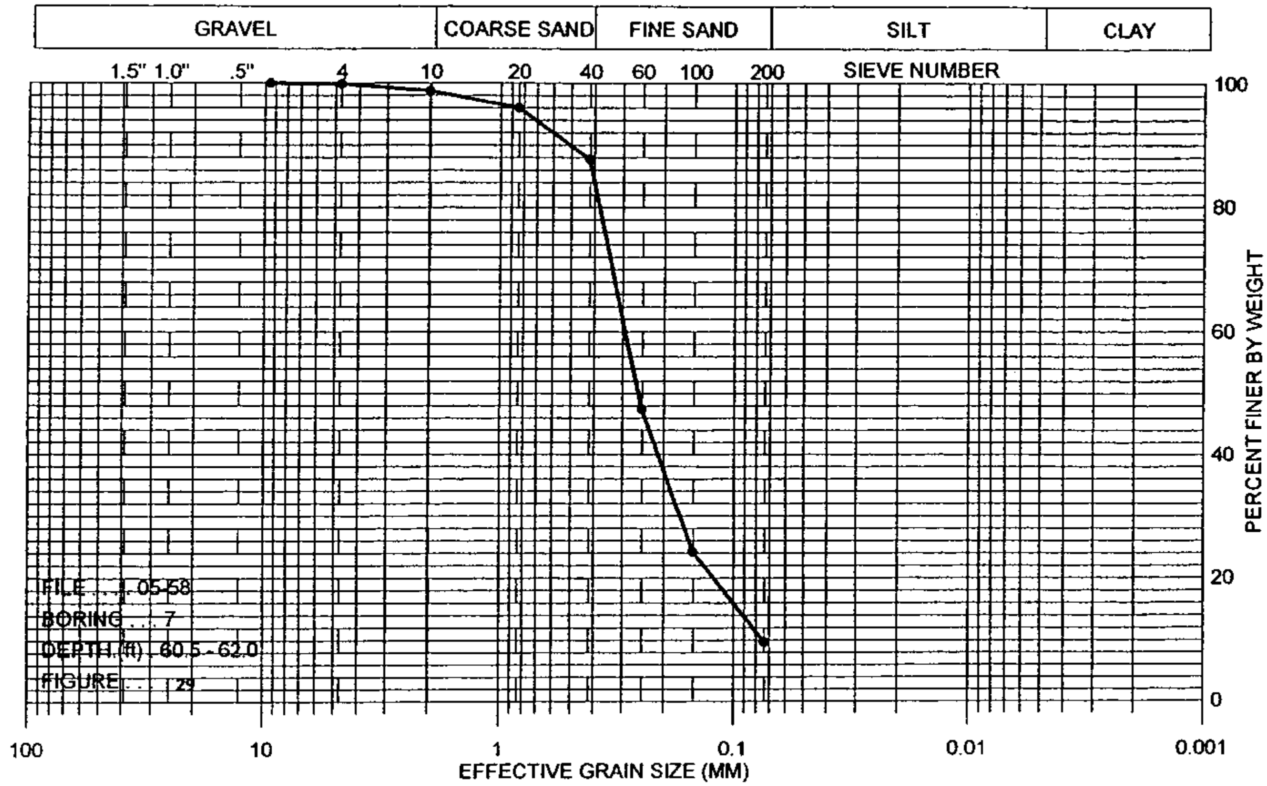
GRAIN SIZE CURVE



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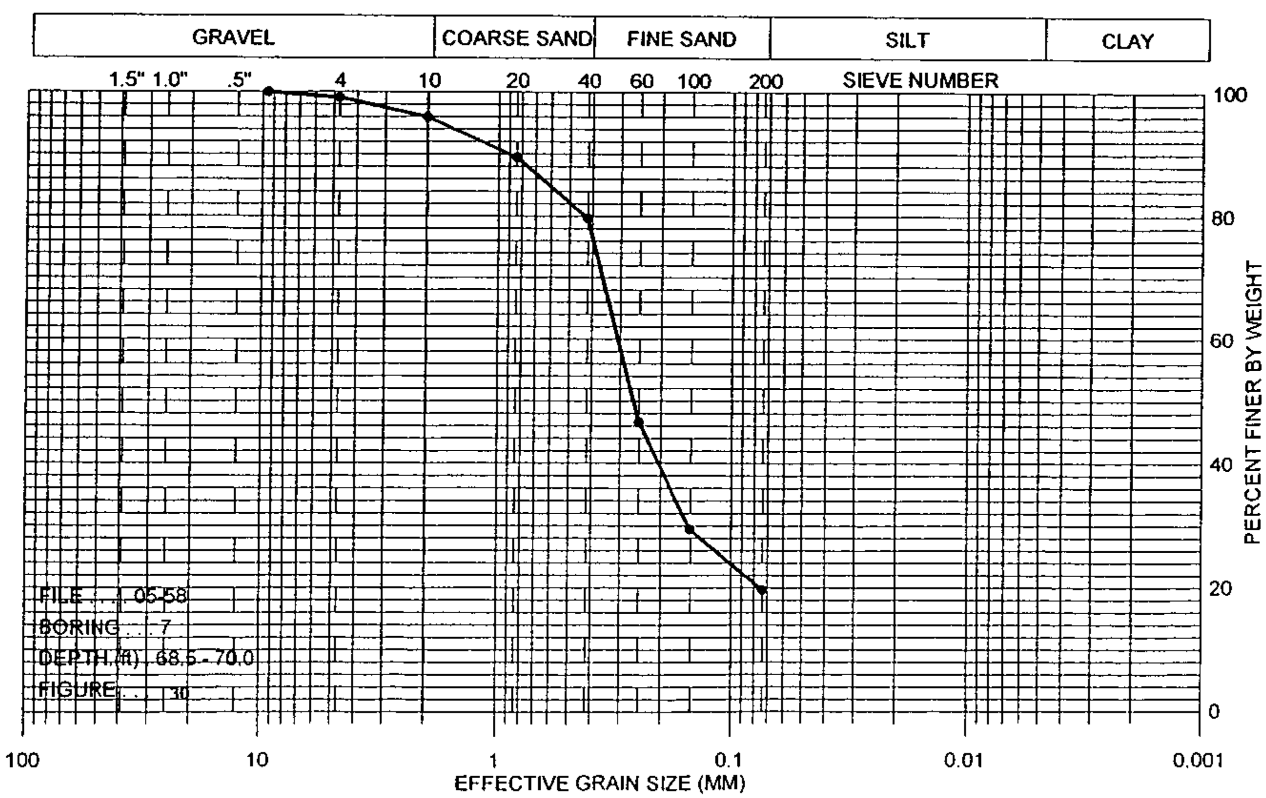

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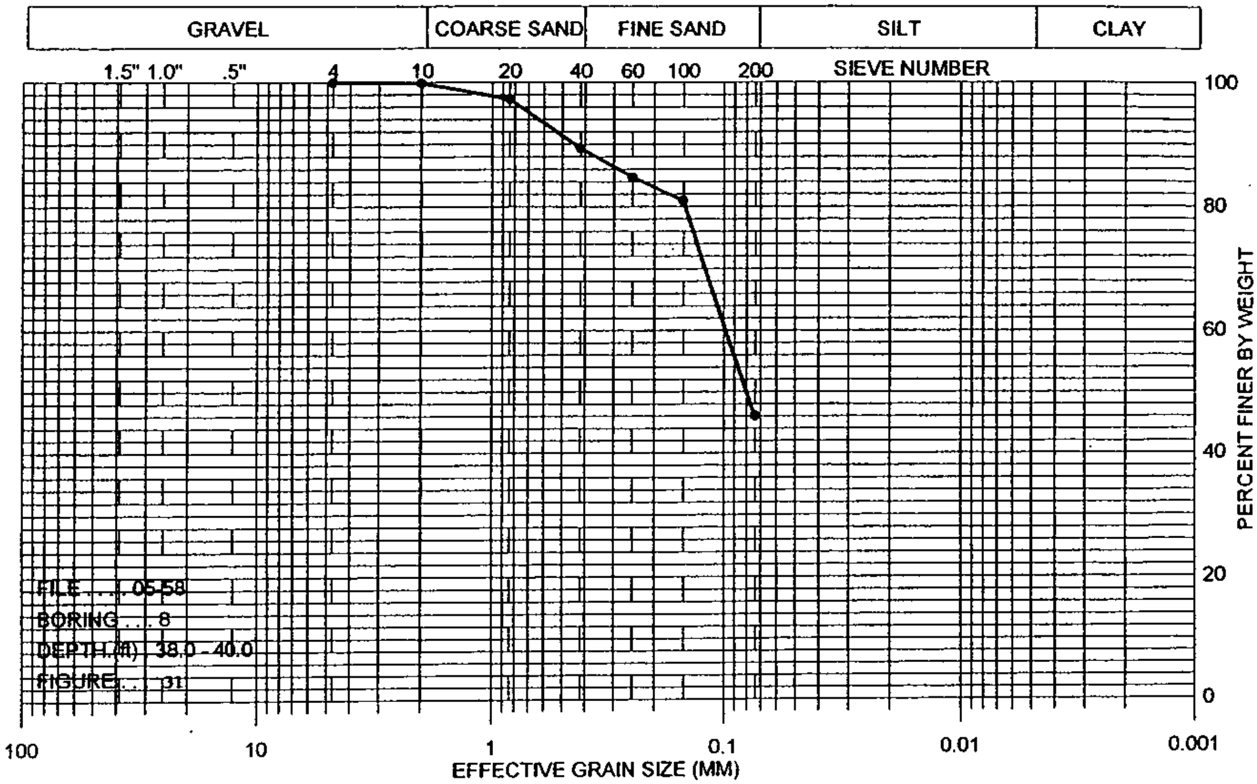

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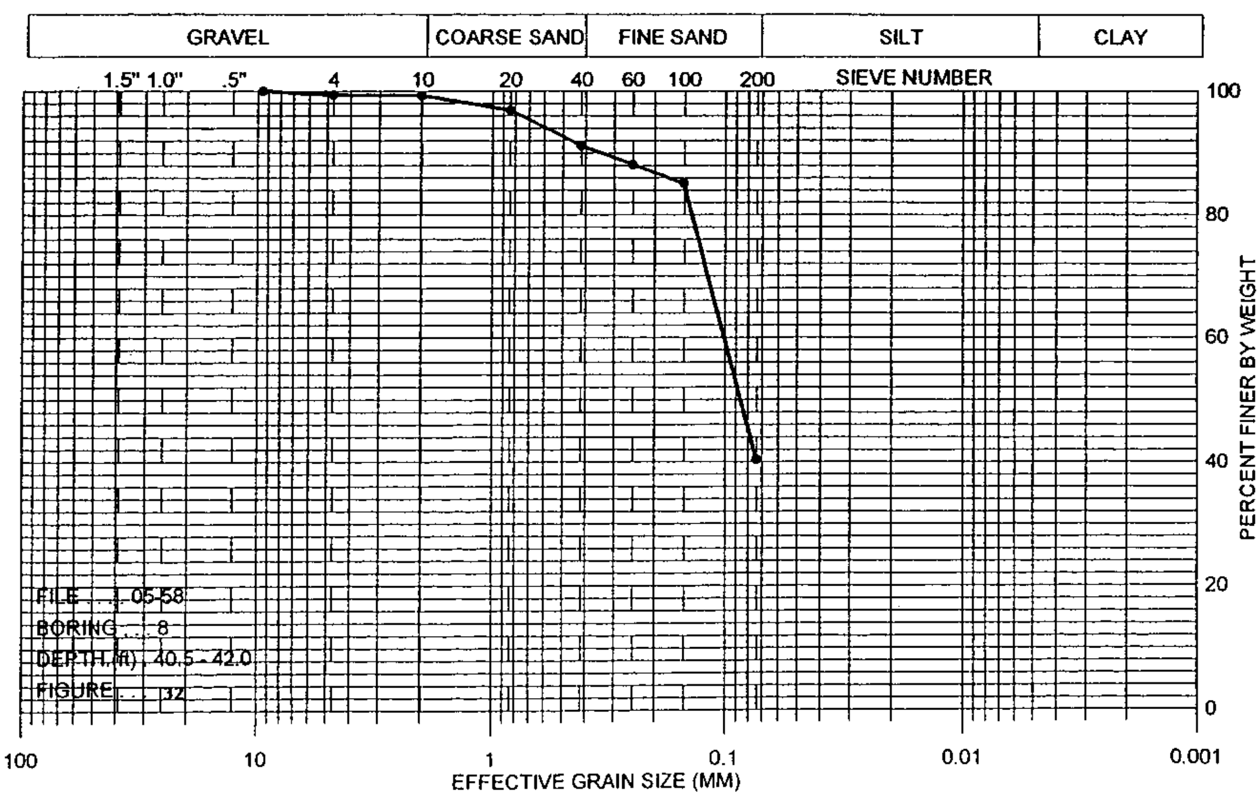
GRAIN SIZE CURVE



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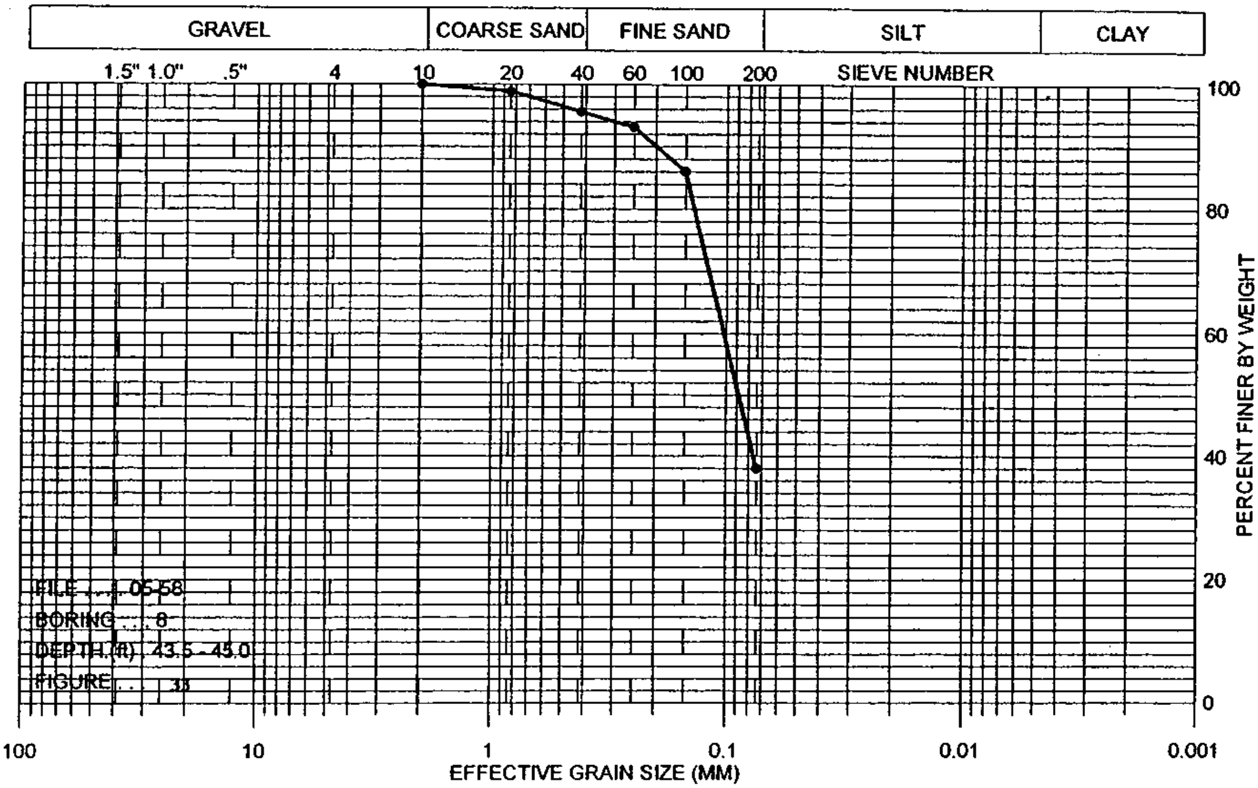
Geotechnical Engineers

GRAIN SIZE CURVE



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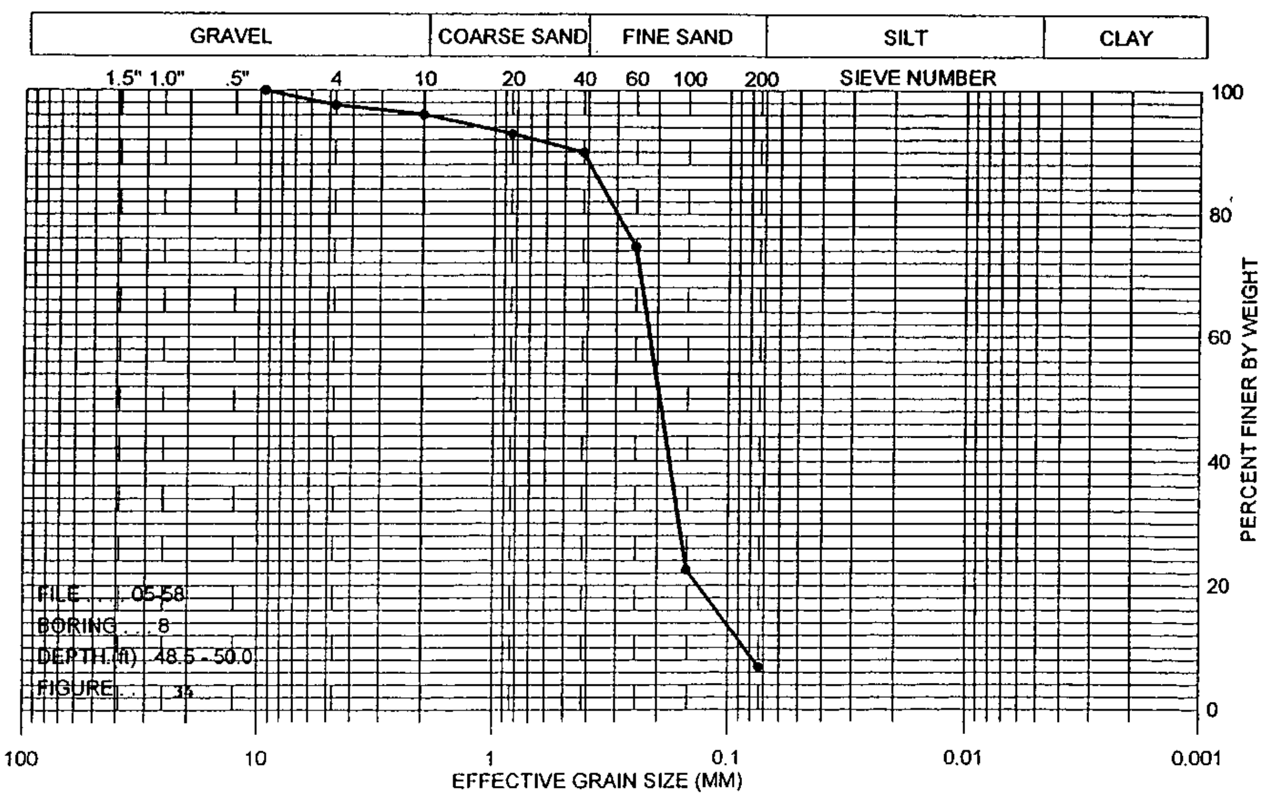
Geotechnical Engineers

GRAIN SIZE CURVE



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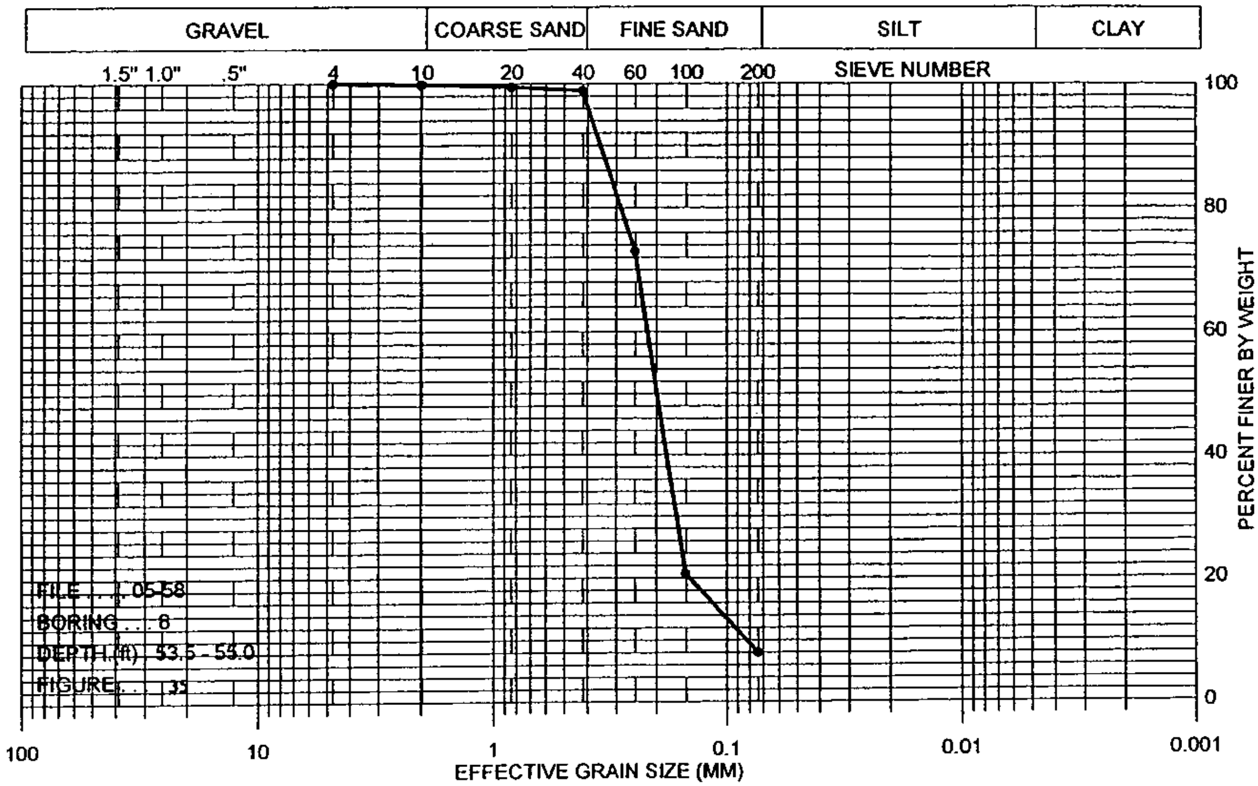
GRAIN SIZE CURVE



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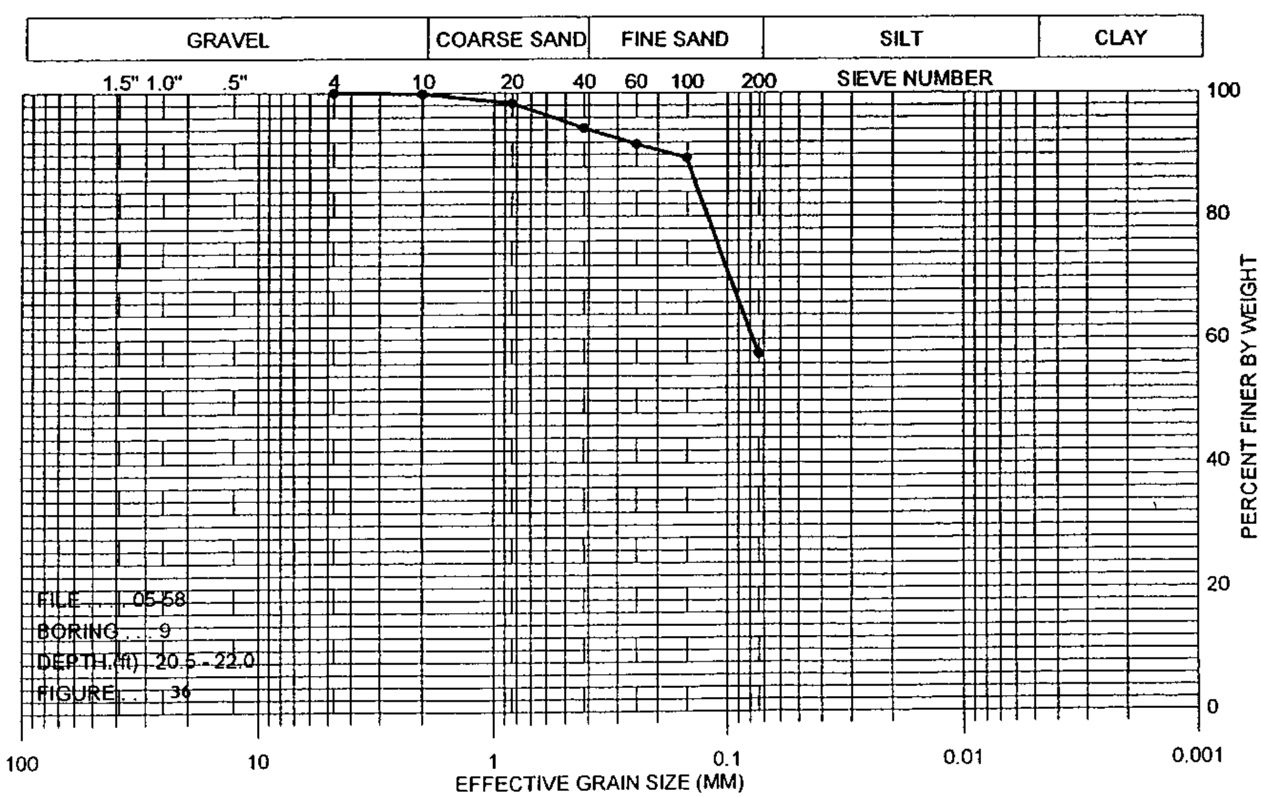
GRAIN SIZE CURVE



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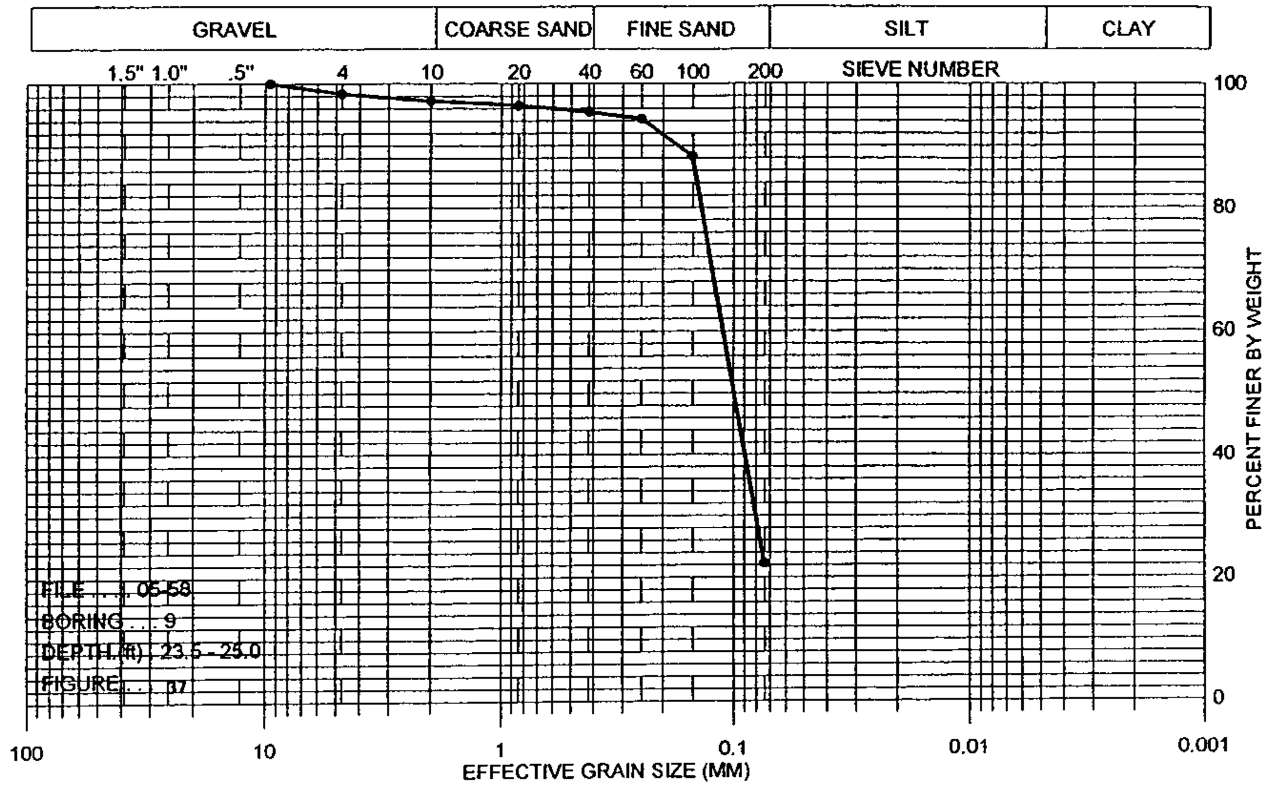
GRAIN SIZE CURVE



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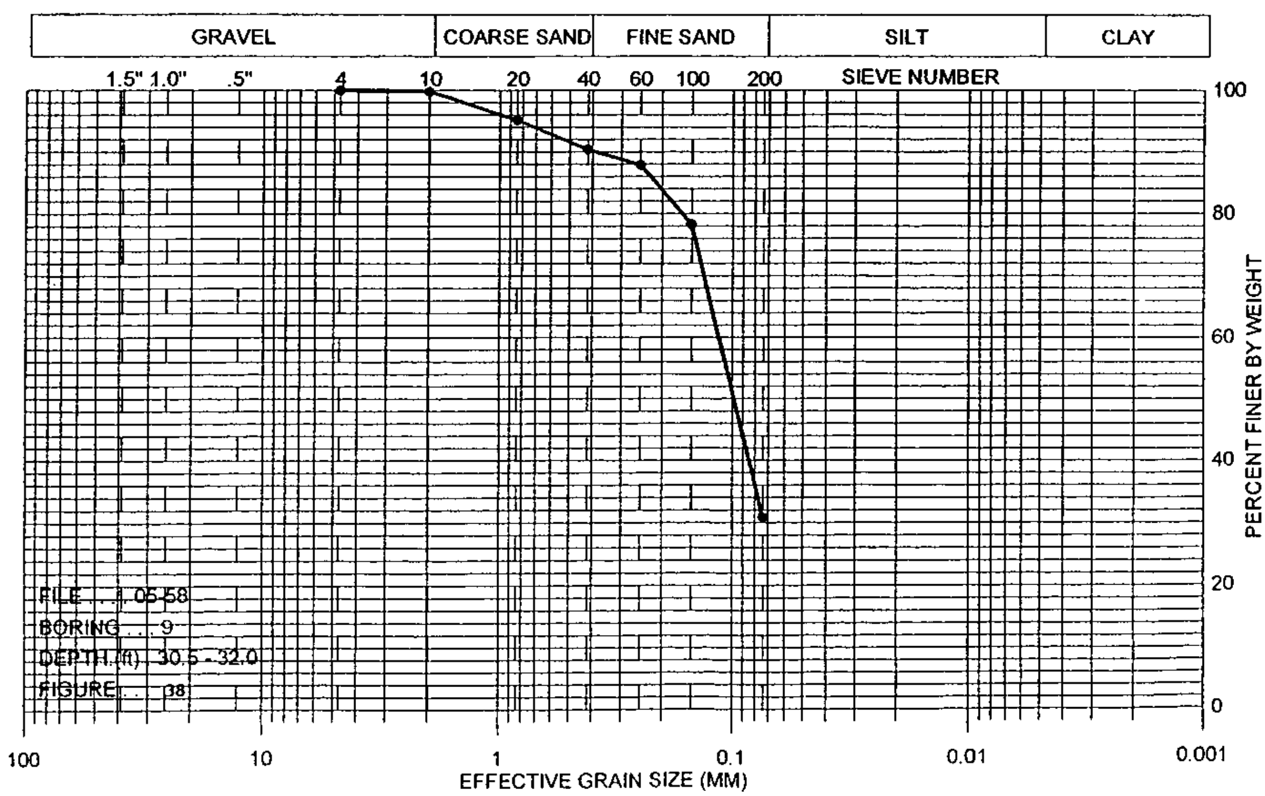
GRAIN SIZE CURVE



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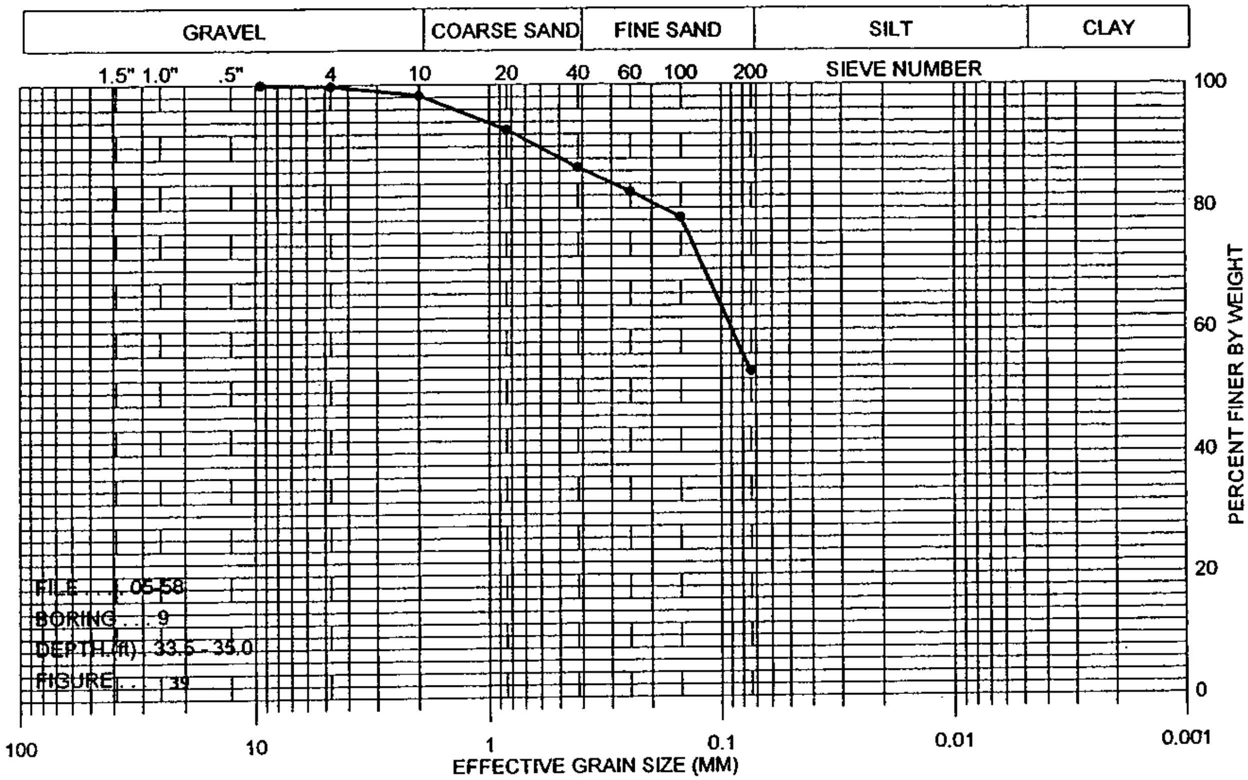
GRAIN SIZE CURVE



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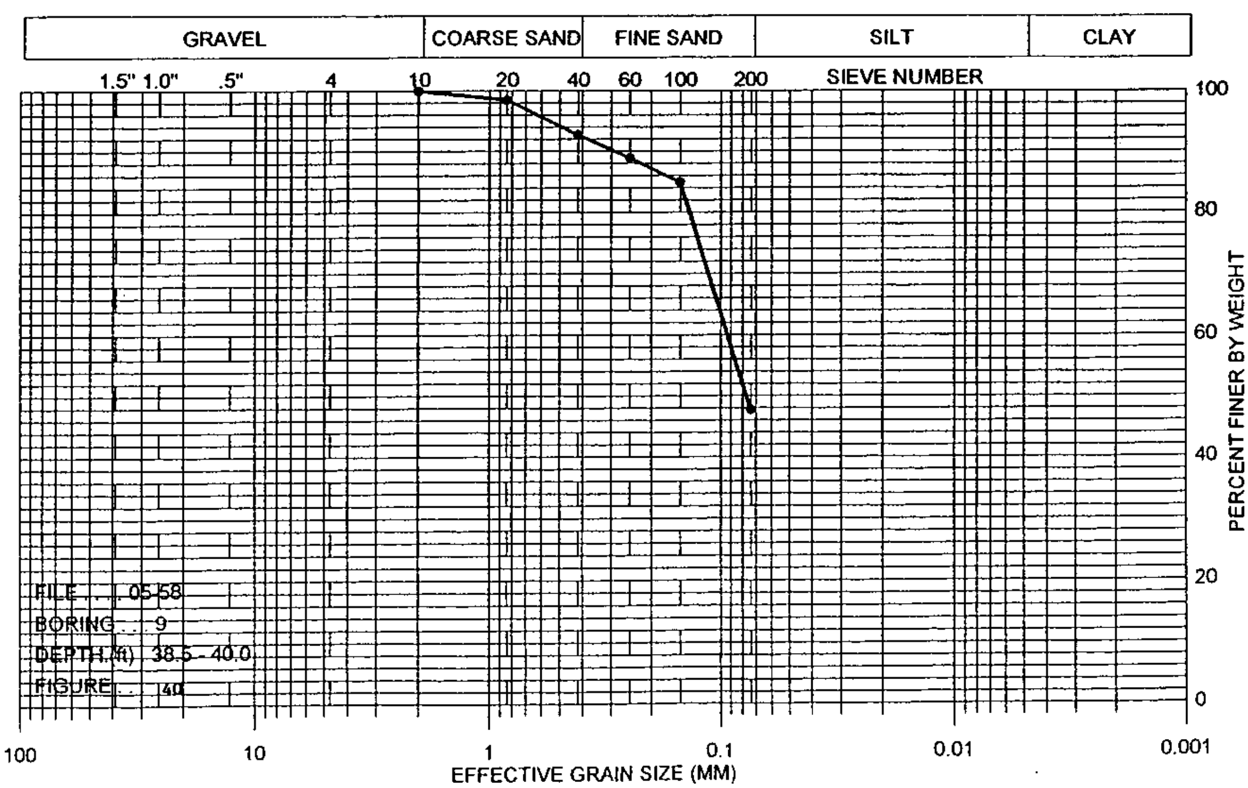
GRAIN SIZE CURVE



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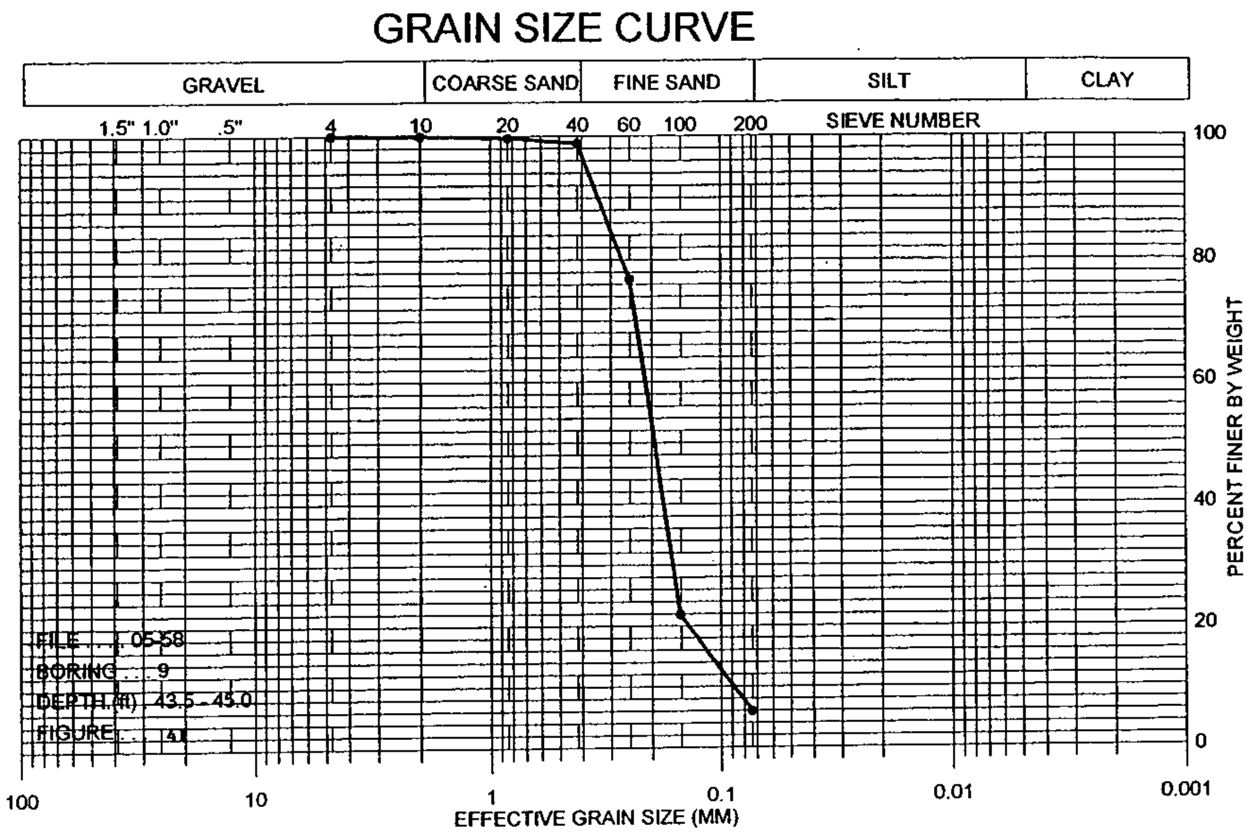

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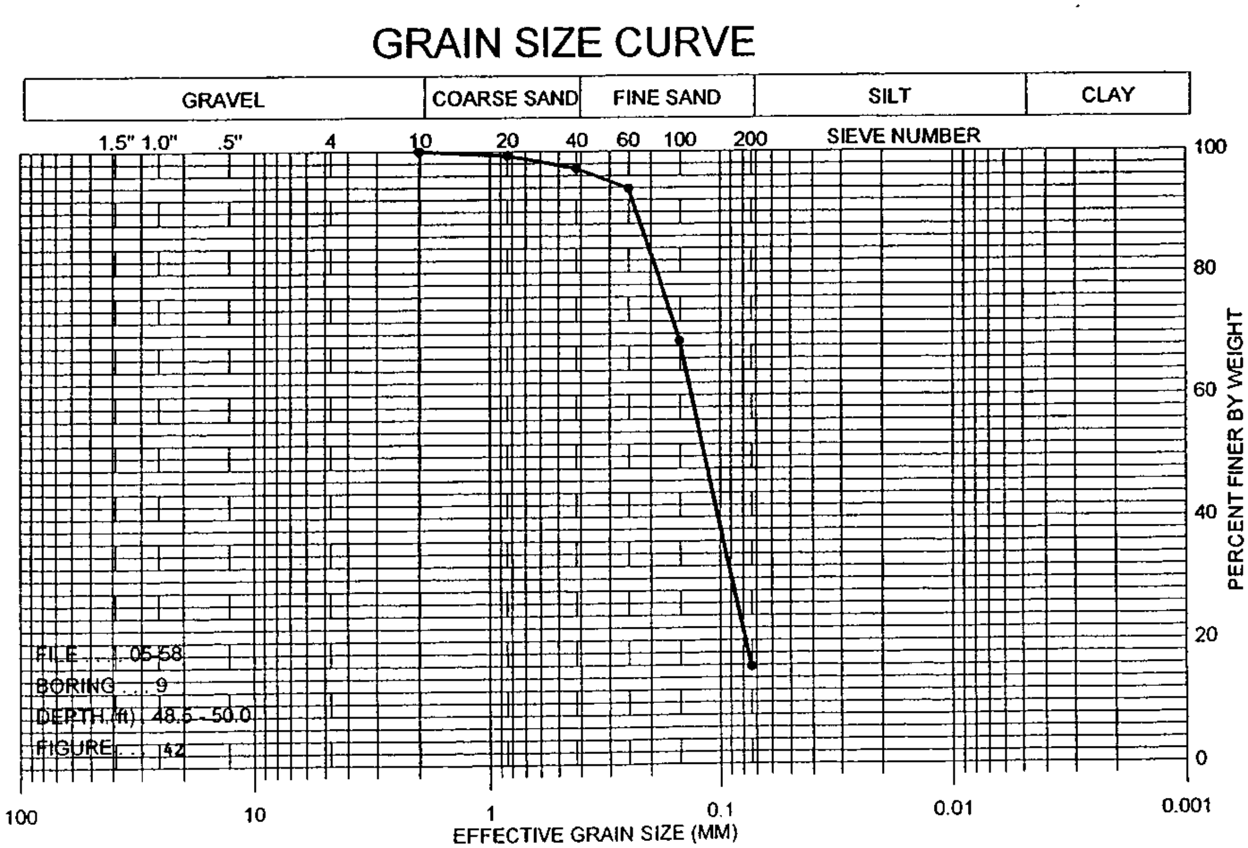

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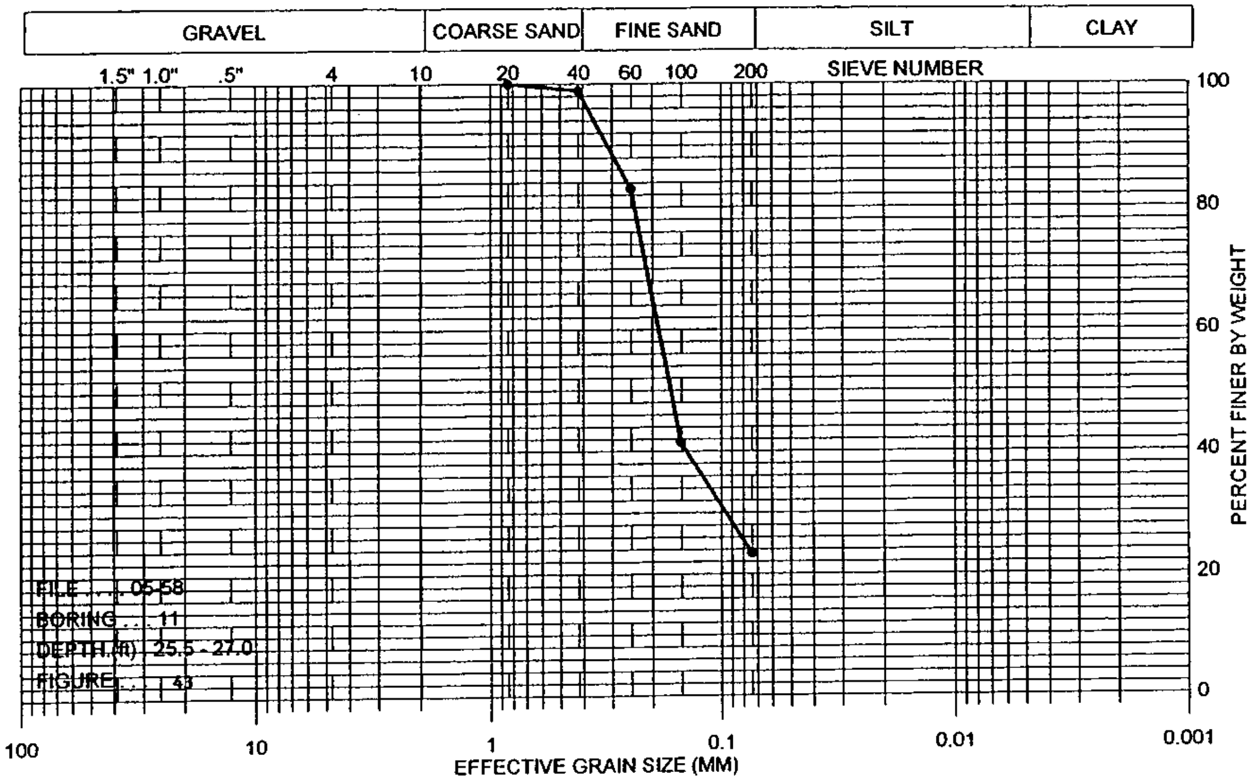
GRAIN SIZE CURVE



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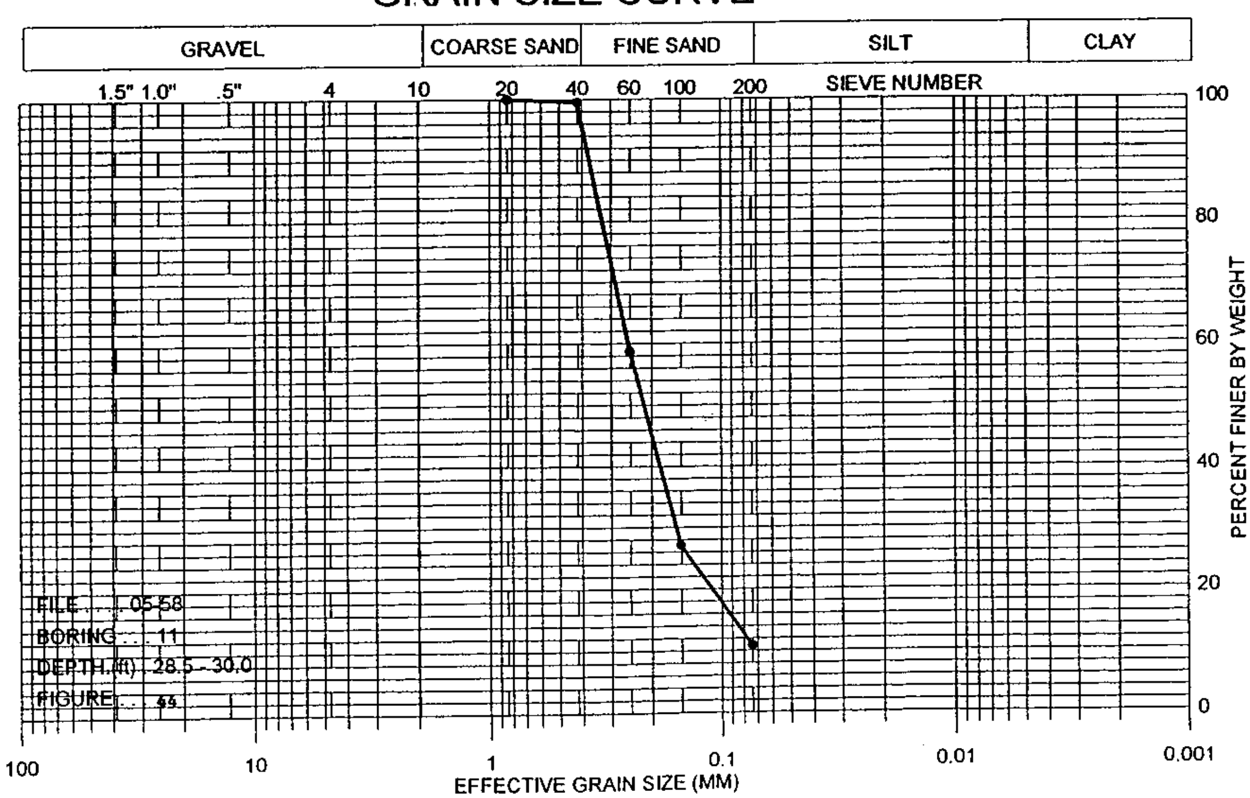
GRAIN SIZE CURVE



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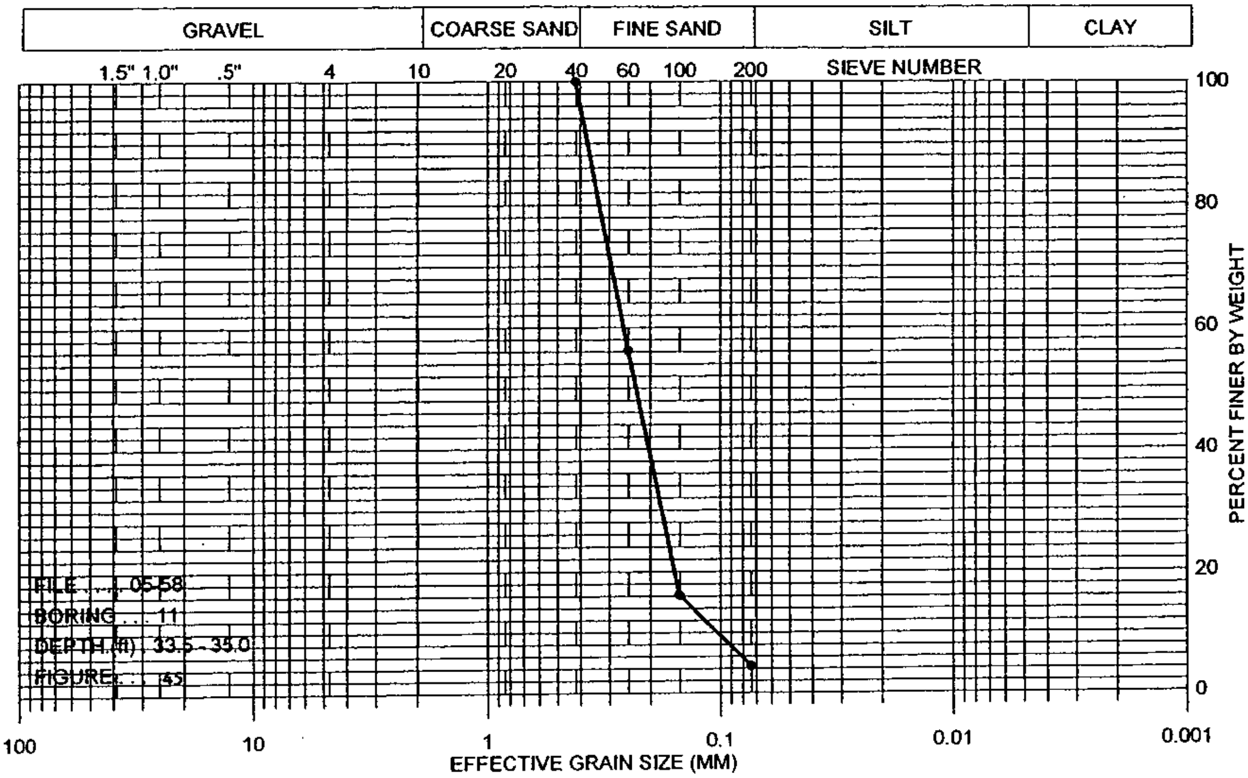
Geotechnical Engineers

GRAIN SIZE CURVE



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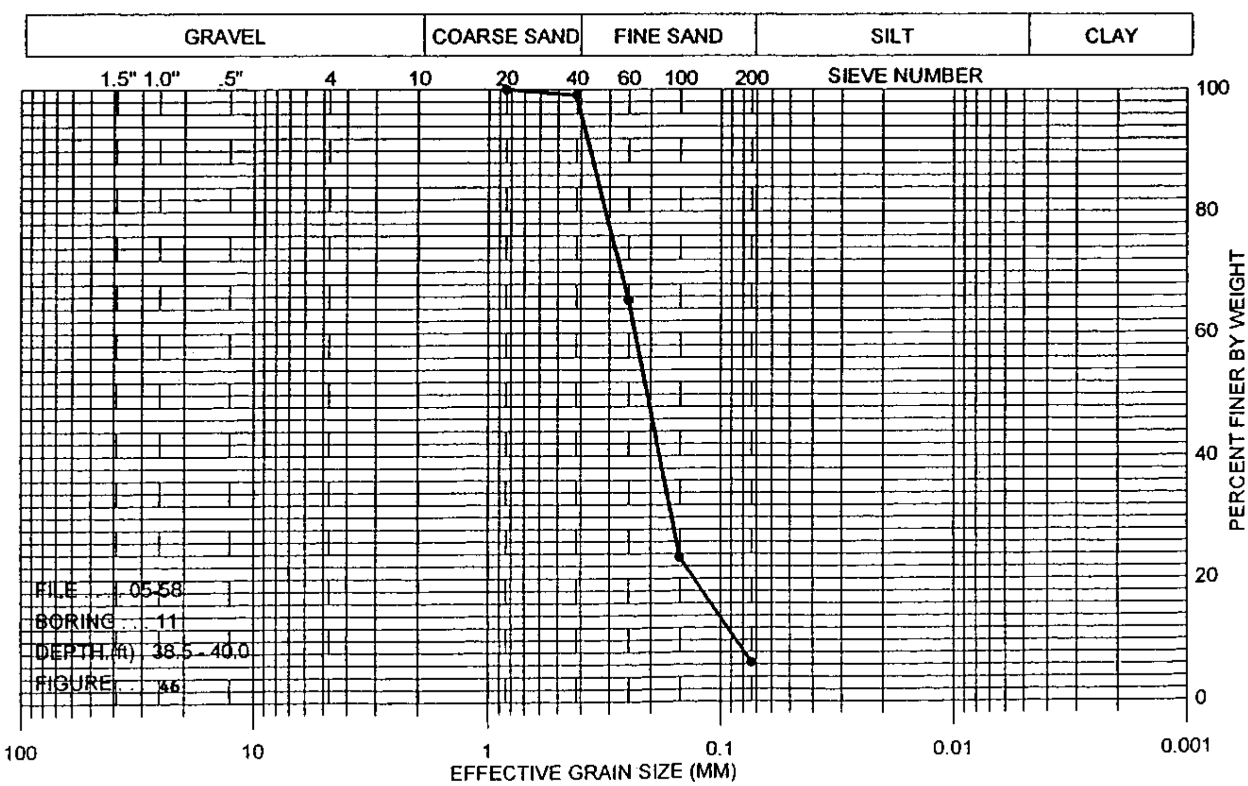
GRAIN SIZE CURVE



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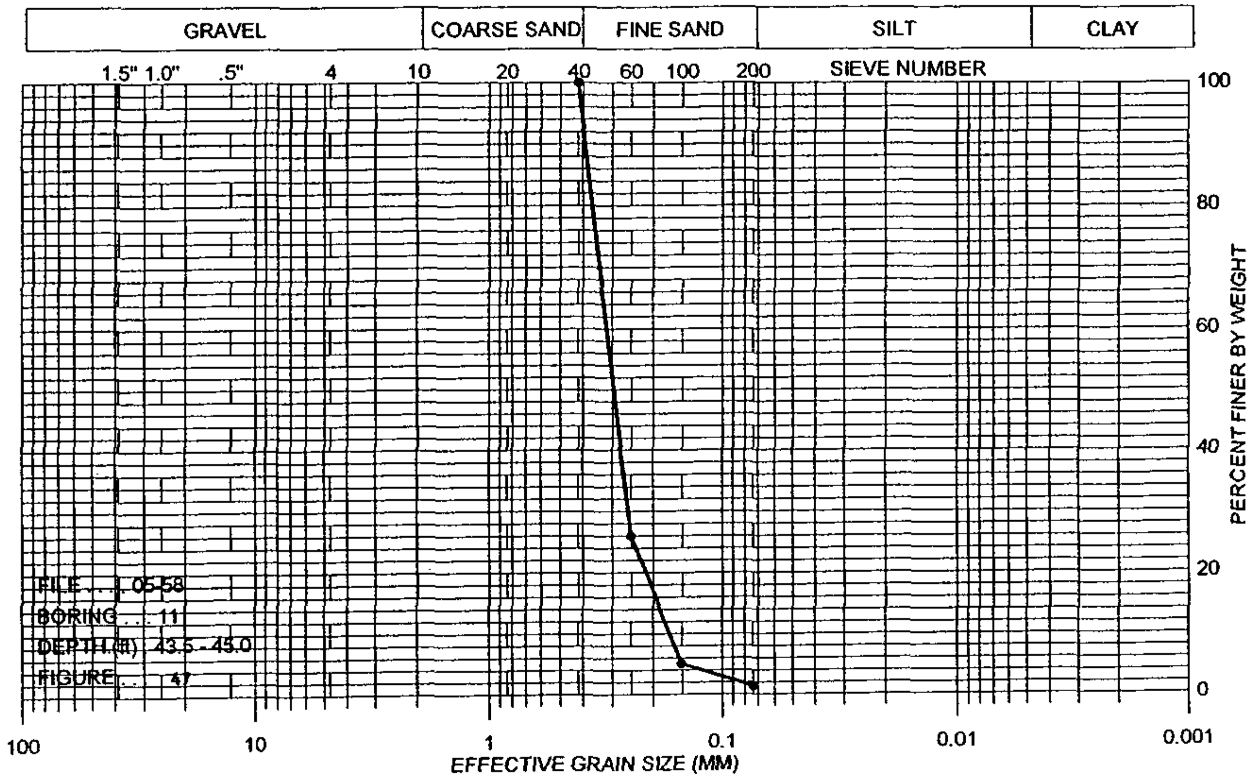
GRAIN SIZE CURVE



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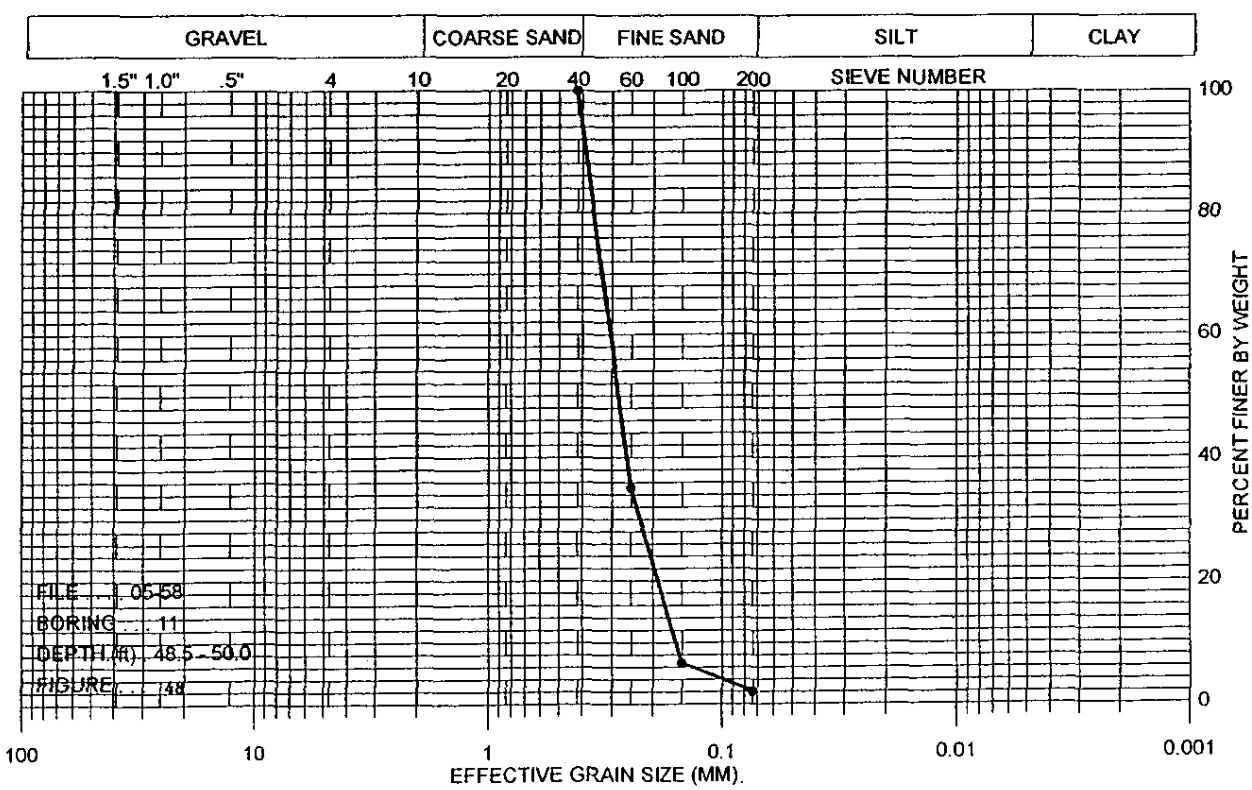
GRAIN SIZE CURVE



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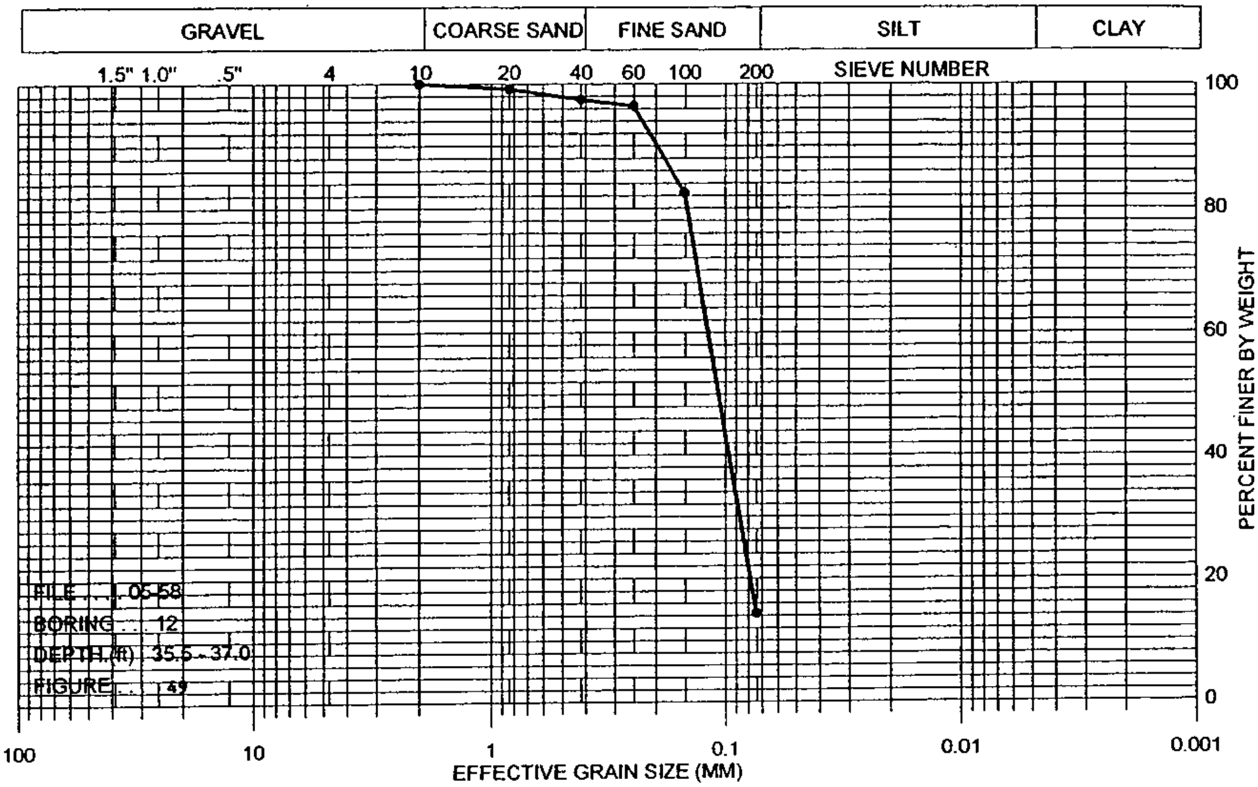
GRAIN SIZE CURVE



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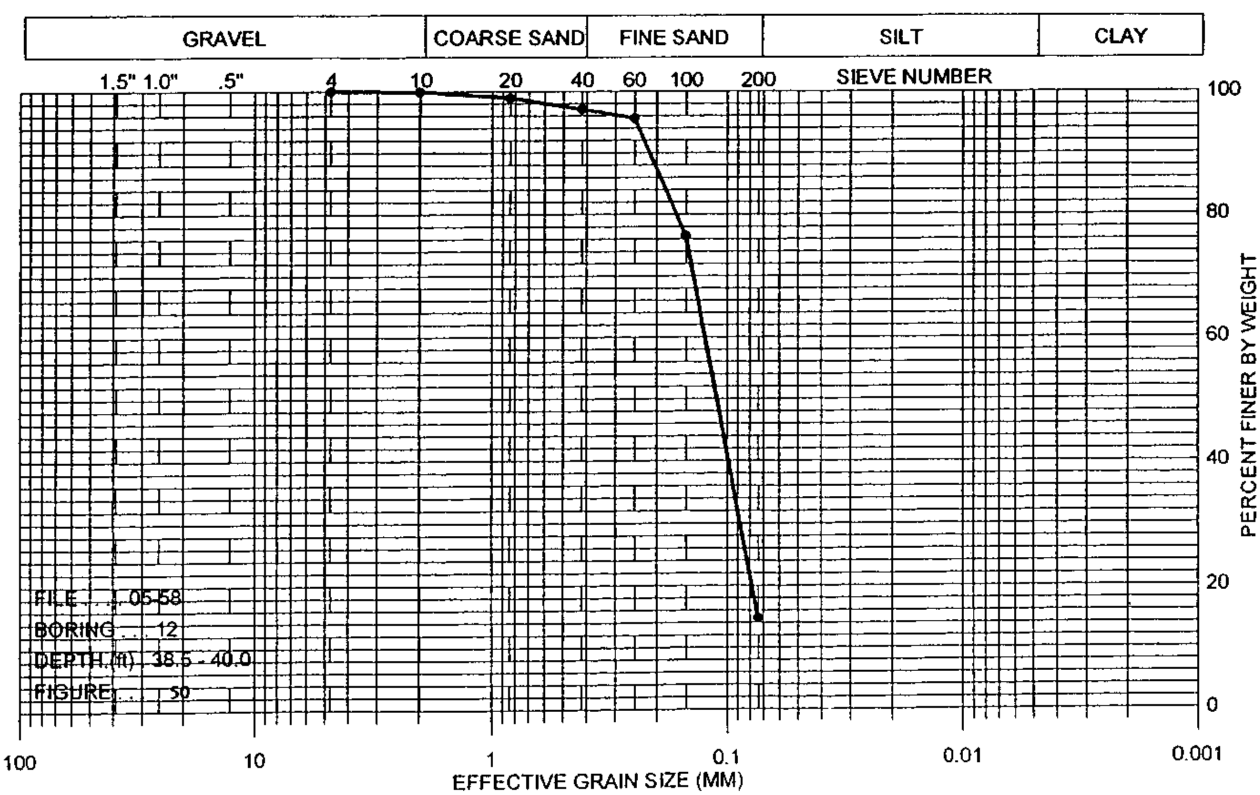
GRAIN SIZE CURVE



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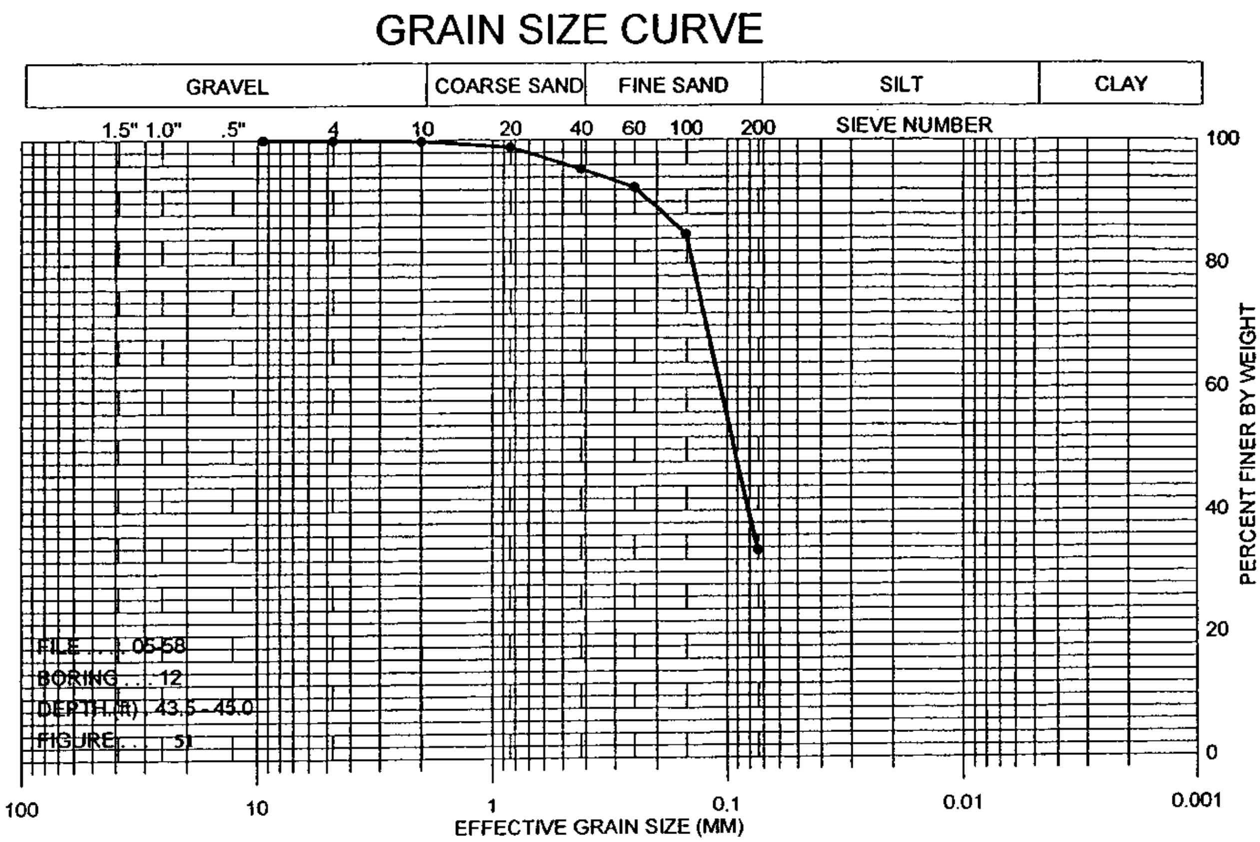

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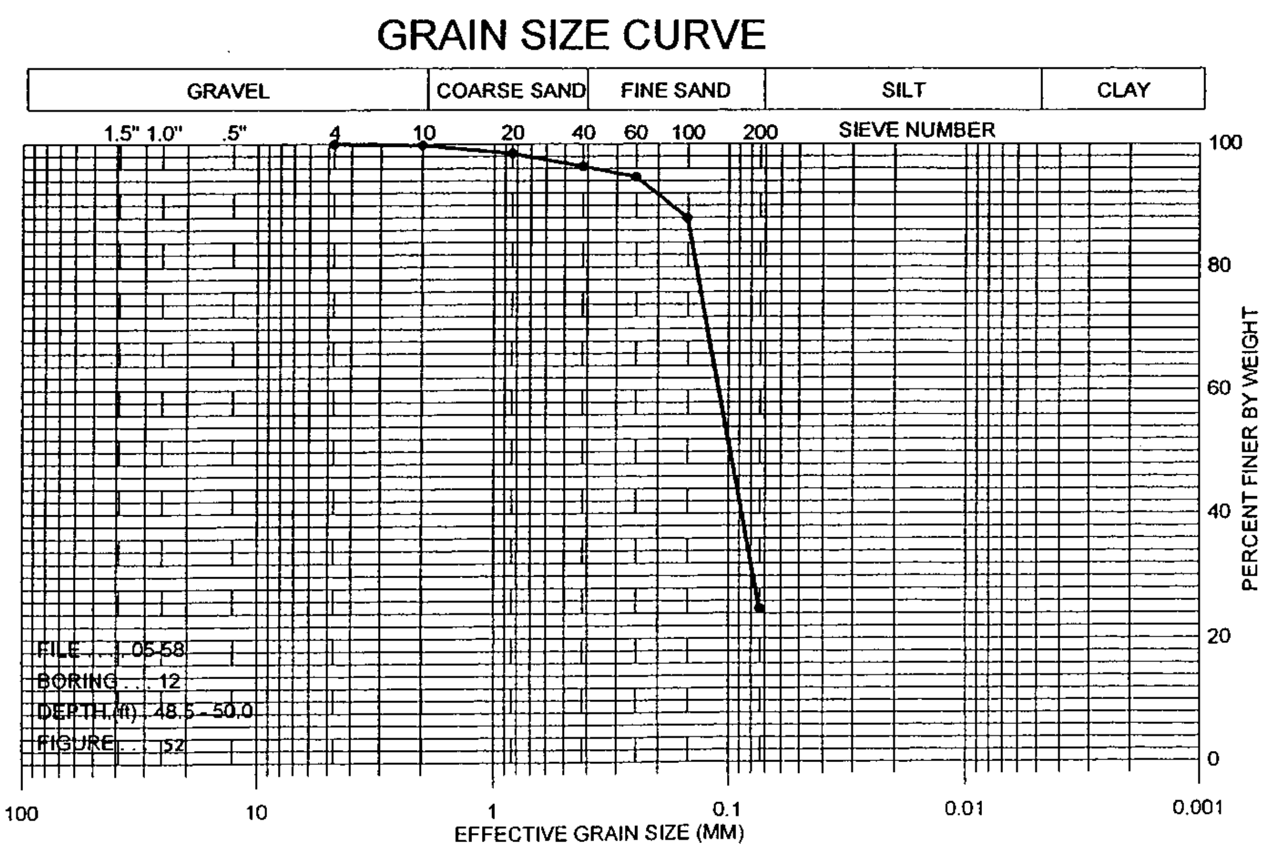

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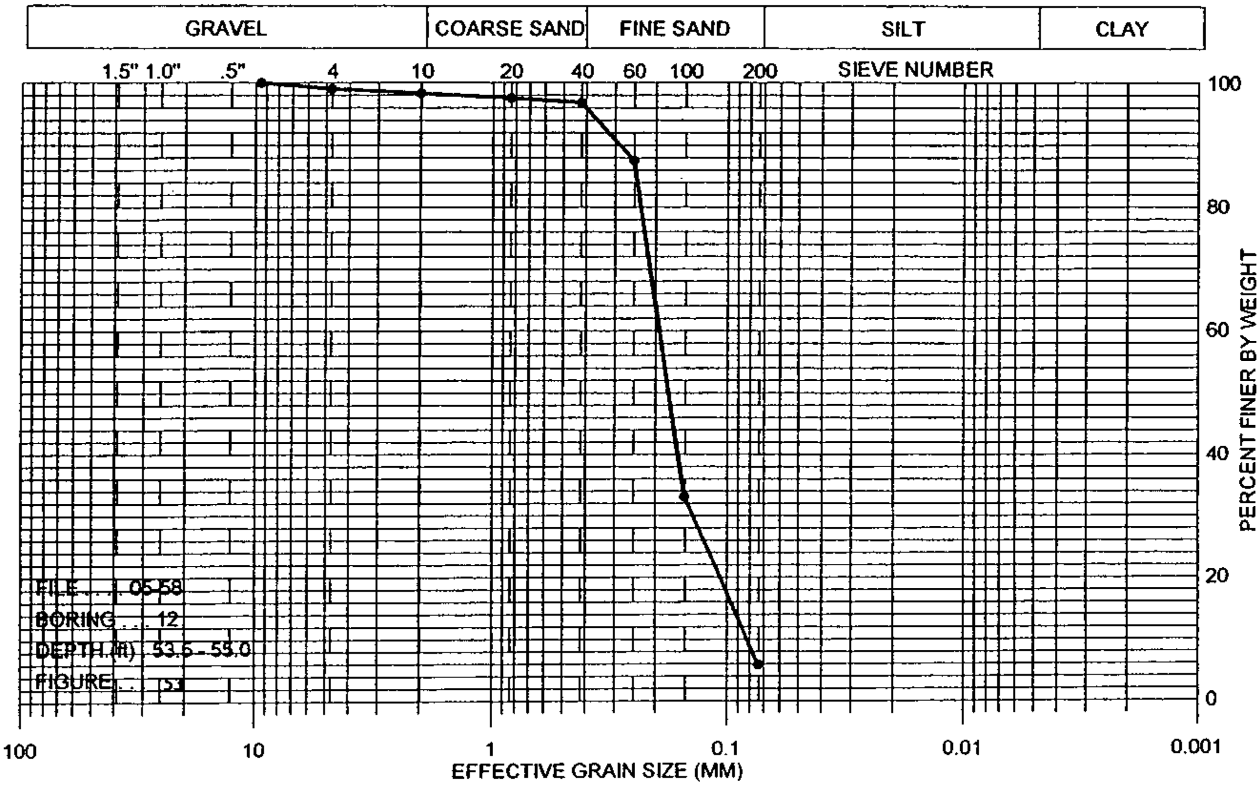
GRAIN SIZE CURVE



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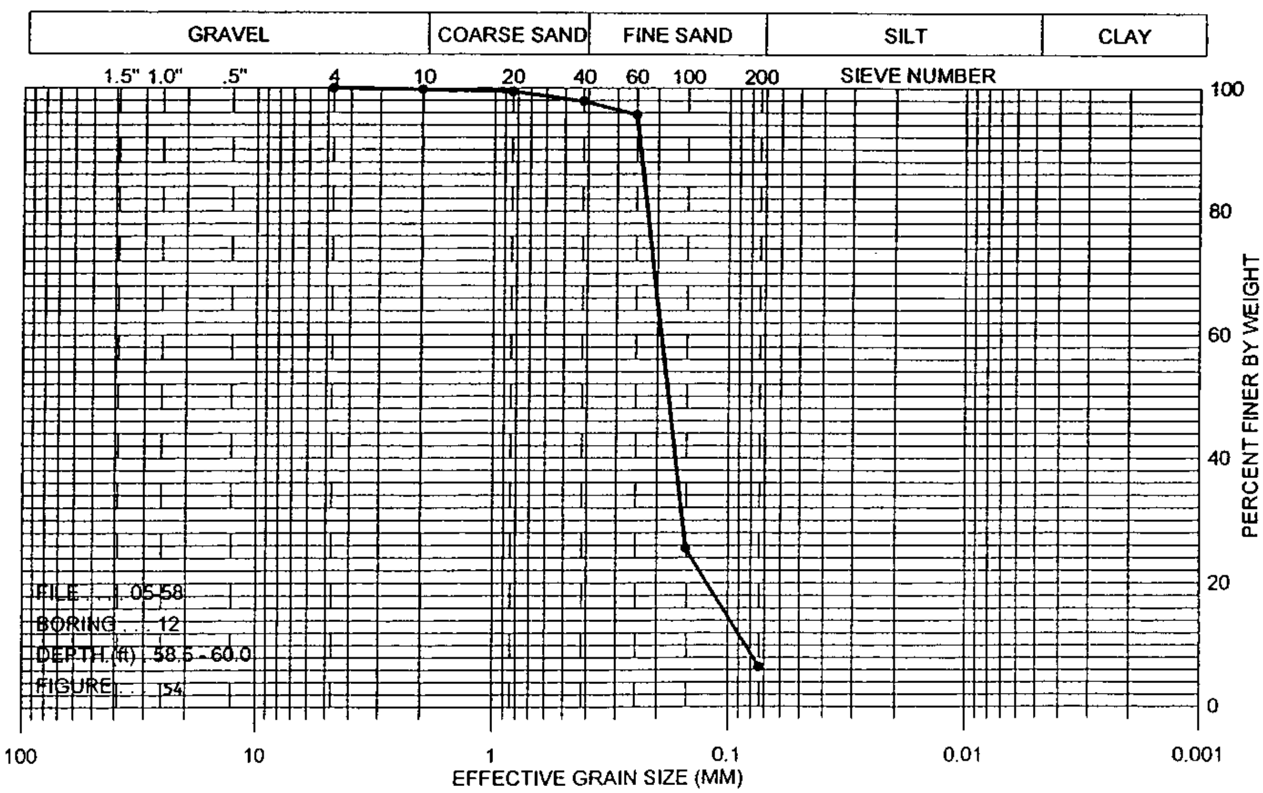
GRAIN SIZE CURVE



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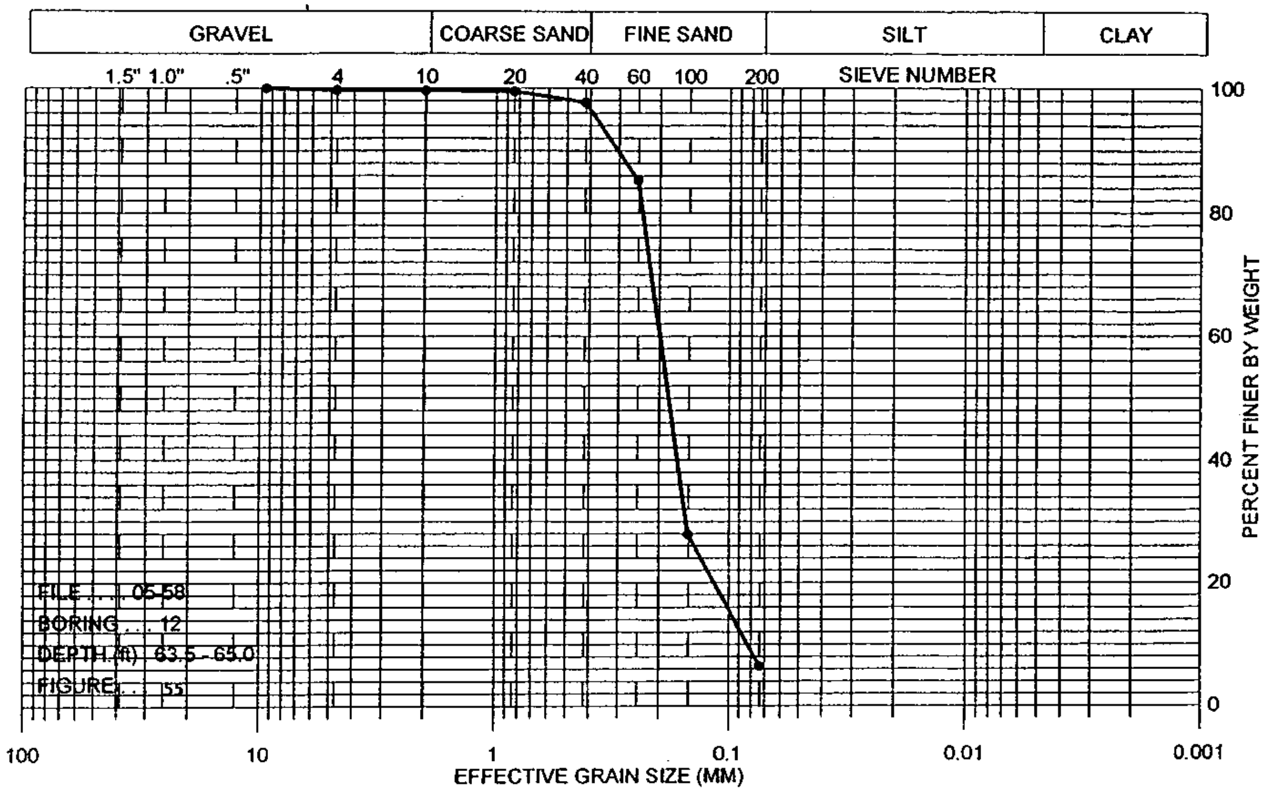
GRAIN SIZE CURVE



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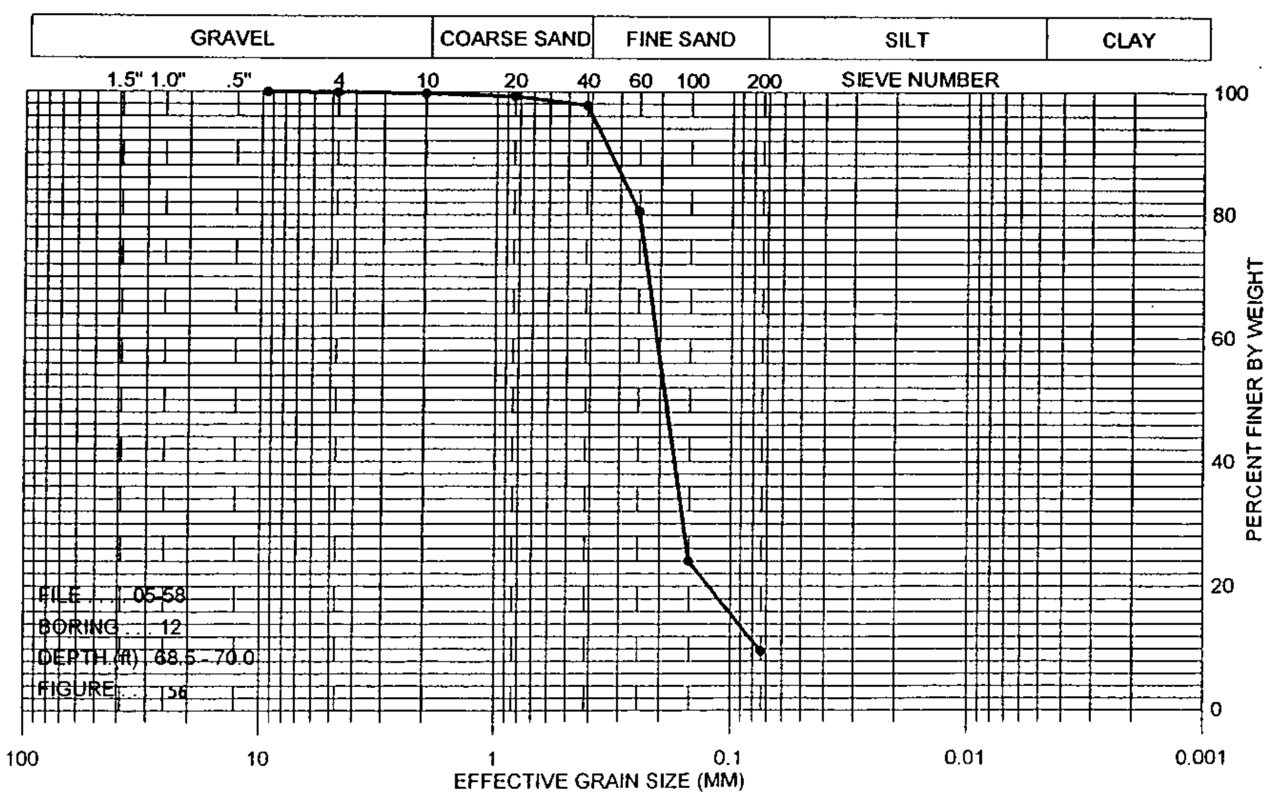
GRAIN SIZE CURVE



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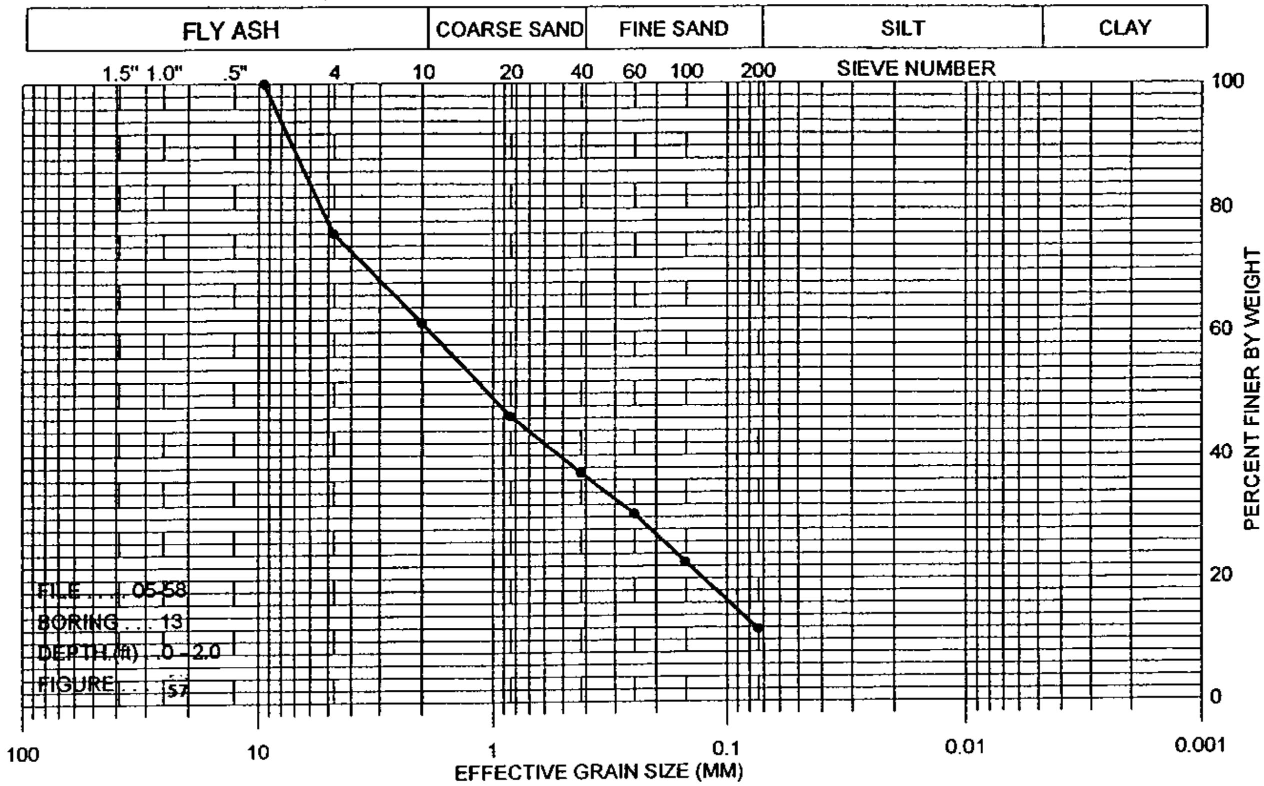
GRAIN SIZE CURVE



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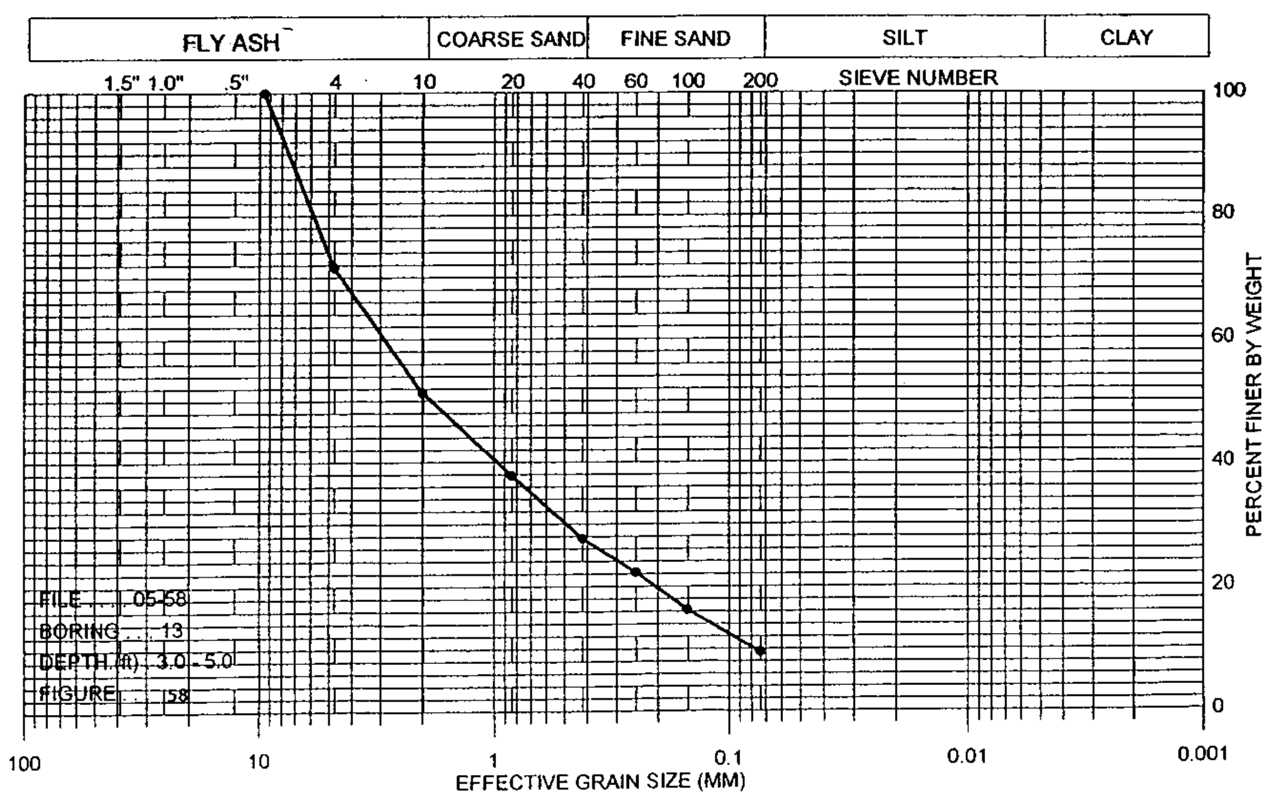
GRAIN SIZE CURVE



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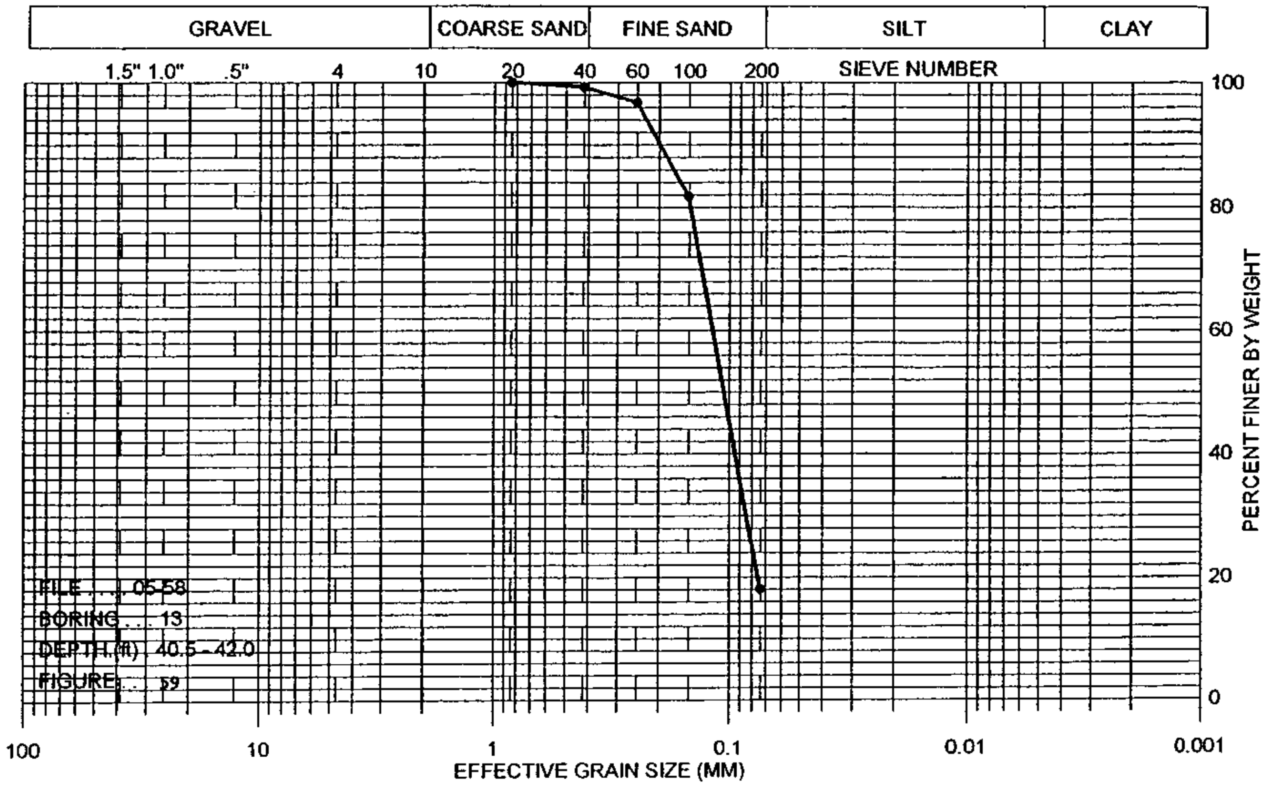
GRAIN SIZE CURVE



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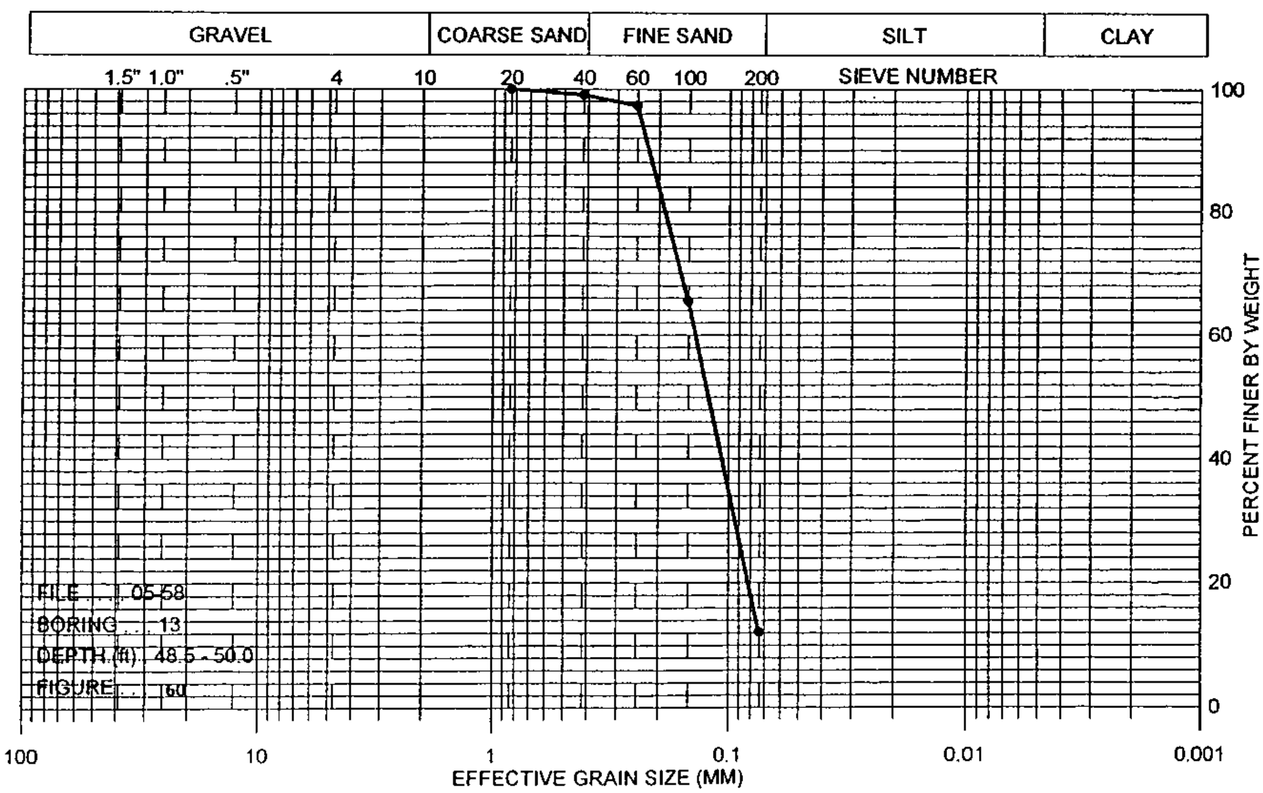
GRAIN SIZE CURVE



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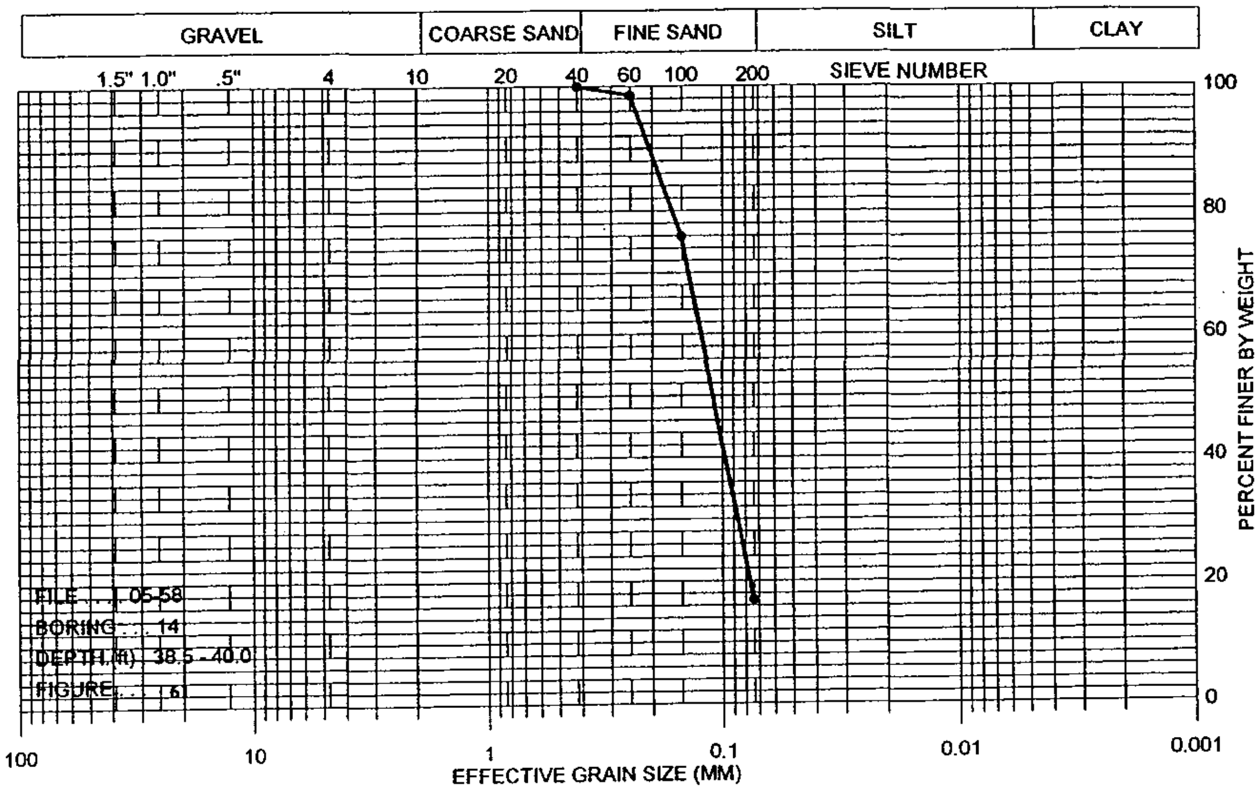
GRAIN SIZE CURVE



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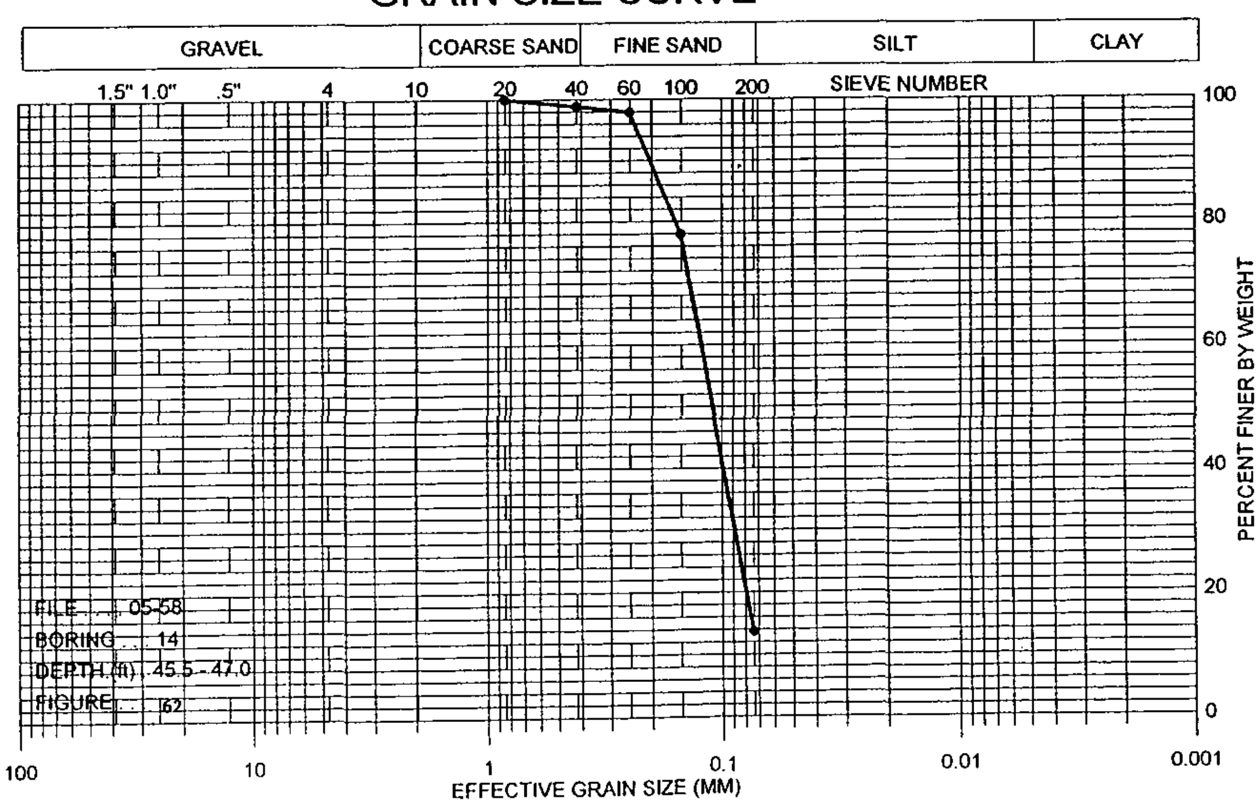
GRAIN SIZE CURVE



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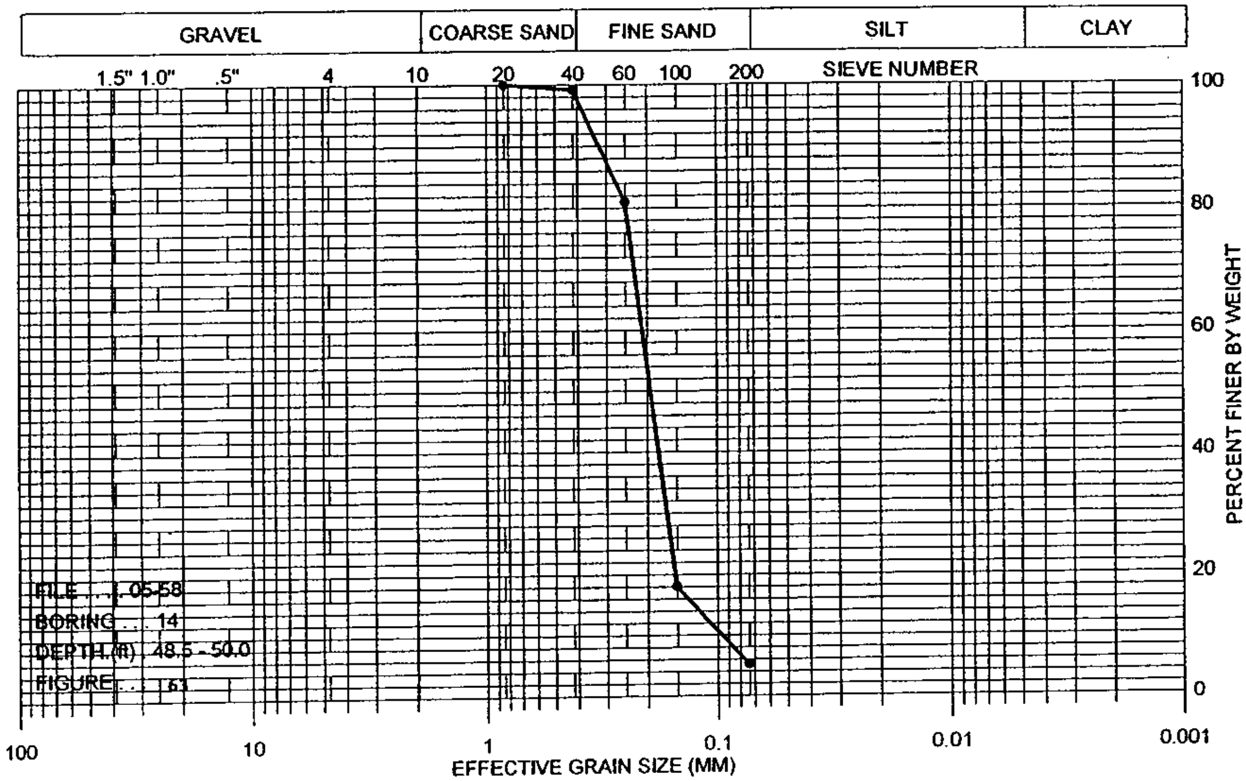
GRAIN SIZE CURVE



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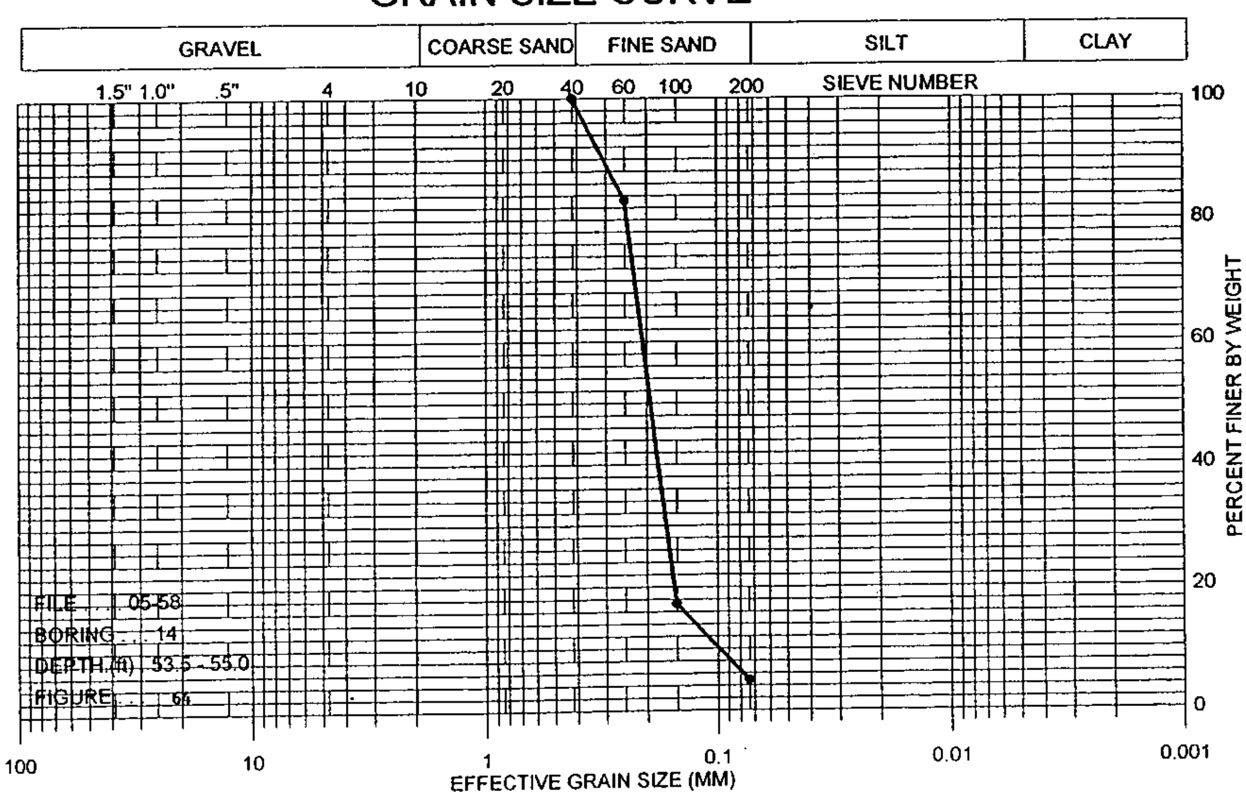
GRAIN SIZE CURVE



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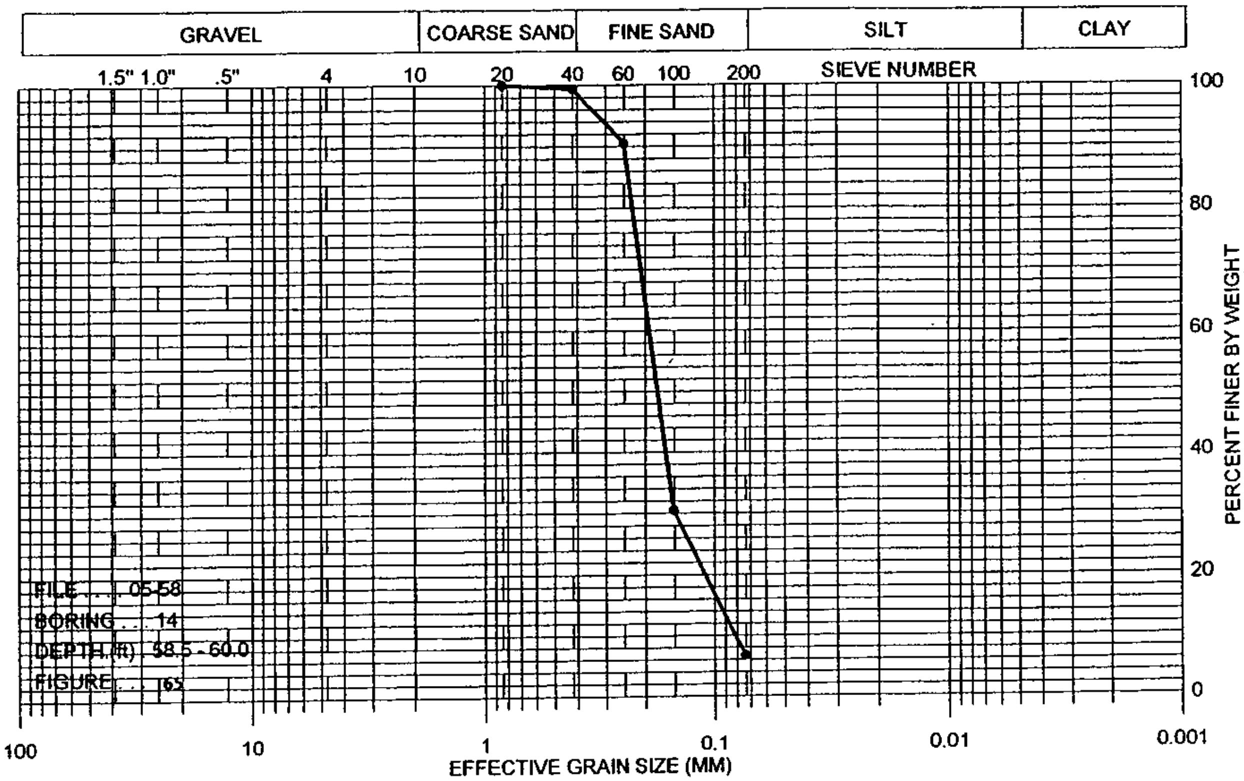
GRAIN SIZE CURVE



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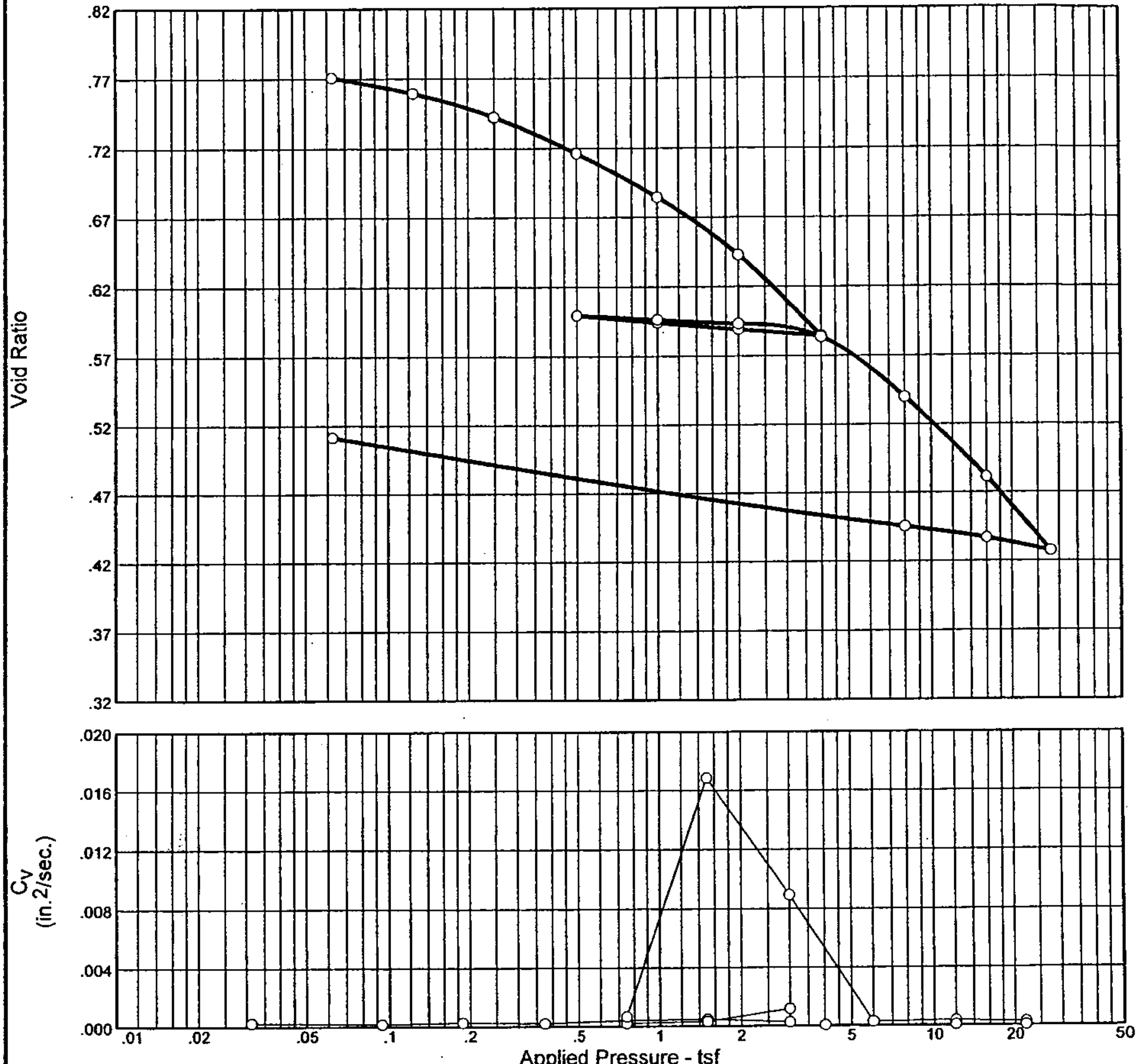
CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	USCS	AASHTO	Initial Void Ratio
Saturation	Moisture							
97.0 %	28.6 %	92.8	48	24	2.65			0.782

MATERIAL DESCRIPTION

Project No. 05-58 **Client:** Shaw

Project: Ash Pond Expansion
Big Cajun II

Source: Boring 5 **Sample No.:** 18 - 20 feet

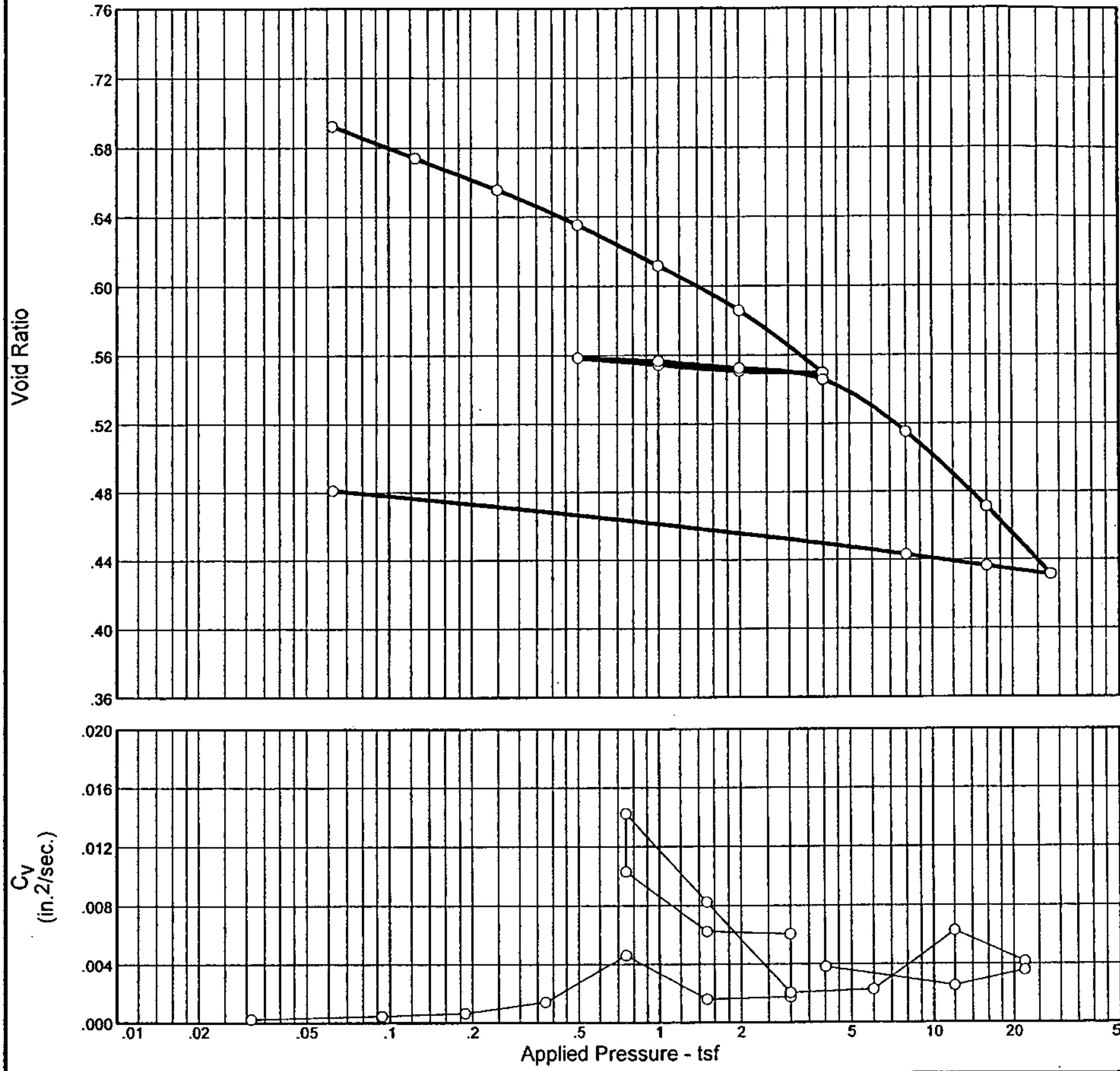
CONSOLIDATION TEST REPORT

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.

Remarks:

Figure Number: 66

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	USCS	AASHTO	Initial Void Ratio
Saturation	Moisture							
100.0 %	32.4 %	94.2	32	14	2.65			0.756

MATERIAL DESCRIPTION

Project No. 05-58 **Client:** Shaw

Project: Ash Pond Expansion
Big Cajun II

Source: Boring 5 **Sample No.:** 33 - 35 feet

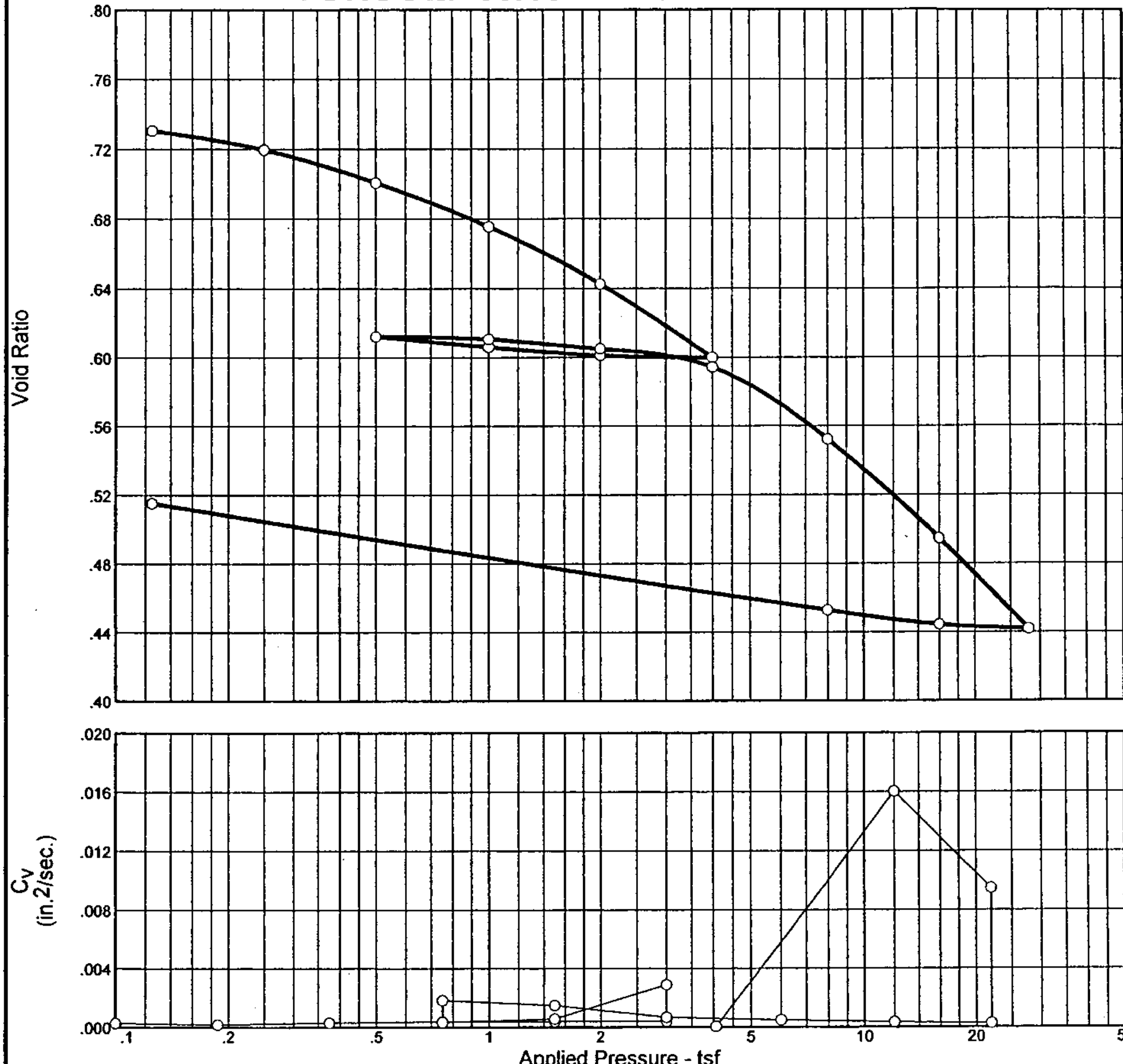
CONSOLIDATION TEST REPORT

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.

Remarks:

Figure Number: 67

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	USCS	AASHTO	Initial Void Ratio
Saturation	Moisture							
100.0 %	28.5 %	95.3	31	10	2.65			0.736

MATERIAL DESCRIPTION

Project No. 05-58 **Client:** Shaw

Project: Ash Pond Expansion
Big Cajun II

Source: Boring 8 **Sample No.:** 23 - 25 feet

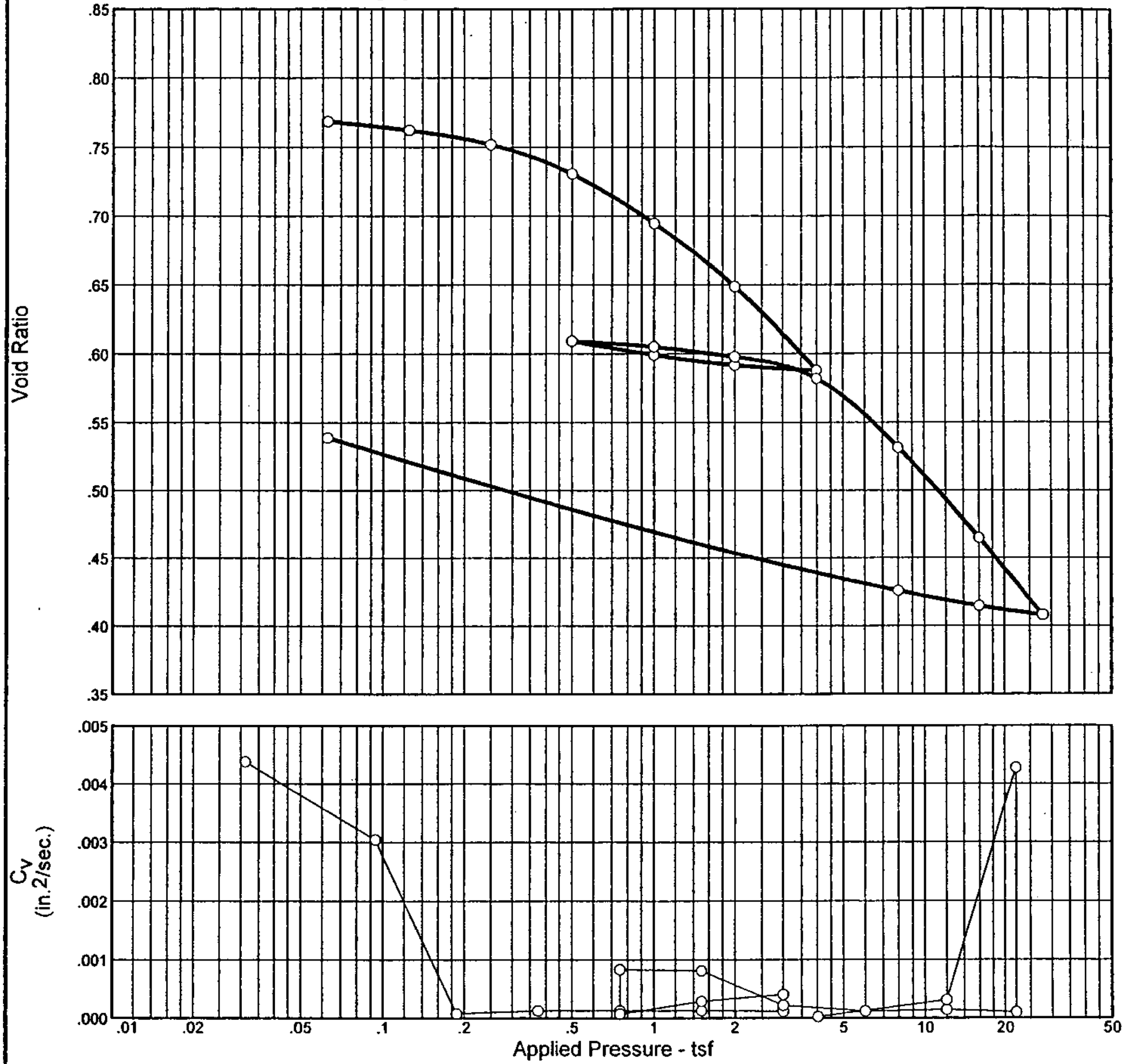
CONSOLIDATION TEST REPORT

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.

Remarks:

Figure Number: 68

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	USCS	AASHTO	Initial Void Ratio
Saturation	Moisture							
98.1 %	28.6 %	93.4	35	14	2.65			0.772

MATERIAL DESCRIPTION

Project No. 05-58 **Client:** Shaw

Project: Ash Pond Expansion
Big Cajun II

Source: Boring 9 **Sample No.:** 8 - 10 feet

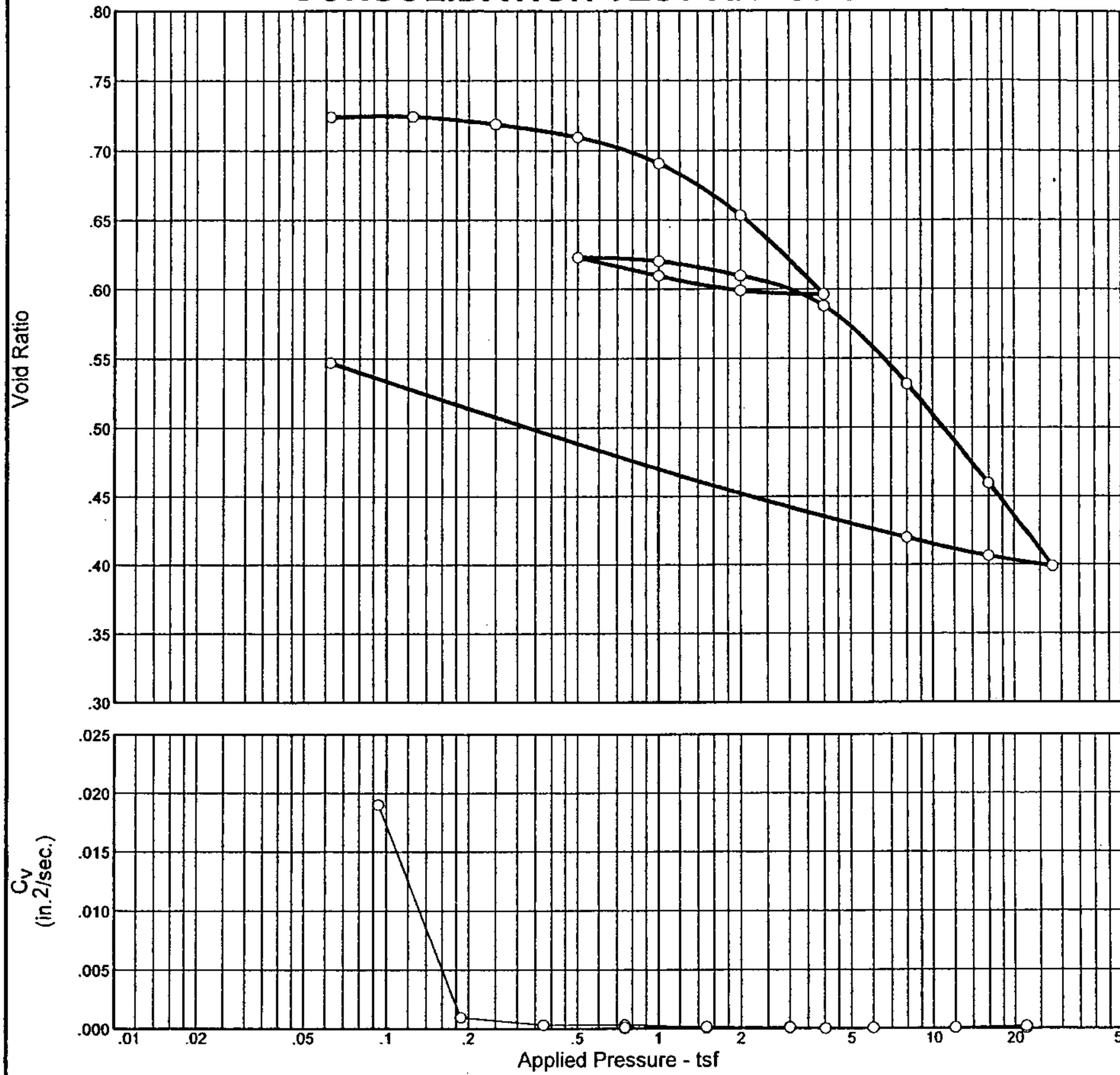
CONSOLIDATION TEST REPORT

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.

Remarks:

Figure Number: 69

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	USCS	AASHTO	Initial Void Ratio
Saturation	Moisture							
98.6 %	27.2 %	95.6	61	39	2.65			0.730

MATERIAL DESCRIPTION

Project No. 05-58 **Client:** Shaw

Project: Ash Pond Expansion
Big Cajun II

Source: Boring 14 **Sample No.:** 18 - 20 feet

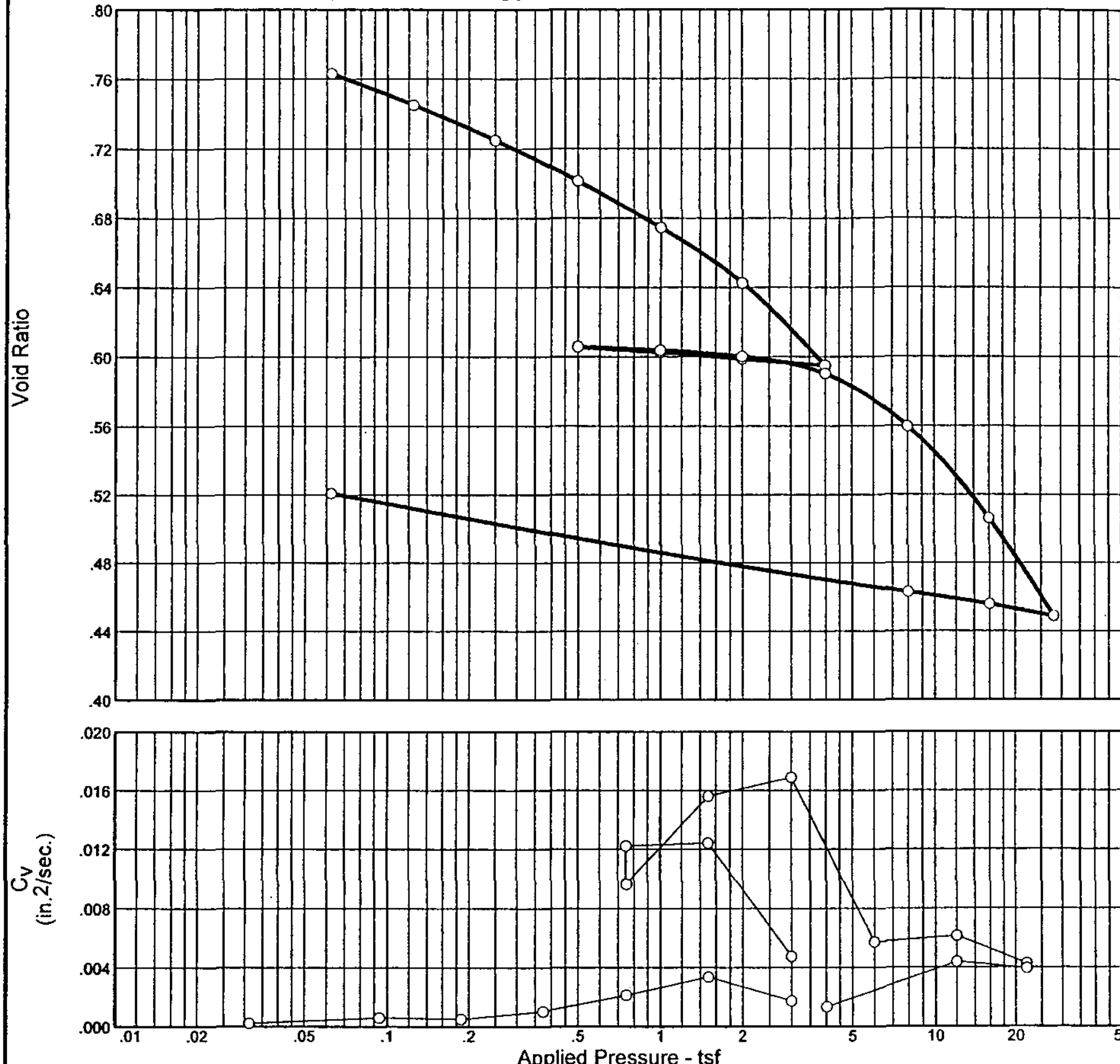
Remarks:

CONSOLIDATION TEST REPORT

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.

Figure Number: 70

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	USCS	AASHTO	Initial Void Ratio
Saturation	Moisture							
100.0 %	34.4 %	90.9	32	9	2.65			0.819

MATERIAL DESCRIPTION

Project No. 05-58 **Client:** Shaw

Project: Ash Pond Expansion
Big Cajun II

Source: Boring 14 **Sample No.:** 28 - 30 feet

Remarks:

CONSOLIDATION TEST REPORT

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.

Figure Number: 71

LOG OF BORING

Project:	Bottom Ash Storage Pond Expansion	Boring:	1
	Big Cajun II, Pointe Coupee Parish, Louisiana	File:	05-58
For:	Shaw Environmental & Infrastructure, Inc.	Date:	24-Aug-05
	Baton Rouge, Louisiana	Technician:	PN

Undisturbed Sample
Standard Penetration Test
Classification Sample
(SLS) Slickensided

Boring Depth: 70 Feet

Depth Feet	SAMPLES	Description	Remarks
0	Classification Sample	Fly ash and gravel with clay traces	Cement-bentonite grout backfill full depth
5	Undisturbed Sample	Stiff gray clay with gravel and fly ash	
10	Undisturbed Sample	Very stiff gray clay	
15	Undisturbed Sample	Stiff tan and gray clay	
20	Undisturbed Sample	Stiff tan and gray clay	
25	Undisturbed Sample	Soft gray silty clay	
30	Undisturbed Sample	Firm brown silty fine sand	
35	Undisturbed Sample	Soft gray slightly silty clay	
40	Standard Penetration Test	Firm gray fine sand with silt traces	19 blows per foot (11/11/8)
45	Standard Penetration Test	Firm gray silty fine sand	24 blows per foot (10/11/13)
50	Standard Penetration Test	Firm gray fine sand with silt traces	25 blows per foot (10/12/13)

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

LOG OF BORING

Project:	Bottom Ash Storage Pond Expansion	Boring:	1
	Big Cajun II, Pointe Coupee Parish, Louisiana	File:	05-58
For:	Shaw Environmental & Infrastructure, Inc.	Date:	24-Aug-05
	Baton Rouge, Louisiana	Technician:	PN

Undisturbed Sample
Standard Penetration Test
Classification Sample
(SLS) Slickensided

Boring Depth: 70 Feet

Depth Feet	SAMPLES	Description	
50			
55	☒	Firm gray fine sand with silt traces	21 blows per foot (6/9/12)
60	☒	Firm light gray fine sand with silt traces	23 blows per foot (7/12/11)
65	☒	Firm light gray fine sand with silt traces	20 blows per foot (9/5/15)
70	☒	Dense light gray fine sand with silt traces	37 blows per foot (12/17/20)

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

LOG OF BORING

Project:	Bottom Ash Storage Pond Expansion	Boring:	3
	Big Cajun II, Pointe Coupee Parish, Louisiana	File:	05-58
For:	Shaw Environmental & Infrastructure, Inc.	Date:	24-Aug-05
	Baton Rouge, Louisiana	Technician:	PN

Undisturbed Sample
Standard Penetration Test
Classification Sample
(SLS) Slickensided

Boring Depth: 50 Feet

Depth Feet	SAMPLES	Description	
0	Undisturbed	Hard tan and gray clay with roots	Cement-bentonite grout backfill full depth
	Undisturbed	Very stiff tan and gray clay with ferrous nodules	
5	Undisturbed	Very stiff tan and gray clay with sand streaks and pockets	
	Undisturbed	Soft tan sandy clay with sand pockets	
10	Undisturbed	Very soft tan and gray very sandy clay	
15	Classification	Tan silty fine sand with clay traces	
	SPT	Loose brown sandy silt	8 blows per foot (2/2/6)
		No sample recovered	
20	SPT	Firm brown fine sand with silt traces	14 blows per foot (6/8/6)
25	SPT	Dense light gray fine sand with silt traces	31 blows per foot (5/15/16)
30	SPT	Firm light gray silty fine sand	23 blows per foot (9/11/12)
35	SPT	Dense light gray fine sand with silt traces	46 blows per foot (16/24/22)
40	SPT	Dense light gray fine sand with silt traces	34 blows per foot (11/17/17)
45	SPT	Very dense light gray fine sand with silt traces	40 blows per foot (15/19/21)
50	SPT	Dense light gray fine sand	34 blows per foot (17/18/16)

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

LOG OF BORING

Project:	Bottom Ash Storage Pond Expansion	Boring:	4
	Big Cajun II, Pointe Coupee Parish, Louisiana	File:	05-58
For:	Shaw Environmental & Infrastructure, Inc.	Date:	24-Aug-05
	Baton Rouge, Louisiana	Technician:	JP

■ Undisturbed Sample
☒ Standard Penetration Test
▯ Classification Sample
(SLS) Slickensided

Boring Depth: 70 Feet

Depth Feet	SAMPLES	Description	Remarks
0	Classification Sample	Tan and gray fly ash and sand	Cement-bentonite grout backfill full depth
5	Undisturbed Sample	Hard brown, tan, and gray clay	
10	Undisturbed Sample	Stiff tan and gray slightly sandy clay	
15	Undisturbed Sample	Very stiff tan and gray clay with sand streaks and pockets	
20	Undisturbed Sample	Stiff gray clay	
25	Undisturbed Sample	Stiff tan and gray clay	
30	Undisturbed Sample	Very soft tan and gray silty clay with 3 inch clayey silt layer	
35	Undisturbed Sample	Soft tan and gray very silty clay with 1 inch clayey silt layer	
40	Undisturbed Sample	Firm tan silty fine sand	
	Standard Penetration Test	Firm tan and gray silty fine sand	11 blows per foot (7/5/6)
45			
50	Standard Penetration Test	Firm gray fine sand with silt traces	26 blows per foot (11/13/13)

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

LOG OF BORING

Project:	Bottom Ash Storage Pond Expansion	Boring:	4
	Big Cajun II, Pointe Coupee Parish, Louisiana	File:	05-58
For:	Shaw Environmental & Infrastructure, Inc.	Date:	25-Aug-05
	Baton Rouge, Louisiana	Technician:	JP

■ Undisturbed Sample
☒ Standard Penetration Test
◫ Classification Sample
(SLS) Slickensided

Boring Depth: 70 Feet

Depth Feet	SAMPLES	Description	Blows
50			
55			
60	☒	Dense gray fine sand with silt traces	34 blows per foot (15/16/18)
65			
70	☒	Dense gray fine sand with silt traces	36 blows per foot (16/17/19)

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

LOG OF BORING

Project:	Bottom Ash Storage Pond Expansion	Boring:	5
	Big Cajun II, Pointe Coupee Parish, Louisiana	File:	05-58
For:	Shaw Environmental & Infrastructure, Inc.	Date:	25-Aug-05
	Baton Rouge, Louisiana	Technician:	JP

Legend: ■ Undisturbed Sample; ☒ Standard Penetration Test; ◫ Classification Sample; (SLS) Slickensided

Boring Depth: 70 Feet

Depth Feet	SAMPLES	Description	Remarks
0–2	Undisturbed	Very stiff brown slightly silty clay with fly ash	Cement-bentonite grout backfill full depth
3–5	Undisturbed	Very stiff brown silty clay	
8–10	Undisturbed	Stiff tan and gray clay	
13–15	Undisturbed	Stiff tan and gray clay with ferrous nodules	
18–20	Undisturbed	Medium tan and gray slightly silty clay	
23–25	Undisturbed	Medium gray silty clay	
28–30	Undisturbed	Loose tan and gray clayey silt	
33–35	Undisturbed	Soft tan and gray very silty clay	
38–40	Undisturbed	Loose gray silty fine sand with clay lenses	
43–45	Undisturbed	Medium gray slightly sandy clay with sand lenses	
48.5–50	Standard Penetration Test	Firm gray sandy silt	12 blows per foot (3/6/6)

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

LOG OF BORING

Project:	Bottom Ash Storage Pond Expansion	Boring:	5
	Big Cajun II, Pointe Coupee Parish, Louisiana	File:	05-58
For:	Shaw Environmental & Infrastructure, Inc.	Date:	25-Aug-05
	Baton Rouge, Louisiana	Technician:	JP

Depth Feet | SAMPLES

■ Undisturbed Sample
☒ Standard Penetration Test
◫ Classification Sample
(SLS) Slickensided

Boring Depth: 70 Feet

Depth (Feet)	Samples	Description	
50			
55			
60	☒	Dense gray fine sand with silt traces	35 blows per foot (15/17/18)
65			
70	☒	Dense gray fine sand with silt traces	36 blows per foot (14/18/18)

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LOG OF BORING

Project: Bottom Ash Storage Pond Expansion
Big Cajun II, Pointe Coupee Parish, Louisiana
For: Shaw Environmental & Infrastructure, Inc.
Baton Rouge, Louisiana

Boring: 6
File: 05-58
Date: 26-Aug-05
Technician: JP

■ Undisturbed Sample
☒ Standard Penetration Test
▯ Classification Sample
(SLS) Slickensided

Boring Depth: 55 Feet

Depth Feet	Description	Notes
0	Brown fly ash with clayey sand pockets and roots	Cement-bentonite grout backfill full depth
5	Hard tan and gray slightly silty clay	
10	Stiff tan and gray clay	
15	Stiff tan and gray clay	
20	Stiff gray clay	
25	Stiff tan and gray clay	
30	Very soft tan and gray very silty clay with 3 inch clayey silt layer	
35	Loose tan and gray clayey silt	
	No sample recovered	
40	Dense tan and gray fine sand with silt and clay traces	39 blows per foot (13/13/26)
45	Very dense tan and gray fine sand with silt traces	53 blows per foot (12/22/31)
50	Dense gray fine sand with silt traces	43 blows per foot (17/21/22)

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

LOG OF BORING

Project:	Bottom Ash Storage Pond Expansion	Boring:	6
	Big Cajun II, Pointe Coupee Parish, Louisiana	File:	05-58
For:	Shaw Environmental & Infrastructure, Inc.	Date:	26-Aug-05
	Baton Rouge, Louisiana	Technician:	JP

Depth Feet | SAMPLES

■ Undisturbed Sample
⊠ Standard Penetration Test
◫ Classification Sample
(SLS) Slickensided

Boring Depth: 55 Feet

Depth Feet	Samples	Description	
50			
	⊠	Dense gray fine sand with silt traces	45 blows per foot (20/18/27)
55			

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LOG OF BORING

Project: Bottom Ash Storage Pond Expansion
Big Cajun II, Pointe Coupee Parish, Louisiana
For: Shaw Environmental & Infrastructure, Inc.
Baton Rouge, Louisiana

Boring: 7
File: 05-58
Date: 26-Aug-05
Technician: JP

■ Undisturbed Sample
⊠ Standard Penetration Test
◫ Classification Sample
(SLS) Slickensided

Boring Depth: 70 Feet

Depth Feet	Description	Remarks
0	Black and brown fly ash	Cement-bentonite grout backfill full depth
5	Hard tan and gray clay	
10	Very stiff tan and gray slightly silty clay	
15	Very stiff tan and gray clay with silt pockets	
20	Stiff gray clay	
25	Stiff tan and gray clay with silt pockets	
30	Medium tan and gray clay with ferrous nodules	
35	Very soft tan and gray very silty clay with ferrous nodules	
40	No sample recovered	
	Very stiff gray silty clay	17 blows per foot (4/7/10)
45		
50	Medium gray very silty clay	

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LOG OF BORING

Project:	Bottom Ash Storage Pond Expansion	Boring:	7
	Big Cajun II, Pointe Coupee Parish, Louisiana	File:	05-58
For:	Shaw Environmental & Infrastructure, Inc.	Date:	26-Aug-05
	Baton Rouge, Louisiana	Technician:	JP

Depth Feet | SAMPLES

■ Undisturbed Sample
⊠ Standard Penetration Test
◫ Classification Sample
(SLS) Slickensided

Boring Depth: 70 Feet

Depth (Feet)	Samples	Description	Blows
50			
55			
60	⊠	Dense gray fine sand with silt traces	34 blows per foot (10/16/18)
65			
70	⊠	Very dense gray sand with silt traces	78 blows per foot (18/36/42)

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

LOG OF BORING

Project:	Bottom Ash Storage Pond Expansion	Boring:	8
	Big Cajun II, Pointe Coupee Parish, Louisiana	File:	05-58
For:	Shaw Environmental & Infrastructure, Inc.	Date:	1-Sep-05
	Baton Rouge, Louisiana	Technician:	PN

■ Undisturbed Sample
☒ Standard Penetration Test
◫ Classification Sample
(SLS) Slickensided

Boring Depth: 55 Feet

Depth Feet	SAMPLES	Description	Remarks
0–2	Classification Sample	Brown and black coal and fly ash	Cement-bentonite grout backfill full depth
3–5	Undisturbed Sample	Brown and black fly ash with clay pockets	
8–10	Undisturbed Sample	Stiff tan and gray slightly sandy clay	
13–15	Undisturbed Sample	Stiff tan and gray clay	
18–20	Undisturbed Sample	Stiff tan and gray clay	
23–25	Undisturbed Sample	Soft tan and gray very silty clay	
28–30	Undisturbed Sample	Loose tan and gray clayey sand	
33–35	Undisturbed Sample	Loose tan sandy silt	
38–40	Classification Sample	Gray silty fine sand	
40–42	Standard Penetration Test	Firm light gray silty fine sand	23 blows per foot (7/10/13)
43–45	Standard Penetration Test	Dense light gray silty fine sand	34 blows per foot (10/17/17)
48–50	Standard Penetration Test	Dense light gray fine sand with silt traces	35 blows per foot (7/17/18)

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

LOG OF BORING

Project:	Bottom Ash Storage Pond Expansion	Boring:	8
	Big Cajun II, Pointe Coupee Parish, Louisiana	File:	05-58
For:	Shaw Environmental & Infrastructure, Inc.	Date:	1-Sep-05
	Baton Rouge, Louisiana	Technician:	PN

Undisturbed Sample
Standard Penetration Test
Classification Sample
(SLS) Slickensided

Boring Depth: 55 Feet

Depth Feet	SAMPLES	Description	
50			
	Standard Penetration Test	Dense light gray fine sand with silt traces	32 blows per foot (10/15/17)
55			

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

LOG OF BORING

Project:	Bottom Ash Storage Pond Expansion	Boring:	9
	Big Cajun II, Pointe Coupee Parish, Louisiana	File:	05-58
For:	Shaw Environmental & Infrastructure, Inc.	Date:	1-Sep-05
	Baton Rouge, Louisiana	Technician:	PN

Depth Feet | SAMPLES

■ Undisturbed Sample
☒ Standard Penetration Test
▯ Classification Sample
(SLS) Slickensided

Boring Depth: 50 Feet

Depth (Feet)	Sample	Description	Remarks
0	Classification Sample	Brown sand with roots	Cement-bentonite grout backfill full depth
	Undisturbed Sample	Very stiff gray sandy clay	
5	Undisturbed Sample	Stiff tan and gray clay	
	Undisturbed Sample	Medium tan and gray clay with ferrous nodules	
10	Undisturbed Sample	Stiff tan and gray silty clay with ferrous nodules	
15	Undisturbed Sample	Loose tan and gray silty fine sand with clay pockets	
20		No sample recovered	
	Standard Penetration Test	Loose light gray sandy silt	6 blows per foot (4/4/2)
25	Standard Penetration Test	Firm light gray silty fine sand with clay traces	18 blows per foot (8/10/8)
30		No sample recovered	
	Standard Penetration Test	Firm light gray silty fine sand	11 blows per foot (4/5/6)
35	Standard Penetration Test	Firm light gray clayey fine sand with organic matter traces	18 blows per foot (4/9/9)
40	Standard Penetration Test	Firm light gray clayey fine sand	28 blows per foot (7/14/14)
45	Standard Penetration Test	Dense light gray fine sand with silt traces	30 blows per foot (10/12/18)
50	Standard Penetration Test	Firm light gray fine sand with silt traces	27 blows per foot (9/13/14)

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Geotechnical Engineers

LOG OF BORING

Project:	Bottom Ash Storage Pond Expansion	Boring:	11
	Big Cajun II, Pointe Coupee Parish, Louisiana	File:	05-58
For:	Shaw Environmental & Infrastructure, Inc.	Date:	23-Aug-05
	Baton Rouge, Louisiana	Technician:	JP

Legend: ■ Undisturbed Sample; ☒ Standard Penetration Test; ◫ Classification Sample; (SLS) Slickensided

Boring Depth: 50 Feet

Depth Feet	SAMPLES	Description	Remarks
0–1	Undisturbed	Hard brown and gray clay with ferrous nodules	Cement-bentonite grout backfill full depth
2–3	Undisturbed	Hard brown clay	
4–5	Undisturbed	Very stiff brown and gray clay with silt streaks and organic matter	
6–7	Undisturbed	Medium gray clay	
8–10	Undisturbed	Medium gray clay	
13–15	Undisturbed	Medium gray clay	(SLS)
18–20	Undisturbed	Loose gray clayey sand	
23–25		No sample recovered	
25–27	SPT	Firm gray silty fine sand	28 blows per foot (7/12/16)
28–30	SPT	Firm gray fine sand with silt traces	15 blows per foot (5/7/8)
33–35	SPT	Dense gray fine sand with silt traces	37 blows per foot (18/18/19)
38–40	SPT	Dense gray fine sand with silt traces	36 blows per foot (17/19/17)
43–45	SPT	Dense gray fine sand	37 blows per foot (13/17/20)
48–50	SPT	Dense gray fine sand	37 blows per foot (16/18/21)

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

LOG OF BORING

Project:	Bottom Ash Storage Pond Expansion	Boring:	12
	Big Cajun II, Pointe Coupee Parish, Louisiana	File:	05-58
For:	Shaw Environmental & Infrastructure, Inc.	Date:	22-Aug-05
	Baton Rouge, Louisiana	Technician:	JP

■ Undisturbed Sample
☒ Standard Penetration Test
◫ Classification Sample
(SLS) Slickensided

Boring Depth: 70 Feet

Depth Feet	SAMPLES	Description	
0	Classification Sample	Black fly ash	Cement-bentonite grout backfill full depth
5	Undisturbed Sample	Very stiff brown clay with fly ash	
10	Undisturbed Sample	Stiff tan and gray clay	
15	Undisturbed Sample	Stiff tan and gray clay with silt streaks and ferrous nodules	
20	Undisturbed Sample	Stiff gray clay	
25	Undisturbed Sample	Soft gray very silty clay	
30	Undisturbed Sample	Soft tan and gray silty clay	
		No sample recovered	
35	Standard Penetration Test	Firm tan and gray fine sand with silt traces	29 blows per foot (10/10/19)
40	Standard Penetration Test	Firm tan and gray fine sand with silt traces	16 blows per foot (8/8/8)
45	Standard Penetration Test	Firm gray silty fine sand with clay traces	11 blows per foot (6/3/8)
50	Standard Penetration Test	Firm gray silty fine sand with clay traces	22 blows per foot (10/16/16)

LOG OF BORING

Project:	Bottom Ash Storage Pond Expansion	Boring:	12
	Big Cajun II, Pointe Coupee Parish, Louisiana	File:	05-58
For:	Shaw Environmental & Infrastructure, Inc.	Date:	22-Aug-05
	Baton Rouge, Louisiana	Technician:	JP

Undisturbed Sample
Standard Penetration Test
Classification Sample
(SLS) Slickensided

Boring Depth: 70 Feet

Depth Feet	SAMPLES	Description	Blows
50			
55	Standard Penetration Test	Dense gray fine sand with shells and silt traces	30 blows per foot (15/14/16)
60	Standard Penetration Test	Dense gray fine sand with shells and silt traces	30 blows per foot (15/13/17)
65	Standard Penetration Test	Dense gray fine sand with silt traces	30 blows per foot (12/14/16)
70	Standard Penetration Test	Dense gray fine sand with silt traces	43 blows per foot (17/20/23)

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Geotechnical Engineers

LOG OF BORING

Project:	Bottom Ash Storage Pond Expansion	Boring:	13
	Big Cajun II, Pointe Coupee Parish, Louisiana	File:	05-58
For:	Shaw Environmental & Infrastructure, Inc.	Date:	23-Aug-05
	Baton Rouge, Louisiana	Technician:	JP

Undisturbed Sample
Standard Penetration Test
Classification Sample
(SLS) Slickensided

Boring Depth: 50 Feet

Depth Feet	SAMPLES	Description	Remarks
0	Undisturbed Sample	Black and brown fly ash and sand	Cement-bentonite grout backfill full depth
	Undisturbed Sample	Soft black and brown fly ash and clay	
5		← Fly ash/soil interference at 5 feet	
	Undisturbed Sample	Stiff tan and gray clay	
10			
	Undisturbed Sample	Stiff tan and gray silty clay with ferrous nodules	
15			
	Undisturbed Sample	Stiff tan and gray clay	
20			
	Undisturbed Sample	Medium tan and gray clay with ferrous nodules	
25			
	Undisturbed Sample	Medium tan and gray clay with ferrous nodules	
30			
	Undisturbed Sample	Medium tan and gray very sandy clay	
35			
		No sample recovered	
40	Standard Penetration Test	Firm tan and gray silty fine sand	25 blows per foot (9/11/14)
45			
	Standard Penetration Test	Dense gray fine sand with silt traces	31 blows per foot (12/16/15)
50			

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LOG OF BORING

Project:	Bottom Ash Storage Pond Expansion	Boring:	14
	Big Cajun II, Pointe Coupee Parish, Louisiana	File:	05-58
For:	Shaw Environmental & Infrastructure, Inc.	Date:	23-Aug-05
	Baton Rouge, Louisiana	Technician:	JP

Undisturbed Sample
Standard Penetration Test
Classification Sample
(SLS) Slickensided

Boring Depth: 60 Feet

Depth Feet	SAMPLES	Description	Remarks
0	Classification Sample	Black and brown fly ash	Cement-bentonite grout backfill full depth
	Classification Sample	Brown fly ash with clay pockets	
5		← Fly ash/clay interference at 5 feet	
10	Undisturbed Sample	Stiff tan and gray clay	
15	Undisturbed Sample	Medium tan and gray silty clay	
20	Undisturbed Sample	Very stiff tan and gray clay with sand streaks	
25	Undisturbed Sample	Stiff tan and gray clay	
30	Undisturbed Sample	Soft tan and gray very silty clay	
35	Undisturbed Sample	Soft tan and gray very sandy clay	
40	Standard Penetration Test	Loose tan and gray silty fine sand	4 blows per foot (6/2/2)
	Undisturbed Sample	Loose gray fine sand with silt traces	
45	Standard Penetration Test	Firm gray fine sand with silt traces	25 blows per foot (12/12/13)
50	Standard Penetration Test	Dense gray fine sand with silt traces	32 blows per foot (15/16/16)

LOUIS J. CAPOZZOLI & ASSOCIATES, INC.
Geotechnical Engineers

LOG OF BORING

Project:	Bottom Ash Storage Pond Expansion	Boring:	14
	Big Cajun II, Pointe Coupee Parish, Louisiana	File:	05-58
For:	Shaw Environmental & Infrastructure, Inc.	Date:	23-Aug-05
	Baton Rouge, Louisiana	Technician:	JP

Undisturbed Sample
Standard Penetration Test
Classification Sample
(SLS) Slickensided

Boring Depth: 60 Feet

Depth Feet	SAMPLES	Description	Blows
50			
55	Standard Penetration Test	Dense gray fine sand with silt traces	31 blows per foot (12/16/15)
60	Standard Penetration Test	Dense gray fine sand with silt traces	46 blows per foot (22/24/22)

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Geotechnical Engineers

Bottom Ash Storage Pond Expansion Big Cajun, Pointe Coupee Parish, LA		
Shaw Environmental & Infrastructure, Inc. Baton Rouge, LA		
Louis J. Capozzoli & Associates, Inc. Geotechnical Engineers Baton Rouge, Louisiana		
Scale Shown	10 Oct 05 Dwn. BJB 19 Oct 05 Ckd. DPS	File No. 05-58

EMBANKMENT INTEGRITY

Theory. For a safe, economical embankment, two criteria must be met.

1. A structurally sound embankment/foundation soil system must be obtained - an adequate factor of safety, as outlined below, must be achieved.

2. Only acceptable embankment and subsoil deformations must be experienced - acceptable in this case means that embankment settlements and lateral deformation of the subsoil are predictable, or decreasing rate with time, and do not result in distress or damage to the embankment.

Structural Soundness. Embankment structural soundness is expressed by the factor of safety against foundation soil bearing capacity failure. The factor of safety is a number obtained by dividing the soil's maximum supportive capacity by the imposed loading of the overlying embankment. A factor of safety of 1.0 indicates that such forces are exactly balanced and a critical condition is in effect. A factor of safety less than 1.0 indicates failure will occur while a factor of safety greater than 1.0 indicates a safe foundation.

The soil's maximum resistive force, or bearing capacity, is reflected in its shear strength. A low initial shear strength will result in a foundation factor of safety less than or equal to 1.0 for the completed embankment. Therefore, if the embankment is built "instantaneously", an unsafe or (at least) "critical" foundation will result. Relatively slow "normal" embankment construction allows time for the soil's shear strength to increase and thereby improves the foundation factor of safety.

As the embankment is built, the water contained in the spaces (pores) between the soil grains is pressurized. Such pressure causes an outflow of pore water. The moisture content of the soil is thus decreased and the soil "dries". Since the shear strength of clay soil is inversely proportional to moisture content (the clay becomes stronger as it dries), outflow of pore water results in the soil shear strength increase required for a safe foundation. Because the outflow of pore water is a time dependent process, the embankment must be built at such a rate so as not to exceed at any time the shear strength gain required for an acceptable factor of safety.

Acceptable Movements. Page 3 depicts two types of subsoil deformations. The top figure shows the soil prior to loading. The middle diagram indicates initial soil reaction to the applied load. In this stage, the soil beneath the embankment "flows" laterally outward with as yet no corresponding outflow of pressurized pore water (this is termed undrained or constant volume deformation). The soil can be compared to a block of rubber which tends to move downward and outward under load. Since no additional soil shear strength has been developed, this is the most critical stage during embankment construction. If the soil experiences enough deformation, its shear strength will be exceeded and the embankment foundation will fail.

Immediate subsoil deformations are dependent on the soil's stiffness as characterized by its undrained (Youngs) stress-strain modules, Eu. Like shear strength, this parameter is inversely proportional to the clay's moisture content, i.e., the clay "stiffens" as it dries. Therefore, if a given load is incrementally applied to the soil, allowing time for load pressurized pore water to drain, Eu will increase during the loading period. Overall result will be less immediate deformation than if the same given load is applied at one time (with consequently no Eu increase during the loading period).

The third figure indicates long term or "consolidation" settlement. This results from outflow of the pressurized pore water and is characterized by slight horizontal movement of the subsoil toward (rather than away from) the embankment centerline. Consolidation occurrence is responsible for subsoil shear strength and Eu increase. This type of movement (termed drained or reduced volume deformation) is time dependent.

Not shown on page 3 is movement potentially occurring subsequent to consolidation completion, i.e. after all load generated pore water pressure has dissipated. The complex mechanism responsible - called undrained creep - is characterized by continued subsoil deformation (both horizontal and vertical) under a constant load. Creep is time dependent and basically caused by high stress levels (the ratio of applied shear stress to the soil's shear strength) in the foundation subsoils. High stress levels are induced by an excessively "critical" loading intensity: safety factor only slightly above 1.0 upon completion of the loading. For "end of loading" safety factors between 1.00 and 1.10, creep movement will increase with time, eventually loading to a slope failure. Safety factors between 1.10 and 1.25 may result in creep terminating before slope failure. Greater end of loading safety factor values will generally produce no creep.

<u>Method of Analysis.</u> Data obtained from the geotechnical site exploration is combined in a computerized limiting equilibrium stability analysis to determine the embankment's short and long term factors of safety. The embankment is designed to keep the end of construction (short term) safety factor at or above 1.25. Such value offers the best trade off between loading efficiency (maximizing use of the soil's available shear strength) and protection against long term creep inducement. Computer prediction of immediate soil deformation is made using a finite element technique. This, combined with standard consolidation settlement computation, serves to determine whether or not acceptable movements will occur. The concurrent computer generated soil stress field (based on revised soil strength, Eu, and measured movement) provides a backup to the above described stability analysis and allows assessment of the potential for long term creep.

Subject SUBSOIL DEFORMATIONS

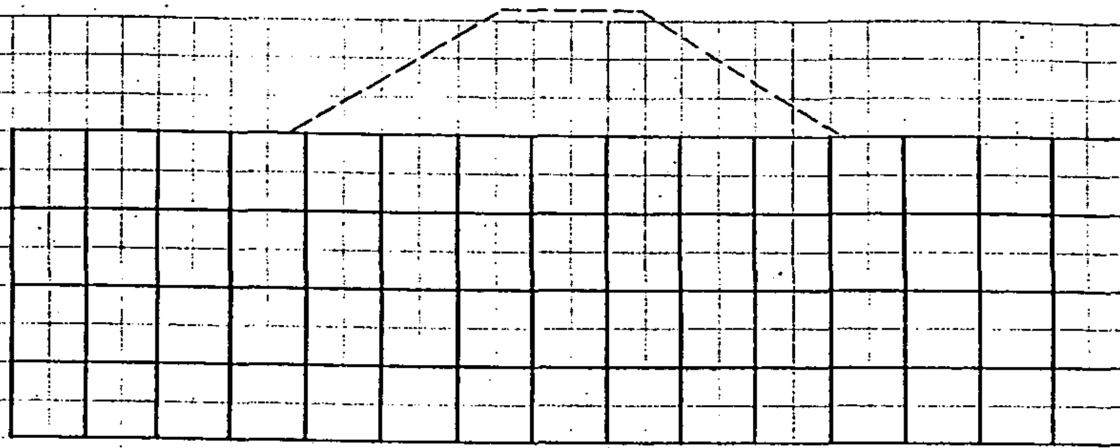
File No.

Appendix B, Page 3, 05-58

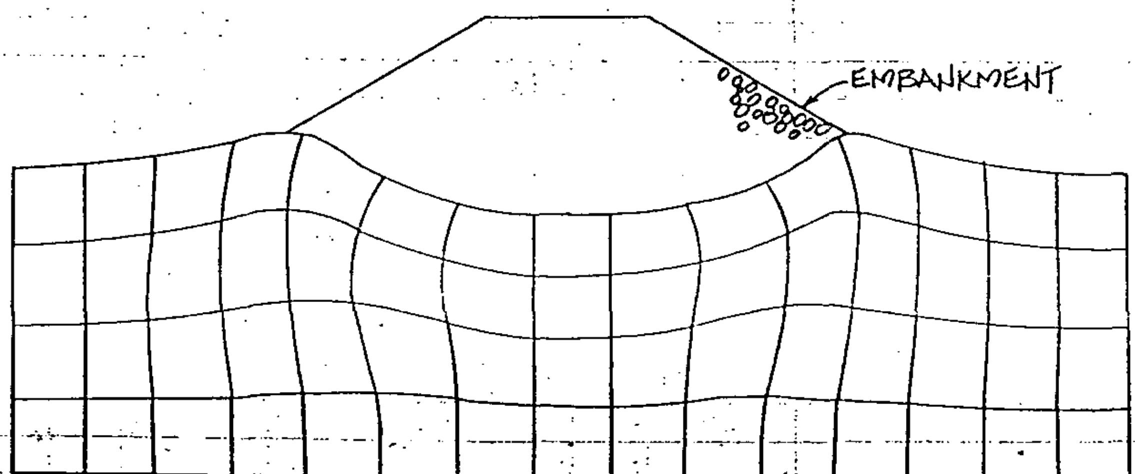
Made by KGC Date 15 Oct05

Checked by DPS Date 20Oct05

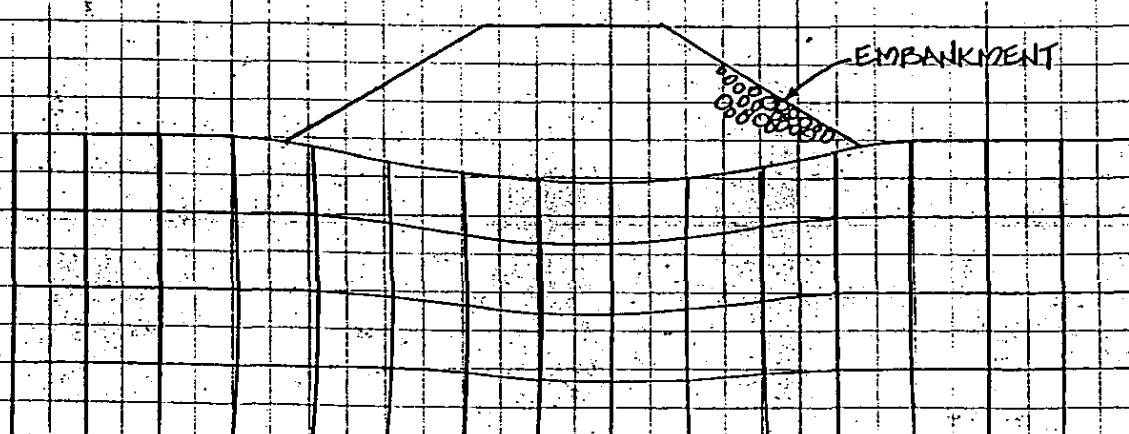
LOUIS J. CAPOZZOLI & ASSOCIATES, INC. Geotechnical Engineers



INITIAL CONDITION (BEFORE LOADING)

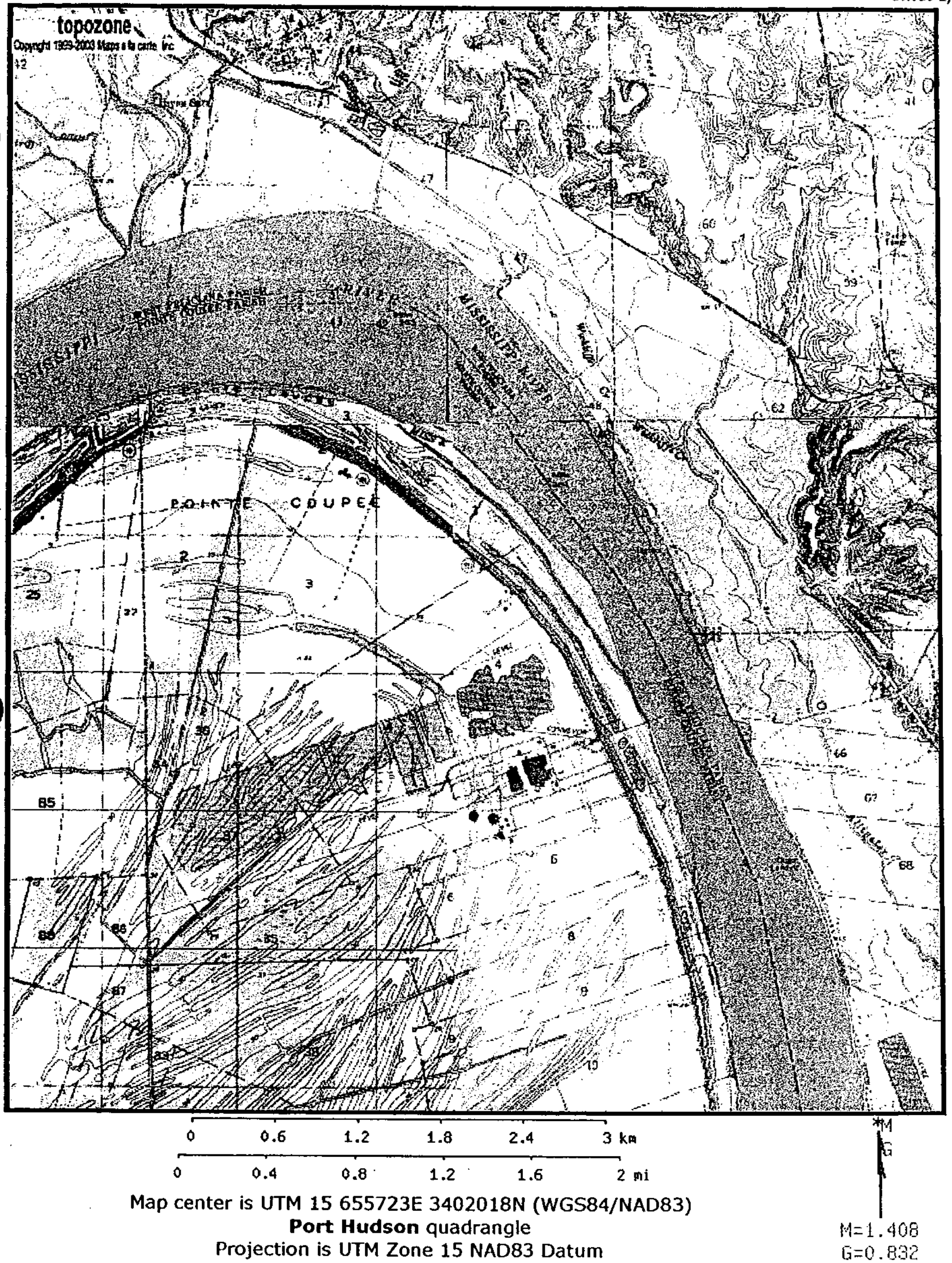


IMMEDIATE DEFORMATION (UNDRAINED OR CONSTANT VOLUME)



CONSOLIDATION DEFORMATION (DRAINED OR LONG TERM)

NOTE: COMBINE THESE TWO DEFORMATIONS TO OBTAIN TOTAL DEFORMATION.



Map center is UTM 15 655723E 3402018N (WGS84/NAD83)
Port Hudson quadrangle
Projection is UTM Zone 15 NAD83 Datum


new roads, la
N
W
E
S
Image © 2005 DigitalGlobe
Google
Pointer 30°43'09.63" N 91°23'44.37" W
Streaming |||||||||| 100%
Eye alt 33884 ft

Bottom Ash Storage Pond Expansion
Global Stability Analyses Summary
Perimeter Embankment Configurations

Shown on Sheet No.	Condition Description: Embankment Geometry	Condition Description: Groundwater Level	Condition Description: Strength Parameters	Global Slope Stability Factor of Safety
4	One Berm 38 feet high 3H:1V slope	Fully saturated	Native soil strength	1.22
5	One Berm 28 feet high 3H:1V slope	Level with ground surface	Native soil strength	1.31
6	One Berm 38 feet high 2H:1V slope	Fully saturated	Native soil strength	1.15
7	One Berm 38 feet high 2H:1V slope	Level with ground surface	Native soil strength	1.15
8	One Berm 38 feet high 2H:1V slope	Level with ground surface	S_u increased under Ash load	1.32
9	Two Berms 18 & 38 feet high 2H:1V slope	Level with ground surface	S_u increased under Ash load	1.42
10	Two Berms 18 & 38 feet high 2H:1V slope	Level with ground surface	S_u increased under Ash load	1.16
11	Two Berms 38 foot Ash Stack 18 & 38 feet high 2H:1V	Fully saturated	S_u increased under Ash load	1.13
12	Two Berms 38 foot Ash Stack 18 & 38 feet high 2H:1V	Fully saturated	Find Su to reach F.S. = 1.4	1.39
13	Two Berms 38 foot Ash Stack 18 & 38 feet high 3H:1V outside	Fully saturated	S_u increased under Ash load	1.22

Shown on Sheet No.	Condition Description: Embankment Geometry	Condition Description: Groundwater Level	Condition Description: Strength Parameters	Global Slope Stability Factor of Safety
14	Two Berms 38 foot Ash Stack 18 & 38 feet high 3H:1V outside	Fully saturated	S_u increased under Ash load	1.38
15	Two Berms 19 foot Ash Stack 18 & 38 feet high 3H:1V outside	Fully saturated	Native soil strength	1.24
16	Two Berms 19 foot Ash Stack 18 & 38 feet high 3H:1V outside	Level with ground surface	Native soil strength	1.30

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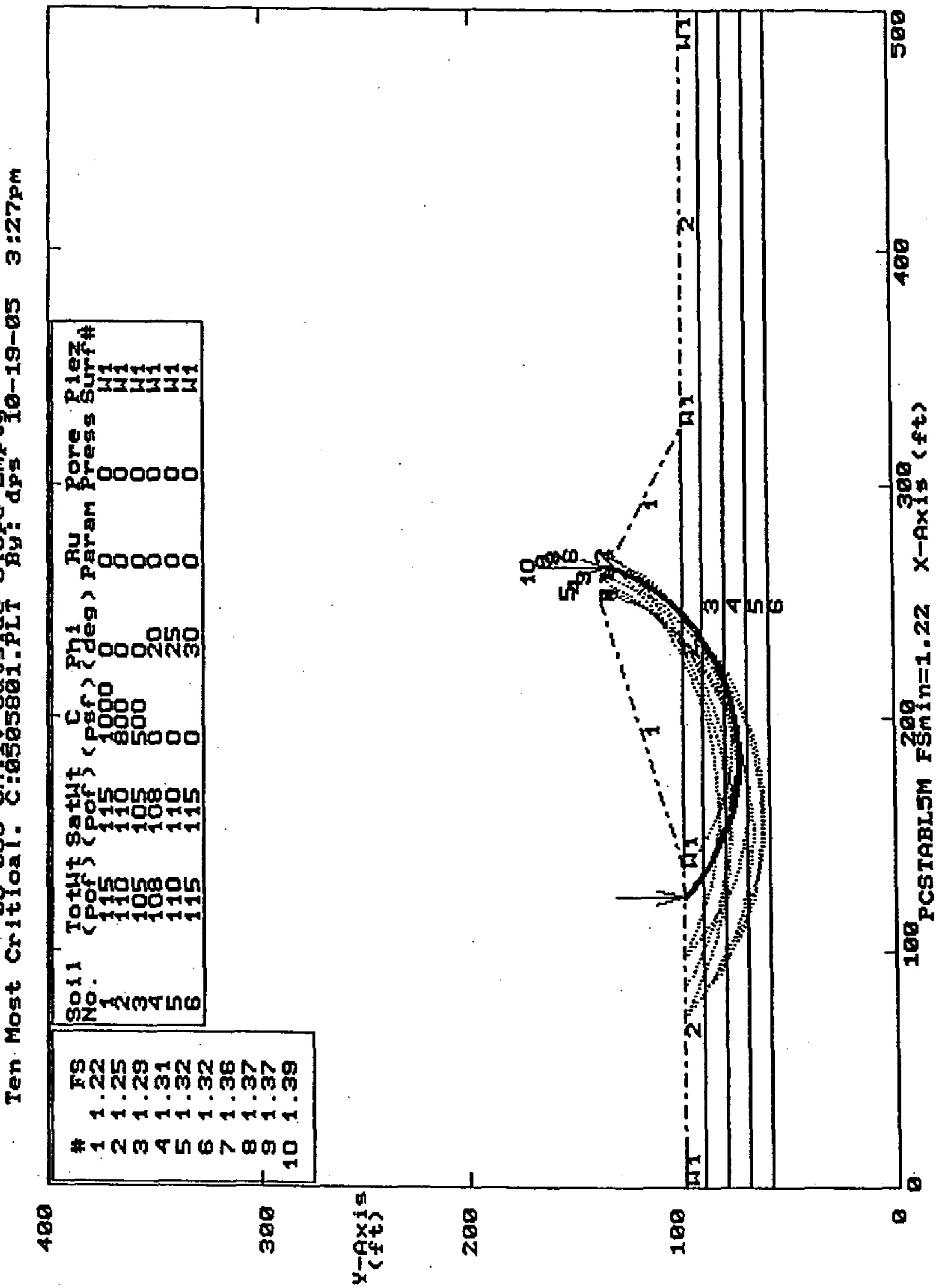

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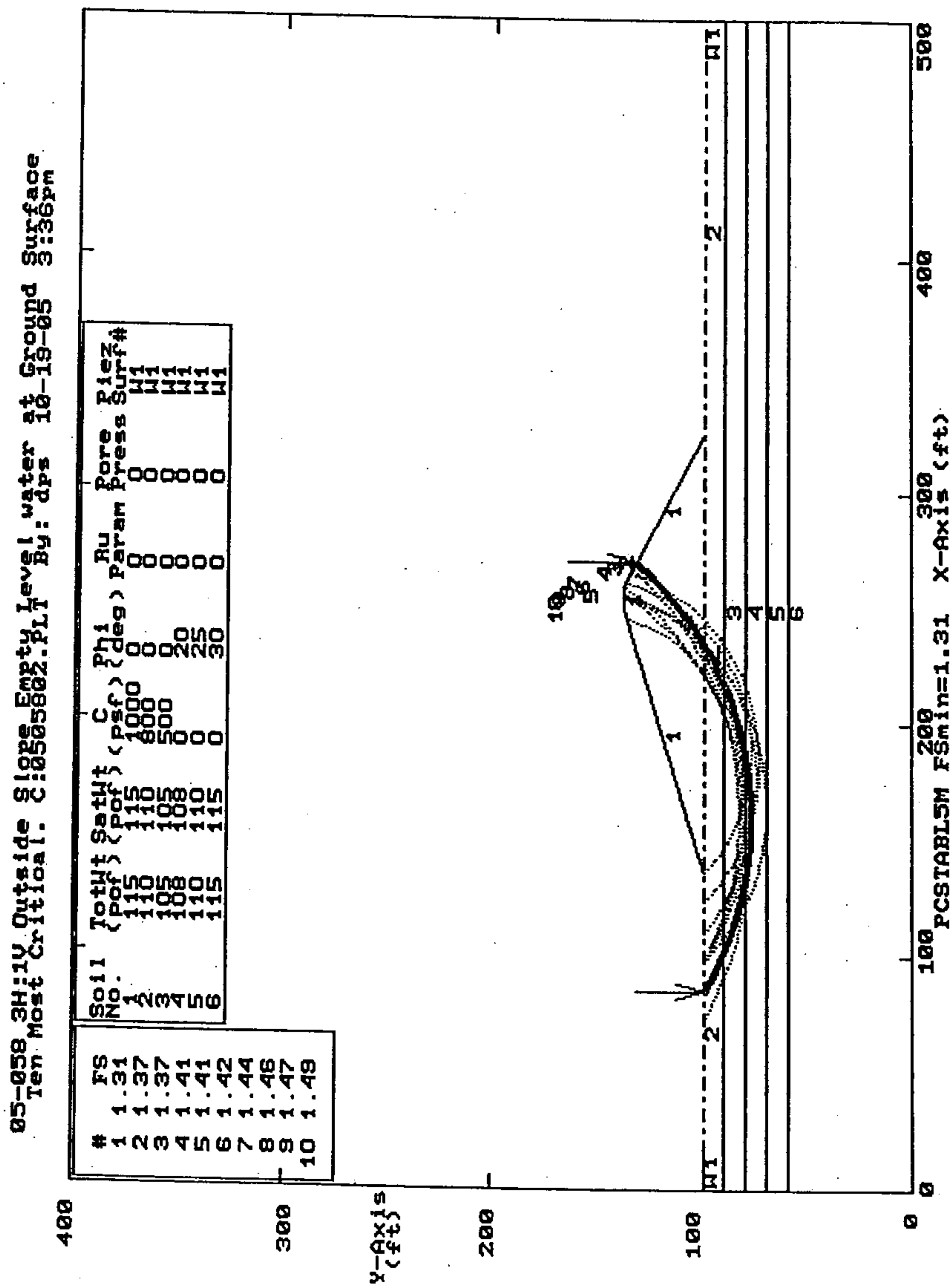

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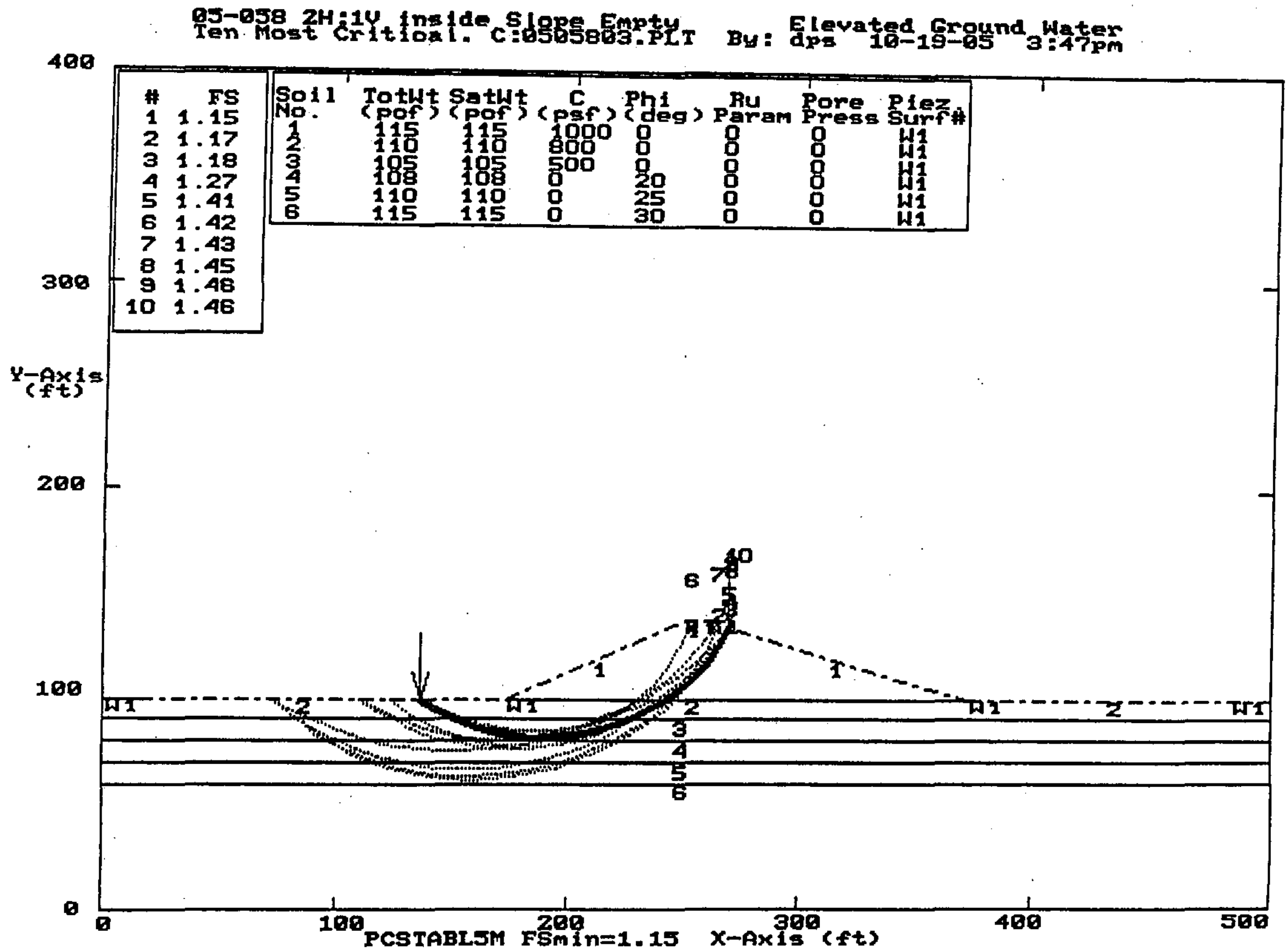

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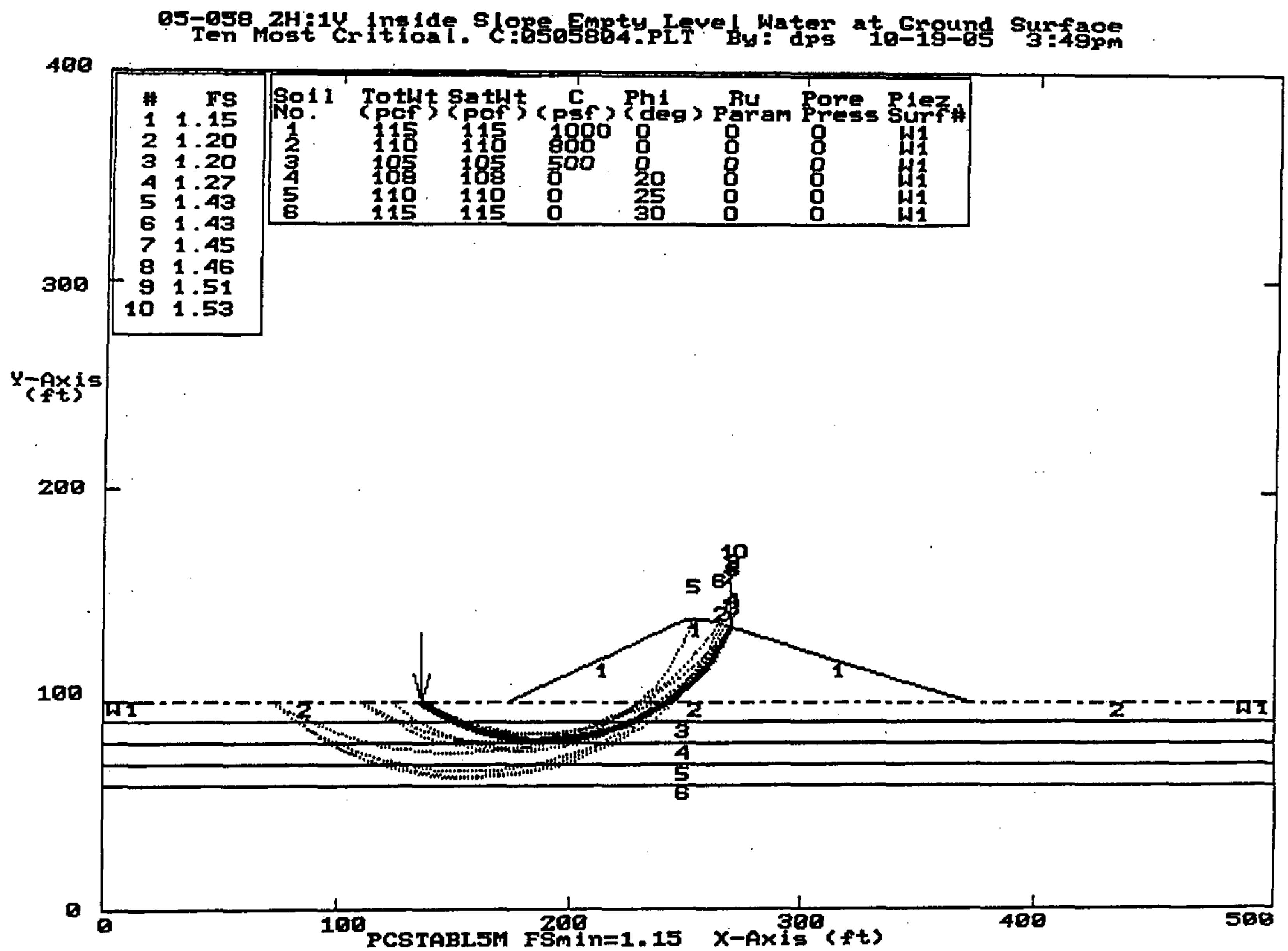
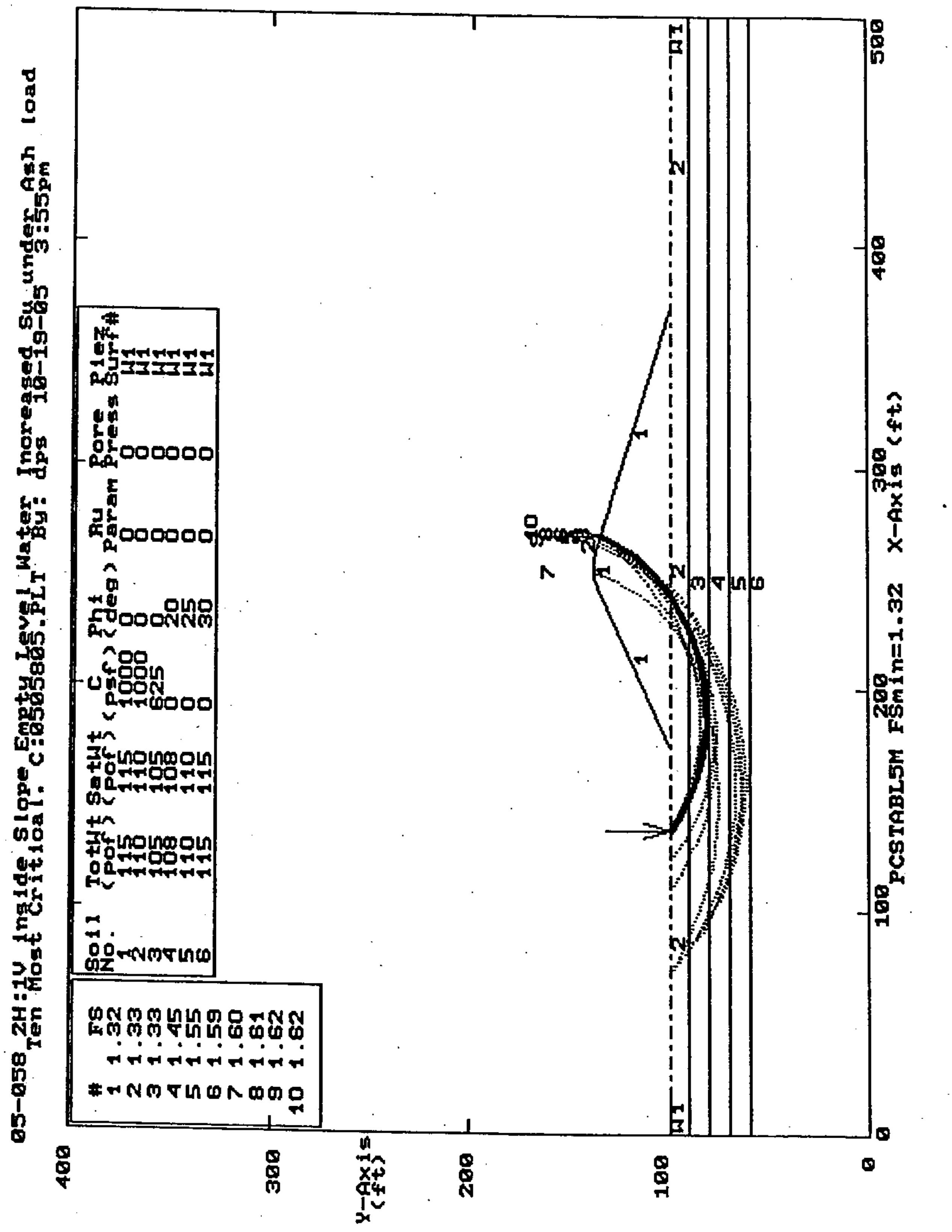


LOUIS J. CAPOZZOLI & ASSOCIATES, INC.



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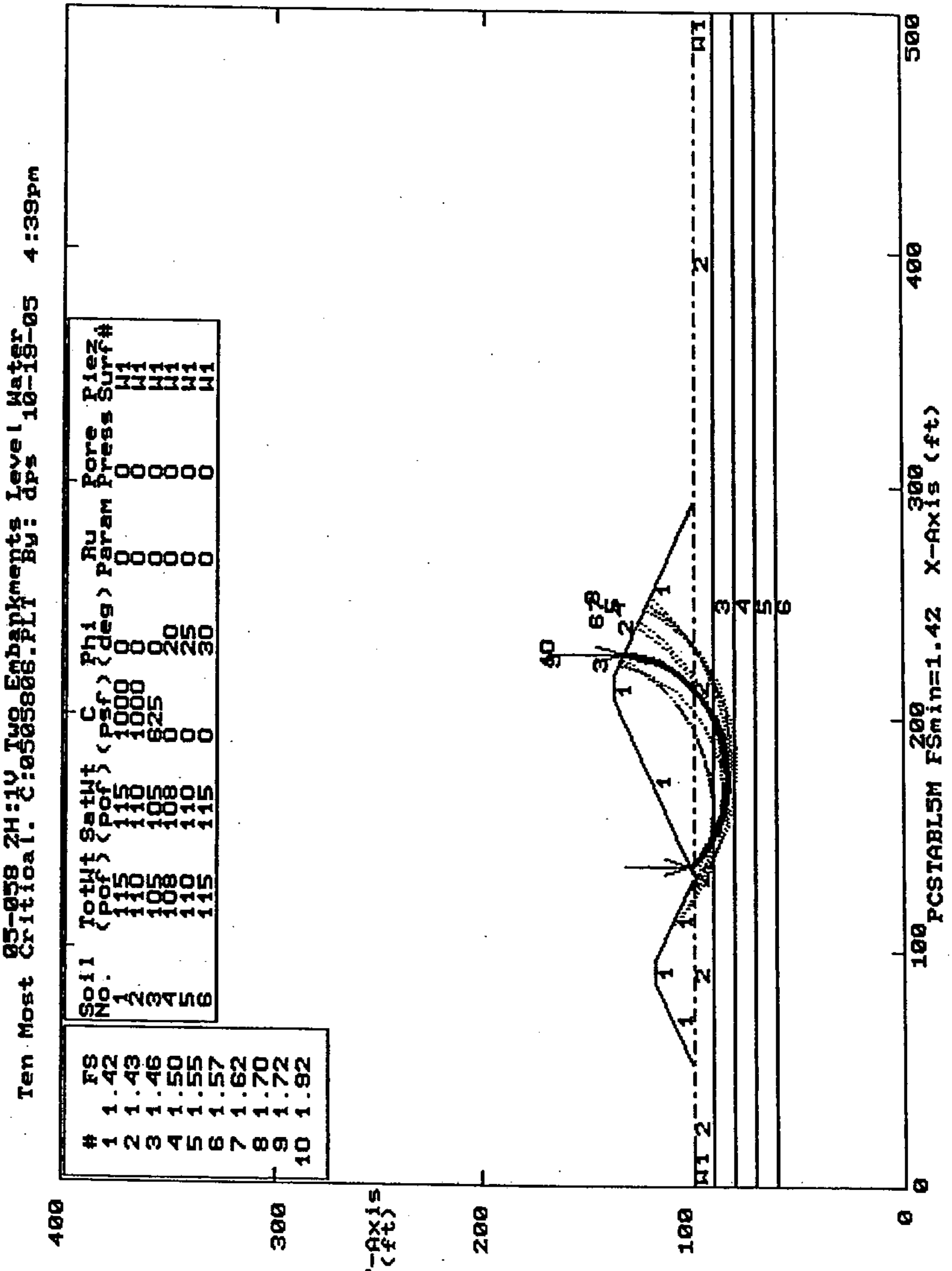

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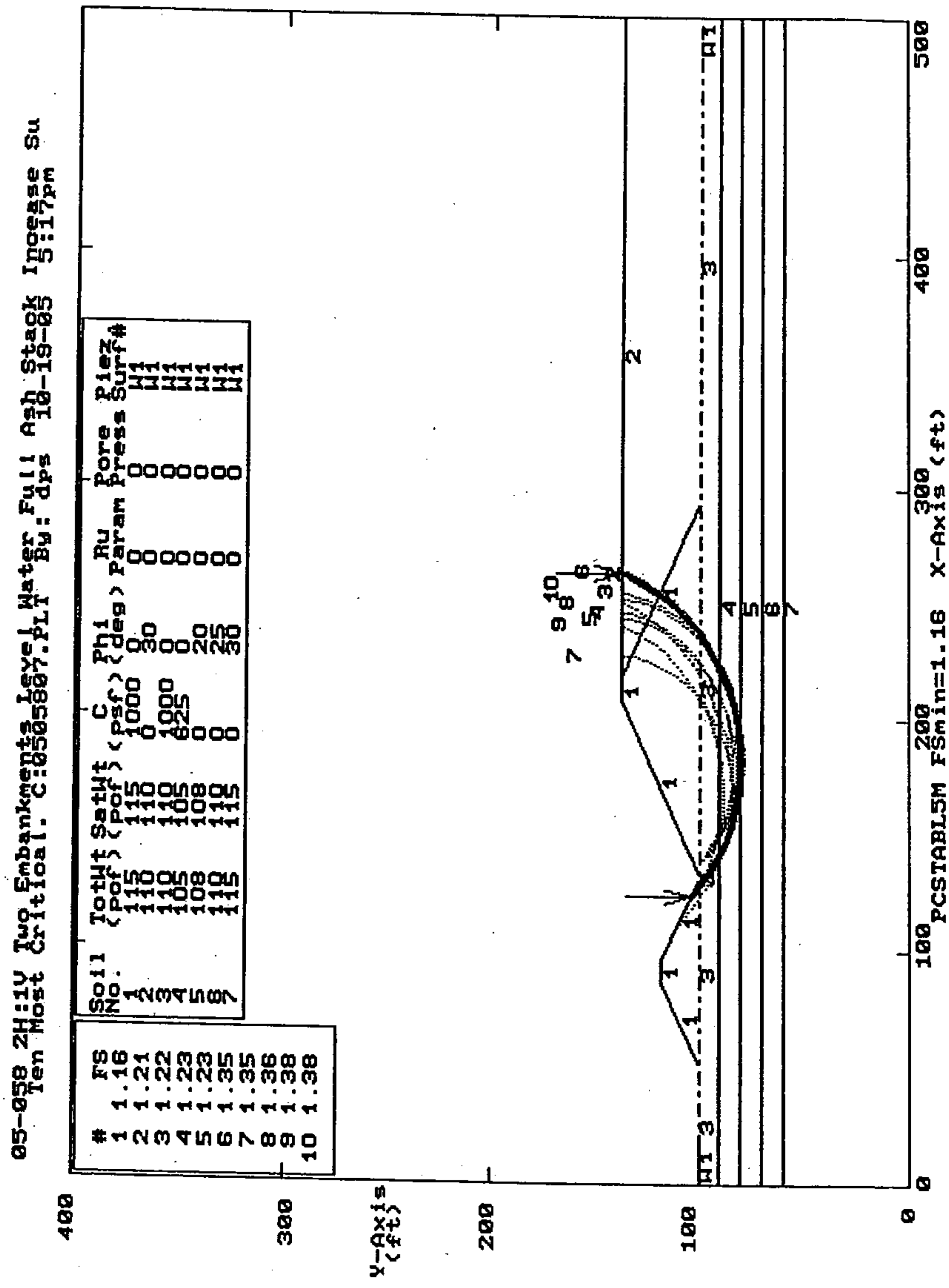
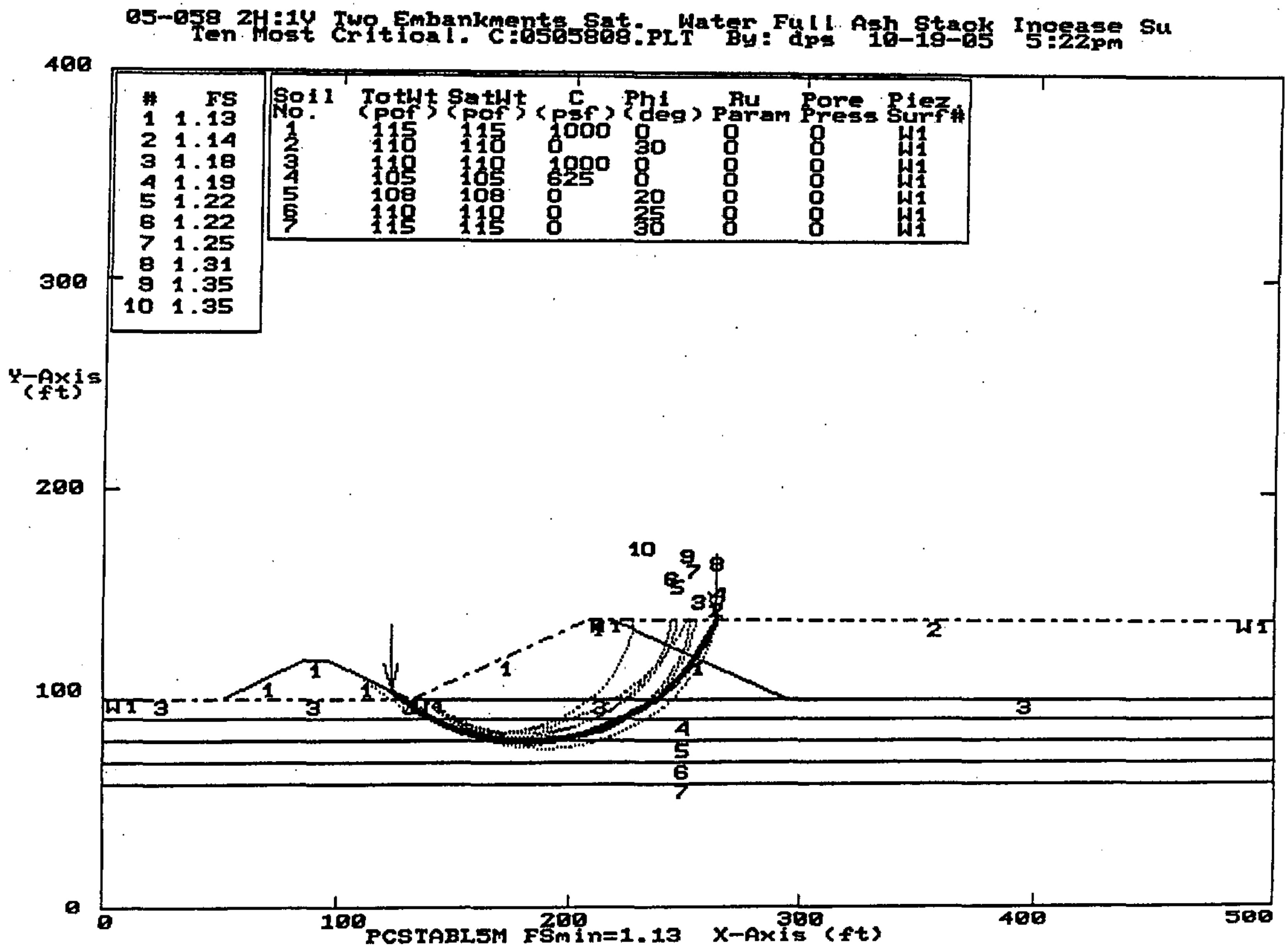
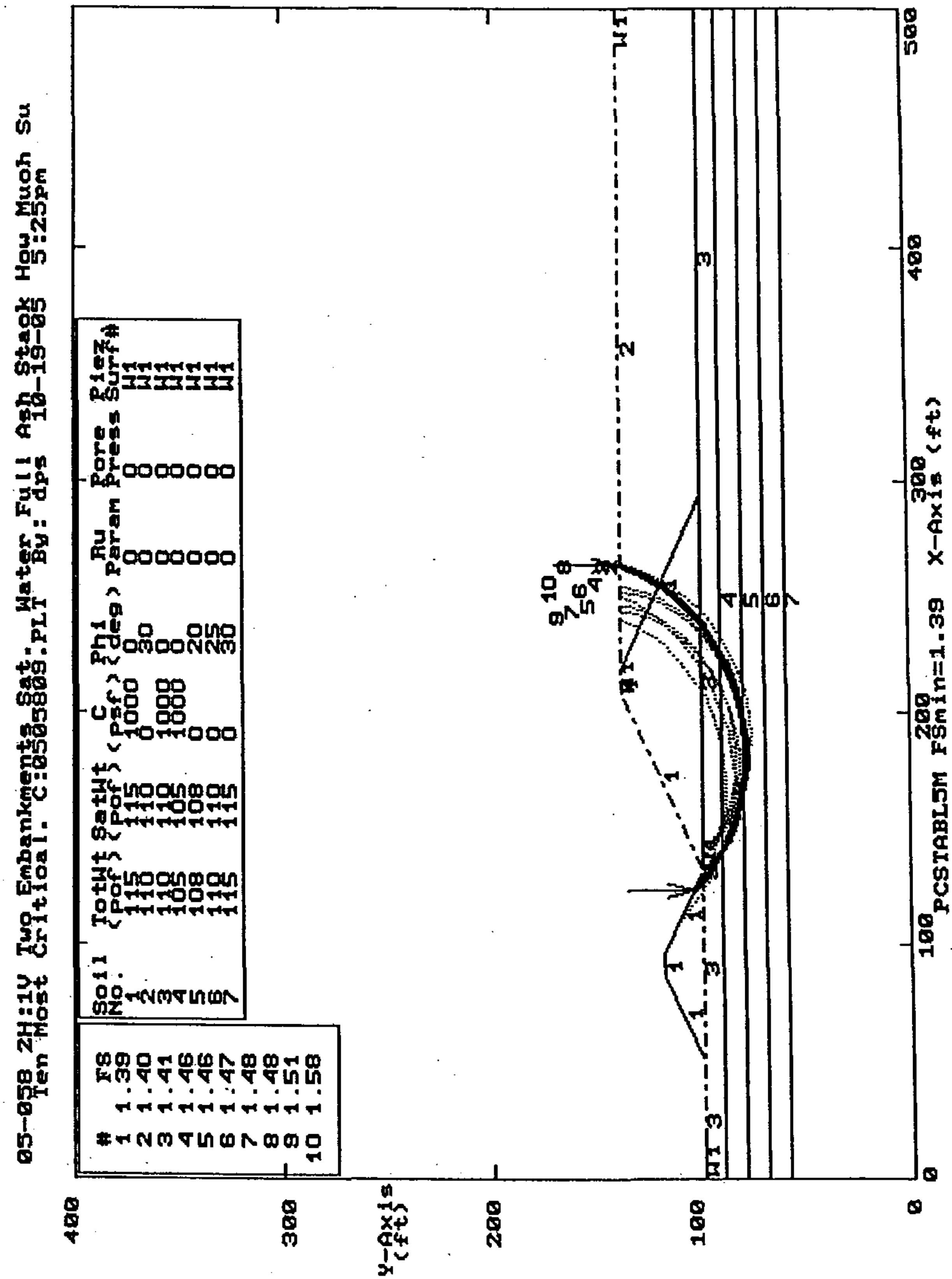


LOUIS J. CAPOZZOLI & ASSOCIATES, INC.

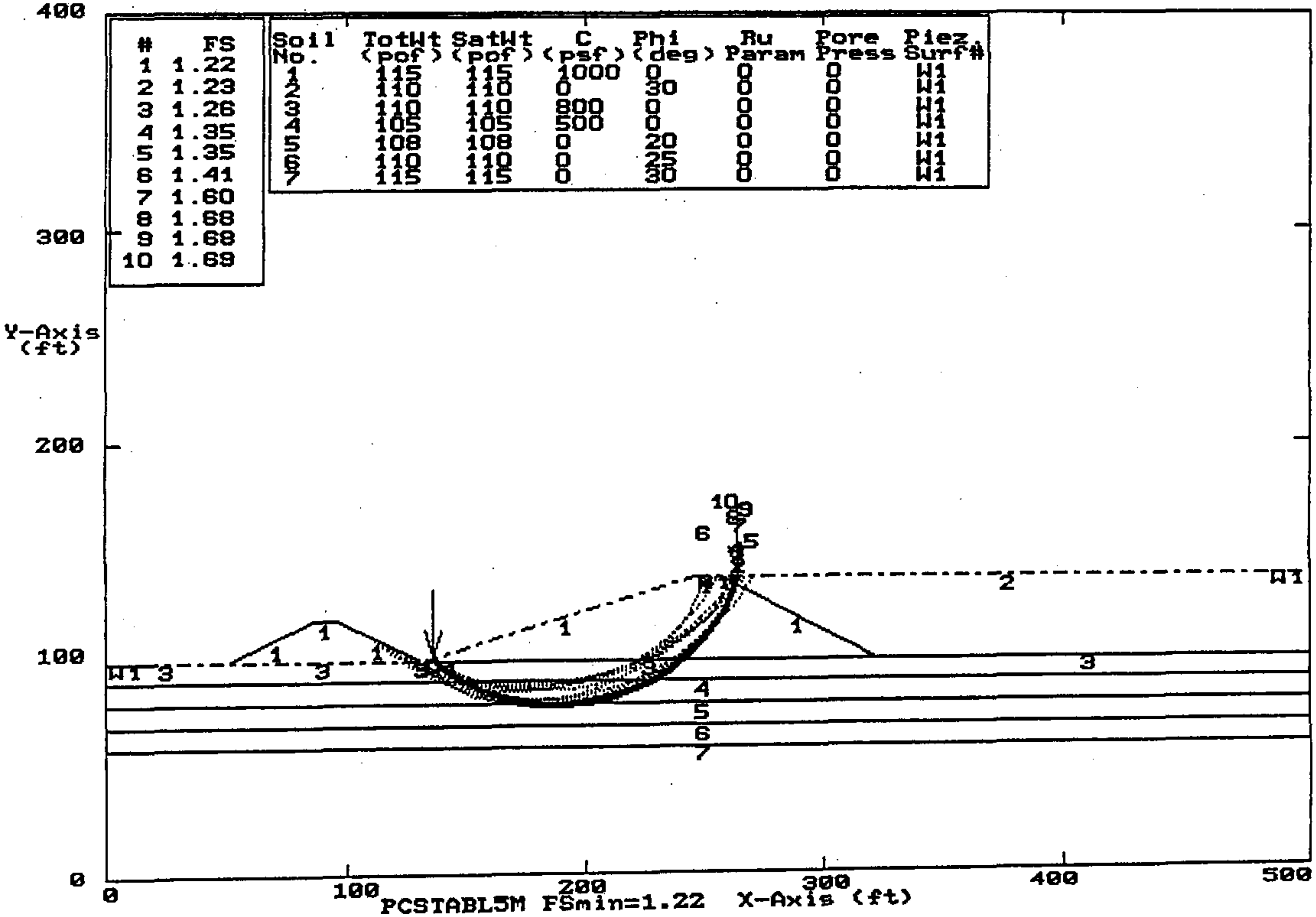


LOUIS J. CAPOZZOLI & ASSOCIATES, INC.



LOUIS J. CAPOZZOLI & ASSOCIATES, INC.

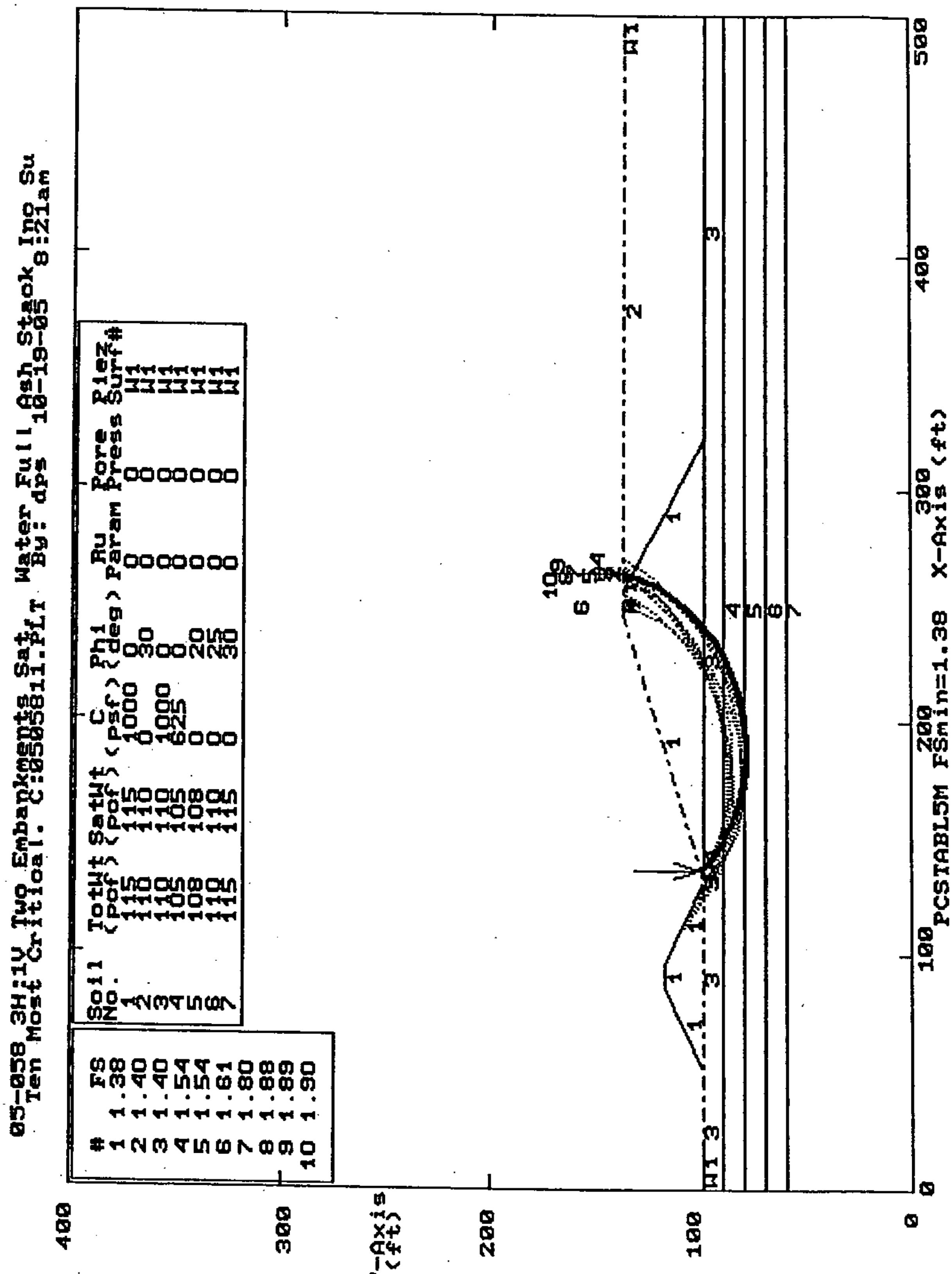
05-058 3H:1V Two Embankments Sat. Water Full Ash Stack
Ten Most Critical. C:0505810.PLT By: dps 10-19-05 8:18am



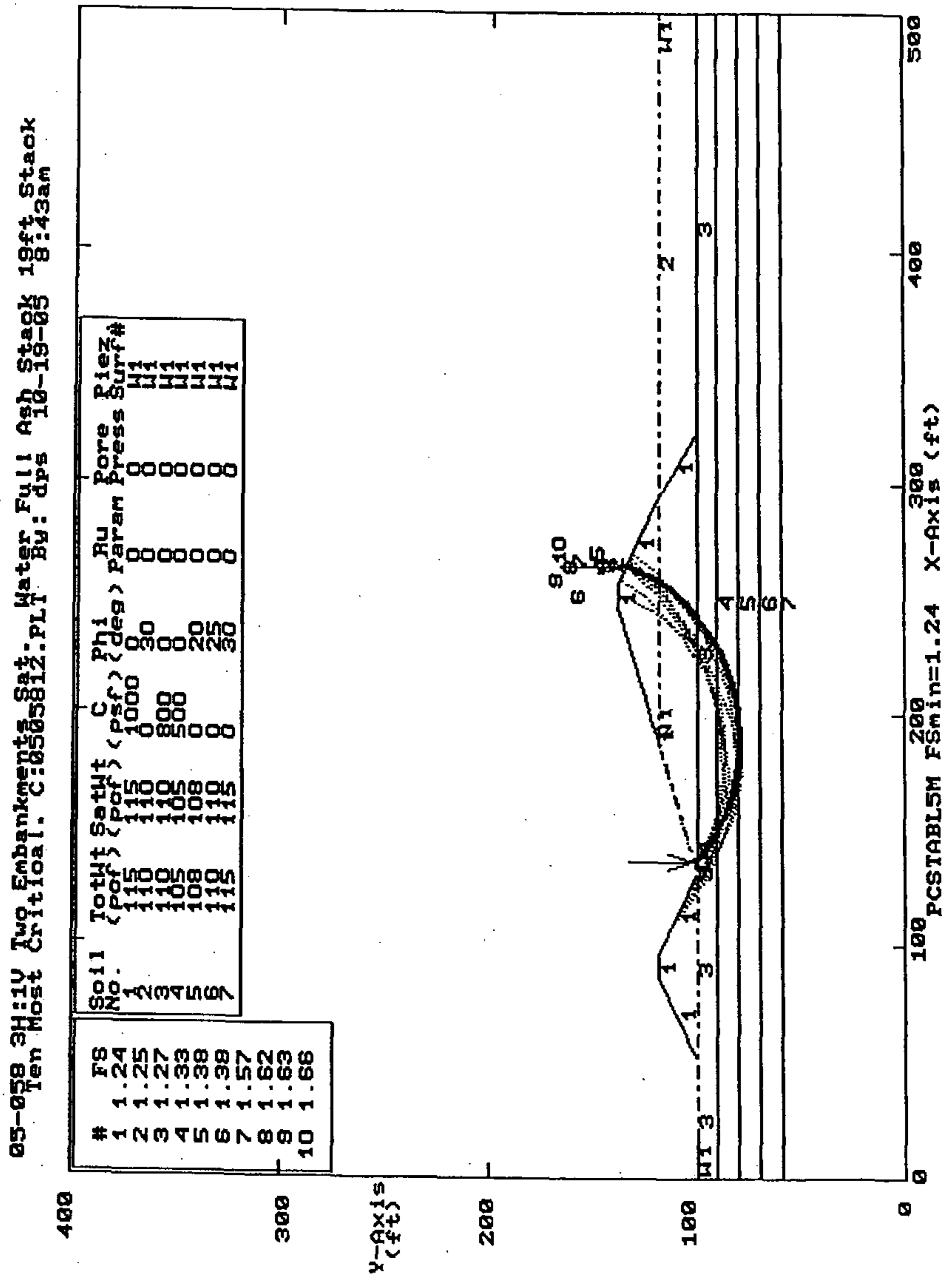
#	FS
1	1.22
2	1.23
3	1.26
4	1.35
5	1.35
6	1.41
7	1.60
8	1.68
9	1.68
10	1.69

Soil No.	TotWt (pcf)	SatWt (pcf)	C (psf)	Phi (deg)	Ru Param	Pore Press	Piez. Surf#
1	115	115	1000	0	0	0	W1
2	110	110	0	30	0	0	W1
3	110	110	800	0	0	0	W1
4	105	105	500	0	0	0	W1
5	108	108	0	20	0	0	W1
6	110	110	0	25	0	0	W1
7	115	115	0	30	0	0	W1

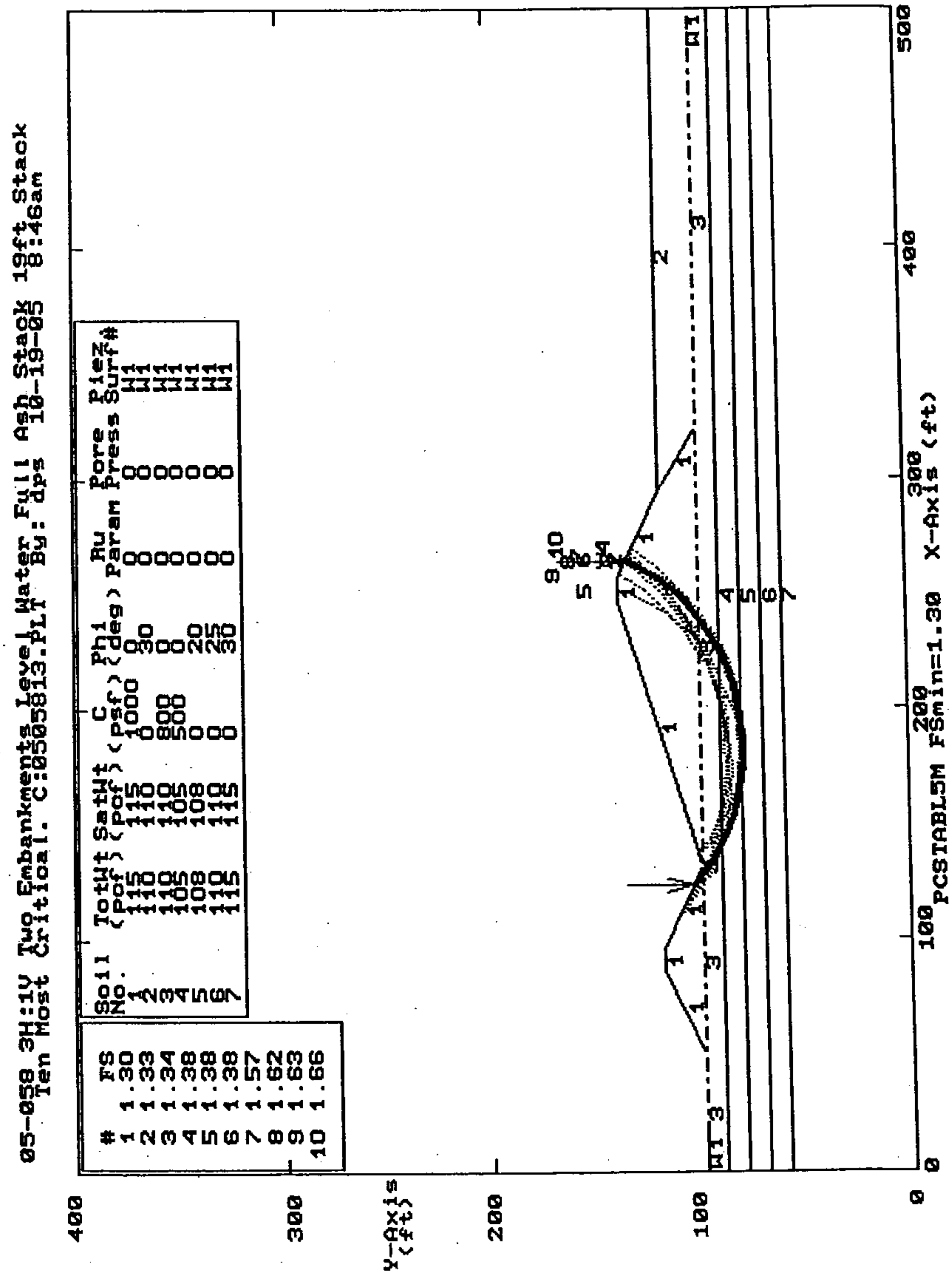
LOUIS J. CAPOZZOLI & ASSOCIATES, INC.



LOUIS J. CAPOZZOLI & ASSOCIATES, INC.



LOUIS J. CAPOZZOLI & ASSOCIATES, INC.



Tassin, Jennifer

From: Chiasson, Elif
Sent: Monday, April 10, 2006 1:46 PM
To: Tassin, Jennifer
Subject: FW: NRG 28ft Slope FS 1.5
Attachments: NRG 28ft Slope Stability Analyses.pdf

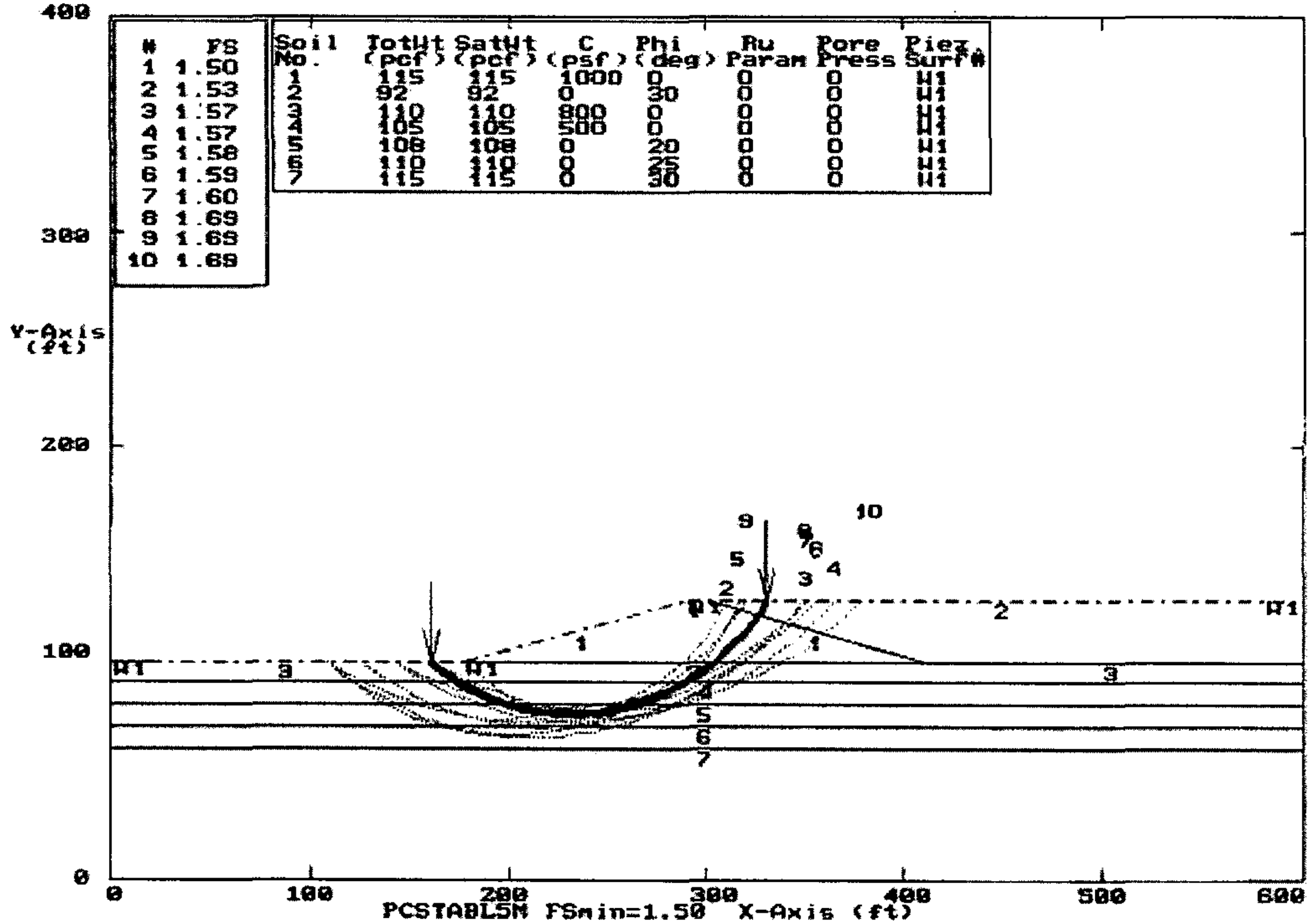
Elif Acar-Chiasson, P.E.
Project Manager
Shaw Environmental & Infrastructure
4171 Essen Lane
Baton Rouge, LA 70809
225.987.7331 direct
225.235.6219 mobile
225.987.3146 fax
www.shawgrp.com

From: Louis J Capozzoli & Associates Inc [mailto:ljca@mindspring.com]
Sent: Wednesday, February 08, 2006 9:36 AM
To: Chiasson, Elif
Subject: NRG 28ft Slope FS 1.5

Elif
Attached is the results for the 28 ft high embankment with FS = 1.50 on the number. I will recommend 30 ft FS=1.44 as a max height. I don't know if DEQ will consider below 1.50, just from a regulatory perspective.

David

05-050 4H:1V Both Slopes Ash 20ft High 20ft Berm Saturated Natural Strengths
Ten Most Critical. C:0505821.PLT By: dps 02-01-06 8:51am



#	FS
1	1.50
2	1.53
3	1.57
4	1.57
5	1.58
6	1.59
7	1.60
8	1.69
9	1.69
10	1.69

Soil No.	TotWt (pcf)	SatWt (pcf)	C (psf)	Phi (deg)	Ru Param	Pore Press	Piez Surf#
1	115	115	1000	0	0	0	W1
2	92	92	0	30	0	0	W1
3	110	110	800	0	0	0	W1
4	105	105	500	0	0	0	W1
5	108	108	0	20	0	0	W1
6	110	110	0	25	0	0	W1
7	115	115	0	30	0	0	W1

Chiasson, Elif

From: Louis J Capozzoli & Associates Inc [ljca@mindspring.com]
Sent: Tuesday, April 25, 2006 4:43 PM
To: Chiasson, Elif
Subject: Final Slope Stability Analyses
Attachments: 05-58 28 Foot Berm Profiles AA and BB.pdf

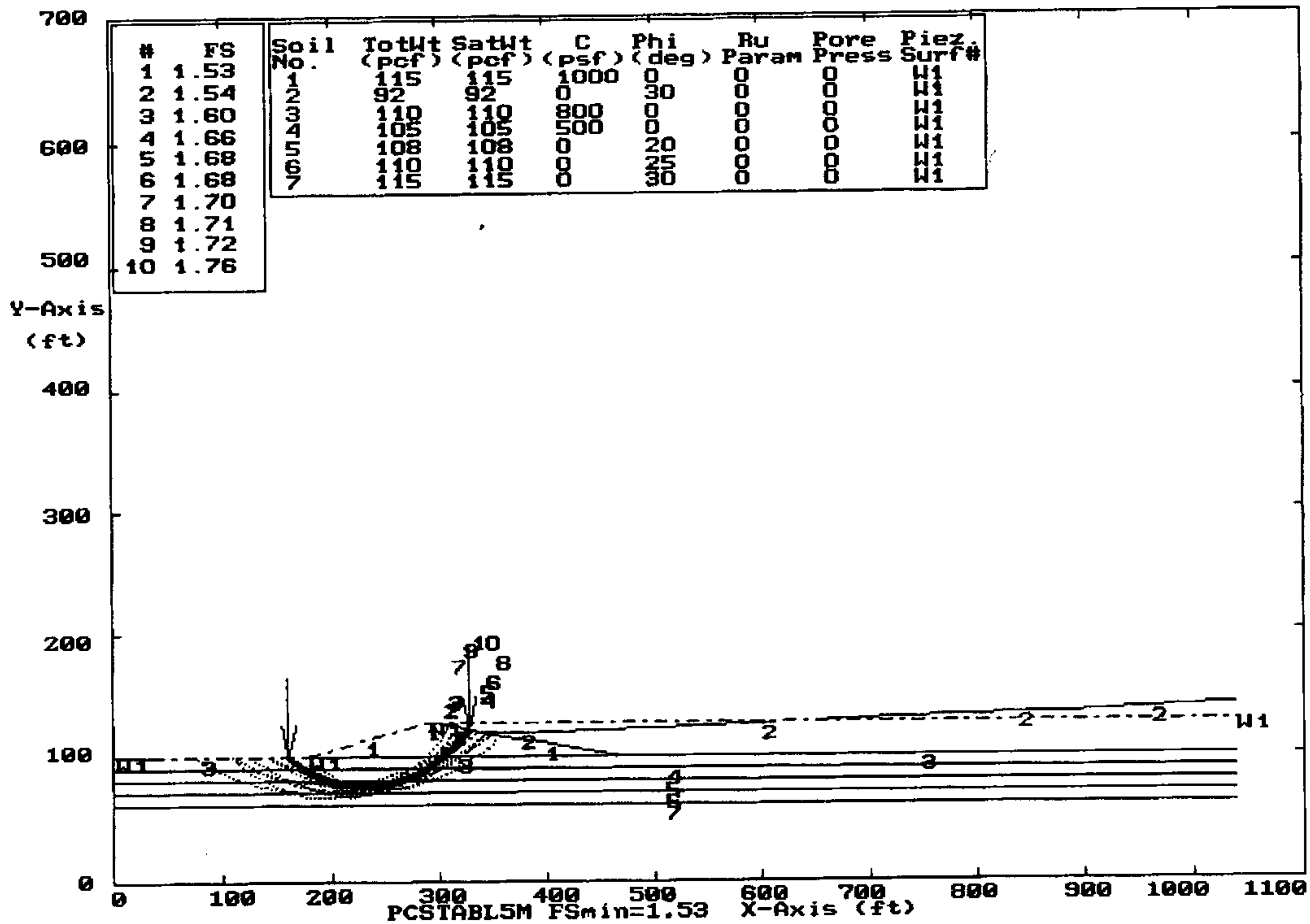
Elif,
Attached are the two runs. In both cases the FS = 1.53.

I used the natural existing shear strength values. The berm and stack are saturated. I also used a water behind the berm collected all the way up to the top of the berm for additional potential driving forces.

I include these runs in the final report, and call to review.

Thanks
David P. Sauls, P.E.
Louis J. Capozzoli & Associates, Inc.
10555 Airline Highway
Baton Rouge, Louisiana 70816
Office: 225-293-2460
Fax: 225-293-2463
ljca@mindspring.com

05-058 4H:1V Both Slopes Ash 28ft High 28ft Berm Sat Natural Su Short Side AA
Ten Most Critical. C:0505822.PLT By: DPS 04-25-06 3:49pm

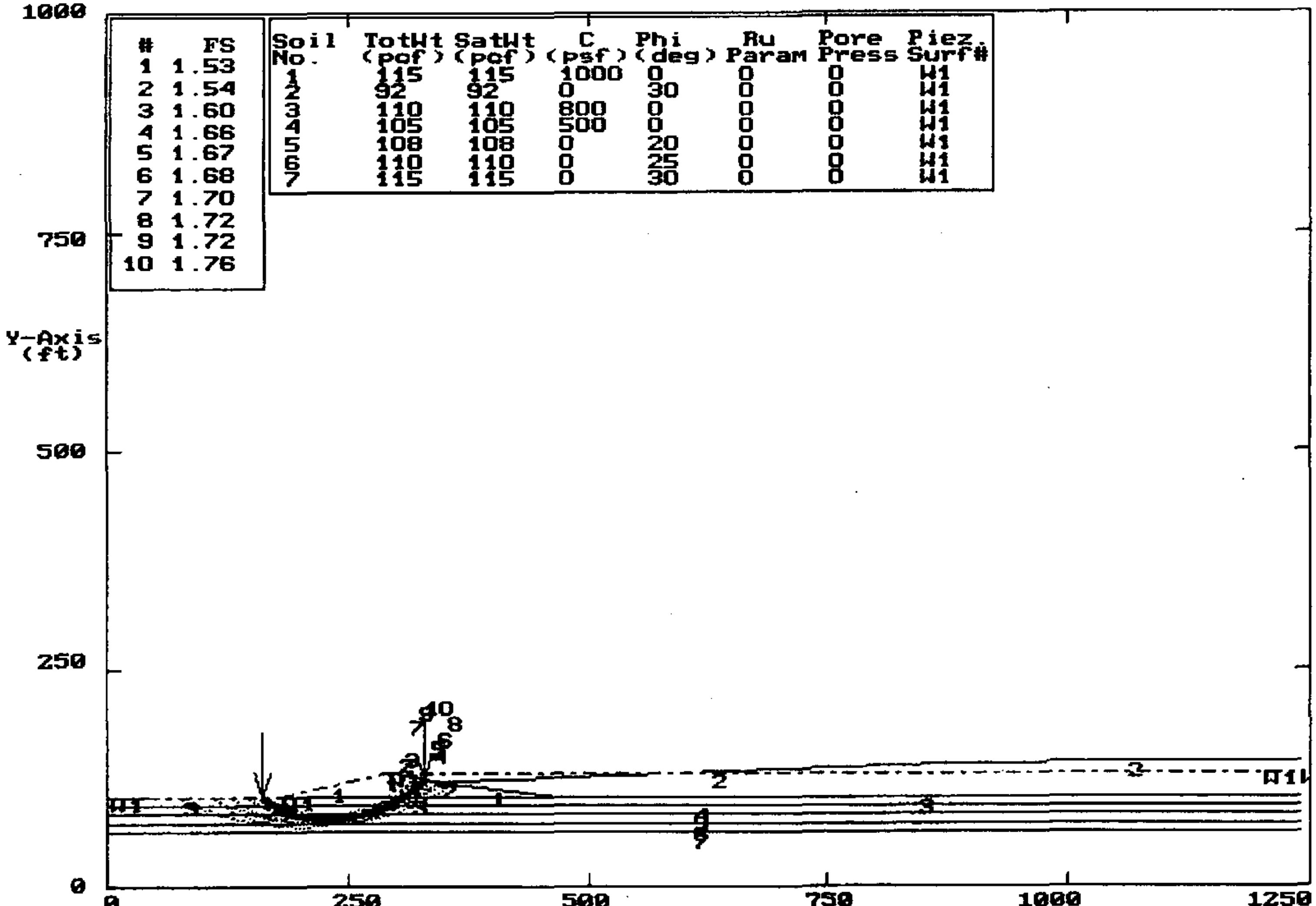


PCSTABL5M FSmin=1.53

05-058 4H:1V Both Slopes Ash 28ft High 28ft Berm Sat Natural Su Long Side BB
Ten Most Critical. C:0505823.PLT By: DPS 04-25-06 3:58pm

#	FS
1	1.53
2	1.54
3	1.60
4	1.66
5	1.67
6	1.68
7	1.70
8	1.72
9	1.72
10	1.76

Soil No.	TotWt (pcf)	SatWt (pcf)	C (psf)	Phi (deg)	Ru Param	Pore Press	Piez. Surf#
1	115	115	1000	0	0	0	W1
2	92	92	0	30	0	0	W1
3	110	110	800	0	0	0	W1
4	105	105	500	0	0	0	W1
5	108	108	0	20	0	0	W1
6	110	110	0	25	0	0	W1
7	115	115	0	30	0	0	W1



PCSTABL5M FSmin=1.53 X-Axis (ft)

Appendix A

Document 6: Storm Watch Management Calculations

Appendix O
Calculations

BOTTOM ASH BASIN EXPANSION
STORM WATER MANAGEMENT CALCULATIONS

1. Purpose and Scope

The purpose of this calculation is to present the preliminary design for the storm water management system for the proposed vertical expansion of the Bottom Ash Basin located at Louisiana Generating, LLC's Big Cajun II facility in New Roads, Louisiana. This submittal addresses the requirements of Louisiana Title 33, Part VII, Subpart 1, Section 521.C.1.b.

The storm water conveyance and detention system is comprised of an final cover perimeter ditch/dike system designed to contain the 25-year, 24-hour storm event prior to capping of the facility. During the remaining active life of the basin, a culvert plug will be placed at the inlet of the 72-inch diamater concrete culvert to prevent the stormwater and runoff from leaving the perimeter/ditch system. As part of the expansion, the bottom ash basin exit weir, which serves as an inlet to the bottom ash drain pipe will be relocated as shown in Drawing No: 100549008-D003. The drain pipe is a 30-inch diameter, Schedule 40 steel pipe that will carry bottom ash surface runoff through the north levee. The flow of water is controlled with a 30-inch butterfly valve.

At the time of closure of the basin, the culvert plug at the inlet will be removed and the stormrunoff will be channeled through the culvert to the drainage ditch located north of the Bottom Ash Basin. A riprap apron will be used to protect the culvert outlet and protect the perimeter dike slope from erosion.

Minor changes in the ditch dimension and slope maybe subject to change during the final design; however, they shall not impact the ability of the system to perform as designed. Any major changes significantly impacting the performance will be documented as a revision to the calculations.

2. Design Input

As the perimeter dike of the existing Bottom Ash Basin are vertically increased, open permieter ditches will be used as originally designed to convey storm water run-off from the ash pile to the exit weir located at the north-east corner of the basin. During the active lifetime of the basin, the ash height will be approciamtely 5 feet below the top elevation of the proposed perimeter dikes. The proposed expansion will inrease the height of the perimeter dikes from the existing 48-ft MSL to 58-ft MSL.

The storm water analysis included in these calculatations considers final cover placement over the entire ash basin.

The final cover will consist of 2-feet of compacted clay and 6-inches of seeded topsoil graded as presented in Drawing No: 100549008-D005 and 100549008-D006.

Final cover perimeter ditches will have 4H:1V side slope on the dike side and 25H:1V (4% cap slope) on the ash pile side.

Final cover perimeter ditch outlet pipe will be a 72-inch diameter concrete culvert placed at 47.5 ft MSL with a 0.5% slope.

Top of the elevated perimeter dike will be at elevation 58 ft MSL.

Stormwater conveyance channels are designed using Manning's Equation.

Run-off is calculated using Urban Hydrology for Small Watersheds, Second Edition, Technical Release No.55, Soil Conservation Service, June 1986.

3. Potential Leachate Generation

The permeability of the bottom ash deposited in the basin is expected to be in the order of $4x10^{-3}$ cm/sec. A simulation of leachate percolation as result of a 25-year, 24-hour storm event was calculated utilizing Hydrologic Evaluation of Landfill Performance Model (HELP) developed by the US Army Corps of Engineers. Five-year historical data for the period of 1974 to 1978 was used for HELP MODEL analysis. The maximum daily rainfall of the data was adjusted to 25-year, 24-hour value of 9.6 inches for a Type III rainfall distribution to include the impact of critical storm event in HELP Model. Peak daily percolation through the clay cap barrier layer is estimated to be 1025 cubic feet.

4. Calculations

The sizing of the final cover perimeter ditch is presented on the attached Typical Cover Perimeter Ditch Sizing Worksheets. The ditch is sized to contain the run-off from the capped Bottom Ash Basin. The highest point of the drainage ditch is located at the south-west corner of the facility. Form that point, stormwater will travel in east-northeastly and north-eastern direction toward the discharge culvert located at the north-east corner of the facility. The high point of the cap will be in the mid section of the basin as presented in Drawing No: 100549008-D005 from which point the stormwater will travel to interceptor swales located east and west of the high point ridge. Interceptor swales are sloped at 0.3% toward the north face of the cap. Perimeter ditches (trapezoidal) will be approximately 3 feet deep and 30 feet wide along the south side and approximately 9 feet deep and 30 feet wide along the north side. The width of the perimeter ditches along the west and east side will be apprximately 107 feet wide and the depth of the ditch will be at an average 4.5 and 8.5 feet on the west and east side, respectively. The bottom of the ditches will be sloped at 0.3 percent to convey run-off to the discharge culvert. During the detailed design erosion control mats or riprap maybe specified as needed to prevent accessive erosion of the perimeter ditches.

5. Conclusions

The storm water detention system comprised of an approximately 28-feet high perimeter dike will have a capacity in excess of the needed amount comprised of run-off volume and a 2-feet of freeboard during the active life of the facility. The run-off volume for the active basin as result of 25-year, 24-hour storm is calculated as 1.9 million cubic feet based on approximately 57 acre drainage area. Including the 2-ft freeboard, estimated available storm water storage capacity will be 7.5 million cubic feet. Hence the active Bottom Ash Basin expansion will have enough capacity to detain design storm event with no discharge from the site.

STACK #7 VOLUME AND FOOTPRINT AREA DETERMINATION

Project Name:	Project No:	By:	Date:
NRG		EAC	2/8/2006
Big Cajun II Bottom Ash Pond Expansion	1005494008	Checked: CJH	Date: 4/26/2006
Parish: Point Coupee	City: New Roads		State: LA

Truncated Rectangular Base Pyramid (Existing Condition)

1. *Bottom (Based on Dwg. OC-0218 Rev.15 by Bovay Engineers, Inc. and & Swg. SK-1A by Burns & McDonnell supplied by NRG)*

Length (L_{bottom})	1,856	ft		
Width (W_{bottom})	1,446	ft		
Area (A_{bottom})	2,683,776	ft^2	61.61	acres

2. *Top*

Length (L_{top})	1,946	ft		
Width (W_{top})	1,536	ft		
Area (A_{top})	2,989,056	ft^2	68.62	acres

3.	Allowable Height of Ash (h) Assume 2-ft freeboard and uniform height of ash in impoundment	15	ft		
4.	Ash Storage Capacity (V)	42,525,690	ft^3	1,575,026	yd^3

$$V = \frac{h}{3}\left(A_{bottom} + (A_{bottom} \times A_{top})^{0.5} + A_{top}\right)$$

5.	Current In-place Volume (V) (based on areal survey)	27,886,005	ft^3	1,032,815	yd^3
6.	Starting Ash Height after Even Distribution) (based on current in-place volume)	10	ft		
8.	Height of Existing Perimeter Berm	18	ft		
9.	Width of Perimeter Berm (top)	6	ft		
10.	Perim. Berm Width (Toe to Toe) (based on 3H:1V slope)	114	ft		
11.	Approximate Existing Total Footprint A (Perim. Berm Toe to Toe)	3,073,200	ft^2	71	acres

Notes: 1. Note that the bottom elevations of the existing impoundment were approximated from available site drawings.
2. Original facility design drawings were not available. Therefore, the actual volume of ash material currently stored in the impoundment may be different than what is estimated in this calculation.

Existing Conditions

STACK #7 VOLUME AND FOOTPRINT AREA DETERMINATION

Project Name: NRG Big Cajun II Bottom Ash Pond Expansion	Project No: 1005494008	By: EAC	Date: 2/8/2006
		Checked: CJH	Date: 4/26/2006
Parish: Point Coupee	City: New Roads		State: LA

Truncated Rectangular Base Pyramid (Existing Condition)

1. *Bottom (Based on Dwg. OC-0218 Rev.15 by Bovay Engineers, Inc. supplied by NRG)*

Length (L_{bottom})	1,600	ft		
Width (W_{bottom})	1,200	ft		
Area (A_{bottom})	1,920,000	ft^2	44.08	acres

2. *Top*

Length (L_{top})	1,784	ft		
Width (W_{top})	1,384	ft		
Area (A_{top})	2,469,056	ft^2	56.68	acres

3.	Allowable Height of Ash (h) Assume 2-ft freeboard and uniform height of ash in impoundment	23	ft		
4.	Ash Storage Capacity (V)	50,341,979	ft^3	1,864,518	yd^3

$$V = \frac{h}{3}(A_{bottom} + (A_{bottom} \times A_{top})^{0.5} + A_{top})$$

5.	Additional Available Capacity	22,455,974	ft^3	831,703	yd^3
6.	Height of Proposed Perimeter Berm	28	ft		
7.	Width of Perimeter Berm (top)	12	ft		
8.	Perim. Berm Width (Toe to Toe) (based on 4H:1V slope)	236	ft		
9.	Approximate Existing Total Footprint A (Perim. Berm Toe to Toe)	3,073,200	ft^2	71	acres

Notes: 1. Note that the bottom elevations of the existing impoundment were approximated from available site drawings.
2. Original facility design drawings were not available. Therefore, the actual volume of ash material currently stored in the impoundment may be different than what is estimated in this calculation.

Proposed Conditions

TR-55 WORKSHEET 2: RUNOFF CURVE NUMBER AND RUNOFF

Project Name: NRG BCII Bottom Ash Expansion	**Project No:** 1005494008	**By:** EAC	**Date:** 3/15/2006
		Checked: CJH	**Date:** 4/26/2006
Parish: Point Coupee	**City:** New Roads		**State:** LA

Check one: ☑ Present ☐ Developed

1. Runoff Curve Number

Soil name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious;unconnected/connected impervious area ratio)	CN[1] Table 2-2	CN[1] Figure 2-3	CN[1] Figure 2-4	Area ☑ acres ☐ sq-mi ☐ %	Product of CN x area
	Bottom Ash	98			56.68	5554.80
						0
						0
						0
				Totals	56.68	5554.80

[1] Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{5554.799229}{56.682} = 98$$

Use CN 98

2. Runoff

		Storm #1	Storm #2	Storm #3
Frequency	yr	25		
Rainfall, P (24-hour)	in	9.6		
Runoff, Q	in	9.36		

Use P and CN with Table 2-1, Figure 2-1, or equations 2-3 and 2-4

Assumptions and Notes:
Assume CN of the bottom ash conservatively as 98

BOTTOM ASH BASIN STORM WATER STORAGE ESTIMATE

Project Name: NRG	**Project No:**	**By:** EAC		**Date:** 3/15/2006
BCII Bottom Ash Expansion	1005494008	**Checked:** CJH		**Date:** 4/26/2006
Parish: Point Coupee	**City:** New Roads			**State:** LA
Check one:				
Drainage area	A_m	56.7	acres	
Rainfall (24-hour)	P	9.60	in	
Rainfall frequency		25.00	year	24 hour
Rainfall distribution	Type	III		
Runoff	Q	9.36		From Worksheet 2, Figure 2-6 of TR-55
Total runoff	Q_{total}	1,925,730	ft^3	Qtotal = $A_m Q$
Total Storage Capacity	$Storage_{total}$	57,862,763	ft^3	Minus 2-ft freeboard
Total Ash Storage	Ash_{total}	50,341,979	ft^3	
Available Storm Water Storage	$Q_{storm\ water}$	7,520,784	ft^3	
Available Storm Water Storage is larger than the Total Runoff.				

TR-55 WORKSHEET 2: **RUNOFF CURVE NUMBER AND RUNOFF**

Project Name:	Project No:	By:	Date:
NRG BCII Bottom Ash Expansion	1005494008	EAC	3/15/2006
		Checked: CJH	Date: 4/26/2006
Parish: Point Coupee	City: New Roads		State: LA

Check one: ☐ Present ☑ Developed

1. Runoff Curve Number

Soil name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious;unconnected/connected impervious area ratio)	CN[1] Table 2-2	CN[1] Figure 2-3	CN[1] Figure 2-4	Area ☑ acres ☐ sq-mi ☐ %	Product of CN x area
N/A	Seeded cap cover &	89			57.54	5121.06
						0
						0
						0
				Totals	57.54	5121.06
				Use CN	89	

[1] Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{5121.06}{57.540} = 89$$

2. Runoff

		Storm #1	Storm #2	Storm #3
Frequency	yr	25		
Rainfall, P (24-hour)	in	9.6		
Runoff, Q	in	8.26		

Use P and CN with Table 2-1, Figure 2-1, or equations 2-3 and 2-4

Assumptions and Notes:
The surface area was calculated utilizing CAD Civil 3D 2006

TR-55 WORKSHEET 3: **TIME OF CONCENTRATION (T_c) OR TRAVEL TIME (T_t)**

Project Name: NRG BCII Bottom Ash Expansion	**Project No:** 1005494008	**By:** EAC **Checked:** CJH	**Date:** 4/15/2006 **Date:** 4/26/2006
Parish: Point Coupee	**City:** New Roads		**State:** LA

Check one: ☑ Present ☑ Developed

Check one: ☑ Tc ☐ Tt Through Sub Area

	Segment ID	Cap	Per. Dike slope & top of road	
1	Surface Description (table 3-1, TR-55)	Short Grass	Short Grass	
2	Manning's roughness co-efficient, n (table 3-1, TR-55)	0.15	0.15	
3	Flow length, L (total <= 300 ft) ....ft	300	41.23	
4	Two-year 24-hour rainfall, P_2 ....in	9.6	9.6	
5	Land slope, S ....ft/ft	0.04	0.25	
6	$T_t = \frac{0.007\,(nL)^{0.8}}{P_2^{0.5}\,S^{0.4}}$ Compute T_t ....hr	0.172	0.017	
			Total T_t	0.189

	Segment ID	Cap	Per. Dike slope & top of road	
7	Surface Description (paved or unpaved)........................	Short Grass	Short Grass	
8	Flow length, L ....ft	220.42		
9	Water Course slope s ....ft/ft	0.04		
10	Average velocity, V (figure 3-1) ....ft/sec	3.2		
11	$T_t = \frac{L}{3600\,V}$ Compute Tt...............hr	0.019	#DIV/0!	#DIV/0!
			Total T_t	0.019

	Segment ID	EW Perimeter ditch	NS Perimeter ditch	
12	Cross sectional flow area, a ....ft^2	358.14	352.04	
13	Wetted perimeter, P_w ....ft	179.87	146.59	
14	Hydraulic radius $r = a/P_w$ Compute r .. ..ft	1.991	2.401	
15	Channel slope, S ....ft/ft	0.003	0.003	
16	Manning's roughness co-efficient, n	0.05	0.05	
17	$V = \frac{1.49\,r^{2/3}\,S^{1/2}}{n}$ Compute V...........ft/sec	2.58	2.93	
18	Flow Length, L ....ft	1,500	1250	
	$T_t = \frac{L}{3600\,V}$ Compute T_t...............hr	0.161	0.119	
19			**Total T_t**	0.280
	Watershed of subarea T_c or T_t.... hr (add Tt in steps 6, 11, and 19)			0.49

Assumptions and Notes:

3 Depth of flow (ft)

L = flow length is based on the design drawing Proposed Cap Plan View

cap_Tc

TR-55 WORKSHEET 4:	GRAPHICAL PEAK DISCHARGE METHOD (FINAL CAP)		
Project Name: NRG BCII Ash Expansion	Project No: 1005494008	By: EAC	Date: 3/15/2006
		Checked: CJH	Date: 4/26/2006
Parish: Point Coupee	City: New Roads		State: LA

Check one: ☐ Present ☑ Developed

1. Data

Drainage area .... A_m = 0.090 mi^2 (acres/640)

Runoff curve number .... CN = 89 (from Worksheet 2),

Time of concentration .... T_c = 0.49 hr (from Worksheet 3)

Rainfall distribution .... = III (I, IA, II, III)

Pond and swamp areas spread throughout watershed .... = 1 percent of A_m (0% acres or mi^2 covered)

			Storm #1	Storm #2	Storm #3
2.	Frequency	yr	25		
3.	Rainfall, P (24-hour)	in	9.6		
4.	Initial abstraction, I_a (Use CN with Table 4-1)	in	0.247		
5.	Compute I_a/P		0.03	#DIV/0!	#DIV/0!
6.	Unit peak discharge, q_u (Use Tc and Ia/P with Exhibit 4-III)	csm/in	345		
7.	Runoff, Q (From Worksheet 2) Figure 2-6	in	8.26		
8.	Pond and swamp adjustment factor, F_p (Use percent pond and swamp area with Table 4-2. Factor is 1.0 for zero percent pond and swamp area)		1	1	1
9.	Peak discharge, q_p (Where $q_p = q_u A_m Q F_p$)	cfs	256	0	0

Assumptions and Notes:

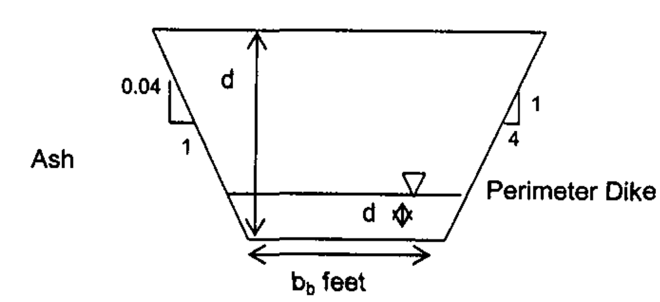
csm/in = cubic feet of discharge per second per square mile of watershed per inch of runoff

A_m = Drainage area calculation based on CAD Civil 3D 2006

cap_Qp

TR-55 WORKSHEET 4:	TYPICAL FINAL COVER PERIMETER DITCH SIZING (North-South)		
Project Name: NRG BCII Ash Expansion	Project No: 1005494008	By: EAC	Date: 3/15/2006
		Checked: CJH	Date: 4/26/2006
Parish: Point Coupee	City: New Roads		State: LA
Check one: ☐ Present ☑ Developed			

					Comments
1.	Drainage area	A_m	0.052	mi^2 (acres/640)	North or South face of the final cap and perimeter dike face
2.	Length of ditch	L	1250	ft	
3.	Ditch slope	s	0.003		
4.	Time of concentration	T_c	10.00	min	assumed
5.	Rainfall (24-hour)	P	9.60	in	
6.	Rainfall frequency		25.00	year	
7.	Rainfall distribution	Type	III		
8.	Runoff	Q	8.26		From Worksheet 2, Figure 2-6 of TR-55
9.	Total runoff	Q_{total}	1,002,798	ft^3	Qtotal = A_mQ
10.	Initial abstraction	I_a	0.25	in	Use CN with Table 4-1 of TR-55 for CN 95
11.	I_a/P		0.026		
12.	Unit peak discharge	q_u	345.00	csm/in	
13.	Peak discharge, q_p	q_p	148.92	cfs	$q_p = q_uAQ$ $F_p = 1$
14.	Width of ditch (bottom)	b_b	30.00	ft	
15.	Side slope of ditch (per. dike side)	1V : 4H	14.04		
16.	Side slope of ditch (Stack #7 side)	0.04V : 1H	2.29		
17.	Depth of ditch	d	6.00	ft	$d = d_w$ + 2ft freeboard
18.	Depth of water in the ditch	d_w	4.00	ft	
19.	Width of ditch (top)	b_t	146.02	ft	
20.	Area of ditch section	A_{ditch}	352.04	ft^2	
21.	Wetted Perimeter of ditch	P	146.59	ft	
22.	Hydraulic radius of section	R	2.401	ft	$R = A_{ditch}/P$
23.	Manning's N value		0.05		
24.	Ditch Discharge Capacity	Q_{ditch}	1,030.45	ft^3/sec	$Qditch = (1.49/n)A_{ditch}R^{2/3}S^{1/2}$
25.	**Calculated capacity of the perimeter ditch is greater than the peak discharge, q_p (line 13)**				
26.	Channel flow velocity	v	2.93	ft/sec	



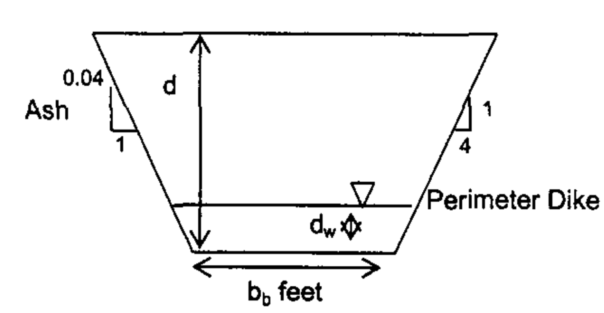
b_b	Required d_w	A_{ditch}	L (ft)	Ditch Volume (ft^3)	Runoff Volume (ft^3)
30	2	118.01	3,000	354,033	1,002,798
30	2.5	165.64	3,000	496,927	1,002,798
30	3	220.52	3,000	661,575	1,002,798
30	4	352.04	3,000	1,056,133	1,002,798

Assumptions and Notes:

1. B_b = The average width of the final cover perimeter ditch is approximately 107 ft on the east and west side and 30 ft on the north and south side.
2. A_m = Drainage area calculation based on CAD Civil 3D 2006 (319,368.1 square feet)
3. n = Manning's coefficient assumed 0.05 for lightly vegetated ditch
4. Per CAD Civil 3D 2006 design, the storm storage capacity of the final cover perimeter ditch is 6,158,270 cubic feet to the top of the dike and 3,744,580 cubic feet with 2-foot freeboard.
5. Total runoff calculated (Q_{total}) for design storm form the final cap and the perimeter dikes equal (ft^3) = 4,011,191
6. Peak discharge q_p from the culvert located at the NE corner of the facility will be (cfs)= 237.84
7. Erosion control mat or riprap maybe specified during detailed design as needed

TR-55 WORKSHEET 4:	TYPICAL FINAL COVER PERIMETER DITCH SIZING (East-West)		
Project Name: NRG BCII Ash Expansion	Project No: 1005494008	By: EAC Checked: CJH	Date: 4/7/2006 Date: 4/26/2006
Parish: Point Coupee	City: New Roads		State: LA
Check one: ☐ Present ☑ Developed			

#	Item	Symbol	Value	Unit	Comments
1.	Drainage area	A_m	0.052	mi^2 (acres/640)	East or West face of the cap and perimeter dike face
2.	Length of ditch	L	1700	ft	
3.	Ditch slope	s	0.003		
4.	Time of concentration	T_c	10.00	min	assumed
5.	Rainfall (24-hour)	P	9.36	in	
6.	Rainfall frequency		25.00	year	
7.	Rainfall distribution	Type	III		
8.	Runoff	Q	8.26		From Worksheet 2, Figure 2-6 of TR-55
9.	Total runoff	Q_{total}	1,002,798	ft^3	Qtotal = A_mQ
10.	Initial abstraction	I_a	0.25	in	Use CN with Table 4-1 of TR-55 for CN 95
11.	I_a/P		0.026		
12.	Unit peak discharge	q_u	345.00	csm/in	
13.	Peak discharge, q_p	q_p	148.92	cfs	$q_p = q_uAQ$ $F_p = 1$
14.	Width of ditch (bottom)	b_b	107.00	ft	
15.	Side slope of ditch (per. dike side)	1V : 4H	14.04		
16.	Side slope of ditch (ash storage side)	0.04V : 1H	2.29		
17.	Depth of ditch	d	4.50	ft	$d = d_w$ + 2ft freeboard
18.	Depth of water in the ditch	d_w	2.50	ft	
19.	Width of ditch (top)	b_t	179.51	ft	
20.	Area of ditch section	A_{ditch}	358.14	ft^2	
21.	Wetted Perimeter of ditch	P	179.87	ft	
22.	Hydraulic radius of section	R	1.991	ft	$R = A_{ditch}/P$
23.	Manning's N value		0.05		
24.	Ditch Discharge Capacity	Q_{ditch}	925.18	ft^3/sec	$Qditch = (1.49/n)A_{ditch}R^{2/3}S^{1/2}$
25.	**Calculated capacity of the perimeter ditch is greater than the peak discharge, q_p (line 13)**				
26.	Channel flow velocity	v	2.58	ft/sec	



b_b	Required d_w	A_{ditch}	L (ft)	Ditch Volume (ft^3)	Runoff Volume (ft^3)
107	2	272.01	3,000	816,033	1,002,798
107	2.5	358.14	3,000	1,074,427	1,002,798
107	3	451.52	3,000	1,354,575	1,002,798

Assumptions and Notes:

1. B_b = The average width of the final cover perimeter ditch is approximately 107 ft on the east and west side and 30 ft on the north and south side.
2. A_m = Drainage area calculation based on CAD Civil 3D 2006 (1,137,324.76 square feet)
3. n = Manning's coefficient assumed 0.05 for lightly vegetated ditch
4. Per CAD Civil 3D 2006 design, the storm storage capacity of the final cover perimeter ditch is 6,158,270 cubic feet to the top of the dike and 3,744,580 cubic feet with 2-foot freeboard.
5. Total runoff calculated (Q_{total}) for design storm form the final cap and the perimeter dikes equal (ft^3) = 4,011,191
6. Peak discharge q_p from the culvert located at the NE corner of the facility will be (cfs)= 237.84
7. Erosion control mat or riprap maybe specified during detailed design as needed

LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT HYDR1120-050798
HYDRAULICS SECTION
DESIGNER: DATE: 04/21/2006
REMARKS :

STATE PROJECT NUMBER 000-00-0000

REINFORCED CONCRETE PIPE (INLET TYPE: 0-PROJECTING)

****

STATION	500+00.00
NUMBER OF PIPES	1
DIAMETER (IN.)	72
DESIGN DISCHARGE (CFS)	300.00
TAILWATER (FT.)	1.39
LENGTH (FT.)	96.00
SLOPE (FT./FT.)	.00500

****

HEADWATER (INLET)	7.71	FT.
OUTLET VELOCITY	13.01	F.P.S.
DEPTH OF SCOUR FOR TYPE A SOIL	5.07	FT.

****

CHANNEL CROSS-SECTION:

SIDE SLOPE RATIO, LEFT (FT.:1)	.04
CHANNEL BOTTOM WIDTH (FEET)	107.00
SLOPE OF CHANNEL BOTTOM (FT./FT.)	.00300
SIDE SLOPE RATIO, RIGHT (FT.:1)	4.00
ROUGHNESS COEFFICIENT	.050

****

DISCHARGE PIPE OUTLET PROTECTION				
Project Name:	NRG	Project No:	By: EAC	Date: 4/7/2006
BCII Ash Expansion		1005494008	Checked: CJH	Date: 4/26/2006
Parish:	Point Coupee	City:	New Roads	State: LA
Number of Pipe	1		If TW<0.5 D_0	$L_a = (1.8Q/D_0^{1.5})+7D_0$
Diameter, D_0	72	inches		
Design Discharge, Q	300	cfs	If TW<0.5 D0	$W = 3D_0+L_a$
Tailwater, TW	1.39	ft		
Length	96	ft		
Slope	0.005			
Headwater (inlet)	7.71	ft		
Outlet Velocity	13.01	fps		
Length of the Apron, L_a	78.74	ft		
Width of the outlet at the end of the apron, W	96.74	ft		
Median Stone Diameter, d_{50}	2.65	ft	$d_{50} = (0.02/TW)*(Q/D_0)^{4/3}$	
Minimum Thickness of Riprap	3.18	ft		
Preformed Scour Hole				
Median Stone Diameter, d_{50}	1.09	ft	If $Y = D_0$ $d_{50} = (0.0082/TW)*(Q/D_0)^{4/3}$	
Depth of Scour, Y	5.07	ft		

Assumptions and Notes:

1. Culvert that will convey the run-off water from the capped Bottom Ash Basin was sized utilizing Louisiana DOTD Hydraulics Menu Program HYDRWIN, 1997
2. 50% by weight of the riprap mixture shall be smaller than the medium size stone designated as d_{50}
3. The largest stone size in the mixture shall be 1.5 times the d_{50} size = 4.0 ft
4. Riprap shall be well graded
5. As per Figure II-C-1 of FHWA HEC-14, for outlet velocity of 13 fps, use 100 pound stone weight (stone weighing 165 lbs per ft^3) with an equivalent spherical diameter of 12.6 inches
6. Minimum thickness of the riprap layer shall be 1.5 times the maximum stone diameter for d_{50} of 15 inches or less; and 1.2 times the maximum stone size for d_{50} greater than 15 inches
7. A filter layer shall be placed between the riprap and the underlying soil surface to prevent soil movement into and through the riprap
8. Filter material can be a gravel layer or a plastic filter cloth (wovem or non-woven monofilament yarns) that meets the base requirements of 20-60 mil thickness, 90-120 lbs grab strength, and shall conform to ASTM D-1777 and ASTM D-1682. Gravel filter material shall be designed comparing particle sizes of the overlying material and the base material.

WARNING: TEMPERATURE FOR YEAR 1974 USED WITH PRECIPITATION FOR YEAR 1

WARNING: SOLAR RADIATION FOR YEAR 1974 USED WITH PRECIPITATION FOR YEAR 1

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0
******************************************************************************
******************************************************************************
**                                                                          **
**                                                                          **
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE               **
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)                **
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY                   **
**                     USAE WATERWAYS EXPERIMENT STATION                    **
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY              **
**                                                                          **
**                                                                          **
******************************************************************************
******************************************************************************


PRECIPITATION DATA FILE:     C:\HELP3\nrg.D4
TEMPERATURE DATA FILE:       C:\HELP3\nrg.D7
SOLAR RADIATION DATA FILE:   C:\HELP3\nrg.D13
EVAPOTRANSPIRATION DATA:     C:\HELP3\nrg.D11
SOIL AND DESIGN DATA FILE:   C:\HELP3\nrg66r1.D10
OUTPUT DATA FILE:            C:\HELP3\nrg66r1.OUT


TIME: 10: 3      DATE:  4/27/2006


******************************************************************************

     TITLE:  NRG - Big Cajun II, Bottom Ash Basin - 66.4 acres

******************************************************************************


     NOTE:  INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE
               COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.


                                 LAYER  1
                                 --------

                     TYPE 1 - VERTICAL PERCOLATION LAYER
                         MATERIAL TEXTURE NUMBER  9
          THICKNESS                  =        6.00   INCHES
          POROSITY                   =      0.5010 VOL/VOL
          FIELD CAPACITY             =      0.2840 VOL/VOL
          WILTING POINT              =      0.1350 VOL/VOL
          INITIAL SOIL WATER CONTENT =      0.4892 VOL/VOL
          EFFECTIVE SAT. HYD. COND.  =  0.190000006000E-03 CM/SEC
        NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  4.63
                FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.
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LAYER 2

TYPE 3 - BARRIER SOIL LINER
MATERIAL TEXTURE NUMBER 16

THICKNESS	=	24.00 INCHES
POROSITY	=	0.4270 VOL/VOL
FIELD CAPACITY	=	0.4180 VOL/VOL
WILTING POINT	=	0.3670 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.4270 VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000001000E-06 CM/SEC

LAYER 3

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 31

THICKNESS	=	276.00 INCHES
POROSITY	=	0.5780 VOL/VOL
FIELD CAPACITY	=	0.0760 VOL/VOL
WILTING POINT	=	0.0250 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0790 VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.410000002000E-02 CM/SEC

LAYER 4

TYPE 3 - BARRIER SOIL LINER
MATERIAL TEXTURE NUMBER 16

THICKNESS	=	36.00 INCHES
POROSITY	=	0.4270 VOL/VOL
FIELD CAPACITY	=	0.4180 VOL/VOL
WILTING POINT	=	0.3670 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.4270 VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000001000E-06 CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS USER-SPECIFIED.

SCS RUNOFF CURVE NUMBER	=	89.00	
FRACTION OF AREA ALLOWING RUNOFF	=	100.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	66.400	ACRES
EVAPORATIVE ZONE DEPTH	=	6.0	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	2.935	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	3.006	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	0.810	INCHES
INITIAL SNOW WATER	=	0.000	INCHES

INITIAL WATER IN LAYER MATERIALS	=	50.362	INCHES
TOTAL INITIAL WATER	=	50.362	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
BATON ROUGE LOUISIANA

STATION LATITUDE	=	30.32 DEGREES
MAXIMUM LEAF AREA INDEX	=	3.50
START OF GROWING SEASON (JULIAN DATE)	=	39
END OF GROWING SEASON (JULIAN DATE)	=	351
EVAPORATIVE ZONE DEPTH	=	6.0 INCHES
AVERAGE ANNUAL WIND SPEED	=	7.70 MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	72.00 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	73.00 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	78.00 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	74.00 %

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR BATON ROUGE LOUISIANA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
4.58	4.97	4.59	5.59	4.82	3.11
7.07	5.05	4.42	2.63	3.95	4.99

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR BATON ROUGE LOUISIANA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
50.80	53.60	60.50	68.40	74.80	80.30
82.10	81.40	77.90	68.20	58.70	53.10

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR BATON ROUGE LOUISIANA
AND STATION LATITUDE = 30.32 DEGREES

WARNING: TEMPERATURE FOR YEAR 1974 USED WITH PRECIPITATION FOR YEAR 1

WARNING: SOLAR RADIATION FOR YEAR 1974 USED WITH PRECIPITATION FOR YEAR 1

WARNING: TEMPERATURE FOR YEAR 1975 USED WITH PRECIPITATION FOR YEAR 2

WARNING: SOLAR RADIATION FOR YEAR 1975 USED WITH PRECIPITATION FOR YEAR 2

WARNING: TEMPERATURE FOR YEAR 1976 USED WITH PRECIPITATION FOR YEAR 3

WARNING: SOLAR RADIATION FOR YEAR 1976 USED WITH PRECIPITATION FOR YEAR 3

WARNING: TEMPERATURE FOR YEAR 1977 USED WITH PRECIPITATION FOR YEAR 4

WARNING: SOLAR RADIATION FOR YEAR 1977 USED WITH PRECIPITATION FOR YEAR 4

WARNING: TEMPERATURE FOR YEAR 1978 USED WITH PRECIPITATION FOR YEAR 5

WARNING: SOLAR RADIATION FOR YEAR 1978 USED WITH PRECIPITATION FOR YEAR 5

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AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1 THROUGH 5

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	5.41	2.68	5.55	2.92	3.15	3.49
	7.40	6.70	4.92	2.72	2.77	4.96
STD. DEVIATIONS	3.72	0.88	5.45	1.76	0.48	1.88
	4.14	3.58	2.85	1.55	1.47	0.60
RUNOFF						
TOTALS	4.031	0.827	2.623	0.958	0.309	0.128
	1.379	1.697	1.211	0.323	0.882	3.540
STD. DEVIATIONS	3.683	0.655	3.927	0.905	0.228	0.231
	2.482	1.748	2.049	0.324	0.820	0.647
EVAPOTRANSPIRATION						
TOTALS	1.453	2.223	3.138	2.975	2.706	3.242
	5.231	4.898	3.822	1.864	1.235	1.070
STD. DEVIATIONS	0.154	0.143	0.468	1.672	0.293	1.746
	1.596	1.251	1.445	0.926	0.311	0.127
PERCOLATION/LEAKAGE THROUGH LAYER 2						
TOTALS	0.1282	0.1114	0.1157	0.0482	0.0217	0.0281
	0.0467	0.0697	0.0796	0.0428	0.0969	0.1295
STD. DEVIATIONS	0.0020	0.0036	0.0127	0.0373	0.0133	0.0363

	0.0426	0.0441	0.0489	0.0278	0.0498	0.0019

PERCOLATION/LEAKAGE THROUGH LAYER 4

TOTALS	0.0000	0.0000	0.0000	0.0000	0.0003	0.0007
	0.0007	0.0014	0.0011	0.0008	0.0015	0.0008
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0004	0.0011
	0.0003	0.0014	0.0018	0.0010	0.0026	0.0011

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)

DAILY AVERAGE HEAD ON TOP OF LAYER 2

AVERAGES	5.1680	3.8797	3.1876	1.2073	0.4087	0.4445
	1.1754	1.9580	1.9535	0.4693	3.2302	5.4770
STD. DEVIATIONS	0.4516	0.5452	1.6033	1.1911	0.2592	0.7588
	1.3122	1.5520	1.6340	0.3372	2.3961	0.4361

DAILY AVERAGE HEAD ON TOP OF LAYER 4

AVERAGES	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

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AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1 THROUGH 5

	INCHES		CU. FEET	PERCENT
PRECIPITATION	52.68	(10.330)	12697083.0	100.00
RUNOFF	17.909	(7.5936)	4316754.00	33.998
EVAPOTRANSPIRATION	33.857	(2.9553)	8160596.50	64.271
PERCOLATION/LEAKAGE THROUGH LAYER 2	0.91835	(0.10409)	221351.016	1.74332
AVERAGE HEAD ON TOP OF LAYER 2	2.380	(0.502)		
PERCOLATION/LEAKAGE THROUGH LAYER 4	0.00724	(0.00565)	1745.674	0.01375
AVERAGE HEAD ON TOP OF LAYER 4	0.000	(0.000)		
CHANGE IN WATER STORAGE	0.904	(0.1250)	217987.66	1.717

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0
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PEAK DAILY VALUES FOR YEARS 1 THROUGH 5

	(INCHES)	(CU. FT.)
PRECIPITATION	9.60	2313907.250
RUNOFF	9.468	2282131.2500
PERCOLATION/LEAKAGE THROUGH LAYER 2	0.004252	1024.84583
AVERAGE HEAD ON TOP OF LAYER 2	6.000	
PERCOLATION/LEAKAGE THROUGH LAYER 4	0.000202	48.66340
AVERAGE HEAD ON TOP OF LAYER 4	0.000	
SNOW WATER	1.61	388137.4370

MAXIMUM VEG. SOIL WATER (VOL/VOL)	0.5010
MINIMUM VEG. SOIL WATER (VOL/VOL)	0.1350

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0
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FINAL WATER STORAGE AT END OF YEAR 5

LAYER	(INCHES)	(VOL/VOL)
1	2.9017	0.4836
2	10.2480	0.4270
3	26.3627	0.0955
4	15.3720	0.4270
SNOW WATER	0.000	

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Appendix A
Document 7: Chemical Analysis of Coal

Appendix P
Chemical Analysis of Coal

STANDARD LABORATORIES, INC.

04/24/06

CUSTOMER: BUCKSKIN MINING COMPANY

E-394

JOB NO.: 200600854001
LOCATION: CASPER, WY
APPROVAL:

PROXIMATE ANALYSIS (%)

	AS RECD	DRY	EQM
MOISTURE	30.38		
ASH	4.78	6.87	
VOLATILE	29.92	42.98	
FIXED C	34.92	50.15	
SULFUR	0.33	0.48	
BTU/#	8396	12060	
		12950	

ULTIMATE ANALYSIS (%)

	AS RECD	DRY	EQM
MOISTURE	30.38		
ASH	4.78	6.87	
SULFUR	0.33	0.48	
NITROGEN	0.74	1.06	
CARBON	49.67	71.35	
HYDROGEN	3.32	4.77	
OXYGEN	10.77	15.47	

MINERAL ANALYSIS OF ASH (%)

PHOSPHORUS PENTOXIDE	0.68
SILICON DIOXIDE	31.98
FERRIC OXIDE	7.96
ALUMINUM OXIDE	12.83
TITANIUM DIOXIDE	1.20
MANGANESE DIOXIDE	0.02
CALCIUM OXIDE	24.37
MAGNESIUM OXIDE	5.63
POTASSIUM OXIDE	0.15
SODIUM OXIDE	1.80
SULFUR TRIOXIDE	11.05
BARIUM OXIDE	0.56
STRONTIUM	0.35
UNDETERMINED	1.42

FORMS OF SULFUR (%)

AS RECD DRY

FUSION TEMPERATURE OF ASH (F)

OXIDIZING REDUCING

ADDITIONAL DATA

AIR DRY LOSS		17.95
LBS H20/MM BTU		36.18
LBS ASH/MM BTU		5.70
LBS SULFUR/MM BTU		0.40
BASE/ACID RATIO		0.87
T250	2217	DEG F
% ALKALI AS Na2O		0.13
SPECIFIC GRAVITY		
FREE SWELLING INDEX		

GRINDABILITY (HGI)

AT % MOISTURE

WATER SOLUBLE ALKALIES (%)

AS RECD DRY

STANDARD LABORATORIES, INC.

04/24/06

CUSTOMER: BUCKSKIN MINING COMPANY

E-423

JOB NO.: 200600854002
LOCATION: CASPER, WY
APPROVAL:

PROXIMATE ANALYSIS (%)

	AS RECD	DRY	EQM
MOISTURE	30.42		
ASH	5.10	7.33	
VOLATILE	30.10	43.26	
FIXED C	34.38	49.41	
SULFUR	0.36	0.52	
BTU/#	8355	12008	
		12958	

ULTIMATE ANALYSIS (%)

	AS RECD	DRY	EQM
MOISTURE	30.42		
ASH	5.10	7.33	
SULFUR	0.36	0.52	
NITROGEN	0.67	0.96	
CARBON	49.35	70.92	
HYDROGEN	3.42	4.92	
OXYGEN	10.68	15.35	

MINERAL ANALYSIS OF ASH (%)

PHOSPHORUS PENTOXIDE	0.83
SILICON DIOXIDE	31.03
FERRIC OXIDE	7.58
ALUMINUM OXIDE	13.64
TITANIUM DIOXIDE	0.95
MANGANESE DIOXIDE	0.03
CALCIUM OXIDE	24.00
MAGNESIUM OXIDE	5.39
POTASSIUM OXIDE	0.20
SODIUM OXIDE	1.75
SULFUR TRIOXIDE	10.66
BARIUM OXIDE	0.59
STRONTIUM	0.38
UNDETERMINED	2.97

FORMS OF SULFUR (%)

AS RECD	DRY

FUSION TEMPERATURE OF ASH (F)

OXIDIZING	REDUCING

ADDITIONAL DATA

AIR DRY LOSS		17.24
LBS H20/MM BTU		36.41
LBS ASH/MM BTU		6.10
LBS SULFUR/MM BTU		0.43
BASE/ACID RATIO		0.85
T250	2210	DEG F
% ALKALI AS Na2O		0.14
SPECIFIC GRAVITY		
FREE SWELLING INDEX		

GRINDABILITY (HGI)

AT % MOISTURE

WATER SOLUBLE ALKALIES (%)

AS RECD	DRY

STANDARD LABORATORIES, INC.

04/24/06

CUSTOMER: BUCKSKIN MINING COMPANY

E-446

JOB NO.: 200600854003
LOCATION: CASPER, WY
APPROVAL:

PROXIMATE ANALYSIS (%)

	AS RECD	DRY	EQM
MOISTURE	30.20		
ASH	5.19	7.43	
VOLATILE	30.40	43.56	
FIXED C	34.21	49.01	
SULFUR	0.40	0.57	
BTU/#	8375	11998	
		12961	

ULTIMATE ANALYSIS (%)

	AS RECD	DRY	EQM
MOISTURE	30.20		
ASH	5.19	7.43	
SULFUR	0.40	0.57	
NITROGEN	0.64	0.92	
CARBON	49.39	70.76	
HYDROGEN	3.34	4.79	
OXYGEN	10.84	15.53	

MINERAL ANALYSIS OF ASH (%)

PHOSPHORUS PENTOXIDE	0.78
SILICON DIOXIDE	31.54
FERRIC OXIDE	6.87
ALUMINUM OXIDE	13.40
TITANIUM DIOXIDE	0.97
MANGANESE DIOXIDE	0.03
CALCIUM OXIDE	23.69
MAGNESIUM OXIDE	5.16
POTASSIUM OXIDE	0.19
SODIUM OXIDE	1.61
SULFUR TRIOXIDE	1.80
BARIUM OXIDE	0.57
STRONTIUM	0.34
UNDETERMINED	13.05

FORMS OF SULFUR (%)

AS RECD	DRY

FUSION TEMPERATURE OF ASH (F)

OXIDIZING	REDUCING

ADDITIONAL DATA

AIR DRY LOSS	17.63
LBS H20/MM BTU	36.06
LBS ASH/MM BTU	6.19
LBS SULFUR/MM BTU	0.48
BASE/ACID RATIO	0.82
T250	2191 DEG F
% ALKALI AS Na2O	0.13
SPECIFIC GRAVITY	
FREE SWELLING INDEX	

GRINDABILITY (HGI)

AT % MOISTURE

WATER SOLUBLE ALKALIES (%)

AS RECD	DRY

STANDARD LABORATORIES, INC.

04/24/06

CUSTOMER: BUCKSKIN MINING COMPANY

E-487

JOB NO.: 200600854004
LOCATION: CASPER, WY
APPROVAL:

PROXIMATE ANALYSIS (%)

	AS RECD	DRY	EQM
MOISTURE	30.10		
ASH	5.03	7.20	
VOLATILE	30.51	43.65	
FIXED C	34.36	49.15	
SULFUR	0.37	0.53	
BTU/#	8388	12000	
		12931	

ULTIMATE ANALYSIS (%)

	AS RECD	DRY	EQM
MOISTURE	30.10		
ASH	5.03	7.20	
SULFUR	0.37	0.53	
NITROGEN	0.63	0.90	
CARBON	49.55	70.89	
HYDROGEN	3.45	4.93	
OXYGEN	10.87	15.55	

MINERAL ANALYSIS OF ASH (%)

PHOSPHORUS PENTOXIDE	0.78
SILICON DIOXIDE	30.78
FERRIC OXIDE	7.44
ALUMINUM OXIDE	13.57
TITANIUM DIOXIDE	0.90
MANGANESE DIOXIDE	0.05
CALCIUM OXIDE	24.57
MAGNESIUM OXIDE	5.40
POTASSIUM OXIDE	0.18
SODIUM OXIDE	1.72
SULFUR TRIOXIDE	11.36
BARIUM OXIDE	0.60
STRONTIUM	0.38
UNDETERMINED	2.27

FORMS OF SULFUR (%)

AS RECD	DRY

FUSION TEMPERATURE OF ASH (F)

OXIDIZING	REDUCING

ADDITIONAL DATA

AIR DRY LOSS	15.37
LBS H20/MM BTU	35.88
LBS ASH/MM BTU	6.00
LBS SULFUR/MM BTU	0.44
BASE/ACID RATIO	0.87
T250	2217 DEG F
% ALKALI AS Na2O	0.13
SPECIFIC GRAVITY	
FREE SWELLING INDEX	

GRINDABILITY (HGI)

AT % MOISTURE

WATER SOLUBLE ALKALIES (%)

AS RECD	DRY

STANDARD LABORATORIES, INC.

04/24/06

CUSTOMER: BUCKSKIN MINING COMPANY

E-510

JOB NO.: 200600854005
LOCATION: CASPER, WY
APPROVAL:

PROXIMATE ANALYSIS (%)

	AS RECD	DRY	EQM
MOISTURE	30.15		
ASH	4.85	6.94	
VOLATILE	30.57	43.76	
FIXED C	34.43	49.30	
SULFUR	0.37	0.53	
BTU/#	8413	12044	
		12942	

ULTIMATE ANALYSIS (%)

	AS RECD	DRY	EQM
MOISTURE	30.15		
ASH	4.85	6.94	
SULFUR	0.37	0.53	
NITROGEN	0.59	0.85	
CARBON	49.58	70.98	
HYDROGEN	3.47	4.97	
OXYGEN	10.99	15.73	

MINERAL ANALYSIS OF ASH (%)

PHOSPHORUS PENTOXIDE	0.33
SILICON DIOXIDE	29.62
FERRIC OXIDE	7.66
ALUMINUM OXIDE	13.00
TITANIUM DIOXIDE	1.07
MANGANESE DIOXIDE	0.02
CALCIUM OXIDE	24.55
MAGNESIUM OXIDE	5.41
POTASSIUM OXIDE	0.16
SODIUM OXIDE	1.73
SULFUR TRIOXIDE	11.81
BARIUM OXIDE	0.53
STRONTIUM	0.32
UNDETERMINED	3.79

FORMS OF SULFUR (%)

	AS RECD	DRY

FUSION TEMPERATURE OF ASH (F)

	OXIDIZING	REDUCING

ADDITIONAL DATA

AIR DRY LOSS	17.33
LBS H20/MM BTU	35.84
LBS ASH/MM BTU	5.76
LBS SULFUR/MM BTU	0.44
BASE/ACID RATIO	0.90
T250	2234 DEG F
% ALKALI AS Na2O	0.13
SPECIFIC GRAVITY	
FREE SWELLING INDEX	

GRINDABILITY (HGI)

AT % MOISTURE

WATER SOLUBLE ALKALIES (%)

	AS RECD	DRY

STANDARD LABORATORIES, INC.

04/24/06

CUSTOMER: BUCKSKIN MINING COMPANY

E-515

JOB NO.: 200600854006
LOCATION: CASPER, WY
APPROVAL:

PROXIMATE ANALYSIS (%)

	AS RECD	DRY	EQM
MOISTURE	30.55		
ASH	4.62	6.65	
VOLATILE	29.78	42.88	
FIXED C	35.05	50.47	
SULFUR	0.28	0.40	
BTU/#	8407	12105	
		12967	

ULTIMATE ANALYSIS (%)

	AS RECD	DRY	EQM
MOISTURE	30.55		
ASH	4.62	6.65	
SULFUR	0.28	0.40	
NITROGEN	0.59	0.85	
CARBON	49.52	71.31	
HYDROGEN	3.08	4.43	
OXYGEN	11.36	16.36	

MINERAL ANALYSIS OF ASH (%)

PHOSPHORUS PENTOXIDE	0.74
SILICON DIOXIDE	31.62
FERRIC OXIDE	6.77
ALUMINUM OXIDE	13.84
TITANIUM DIOXIDE	1.04
MANGANESE DIOXIDE	0.01
CALCIUM OXIDE	24.84
MAGNESIUM OXIDE	5.67
POTASSIUM OXIDE	0.16
SODIUM OXIDE	1.82
SULFUR TRIOXIDE	9.38
BARIUM OXIDE	0.56
STRONTIUM	0.37
UNDETERMINED	3.18

FORMS OF SULFUR (%)

	AS RECD	DRY

FUSION TEMPERATURE OF ASH (F)

	OXIDIZING	REDUCING

ADDITIONAL DATA

AIR DRY LOSS	15.67
LBS H20/MM BTU	36.34
LBS ASH/MM BTU	5.49
LBS SULFUR/MM BTU	0.33
BASE/ACID RATIO	0.84
T250	2205 DEG F
% ALKALI AS Na2O	0.13
SPECIFIC GRAVITY	
FREE SWELLING INDEX	

GRINDABILITY (HGI)

AT % MOISTURE

WATER SOLUBLE ALKALIES (%)

	AS RECD	DRY

ANALYTICAL SERVICE LABORATORY REPORT

NALCO

COAL ANALYSIS

FROM:
CEPCO, INC.
NEW ROADS, LOUISIANA

SAMPLE MARKED:
COAL PILE - CAJUN #2

PAGE 1 OF 2
ANALYSIS NO: 711716
DATE SAMPLED: 12/28/80
DATE RECEIVED: 1/12/81
DATE PRINTED: 2/ 2/81

PHYSICAL APPEARANCE: BLACK PIECES

PERCENT MOISTURE, LOSS AT 105C 29.6

**** ANALYSIS OF SAMPLE, MOISTURE FREE BASIS ****

SULFUR (% S)	0
PERCENT ASH	9.1
BTU'S PER POUND	10960
ASH FUSION TEMPERATURE	SEE BELOW
VOLATILES (%)	46.8

ASH COMPONENTS, PERCENT OF ASH

SILICON (SIO2)	30
CALCIUM (CAO)	21
SULFUR (SO3)	19
ALUMINUM (AL2O3)	18
MAGNESIUM (MGO)	6
IRON (FE2O3)	5
SODIUM (NA2O)	2
PHOSPHORUS (P2O5)	2
TITANIUM (TIO2)	1
BARIUM (BAO)	1
POTASSIUM (K2O)	1

THE FOLLOWING ELEMENTS WERE NOT DETECTED:
CL V CR MN CO NI CU ZN SR SN PB

James J Hickey

P. O. BOX 87 • SUGAR LAND, TEXAS 77478

ANALYTICAL SERVICE LABORATORY REPORT

NALCO

COAL ANALYSIS

FROM:
CEPCO, INC.
NEW ROADS, LOUISIANA

SAMPLE MARKED:
COAL PILE - CAJUN #2

ANALYSIS NO: 711716
DATE SAMPLED: 12/28/80
DATE RECEIVED: 1/12/81
DATE PRINTED: 2/ 2/81

LAB COMMENTS:
--FUSION TEMPERATURE OF ASH--

	REDUCING	OXIDIZING
INITIAL DEF., IT	2125	2170
SOFTENING, ST	2180	2210
SOFTENING, HT	2230	2240
FLUID, FT	2285	2310

James J Hickey

P. O. BOX 87 • SUGAR LAND, TEXAS 77478

NALCO CHEMICAL COMPANY
REGIONAL ANALYTICAL LABORATORIES

2111 E. Dominguez St. Carson, CA 90745
6216 W. 66th Place Chicago, Illinois 60638
Box 16A Paulsboro, NJ 08066
Box 87 Sugar Land, TX 77478

ANALYTICAL SERVICE LABORATORY REPORT

NALCO

COAL ANALYSIS

FROM:
CAJUN ELECTRIC POWER
NEW ROADS, LOUISIANA

SAMPLE MARKED:
COAL STORAGE PILE

ANALYSIS NO:	539376
DATE SAMPLED:	4/25/80
DATE RECEIVED:	5/ 8/80
DATE PRINTED:	5/13/80

PHYSICAL APPEARANCE: DARK BROWN POWDER

PERCENT MOISTURE, LOSS AT 105C	5.2

**** ANALYSIS OF SAMPLE, MOISTURE FREE BASIS ****

SULFUR (% S)	0.65
PERCENT ASH	9.8
BTU'S PER POUND	10860
VOLATILES(%)	45.0

ASH COMPONENTS, PERCENT OF ASH

SILICON (SIO2)	28
SULFUR (SO3)	21
CALCIUM (CAO)	19
ALUMINUM (AL2O3)	15
IRON (FE2O3)	7
MAGNESIUM (MGO)	5
TITANIUM (TIO2)	1
SODIUM (NA2O)	1
PHOSPHORUS (P2O5)	1
BARIUM (BAO)	1

THE FOLLOWING ELEMENTS WERE NOT DETECTED:
CL K V CR MN CO NI CU ZN SR SN PB

James J Hickey

P.O. BOX 87 • SUGAR LAND, TEXAS 77478

APPENDICES

APPENDIX A

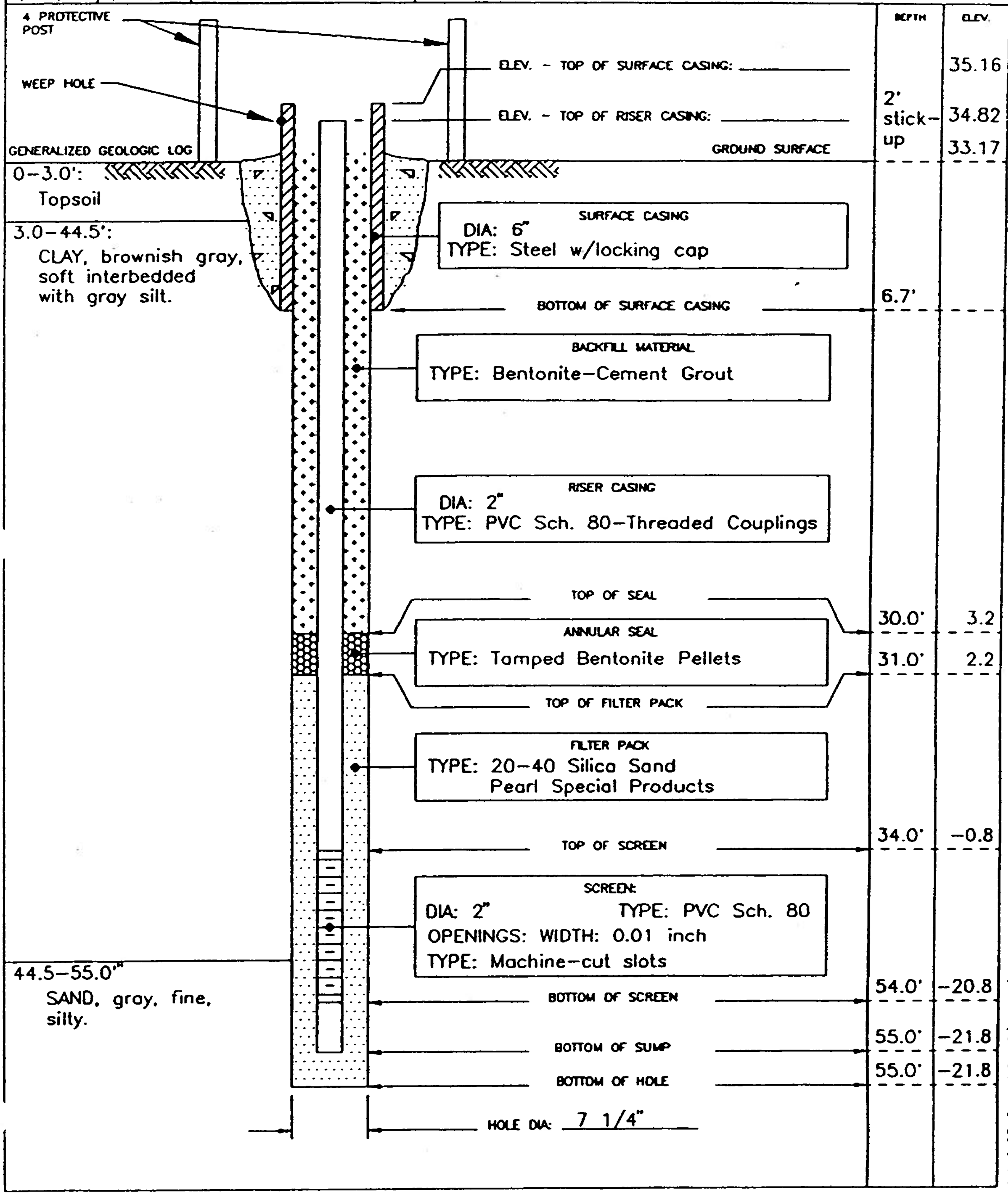
SOIL BORING LOGS

OBSERVATION WELL

PROJECT	WELL NO.
CEPCO – BIG CAJUN II	85A

JOB NO.	SITE	COORDINATES
14630	Fly Ash Pond	E 2030, N 4190

BEGUN	COMPLETED	PREPARED BY	REFERENCE POINT FOR MEASUREMENTS
6/18/85	6/18/85	D. R. Beissel	Top of PVC

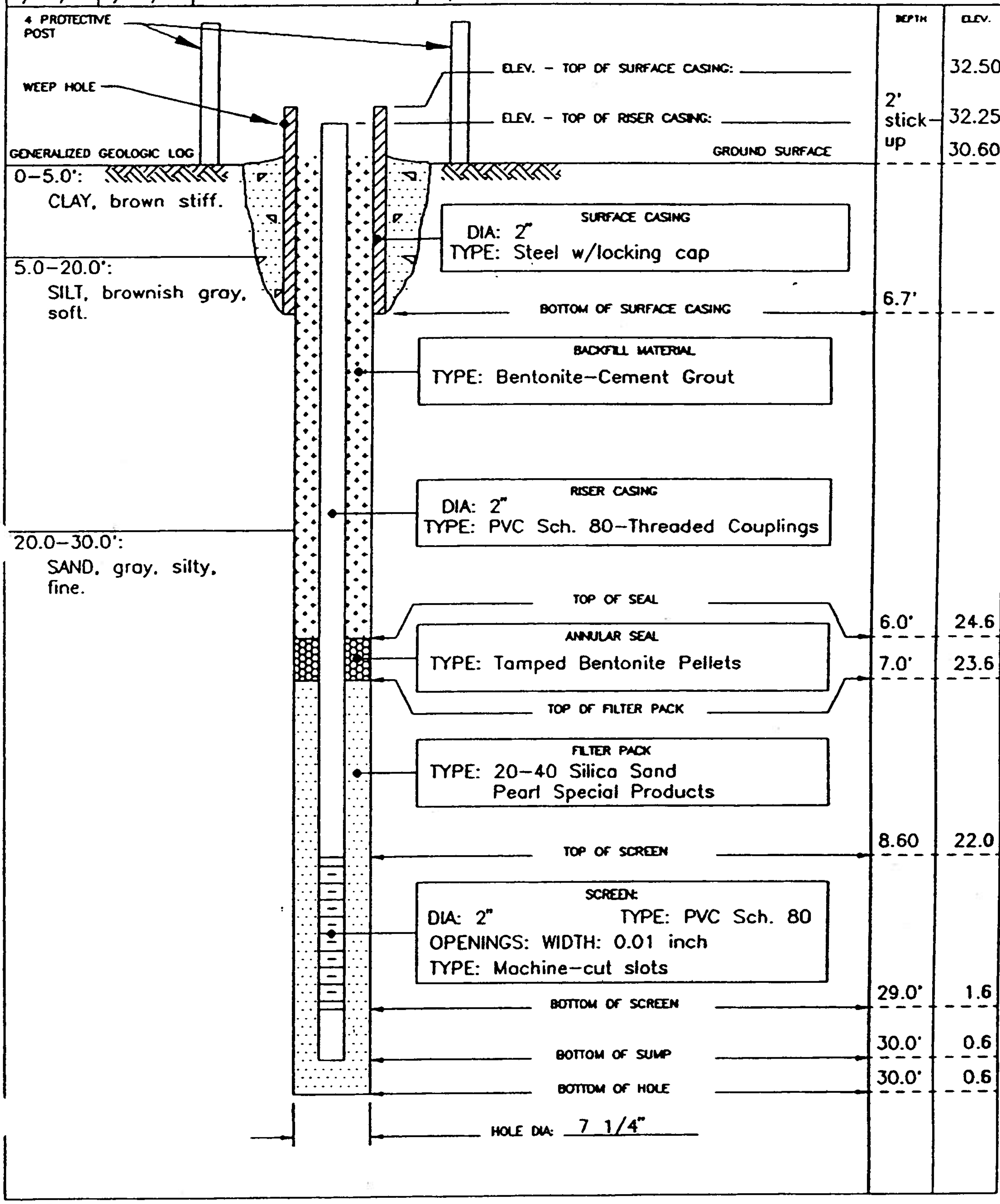


OBSERVATION WELL

PROJECT			WELL NO.
CEPCO – BIG CAJUN II			85B

JOB NO.	SITE	COORDINATES
14630	North Bottom Ash Pond	E 6449, N 5262

BEGUN	COMPLETED	PREPARED BY	REFERENCE POINT FOR MEASUREMENTS
6/20/85	6/20/85	D. R. Beissel	Top of PVC



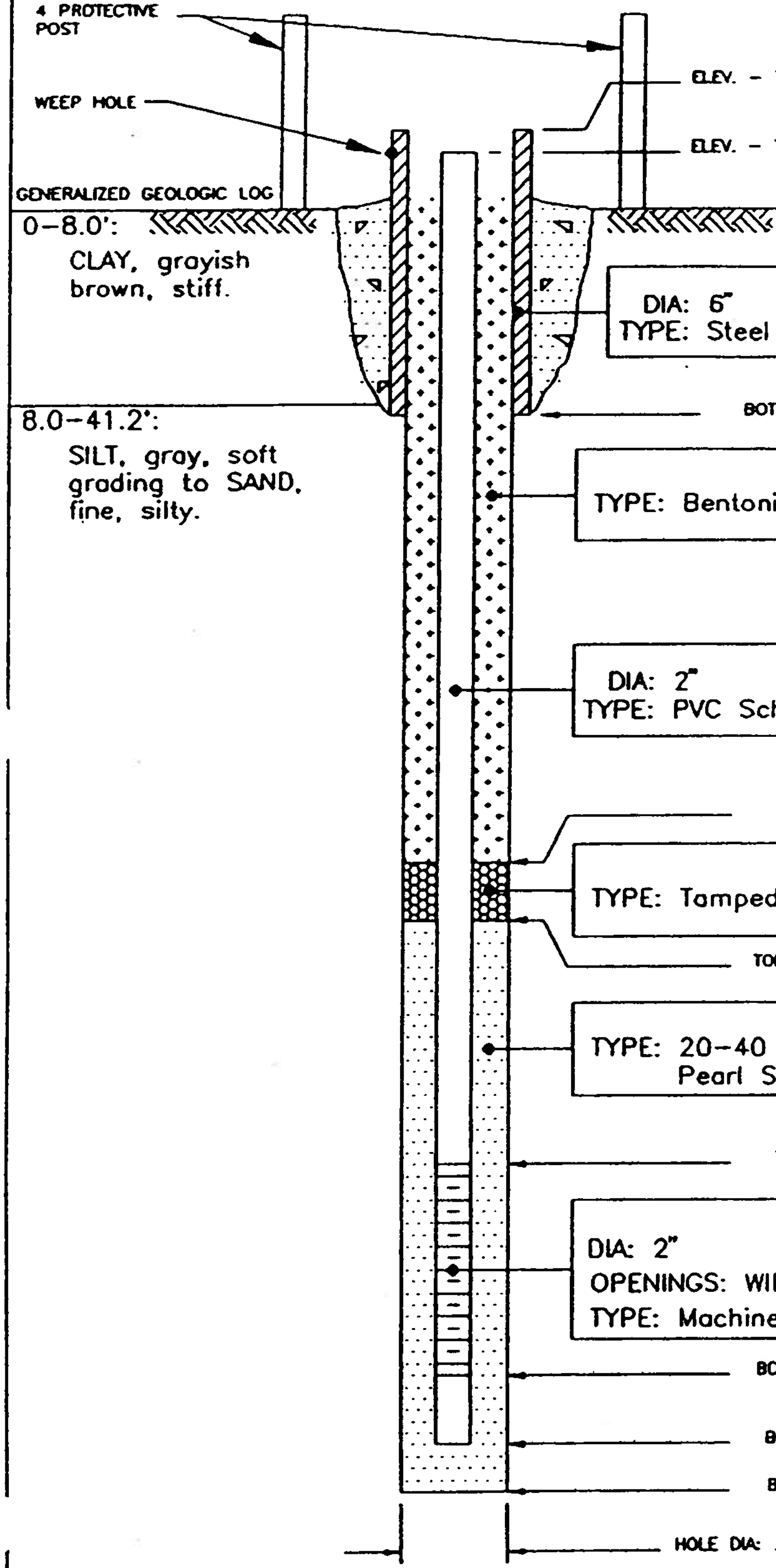
AutoCADD Dwg. NO.: D:\CAJUN\WELL85B.DWG

OBSERVATION WELL

PROJECT	WELL NO.
CEPCO – BIG CAJUN II	85C

JOB NO.	SITE	COORDINATES
14630	North Rainfall Pond	E 9490, N 5167

BEGUN	COMPLETED	PREPARED BY	REFERENCE POINT FOR MEASUREMENTS
6/20/85	6/20/85	D. R. Beissel	Top of PVC



GENERALIZED GEOLOGIC LOG

0–8.0':
CLAY, grayish brown, stiff.

8.0–41.2':
SILT, gray, soft grading to SAND, fine, silty.

	DEPTH	ELEV.
ELEV. – TOP OF SURFACE CASING:		35.16
ELEV. – TOP OF RISER CASING:	2' stick-up	35.05
GROUND SURFACE		33.46
BOTTOM OF SURFACE CASING	7.0'	26.5
TOP OF SEAL	14.0'	19.5
TOP OF FILTER PACK	15.0'	18.5
TOP OF SCREEN	17.85	15.7
BOTTOM OF SCREEN	38.2'	-4.7
BOTTOM OF SUMP	39.2'	-5.7
BOTTOM OF HOLE	41.2	-6.7

SURFACE CASING
DIA: 6"
TYPE: Steel w/locking cap

BACKFILL MATERIAL
TYPE: Bentonite–Cement Grout

RISER CASING
DIA: 2"
TYPE: PVC Sch. 80–Threaded Couplings

ANNULAR SEAL
TYPE: Tamped Bentonite Pellets

FILTER PACK
TYPE: 20–40 Silica Sand
Pearl Special Products

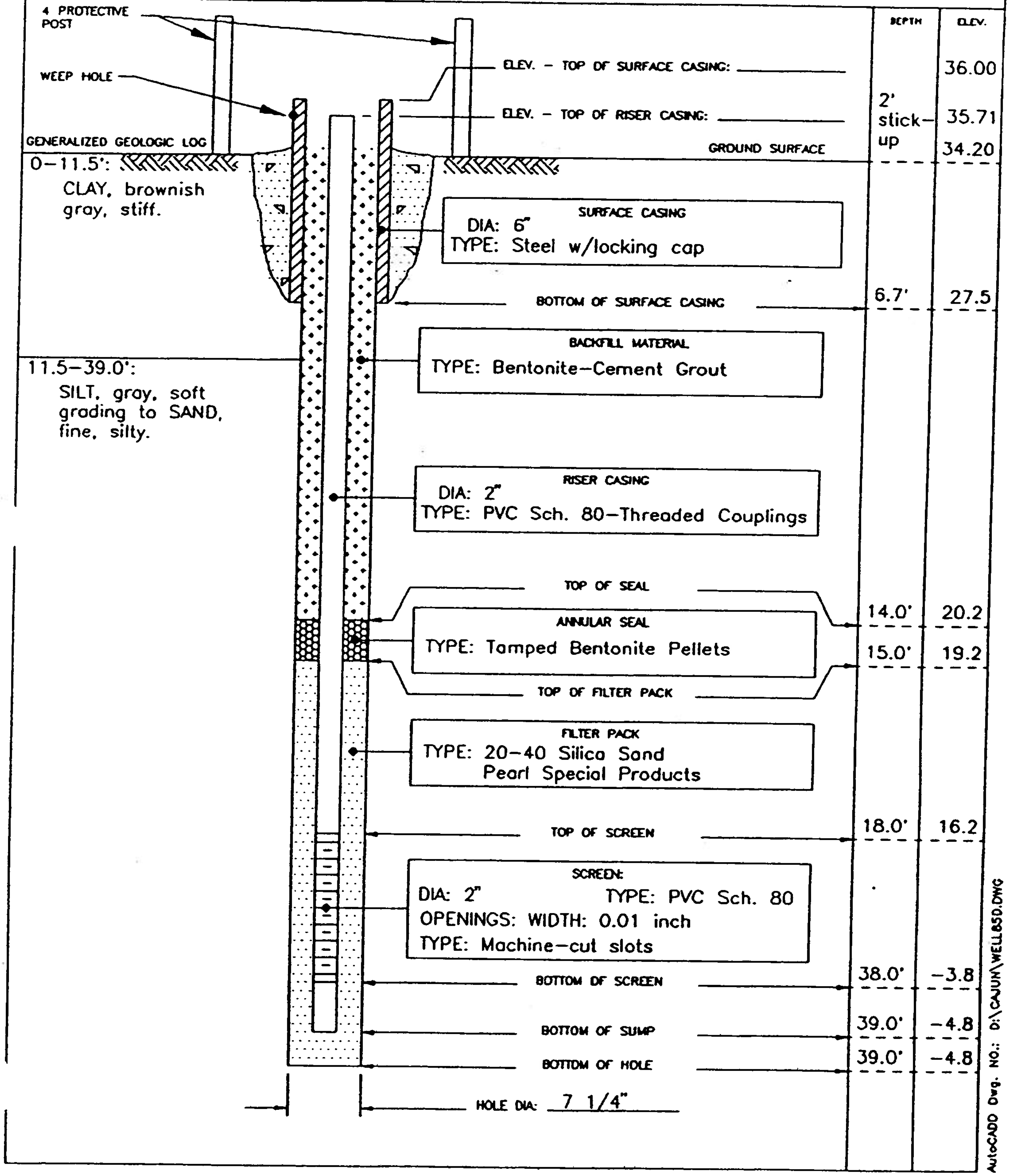
SCREEN:
DIA: 2" TYPE: PVC Sch. 80
OPENINGS: WIDTH: 0.01 inch
TYPE: Machine–cut slots

HOLE DIA: 7 1/4"

AutoCADD Dwg. NO.: D:\CAJUN\WELL85C.DWG

OBSERVATION WELL

PROJECT			WELL NO.
CEPCO – BIG CAJUN II			85D
JOB NO.	SITE	COORDINATES	
14630	South Rainfall Pond	E 9210, N 3780	
BEGUN	COMPLETED	PREPARED BY	REFERENCE POINT FOR MEASUREMENTS
6/20/85	6/20/85	D. R. Beissel	Top of PVC

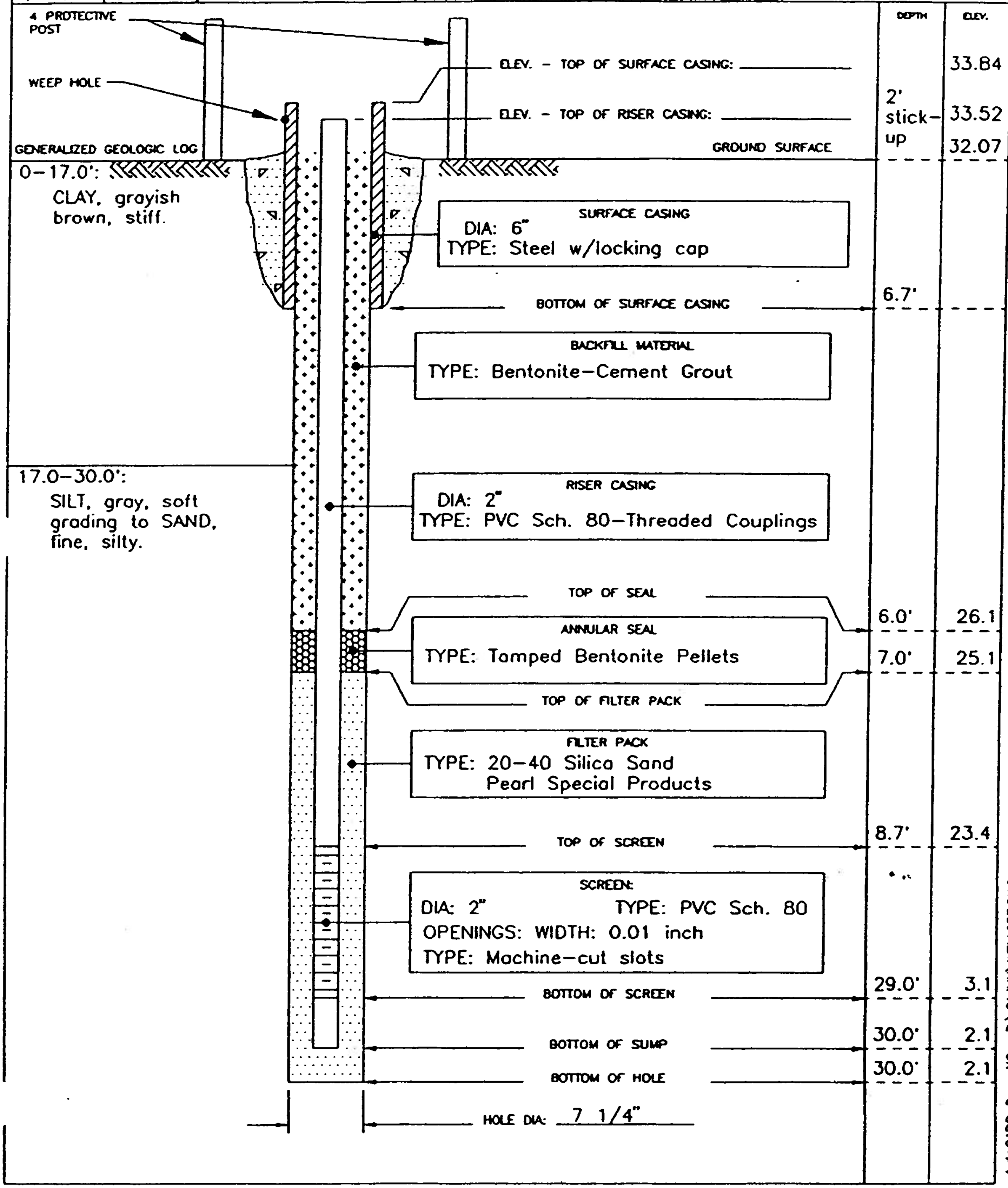


OBSERVATION WELL

PROJECT	WELL NO.
CEPCO – BIG CAJUN II	85E

JOB NO.	SITE	COORDINATES
14630	South Bottom Ash Pond	E 6550, N 3245

BEGUN	COMPLETED	PREPARED BY	REFERENCE POINT FOR MEASUREMENTS
6/19/85	6/19/85	D. R. Beissel	Top of PVC



AutoCADD Dwg. NO.: D:\CAJUN\WELL85E.DWG

Appendix A

Document 8: Response to Notice of Deficiencies (2010)

Shaw Environmental, Inc.
4171 Essen Lane
Baton Rouge, LA 70809
225-932-2500
FAX: 225-987-7300

Shaw® Shaw Environmental, Inc.

VIA HAND DELIVERY

May 12, 2010

Mr. Sam Phillips
Administrator, Waste Permits
Louisiana Department of Environmental Quality
Post Office Box 4313
Baton Rouge, Louisiana 70821

Re: Response to Notice of Deficiencies – Technical Review #2
Louisiana Generating LLC, Big Cajun II Power Plant
Agency Interest No. 38867/GD-077-0583/P-0108
PER19960002
New Roads, Pointe Coupee Parish, Louisiana

Dear Mr. Phillips:

On behalf of Louisiana Generating, LLC, Big Cajun II Power Plant (LaGen), Shaw Environmental, Inc. (Shaw) is submitting this Response to the LDEQ Notice of Deficiencies (NODs) letter sent via electronic mail, dated January 22, 2010, with regard to the Solid Waste Facility Permit Renewal and Modification Application that was submitted in April, 2006. The submittal contains LaGen's responses to the NOD comments and the revised responses to the regulations. Enclosed are four copies of the complete NOD Response.

If you or members of your staff have questions, please feel free to contact me, at 225.987.7325, or Mr. Gary Ellender, of LaGen, at 225.638.3773.

Sincerely,

Deborah C. Saxton

Deborah C. Saxton
Client Program Manager
Shaw Environmental, Inc.

c: Mr. Curt A. Auzenne, LDEQ
Mr. Gary Ellender, Louisiana Generating, LLC

Shaw Environmental, Inc.
4171 Essen Lane
Baton Rouge, LA 70809
225-932-2500
FAX: 225-987-7300

Shaw® Shaw Environmental, Inc.

VIA HAND DELIVERY

May 12, 2010

Mr. Sam Phillips
Administrator, Waste Permits
Louisiana Department of Environmental Quality
Post Office Box 4313
Baton Rouge, Louisiana 70821

Re: Response to Notice of Deficiencies – Technical Review #2
Louisiana Generating LLC, Big Cajun II Power Plant
Agency Interest No. 38867/GD-077-0583/P-0108
PER19960002
New Roads, Pointe Coupee Parish, Louisiana

Dear Mr. Phillips:

On behalf of Louisiana Generating, LLC, Big Cajun II Power Plant (LaGen), Shaw Environmental, Inc. (Shaw) is submitting this Response to the LDEQ Notice of Deficiencies (NODs) letter sent via electronic mail, dated January 22, 2010, with regard to the Solid Waste Facility Permit Renewal and Modification Application that was submitted in April, 2006. The submittal contains LaGen's responses to the NOD comments and the revised responses to the regulations. Enclosed are four copies of the complete NOD Response.

If you or members of your staff have questions, please feel free to contact me, at 225.987.7325, or Mr. Gary Ellender, of LaGen, at 225.638.3773.

Sincerely,

Deborah C. Saxton

Deborah C. Saxton
Client Program Manager
Shaw Environmental, Inc.

c: Mr. Curt A. Auzenne, LDEQ
Mr. Gary Ellender, Louisiana Generating, LLC

RESPONSE TO NOTICE OF DEFICIENCY (NOD)
TYPE I SOLID WASTE FACILITY PERMIT RENEWAL AND MODIFICATION APPLICATION

Louisiana Generating, L.L.C
Big Cajun II Power Plant
New Roads, Louisiana
Pointe Coupee Parish
Agency Interest Number 38867/GD-077-0583
Per 19960002
Permit No. P-0108

May 2010

Prepared for:

Louisiana Generating, L.L.C
Big Cajun II Power Plant
New Roads, Pointe Coupee Parish, Louisiana 70760

Prepared by:

Shaw™ Shaw Environmental, Inc.

Shaw Environmental, Inc.
4171 Essen Lane
Baton Rouge, Louisiana 70809

Table of Contents

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1.0 Introduction

The purpose of this document is to address deficiencies noted during the Louisiana Department of Environmental Quality's (LDEQ) technical review of the Permit Renewal Application for the Big Cajun II Power Plant (BC II), submitted in April 2006, by Louisiana Generating, LLC (LaGen). LDEQ issued a Notice of Deficiencies (NOD), via e-mail, on January 22, 2010 (***Attachment A***). Shaw requested an extension to time to respond to the NOD letter, on February 11, 2010. The extension request was approved by LDEQ on April 14, 2010. This document contains clear and concise responses to each of the deficiencies noted in the NOD. Each deficiency is addressed separately below in an "LDEQ comment" and "Response" format. In addition, the responses to the specific regulations have been updated to incorporate revisions made in response to LDEQ's NOD. All appendices, attachments, tables and figures are italicized and bolded when referred to in an NOD comment response, if included as part of the NOD Response document.

2.0 Responses to Notice of Deficiencies (NODs)

Engineering Comments

LDEQ Comment:

521.C.1.e

The response to this section states the 100-year flood elevation is 33 feet within the flood zone and 36 feet outside of the flood zone. Clarify this response and provide the minimum elevation of the levees.

Show the location of the impoundments on the FIRM maps provided.

Response:

The facility is located within Flood Zone A, which is part of the 100-year flood plain. The base flood elevation within the flood plain is not defined on the Flood Insurance Rate Maps (FIRM maps), but is assumed to be below 35 feet based on the 35-foot contour located outside of the flood zone. All of the existing levees for the impoundments are greater than 35 feet at mean sea level elevation. ***Figure 29*** includes a FIRM map showing the location of the facility and that the 35- foot elevation is outside of the flood plain.

The revised response to this regulation is as follows:

The Area Master Plan (***Figure 1***) depicts the 100-year flood plain in the vicinity of the plant site. The plant site itself was built on several feet of fill, to ensure continuous operation during adverse weather conditions. Dikes that are greater in height than the elevation within the 100-year floodplain were constructed around the solid waste facilities, to preclude any contamination of flood waters by waste products. The Flood Insurance Rate Map for Pointe Coupee Parish is provided as ***Figure 29*** and includes the location of the outline of the facility and the approximated location of the impoundments.

LDEQ Comment:

521.J.1.c

Please note, the response to 521.F.3.b does not demonstrate sufficient clay exists onsite for the closure of the impoundments. Therefore, provide closure cost estimate based on importing clay and topsoil from offsite.

Response:

The present cost estimate (2006) for the closure of all five impoundments was calculated to be $6,269,599 (pre-expansion of the Bottom Ash Basin) utilizing on-site fill material for the closure of all impoundments. The previously submitted cost estimate was updated to show the present cost estimate (2006) with clay and topsoil from offsite resources. Quotes were received for the delivery of clay and topsoil from offsite. The closure cost estimates have been updated and are included as ***Table 6***.

The revised response to this regulation is as follows:

The cost estimate for closure of all five impoundments has been revised to account for the utilization of off-site fill material and is calculated to be $15,053,253 (pre-expansion of the Bottom Ash Basin). The individual costs for closure of the Fly Ash and Bottom Ash Basin were itemized, and were calculated to be $8,703,498 and $3,268,291, respectively. The estimated cost of closure of the Rainfall Surge Pond was calculated to be $1,233,823. The estimated costs of closure of the Primary and Secondary LPDES Treatment Ponds were calculated to be $1,456,926 and $390,713, respectively.

The closure costs, based on the use of an off-site supplier of fill material, are $5,727,460, for the Bottom Ash Basin with expansion. Therefore, including the revised cost of closing the expanded Bottom Ash Basin, the total cost estimate for closure would be $17,512,421.

The costs of closure and post-closure care are included as ***Table 6***.

LDEQ Comment:

521.J.3.b

Please note, this submittal is a permit renewal in addition to a modification for the bottom ash basin. Therefore, provide drawings showing the final contours for all of the impoundments that are to be closed in place. In addition, Figures 28a and 28b could not be located in the response to NODs.

Response:

The anticipated final contours for all impoundments is included as ***Figure 31a***. ***Figures 31b*** through ***31e*** are cross sections of the anticipated cap for each of the impoundments to be closed. ***Figures 28a*** (Proposed Cap for Bottom Ash Basin) and ***28b*** (Proposed Cap Cross-Section for Bottom Ash Basin) are also included.

The revised response to this regulation is as follows:

Final contours based on the potential vertical expansion of the Bottom Ash Basin are shown on ***Figures 28a*** and ***28b***. Drawings showing the final contours and cross-sections of each of the other impoundments are included as ***Figures 31a*** through ***31e***. All final contours are being provided for "information purposes only," and are not meant to be used as final design or construction drawings.

LDEQ Comment:

Appendix R

Please note, as stated in the response to 521.J.1.b, the QA/QC plan provided in this appendix will be followed during the installation of the final cover. Therefore, this appendix shall apply to all impoundments that are closed in place. If this appendix is not intended for this purpose, provide a QA/QC plan for the installation of the clay cap for all of the impoundments and correct the reference in 521.J.1.b.

Response:

The QA/QC plan (***Appendix R***) that was originally submitted as a result of the previous response to Notice of Deficiency, on January 29, 2007, has been updated to include reference to the Fly Ash Basin that is to be closed in place. A separate QA/QC plan was developed for the closure of the LPDES Treatment Ponds and Rainfall Surge Pond and is included as ***Appendix S***.

Geological Comments

LDEQ Comment:

521.D

Appendix G of the renewal application shows 8 borings drilled in 1974 that are deep enough to satisfy 709.C.1.c.ii but are not located on Figure 25. Please submit a boring location map for the 1974 borings. If these borings prove sufficient to satisfy 709.C.1.c.ii, no additional borings will be required.

Response:
Shaw obtained a copy of the boring location map and boring logs for the eight (8) borings installed in 1974 by Louis Cappozoli and Associates. The boring locations were plotted on the historical boring location map based on measurement data presented on the Cappozoli map. ***Figure 25***, showing historical soil boring locations, has been revised to include the Cappozoli borings, labeled 1 through 8. Two soil cross sections were constructed and show the soil lithology beneath the ash impoundments. The cross sections are presented as ***Figures 25a*** (Section A – A') and ***25b*** (Section B – B'). The depth of the borings used in constructing the cross sections ranged from 150 feet to 200 feet meeting the requirement of 709.C.1.c.ii, which states: "*All boreholes shall extend to a depth of at least 30 feet below the lowest point of the excavation. At least 10 percent of the borings (minimum of three borings) shall extend to 100 feet below grade level to characterize the shallow geology.*" Based on this information, no additional borings will be required.

The revised response to this regulation is as follows:

521.D
l. The following information regarding geology is required for Type I and Type II facilities:

a. isometric profile and cross-sections of soils, by type, thickness, and permeability;
An isometric profile and cross section of the soils within the site are included in Figures 17 and 19. Figure 18 depicts boring, monitoring well, and cross section locations. Soil data derived from four of eight borings (1 through 8) installed in 1974 by Louis Cappozoli and Associates and plotted on Figure 25 were used to construct two soil cross sections which represent the lithology beneath the ash impoundments. The cross sections are presented as Figures 25a (Section A – A') and 25b (Section B – B'). Borings 5, 6, and 8 were installed to a depth of 150 feet and Boring 3 was installed to a depth of 200 feet.

b. logs of all known soil borings taken on the facility and a description of the methods used to seal abandoned soil borings;
Soil boring logs from the facility are included in Appendix G. Appendix G includes soil boring data from the eight (8) boring logs installed in 1974 by Cappizoli. Description of

the methods used to seal and abandon soil borings are included in Big Cajun II's Sampling and Analysis Plan, Appendix H.

LDEQ Comment:

521.E.1.a.iii

Please, submit a monitoring well location map for the proposed wells and piezometers and a table that includes the proposed depth and other construction details. Provide implementation schedule of work.

Response:

A total of 10 new monitoring wells, installed along the west and east boundaries of the impoundment are proposed. The proposed wells, 10A through 10J, will be installed as downgradient wells with an approximate spacing of 800 feet, as required by LAC 709.E.1.b.iv, and will incorporate existing monitoring wells 85A through 85E into the monitoring well system. Construction details for the proposed monitoring wells are summarized on ***Table 5***. In addition to the perimeter wells, one (1) background well (MW-10BG) will be installed in the south-central portion of the site. The proposed monitoring wells, along with existing monitoring wells are presented on revised ***Figure 24***. A revised implementation schedule of work is included as revised ***Appendix I.***

The revised response to this regulation is as follows:

521.E.l.a.iii: The following information on subsurface hydrology is required for all Type I facilities and Type II landfills and surface impoundments:

a. **delineation of the following information for the water table and all permeable zones from the ground surface to a depth of at least 30 feet below the base of excavation:**

i. areal extent beneath the facility;
Refer to the response given for LAC 33:VII.521.E.1.a.iii.

ii. thickness and depth of the permeable zones and fluctuations;
Refer to the response given for LAC 33:VII.521.E.1.a.iii.

iii. direction(s) and rate(s) of groundwater flow based on information obtained from piezometers and shown on potentiometric maps; and
Potentiometric data from the most recent groundwater monitoring events (included as Figures 20 through 23), indicate that the groundwater flow direction in the area of the impoundments varies. The location and vicinity of the Big Cajun II facility, with respect to the Mississippi River and its associated meander, historical water level measurements

in groundwater units, Mississippi River elevations, and area precipitation are all factors that need to be considered in order to better understand the groundwater flow in the area. 10 new monitoring wells are proposed to be installed along the west and east boundaries of the impoundments. The proposed wells, 10A through 10J, will be installed as downgradient wells with an approximate spacing of 800 feet, as required by LAC 709.E.1.b.iv, and will incorporate existing monitoring wells 85A through 85E into the monitoring well system. Construction details for the proposed monitoring wells are summarized on Table 5. In addition to the perimeter wells, one (1) background well (MW-10BG) will be installed in the south-central portion of the site. The proposed monitoring wells, along with existing monitoring wells are presented on Figure 24. An implementation schedule of work is included as Appendix I.

LDEQ Comment:

521.E.1.a.iv

Via a telephone conference on February 22, 2010, LDEQ representatives instructed Shaw personnel to install a measuring staff in each of the impoundments. Said staff will be utilized to obtain water elevation measurements.

Response:

A measuring staff will be constructed in each of the impoundments in order to obtain water elevation measurements. The measurement data will be used to evaluate the potential effects to the groundwater resulting from fluids in the impoundments.

The revised response to this regulation is as follows:

Big Cajun II does not anticipate any change in groundwater flow resulting from facility activities. However, in order to evaluate the potential effects to the groundwater resulting from fluids in the impoundments, a measuring staff will be constructed in each of the impoundments for future water elevation measurements.

LDEQ comment:

521.F.5.b

A cross-gradient well would not be acceptable as a background well. Please be advised that a monitoring well being used as a background well shall be placed away from the impoundments and other potential sources of contamination.

Response:

The groundwater flow direction in the area of the impoundment varies seasonally. The groundwater flow is influenced by the level of the Mississippi River and by the amount of precipitation received in the area. The direction of flow is generally either to the west or to the east; however, at times a divergent flow to the east and west originating from the center of the ash impoundment area has been noted. Due to this variability, it is not possible at this time to conclusively specify an upgradient and downgradient monitoring well. To the west, monitoring well MW-85A is located as far from the dike of the ash impoundment as the property line permits. To the east, there is currently no well that can be considered a background well that is located away from the impoundments or other sources of contamination. There are two existing monitoring wells (MW-85C and MW-85D) located on the north and south sides of the rainfall surge reservoir, which is adjacent to the eastern boundary of the ash impoundments. A monitoring well is proposed along the eastern boundary of the rainfall surge reservoir. Based on the limitations in placing a background well in a downgradient location, in a discussion with Estuardo Silva of the LDEQ on February 11, 2010, it was agreed that a cross-gradient background well (MW-10BG) could be used at the site. The proposed background well, located in the south-central portion of the site, is shown on ***Figure 24***. Due to the variability of the groundwater flow, a point of compliance has been proposed for the west and east ends of the impoundments. The proposed point(s) of compliance are presented on ***Figure 30***. The western point of compliance will consists of existing monitoring well MW-85A, along with proposed monitoring wells MW-10A, MW-10B, MB-10C, MW-10G, MW-10H, MW-10I, and MW-10J. The eastern point of compliance will consists of existing monitoring wells MW-85C and MW-85D, along with proposed monitoring wells MW-10D, MW-10E, and MW-10F.

The revised response to this regulation is as follows:

5. The following information on plans and specifications for groundwater monitoring must be provided for Type I and II facilities:

a. **a minimum of three piezometers or monitoring wells in the same zone must be provided in order to determine groundwater flow direction;**
The groundwater monitoring system will consist of the five existing monitoring wells, 85A through 85E, and 10 proposed monitoring wells (MW-10A through MW-10J), shown on Figure 24, that will surround the Bottom Ash Basin and adjacent solid waste facilities. The wells (existing and proposed) are for the intended purpose of monitoring the uppermost aquifer and gaining a better understanding of groundwater flow. The additional proposed wells will meet the location requirements of LAC 33:VII.709.E.b.

b. **for groundwater monitoring wells, cross-sections illustrating construction of wells, a scaled map indicating well locations and the relevant point of compliance, and pertinent data on each well, presented in tabular form, including drilled depth, the depth to which the well is cased, screen interval,**

slot size, elevations of the top and bottom of the screen, casing size, type of grout, ground surface elevation, etc.;
Please refer to Big Cajun II's Sampling and Analysis Plan (Appendix H) for groundwater monitoring well specifications. Cross sections illustrating the construction of wells are located in the Soil Boring Logs (Appendix G). The proposed monitoring wells are shown on Figure 24 and the proposed monitoring well construction details are presented on Table 5. Due to the variability of the groundwater flow, a point of compliance has been proposed for the west and east ends of the impoundments. The proposed point(s) of compliance are presented on Figure 30. The western point of compliance will consist of existing monitoring well MW-85A, along with proposed monitoring wells MW-10A, MW-10B, MB-10C, MW-10G, MW-10H, MW-10I, and MW-10J. The eastern point of compliance will consists of existing monitoring wells MW-85C and MW-85D, along with proposed monitoring wells MW-10D, MW-10E, and MW-10F.

LDEQ comment:

521.F.5.c

Appendix P only contains TCLP and a mineral analysis. Provide a complete and updated chemical analysis of the sludge and water in the impoundment should be provided in order to justify that the proposed groundwater monitoring parameters are the most appropriate parameters. Please submit a complete laboratory report which indicates the detection limits used during the analysis and the different chemicals tested.

As stated previously on the May 22, 2006 NOD, the polymer used to treat the clarifier sediment is part of the waste stream; therefore, the Department's request for more information on the polymer must be addressed.

Response:

The five impoundment monitoring wells (MW-85A through MW-85E) were sampled on January 15, 2010, and analyzed for the constituents listed in LAC 33:VII.3005, Appendix C - Table 1. Based on discussions with the LDEQ on February 2, 2010, the analytical results for the groundwater samples can be used in lieu of additional sludge and water sampling from the impoundments. A copy of the analytical laboratory report is included as ***Attachment B.*** The analytical results indicated the detection of barium in four of the five monitoring well samples; arsenic was detected in one monitoring well. Methylene chloride was detected in three of the groundwater samples but was also detected in several of the blanks. The maximum concentration of methylene chloride detected in the blanks is 11 micrograms per liter (µg/L) while the maximum concentration detected in the groundwater samples was 9.79 µg/L. Because the concentration in the sample is less than the concentration in the blank, the methylene chloride should not be considered as a positive result. In order to confirm if arsenic is truly present in the groundwater, re-sampling of the well in which it was detected (MW-85E) is recommended.

Based on these results, barium should be added to the list of detection monitoring parameters. If analytical results for the re-sampling of MW-85E confirm the presence of arsenic, it will be added to the detection monitoring parameters.

The polymer that is used to treat the clarifier sediment is called Cat-Floc 8103 Plus and is manufactured by Nalco Company. A Material Safety Data Sheet (MSDS) is included as ***Attachment C.*** The MSDS does not list the chemical composition of the material; however, it does state that the product is not hazardous under 29 CFR 1910.1200. ***Attachments B and C***, analytical report and MSDS, respectively, will be added to Appendix P.

The revised response to this regulation is as follows:

A groundwater sampling and analysis plan is included in Big Cajun II's Sampling and Analysis Plan (Appendix H). Analytical results, to be included in Appendix P, for groundwater samples collected from monitoring wells MW-85A through MW-85E on January 15, 2010, indicated detectable concentrations of barium in four of the five monitoring wells. Arsenic was detected in one well (MW-85E) and re-sampling is recommended in order to confirm the presence of arsenic. Based on the recent results, barium will be added to the detection monitoring parameter list and if confirmed to be present, arsenic will also be added. The Sampling and Analysis Plan (Appendix H) will be revised to include the recommended additional parameter(s).

LDEQ comment:

521.F.5.e
As stated previously on the May 22, 2006 NOD, Please provide a flow-chart/decision-tree plan indicating the steps to be followed when selecting the appropriate statistical method. An example is available in Appendix C of the latest version of the Solid Waste Rules and Regulations.

Please note that Applicant should propose a statistical method which can determine if there is a statistically significant difference in groundwater quality. This must be accomplished by comparing the concentration of each parameter or constituent of each down-gradient well to the background well(s). The revised SAP does not specifically state that the up-gradient well will be compared to the down-gradient well for statistical comparison. Intra-well comparisons are not acceptable in determining background concentration of parameters. Background should be determined by collecting four consecutive quarterly samples at the up-gradient and down-gradient wells. Then statistically compare the up- to down-gradient results, if they demonstrate that groundwater was not impacted, then intra-well comparisons may be requested by the Facility.

The statistical method(s) proposed by the facility will be required to be submitted to the Department as a permit modification within ninety (90) days after completion of the initial sampling event. This permit modification shall include the data collected from the initial sampling event (four quarters), the proposed statistical method chosen for each parameter

and justification for choosing the proposed statistical method(s). This justification must provide verification of the underlying statistical assumptions and demonstrate that the statistical method chosen for each individual parameter is the most appropriate method based on the analytical data-set that was generated from the initial sampling event (four quarters).

In paragraph 3 of this response 0.005 is used as an error rate for each testing period. Pursuant to 709.E.2.e.iii.(b) 0.05 should be used.

Response:

The Decision-Tree/Flow-Chart process (LAC 33:VII.3005.Appendix C) will be used for evaluating appropriate statistical methods for the ash impoundments groundwater monitoring data. The Decision-Tree/Flow-Chart process, and therefore, the appropriate statistical methodologies are primarily based on percentages of detections for each monitored parameter in the dataset. Three statistical method outcomes can result for each parameter, based on the percentage of detections for each parameter. The fourth possible outcome is that no statistical analyses are necessary, if non-detects equal 100%. A diagram showing the Decision-Tree process is included as ***Attachment D***. The Decision Tree diagram will be included in Appendix H, Groundwater Sampling and Analysis Plan.

Parametric Tests (ANOVA) will be used for parameters with non-detects that are less than 15%. The general assumptions for parametric ANOVA tests are independent samples, normal population distribution (not necessarily sample) and equality of population variance (homoscedasticity). These assumptions will be tested in the analysis process, but the ANOVA procedure is fairly robust even if the strict normality and variance assumptions are not met, particularly if the sample sizes are approximately equal.

Nonparametric Tests (Kruskal-Wallis One-Way ANOVA) will be used for parameters with nondetects that are greater than or equal to 15%, and less than 50%. The Kruskal-Wallis One-Way ANOVA by ranks does not assume the data has a definitive distribution but for equivalence, this test assumes that the background and downgradient data groups have the same distribution. Differences between medians and distribution shape can result in a determination that the background and downgradient results are not equivalent, i.e. rejection of the null hypothesis of equivalence.

Proportional Nonparametric Statistics will be used for parameters with nondetects that are greater than or equal to 50%. The Proportional Nonparametric Statistics method has no overriding statistical assumptions and will consist of fitting a Poisson's distribution for parameters with greater than 90% nondetects. Nonparametric quartile prediction (tolerance) intervals of 5% to 95% will be calculated for parameters with nondetects between 50% - 90% of the results.

Unlike the preceding ANOVA tests, for interval evaluations, there is no definitive statistical test result that indicates contamination. Thus for contamination analysis, the background Poisson or tolerance interval will be compared to the respective interval from each individual downgradient well. If the upper 95% value for the downgradient interval range is greater than the background well, then the data values will be examined to determine which results are contributing to the downgradient high interval value and if the data patterns indicate that there may be contamination. If one or two data values are causing the high interval value, then contamination may not actually exist. However, if there are several recent data values greater than the background upper interval, then contamination may exist at that location. Box and quartile plots will be used in this assessment as appropriate.

It must be noted that with a high proportion of non-detects (which effectively censor the low concentrations), an interval evaluation is unlikely to result in a definitive determination of contamination. At best, these evaluations can only give an indication of contamination. As such, any dataset that has a finding of potential contamination from an interval test will likely require further analysis over time before a final determination can be made.

No Statistics will be necessary for parameters with 100% non-detects.

Calculation Procedures. The calculation procedures used for the statistical evaluations will be based on the procedures defined in the USGS, Techniques of Water Resources, TWRI 4.a.3, Book, Chapter A3 (http://pubs.usgs.gov/twri/twri4a3/html/pdf_new.html). As appropriate, computer software, e.g. SAS, JMP, or SPSS, will be used to perform the majority of the statistical calculations and associated graphic presentations.

The revised response to this regulation is as follows:
A plan for detecting, reporting, and verifying changes in groundwater is included in Big Cajun II's Groundwater Sampling and Analysis Plan (Appendix H). The Groundwater Sampling and Analysis Plan will be revised to include a chart/decision tree for selection of the appropriate statistical method.

ATTACHMENTS

Attachment A

From: Curt Auzenne [mailto:Curt.Auzenne@LA.GOV]
Sent: Friday, January 22, 2010 11:01 AM
To: 'Ellender, Gary'
Cc: Mayhall, Valerie
Subject: Big Cajun II Permit Renewal NOD

Dear Mr. Ellender:
The Waste Permits Division has performed the technical review of your notice of deficiency responses submitted on your behalf by Shaw Environmental, regarding the Louisiana Generating Big Cajun II permit renewal application. Based on a technical review, the following comments are presented regarding items not considered in conformity with the applicable sections of the Louisiana Solid Waste Regulations LAC 33:VII:

Engineering Comments

521.C.1.e The response to this section states the 100-year flood elevation is 33 feet within the flood zone and 36 feet outside of the flood zone. Clarify this response and provide the minimum elevation of the levees.

Show the location of the impoundments on the FIRM maps provided.

521.J.1.c Please note, the response to 521.F.3.b does not demonstrate sufficient clay exists onsite for the closure of the impoundments. Therefore, provide closure cost estimate based on importing clay and topsoil from offsite.

521.J.3.b Please note, this submittal is a permit renewal in addition to a modification for the bottom ash basin. Therefore, provide drawings showing the final contours for all of the impoundments that are to be closed in place. In addition, Figures 28a and 28b could not be located in the response to nods.

Appendix R Please note, as stated in the response to 521.J.1.b, the QA/QC plan provided in this appendix will be followed during the installation of the final cover. Therefore, this appendix shall apply to all impoundments that are closed in place. If this appendix is not intended for this purpose, provide a QA/QC plan for the installation of the clay cap for all of the impoundments and correct the reference in 521.J.1.b.

Geology Comments

521.D Appendix G of the renewal application shows 8 borings drilled in 1974 that are deep enough to satisfy 709.C.1.c.ii but are not located on Figure 25. Please submit a boring location map for the 1974 borings. If these borings prove sufficient to satisfy 709.C.1.c.ii, no additional borings will be required.

521.E.1.a.iii Please, submit a monitoring well location map for the proposed wells and piezometers and a table that includes the proposed depth and other construction details. Provide implementation schedule of work.

521.F.5.b. A cross-gradient well would not be acceptable as a background well. Please be advised that a monitoring well being used as a background well shall be placed away from the impoundments and other potential sources of contamination.

521.F.5.c Appendix P only contains TCLP and a mineral analysis. Provide a complete and updated chemical analysis of the sludge and water in the impoundment should be provided in order to justify that the proposed groundwater monitoring parameters are the most appropriate parameters. Please submit a complete laboratory report which indicates the detection limits used during the analysis and the different chemicals tested.

As stated previously on the May 22, 2006 NOD, the polymer used to treat the clarifier sediment is part of the waste stream; therefore, the Department's request for more information on the polymer must be addressed.

521.F.5.e. As stated previously on the May 22, 2006 NOD, Please provide a flow-chart/decision-tree plan indicating the steps to be followed when selecting the appropriate statistical method. An example is available in Appendix C of the latest version of the Solid Waste Rules and Regulations.

Please note that Applicant should propose a statistical method which can determine if there is a statistically significant difference in groundwater quality. This **must** be accomplished by comparing the concentration of each parameter or constituent of each down-gradient well to the background well(s). The revised SAP does not specifically state that the up-gradient well will be compared to the down-gradient well for statistical comparison. Intra-well comparisons are not acceptable in determining background concentration of parameters. Background should be determined by collecting four consecutive quarterly samples at the up-gradient and down-gradient wells. Then statistically compare the up- to down-gradient results, if they demonstrate that groundwater was not impacted, then intra-well comparisons may be requested by the Facility.

The statistical method(s) proposed by the facility will be required to be submitted to the Department as a permit modification within ninety (90) days after completion of the initial sampling event. This permit modification shall include the data collected from the initial sampling event (four quarters), the proposed statistical method chosen for each parameter and justification for choosing the proposed statistical method(s). This justification must provide verification of the underlying statistical assumptions and demonstrate that the statistical method chosen for each individual parameter is the most appropriate method based on the analytical data-set that was generated from the initial sampling event (four quarters).

In paragraph 3 of this response 0.005 is used as an error rate for each testing period. Pursuant to 709.E.2.e.iii.(b) 0.05 should be used.

Please refer to the sections and denoted regulations when responding to the comments. Additionally, four (4) copies of your

response, including appendices, shall be provided. Please provide your response within thirty (30) days of receipt of this notice. Please reference your Agency Interest Number (AI-38867), Permit Activity Number (PER19960002), and Permit Number (P-0108) on all future correspondence pertaining to this matter. If you have any questions concerning this matter please contact me at the number below or for geology questions contact Tim Seiler (225/219-1223) or engineering questions contact Jason Meyers (225/219-0791).
Furthermore, please respond to confirm that you have received this email.
Thanks

Curt A. Auzenne
Environmental Scientist
LDEQ- Waste Permits Division
(225) 219-3468
(225) 219-3158 (fax)

Appendix A
Document 9: Response to Notice of Deficiencies (2007)

MAIN FILE

Shaw Environmental, Inc.
4171 Essen Lane
Baton Rouge, LA 70809
225-932-2500
FAX: 225-987-7300

Shaw® Shaw Environmental, Inc.

VIA HAND DELIVERY

original to IOSW

Sm copy to SW/G1/Townsel

AVG

January 29, 2007

Bijan Sharafkhani, P.E.
Administrator, Waste Permits
Louisiana Department of Environmental Quality
Post Office Box 4313
Baton Rouge, Louisiana 70821

Re: Response to Notice of Deficiencies – Technical Review #1
Louisiana Generating LLC, Big Cajun II Power Plant
Agency Interest No. 38867/GD-077-0583/P-0108
PER19960002
New Roads, Pointe Coupee Parish, Louisiana

Dear Mr. Sharafkhani:

On behalf of Louisiana Generating, LLC, Big Cajun II Power Plant (LaGen), Shaw Environmental, Inc. (Shaw) is submitting this Response to the Notice of Deficiencies (NODs) with regard to the Type I Solid Waste Facility Permit Renewal and Modification Application that was submitted in April 2006. The submittal contains LaGen's responses to the NODs and the revised responses to the regulations.

Responses to regulations **521.L.3** and **521.L.4** will be submitted upon receipt of updated financial assurance documentation. LaGen is currently in the process of updating this information and it is estimated a response to these regulations will be submitted within two weeks.

Enclosed are five copies of this NOD Response to the Type I Solid Waste Facility Permit Renewal and Modification Application document for LDEQ's review. If you or members of your staff have questions, please feel free to contact me, at 225.932.2741, or Mr. Gary Ellender, of LaGen, at 225.638.3773.

Sincerely,

Shaw Environmental, Inc.

Boyd Boswell

Boyd Boswell
Environmental Scientist

c: Mr. Curt A. Auzenne, LDEQ
Mr. Gary Ellender, Louisiana Generating, LLC

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LDEQ

RESPONSE TO NOTICE OF DEFICIENCIES (NODS)
TYPE I SOLID WASTE FACILITY PERMIT RENEWAL AND MODIFICATION APPLICATION

Louisiana Generating, L.L.C.
Big Cajun II Power Plant
New Roads, Louisiana
Pointe Coupee Parish
Agency Interest Number 38867/GD-077-0583
PER 19960002
Permit No. P-0108

January 2007

Prepared for:

Louisiana Generating, L.L.C.
Big Cajun II Power Plant
New Roads, Pointe Coupee Parish, Louisiana 70760

Prepared by:

Shaw™ Shaw Environmental, Inc.

Shaw Environmental, Inc.
4171 Essen Lane
Baton Rouge, Louisiana 70809

Table of Contents

List of Appendices

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1.0 Introduction

The purpose of this document is to address deficiencies noted during the Louisiana Department of Environmental Quality's (LDEQ) technical review of the Solid Waste Permit Renewal Application for the Big Cajun II Power Plant (BC II), submitted in April, 2006 by Louisiana Generating, LLC (LaGen). This document contains clear and concise responses to each of the deficiencies noted in LDEQ's Notice of Deficiencies (NOD) letter dated November 22, 2006 (***Appendix A***). Each deficiency noted in the LDEQ letter is addressed separately below in an "LDEQ Comment" and "Response" format. In addition, the responses to the specific regulations have been updated to incorporate revisions made in response to LDEQ's NOD letter.

2.0 Responses to Notice of Deficiencies (NODs)

Permit Reviewer Comments

521.A.1.f.

Please provide a wetlands demonstration as this is an expansion of an existing facility.

Response:

The expansion of the Bottom Ash Basin will not change the footprint of the existing impoundments; it will entail vertically expanding the existing dikes. Therefore, no additional land will be impacted. Furthermore, LaGen implements additional precautionary measures at the facility to ensure that surrounding properties are protected. The revised response to this regulation addresses the requirements set forth in LAC 33:VII.709.A.4.

The revised response to this regulation is as follows:

The expansion of the Bottom Ash Basin will not change the footprint of the existing impoundments; it will entail vertically expanding the existing dikes. Therefore, no additional land will be impacted. Furthermore, LaGen implements additional precautionary measures at the facility to ensure that surrounding properties are protected.

The requirements set forth in LAC 33:VII.709.A.4 are addressed below. The existing facility is not located in wetlands. Because the proposed modification of the facility is for a vertical expansion, no wetlands will be impacted due to it. Thus, neither Section 404 of the Clean Water Act nor any state wetlands laws are applicable. The construction and operation of the facility, as expanded, will not: cause or contribute to violations of any applicable state water-quality standard; violate any applicable toxic effluent standard or prohibition under Section 307 of the Clean Water Act; jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of a critical habitat, protected under the Endangered Species Act of 1973; violate any requirement under the Marine Protection, Research, and Sanctuaries Act of 1972 for the protection of a marine sanctuary.

In addition, the facility will not cause or contribute to significant degradation of wetlands. The integrity of the facility and its ability to protect ecological resources are proven through the responses to each regulation cited in this permit application renewal document. Impacts to wetlands were avoided to the maximum extent practicable.

521.F.1.

The certification must be signed and certified by a registered engineer, licensed in the state of Louisiana as required by section 713.B.1.

Response:

The required certification, signed and certified by a registered engineer licensed in the state of Louisiana, is provided in ***Appendix B*** of this NOD Response.

The revised response to this regulation is as follows:

The required certification is contained in ***Appendix M.***

521.H.1.f.

Please address LA R.S. 30:2157 in this section.

Response:

The response to this regulation has been revised to address LA R.S. 30:2157.

The revised response to this regulation is as follows:

Emergency plans to deal with fire, including fire exits and established locations for fire extinguishers, are maintained in accordance with the Occupational Safety Health Administration requirements. The Plant also has emergency plans to deal with employee safety and health and medical treatment in case of accidental job-related injury. A copy of the Emergency Action Procedure can be found in ***Appendix E.***

In accordance with LA RS 30:2157, the ability of local emergency response agencies and medical care facilities to respond to a hazardous material incident at the Plant was evaluated and determined to be adequate. Also in accordance with LA R.S. 30:2157, letters were obtained from the local Fire Department, local emergency medical services agency, and local hospital regarding the services these agencies provide (See ***Appendix S***).

Engineering Comments

~~521.A.1.a.ii~~

521.A.1.e.ii.

Provide the additional documentation referenced.

Response:

In addition to the documentation previously provided, we have included in this submittal a copy of correspondence recently sent to the U.S. Army Corps of Engineers (Corps) in which a Jurisdictional Determination was requested (See ***Appendix D*** of this NOD Response). A copy of the Corps' reply correspondence will be submitted to LDEQ upon receipt.

The revised response to this regulation is as follows:

Appendix C contains documentation from the appropriate state and federal agencies (i.e., Louisiana Department of Culture, Recreation and Tourism, United States Fish and Wildlife Service, and the Louisiana Department of Wildlife & Fisheries) substantiating the historic sites, recreation areas, archeological sites, designated wildlife management areas, habitats for endangered species, and other sensitive ecological areas within 1,000 feet of the facility.

In addition, a Jurisdictional Determination has been requested from the U.S. Army Corps of Engineers (Corps) (See ***Appendix C***). A copy of the Corps' reply correspondence will be submitted to LDEQ upon receipt.

521.B.1.f.

Provide methods to monitor waste received into the bottom ash impoundment.

Response:

Methods to monitor the waste received into the bottom ash impoundment have been incorporated into the response to this regulation.

The response to this regulation has been revised as follows:

A scale is used to weigh the fly ash trucks prior to unloading of the ash material into the ash collection area. This is the method by which the facility determines the quantity of fly ash that is disposed in the Fly Ash Basin. The ash is generated on-site and is trucked directly to the Fly Ash Basin. No off-site waste is disposed in the Fly Ash Basin. Visual inspections of the treatment ponds and rainfall surge ponds are conducted regularly to observe freeboard and integrity of the facilities.

Big Cajun II does not accept waste generated from off-site locations for treatment, storage, or disposal in any of its on-site impoundments. The bottom ash from Units 1 and 2 is transported via a sluice to the Bottom Ash Basin for disposal. Bottom ash from Unit 3 is trucked to the

Bottom Ash Basin for disposal. Big Cajun II maintains an on-site contractor, who along with Big Cajun II personnel, ensures the proper transportation and disposal of the bottom ash into the Bottom Ash Basin.

521.C.1.e

Provide the 100-year flood evaluation.

Response:

The 100-year flood elevation for the areas of the facility located within the 100-year flood zone is 33 feet. The 100-year flood elevation for the areas of the facility located outside the 100-year flood zone is 36 feet. Flood Insurance Rate Maps are found in ***Appendix E*** of this NOD Response.

The response to this regulation has been revised as follows:

The Area Master Plan (***Figure 1***) depicts the 100-year flood zone in the vicinity of the plant site. The plant site itself was built on several feet of fill to ensure continuous operation during adverse weather conditions. Dikes were constructed around the solid waste facilities to preclude any contamination of flood waters by waste products.

The 100-year flood elevation for the areas of the facility located within the 100-year flood zone is 33 feet. The 100 year flood elevation for the areas of the facility located outside the 100-year flood zone is 36 feet. Flood Insurance Rate Maps are found in ***Appendix S***.

521.F.3.b

Please note, this requirement is applicable. Address the type of material proposed for the final cover. Provide calculations demonstrating that an adequate volume of material exists for the final cover.

Response:

We have revised the response to this regulation to address the final cover requirement. In addition, we have removed the reference to the landfill.

The revised response to this regulation is as follows:

Due to the nature of the material to be stored in the fly ash and bottom ash basins, neither daily nor interim cover is necessary. Fly ash is a pozzolanic material, that is, its silicon oxide and aluminum oxide components react with its calcium fraction in the presence of water to form slow hardening cement. The result of this reaction produces a hard, structurally stable compound with very low permeability. The bottom ash has similar characteristics of the fly ash and is transported via a sluice to the Bottom Ash Basin or hauled in a hydrated state by truck for disposal.

Both ash types are essentially inert materials and are used as components of construction cement and other beneficial reuse applications. In addition, the inert, solid waste ash to be stored within the impoundment is a non-combustible, granular material that does not have the potential to generate litter or noxious odors.

Big Cajun II is proposing to use clay located on-site for the final cover. If the on-site clay is not of sufficient quality to use for the final cover, Big Cajun II will obtain sufficient quality and specification clay from an off-site source to use during final cover operations.

521.H.1.a.

2nd paragraph: Table 2 with the referenced material could not be located.

Response:

We were unable to locate a table containing the information mentioned; therefore, we have revised the response to this regulation accordingly.

Paragraph 2 of the response to this regulation has been revised as follows:

Below is a summary of all wastes disposed in the facilities at Big Cajun II. This summary includes information regarding the chemical and physical characteristics of the wastes. The total amount of waste generated per year at the facility is 4,680-7,800 tons per year.

521.J.1.c

Please note, from the response to 521.J.1.b, it appears all 5 impoundments will be closed in place. Therefore, provide an estimated cost based on closing all the impoundments. Remove the inflation factors and provide an estimate including the closure of all the impoundments. Note, the unit costs for similar components shall be the same and the cost of clay and topsoil shall be adjusted if the results to the calculations in 521.F.3.b show that sufficient soil does not exist on site.

Response:

It is LaGen's intent that all five impoundments be closed in place. The estimated cost to close all of the impoundments is: **$6,269,599** (pre-expansion). The estimated cost to close each impoundment, individually, is as follows:

Fly Ash Basin:	$3,395,207
Bottom Ash Basin:	$1,295,879 (pre-expansion)
	$2,221,800 (post-expansion)

Rainfall Surge Pond:	$632,062.95
Primary LPDES Treatment Pond:	$746,307.94
Secondary LPDES Treatment Pond:	$200,142.11.

The revised response to this regulation includes itemized closure costs for each of the impoundments. The revised itemized cost estimates now include the same costs for similar components. In addition, the estimates have been adjusted to include the cost of clay and topsoil, due to the fact that these materials may be obtained from off-site sources.

The revised response to this regulation is as follows:

The combined total cost of closure and post-closure care for the existing Fly Ash Basin, Bottom Ash Basin, Rainfall Surge Pond, and LPDES Treatment Ponds was estimated to be **$3,900,000** as stated in Big Cajun II's 1986 permit application accepted and approved by the DEQ. This cost was adjusted to present day cost estimates using inflation factors derived from the Implicit Price Deflator for the Gross Domestic Product as required in LAC 33:VII.727.A.b.2.iii. The present cost estimate for closure of all five impoundments is calculated to be **$6,269,599** (pre-expansion of the Bottom Ash Basin).

The individual costs for closure of the Fly Ash and Bottom Ash Basin were itemized in 1998 by Burns and McDonnell, as shown below. These cost estimates were adjusted per the Implicit Price Deflator for the Gross Domestic Product, and were calculated to be **$3,395,207** and **$1,295,879,** respectively. The estimated cost of closure of the Rainfall Surge Pond was calculated to be **$632,062.95.** The estimated costs of closure of the Primary and Secondary LPDES Treatment Ponds were calculated to be **$746,307.94** and **$200,142.11**, respectively.

Fly Ash Basin
Closure Cost

Description	**Quantity/Unit**	**Cost per Unit**	**Cost**
Ash Grading	178000 cubic yards	2.00	356,000
Clay Cover	518,000 cubic yards	3.50	1,813,000.00
Topsoil	129,500 cubic yards	3.00	388,500.00
Culverts	600 linear feet	30.00	18,000.00
Trenching	300 cubic yards	10.00	3,000.00
Riprap	2,050 cubic yards	40.00	82,000.00

Seeding	160 acres	1,490.67	238,507.20
		Total:	**2,899,007.20**
		Total Costs Adjusted for 2005:	**$3,395,207**

Bottom Ash Basin Closure Cost

Description	**Quantity/Unit**	**Cost per Unit**	**Cost**
Ash Grading	67,000 cubic yards	2.00	134,000.00
Clay Cover	192,500 cubic yards	3.50	673,750.00
Topsoil	48,100 cubic yards	3.00	144,300.00
Culverts	200 linear feet	30.00	6,000.00
Trenching	100 cubic yards	10.00	1,000.00
Riprap	1,450 cubic yards	40.00	58,000.00
Seeding	60 acres	1,490.67	89,440.20
		Total:	**1,106,490.20**
		Total Costs Adjusted for 2005:	**$1,295,879**

Rainfall Surge Pond Closure Cost

Description	**Quantity**	**Unit**	**Unit Price**	**Total**
Dewatering	6,947,143.00	GALLONS	$0.04	$259,702.78
Sediment Stabilization and Backfill	17,179.78	CY	$2.00	$34,359.56
Clay Cover	68,791.11	CY	$3.50	$240,768.89
Topsoil	17,179.78	CY	$3.00	$51,539.34
Culverts	79.95	LF	$30.00	$2,398.50
Trenching	42.64	CY	$10.00	$426.40
Riprap	277.16	CY	$40.00	$11,086.40
Seeding	21.32	ACRE	$1,490.67	$31,781.08
			Total	**$632,062.95**

Primary LPDES Treatment Pond

Description	Quantity	Unit	Unit Price	Total
Dewatering	8,201,670.00	GALLONS	$0.04	$306,600.35
Sediment stabilized and backfilled	20,303.38	CY	$2.00	$40,606.76
Clay Cover	81,213.52	CY	$3.50	$284,247.32
Topsoil	20,303.38	CY	$3.00	$60,910.14
Culverts	94.38	LF	$30.00	$2,831.40
Trenching	50.34	CY	$10.00	$503.40
Riprap	327.21	CY	$40.00	$13,088.40
Seeding	25.17	ACRE	$1,490.67	$37,520.16
			Total	**$746,307.94**

Secondary LPDES Treatment Pond

Description	Quantity	Unit	Unit Price	Total
Dewatering	2,199,494.00	GALLONS	$0.04	$82,222.97
Sediment stabilized and backfilled	5,444.88	CY	$2.00	$10,889.76
Clay Cover	21,779.55	CY	$3.50	$76,228.43
Topsoil	5,444.88	CY	$3.00	$16,334.64
Culverts	25.31	LF	$30.00	$759.30
Trenching	13.50	CY	$10.00	$135.00
Riprap	87.75	CY	$40.00	$3,510.00
Seeding	6.75	ACRE	$1,490.67	$10,062.02
			Total	**$200,142.11**

A revised closure estimate for the Bottom Ash Basin was calculated based on the proposed expansion and closure cap design depicted in ***Figure 28.*** The estimated cost of closing the expanded Bottom Ash Basin was found to be **$2,221,800**, as shown below. Therefore, incorporating the revised cost of closing the expanded Bottom Ash Basin, the total cost estimate for closure would be **$7,195,520**.

Bottom Ash Basin (with Expansion)

Description	Quantity	Unit	Unit Price	Total
Ash Grading	119,082	CY	$2.00	$278,929.10
Clay Cover	342,139	CY	$3.50	$1,402,451.34
Topsoil	85,490	CY	$3.00	$300,369.17
Culverts	355	LF	$30.00	$12,489.36
Trenching	178	CY	$10.00	$2,081.56
Riprap	2,577	CY	$40.00	$120,730.51
Seeding	60	ACRE	$1,490.67	$104,748.96
			Total	**$2,221,800.00**

521.J.2.c

Provide an estimate of the maximum inventory of solid waste for all impoundments to be closed in place.

Response:

We have revised the response to this regulation to include the maximum inventory of solid waste ever on-site over the active life of each individual impoundment.

The revised response to this regulation is as follows:

An estimate of the maximum inventory of solid waste ever on-site over the active life of the existing facilities, combined, was calculated to be approximately 6,218,270 cubic yards. The individual estimates of maximum inventory of solid waste ever on-site over the active life of the existing facilities are listed below.

Fly Ash Basin:	2,823,333 cubic yards
Bottom Ash Basin:	1,916,640 cubic yards
Rainfall Surge Pond:	534,497 cubic yards
Primary Treatment Pond:	737,616 cubic yards
Secondary Treatment Pond:	206,184 cubic yards

The total storage of the Bottom Ash Basin based on the proposed expansion was calculated to be 2,063,453 cubic yards. Incorporating the additional capacity of the proposed expansion, an estimate of the maximum inventory of solid waste ever on-site over the active life of all of the facilities combined was calculated to be approximately 6,365,083 cubic yards.

521.J.3.b

Please note, the response to 521.J.1.b does not include a reference to any drawing showing the final contours of the facility. Reference the drawings that show the proposed final contours for all the impoundments.

Response:

Figures 28a and ***28b*** show final contours based on the proposed vertical expansion of the Bottom Ash Basin. These contours were provided in this permit renewal application due to the potential vertical expansion of the Bottom Ash Pond. Drawings showing final contours of each of the other impoundments will be created and submitted to LDEQ along with the Official Notice of Intent to Close.

The revised response to this regulation is as follows:

Final contours based on the proposed vertical expansion of the Bottom Ash Basin are shown on ***Figures 28a and 28b.*** These contours were provided in this permit renewal application due to the potential vertical expansion of the Bottom Ash Pond. Drawings showing the final contours of each of the other impoundments will be created and submitted to LDEQ along with the Official Notice of Intent to Close.

521.K.1.b

Provide an itemized post-closure cost estimate. Include items such as cap maintenance, erosion repair, groundwater monitoring, etc.

Response:

The revised response to this regulation includes an itemized post-closure cost estimate.

The revised response to this regulation is as follows:

The estimated annual cost of hiring a third party to conduct post-closure activities for all five impoundments is **$15,000.** The combined cost of post-closure for all of the impoundments, for the required 30-year period, is **$608,521.** An itemized post-closure estimate, for all five impoundments combined is provided below:

Task	Description	Frequency	Cost
1	Cover Inspection	AS NEEDED	$1,250.00
2	Cover Integrity Maintenance	AS NEEDED	$3,000.00
3	Groundwater Sampling	2/YEAR	$5,000.00
4	Groundwater Analysis	2/YEAR	$2,750.00
5	Annual Reports	1/YEAR	$3,000.00
6	Gas Collection System Monitoring	N/A	$0.00
7	Gas Collection System Maintenance	N/A	$0.00
8	Leachate Collection System Monitoring	N/A	$0.00
9	Leachate Collection System Maintenance	N/A	$0.00
	Total	ANNUALLY	$15,000.00
	Total (with annual 2% inflation rate)	30 YEARS	$608,521.00

Appendix R

Please note, this appendix shall apply to all impoundments that are closed in place. Clarify the response.

Response:

Actually, it is by design that ***Appendix R*** of the permit renewal application is specific to the Bottom Ash Basin. This Plan was provided due to the fact that the permit renewal application includes a potential modification to allow for expansion of the Bottom Ash Pond. The other four impoundments covered by the existing permit do not require an updated Soil and Linder Quality Control Plan, as they are not being modified.

Response:

Section 2.2.2 (Clay Cap Soil Liner) has been revised to reflect a permeability of 1×10^{-7} cm/sec. ***Appendix R*** has been revised and is attached hereto as ***Appendix F***.

Page 7, 6th paragraph: Provide additional clarification for this paragraph (the POR...).

Response:

This paragraph has been revised as follows and is attached hereto as *Appendix F*.

The revised response is as follows:

The Professional of Record (POR), on behalf of the Owner, shall submit to the LDEQ a Closure Certification Report (CCR) for approval of each soil liner area.

Section 2.2.4: The last sentence of the paragraph is not applicable, please remove.

Response:

Section 2.2.4 (Top Soil Cover) has been revised and is attached hereto as *Appendix F.*

Table 2.2: Provide a frequency for permeability testing in units of # tests/acre/lift.

Response:

Table 2.2 was modified to reflect the correct testing frequency as required by ASTM 5084 and is attached hereto as *Appendix F*.

Geology Comments

General

Please provide a single plane view, updated, legible, and scaled map that depicts all soil borings, monitoring wells, and piezometers at the facility. Please use different nomenclature to identify soil borings, piezometers, and monitoring wells. Please do not depict any of the borings drilled to 10' bgs.

Response:

The revised historical boring location map (See ***Appendix G, Figure 25***) depicts existing monitoring wells and only those borings that were advanced to depths greater than ten feet below ground surface (bgs). No piezometers are present at the subject facility.

521.C.1.d

Please provide proper documentation which shows the location of aquifer recharge areas in the site or within 1,000 feet of the site perimeter.

Response:

Figure 29 in ***Appendix G*** shows the location of aquifer recharge areas within 1,000 feet of the site perimeter.

The revised response to this regulation is as follows:

A map showing aquifer recharge areas within 1,000 feet of the site perimeter is included as ***Figure 29***.

521.D

From the information submitted, it can not be determined if the facility meets the minimum boring requirements of the Solid Waste Regulations as stipulated in LAC 33:VII.709.C.1.c. This determination will be made once updated maps and geological cross sections are submitted. Please note that borings should meet the minimum spacing, depth, and sampling frequency requirements. All borings should be continuously sampled to at least 30 feet below the base of excavation. Maximum distance between borings shall not exceed 450 feet.

Response:

The revised boring location map (See *Appendix G, Figure 25*) depicts borings which were advanced to depths greater than ten feet bgs. The borings that were advanced in 2005 were spaced approximately 500 feet apart; however, these borings were advanced only to determine geotechnical characteristics, such as slope stability. Previously advanced borings (1974 and 1977) were spaced approximately 250 feet apart, in accordance with Solid Waste Regulations.

The revised response to this regulation is as follows:

An isometric profile and cross-sections of the soils within the site are included in ***Figures 17*** and ***19A*** through ***19E***. ***Figure 18*** depicts historical borings, existing monitoring well, and cross-section locations.

521.D.1.a.

Both the cross sections and isometric profile should depict the monitoring wells/piezometers, boring logs, and screen intervals. Please note that cross-sections should be developed for each transect of the boring grid pattern. Also cross sections should show the maximum excavation depth of the impoundments.

Response:

Additional cross-sections (***Figures 19A*** through ***19E***) and a revised isometric profile (***Figure 17***) are included in ***Appendix G***. The isometric profile was revised to depict the screen intervals of the monitoring wells. Cross-sections are included for each transect of the 2005 boring grid pattern.

The revised response to this regulation is as follows:

An isometric profile and cross-sections of the soils within the site are included in ***Figures 17*** and ***19A*** through ***19E***. ***Figure 18*** depicts boring, monitoring well, and cross-section locations.

521.D.1.b.

Boring logs should depict ground surface elevation and first water encountered.

Response:

The geotechnical subcontractor, Capozzoli & Associates, Inc., was unable to provide this information. A review of boring logs dating back to 1975 indicates that ground surface elevations and first indications of groundwater were not included in the logs. Logs of any future borings or monitoring wells installed at the site will include this information.

521.E.1.a.iii

Once the geology beneath the site has been properly characterized, it needs to established which strata comprises the uppermost aquifer, lower confining unit, and if applicable, the uppermost water-bearing permeable zone beneath the impoundments.

Note that we could not find any discussion about vertical groundwater flow. In order to discern vertical groundwater flow, a deep piezometer should be installed (in clusters) adjacent to an existing shallow monitoring well/piezometer. If the water level data indicates that there is a vertical groundwater flow component beneath the facility, a flow net should be developed. The vertical groundwater flow will have to be analyzed in detail in order to determine how it may affect the groundwater monitoring at the facility.

Provide direction(s) and rate(s) of groundwater flow based on information from piezometers and monitoring wells and shown on potentiometric maps.

Response:

These issues are addressed in the revised response below.

The revised response to this regulation is as follows:

Because of the hydrogeological setting of the site, proximal to the Mississippi River and situated within a meander lobe of the river, groundwater flow direction can vary as much as 180°. Potentiometric maps (***Figures 20*** through ***23***) show the change in groundwater flow direction.

Big Cajun II plans to install additional monitoring wells to better understand groundwater flow and to establish background conditions. Because of the directional change of groundwater flow, it is likely that side gradient wells will be installed for use as background wells.

As part of the proposed installation of additional wells, vertical piezometers will be installed to determine if a vertical component of groundwater flow exists.

521.F.5.a

By observing Exhibit 1 of Appendix H, it appears that the groundwater monitoring wells are screened in different permeable units. Please note that monitoring wells should be screened in the same water-bearing zone and should be installed as close to the monitored unit as practicably possible. Also, the screen length shall not be greater than 10 feet.

Response:

All of the existing groundwater monitoring wells screen sections intercept a silty sand unit, with the exception of MW-85E, which is screened in an upper discontinuous silt unit. All five of the existing groundwater monitoring wells have screen lengths of 20 feet.

Additional wells are planned to augment the monitoring well network. These wells will be screened within the same permeable unit, and screen lengths will not be greater than ten feet. However, Big Cajun II plans to continue use of the existing monitoring wells MW-85A through MW-85E as part of the monitoring well network.

521.F.5.b

Provide a scaled map that depicts the relative point of compliance. Please note that the relative point of compliance must intersect all the downgradient monitoring wells.

Response:

Because of the variable nature of groundwater flow direction at the site, a point of compliance cannot be determined at this time.

Big Cajun II plans to install additional monitoring wells as part of the monitoring well network. It is anticipated that these proposed wells will aid in characterizing groundwater flow patterns, in addition to establishing background conditions and augmenting the existing monitoring well network. Because of the directional change of groundwater flow, most likely side gradient wells will be installed for use as background wells.

The revised response to this regulation is as follows:

Please refer to Big Cajun II's Sampling and Analysis Plan (***Appendix H***) for groundwater monitoring well specifications. Cross-sections illustrating the construction of wells are located in the Soil Boring Logs (***Appendix G***). A relevant point of compliance has not yet been determined because of the variable nature of groundwater flow direction at the site. Additional potentiometric data points are needed to establish true upgradient/downgradient wells. As discussed in the Sampling and Analysis Plan (***Appendix H***), upon LDEQ's approval, five piezometers will be installed at the locations depicted in ***Figure 24.*** Potentiometric data will be collected from the piezometers and existing wells for a period of one year. At this point the data will be evaluated to determine upgradient/downgradient wells, and additional wells will be installed.

Big Cajun II plans to install additional monitoring wells as part of the monitoring well network. It is anticipated that these proposed wells will aid in characterizing groundwater flow patterns, in addition to establishing background conditions and augmenting the existing monitoring well network. Because of the directional change of groundwater flow, most likely side gradient wells will be installed for use as background wells.

521.F.5.c

Note that the proposed groundwater monitoring system may need to be upgraded based on future geological and hydrogeologic data that may be obtained.

The following comments refer to the Sampling Analysis Plan (SAP) included as part of your Ground Water Monitoring Plan submitted in Appendix H of the permit renewal application.

3.0 Detection Monitoring Parameters:
Total Petroleum hydrocarbons (TPH's), aluminum, arsenic, barium, selenium, as well as acid (phenol) compounds, base-neutral compounds and volatile compounds shall be added to the list of proposed parameters.

Response:

As required in LAC 33:VII.709.E.3.g, the inorganic and organic parameters selected by BCII for detection monitoring are indicator parameters or reaction products of water placed in the impoundments. In accordance with LAC 33:VII.709.E.3.g, ten parameters were chosen to provide a reliable indication of the presence of contaminants in the groundwater. The detection monitoring parameters are:

- pH
- specific conductance
- temperature
- total dissolved solids
- selenium
- magnesium
- sulfate
- chloride
- calcium
- iron

These parameters were chosen based on the chemical characteristics of the waste, as demonstrated by sampling and analysis. The additional parameters requested by the LDEQ are not constituents associated with solid waste in the subject impoundments, nor are they reaction products of water placed in the impoundments. Big Cajun II respectfully submits that the existing 10 parameters are sufficient as indicator compounds for the groundwater monitoring program.

4.0 Sampling and Analysis Plan:
Initial sampling should be conducted quarterly for the first year and semi-annually thereafter.

Response:

The Sampling and Analysis Plan has been revised accordingly.

The revised Section 4.0 of the Sampling and Analysis Plan is as follows:

Initial sampling and analysis of the Big Cajun II groundwater wells will be conducted quarterly for the first year following installation of additional monitoring wells and semi-annually thereafter, for the life of the impoundments and the duration of the post-closure care period, as required by LAC 33:VII.709.E.c and d.

The initial sampling for detection monitoring will occur after receipt of LDEQ approval of this Groundwater Monitoring Plan, and after additional monitoring wells have been installed. The initial sampling will include independent samples collected from each well for analysis of the detection monitoring parameters.

This sampling and analysis plan explains procedures and techniques for:

- sample collection which ensures that collected samples are representative of the zone being monitored and which prevents cross-contamination of or tampering with samples;
- sample preservation and shipment which ensures the integrity and reliability of the sample collected for analysis; and
- chain-of-custody control.

4.1.3 Well Evacuation:

Explain in detail how three well volumes will be calculated.

Response:

The Sampling and Analysis Plan has been revised to include this information.

The revised Section 4.1.3 is as follows:

After water level measurements are taken, a volume of water equal to at least three times the volume of water initially contained in each well is purged to remove stagnant water in the well. If at least three well volumes of water cannot be removed, the well will be purged dry.

To calculate well volumes, the depth to water measurement is subtracted from the total depth of the well to determine the water column length in each well. This length is multiplied by the cross-sectional area of the well to determine well volume. The following formula includes conversion factors, as well as the numerical equivalent of π:

$V = 5.875 \times D^2 \times H$.

Where:

V = Well volume (gallons)
D = Inside well diameter (feet)
H = Height of groundwater column (feet)

4.1.6 Well Maintenance:

Indicate that if it is determined that over 10% of a well screen is blocked due to the settling of solids within the well, the well must be redeveloped prior to the next sampling event.

Response:

The Sampling and Analysis Plan has been revised to include this information.

The revised Section 4.1.6 of the Sampling and Analysis Plan is as follows:

During sampling events, wells will be inspected for signs of tampering, damage, corrosion, faulty locking devices, etc. Any areas of concern will be noted in the field log book, reported to LDEQ and promptly corrected upon receipt of LDEQ approval.

Depth to well bottom measurements will be collected on an annual basis to determine if settling of solids has occurred. If over 10% of a well screen is blocked due to the settling of solids within the well, the well will be redeveloped prior to the next sampling event.

6.0 Quality Assurance/Quality Control

At a minimum, one field blank and one trip blank should be collected per day/cooler per sampling event.

Response:

The Sampling and Analysis Plan has been revised to include this information.

The revised Section 6.1.1 of the Sampling and Analysis Plan is as follows:

A field blank is collected to determine potential absorption of volatile organics from the air into a sample. The field blank is collected at the sampling site by filling a container received from the laboratory with deionized water and without the use of any intermediary tubes or vessels. The field blank is labeled with a unique identification number, and standard chain-of-custody procedures are followed. The field blank is subjected to the same laboratory analysis as the samples. The concentration levels of any contaminant found in the field blank will be noted and compared to sample results. One field blank sample will be collected per day.

The revised Section 6.1.2 of the Sampling and Analysis Plan is as follows:

A trip blank, also known as a laboratory blank, is furnished by the contract laboratory to detect and quantify potential chemical artifacts originating from sample containers, deionized water, or laboratory handling procedures. The trip blank is produced by the laboratory prior to field mobilization. The trip blank is transported to the sampling location and returned to the laboratory with the samples. The trip blank is not opened in the field but is subjected to the same laboratory analysis as the samples. The concentration levels of any contaminant found in the trip blank will be noted and compared to sample results. One trip blank will be included in each sample cooler.

6.2 Laboratory Quality Control:

Indicate that laboratory matrix spikes and matrix spikes duplicates (MS/MSD) will be analyzed.

Response:

The Sampling and Analysis Plan has been revised to include this information.

The revised Section 6.2 of the Sampling and Analysis Plan is as follows:

Big Cajun II submits all groundwater samples to a qualified independent laboratory which performs testing according to documented and approved procedures by trained personnel using calibrated equipment. QA/QC procedures, including field blanks, laboratory spikes and blanks, precision and accuracy of analyses, and detection limits, conform to those specified in SW-846.

Laboratory matrix spikes and matrix spikes duplicates (MS/MSD) will be analyzed at a rate of at least one for each twenty samples.

General:

Field instruments shall be calibrated before and after each sampling event. Calibrations should be done in accordance with the manufacturer's recommendations. Calibration data shall be recorded in a logbook for each sampling even so the intention of LAC 33:VII.709.E.2 can be met.

Response:

The Sampling and Analysis Plan has been revised to include this information.

The revised Section 4.1.5 of the Sampling and Analysis Plan is as follows:

Field measurements of temperature, conductivity, and pH are taken and recorded on the Groundwater Sampling Data Form, and the appearance of the ground water is also noted.

Field instruments will be calibrated before and after each sampling event, in accordance with manufacturer's specifications. The calibration data will be recorded in a logbook for each sampling event.

Upgradient wells should be sampled before downgradient wells.

Response:
At the present time, upgradient and downgradient wells cannot be determined at the site, due to periodic reversals in the direction of the groundwater flow. Based on historical sampling data, the sampling order will be from least impacted to most impacted wells.

521.F.5.d

The initial sampling event shall be a minimum of four independent samples collected for each parameter. These samples should be collected quarterly over a period of one year in order to reflect seasonal variations in groundwater quality. Please note that some statistical methods require more than four (4) independent samples for the method to be valid.

Response:

The Sampling and Analysis Plan has been revised accordingly.

The revised Section 4.0 of the Sampling and Analysis Plan is as follows:

Initial sampling and analysis of the Big Cajun II groundwater wells will be conducted quarterly for the first year following installation of proposed additional monitoring wells and semi-annually thereafter, for the life of the impoundments and the duration of the post-closure care period, as required by LAC 33:VII.709.E.c and d.

The initial sampling for detection monitoring will occur after receipt of DEQ-SWD approval of this Groundwater Monitoring Plan and following the installation of additional proposed monitoring wells. The initial sampling will include independent samples collected from each well for analysis of the detection monitoring parameters.

This sampling and analysis plan explains procedures and techniques for:

- sample collection which ensures that collected samples are representative of the zone being monitored and which prevents cross-contamination of or tampering with samples;
- sample preservation and shipment which ensures the integrity and reliability of the sample collected for analysis; and
- chain-of-custody control.

The revised response to this regulation is as follows:

Upon LDEQ approval of the Sampling and Analysis Plan, the existing five monitoring wells and five additional monitoring wells will initially be sampled on a quarterly basis, for a period of one year, and semi-annually thereafter. Groundwater Monitoring Reports are submitted to the LDEQ subsequent to each sampling event and contain all data generated from the samples.

521.F.5.e

Provide a flow-chart/decision-tree plan indicating the steps to be followed when selecting the appropriate statistical method.

Please note that the facility should propose a statistical method, which can determine if there is statistically significant difference in groundwater quality. This must be accomplished by comparing the concentration of each parameter or constituent of each downgradient well to the background well(s).

Response:

Big Cajun II is of the opinion that the steps followed in selecting the appropriate statistical method are set forth in section 7.0 of the revised Sampling and Analysis Plan. This section is provided below for ease of reference:

Selection of the statistical method used by Big Cajun II is according to the Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Final Guidance, EPA 530-SW-89-026, April 1989.

The statistical method used in evaluating the groundwater monitoring data for each parameter sampled and analyzed is either a parametric analysis of variance (ANOVA) or an ANOVA based on ranks, followed by a multiple comparisons procedures to identify statistically significant evidence of contamination. If a parametric ANOVA is used, it includes estimation and testing of the contrasts between each compliance well's mean and the background mean levels for each parameter. If an ANOVA based on ranks is used, it includes estimation and testing of the contrasts between each compliance well's median and the background median levels for each parameter or constituent. The multiple comparisons procedure has a Type I experiment-wise error rate of no less than 0.005 for each testing period and the individual well comparison procedure maintains a Type I error rate of no less than 0.01 for each testing period. If possible, the method includes procedures to control or correct for seasonal and spatial variability as well as temporal correlation in the data.

Since the proportion of non-detected concentrations and the distribution of data for each parameter may differ, more than one method is occasionally needed so that each parameter is evaluated using the most appropriate method. In the event that the most appropriate method is not readily identifiable, a qualified statistician is consulted for guidance in choosing the most appropriate method. However, the majority of cases are handled by the following guidelines in choosing the most appropriate method.

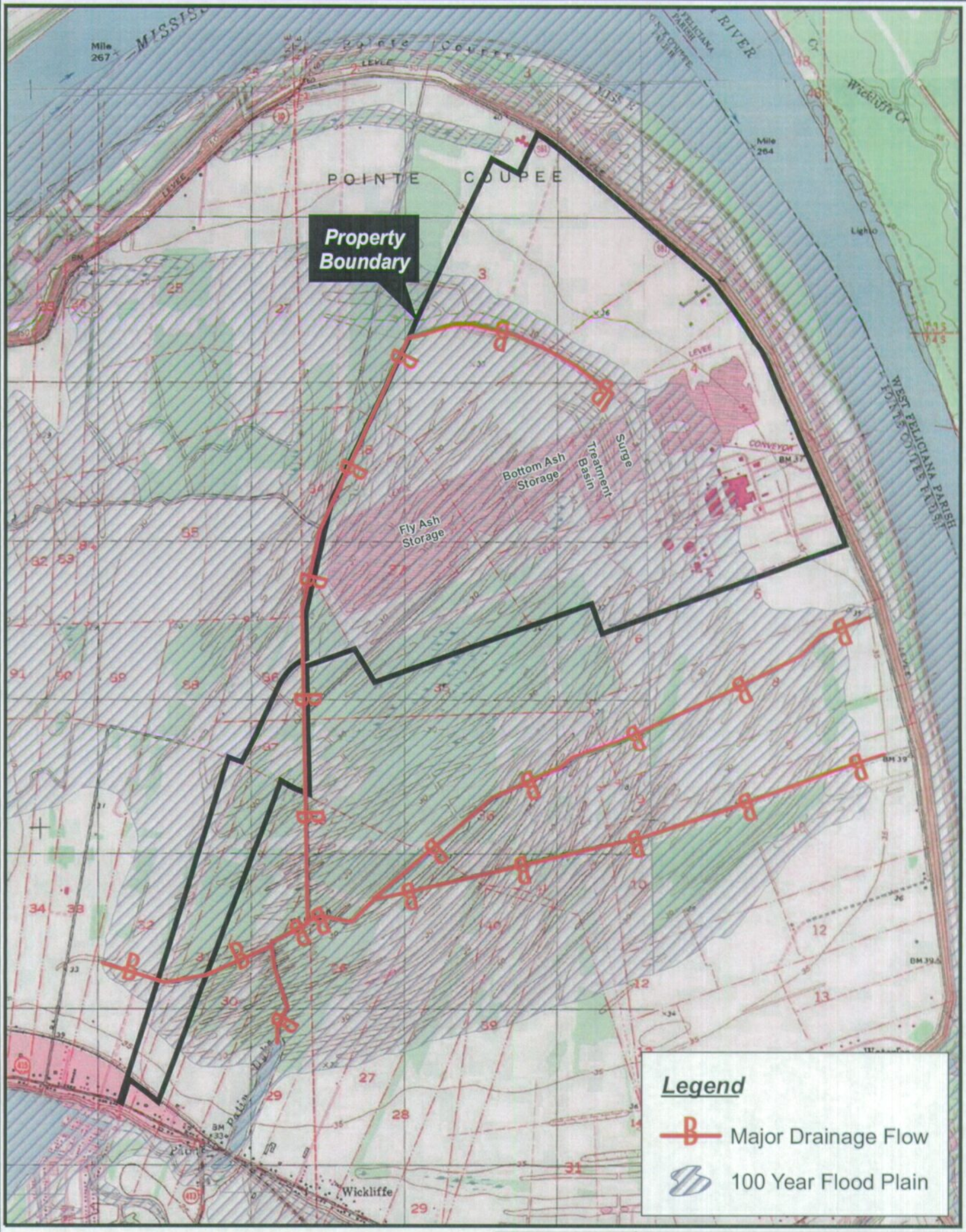
In determining the most appropriate method for each parameter, the first step is to assess the proportion of non-detected concentrations. If the proportion of non-detects in the data set is greater than 50% but not greater than 90%, then a test of proportions is used since it is appropriate for data sets with approximately that proportion of non-detects. If the proportion of non-detects in the data set is greater than or equal to 15% but not greater than 50%, then the ANOVA based on ranks is used since it is appropriate for data sets with approximately that proportion of non-detects. However, if the proportion of non-detected concentrations is not greater than or equal to 15% of the data set, then the non-detects are replaced with a value that is half of the non-detect level. Please note that if the proportion of non-detected concentrations is greater than 90%, or if some feature of the data is questionable, a qualified statistician is consulted for guidance in choosing the most appropriate method.

The second step in determining the most appropriate method is to determine whether or not the distribution of data for each parameter is normal using a normal theory test. If a normal theory test indicates that the distribution of the data is not normal, the data is mathematically transformed to approximate a normal distribution, if possible. If the data is normally distributed or can be mathematically transformed to approximate a normal distribution, then the parametric ANOVA is used; if not, the ANOVA based on ranks is used since it is a distribution-free method.

Should a statistically significant increase over background values for one or more parameter be determined, Big Cajun II will notify DEQ-SWD according to the Notification Regulations and Procedures for Unauthorized Discharge (LAC 33:I.Subpart 2) and, within 14 days after the determination is made, submit to DEQ-SWD a report that identifies which parameters were determined to have shown statistically significant changes from background levels. Within 90 days after the determination is made, Big Cajun II will initiate an assessment monitoring program as described in LAC 33:VII.709.E.8, or Big Cajun II will submit a report to DEQ-SWD demonstrating that a source other than Big Cajun II impoundments caused the statistically significant increase or that the statistically significant increase resulted from an error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality.

Upon evaluation of the data from the newly proposed monitoring wells, a new statistical method may be imposed.

FIGURES



3,000 1,500 0 3,000
Feet

REFERENCE:
USGS 7.5 Minute Topographic Quadrangle Maps
New Roads, Port Hudson, Elm Park, and St. Francisville, LA

Map Document: (N:\DRAFTING\Big Cajun\ArcView\GIS_Documents\MXD\5494007_AV-01.mxd)
2/9/2006 -- 8:34:56 AM

OFFICE	DRAWN BY		CHECKED BY	APPROVED BY	DRAWING NUMBER
BTR	B. Holt	1/26/06			5494007_AV-01

Shaw®

LOUISIANA GENERATING, LLC
NEW ROADS, LOUISIANA

FIGURE 1

AREA MASTER PLAN

BIG CAJUN II
SOLID WASTE PERMIT APPLICATION

APPENDIX A
LDEQ NOD LETTER

DEPARTMENT OF ENVIRONMENTAL QUALITY

DEQ LOUISIANA

KATHLEEN BABINEAUX BLANCO
GOVERNOR

MIKE D. McDANIEL, Ph.D.
SECRETARY

NOV 2 2 2006

CERTIFIED MAIL 7004 1160 0000 3793 6429
RETURN RECEIPT REQUESTED

RECEI... 29

Mr. Gary C. Ellender, Manager, Environmental Department
Louisiana Generating, LLC, Big Cajun II Power Plant
112 Telly Street
New Roads, Louisiana 70760

Re: Notice of Deficiency Permit Application
Technical Review #1
Louisiana Generating LLC, Big Cajun II Power Plant
AI #38867/GD-077-0583 / P-0108
PER19960002
Pointe Coupee Parish

Dear Mr. Ellender:

The Waste Permits Division has performed the technical review of your permit renewal application submitted on your behalf by Shaw Environmental on April 28, 2006. The submittal has been determined to be deficient and not in compliance with LAC 33:VII. The deficiencies are outlined below:

Permit Reviewer Comments

521.A.1.f — Please provide a wetlands demonstration as this is an expansion of an existing facility.

521.F.1 — The certification must be signed and certified by a registered engineer, licensed in the state of Louisiana as required by 713.B.1.

521.H.1.f — Please address LA R.S. 30:2157 in this section.

521.L.3 — Please provide a certificate of liability insurance with the wording as required in LAC 33:V.II.727.A.1.d.i.(e)

In addition, please provide in this section (or refer to Financial Assurance Section) all responses to financial assurance requirements in LAC 33:VII.727.A.1.a-f that relate to the applicable financial assurance mechanism. You should have a response for each section even if the answer is "does not apply" but please explain why it does not apply.

ENVIRONMENTAL SERVICE
: PO BOX 4313, BATON ROUGE, LA 70821-43
P:225-219-3181 F:225-219-33
WWW.DEQ.LOUISIANA.G

521.L.4 Please provide an updated Trust Fund agreement with the language as specified in LAC 33:V.II.727.A.2.d.ix.

In addition, please provide in this section (or refer to Financial Assurance Section) all responses to financial assurance requirements in LAC 33:VII.727.A.2.a-k that relate to the applicable financial assurance mechanism. You should have a response for each section even if the answer is "does not apply" but please explain why it does not apply.

Engineering Comments

521.A.1.a.ii Provide the additional documentation referenced.

521.B.1.f Provide methods to monitor waste received into the bottom ash impoundment.

521.C.1.e Provide the 100-year flood elevation.

521.F.3.b Please note, this requirement is applicable. Address the type of material proposed for the final cover. Provide calculations demonstrating that an adequate volume of material exists for final cover.

Last paragraph: Remove the reference to landfill.

521.H.1.a 2nd paragraph: Table 2 with the referenced material could not be located.

521.J.1.c Please note, from the response to 521.J.1.b, it appears all 5 impoundments will be closed in place. Therefore, provide an estimated cost based on closing all the impoundments. Remove the inflation factors and provide an estimate including the closure of all the impoundments. Note, the unit costs for similar components shall be the same and the cost of clay and topsoil shall be adjusted if the results to the calculations in 521.F.3.b show that sufficient soil does not exist on site.

521.J.2.c Provide an estimate of the maximum inventory of solid waste for all impoundments to be closed in place.

521.J.3.b Please note, the response to 521.J.1.b does not include a reference to any drawing showing final contours of the facility. Reference the drawings that show the proposed final contours for all the impoundments.

521.K.1.b	Provide an itemized post-closure cost estimate. Include items such as cap maintenance, erosion repair, groundwater monitoring, etc.
Appendix R	Please note, this appendix shall apply to all impoundments that are closed in place. Clarify the response. Section 2.2.2: Note, the permeability shall be 1×10^{-7} (cm/sec) or less. Correct the response. Page 7, 6th paragraph: Provide additional clarification for this paragraph (The POR...). Section 2.2.4: The last sentence of the paragraph is not applicable, please remove. Table 2.2: Provide a frequency for permeability testing in units of # tests/acre/lift.

Geology Comments

General	Please provide a single plane view, updated, legible, and scaled map that depicts all soil borings, monitoring wells, and piezometers at the facility. Please use different nomenclature to identify soil borings, piezometers, and monitoring wells. Please do not depict any of the borings drilled to 10' bgs.
521.C.1.d	Please provide proper documentation which shows the location of aquifer recharge areas in the site or within 1,000 feet of the site perimeter.
521.D	From the information submitted, it can not be determined if the facility meets the minimum boring requirements of the Solid Waste Regulations as stipulated in LAC 33:VII.709.C.1.c. This determination will be made once updated maps and geological cross sections are submitted. Please note that borings should meet the minimum spacing, depth, and sampling frequency requirements. All borings should be continuously sampled to at least 30 feet below the base of excavation. Maximum distance between borings shall not exceed 450 feet.
521.D.1.a	Both the cross sections and isometric profile should depict the monitoring wells/piezometers, boring logs, and screen intervals. Please note that cross-sections should be developed for each transect of the boring grid pattern. Also cross sections should show the maximum excavation depth of the impoundments.

521.D.1.b Boring logs should depict ground surface elevation and first water encountered.

521.E.1.a.iii Once the geology beneath the site has been properly characterized, it needs to be established which strata comprises the uppermost aquifer, lower confining unit, and if applicable, the uppermost water-bearing permeable zone beneath the impoundments.

Note that we could not find any discussion about vertical groundwater flow. In order to discern vertical groundwater flow, a deep piezometer should be installed (in clusters) adjacent to an existing shallow monitoring well/piezometer.
If the water level data indicates that there is a vertical groundwater flow component beneath the facility, a flow net should be developed. The vertical groundwater flow will have to be analyzed in detail in order to determine how it may affect the groundwater monitoring at the facility.

Provide direction(s) and rate(s) of groundwater flow based on information from piezometers and monitoring wells and shown on potentiometric maps.

521.F.5.a By observing Exhibit 1 of Appendix H, it appears that the groundwater monitoring wells are screened in different permeable units. Please note that monitoring wells should be screened in the same water-bearing zone and should be installed as close to the monitored unit as practicably possible. Also, the screen length shall not be greater than 10 feet.

521.F.5.b Provide a scaled map that depicts the relative point of compliance. Please note that the relative point of compliance must intersect all the downgradient monitoring wells.

521.F.5.c Note that the proposed groundwater monitoring system may need to be upgraded based on future geological and hydrogeologic data that may be obtained.

The following comments refer to the Sampling Analysis Plan (SAP) included as part of your Ground Water Monitoring Plan submitted in Appendix H of the permit renewal application.

3.0 Detection Monitoring Parameters:

Total petroleum hydrocarbons (TPH's), aluminum, arsenic, barium, selenium, as well as acid (phenol) compounds, base-neutral compounds and volatile compounds shall be added to the list of proposed parameters.

Provide more specific information about the polymer used as clarifier.

4.0 Sampling and Analysis Plan:
Initial sampling should be conducted quarterly for the first year and semi-annually thereafter.

4.1.3 Well Evacuation:
Explain in detail how three well volumes will be calculated

4.1.6 Well Maintenance:
Indicate that if it is determined that over 10% of a well screen is blocked due to the settling of solids within the well, the well must be redeveloped prior to the next sampling event.

6.0 Quality Assurance/Quality Control:
At a minimum, one field blank and one trip blank should be collected per day/cooler per sampling event.

6.2 Laboratory Quality Control:
Indicate that laboratory matrix spikes and matrix spikes duplicates (MS/MSD) will be analyzed.

General:
Field instruments shall be calibrated before and after each sampling event. Calibrations should be done in accordance with the manufacturer's recommendations. Calibration data shall be recorded in a logbook for each sampling event so the intention of LAC 33:VII.709.E.2 can be met.

Upgradient wells should be sampled before downgradient wells.

521.F.5.d The initial sampling event shall be a minimum of four independent samples collected for each parameter. These samples should be collected quarterly over a period of one year in order to reflect seasonal variations in groundwater quality. Please note that some statistical methods require more than four (4) independent samples for the method to be valid.

521.F.5.e: Provide a flow-chart/decision-tree plan indicating the steps to be followed when selecting the appropriate statistical method.

Please note that the facility should propose a statistical method, which can determine if there is a statistically significant difference in groundwater quality. This must be accomplished by comparing the concentration of each parameter or constituent of each downgradient well to the background well(s).

Your response to these deficiencies shall be sent to this office within thirty (30) days of receipt of this letter. Additionally, five (5) copies of your response, including appendices, shall be provided. Failure to respond to these deficiencies as described as well as failure or refusal to comply with this notice may result in a permit denial.

Please reference Agency Interest Number (AI # 38867), Site Identification Number (GD-077-0583), Permit Number (P-0108) and the Permit Activity Number (PER19960002) on all future correspondence pertaining to this permit activity. For questions concerning this matter, please contact Curt A. Auzenne at (225) 219-3060 (Permit Writer Review), Estuardo Silva at (225) 219-3408 (Geology Review) or Jason Meyers at (225) 219-3459 (Engineering Review).

Sincerely,

Bijan Sharafkhani

Bijan Sharafkhani, P.E.
Administrator
Waste Permits Division

ca

c: Jason Meyers - LDEQ
Estuardo Silva – LDEQ
Richard "Shan" Schatzle – Shaw Environmental

APPENDIX B
ENGINEERING CERTIFICATION

Facility Plans and Specifications
Certification
(LAC 33:VII.521.F.1)

The Industrial Solid Waste Impoundments (i.e., Fly Ash Basin, Bottom Ash Basin, Rainfall Surge Pond, Primary Treatment Pond, and Secondary Treatment Pond), located within the Big Cajun II Facility, are existing facilities that were originally designed and constructed to engineered specifications in compliance with the regulatory and design requirements of that time.

No design, plans or specifications were prepared for this permit renewal application.

I certify under penalty of law that I have personally examined and I am familiar with the information submitted in this permit application and that the facility as described in this permit application meets the requirements of the Solid Waste Rules and Regulations. I am aware that there are significant penalties for knowingly submitting false information, including the possibility of fine and imprisonment.

A professional engineer's certification of conditions comprises a declaration of his professional judgment. It does not constitute a warranty or guarantee, expressed or implied.

Anthony L. Jones
Name

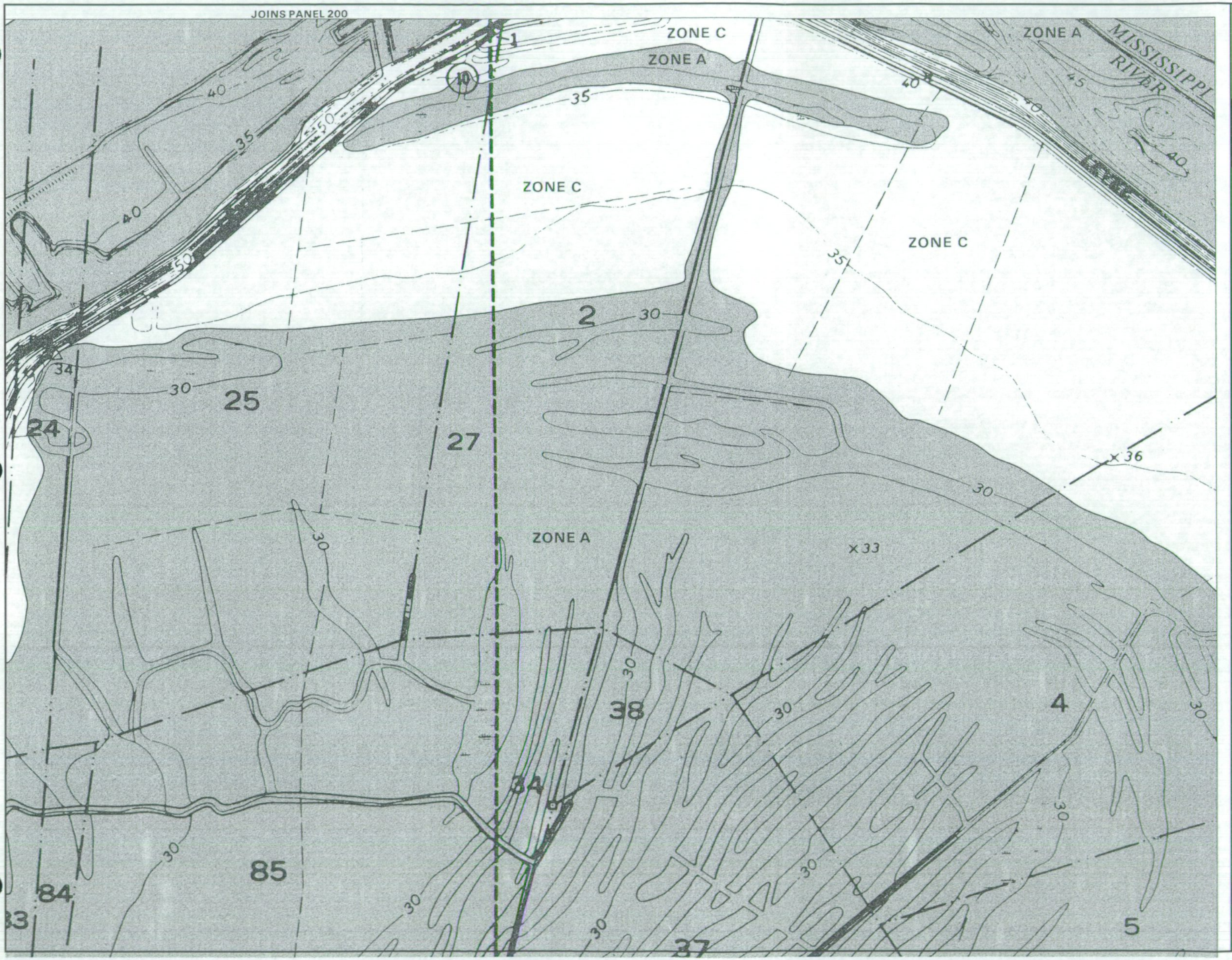
24690 | LA
Registration No. | State

Anthony L. Jones
Signature

01/29/2007
Date

STATE OF LOUISIANA
ANTHONY L. JONES
License No. 24690
PROFESSIONAL ENGINEER IN
CHEMICAL ENGINEERING

APPENDIX E
FLOOD INSURANCE RATE MAPS



NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

POINTE COUPEE PARISH,
LOUISIANA
(UNINCORPORATED AREAS)

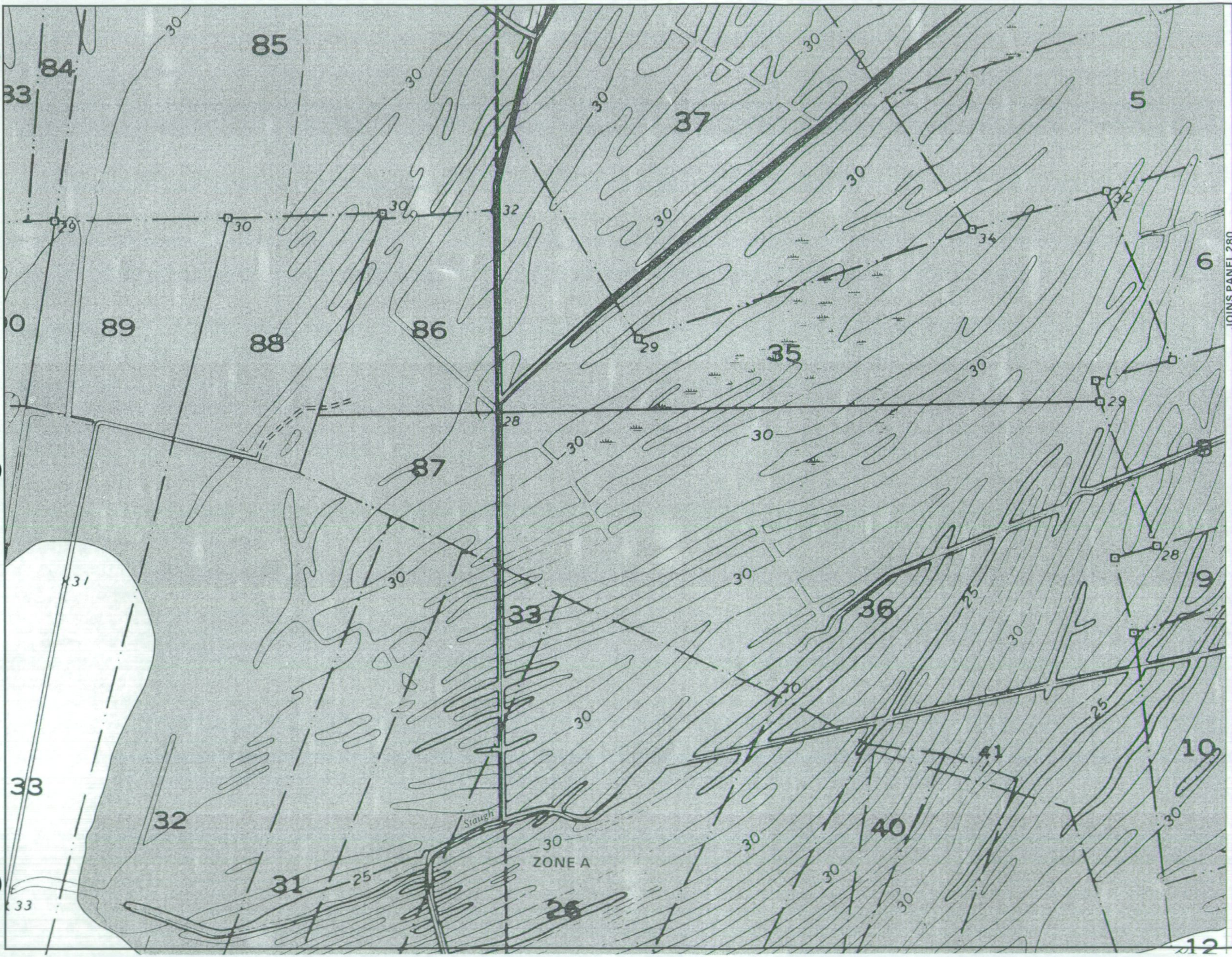
PANEL 260 OF 475
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
220140 0260 C

MAP REVISED:
NOVEMBER 16, 1995

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



APPROXIMATE SCALE

1000 0 1000 FEE

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

POINTE COUPEE PARISH,
LOUISIANA
(UNINCORPORATED AREAS)

PANEL 260 OF 475
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
220140 0260 C

MAP REVISED:
NOVEMBER 16, 1995

Federal Emergency Management Agency

APPENDIX F
BOTTOM ASH BASIN SOILS AND LINER QUALITY CONTROL PLAN

BOTTOM ASH BASIN CLOSURE
SOILS AND LINER QUALITY CONTROL PLAN
POINTE COUPEE PARISH, LOUISIANA

January 2007

Prepared for:

Louisiana Generating, L.L.C.
Big Cajun II Power Plant
New Roads, Pointe Coupee Parish, Louisiana 70760

Prepared by:

Shaw Shaw Environmental & Infrastructure, Inc.

Shaw Environmental & Infrastructure, Inc.
4171 Essen Lane
Baton Rouge, Louisiana 70809

Table of Contents

1.0 Introduction

1.1 Purpose

This Soils and Liner Quality Control Plan (SLQCP) has been prepared to provide the Owner, Design Engineer, Construction Quality Assurance Professional of Record, and the Contractor the means to govern the construction quality and to satisfy the environmental protection requirements under current Louisiana Department of Environmental Quality (LDEQ) Municipal Solid Waste Division Rules. More specifically, the SLQCP addresses the soil components of the liner system.

This SLQCP is divided into the following parts:

- Section 1 - Introduction
- Section 2 - Construction Quality Assurance for Earthwork
- Section 3 - Documentation

1.2 Definitions

Whenever the terms listed below are used, the intent and meaning shall be interpreted as indicated.

ASTM

This means the American Society for Testing and Materials.

Construction Quality Assurance (CQA)

A planned system of activities that provides the Owner and permitting agency assurance that the facility was constructed as specified in the design (EPA, 1986). Construction quality assurance includes observations and evaluations of materials, and workmanship necessary to determine and document the quality of the constructed facility. Construction quality assurance (CQA) refers to measures taken by the CQA organization to assess if the installer or contractor is in compliance with the plans and specifications for a project.

Construction Quality Assurance Professional of Record (POR)

The POR is an authorized representative of the Owner and has overall responsibility for construction quality assurance and confirming that the facility was constructed in general accordance with plans and specifications approved by the permitting agency. The POR must be registered as a Professional Engineer in Louisiana and experienced in geotechnical testing and its interpretations. Experience and education should include geotechnical engineering, engineering geology, soil mechanics, geotechnical laboratory testing, construction quality assurance, and quality control testing, and hydrogeology. The POR must show competency and experience in certifying like installations, and be approved by the permitting agency, and be presently employed by or practicing as a geotechnical engineer in a recognized geotechnical/environmental engineering organization. The credentials of the POR must meet or exceed the minimum requirements of the permitting agency. Any references to monitoring, testing, or observations to be performed by the POR should be interpreted to mean the POR or CQA monitors working under the POR's direction.

The POR may also be known in applicable regulations and guidelines as the CQA Engineer, Resident Project Representative, or the Geotechnical Professional (GP).

Construction Quality Assurance (CQA) Monitors

These are representatives of the POR who work under direct supervision of the POR. The CQA monitor is responsible for quality assurance monitoring and performing onsite tests and observations. The CQA monitor is on site full-time during construction and reports directly to the POR. The CQA monitor performing daily QA/QC observation and testing shall be NICET-certified in geotechnical engineering technology at level 2 or higher for soils; a CQA monitor with a minimum of four years of directly related experience; or a graduate engineer or geologist with one year of directly related experience. Field observations, testing, or other activities associated with CQA may be performed by the CQA monitor(s) on behalf of the POR.

Contract Documents

These are the official set of documents issued by the Owner. The documents include bidding requirements, contract forms, contract conditions, specifications, contract drawings, addenda, and contract modifications.

Contract Specifications

These are the qualitative requirements for products, materials, and workmanship upon which the contract is based.

Contractor

This is the person or persons, firm, partnership, corporation, or any combination, private or public, who, as an independent contractor, has entered into a contract with the Owner, and who is referred to throughout the contract documents by singular number and masculine gender.

Design Engineer

These individuals or firms are responsible for the design and preparation of the project construction drawings and specifications. Also referred to as "designer" or "engineer."

Earthwork

This is a construction activity involving the use of soil materials as defined in the construction specifications and Section 2.2 of this plan.

Nonconformance

This is a deficiency in characteristic, documentation, or procedure that renders the quality of an item or activity unacceptable or indeterminate. Examples of non-conformances include, but are not limited to, physical defects, test failures, and inadequate documentation.

Operator

The organization that will operate the disposal unit.

Operators Representative

This is the person that is an official representative of the operator responsible for planning, organizing, and controlling the design and construction activities.

Quality Assurance

This is a planned and systematic pattern of procedures and documentation to ensure that items of work or services meet the requirements of the contract documents. Quality assurance includes quality control. Quality assurance will be performed by the POR and CQA monitor.

Quality Control

These actions provide a means to measure and regulate the characteristics of an item or service to comply with the requirements of the contract documents. Quality control will be performed by the contractor.

Closure Certification Report (CCR)

Construction report for the soil liner prepared and sealed by the POR and submitted to the LDEQ.

2.0 Construction Quality Assurance for Earthwork and Drainage Aggregates

2.1 Introduction

This section of the SLQCP addresses the construction of the soil and drainage components of the liner system and outlines the SLQCP program to be implemented with regard to materials selection and evaluation, laboratory test requirements, field test requirements and treatment of problems.

The scope of earthwork and related construction quality assurance includes the following elements:

- Subgrade preparation
- Soil liner stockpile
- Soil liner placement

2.2 Earthwork Construction

The following paragraphs describe general construction procedures to be used for various earthwork components of the Bottom Ash Basin final clay cap and perimeter dike vertical expansion. The earthwork construction specifications will contain more detail for specific considerations. The earthwork specifications will include details for compaction of soils, cross sections showing typical slopes, widths, and thicknesses for compacted lifts.

2.2.1 Subgrade

Subgrade refers to the stored bottom ash surface.

Prior to beginning cap liner construction, the subgrade area will be prepared as follows:

- The top 12 inches of ash material shall be compacted to a minimum of 95% of maximum dry density as determined by ASTM D 698, and then proof rolled to determine suitability of the subgrade.
- Prior to placement of the clay cap the contractor shall inspect the subgrade for the following:
    - Moisture seeps in the base or side slopes.
    - Side slope or base softening or failure due to moisture seeps.

- Presence of zones of high permeability that could present a pathway to seepage. Zones of high permeability can be fissures or fractures in the base or side slope or pockets of high permeability gravel or rock.

- The operator's engineer shall define the regions of high permeability requiring sealing. The contractor shall seal all regions of high permeability identified by the operator's engineer by over excavating a minimum of 2 feet and backfilling the over excavation with material meeting the requirements for satisfactory clay cover material compacted to a minimum of 95% of maximum dry density as determined by ASTM D 698. This type of work shall be performed in the presence of the operator's engineer.

- The operator's engineer shall define the work required to eliminate moisture seeps and/or repair damage due to moisture seeps.

The CQA monitor will approve the prepared subgrade prior to the placement of cap soil liner. Approval will be based on a review of test information, if applicable, and CQA monitoring of the subgrade preparation.

Surveying will be performed to verify that the finished subgrade is to the lines and grades specified in design with a vertical tolerance of -0.2 feet to +0.0 feet.

2.2.2 Clay cap soil liner

The clay cap soil liner will consist of a minimum 2 feet-thick compacted soil barrier (measured perpendicular to the subgrade surface) that will cover the regarded bottom ash pond. All soils used in soil liners will have the following minimum values verified by testing in a soil laboratory:

- Plasticity Index equal to or greater than 15 percent but less than 40 percent
- Liquid Limit equal to or greater than 30 percent
- Percent passing the No. 200 mesh sieve equal to or greater than 50 percent
- Percent passing the 1-inch screen equal to 100 percent
- Permeability (hydraulic conductivity) of the clay material shall be a maximum of 1×10^{-7} cm/sec

The soil liner material will consist of relatively homogeneous clay, sandy clay, or clayey sand. The soil will be free of debris, rock greater than 3/4 inch in diameter, vegetative matter, frozen materials, foreign objects, and organics.

A permeability test will be conducted for each different sample of borrow soil. The permeability test specimens will be prepared by laboratory compaction to a dry density of approximately 95 percent of the standard Proctor maximum dry density at a moisture content approximately equal to the optimum moisture content. One Proctor moisture-density relationship and remolded permeability test will be required for each different material as determined by a change in the liquid limit or plasticity index of more than 10 points.

The soil liner material should be placed in maximum 9-inch loose lifts to produce compacted lift thickness of approximately 6 inches. The material will be compacted to a minimum of 95 percent of the maximum dry density determined by standard Proctor (ASTM D 698) at moisture content between the standard Proctor optimum and 5 percentage points above optimum. The CQA monitor, earthwork contractor, and/or Owner shall identify the clay material during excavation, and the clay material will be stockpiled separately, if stockpiling is required.

Because of some variability of the onsite materials, additional stockpile testing will be performed if different physical properties of the borrow soil (color, texture, etc.) are observed by the CQA monitor, and the materials vary by more than ten points in either liquid limit or plasticity index from previously evaluated materials.

The clay materials to be used for liner materials will require processing to achieve the required moisture content for compaction. The physical characteristics of the clay materials shall be evaluated through visual observation before and during construction. To add moisture to the material properly, the clod sizes will first be crushed into manageable sizes of 3/4 inch in diameter or less. Rocks within the liner should be less than 1 inch in diameter and will not total more than 10 percent by weight.

Clod-size reduction may be achieved using a disc harrow or soil pulverizer. In order to efficiently break down the clods and pieces of shale, multiple passes of the processing equipment in two directions are recommended. Water will be applied as necessary to the material and worked into the material with the processing or compacting equipment. If necessary to achieve even moisture distribution or break down clod size, the material will be watered and processed in the stockpile prior to placing in the liner to allow the soil adequate time to hydrate. Water used for the soil liner must be clean and not contaminated by waste or any objectionable material. Collected onsite stormwater may be utilized if it has not come into contact with the solid waste.

The soil liner must be compacted with a pad/tamping-foot (preferable) or prong-foot (sheepsfoot) roller. The lift thickness shall be controlled so that there is total penetration through the loose lift under compaction into the top of the previously compacted lift; therefore, the lift thickness must not be greater than the pad or prong length. This is necessary to achieve adequate bonding between lifts and reduce seepage pathways. Adequate cleaning devices must be in place and maintained on the compaction roller so that the prongs or pad feet do not become clogged with clay soils to the point that they cannot achieve full penetration during initial compaction. The footed roller is necessary to achieve this bonding and to reduce the individual clods and achieve a blending of the soil matrix through its kneading action. In addition to the kneading action, weight of the compaction equipment is important. The minimum weight of the compactor should be 50,000 pounds, and a minimum of 5 passes are recommended for the compaction process. A pass is defined as one pass (1 direction) of the compactor, not just an axle, over a given area. The recommended minimum of five passes is for a vehicle with front and rear drums. The Caterpillar 815B and 825C are examples of equipment typically used to achieve satisfactory results.

The soil liner shall not be compacted with a bulldozer or any track-mobilized equipment unless it is used to pull a pad-footed roller.

CQA testing of the soil liner will be performed as the liner is being constructed. Testing of the soil liner is addressed in this section.

Soil liner construction and testing will be conducted in a systematic and timely fashion on each lift. Delays will be avoided in liner completion. Construction and testing of the soil liner should generally not exceed 60 working days from beginning to completion. The LDEQ will be notified during construction if delays in excess of 60 days are anticipated. Reasons for any liner construction taking more than 60 days to complete should be fully explained in the Closure Certification Report (CCR) submittal.

Surveying will be performed to observe that the finished soil liner has been constructed to the design lines and grades, within a vertical tolerance of 0.0 feet to +0.2 feet.

The Professional of Record (POR), on behalf of the Owner, shall submit to the LDEQ a Closure Certification Report (CCR) for approval of each soil liner area.

Testing and evaluation of the soil liner during construction will be in accordance with LDEQ standards. The construction methods and test procedures documented in the CCR will be consistent with the SLQCP and LDEQ standards.

The soil liner shall be prevented from losing moisture during the CCR approval process. Preserving the moisture content of the installed soil liner will be dependent on the earthwork contractors means and methods, and is subject to POR approval.

2.2.3 Earthen Dike

This section describes the specific inspection and testing required to control, verify, and document satisfactory work performance for the construction of the dike. These requirements are summarized in Table 2.1 which is located below.

Table 2.1
Recommended Tests and Observations on Earthen Dike

TEST/INSPECTION METHODS	MINIMUM FREQUENCY	PURPOSE	ACCEPTANCE CRITERIA
Base (visual only)	-	Assess suitability	As per specification
Lift thickness (visual only)	-	Assure compaction	8 inch loose
Coverage and surface scarifying (visual only)	-	Assure compaction	As per specification
Height and slopes (Surveying and Verification)	-	Assure design requirements	As per specification
Visual-manual procedure (ASTM D-2488)	1 per 2,000 c.y.	Assess material consistency	As per specification
Soil Classification (ASTM D-2487)	1 per 1,000 c.y.	Assess material consistency	As per specification
Atterberg Limits (ASTM D-4318)	1 per 1,000 c.y.	Assess material consistency	-
Grain Size Analysis (ASTM D-422)	1 per 1,000 c.y.	Assess material consistency	As per specification
Specific Gravity (ASTM D-854)	1 per Standard Proctor Curve	Assess material consistency	-
Standard Proctor (ASTM D-698)	1 per 2,000 c.y. or if material varies	Assess material consistency	±2 p.c.f. for density and ±2% for moisture content(one point) of preestablished curve failing which new moisture-density curve shall be established
In-Place Density (ASTM D-2922 or ASTM D-1556)	1 per 500 c.y. or 1 per day	Assess adequacy of compaction effort	98%of maximum dry density
Moisture Content (ASTM D-3017 or ASTM D-2216)	1 per 500 c.y. or 1 per day	Assess adequacy of compaction effort	±2% optimum moisture content

2.2.4 Top soil cover

Top soil cover will be placed over the clay cap soil liner in accordance with the project plans and specifications. The top soil cover shall be free of organics, foreign objects, or other deleterious materials. The physical characteristics of the top soil cover shall be evaluated through visual observation (and laboratory testing if justified by the design requirements) before construction and visual observation during construction. Additional testing during construction will be at the discretion of the CQA monitor.

The thickness of the top soil cover shall be verified with surveying procedures at a minimum of 1 survey point per 5,000 square feet of constructed area by a registered Louisiana surveyor with a minimum 2 reference points.

During construction the CQA monitor will:

- Verify that grade control is performed prior to work.
- Verify that the cover soil for side slopes is pushed from the toe up the slope.
- The POR will coordinate with the project surveyor to perform a thickness verification survey of the top soil cover materials upon completion of placement operations. Verify corrective action measures as determined by the verification survey.

2.3 Construction Testing

2.3.1 Standard Operating Procedures

CQA monitors will perform field and laboratory tests in accordance with applicable standards specified in the project technical specifications. Standard operating procedures for soil testing will be prepared that describe test procedures and methods used by site testing personnel for the following ASTM test methods. In some instances the standard operating procedure will be prepared or modified by the POR during construction.

The following test standards apply as called out in this manual and in the technical specifications:

STANDARD	TEST DESCRIPTION
ASTM D 698	Moisture-density relations of soils and soil-aggregate mixtures, using 5½-lb hammer and 12-inch drop
ASTM D 422	Particle size analysis of soils
ASTM D 1556	Density of soil-in-place by the sand cone method
ASTM D 2167	Density and unit weight of a soil in place by the rubber balloon method

STANDARD	TEST DESCRIPTION
ASTM D 2922	Density of soil and soil-aggregate in place by nuclear methods (shallow depth)
ASTM D 3017	Water content of soil and rock in place by nuclear methods (shallow depth)
ASTM D 2216	Laboratory determination of water (moisture) content of soil, rock, and soil-aggregate mixtures
ASTM D 5084	Method of test for permeability of fine-grained soils
ASTM D 4318	Atterberg limits
ASTM D 1140	Amount of material in soils finer than the No. 200 sieve
ASTM D 2487	Classification of soils for engineering purposes
ASTM D 2488	Description and identification of soils (visual-manual procedure)

2.3.2 Test Frequencies

The LDEQ standards will establish the minimum test frequencies for the soil liner construction quality assurance. The test frequencies for soil liner from the current LDEQ regulations are listed in Table 2.2. Extra testing must be conducted whenever work or materials are suspect, marginal, or of poor quality. Extra testing may also be performed to provide additional data for engineering evaluation. The minimum number of tests is interpreted to mean minimum number of passing tests, and any tests that do not meet the requirements will not contribute to the total number of tests performed to satisfy the minimum test frequency.

Table 2.2
Recommended Tests and Observations on Compacted Clay Liner

PARAMETER	FREQUENCY	TEST METHOD
Moisture density relationship	12/ac./6 in. compacted lift	ASTM D 698
Field Density and Moisture	12/ac./6 in. compacted lift	ASTM D 1556, D 2167 or D 2922; and ASTM D 2216 or ASTM D 3017
Sieve Analysis (passing no. 200)	1 per 100,000 SF with a minimum of 1 per 6 inches	ASTM D 1140
Atterberg Limits (liquid and plastic limit)	1 per acre per lift. 1 per 2000 c.y.	ASTM D 4318
Permeability (Hydraulic Conductivity)	1 per acre per compacted lift. 1 per lift per 750 c.y. [1]	ASTM D 5084 (Falling head, flex wall) Corps of Engineers
Thickness Verification	1 each 5,000 SF with a minimum of 2 reference points by a registered Louisiana surveyor	Survey subgrade and top of clay liner. Additionally, survey top of drainage aggregate or top soil cover layer

1: Multiple requirements may be necessary. Requirement resulting in most frequent testing shall be used.

2.4 Reporting

The POR on behalf of the Owner shall submit to the LDEQ a CCR for approval of each soil liner area. Section 3 describes the documentation requirements.

3.0 Documentation

The quality assurance plan depends on thorough monitoring and documentation of all construction activities. Therefore, the POR and CQA monitor will document that all quality assurance requirements have been addressed and satisfied. Documentation may consist of daily recordkeeping, testing and installation reports, nonconformance reports (if necessary), progress reports, photographic records, design and specification revisions. The appropriate documentation will be included in the CCR. Standard report forms will be provided by the POR prior to construction.

3.1 Preparation of CCR

The POR, on behalf of the Owner, shall submit to the LDEQ a CCR for approval of each soil liner.

Testing, evaluation and submission of the CCRs for the liner system during construction shall be in accordance with LDEQ regulations. The construction methods and test procedures documented in the CCR will be consistent with this SLQCP and the LDEQ regulations.

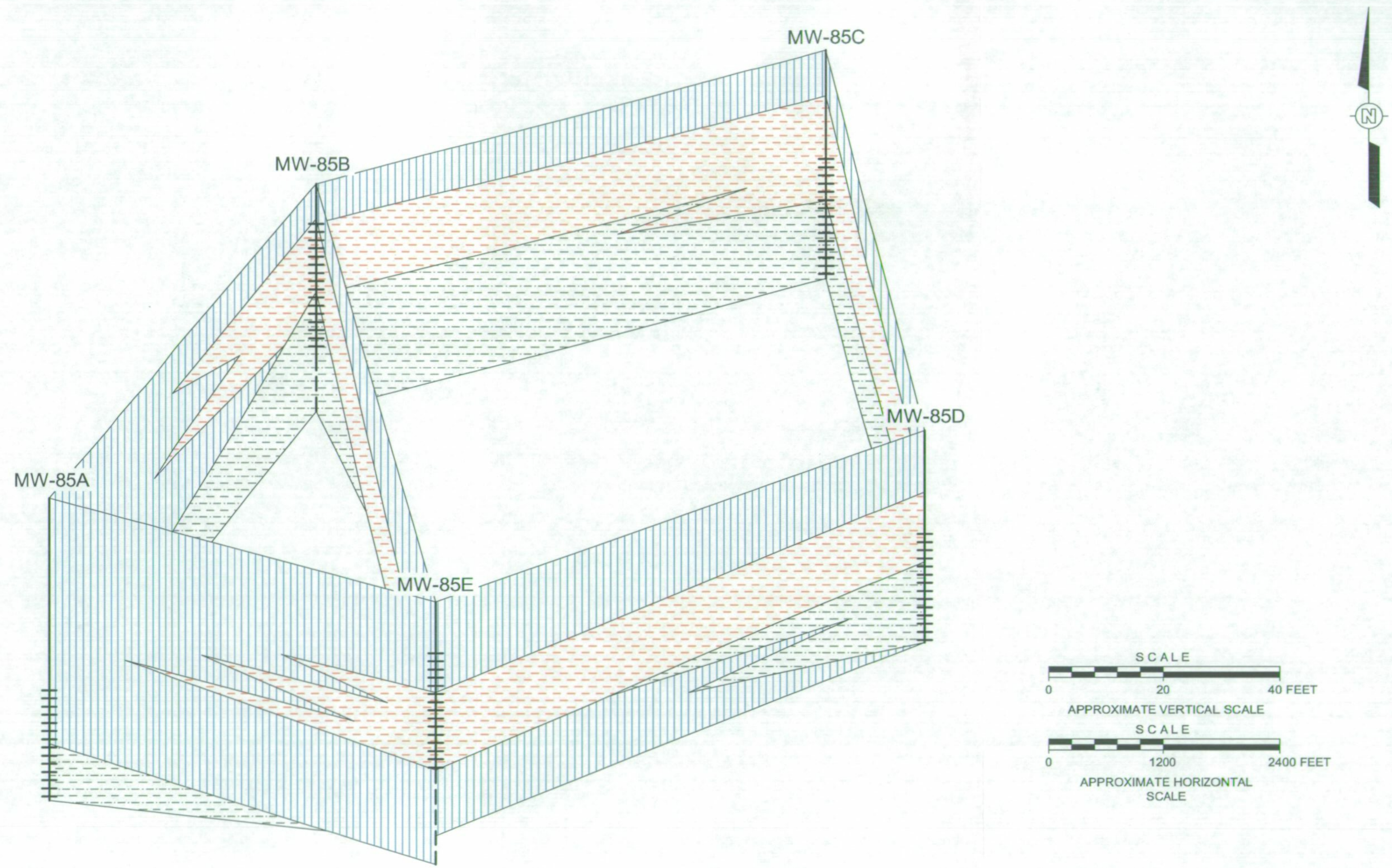
At a minimum, the CCR will contain:

- A summary of all construction activities.
- A summary of all laboratory and field test results.
- Sampling and testing location drawings.
- A description of significant construction problems and the resolution of these problems.
- As-built record drawings.
- A statement of compliance with the permit SLQCP and construction plans.
- The CCR shall be signed and stamped by a professional engineer(s) registered in the state of Louisiana.

The as-built record drawings will accurately site the constructed location of all work items. The POR will review and verify that as-built drawings are correct. As-built drawings will be included in the CCR as appropriate.

APPENDIX G
GEOLOGICAL UPDATES AND ADDITIONS

FIGURE 17
ISOMETRIC SOIL PROFILE



LEGEND

SM	SILTY SAND OR SILT AND SAND MIXTURE
ML	SILT
CH	INORGANIC CLAY, HIGH PLASTICITY
	WELL SCREEN SECTION

IMAGE	X-REF	OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
---	---	BTR	J.BOUDREAUX 01/23/07			1005494010-B26

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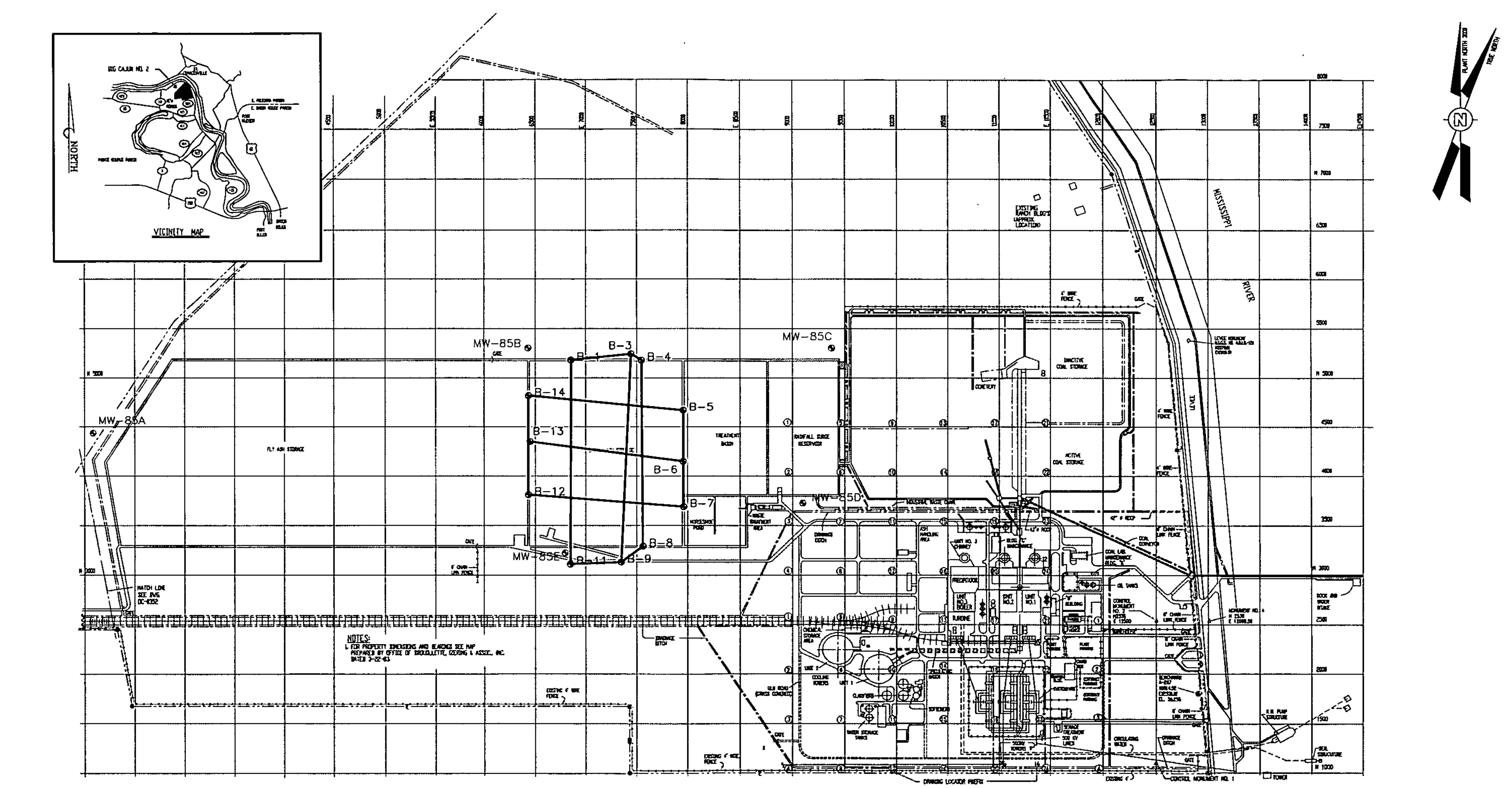
BIG CAJUN II POWER PLANT
NEW ROADS, LA

FIGURE 17

ISOMETRIC SOIL PROFILE

BIG CAJUN II POWER PLANT

FIGURE 18
CROSS SECTION/BORING LOCATION MAP



LEGEND

—··—	PROPERTY LINE
⊗	BORING LOCATIONS

SCALE

0 1000 2000 FEET

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BIG CAJUN II POWER PLANT
NEW ROADS, LA

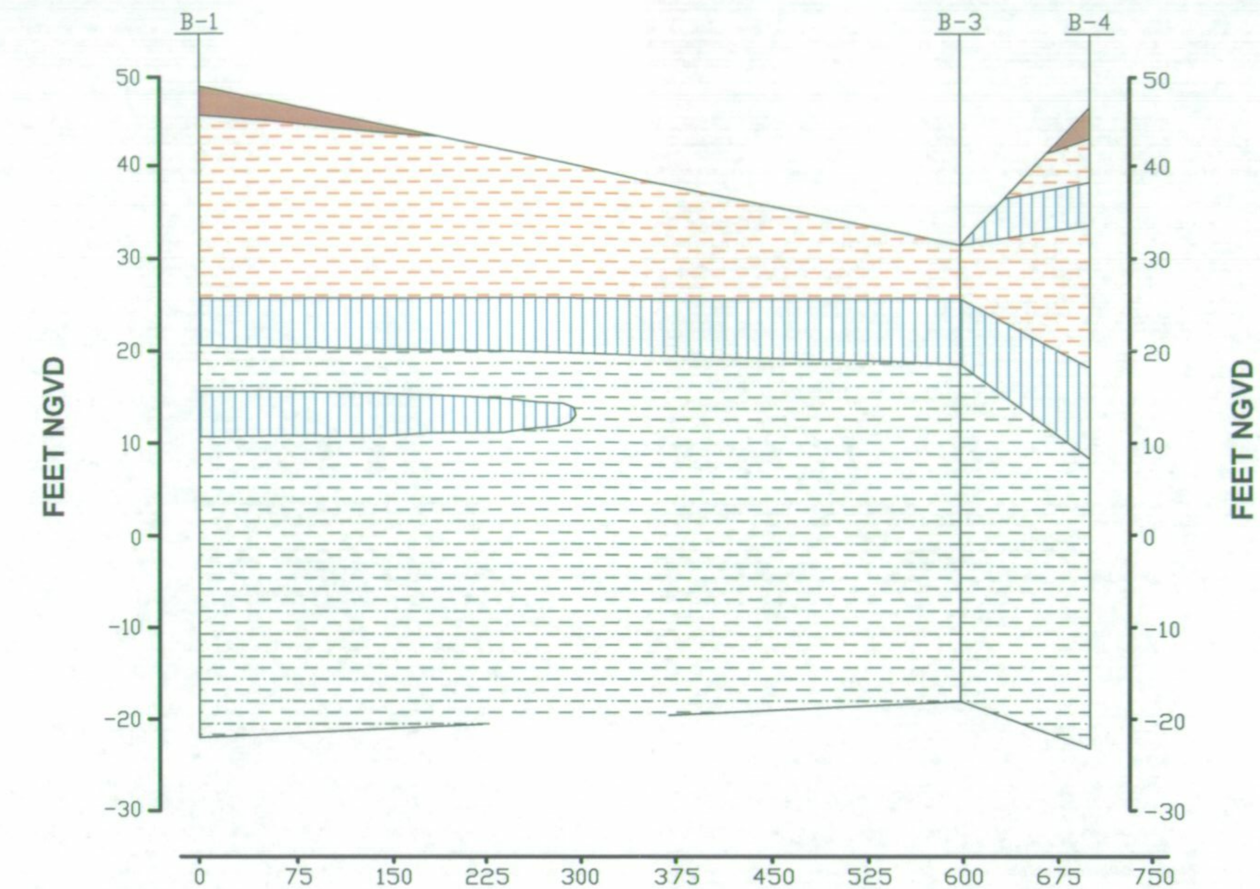
FIGURE 18

CROSS SECTION/ BORING LOCATION MAP

BIG CAJUN II POWER PLANT

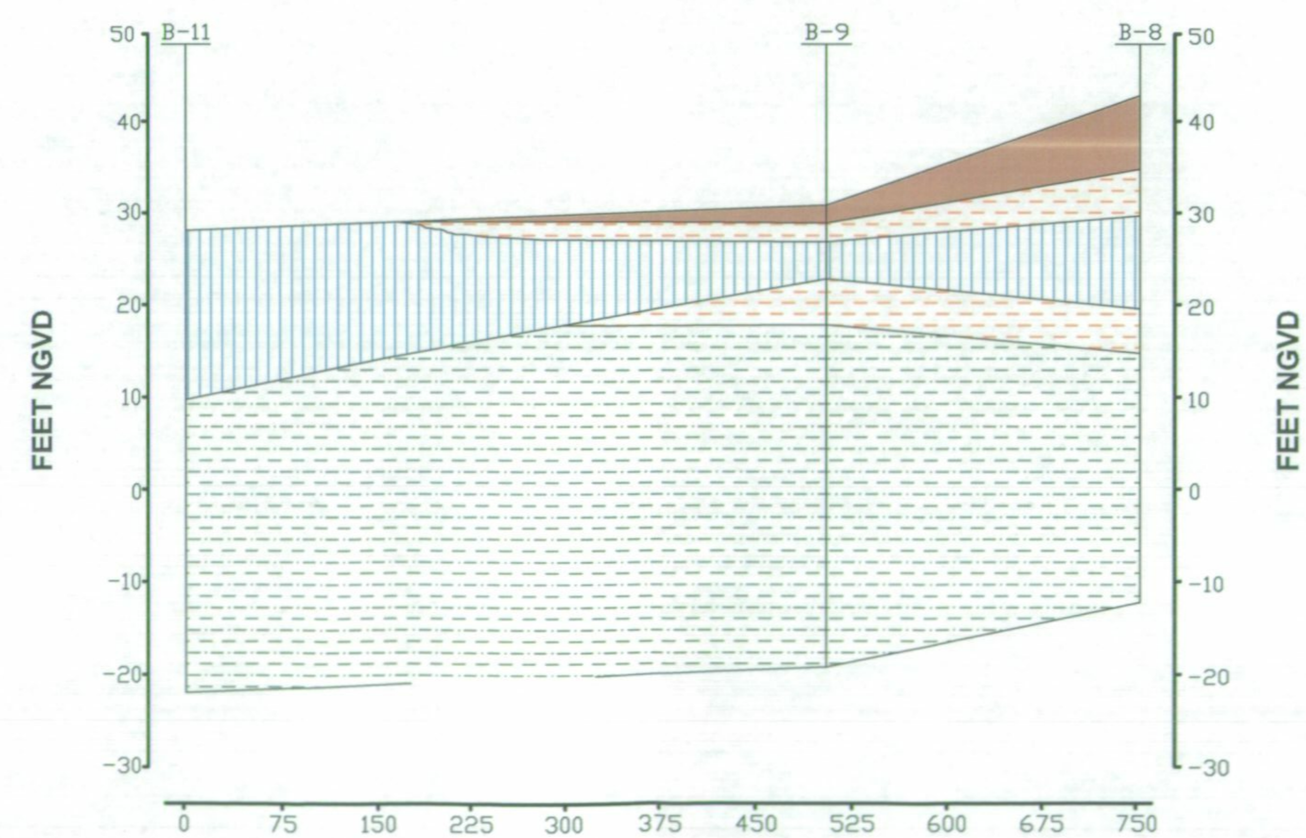
IMAGE	X-REF	OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
---	---	BTR	J.BOUDREAUX 01/23/07			1005494010-B24

FIGURE 19A
CROSS SECTIONS



SCALE
0 20 40 FEET
APPROXIMATE VERTICAL SCALE

SCALE
0 150 300 FEET
APPROXIMATE HORIZONTAL SCALE



SCALE
0 20 40 FEET
APPROXIMATE VERTICAL SCALE

SCALE
0 200 400 FEET
APPROXIMATE HORIZONTAL SCALE

LEGEND

- FILL MATERIAL
- SM — SILTY SAND OR SILT AND SAND MIXTURE
- CL — NON-HUMUS CLAY, SANDY CLAY, SILTY CLAY, LOW TO MEDIUM PLASTICITY
- CH — INORGANIC CLAY, HIGH PLASTICITY

IMAGE	X-REF	OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
---	---	BTR	J.BOUDREAUX 01/22/07			1005494010-B22

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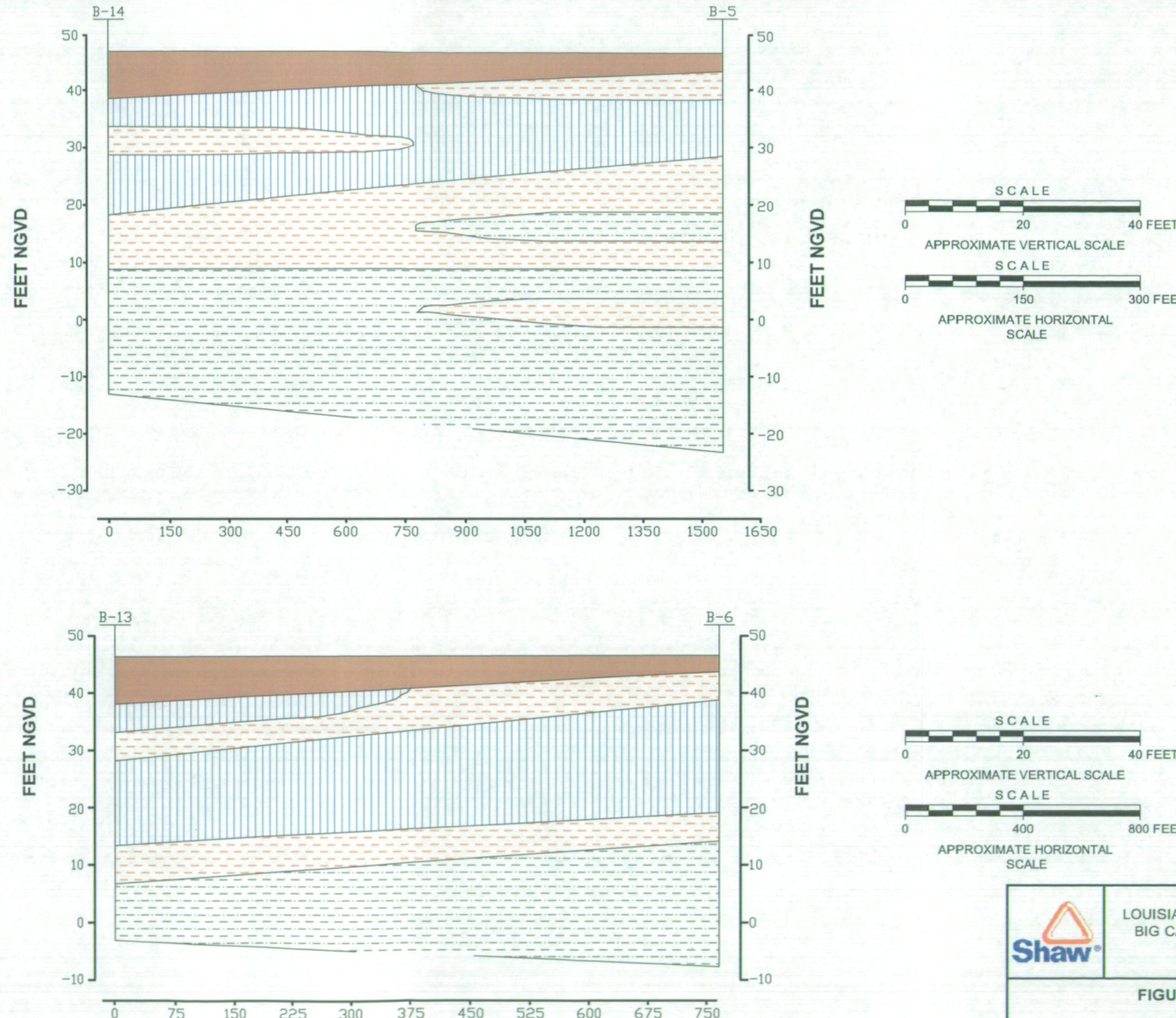
BIG CAJUN II POWER PLANT
NEW ROADS, LA

FIGURE 19A

CROSS SECTIONS

BIG CAJUN II POWER PLANT

FIGURE 19B
CROSS SECTIONS



LEGEND

- FILL MATERIAL
- SM — SILTY SAND OR SILT AND SAND MIXTURE
- CL — NON-HUMUS CLAY, SANDY CLAY, SILTY CLAY, LOW TO MEDIUM PLASTICITY
- CH — INORGANIC CLAY, HIGH PLASTICITY

IMAGE	X-REF	OFFICE	DRAWN BY		CHECKED BY	APPROVED BY	DRAWING NUMBER
---	---	BTR	J.BOUDREAUX	01/22/07			1005494010-B21

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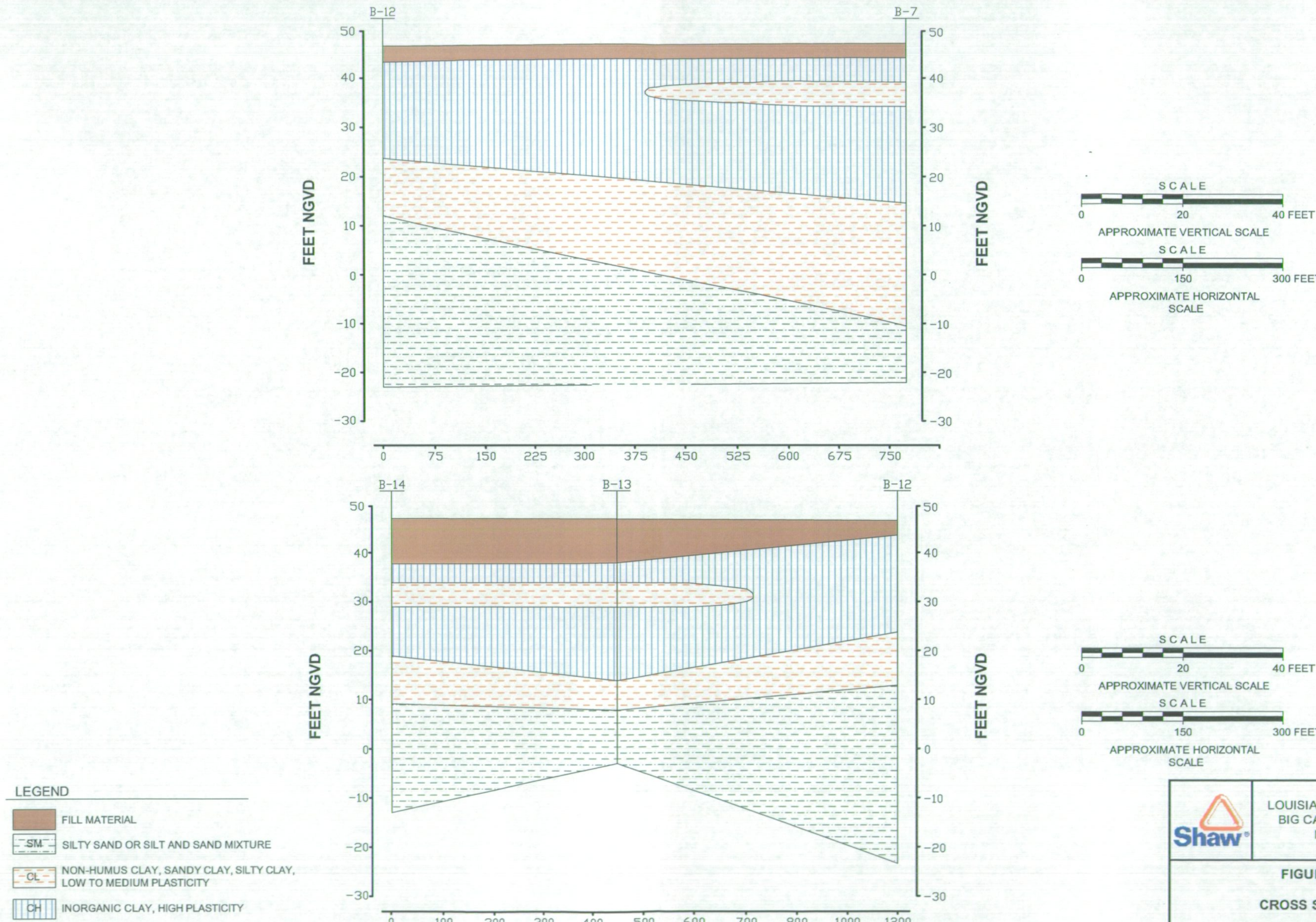
BIG CAJUN II POWER PLANT
NEW ROADS, LA

FIGURE 19B

CROSS SECTIONS

BIG CAJUN II POWER PLANT

FIGURE 19C
CROSS SECTIONS



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BIG CAJUN II POWER PLANT
NEW ROADS, LA

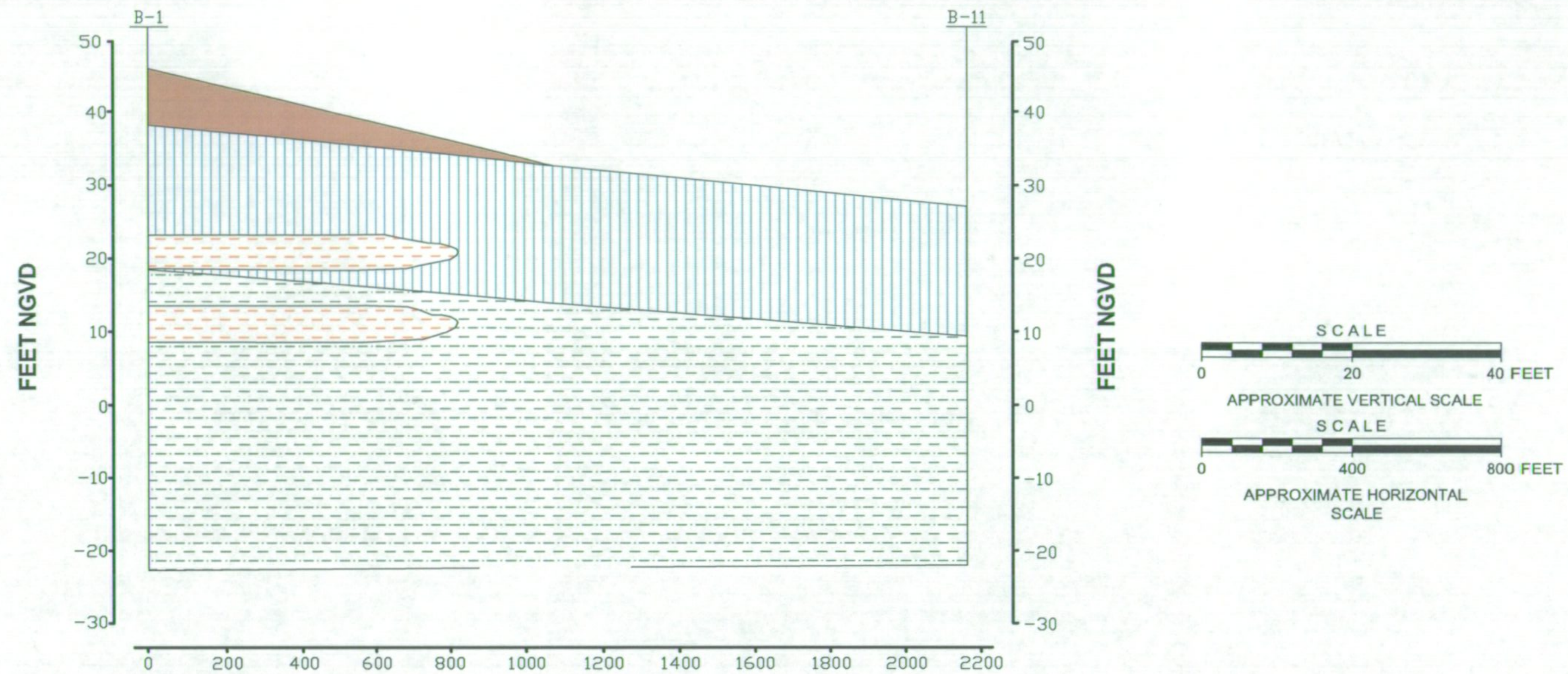
FIGURE 19C

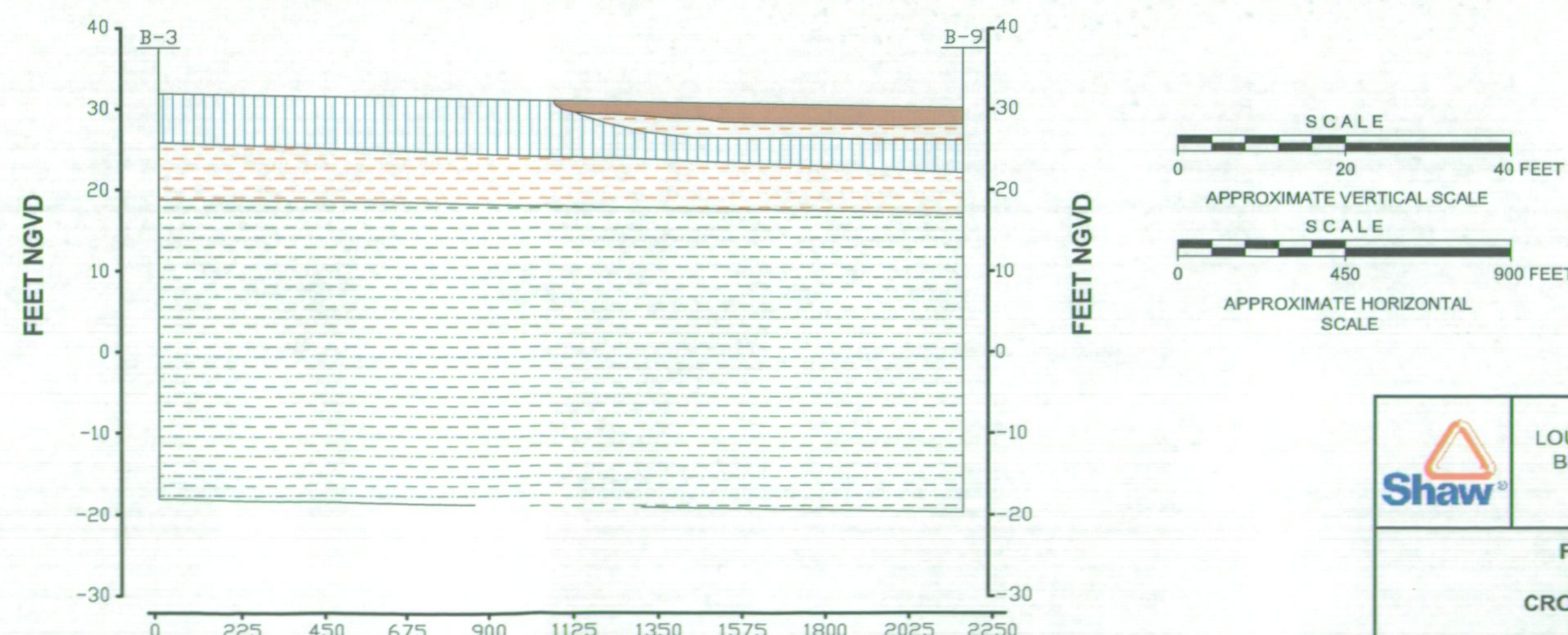
CROSS SECTIONS

BIG CAJUN II POWER PLANT

IMAGE	X-REF	OFFICE	DRAWN BY		CHECKED BY	APPROVED BY	DRAWING NUMBER
---	---	BTR	J.BOUDREAUX	01/22/07			100549401O-B17

FIGURE 19D
CROSS SECTIONS





LEGEND

- FILL MATERIAL
- SM — SILTY SAND OR SILT AND SAND MIXTURE
- CL — NON-HUMUS CLAY, SANDY CLAY, SILTY CLAY, LOW TO MEDIUM PLASTICITY
- CH — INORGANIC CLAY, HIGH PLASTICITY

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BIG CAJUN II POWER PLANT
NEW ROADS, LA

FIGURE 19D

CROSS SECTIONS

BIG CAJUN II POWER PLANT

IMAGE	X-REF	OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
---	---	BTR	J.BOUDREAUX 01/22/07			1005494010-B19

FIGURE 19E
CROSS SECTIONS

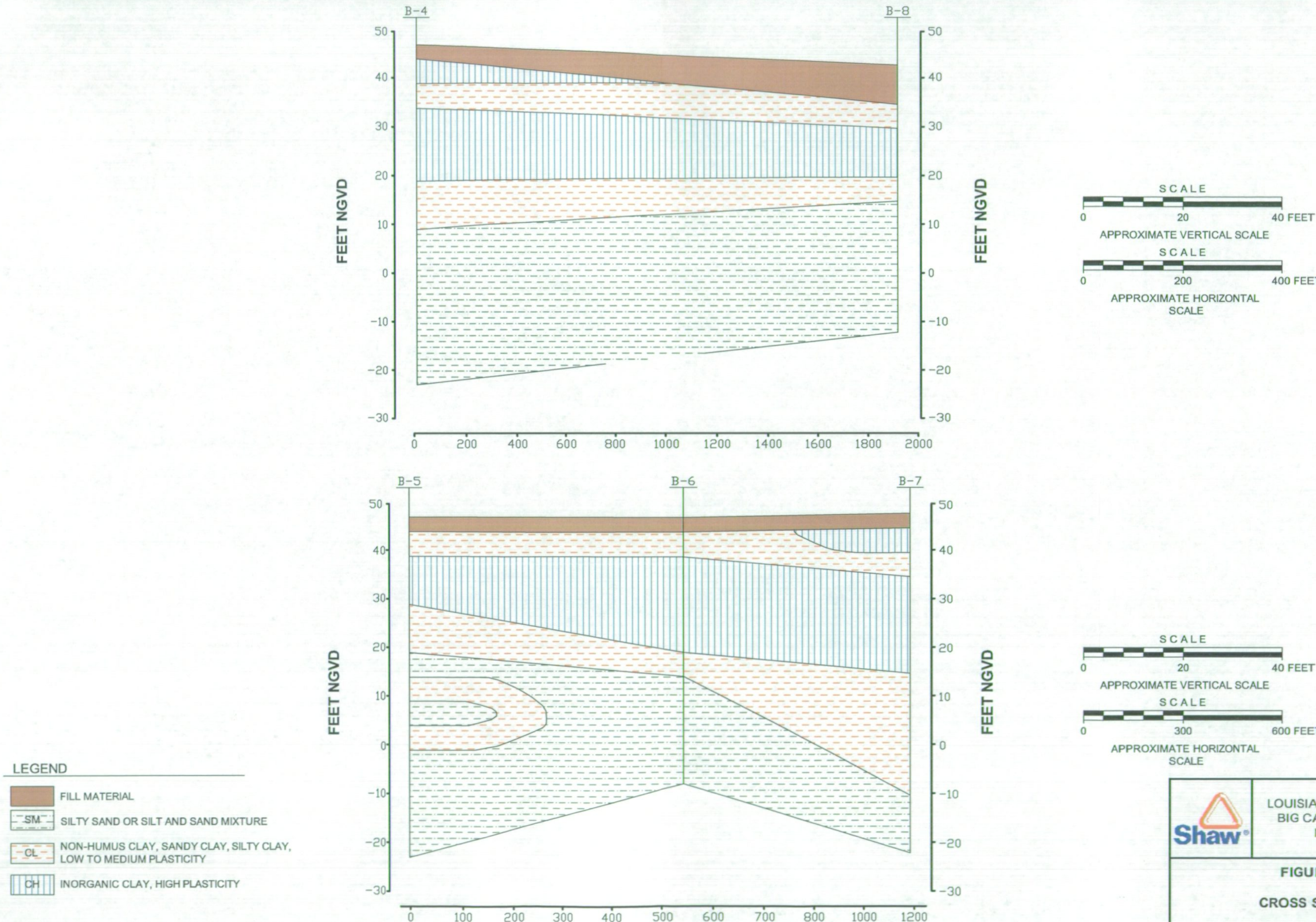

IMAGE	X-REF	OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
---	---	BTR	J.BOUDREAUX 01/22/07			1005494010-B23

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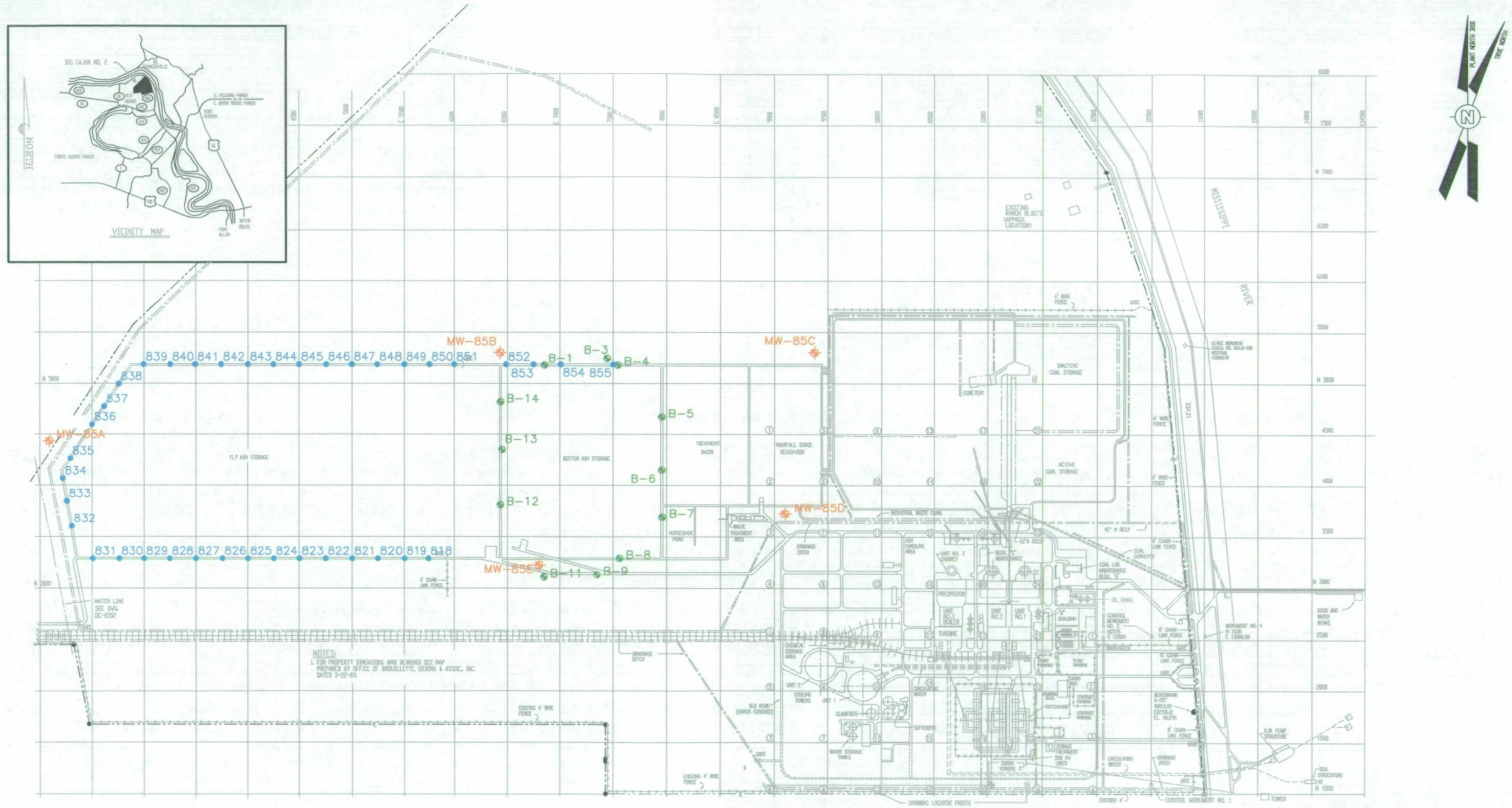
FIGURE 19E

CROSS SECTIONS

BIG CAJUN II POWER PLANT

FIGURE 25
HISTORICAL BORING LOGS



LEGEND

PROPERTY LINE

SOIL BORINGS ADVANCED IN 2005

SOIL BORINGS ADVANCED PRIOR TO 2005

MONITORING WELL LOCATION

SCALE

0 1000 2000 FEET

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BIG CAJUN II POWER PLANT
NEW ROADS, LA

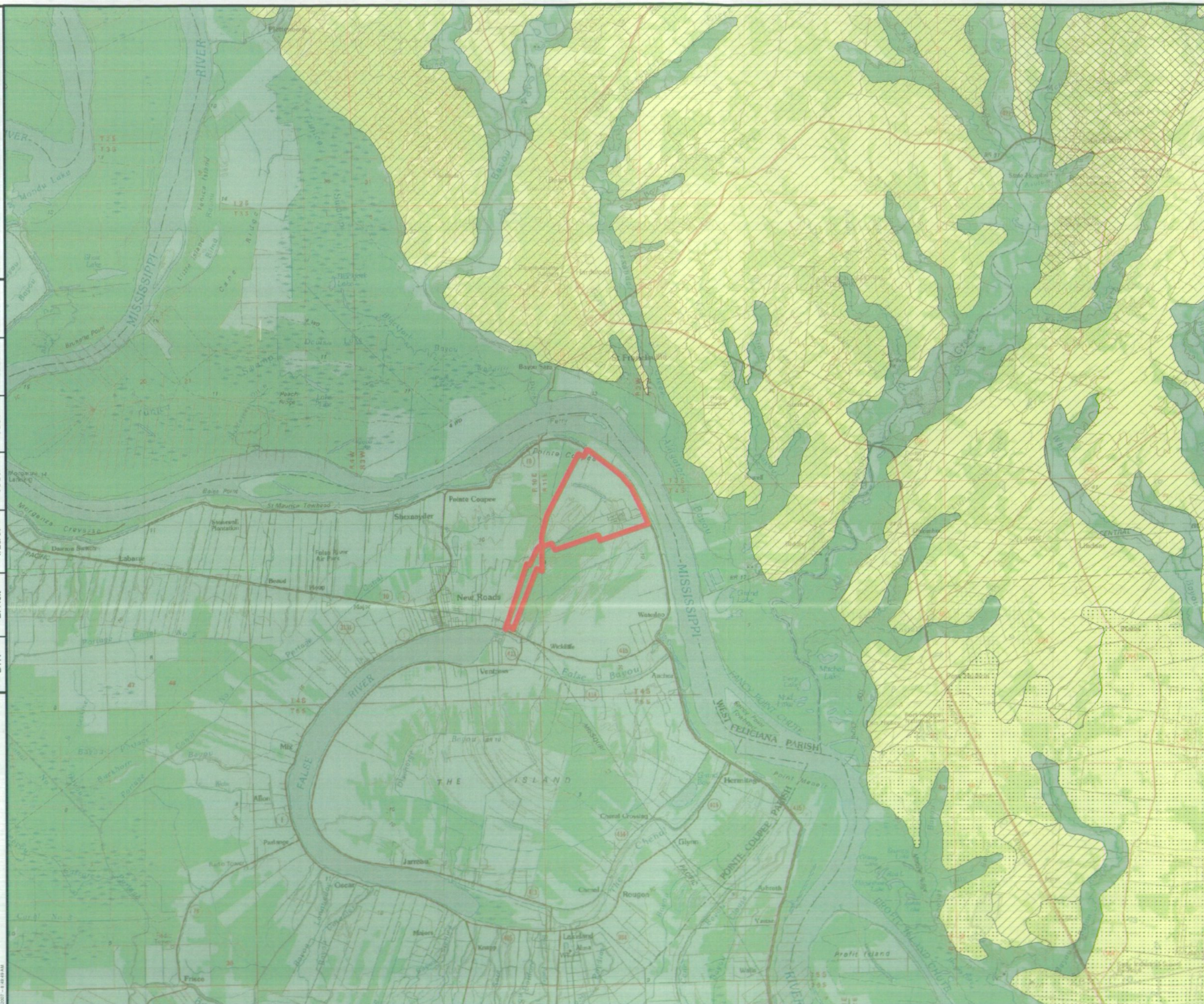
FIGURE 25

HISTORICAL SOIL BORING LOCATIONS

BIG CAJUN II POWER PLANT

IMAGE	X-REF	OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
---	---	BTR	J.BOUDREAUX 01/23/07			1005494010-B25

FIGURE 29
AQUIFER RECHARGE MAP



REFERENCE:
Louisiana Department of Environmental Quality, 1999, Recharge Potential of Louisiana Aquifers, Geographic NAD83, LDEQ (1999) [aquifer]: Louisiana Department of Environmental Quality, Baton Rouge, LA.

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BIG CAJUN II POWER PLANT
NEW ROADS, LOUISIANA

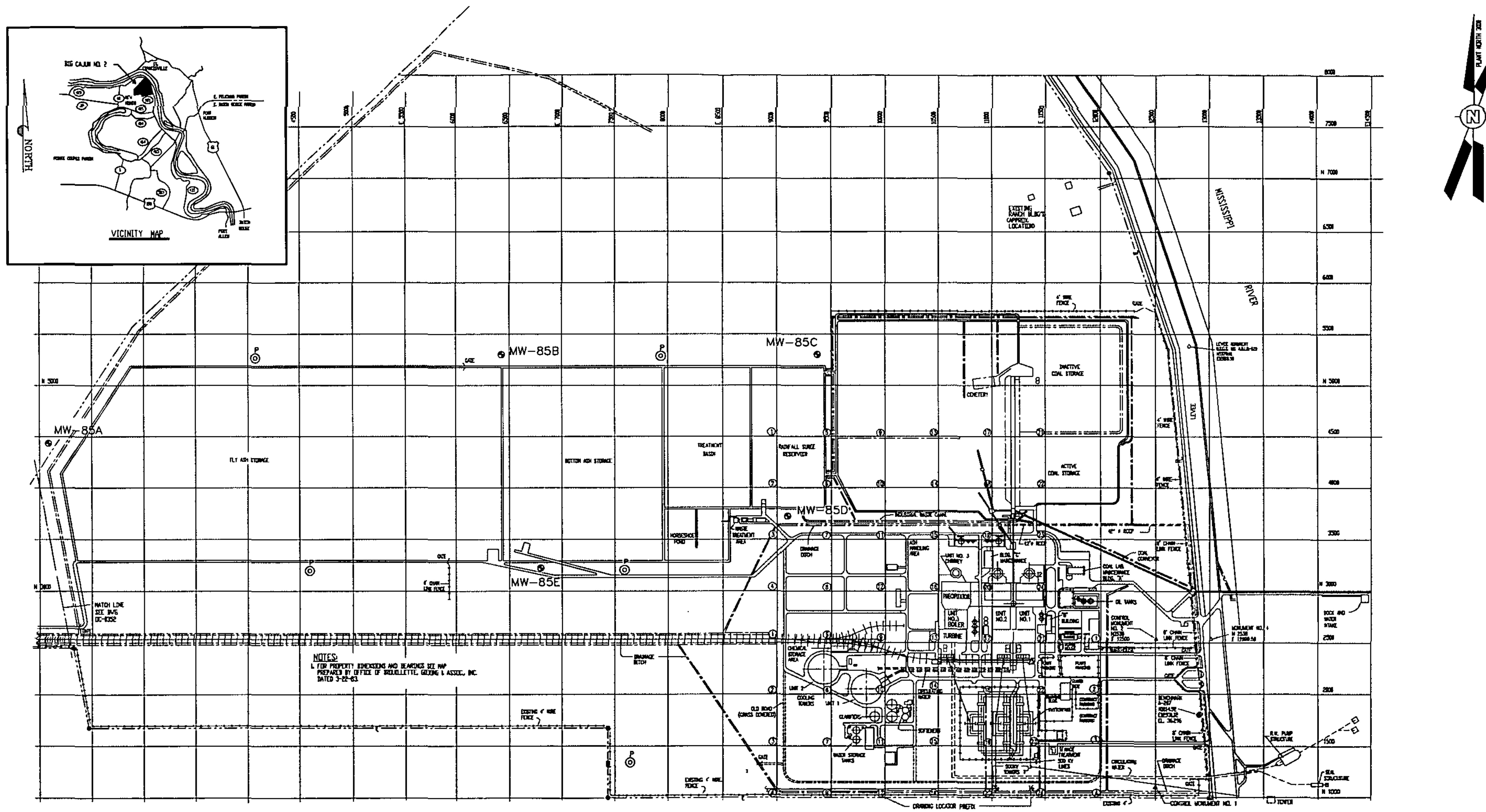
FIGURE 29

AQUIFER RECHARGE MAP

BIG CAJUN II POWER PLANT

OFFICE	DRAWN BY		CHECKED BY		APPROVED BY		DRAWING NUMBER
BTR	B. Holt	1/23/07	XXX	XXX	XXX	XXX	nrg_4010_0002_aquifer_recharge

EXHIBIT 8
PROPOSED PIEZOMETER LOCATIONS



LEGEND

—·—·—	PROPERTY LINE
⊗ MW-85B	MONITORING WELL LOCATION
P ◎	PROPOSED PIEZOMETER LOCATIONS

SCALE

0 1000 2000 FEET

IMAGE	X-REF	OFFICE	DRAWN BY		CHECKED BY	APPROVED BY	DRAWING NUMBER
---	---	BTR	J.BOUDREAUX	02/23/06			100549401O-B10

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BIG CAJUN II POWER PLANT
NEW ROADS, LA

FIGURE 24

PROPOSED PIEZOMETERS FOR GROUNDWATER MONITORING

BIG CAJUN II POWER PLANT

Appendix B

EPA Field Observation Checklist

Site Name:	**Big Cajun II**	**Date:**	**6/22/10**
Unit Name:	**Fly Ash Pond, Bottom Ash Pond, Primary and Secondary Water Treatment Ponds**	**Operator's Name:**	**Louisiana Generating, LLC**
Unit I.D.:	**N/A**	**Hazard Potential Classification:**	**High** ☐ **Significant** ☐ **Low** ☒
	Inspector's Name:	John Flanagan, PE and Lauren Ohotzke	

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?	X		18. Sloughing or bulging on slopes?	X	
2. Pool elevation (operator records)?		X	19. Major erosion or slope deterioration?	X	
3. Decant inlet elevation (operator records)?		X	20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?		X	Is water entering inlet, but not exiting outlet?		X
5. Lowest dam crest elevation (operator records)?		X	Is water exiting outlet, but not entering inlet?		X
6. If instrumentation is present, are readings recorded (operator records)?		X	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?	N/A	N/A	At natural hillside in the embankment area?		X
11. Is there significant settlement along the crest?		X	Over widespread areas?		X
12. Are decant trashracks clear and in place?		X	From downstream foundation area?		X
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		X	"Boils" beneath stream or ponded water?		X
14. Clogged spillways, groin or diversion ditches?		X	Around the outside of the decant pipe?		X
15. Are spillway or ditch linings deteriorated?		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.

Issue #	Comments
1	Daily; documented inspection commenced Feb. 2010
9	No trees on levees, certain areas along toe have trees
14	Underwater pipes allow water to flow; must keep these pipes clean

Coal Combustion Waste (CCW)

Impoundment Inspection

Impoundment NPDES Permit LA005A135 **INSPECTOR** Flanagan/Ohotzke

Date 6/22/10

Impoundment Name Fly Ash, Bottom Ash, Primary and Secondary Water Treatment Ponds

Impoundment Company Louisiana Generating

EPA Region

State Agency

(Field Office) Address

Name of Impoundment

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

New ☐ **Update** ☐

	Yes	**No**
Is impoundment currently under construction?	☐	☒
Is water or ccw currently being pumped into the impoundment?	☒	☐

IMPOUNDMENT FUNCTION: To collect and treat CCR.

Nearest Downstream Town Name: New Roads, LA

Distance from the impoundment: ~10 miles

Location:

Latitude	30	Degrees	43	Minutes	37	Seconds	**N**
Longitude	91	Degrees	22	Minutes	7	Seconds	**W**

State LA **County** Pointe Coupee Parish

	Yes	No
Does a state agency regulate this impoundment?	☒	☐

If So Which State Agency? LA Dept. of Environmental Quality

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

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

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

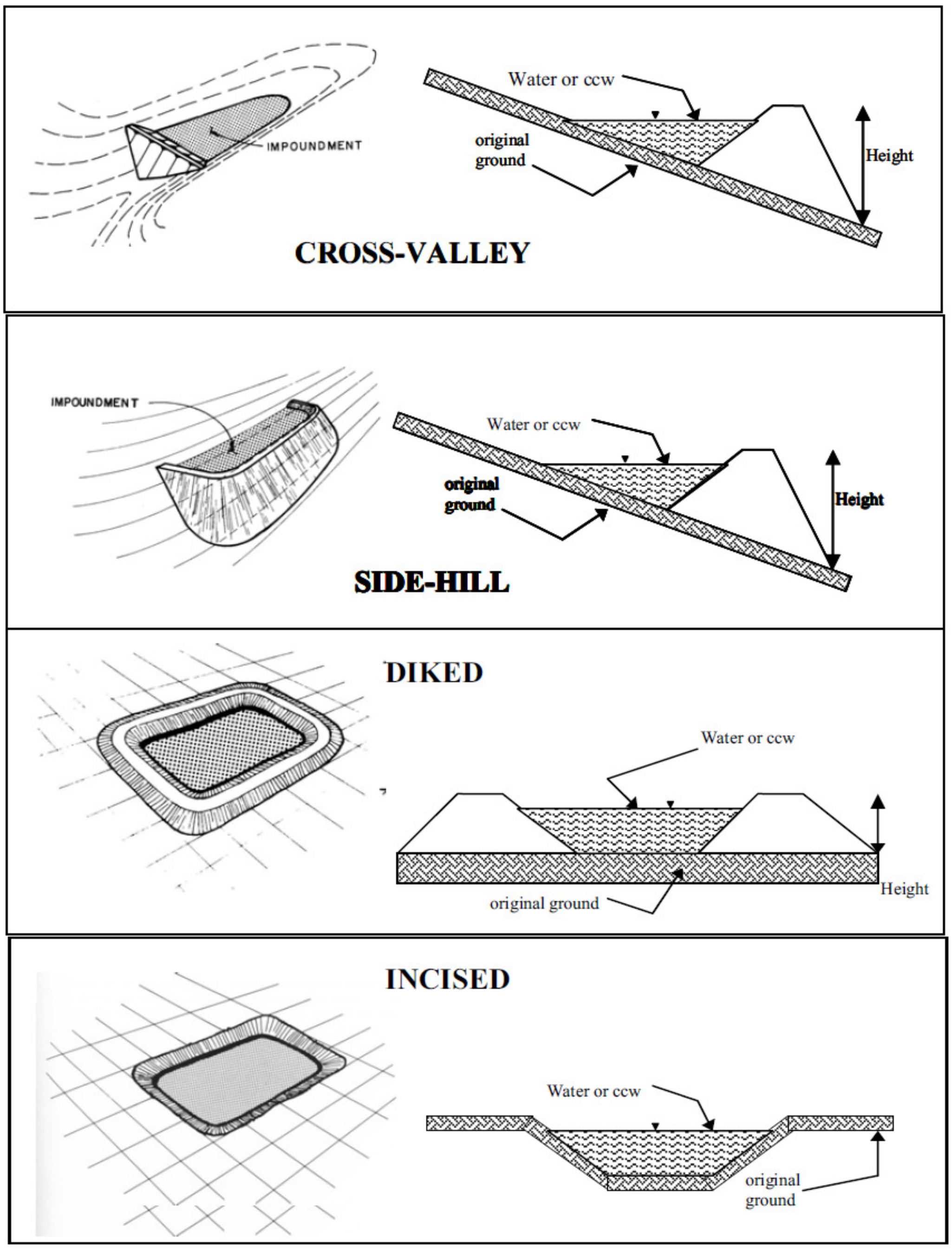
☐ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns.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

If levees fail, effluent could enter drain ditches that lead to False River, causing environmental impacts/contamination.

CONFIGURATION:



☐ Cross-Valley ☐ Side-Hill ☐ Diked

☐ Incised (form completion optional) ☒ Combination Incised/Diked

Embankment Height (ft) 10-18 feet

Pool Area (ac) 241 Acre

Current Freeboard (ft)

Embankment Material Earth

Liner Clay

Liner Permeability Earthen impervious material

TYPE OF OUTLET (Mark all that apply)

☒ **Open Channel Spillway**

☐ Trapezoidal

☐ Triangular

☒ Rectangular

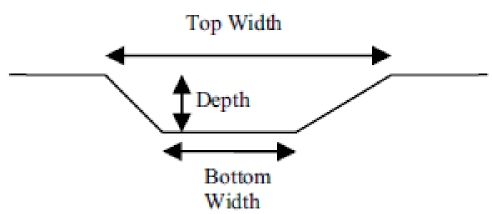
☐ Irregular

depth (ft)

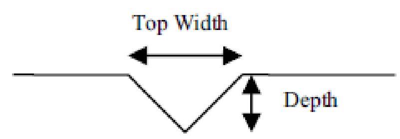
average bottom width (ft)

top width (ft)

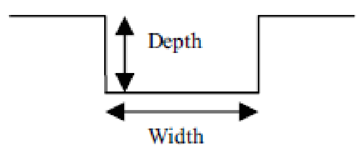
TRAPEZOIDAL



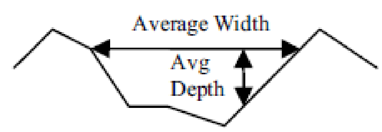
TRIANGULAR



RECTANGULAR

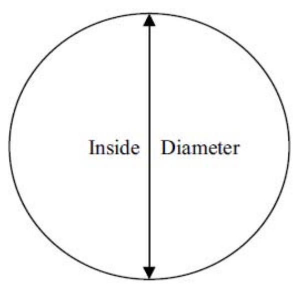


IRREGULAR



☒ **Outlet**

18” inside diameter
(SDR 17 – smooth lined – 19.5” OD)



Material

☐ corrugated metal

☐ welded steel

☒ Concrete (treatment outlet)

☐ plastic (hdpe, pvc, etc.)

☐ other (specify):

	Yes	No
Is water flowing through the outlet?	☒	☐

☐ **No Outlet**

☐ **Other Type of Outlet** (specify):

The Impoundment was Designed By **Shaw Group**

	Yes	No
Has there ever been a failure at this site?	☐	☒
If So When?		

If So Please Describe :

	Yes	No
Has there ever been significant seepages at this site?	☐	☒
If So When?		

If So Please Describe :

	Yes	No
Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site?	☐	☒
If so, which method (e.g., piezometers, gw pumping,...)?		

If So Please Describe :

ADDITIONAL INSPECTION QUESTIONS

Concerning the embankment foundation, was the embankment construction built over wet ash, slag, or other unsuitable materials? If there is no information just note that.

No.

Did the dam assessor meet with, or have documentation from, the design Engineer-of-Record concerning the foundation preparation?

No.

From the site visit or from photographic documentation, was there evidence of prior releases, failures, or patchwork on the dikes?

Patchwork using ash along floodside slopes (erosion repair).