FINAL

Coal Combustion Waste Impoundment
Round 5 - Dam Assessment Report

Plant Wansley

Ash Pond Separation Dike
Georgia Power
Carrolton, Georgia

Prepared for:

United States Environmental Protection Agency
Office of Resource Conservation and Recovery

Prepared by:

Dewberry & Davis, LLC
Fairfax, Virginia

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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 Plant Wansley fly ash management unit is based on a review of available documents and on the site assessment conducted by Dewberry personnel on June 30, 2010. We found the supporting technical information adequate (Section 1.1.3). As detailed in Section 1.2.6 there are recommendations that may help to maintain a safe and trouble-free operation,

In summary, the Wansley Plant ash pond is SATISFACTORY for continued safe and reliable operation, with no apparent existing or potential management unit safety deficiencies.

PURPOSE AND SCOPE

The U. S. Environmental Protection Agency (EPA) is investigating the potential for catastrophic failure of Coal Combustion Surface Impoundments (i.e. management unit) 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 addresses power plant management units that have a classification of 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 December 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 of 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 potentially 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 wastes 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 from Dewberry & Davis, including one licensed in the State of Georgia, for a one-day visit. The two-person team met with the owner of the management unit as well as several technical representatives 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 unit(s).

Factors considered in determining the hazard potential classification of the management unit(s) included the age and size of the impoundment, the quantity of coal combustion residuals or by-products that were stored or disposed in 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.

LIMITATIONS

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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Reserved

1.0 CONCLUSIONS AND RECOMMENDATIONS

1.1 CONCLUSIONS

Conclusions are based on visual observations from the one-day site visit and review of technical documentation provided by Georgia Power.

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

The structural stability of the Ash Pond embankments appears to be in satisfactory condition.

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

Adequate capacity and freeboard exist to safely pass the design storm.

1.1.3 Conclusions Regarding the Adequacy of Supporting Technical Documentation

Supporting technical documentation was adequate.

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

Descriptions provided are appropriate.

1.1.5 Conclusions Regarding the Field Observations

The emergency overflow concrete channel was cracking and showed a potential to be undermined in future rain events. This is not a safety issue at this time, but needs to be monitored.

1.1.6 Conclusions Regarding the Adequacy of Maintenance and Methods of Operation

Maintenance and methods of operation are adequate.

1.1.7 Conclusions Regarding the Adequacy of the Surveillance and Monitoring Program

Existing surveillance and monitoring programs are adequate.

1.1.8 Classification Regarding Suitability for Continued Safe and Reliable Operation

Facility is SATISFACTORY for continued safe and reliable operation. A classification of "satisfactory" is appropriate when no existing or potential management unit safety deficiencies are recognized. Acceptable performance is expected under all applicable loading conditions (static, hydrologic, seismic) in accordance with the applicable criteria. Minor maintenance items may be required.

1.2 RECOMMENDATIONS

1.2.1 Recommendations Regarding the Structural Stability

Continue with the current maintenance and inspection programs set in place.

1.2.2 Recommendations Regarding the Hydrologic/Hydraulic Safety

None appear warranted at this time.

1.2.3 Recommendations Regarding the Supporting Technical Documentation

None appear warranted at this time.

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

None appear warranted at this time.

1.2.5 Recommendations Regarding the Field Observations

None appear warranted at this time.

1.2.6 Recommendations Regarding the Maintenance and Methods of Operation

None appear warranted at this time.

1.2.7 Recommendations Regarding the Surveillance and Monitoring Program

Continue current program. Begin monitoring erosion at concrete channel to avoid channel being undermined. Monitor cracking along the concrete channel.

1.2.8 Recommendations Regarding Continued Safe and Reliable Operation

None appear warranted at this time.

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1.3 PARTICIPANTS AND ACKNOWLEDGEMENT

1.3.1 List of Participants

Jim Heibron – Georgia Power
Michelle Kroh – Georgia Power
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Hugh H. Armitage, P.E. – Southern Company
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Bradley J. Adams – Troutman Sanders LLP
Hollister A. Hill – Troutman Sanders LLP
Frederic Shmurak, P.E. – Dewberry & Davis, Inc.
Justin Story, E.I. – Dewberry & Davis, Inc.

1.3.2 Acknowledgement and Signature

We acknowledge that the management unit referenced herein has been assessed on June 30, 2010.

Frederic M Shmurak   Justin R. Story

Frederic M. Shmurak, PE, Civil Engineer   Justin R. Story, E.I., Civil Designer

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

2.1 LOCATION

Plant Wansley's ash pond facility is located just south of Carrollton, Georgia. The ash pond dike is approximately 0.5 miles from the Chattahoochee River. The Town of Centralhatchee is approximately 4 miles downstream of the ash pond embankments. Figure 2.1a depicts a vicinity map around Plant Wansley, while Figure 2.1b depicts an aerial view of Plant Wansley.

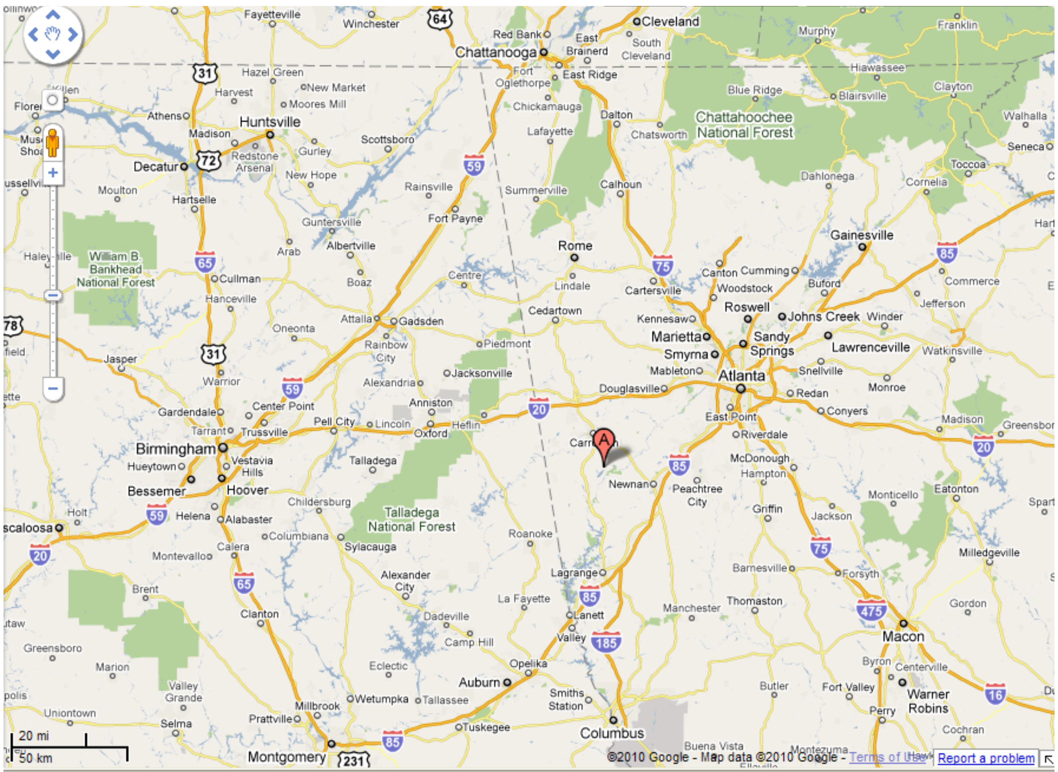


Figure 2.1 a: Plant Wansley Vicinity Map

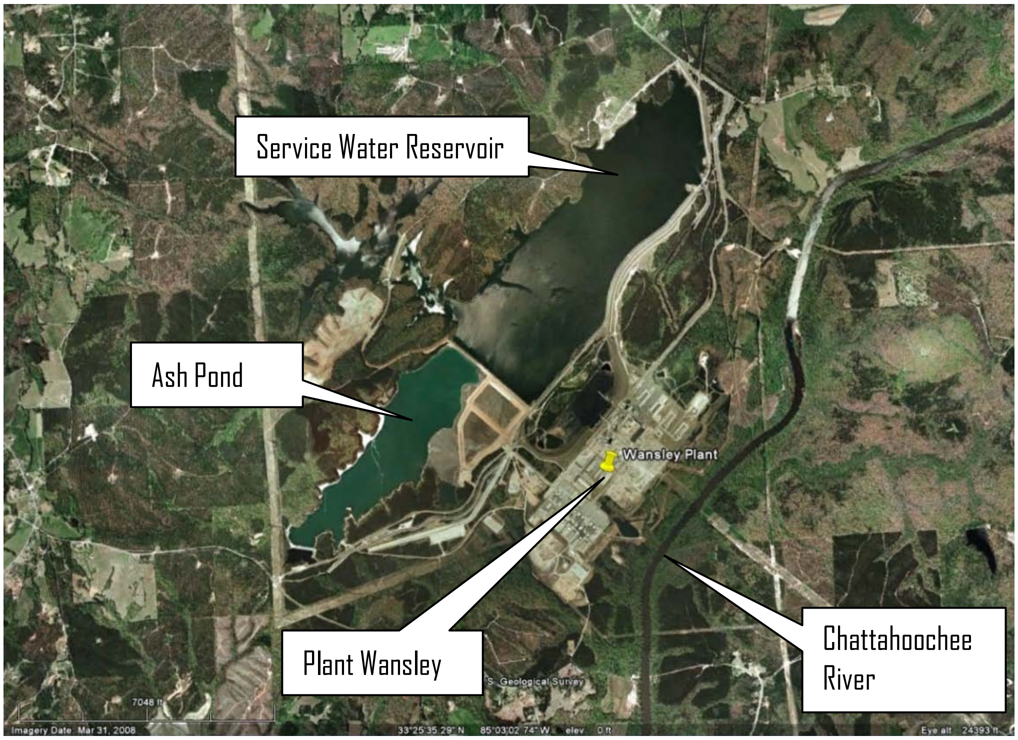


Figure 2.1 b: Plant Wansley Aerial View

2.2 SIZE AND HAZARD CLASSIFICATION

The ash pond is impounded by an earthen embankment system consisting of a dike (hereby referred to as the separation dike) that separates the pond from a large reservoir. A smaller dike (hereby referred to as the western dike) existing near the emergency spillway and outlet of the ash pond was also observed. Based on data provided by Georgia Power, the ash pond embankment system was constructed to a maximum height of 110 feet with a crest width of 35.4 feet, side slopes of 3(H):1(V) to 2.5(H):1(V) and a length just under 3,000 feet. The maximum storage volume corresponding to the top of the embankment is 16,920 acre-feet or 27,297,333 cubic yards (see Table 2.2b). The water elevation ranges from 795 to 799' and at 799' there is approximately 1,001 acre-feet of storage remaining. The classification for size, based on the height of the dam and storage capacity, is Intermediate in accordance with the USACE Recommended Guidelines for Safety Inspection of Dams ER 1110-2-106 criteria (see Table 2.2a for size classification criteria).

Table 2.2a USACE ER 1110-2-106
Size Classification

	Impoundment	
Category	**Storage (Ac-ft)**	**Height (ft)**
Small	< 1,000	< 40
Intermediate	1,000 to < 50,000	40 to < 100
Large	> 50,000	> 100

Table 2.2b: Summary of Dam Dimensions and Size	
	Ash Pond
Dam Height (ft)	110
Crest Width (ft)	35.4
Length (ft)	≈3,000
Side Slopes (upstream) H:V	3 to 2.5:1
Side Slopes (downstream) H:V	3 to 2.5:1
Hazard Classification	Low

The ash pond embankment system has been classified as a Category II dam by the Georgia Safe Dams Program (GSDP). According to the GSDP classification system, "Category II means the classification where improper operation or dam failure would not result in probable loss of human life". Per the Federal Guidelines for Dam Safety dated April 2004, a low hazard potential classification applies to those dams 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. Considering the low probability of loss of life as well as the low economic and/or environmental impacts, a Federal Hazard Classification of **Low** is appropriate for this facility (see Table 2.2c Federal Guidelines for Hazard Classification criteria).

*** GSDP assigned a hazard classification of Low due to potential minimal economic loss due to failure.**

Table 2.2c FEMA Federal Guidelines for Dam Safety Hazard Classification

Hazard Potential 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 this classification)

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

Per Georgia Power, the ash pond primarily contains fly ash, bottom ash, boiler slag, flue gas emission control residues, pyrites and other low volume waste. Other materials that the pond may contain are ash sluice water, categorical low volume wastewater, coal pile storm water runoff and other storm water. The drainage area for the ash pond is approximately 711 acres while the surface area of the pond is approximately 343 acres. The maximum design storage capacity is approximately 16,920 acre-feet or 27,297,333 cubic yards.

Table 2.3: Amount of Residuals and Maximum Capacity of Unit

	Ash Pond
Surface Area (acre)	343
Current Storage Volume (acre-feet)	8,321
Max. Design Storage Capacity (acre-feet)	16,920

2.4 PRINCIPAL PROJECT STRUCTURES

2.4.1 Earth Embankment Dam

The dam embankment generally consists of lean clays and silts obtained from borrow areas. Some sandy material was found in the borrow areas, but was tested and reported to be satisfactory per the design standards. A plan view of the Ash Pond is depicted in Figure 2.4.1 a. Figures 2.4.1 a and b reflect conditions of the Ash Pond, per the Design Drawings prepared in 1976 and 1973 respectively. Additional drawings of the ash pond are included within Appendix A (Doc 07: Plant Wansley Unit No. 1 Ash Pond.pdf, Doc 13: Ash Pond Construction Drawing, Doc 14: Separation Dam Plan View.pdf and Doc 15: Ash Pond Overall).

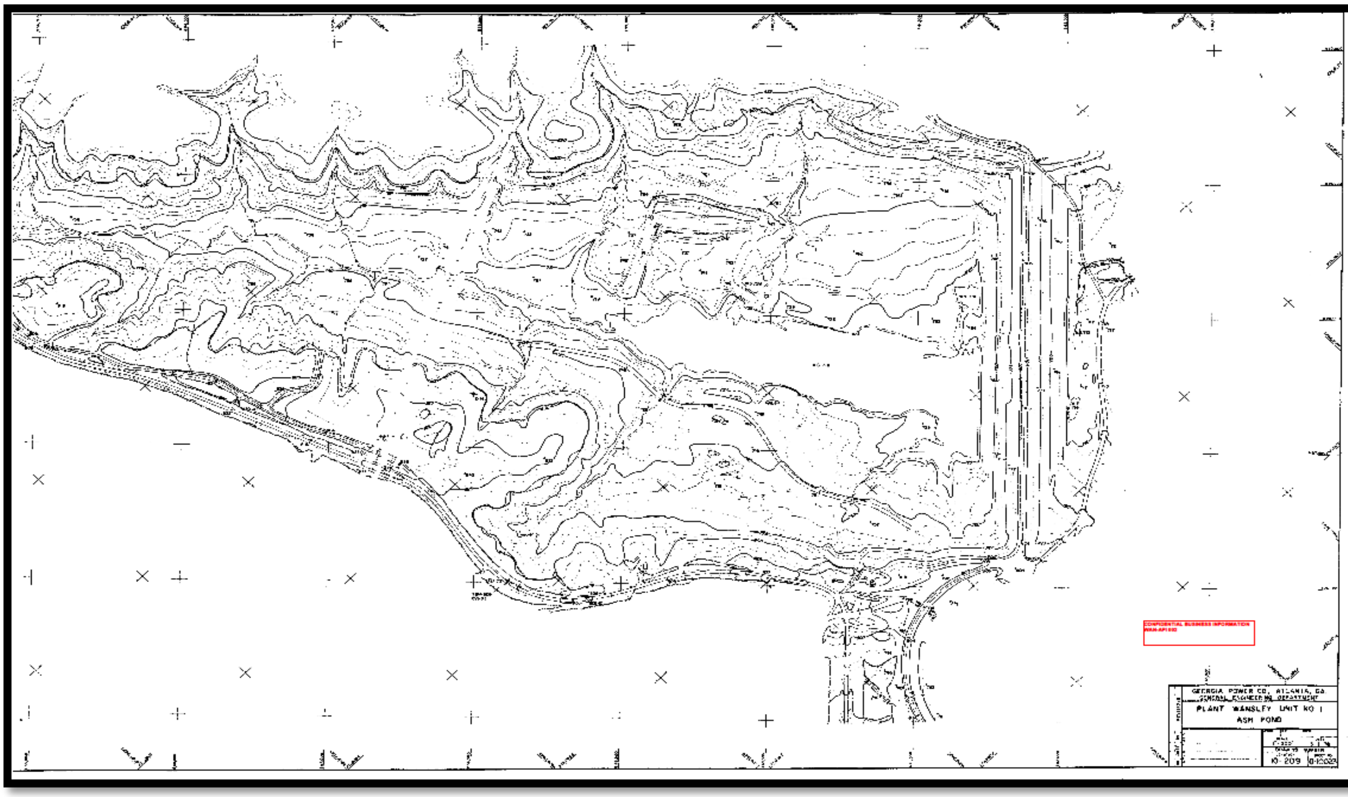
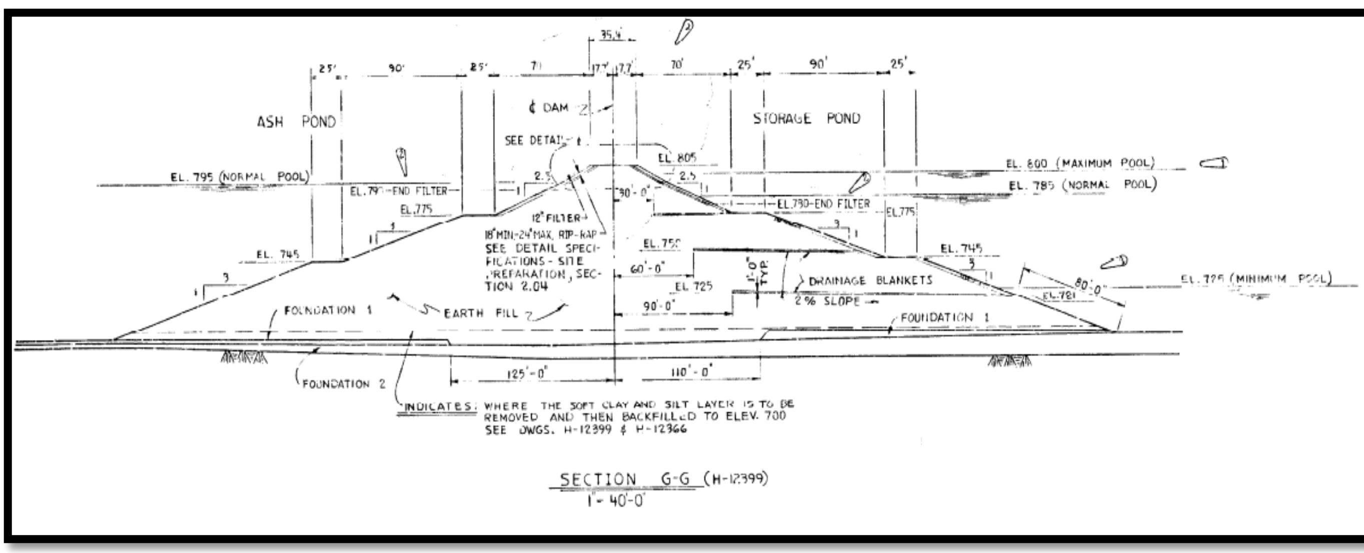


Figure 2.4.1 a: Plant Wansley Unit No 1 – Ash Pond



2.4.2 Outlet Structures

The outlet works consist of a broad crested weir and an open channel emergency spillway. Due to circulation and re-use of sluice water, the plant regulates the ash pond water surface elevation below the invert of the outlet works and has no record of the skimmer weir or the spillway ever being used. During the design of the ash pond unit, some late changes were made to divert storm water flow away from the pond which eliminates a majority of the elevation fluctuation due to storm events. Once the skimmer weir elevation is breached the flow travels through a Corrugated Metal Pipe (CMP) to the downstream storm water pond.

2.5 CRITICAL INFRASTRUCTURE WITHIN FIVE MILES DOWN GRADIENT

All critical infrastructures were located using aerial photography and might not accurately represent what currently exists down-gradient of the site. Figure 2.5 shows Plant Wansley and associated critical infrastructure, listed in Table 2.5.

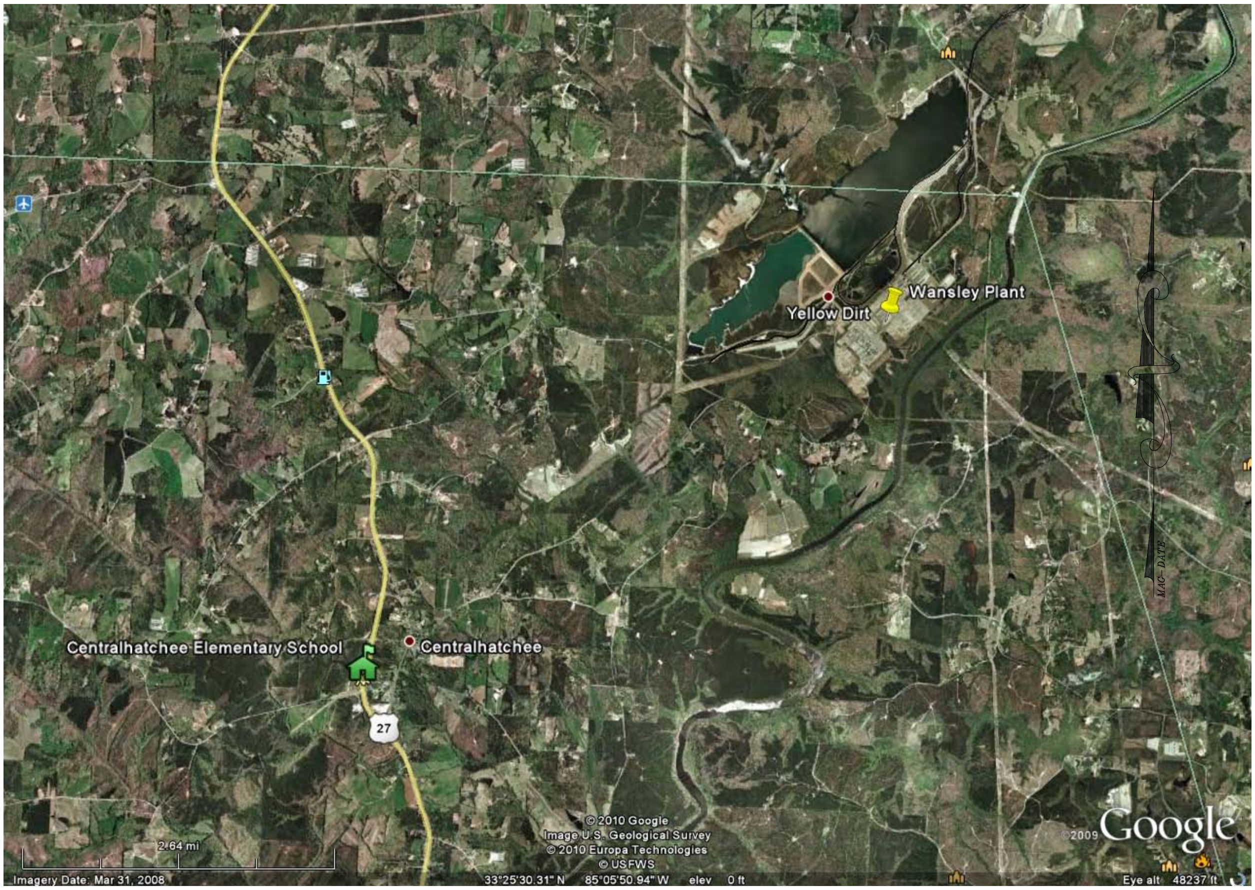


Figure 2.5: Plant Wansley Critical Infrastructure Map

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Table 2.5: Plant Wansley Critical Infrastructure Within 5 Miles

Schools	Transportation	Nursing Homes
Central Hatchee Elementary School 315 Central Hatchee Parkway Franklin, GA 30217	Martha Berry Hwy (US Hwy 27)	None
		Fire Stations
		None

3.0SUMMARY OF RELEVANT REPORTS, PERMITS AND INCIDENTS

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

Approximately thirteen (13) quarterly safety inspection reports were provided by Georgia Power dating back to 2005. Information pertaining to the separation dike of the most recent reports is summarized below.

Southern Company Generation 2009 Inspection Report for Plant Wansley Ash Pond Complex, REA # WN-08900, December 9, 2009 (Appendix A, Doc 1: 2009 4th Quarter Dam Safety Inspection Report):

- The piezometers on the separation dike are generally registering within their historical ranges. Piezometer BB is registering an elevated water level and has generally followed the change in the ash pond elevation. This piezometer was repaired after being damaged in 2008.

Southern Company Generation 2009 Inspection Report for Plant Wansley Ash Pond Complex, REA # WN-08900, January 12, 2009 (Appendix A, Doc 3: 2008 4th Quarter Dam Safety Inspection Report):

- It was noticed the piezometer BB had been broken off and buried during the recent gypsum storage facility construction activities. Water levels in the piezometer appear to be higher, but this may be caused by inspectors using a different reference point to measure the water levels with the pipe being broken off. Plant personnel are inspecting and will advise Hydro Services.
- Current Recommendations: Cracks in concrete lined ditches should be cleaned out and caulked. **Pending completion - open.**
- Status of Previous Recommendations: Upstream and Downstream slopes - Localized erosion rills/gullies need to be repaired to mitigate further erosion. **Fixed – closed.**
- Status of Previous Recommendations: Runoff erosion at crest of upstream slope repaired. **Closed.**

Southern Company Generation 2008 Inspection Report for Plant Wansley Ash Pond Complex, REA # WN-08900, September 9, 2008 (Appendix A, Doc 4: 2008 3rd Quarter Dam Safety Inspection Report):

- The piezometers are registering in their historic ranges. They exhibit a muted relationship to the storage pond elevation, but little relationship to the ash pond elevation.
- Current Recommendations: Upstream and Downstream slopes - Localized erosion rills/gullies need to be repaired to mitigate further erosion

- Status of Previous Recommendations: Runoff erosion at crest of upstream slope repaired. **Pending completion - open.**

Southern Company Generation 2008 Inspection Report for Plant Wansley Ash Pond Complex, REA # WN-08900, May 28, 2008 (Appendix A, Doc 5: 2008 1st Quarter Dam Safety Inspection Report):

- The piezometers are registering in their historic ranges. They exhibit a muted relationship to the storage pond elevation, but little relationship to the ash pond elevation.
- Current Recommendations: Upstream and Downstream slopes - Localized erosion rills/gullies need to be repaired to mitigate further erosion
- Status of Previous Recommendations: Runoff erosion at crest of upstream slope repaired. **Pending completion - open.**

3.2 SUMMARY OF LOCAL, STATE AND FEDERAL ENVIRONMENTAL PERMITS

The ash pond facility is under regulation by the Georgia Department of Natural Resources (GDNR), Environmental Protection Division Safe Dams Program (EPDSDP). The discharges of the ash pond are permitted under the Federal National Pollutant Discharge Elimination Program. (NPDES Permit # GA0026778)

3.3 SUMMARY OF SPILL/RELEASE INCIDENTS (IF ANY)

No spills or releases from the Ash Pond facilities have been noted by Georgia Power for this site.

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4.0SUMMARY OF HISTORY OF CONSTRUCTION AND OPERATION

4.1 SUMMARY OF CONSTRUCTION HISTORY

4.1.1 Original Construction

Construction was started on the ash pond separation dike in 1973. The original designer for the ash pond management unit was Southern Services, Inc. Plant Wansley has disposed of coal combustion by-products (ash) in one main storage impoundment since 1976. The Plant Wansley ash pond was commissioned in 1975.

The dam assessor did not meet with, or receive information from, the design engineer of record regarding foundation preparation for the ash pond. However, the dam assessor did receive documentation from Georgia Power regarding impoundment materials for the ash pond. Information in the report from Georgia Power Company in May of 1975 and the Drawings for the ash pond (1973) provide documentation on the impoundment material (see Appendix A (Doc 06: Earth Embankment Report.pdf, Doc 13: Ash Pond Construction Dwg.pdf and Doc 08: Plant Wansley Separation Dam Stability Analysis, 1 of 3.pdf)). These drawings include soil descriptions for the separation dike. The dike was constructed over a core area that was undercut to weathered rock and then fill was compacted onto the inspected rock.

Gypsum dewatering cells from drawings dated in 2007 were recently added on to the existing ash pond (see Appendix A (Doc 12: Gypsum Overall Plan View)).

4.1.2 Significant Changes/Modifications in Design since Original Construction

No significant changes/modifications were noted for the Ash Pond before 2007.

Plans and specifications dated 2007 show new construction of gypsum dewatering cells that were installed on the existing ash pond facility. These dewatering cells were assumed to have been built to local codes and standards. Upon visual observation of the four dikes for this facility, everything appeared to be well maintained. See Appendix A Doc 12: Gypsum Overall Plan View for a drawing of the dewatering cells.

4.1.3 Significant Repairs/Rehabilitation since Original Construction

No significant repairs or rehabilitation had been noted other than typical maintenance items described in the quarterly reports.

4.2 SUMMARY OF OPERATIONAL HISTORY

4.2.1 Original Operational Procedures

The ash pond was designed and operated for reservoir sedimentation and sediment storage of fly ash, bottom ash and boiler slag. Plant process waste water, coal combustion waste, coal pile stormwater runoff, and minimal stormwater runoff around the Ash Pond facility are pumped into the reservoir. Inflow water is treated through gravity settling and deposition. The ash sluice water is re-circulated through the system by a combination of a gravity fed system and pumps.

4.2.2 Significant Changes in Operational Procedures since Original Startup

No significant operating procedures for the ash pond have changed since the original start-up.

4.2.3 Current Operational Procedures

The ash pond was designed and operated for reservoir sedimentation and sediment storage of fly ash, bottom ash and boiler slag. Plant process waste water, coal combustion waste, coal pile stormwater runoff, and minimal stormwater runoff around the Ash Pond facility are pumped into the reservoir. Inflow water is treated through gravity settling and deposition. The ash sluice water is re-circulated through the system by a combination of a gravity fed system and pumps.

4.2.4 Other Notable Events since Original Startup

No additional information was provided.

5.0FIELD OBSERVATIONS

5.1 PROJECT OVERVIEW AND ASSESSMENT

Dewberry personnel Frederic Shmurak, PE and Justin Story, EI performed a site visit on Wednesday, June 30, 2010. The site visit began at 8:00 AM. Weather was hot and cloudy. The overall visual assessment of the Ash Pond was that it is in satisfactory condition and no significant findings were noted. Coal Combustion Dam Inspection Checklists created on June 30, 2030, by the two engineers for the Plant Wansley Ash Pond are provided in Appendix B, Doc 1: 2010.06.28 – Ash Pond Checklist. Photographs from the site visit are provided in Appendix B, Doc 4: Photographs.

5.2 EARTH EMBANKMENT DAM

5.2.1 Crest

The crest was covered by graded aggregate base material and had no signs of any rutting, depressions, tension cracks or other indications of settlement or shear failure, and appeared to be in satisfactory condition.

5.2.2 Upstream Slope

The upstream slope of the separation dike is mostly lined with rip rap and stone. Scarps, sloughs, depressions, bulging or other indications of slope instability or signs of erosion were not observed.

Figure 5.2.2a: Crest and Upstream Slope of ash pond's separation dike.

The upstream slope of the western dike is mostly lined with rip rap and stone. Scarps, sloughs, depressions, bulging or other indications of slope instability or signs of erosion were not observed.

Figure 5.2.2b: Upstream side of western dike

5.2.3 Downstream Slope and Toe

The downstream slope is mostly lined with rip rap and stone. Scarps, sloughs, depressions, bulging or other indications of slope instability or signs of erosion were not observed. Gravel had been placed at a few locations along the embankment as some regular maintenance. The toe of this slope is below the normal pool of the cooling water pond; therefore, visual assessment of seepage could not be performed.

Figure 5.2.3a: Crest and Downstream Slope of ash pond's separation dike.

Figure 5.2.3b: Gravel placed along downstream embankment which appeared to be routine maintenance

Figure 5.2.3c: Crest and Downstream Slope of ash pond's western dike.

5.2.4 Abutments and Groin Areas

The embankment consists of a raised dike system; therefore the earthen embankment does not abut existing hillsides, rock outcrops or other raised topographic features.

5.3 OUTLET STRUCTURES

5.3.1 Overflow Structure

The outlet structure was not in use; however, it visually appeared to be in good condition. Due to circulation and re-use of sluice water, the plant regulates the ash pond water surface elevation below the invert of the outlet works and has no record of the skimmer weir or the spillway ever being used.

5.3.2 Outlet Conduit

The spillway system was not in use at the time of the assessment; however, the visible portion of the outlet conduit had no apparent deterioration.

5.3.3 Emergency Spillway (If Present)

The emergency overflow spillway visually appeared to be in good condition.

5.3.4 Low Level Outlet

No low level outlet is present.

6.0HYDROLOGIC/HYDRAULIC SAFETY

6.1 SUPPORTING TECHNICAL DOCUMENTATION

6.1.1 Floods of Record

No flood of record analysis was provided; however, design flow analyses described below indicate there would be no overtopping during floods. This is supported by the fact that the dikes were not reported to have been overtopped during past hurricanes, tropical storms and depressions.

6.1.2 Inflow Design Flood

According to FEMA Federal Guidelines for Dam Safety, current practice in the design of dams is to use the Inflow Design Flood (IDF) that is deemed appropriate for the hazard potential of the dam and reservoir, and to design spillways and outlet works that are capable of safely accommodating the flood flow without risking the loss of the dam or endangering areas downstream from the dam to flows greater than the inflow. The recommended IDF or spillway design flood for a significant hazard intermediate sized structure (See section 2.2), in accordance with the USACE Recommended Guidelines for Safety Inspection of Dams ER 1110-2-106 criteria is the 100-yr to ½ PMF (See Table 6.1.2).

Table 6.1.2: USACE Hydrologic Evaluation Guidelines Recommended Spillway Design floods

Hazard	Size	Spillway Design Flood
Low	Small	50 to 100-yr frequency
	Intermediate	100-yr to ½ PMF
	Large	½ PMF to PMF
Significant	Small	100-yr to ½ PMF
	Intermediate	½ PMF to PMF
	Large	PMF
High	Small	½ PMF to PMF
	Intermediate	PMF
	Large	PMF

The Probable Maximum Precipitation (PMP) is defined by American Meteorological Society as the theoretically greatest depth of precipitation for a given duration that is physically possible over a particular drainage area at a certain time of year. The National Weather Service (NWS) further states that in consideration of our limited knowledge of the complicated processes and interrelationships in storms, PMP values are identified as estimates. The NWS has published application procedures that can be used with PMP estimates to develop spatial and temporal characteristics of a Probable Maximum Storm (PMS). A PMS thus developed can be used with a precipitation-runoff simulation model to calculate a probable maximum flood (PMF) hydrograph.

In a stormwater capacity report provided by Southern Company (See Appendix A, Doc 19: Stormwater Capacity.pdf) the authors determined the Wansley Ash Pond can handle the following:

" *A 24 hour rainfall runoff of : 1) 16.9 inches of rainfall runoff, which is 2.13 times the 100 year storm, at the level of the emergency spillway crest, and 2) 23.5 inches of rain which is 2.96 times the 100 year storm, at a level one foot below the crest of the dike*."

The Ash Pond is designed to safely pass the design storm corresponding to the ½ PMP and is therefore in compliance with recommended federal guidelines. The 6-hour, 10 square mile PMP is 30.5 inches. Adequate freeboard exists to store the ½ PMP event.

6.1.3 Spillway Rating

No spillway rating was provided. The outlet structure type is unregulated and given little change in the normal pool elevation the resulting discharge rate is expected to be relatively constant.

6.1.4 Downstream Flood Analysis

No downstream flood analysis was provided.

6.2 ADEQUACY OF SUPPORTING TECHNICAL DOCUMENTATION

Supporting technical documentation provided is sufficient.

6.3 ASSESSMENT OF HYDROLOGIC/HYDRAULIC SAFETY

Adequate capacity and freeboard exists to safely pass the design storm.

7.0STRUCTURAL STABILITY

7.1 SUPPORTING TECHNICAL DOCUMENTATION

7.1.1 Stability Analyses and Load Cases Analyzed

A stability analysis report for the Fly Ash Pond, prepared in 1973, by Southern Services, Inc., with Geotechnical Testing performed by Law Engineering Testing Company, provides information on the stability analysis results and is presented in Section 7.1.4 Factors of Safety and Base Stresses. Drawings provided by Georgia Power dated 1973 also contains the critical data for the slop stability analysis. Both steady state (normal) loading and drawdown loading conditions were analyzed. See Appendix A (Doc 08: Separation Dike Analysis (1 of 3).pdf) for the drawing.

7.1.2 Design Properties and Parameters of Materials

Construction drawings for Plant Wansley's separation dike were prepared by the Georgia Power in conjunction with Southern Services, Inc. from 1973. The drawings include documentation of the shear strength design properties for the Fly Ash Pond, which is included in this report and is presented in the following section; see Appendix A (Doc 08: Separation Dike Analysis (1 of 3).pdf) for the drawing.

TOTAL STRESS
SOIL CHARACTERISTICS

TYPE SOIL	CONSTRUCTION			STEADY SEEPAGE & DRAWDOWN		
	γ_m	ϕ	C	γ_m	ϕ	C
	LBS/CU.FT	DEGREES	LBS/SQ.FT.	LBS/CU.FT.	DEGREES	LBS/SQ.FT.
EMB. FILL (A)	124	26.5	1200	124	19	1400
FILTER (B)	130	40	0	130	40	0
RIP-RAP (C)	130	38	0	130	38	0
BEDROCK (D)	150	40	3000	150	40	3000
FDN. 1 (E)	112	8	550	112	12	700

Design Shear Strength

The following items were noted on the Separation Dike Stability Analysis drawings:

- *Safety factors shown are the minimum for each condition. Complete computer results available from Southern Services, Inc.*
- *Safety factors do not include benefit from deposit of ash.*
- *Soil characteristics from Law Engineering and Testing Co. through Georgia Power.*
- *Materials recommended by LETCO for embankment fills are: a. Fine to medium sandy silt (west borrow); b. stiff to hard fine to medium sandy micaeous silt (north borrow); partially weathered rock (LETCO report No. 40 1972).*
- *Embankment fills shall be compacted to at least secure the design strength characteristics used in the analysis of slopes. Field control should ensure the design strength of the materials used in the design.*

The above referenced document is provided in Appendix A (Doc 08: Separation Dike Analysis (1 of 3).pdf).

A more recent study was performed in the 2010 and the results are found below. The soil weight and strength parameters used in the study are consistent with soils found in the Piedmont geological province. For the complete report see Appendix A, Doc 17: Slope Stability Analysis.pdf. There is no evidence that the dikes were built of or upon wet ash, slab, or other unsuitable materials.

	Dry Unit Weight (pcf)	Moist Unit Weight (pcf)	Effective Stress Parameters		Total Stress Parameters	
			Internal Friction Angle	Cohesion (psf)	Internal Friction Angle	Cohesion (psf)
Embankment Fill	102	123	32	140	29	400
Foundation Soil	--	112	37	0	24	80
Foundation (Gravel Filter)	--	130	40	0	40	0
Sluiced Ash	--	80	10	0	10	0
Rock	--	150	40	3000	40	3000

7.1.3 Uplift and/or Phreatic Surface Assumptions

The 1973 Separation Dike Stability Analysis drawings, prepared by Georgia Power and Southern Services, Inc., provides information on the phreatic surface as shown in Figure 7.1.3A and the drawings can be found in Appendix A (Doc 08: Separation Dike Analysis (1of3).pdf). A 2010 slope stability analysis was provided that shows the phreatic surface profiles (See Figure 7.1.3B through D). For the complete report and drawings showing the phreatic surfaces see Appendix A, Doc 17: Slope Stability Analysis.pdf. Piezometric readings indicate that the phreatic surface has overall been stable and is consistent with the assumptions made in the slope stability models.

"The most recent levels for each pond along with the piezometer readings are summarized in the table below.

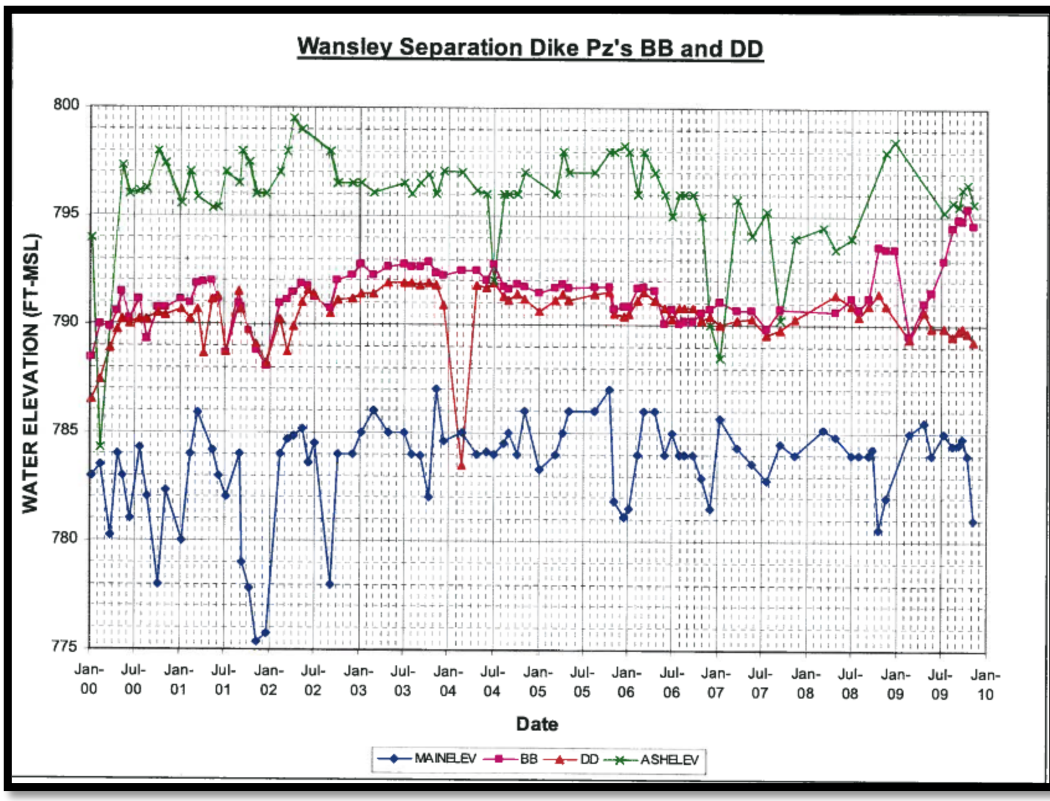


Figure 7.1.3a: Historic Piezometer Readings

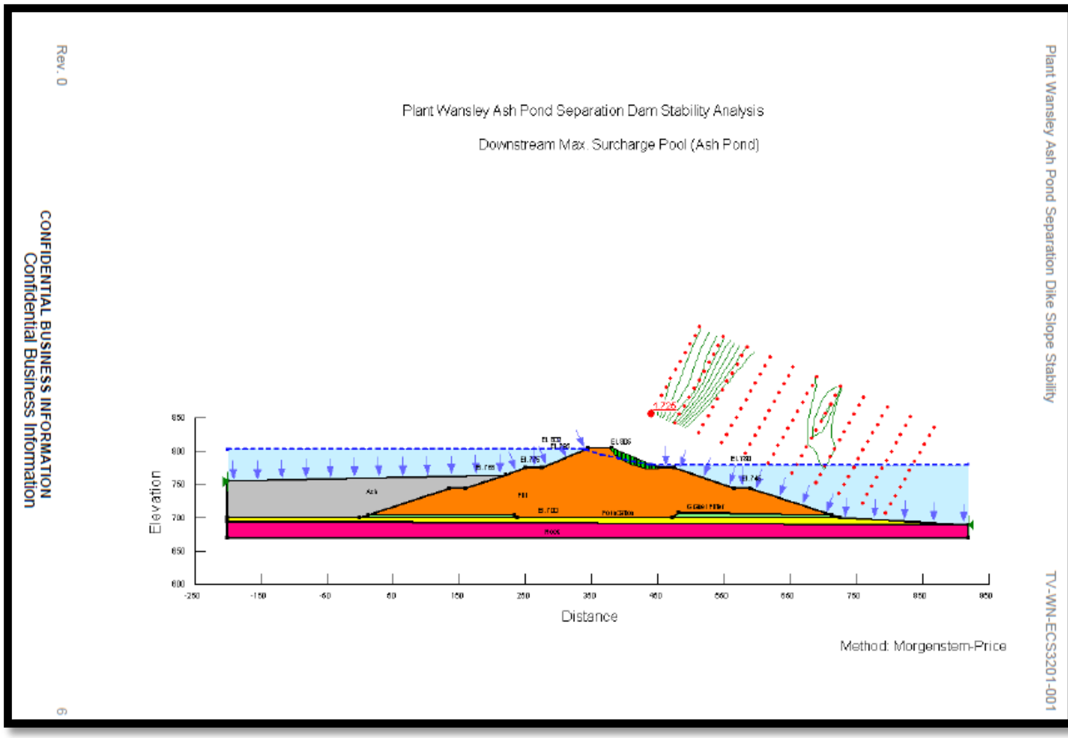


Figure 7.1.3b: Phreatic Surface Profile (Steady State)

*The locations of the piezometers are depicted in Figure 9.2.1, within the Instrumentation Plan Section. (See Appendix A Doc 1 through 5 for inspection reports showing historical piezometer data). Piezometer BB was damaged in 2008 and Ge*orgia Power stated it was recently repaired.

The piezometer reading information generally indicates a steady and consistent trend. There appears to be a major drop in piezometer DD reading in 2004 which is unexplained.

The increased elevated readings of piezometer BB starting in 2008 were potentially caused from measurements being made from different reference points when the top of the pipe was broken off.

Internal drainage collection and discharge piping was not located by the dam assessors during the visual site inspection. However, Georgia Power provided documentation on internal drainage collection (drainage blankets) and discharge piping. See Appendix C (Doc 07: Ash Pond Profile.pdf) for the drawing.

7.1.4 Factors of Safety and Base Stresses

A stability analysis drawing for the separation dike prepared in 1973, by Georgia Power, with Southern Services, Inc. provides information on the factors of safety and is presented below. See Appendix A (Doc 08: Separation Dike Analysis (1of3).pdf) for the complete report.

The results of the stability analysis are summarized in the drawings below. The stability analyses were performed on the downstream slope of the separation dike, however, no information was provided for the western dike.

The safety factors presented in the drawings (Steady State = 1.56; Drawdown = 1.27) show that the slopes of the fly ash facility at Plant Wansley have satisfactory safety factors under static and drawdown conditions.

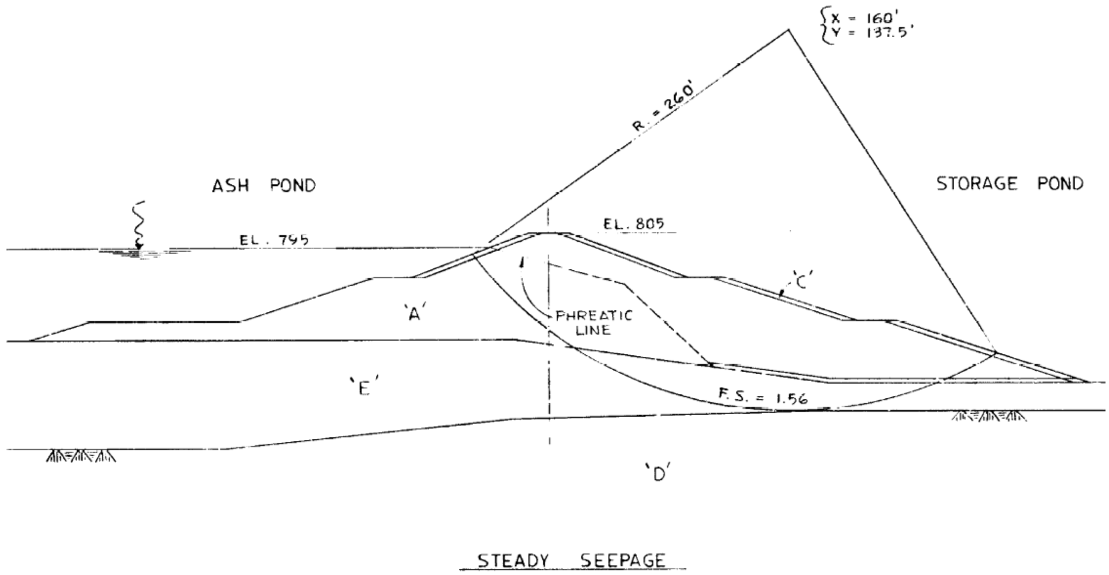


Figure 7.1.4a: Steady Seepage Profile

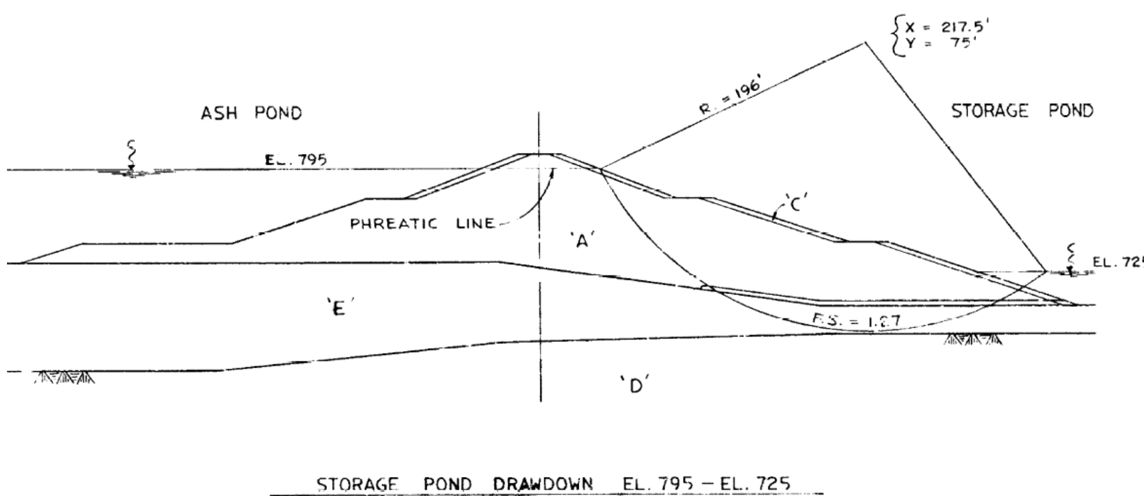


Figure 7.1.4b: Drawdown Profile

A slope stability analysis was performed in 2010 and the results are below. For the complete report please see Appendix A, Doc 17: Slope Stability Analysis.pdf.

Table 7.1.4: Factors of Safety

Failure Conditions	Computed Factor of Safety	Required Minimum Factor of Safety[1]
Downstream Steady State	1.9	1.5
Downstream Seismic	1.2	1.1
Downstream Maximum Surcharge Pool (Ash Pond)	1.7	1.4
Upstream Rapid Drawdown (Ash Pond)	1.9	1.3
Downstream Rapid Drawdown (Storage Pond)	1.4	1.3

[1] US Corps of Engineers Manual EM 1110-2-1902, October 2003

Based on the results of the analyses presented in this report, all the dams and dikes that form the fly ash disposal facility at Plant Wansley were found to have stability safety factors at or above the minimum recommended values. Slope stability analysis were provided for the western dike (Appendix A, Doc 20: Slope Stability Analyses of the West Dike.pdf) on October 28, 2010 which yielded similar stability factors at or above the minimum recommended values.

On this basis, it is believed that the facility is performing as intended in its design. Routine maintenance and inspections should continue to enable the facility to perform as found in this evaluation.

7.1.5 Liquefaction Potential

A 2010 study was provided that showed the soils have a factor of safety of 1.4 against liquefaction. It was stated that from liquefaction potential analysis, that "*the separation dike soils are not subject to appreciable strength loss due to earthquake shaking.*" (See Appendix A, Doc 18: Liquefaction Potential.pdf).

A separate soil report stated the fill material came from native borrow sites and the typical soil in the surrounding area does not have liquefaction problems.

Original foundation soil conditions do not appear susceptible to support liquefaction.

7.1.6 Critical Geological Conditions and Seismicity

No critical geological conditions were noted.

An engineering report for Plant Wansley titled "Earth Embankments Final Report and Appendices" references the geological conditions of the site as follows:

" The site geology and soil profile are typical of much of the Southeastern Piedmont. The plant area and embankments are within the Brevard Zone which is a pronounced geological lineament of deformed rocks extending from Alabama northeastward into North Carolina. The rocks at the site are biotite gneiss and schists, typically striking northeast with a southeast dip. Where sound and unweathered, they are highly competent, but because of the pronounced foliation, they break into flat particles when excavated and crushed. However, this characteristic is not sufficiently detrimental to prevent the rock from being entirely adequate for riprap, bedding material, sub-ballast, and road base. It was not used for concrete aggregate.

Upland soils throughout the site are residual from in-place weathering of underlying parent rock. These soils were used in the construction of dikes and dams, and are generally sandy, micaceous, silts and silty, micaceous, fine sand. The upper layer, however, was more clayey because of advanced weathering of the minerals, and is generally described as red-brown, sandy, silty, clay, sandy, clayey silts.

In the valleys of streams and smaller drainages features, alluvial soils cover the valley floors. These are primarily silts and fine sands, with pockets of soft, organic much soils which required removal before placing embankment. They were not used for embankment fills."

See Appendix A (Doc 06: Earth Embankment Report.pdf) for the complete document.

Based on USGS Seismic-Hazard Maps for the Conterminous United States, dated 2005, the facility is located in an area anticipated to experience a 0.10g acceleration with a 2-percent probability of exceedance in 50-years.

7.2 ADEQUACY OF SUPPORTING TECHNICAL DOCUMENTATION

Structural stability documentation is adequate.

7.3 ASSESSMENT OF STRUCTURAL STABILITY

The structural stability of the ash pond appears to be satisfactory.

Based on the previous assessment reports/inspections provided by Georgia Power, this assessment of the ash pond is generally consistent with historical observations.

8.0MAINTENANCE AND METHODS OF OPERATION

8.1 OPERATIONAL PROCEDURES

Operational procedures are adequate. The facility is operated for reservoir sedimentation and sediment storage; specifically, fly ash, bottom ash, pyrites, boiler slag and flue emission control residuals. Coal combustion process waste water and stormwater runoff from the facility are discharged into the reservoir, inflow water is treated through gravity settling and deposition. The sluice water is re-circulated through the plant.

8.2 MAINTENANCE OF THE DAM AND PROJECT FACILITIES

Maintenance procedures are adequate. Grassed areas are routinely mowed and vegetation is removed from the rip-rap slopes. Spillways and outlets are maintained and debris is removed as needed. Deficiencies as noted in the surveillance & monitoring program are corrected and documented.

8.3 ASSESSMENT OF MAINTENANCE AND METHODS OF OPERATION

8.3.1 Adequacy of Operational Procedures

Operational procedures are adequate.

8.3.2 Adequacy of Maintenance

The maintenance program is adequate.

9.0SURVEILLANCE AND MONITORING PROGRAM

9.1 SURVEILLANCE PROCEDURES

Georgia Power stated they have daily, weekly, monthly, and quarterly inspections for the ash pond. Only documentation was provided on the quarterly inspections.

<u>Quarterly Inspections</u>:

A quarterly inspection is conducted by plant personnel and at least one representative of Hydro Services. See Appendix A (Doc 01 through Doc 05) for copies of the 2008 & 2009 quarterly inspection reports.

9.2 INSTRUMENTATION MONITORING

9.2.1 Instrumentation Plan

The following data is based on inspection reports provided by Georgia Power:

An instrumentation plan was not provided, however piezometers have been installed to collect instrumental data. The peizometers are located at the south end at the crest of the separation dike. For piezometer readings, a water level indicator probe is used, which is lowered within the monitoring well until water is reached, and the distance is recorded. Profiles of the monitoring wells and piezometers are depicted in Figure 9.2.1. Please refer to Appendix A (Doc 11: Separation Dike Profiles.pdf) for piezometer profile drawings.

9.2.2Instrumentation Monitoring Results

Instrumentation monitoring data has been provided and is discussed in Section 7.1.3 Uplift and/or Phreatic Surface Assumptions.

9.2.3Evaluation

The historical data indicates that the embankment dams are performing adequately.

9.3 ASSESSMENT OF SURVEILLANCE AND MONITORING PROGRAM

9.3.1 Adequacy of Inspection Program

Inspection program is adequate.

FINAL

9.3.2Adequacy of Instrumentation Monitoring Program

The surveillance and monitoring programs should include additional monitoring of the emergency overflow spillway. As indicated previously, the overflow spillway is not in use; however, minor cracking is occurring and the potential for water to undermine the spillway slab exists.

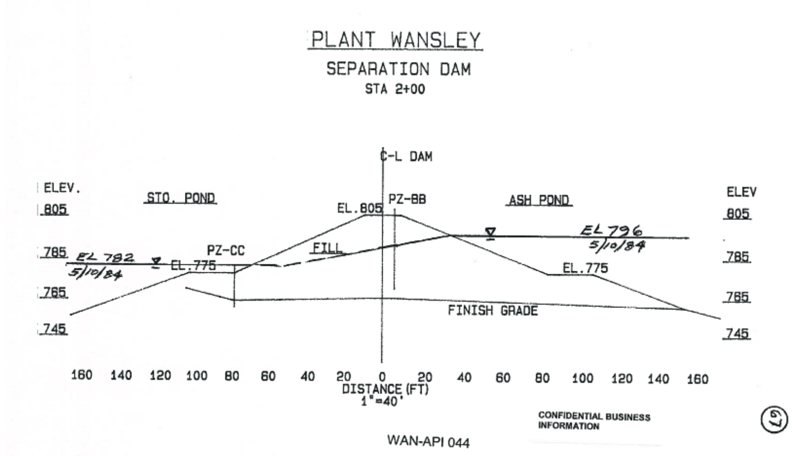


Figure 9.2.1a: Separation Dam Cross Section

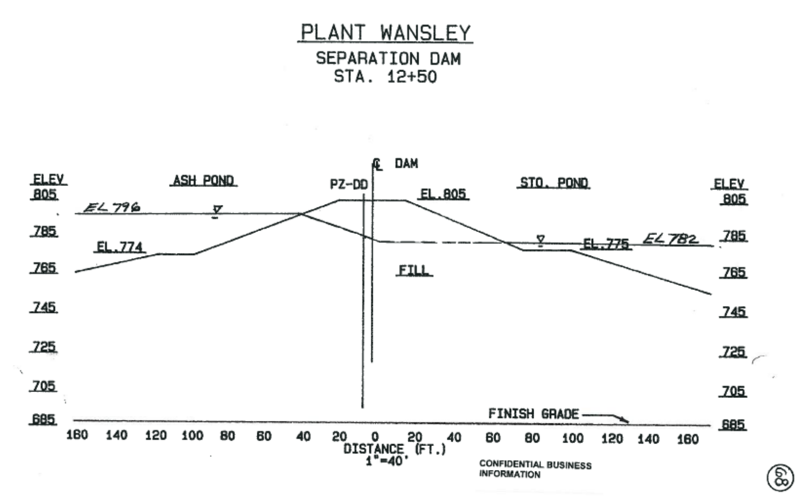


Figure 9.2.1b: Separation Dam Cross Section

Southern Company Generation
Bin 10193
241 Ralph McGill Boulevard NE
Atlanta, Georgia 30308-3374

Tel 404.506.7033

SOUTHERN COMPANY
Energy to Serve Your World™

December 9, 2009

PLANT WANSLEY
Dam Safety Surveillance
Quarterly Report
REA No. WN-08900

Mr. J. P. Heilbron
Plant Manager
Georgia Power Co.
Plant Wansley

Dear Mr. Heilbron:

Attached is the 4th Quarter - 2009 report on Dam Safety Surveillance for Plant Wansley. The inspection of the dikes at the Main Storage Pond, Ash Pond, Separator Dike, Potable Water Pond, Detention Pond and Gypsum Storage Pond was performed on October 16, 2009 by Hugh Armitage of the SCG Hydro Services Group. A representative from Plant Wansley accompanied Mr. Armitage on the inspections.

This report includes:

a) A review of the current instrumentation data;
b) The *4th Quarter – 2009 Dam Safety Inspection Report* summarizing the current and previous recommendations, field observations, comments. and photographs made during the October 16, 2009, inspections;
c) A copy of the current instrumentation plots;
d) A copy of the finalized 1st Qtr report. This report was issued in Draft to plant personnel in April 2009.

The current recommendations from this 4th Quarter Inspection are described on the first page of the attached report. The description and status of recommendations from the previous quarterly inspection are also described on pages 1 and 2 of the attached report.

Should you have any questions, please contact Hugh Armitage at extension 8-506-7109.

Sincerely,

Larry B. Wills

Larry B. Wills
Principal Engineer, Hydro Services

WAN-API 058

/hha

Attachments

CONFIDENTIAL BUSINESS
INFORMATION

xc: **Georgia Power Company**

M. A. Leason	(w/ attachment)
N. I. Dean	(w/ attachment)
T. S. Lovvorn	(w/ attachment)
G. C. Moncus	(w/ attachment)
B. Harcrow	(w/ attachment)

Southern Company Services

D. E. Jones	(w/attachment)
E. B. Allison	(w/ attachment)
J. H. Crisler	(w/ attachment)
B. J. Peterson	(w/attachments)
K. Furman	(w/ attachments)

Hydro Service Wansley Notebook
Master File: WN-09900

Hydro Services Correspondence Notebook (w/attachments)

T:\Quarterly Reports\Fossil Plants\2009\WANSLEY\09-4th Qtr\1 - 09-Qtr 4 - Cover Letter.DOC

CONFIDENTIAL BUSINESS INFORMATION

Instrumentation Data Review
4th Quarter – 2009

In the 3rd quarter of 2009, it was agreed that the level of the storage pond would be gradually reduced by usage to elevation 780 ft. in an effort to reduce the extent of the wet area on the lower downstream slope at Sta. 37+50. This issue has been discussed since the early 1980's. The pond level taken during the November instrumentation readings was reported to be elevation 781.0 feet.

A current assessment of instrumentation data reviewed up to the most recent readings at Plant Wansley is as follows.

Storage Pond:

Sta. 20+00: Piezometers are generally within their historic range and seem to be tracking the pond level.

Sta 37+50-1: Piezometers PP and TT3 experienced a significant drop in elevation in the spring. It is not known exactly why this occurred but may have been related to a delayed response to a decrease in the pond level late in 2008. The readings since July have returned to their historic levels.

Sta 37+50-2: All of these piezometers appear to be in their historic range. They generally are tracking the pond level.

Sta 37+50 Pipe Flows: These flows appear to be in their historic ranges. These flow rates will continue to be monitored to assess if any trends develop. They seem to be tracking the pond level. The flow rate is decreasing at most of the drains as the pond level is being lowered to elevation 780 ft.

Sta 47+50: The piezometers are within their historic range of measurement.

It is recommended that the flow rate at the toe drain at Station 39+00 be obtained at monthly intervals rather than the current 6 month schedule. This information will be useful when modifications to the drains at 37+50 are carried out.

Sta 58+00: The piezometer levels are Sta. 58+00 are within their historic range. The piezometer LLL was repaired this past summer when the drain valve was observed leaking earlier in the year.

Relief Wells: The relief wells appear to be discharging in their historic range, but also in response to the lower pond level. Dip in flow seems to have occurred when the seep was discovered in July.

Sta 65+00: Piezometric levels at C, E and MM are within their historic ranges.

Sta 70+00: All of these piezometers are reading in their historic ranges.

Weir and Pipe Flows: Weir measurements at Sta. 11+20 and 49+00 indicate a continuing trend to their historic range.

Separation Dike:

These piezometers are generally registering in their historic ranges. Although Piezometer BB continues to exhibit has recently exhibited an elevated water level and generally has followed the change in level of the ash pond. The piezometer was repaired after being damaged in 2008.

Potable Water Pond Dike:

These piezometers were registering in their historic ranges and appear to respond to the water level in the main pond level.

Plant Wansley

2009 - 4th Quarter Dam Safety Inspection Summary

Date of Inspection:	October 16, 2009	**Inspection by:**	H. Armitage - SCG Hydro Services
Weather:	Overcast, windy		Daryl Clayton - Plant Security Officer
Temperature:	~56° F		
Rainfall (past 24 hrs):	0		

SUMMARY

1. No major dam safety issues that would impact the safety of the structures were observed during this inspection. Recommendations to address current and previous inspection observations are summarized below. Many of the current recommendations are routine, on-going maintenance type activities.

ADDITIONAL COMMENTS

1. Plant personnel did a very good job in completing many of the recommendations from previous quarterly inspections.
2. A copy of the Plant Wansley instrumentation data and review comments are attached.

CURRENT RECOMMENDATIONS

No.	Description	Location	Status - Open/Closed
1	Sign at Station 0-00 needs to be repaired & reinstalled.	Storage Pond - East Dike	**Open**
2	Weeds and grass need to be cut at toe of slope.	Storage Pond - East Dike	**Open**
3	Localized bare spots on slopes need to be re-grassed to prevent further erosion and silt washing into ditches. A manufactured grass matting product would be preferable to minimize erosion/wash-out during initial grass growth.	Storage Pond - Various locations along East and Southeast dikes (downstream slopes)	**Open**
4	Numerous rodent/animal burrow holes observed on downstream slopes. All require filling in. (Excerpt from FEMA Publication 473 - "Impact of Animals on Earthen Dams" . Copy prev. forwarded to plant personnel, provides options for repair).	Storage Pond - Various locations along East & Southeast dikes (downstream slopes)	**Open**
5	Numerous ant mounds observed on downstream slopes. Treatment required for ant mounds by fumigants or chemical methods as described in FEMA Publication 473 - "Impact of Animals on Earthen Dams". Copy prev. forwarded to plant personnel, provides options for repair).	Storage Pond - Various locations along East & Southeast dike (downstream slopes)	**Open**
6	Clean out debris and dirt in concrete lined toe ditches	Storage Pond - East and Southeast Dikes - Various locations	**Open**
7	Localized holes in concrete need to be repaired (i.e. pressure grout) to prevent undermining of concrete. Water flowing out of holes .	Storage Pond - East Dike, Ash Pond Overflow Channel	**Open**
8	Mud and debris needs to be removed from behind weir.	Storage Pond - Sta 37+50 - Southeast Dike	**Open**
9	Truckload of #57 stone required at Emergency Aggregate stockpiles	Storage Pond - Southeast Dike	**Open**
10	Portion of rip rap spillway washed away should be repaired by replacing with a concrete slab or alternatively use Type 1 rip rap placed on a 16ounce/sq. yard non-woven geotextile. Some excavation will be required with rip-rap option so elevation of existing concrete and rip-rap match existing rip rap.	Ash Pond - Emergency Spillway	**Open**
11	Repair downstream end of channel using Type #1 rip-rap placed over a 16 oz/sy non-woven geotextile. Area of scour beside the channel should be repaired using type 1 rip rap placed on a 16 oz./sy non-woven geotextile. Alternatively, a concrete slab could be extended from the edge of the concrete channel to prevent future scour.	Ash Pond - Outflow Channel	**Open**
12	Eroded area of upstream (west side) to be repaired. Recommended repair procedure provided by SCG Hydro Services to Plant personnel. All vegetation and large rocks/boulders need to be removed from upstream approach channel to prevent future blockage of spillway during high flow conditions.	Potable Water Pond	**Open**
13	Fill in several potholes on road at crest of East Dike.	Storage Pond	**Open**
14	The measurement of flow from the toe drain at **Sta. 39+00** should be done monthly and added to monthly instrumentation report that is sent to Hydro Services.	Storage Pond	**Open**
15	The measurement of flow from the new drain installed in July 2009 near the service water pump house should be done monthly and added to the monthly instrumentation report that is sent to Hydro Services.	Storage Pond	**Open**

CONFIDENTIAL BUSINESS INFORMATION

Plant Wansley

2009 - 4th Quarter Dam Safety Inspection Summary

STATUS OF PREVIOUS RECOMMENDATIONS

No.	Location, Description & Action Required	Status - Open/Closed
1	**Storage/Potable Water and Detention Pond** -Grassed areas on slope should be fertilized to promote healthy & more robust grass growth.	**Ongoing**
2	**Storage Pond** - Localized rutting on east dike from grass cutting equipment. Ruts to be filled in with soil and compacted and re-grassed	**Closed - Repaired**
3	**Storage Pond** - Localized bare spots on slopes need to be re-grassed to prevent further erosion and silt washing into ditches	**Closed - Repaired -** However new areas observed. See Current Recommendation 3
4	**Storage Pond - Various locations along east dike (downstream)** - Numerous rodent/animal burrow holes observed on downstream slopes. All require filling in. (Excerpt from FEMA Publication 473 - "Impact of Animals on Earthen Dams". Copy forwarded to plant personnel, provides options for repair).	**Closed-Repaired** (New ones since 1st Qtr - See Current Recommendation 4)
5	**Storage Pond** - Numerous ant mounds observed on downstream slopes. Treatment required for ant mounds by fumigants or chemical methods as described in FEMA Publication 473 - "Impact of Animals on Earthen Dams". Copy forwarded to plant personnel, provides options for repair)	**Closed- Repaired** (New ones since 1st Qtr - See Current Recommendation 5)
6	**Storage Pond** - A truckload of (a) GDOT #10 washed sand and (b) washed #89 stone is required to replace depleted stockpiles.	**6(a) - Closed 6(b) - Open**
7	**Storage Pond - East Dike - Various locations** - Clean out debris and dirt in concrete lined toe ditches	**Closed-** New debris observed in Ditches (See Current Recommendation 6)
8	**Storage Pond - East Dike -Lower Slope** - Storage Pond - Sta 37+00 - Repair undermining at end of concrete lined ditch	**Closed - Repaired** (See Photo 10)
9	**Storage Pond- East Dike** - Sta 45+00 & 49+00, 54+00 and Sta 57+00. Clean out ditch behind weirs and inside of the ends of drainage pipes.	**Closed - Completed**
10	**Ash Pond Emergency Overflow** -Several holes observed in bottom of concrete lined ditch and water spouting out. Repair required to mitigate undermining of slab.	**Closed** - Replaced by Current Recommendation 7
11	**Ash Pond Emergency Overflow** - End of concrete llined ditch is undermined. Needs to be repaired per recommendation in 5-28-08 inspection report (page 11 of 20).	**Closed - Repaired** (Undermined again during recent heavy rains - See Current Recommendation 11)
12	**Storage Pond** -Cracks in concrete lined ditches should be cleaned out and caulked - **Pending completion**	**Open**
13	**Storage Pond - Downstream Slopes - Sta 19+00 & 22+00 and 37+50D** - Drain pipes need to be cleaned out and repaired. - **Pending Completion**	**Open**
14	**Storage Pond - Downstream Slope - Sta 37+50** - Hydro Services investigated wet area 1/29/09 and further options to address will be investigated. Plant personnel needs to monitor this area DAILY for any evidence of distress or unusual events, or movement of slope and contact Hydro Services immediately particularly when pool elev. 782-785 ft. **Pending SCG Hydro Services continued monitoring and review. Hydro Services contacted Georgia Safe Dams Program for an extension of time to review possible repair options.**	**Open - Pending Further Review and Monitoring.** Pond level being reduced to elev. 780 ft. to see if this reduces the extent of wet area. Area being monitored daily.
15	**Storage Pond - Downstream Slope - approx. Sta 56+00** - Damaged marker pole for toe drain needs to be repaired.	**Open**
16	**Storage Pond - Downstream Slope - approx. Sta 62+00** - Damaged concrete ditch needs to be fixed and accumulated silt removed.	**Closed - Repaired**
17	**Storage Pond - Downstream Slope - Piezometer LLL** - Piezometer leak at spigot connection needs to be repaired. Ground surface is wet around piezometer	**Closed - Repaired**

OBSERVATIONS FOR 4th QUARTER INSPECTION

I - Storage Pond - North Dike - (Road to Recreational Area)		Storage Pond Elev. 782' (10-18-09)
	Observations - Comments	**Photograph No.**
1. Upstream Slope		
a. Condition	*Grass covered - Overall condition is good. No evidence of instability. Several ant mounds near crest that need to be treated with approved pesticide.* ***(See Current Recommendation 5).***	*n/a*
b. Erosion/Sloughing	*Yes (X) No ( )- Minor localized bare spots. Need to be re-grassed.* ***(See Current Recommendation 3).***	*n/a*
2. Crest		
a. Condition	*Gravel surfaced - No distress or potholes in road surface observed.*	*n/a*
3. Downstream Slope		
a. Condition	*Good - Grass covered and length that permits good observation.*	*n/a*
b. Seepage/Wet Spots	*Yes ( ) No (X)*	*n/a*
c. Erosion/Sloughing	*Yes ( ) No (X)*	*n/a*

CONFIDENTIAL BUSINESS INFORMATION

Plant Wansley

2009 - 4th Quarter Dam Safety Inspection Summary

II - Storage Pond - East Dike (from North Dike to Spillway)

	Observations - Comments	Photograph No.
1. Upstream Slope		
a. Condition	*Rip-rap on upstream face looks satisfactory and no dam safety issues observed.*	n/a
b. Erosion/Sloughing	*Yes ( ) No (X)*	n/a
2. Crest		
a. Condition	*Good - Gravel surfaced. Several depressions on road need to be filled potholes in road surface observed. **(See Current Recommendation 13)***	1
3. Downstream Slope		
a. Condition	*Good - Grass covered and at a length that permitted a good visual inspection. See other comments below.*	
	*1. Station marker at 0-00 needs to be replaced. **(See Current Recommendation 1)**.*	2
	*2. Weeds and grass near toe of slope needs to be cut down **(See Current Recommendation 2)**.*	3
	*3. Numerous bare spots on slopes and areas adjacent to concrete lined ditch need to be re-grassed (i.e. grass matting product) to prevent further erosion and silt from washing into ditch (i.e. see Photo 4 @ ~Sta 6+10) - **(See Current Recommendation 3)**.*	4
	*4. Rodent holes observed at Sta. 7+00, 17+40. Need to be treated. **(See Current Recommendation 4)***	n/a
	*5. Localized ant mounds observed on slopes. Need to be treated. **(See Current Recommendations 5)***	n/a
b.Seepage/Wet Spots	*Yes ( ) No (X) - No seepage or wet spots observed on slope.*	n/a
c. Erosion/Sloughing	*Yes ( ) No (X) - No evidence of instability.*	n/a
d. Concrete-Lined Drainage Ditch	*Concrete in good condition. See other comments below.*	5, 6 & 7
	*1. Debris in drain pipe at Sta. 19+00 need to be cleaned out and new sections of pipe required at drains at Sta 19+00 and 22+00 to repair damaged/crushed outlets ends. **(See Previous Recommendation 13)**.*	n/a
	*2. Ditch needs to be cleaned out of debris between Sta 2+00 and Sta 19+00. **(See Current Recommendation 6)**.*	5 & 6
	*3. Hole in concrete ditch needs to be repaired (i.e. pressure grouted). **(See Current Recommendation 7)**.*	7
e. Emergency Aggregate Stockpiles	*Yes (X) No ( ) - Needs tandem truckload of GDOT #89 stone. **(See Previous Recommendation 6 (b)**.*	n/a

III - Storage Pond - Spillway

	Observations - Comments	Photograph No.
1. Spillway Abutment/Deck		
a. Condition	*Concrete condition is satisfactory.*	n/a
2. Spillway Floor		
a. Condition	*Concrete satisfactory. Localized areas where caulking required to fill open joints. **(See Previous Recommendation 12)**.*	n/a
3. Spillway Walls		
a. Condition	*Concrete satisfactory*	n/a
4. Spillway Gates		
a. Condition	*Looked satisfactory. Gate seals appear okay.*	n/a
5. Downstream of Spillway (Channel)		
a. Condition	*Satisfactory.*	n/a

IV - Storage Pond - Southeast Dike (Spillway to Separator Dike)

	Observations - Comments	Photograph No.
1. Upstream Slope		
a. Condition	*Rip-rap is satisfactory. No instability or beaching evident.*	n/a
b. Erosion/Sloughing	*Yes ( ) No (X)*	n/a
2. Crest		
a. Condition	*Satisfactory - Gravel surfaced/Railway tracks - No distress observed along road surface .*	n/a
3. Downstream Slope		
3a - Upper Slope		
a. Condition	*Satisfactory - Grass covered. Rodent hole observed above concrete ditch. Near Sta. 41+00. **(See Current Recommendation 4)**.*	8
b.Seepage/Wet Spots	*Yes ( ) No (X)*	n/a
c. Erosion/Sloughing	*Yes ( ) No (X) - No evidence of instability.*	n/a

CONFIDENTIAL BUSINESS INFORMATION

Plant Wansley

2009 - 4th Quarter Dam Safety Inspection Summary

3b - Mid-Slope Road & Drainage Ditch		
a. Road Condition	*Gravel surfaced - looks good. No distress or potholes in road surface observed.*	*n/a*
b. Concrete-Lined Drainage Ditch	*Concrete in good condition. Cleanout debris in concrete lined ditches.* ***(See Current Recommendation 6).***	*n/a*
3c - Middle Slope		
a. Condition	*Satisfactory. Grass covered. Recent rodent holes observed, near Sta 40+00 at edge of concrete ditch.* ***(See Current Recommendation 4).***	*n/a*
b.Seepage/Wet Spots	*Yes ( ) No (X)*	*n/a*
c. Erosion/Sloughing	*Yes ( ) No (X)*	*n/a*
3d. Lower Road & Drainage Ditch		
a. Road Condition	*Gravel surfaced - looks good. No distress or potholes in road surface observed.*	*n/a*
b. Concrete-Lined Drainage Ditch	*Concrete condition is acceptable*	*n/a*
3e - Lower Slope		
a. Condition	*Satisfactory - Grass covered - Grass at a length that permitted a good visual examination. See other comments below.*	*n/a*
	1*. Several bare areas require repair.* ***(See Current Recommendation 3)***	*n/a*
	2. *Treat ant mounds and rodent holes at various locations.* ***(See Current Recommendations 4 and 5).***	*n/a*
b.Seepage/Wet Spots	*Yes (X) No ( ) - See other comments below.*	*n/a*
	1. *Ground surface in the area of Sta 37+50 is wet. Operating level of pond is at 782 ft. and is gradually being lowered to Elev. 780 ft. in an effort to "dry up" this area.This area will continued to be monitored.*	*n/a*
	2*. Sta 37+50 - Mud and debris needs to be cleaned out from behind weir* ***(See Current Recommendation 8)****.*	**9**
	3. *Large area of ground subsidence/loss was observed near the downslope concrete drainage ditch. This ground loss occurred presumably because of water migrating beside/beneath the concrete ditch as a result of water flowing into a hole in the bottom of a road crossing culvert that discharges into the concrete drainage ditch (Photo 10). Plant personnel mobilized contractor during the inspection to repair the area per instructions provided by Hydro Services. Hole was backfilled with #89 stone and then covered with clayey soil and grass seed and hay mulch placed at ground surface. Plant subsequently mobilized Civil Field Servivces to grout the holes in the corroded culvert and also grout in the area of the repair.*	**11**
	4. *Flow measurement at the toe drain at* ***Station 39+00*** *should be made monthly and sent to Hydro Services* ***(See Current Recommendation 14)***	*n/a*
c. Erosion/Sloughing	*Yes ( ) No (X) - No evidence of instability. Some recent bare on slope areas require re-seeding.* ***(See Current Recommendation 3).***	*n/a*
d. Concrete Drainage Ditch	*Concrete condition is good. Ditches need to be cleaned out of mud and other debris.* ***(See Current Recommendation 6).***	*n/a*
e. Concrete Drainage Channel at 37+50	*Concrete condition is good. Rip-rap has been replaced satisfactorily at end on concrete channel.*	**10**
f. Emergency Aggregate Stockpiles	*Yes (X) No ( ) - Need one truckload of GDOT washed # 57 stone* ***(See Current Recommendation 9)***	*n/a*
3f - Lower Concrete-Lined Drainage Ditch		
a. Condition	*Acceptable*	*n/a*
V - Storage Pond/Ash Pond - Separator Dike		**Ash Pond Elev. 795 ft**
	Observations- Comments	**Photograph No.**
1. Upstream Slope (Storage Pond)		
a. Condition	*Rip-Rap - Looks satisfactory. No evidence of instability.*	*n/a*
b. Erosion/Sloughing	*Yes ( ) No (X)*	*n/a*
2. Crest		
a. Condition	*Gravel surfaced and in good condition.*	*n/a*
3. Downstream Slope (Ash Pond)		
3a. North End		
a. Condition	*Rip-Rap - Looks satisfactory. No evidence of instability*	*n/a*
b. Erosion/Sloughing	*Yes ( ) No (X)*	*n/a*
3b. South End - (No longer applicable due to Gypsum Pond/berm construction)		

CONFIDENTIAL BUSINESS INFORMATION

Plant Wansley

2009 - 4th Quarter Dam Safety Inspection Summary

V - Ash Pond Emergency Overflow & Spillway		Ash Pond Elev. 795 ft
	Observations- Comments	**Photograph No.**
1. Upstream Slope		
a. Condition	*Rip-Rap - Looks satisfactory. Grass portion of slope generally looks satisfactory.*	n/a
b. Erosion/Sloughing	*Yes (X) No ( ) - Minor erosion at toe of grassed portion of slope. Not serious at this time but condition should be monitored to assess whether condition deteriorate which will require repair.*	n/a
2. Crest		
a. Condition	*Gravel surfaced and in good condition.*	n/a
3. Downstream Slope		
a. Condition	*Rip-Rap - Looks satisfactory. No evidence of instability*	n/a
b. Erosion/Sloughing	*Yes ( ) No (X)*	n/a
4. Concrete Lined Emergency Spillway		
a. Condition	*Concrete in good condition. Part of the rip rap of spillway was washed away during heavy rainstorms in September. This area should be repaired. . **(See Current Recommendation 10)***	n/a
5. Concrete Lined Overflow Channel		
a. Condition	*Concrete in good condition. See other comments below.*	15 & 16
	***1.** Several localized areas where hole in concrete have water spouting out. **Repair option - pressure grouting. (See Current Recommendation 7)**.*	n/a
	2**. Downstream outlet end of concrete lined ditch is undermined following heavy September rains. Needs to be repaired. (photo 15). **(See Current Recommendation 11).	15
	***3.** Area adjacent to channel (photo 16), was scoured during heavy September rains and overflow of channel. Area needs to be repaired to prevent further erosion/scour. **(See Current Recommendation 11)**.*	16

VII- Potable Water Pond		Potable Water Pond Elev. 801'
	Observations - Comments	**Photograph No.**
1. Upstream Dike Slope (Potable Water)		
a. Condition	*Rip-rap on upstream face looks good.*	n/a
b. Erosion/Sloughing	*Yes (X) No ( ) - Localized, minor surface erosion.*	n/a
c. Concrete Drainage Ditch	*Concrete in good condition. No obstructions in channel observed.*	n/a
2. Crest		
a. Condition	*Satisfactory - Gravel surfaced. No distress or potholes in road surface observed.*	n/a
3. Downstream Dike Slope (Storage Pond)		
a. Condition	*Grass covered portion- Satisfactory. Rip Rap covered portion - Satisfactory*	n/a
b.Seepage/Wet Spots	*Yes ( ) No (X) - No seepage or wet spots observed on slope.*	n/a
c. Erosion/Sloughing	*Yes (X) No ( ) - Localized, minor surface erosion. Re-seeding and mulching done and grass starting to grow.*	n/a
d. Concrete Drainage Ditch	*Yes ( ) No (X) - Condition of concrete satisfactory.*	n/a
4. Spillway Approach Channel		
a. Condition-General	*Portion of the upstream approach embankment washed out during heavy rains in September. SCG Hydro Services provided plant with written repair options. Remaining weeds and large rocks/boulders in approach channel need to be removed. **(See Current Recommendation 12).***	17 & 18
b. Condition-Rip-Rap	*Good. No evidence of instability.*	n/a
c.Condition-Concrete	*Good.*	n/a
5. Spillway Structure - Abutments/Deck		
a. Condition	*Concrete in good condition.*	n/a
6 . Spillway Structure - Floor		
a. Condition	*Concrete in good condition*	n/a
7 . Spillway Structure - Walls		
a. Condition	*Concrete - Good*	n/a

CONFIDENTIAL BUSINESS INFORMATION

Plant Wansley

2009 - 4th Quarter Dam Safety Inspection Summary

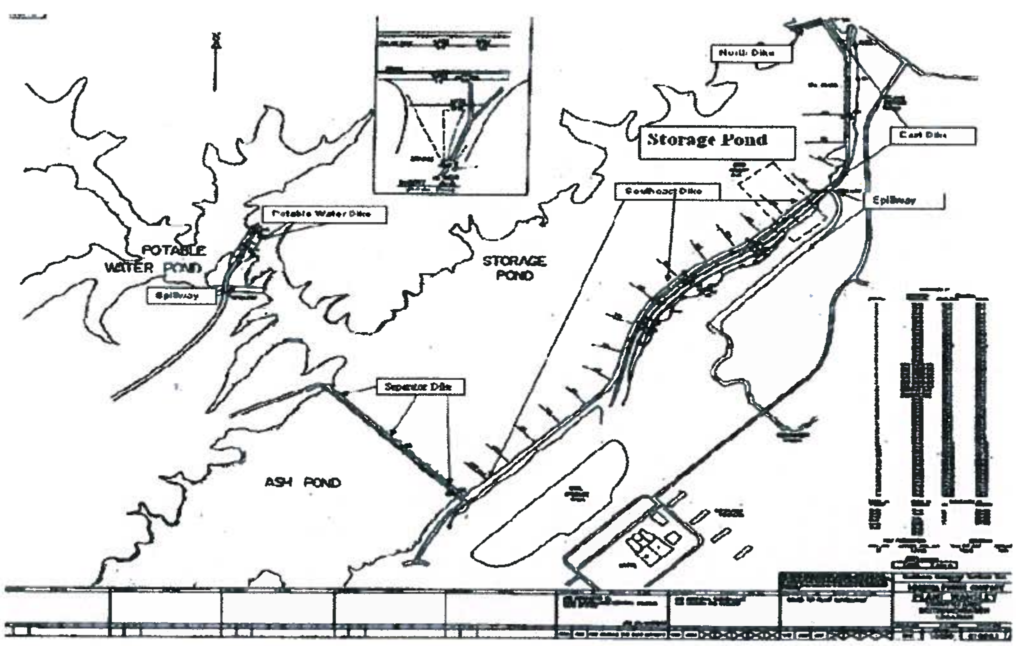
VIII - Detention Pond		
	Observations- Comments	**Photograph No.**
1. Upstream Dike Slope		
a. Condition	*Rip-rap in good condition.*	*n/a*
b. Erosion/Sloughing	*Yes ( ) No (X) - Slope looks satisfactory, no visible instability observed*	*n/a*
2. Crest		
a. Condition	*Gravel surfaced and in good condition. No distress or potholes observed.*	*n/a*
3. Downstream Dike Slope		
a. Condition	*Satisfactory Grass-covered. Needs cutting. No visible evidence of instability observed*	*n/a*
b.Seepage/Wet Spots	*Yes (X) No ( ) - Localized, minor wet water beyond toe of slope. Will continue to be monitored*	*n/a*
c. Erosion/Sloughing	*Yes ( ) No (X)*	*n/a*
4. Concrete Spillway Channel		
a. Concrete Condition	*Concrete is in good condition*	*n/a*
5.Spillway Outlet Channel		
a. Condition	*Rip-rap at outfall and outlet channel is in good condition. No issues observed.*	*n/a*

VIII - Gypsum Pond Dikes (No fluid in ponds)		
	Observations- Comments	**Photograph No.**
1. Upstream Dike Slopes		
a. Condition	*Good.*	*n/a*
b. Erosion/Sloughing	*Yes ( ) No (X)*	*n/a*
2. Crest		
a. Condition	*Gravel surfaced and in good condition.*	*n/a*
3. Downstream Dike Slope		
a. Condition	*Grass-covered. Good condition.*	*n/a*
b.Seepage/Wet Spots	*Yes ( ) No (X)*	*n/a*
c. Erosion/Sloughing	*Yes ( ) No (X)*	*n/a*

Hugh H. Armitage - Sr. Engineer

SCG - Hydro Services

Location Plan
Storage Pond and Potable Water Pond



CONFIDENTIAL BUSINESS INFORMATION

Plant Wansley

2009 - 4th Quarter Inspection Photographs - October 16, 2009

(See accompanying report attached)

Photo No.	Description	
1	**Storage Pond - East Dike** - Crest - Localized depressions at crest should be filled with Graded Aggregate Base (GAB).	
2	**Storage Pond - East Dike** - Marker pole at Sta 0-00 needs to be re-installed. Has been broken off at ground level	
3	**Storage Pond - East Dike** - Cut grass/brush down along toe of dike.	
4	**Storage Pond - East Dike** - Bare areas need to be re-grassed. (Use of a grass mat type product will minimize erosion/wash out during initial growth of grass)	

Plant Wansley

2009 - 4th Quarter Inspection Photographs - October 16, 2009

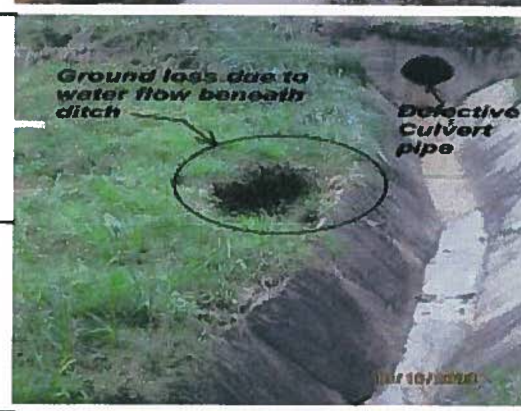
(See accompanying report attached)

Photo No.	Description	
5	**Storage Pond - East Dike** - Remove mud/debris from drainage ditches, along east dike.	
6	**Storage Pond - East Dike -Toe Ditch** - Remove overgrowth from drainage ditch	
7	**Storage Pond - East Dike -Toe Ditch** - Localized holes in concrete ditch need to be grouted to prevent water flow beneath concrete and potential ground loss	
8	**Storage Pond- Southeast Dike - Rodent holes on slope need to be filled in.**	

Plant Wansley

2009 - 4th Quarter Inspection Photographs - October 16, 2009

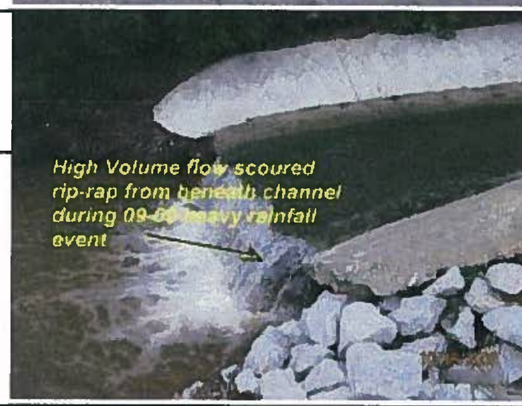
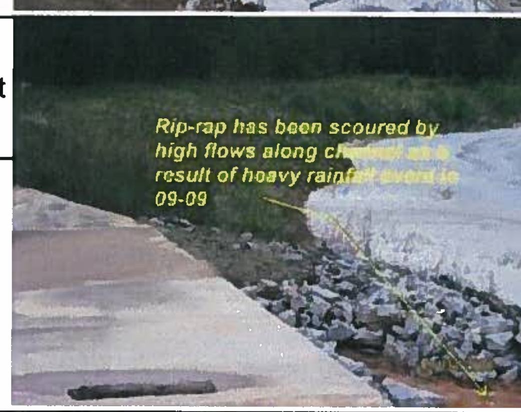
(See accompanying report attached)

Photo No.	Description	
9	**Storage Pond - Southeast Dike - Lower Slope -** Sta 37+50. Clear mud/rocks from behind weir.	
10	**Storage Pond - Southeast Dike - Lower Slope - Sta 37+00 -** Undermined area at end of concrete lined ditch fixed satisfactorily.	
11	**Storage Pond - Southeast Dike-Downstream-Lower Slope -Sta 37+50 -** Ground loss resulting from defective/leaking (corroded) culvert allowing water to flow beneath and beside concrete ditch. Both items have been repaired since inspection on 10-16-09.	
12	**Storage Pond- Southeast Dike - Mid-slope Ditch -** Mud and vegetation needs to be removed from ditches.	

Plant Wansley

2009 - 4th Quarter Inspection Photographs - October 16, 2009

(See accompanying report attached)

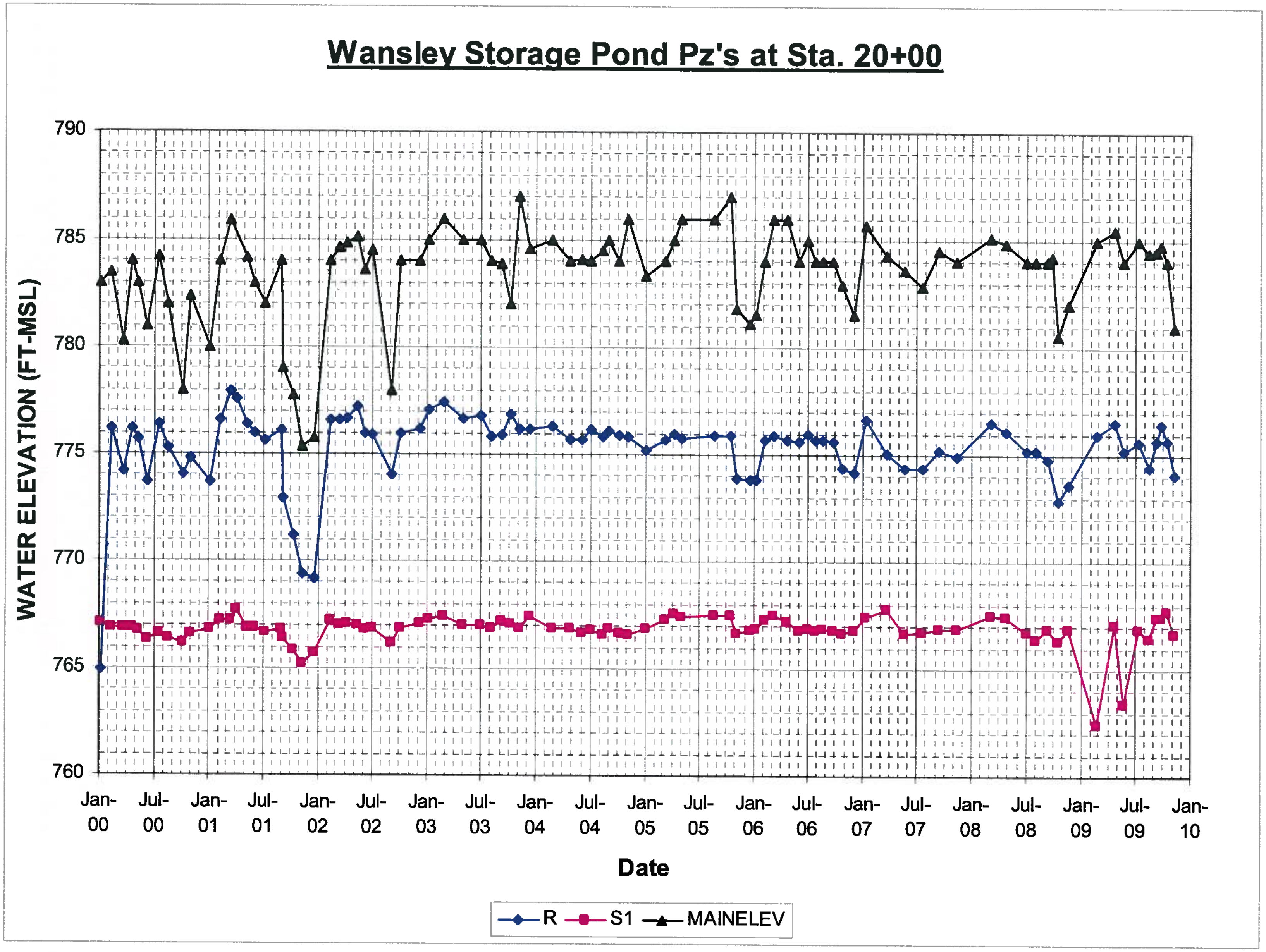
Photo No.	Description	
13	**Storage Pond- Southeast Dike - Lower Slope - Toe Ditch** - Mud needs to be removed from ditches.	
14	**Ash Pond- Emergency Overflow - Downstream** - Scour adjacent to concrete channel which occurred during Sept-09 heavy rainfall at site. Requires repair.	
15	**Ash Pond- Emergency Overflow - End of Concrete Channel** - Rip-rap has been scoured from beneath end of concrete channel following 09-09 heavy rainfall at site.	
16	**Ash Pond- Emergency Overflow - Spillway** - Rip-rap was scoured due to high flows in adjacent concrete channel following 09-09 rain event	

Plant Wansley

2009 - 4th Quarter Inspection Photographs - October 16, 2009

(See accompanying report attached)

Photo No.	Description	
17	**Potable Water Pond- Spillway - Upstream -** Left, upstream spillway approach embankment needs to be repaired. Hydro Services has provided plant personnel with repair procedure.	
18	**Potable Water Pond - Spillway (Upstream) -** Rip-rap was scoured due to high flows in adjacent concrete channel following Sept-09 rain event.	



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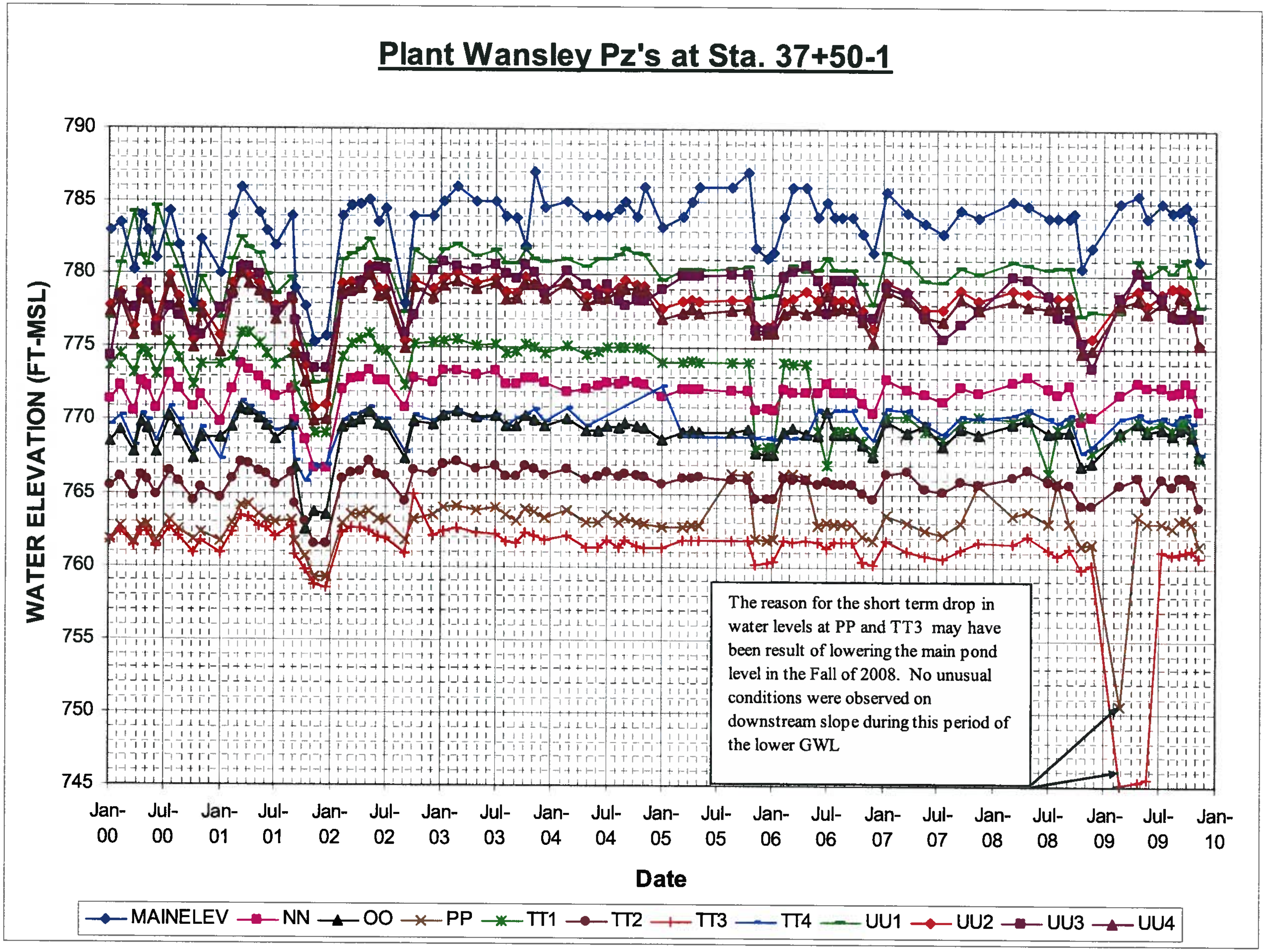

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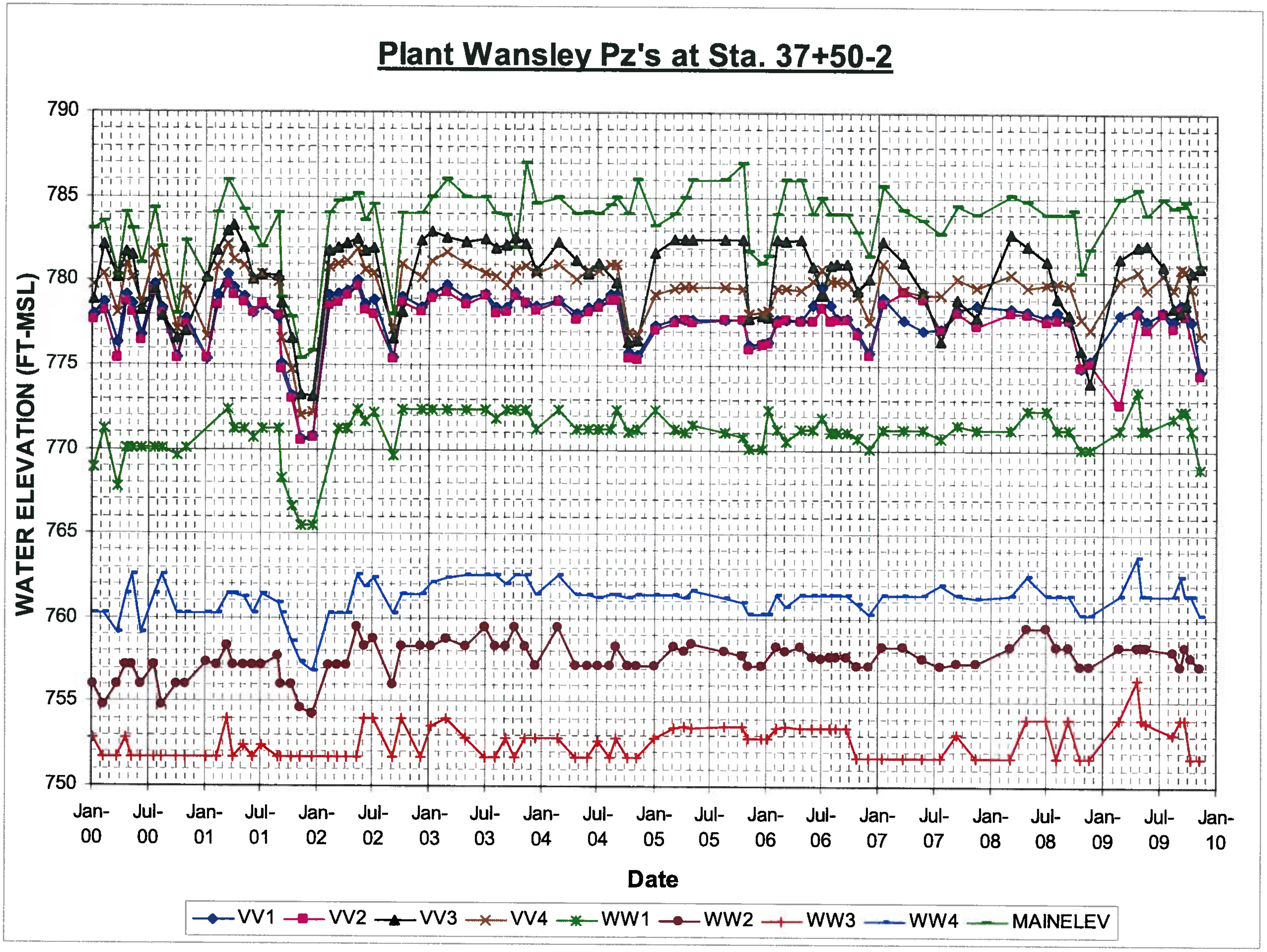

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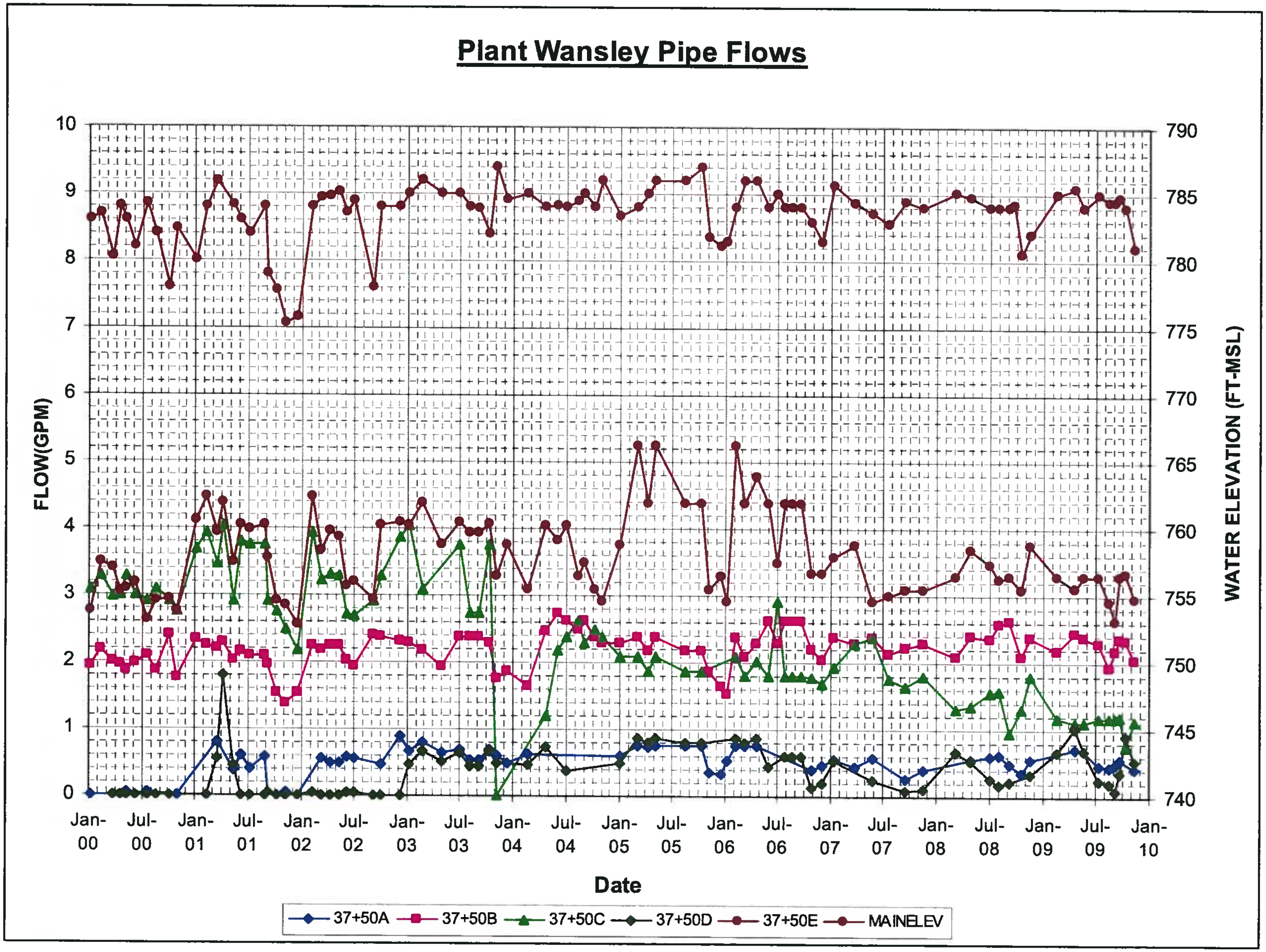

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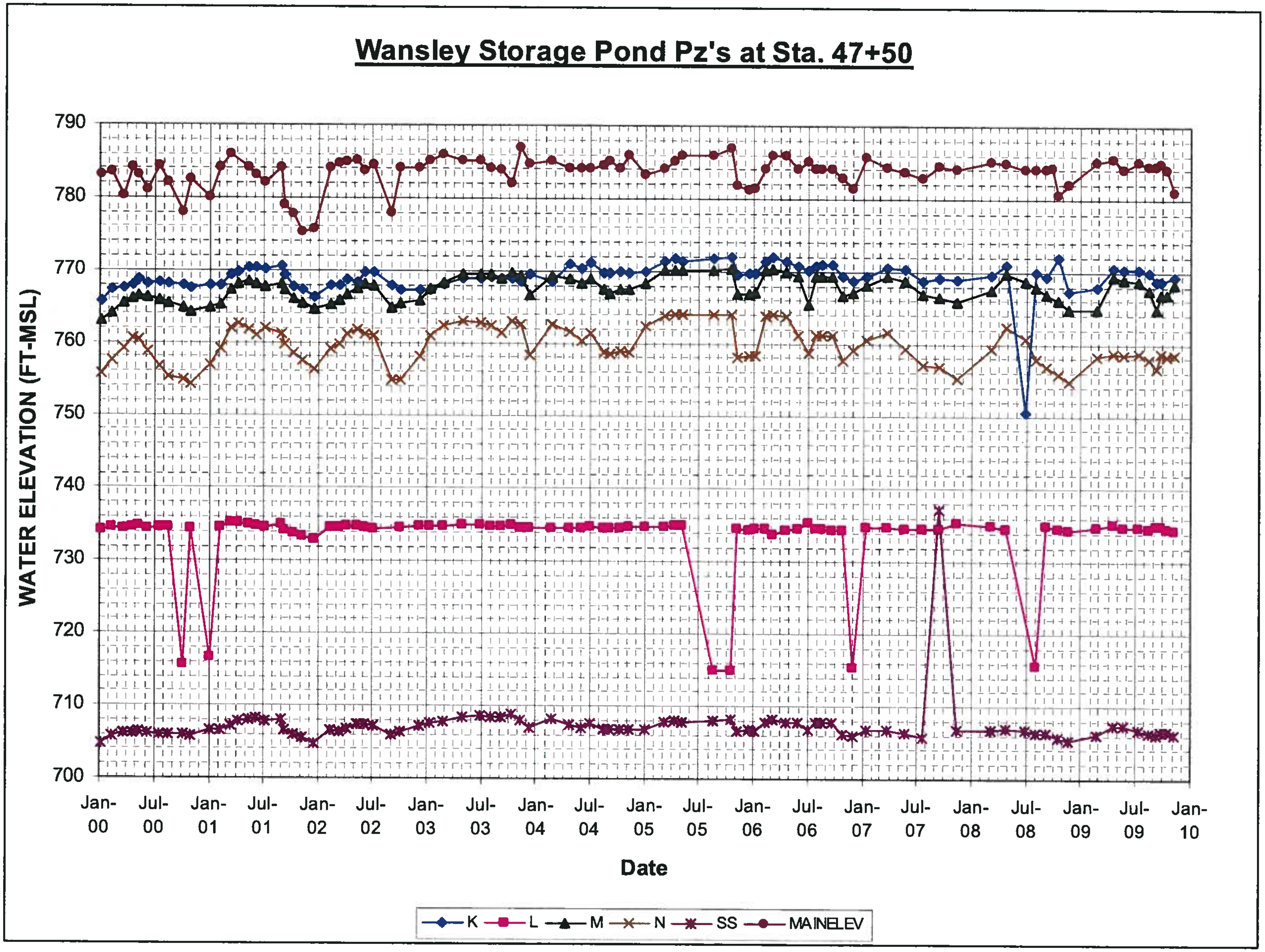

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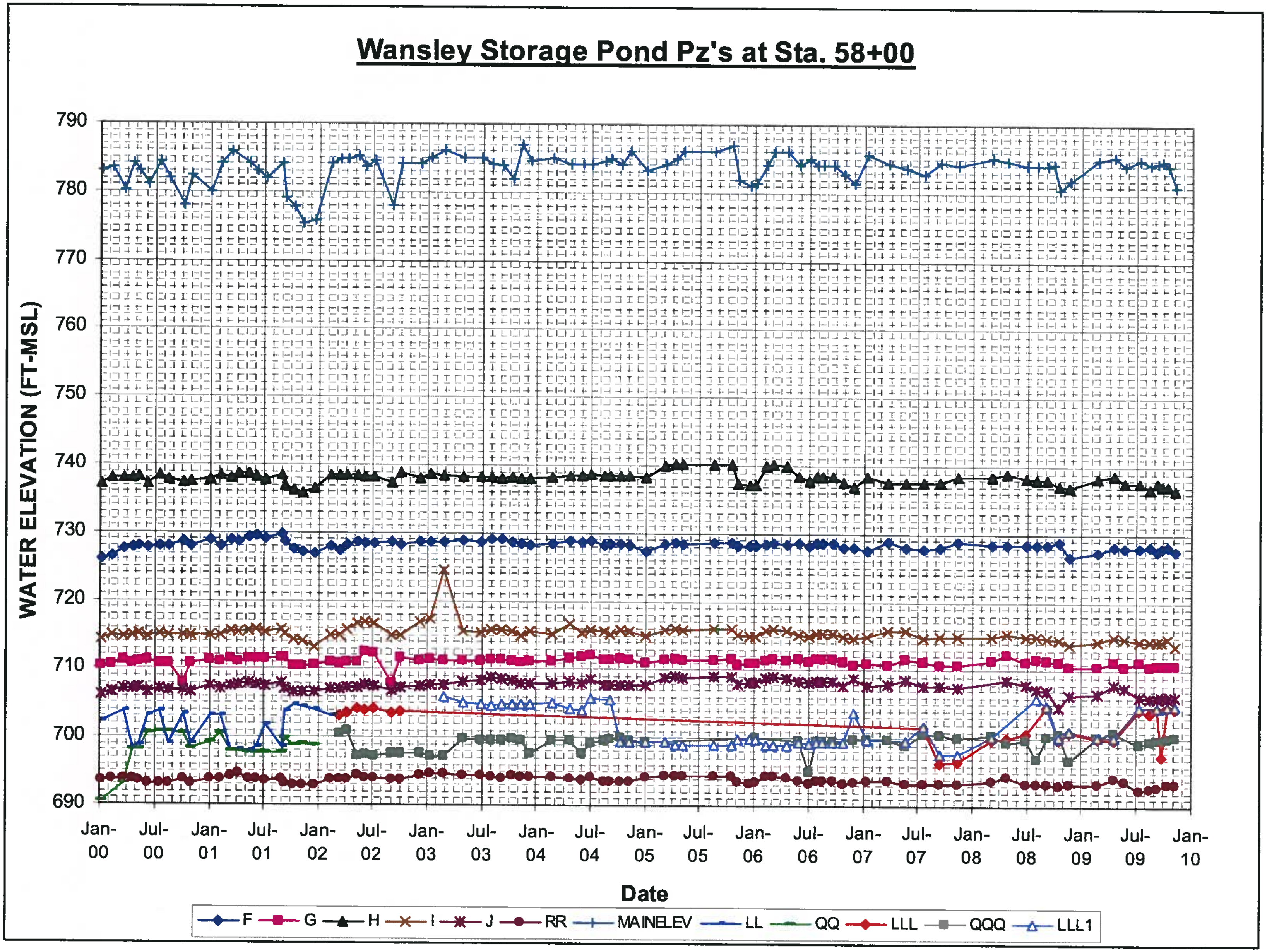

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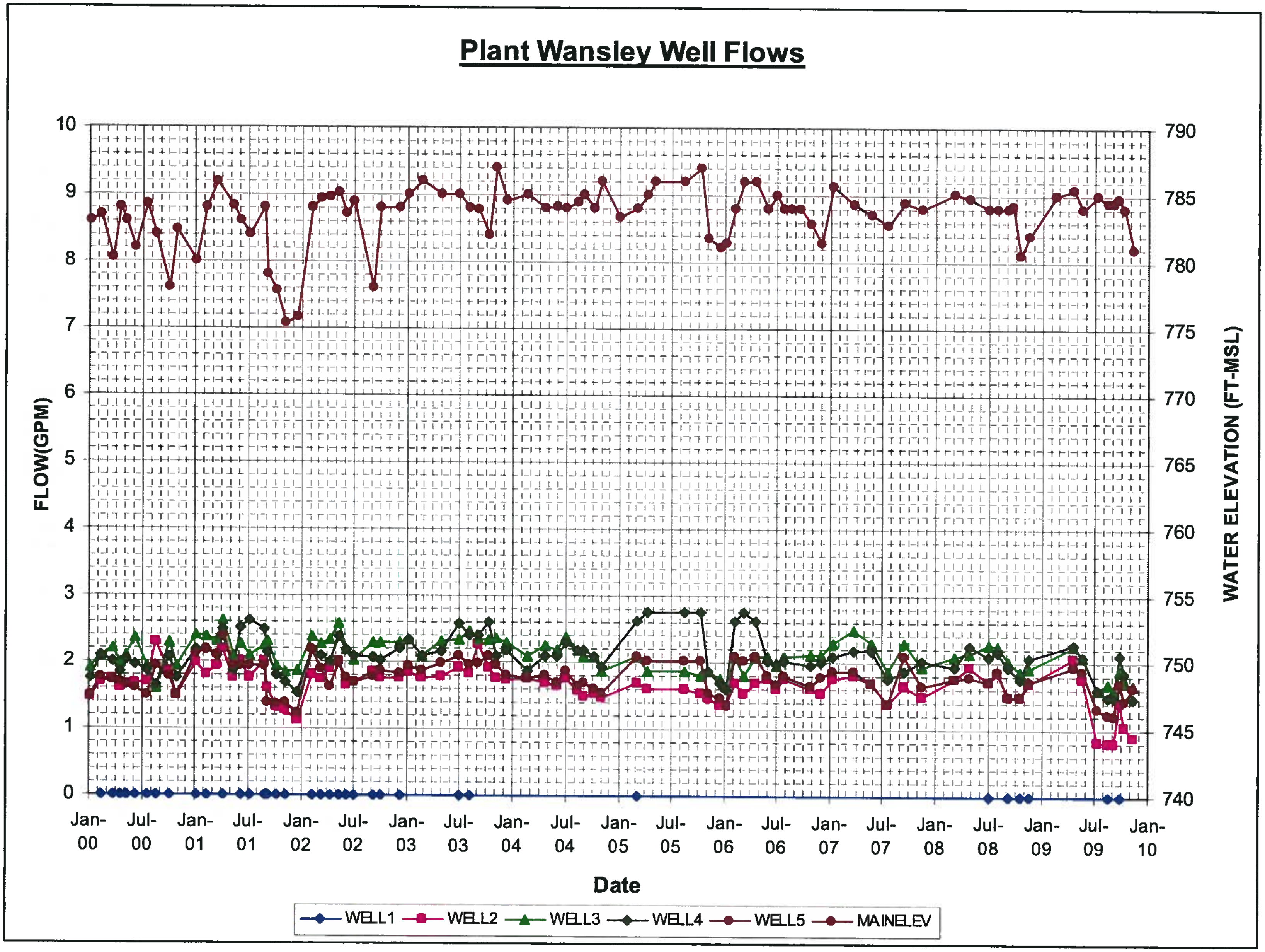

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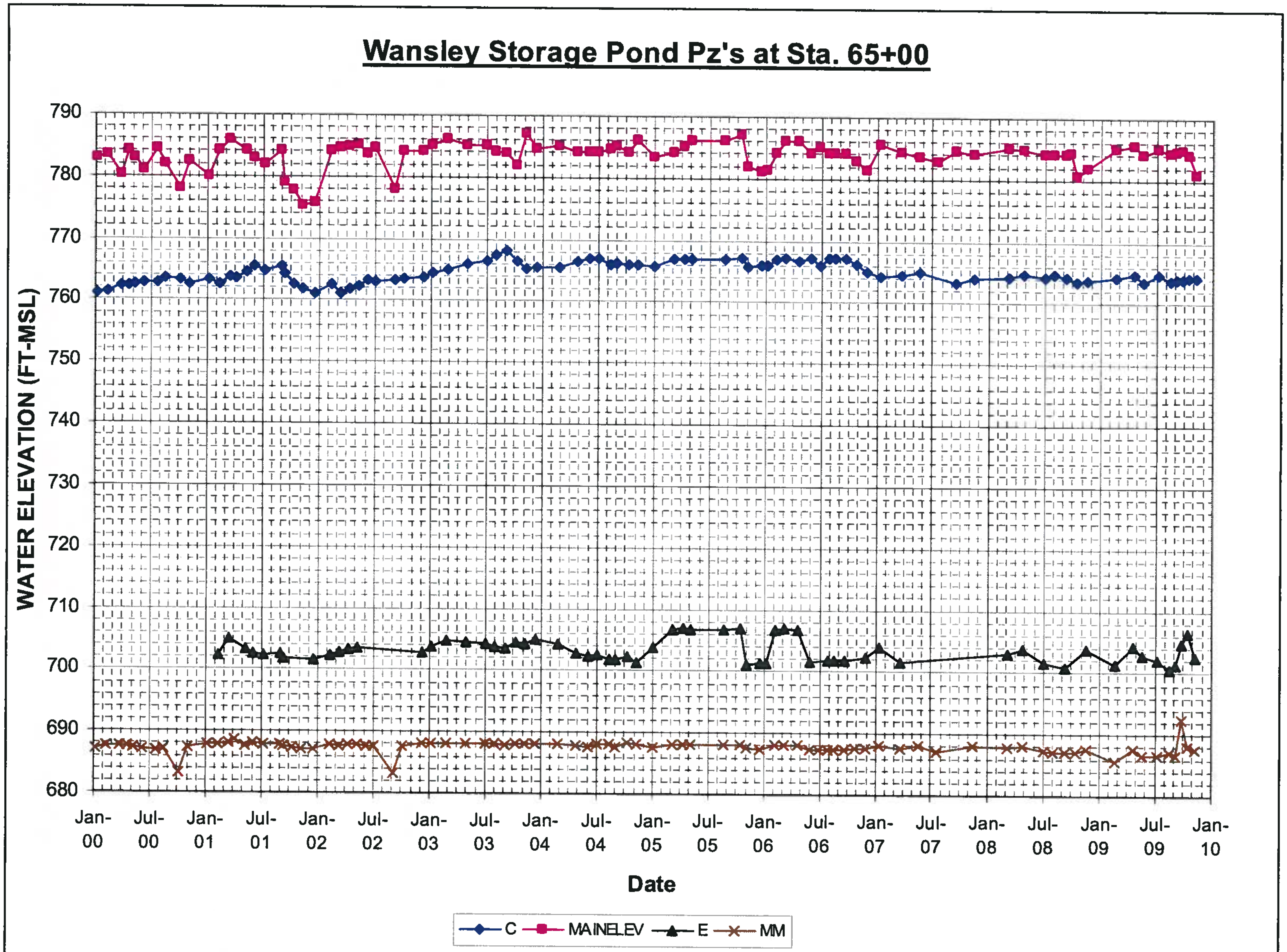

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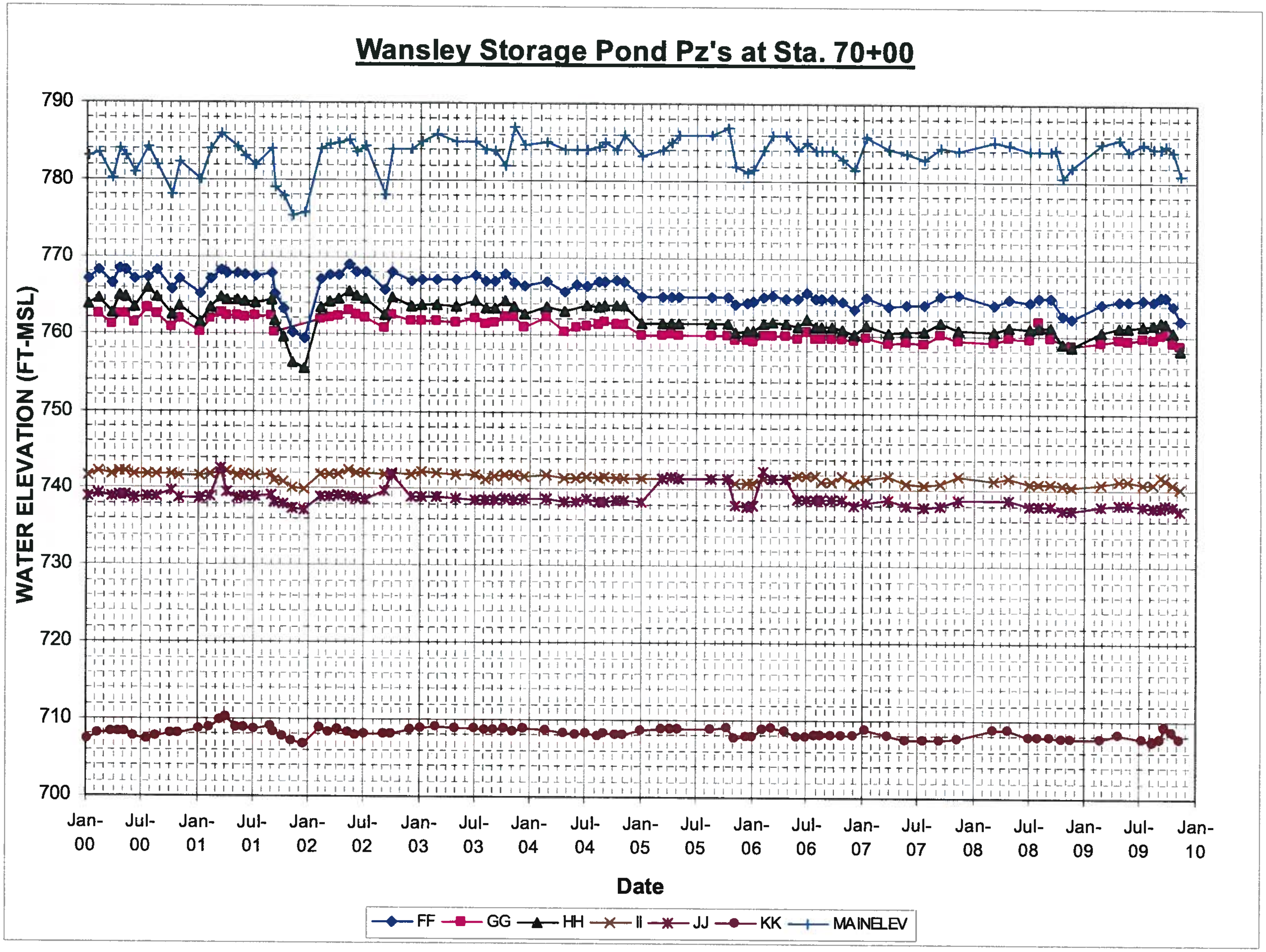
Wansley Storage Pond Pz's at Sta. 70+00
WATER ELEVATION (FT-MSL)
790
780
770
760
750
740
730
720
710
700
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
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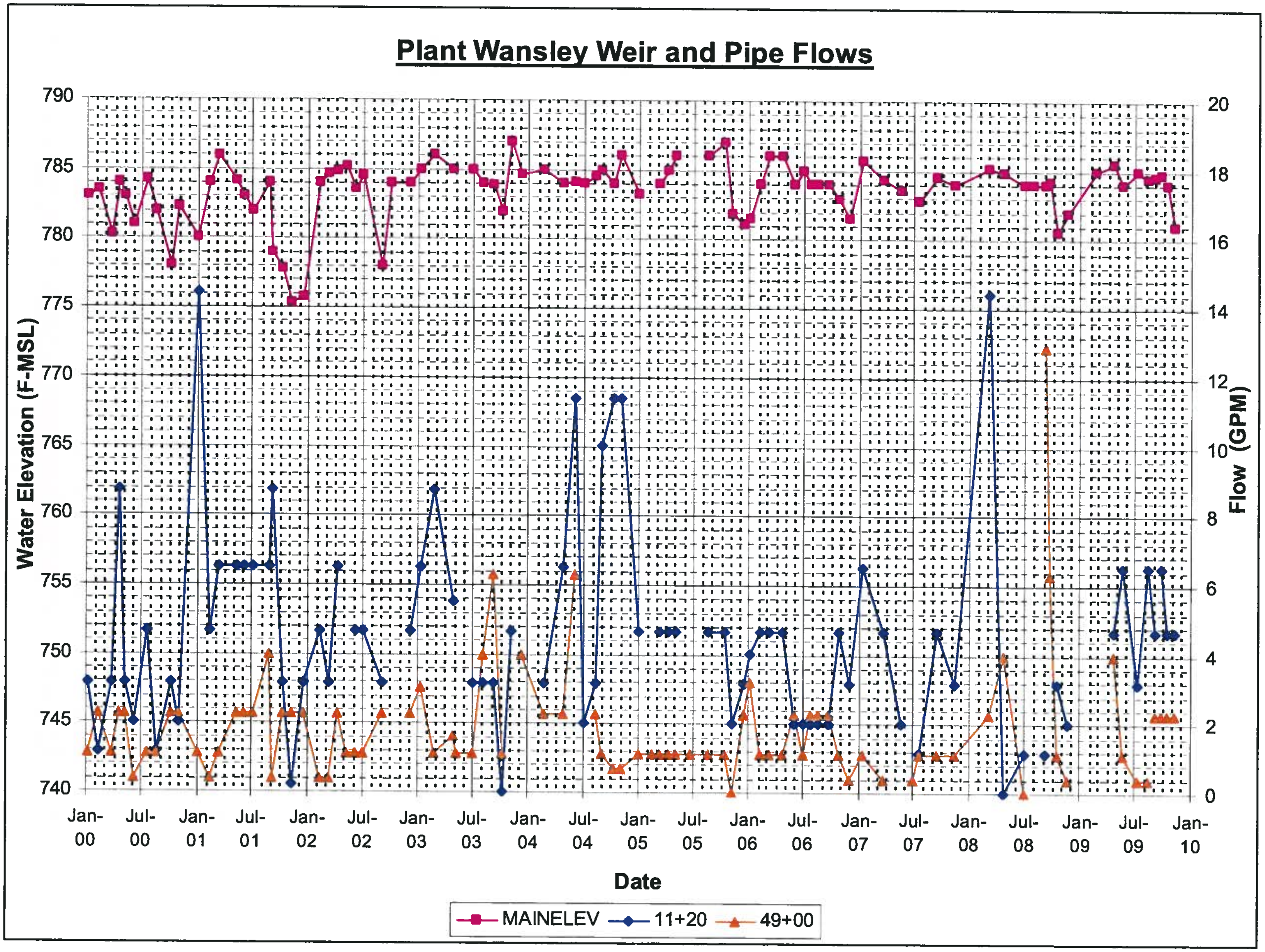

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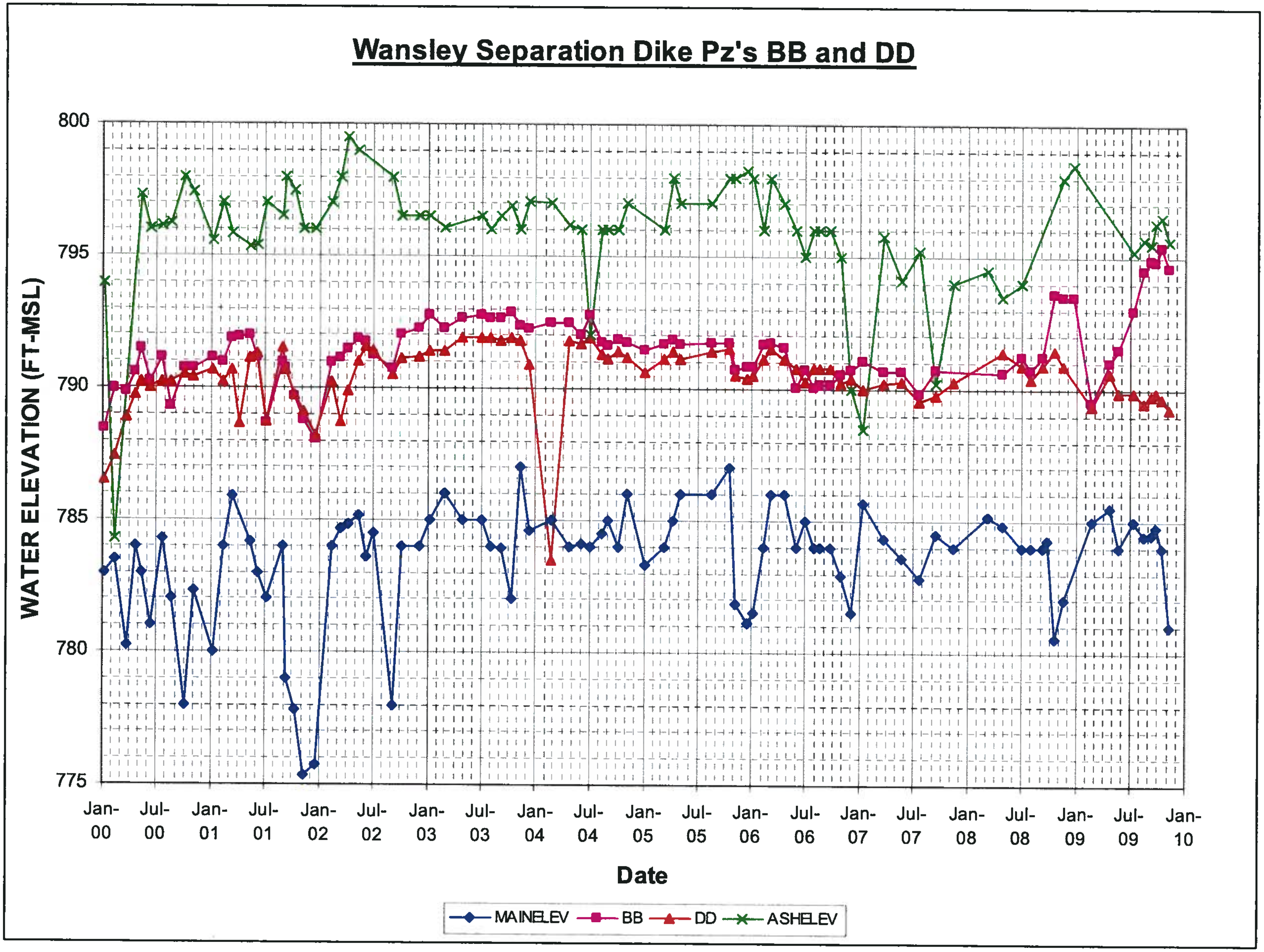

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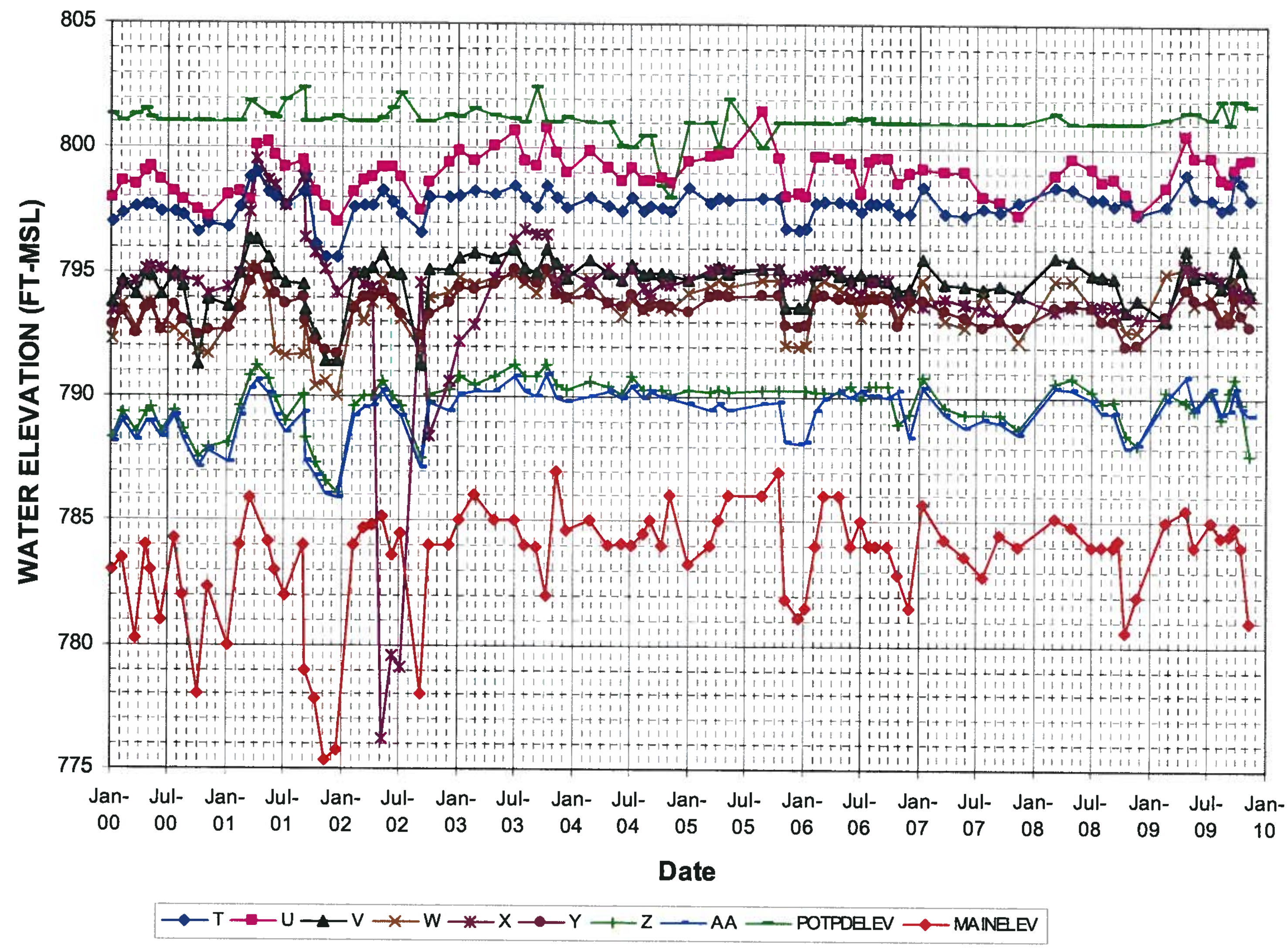
Plant Wansley Potable Pond Piezometers



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Southern Company Generation
Bin 10193
241 Ralph McGill Boulevard NE
Atlanta, Georgia 30308-3374

Tel 404.506.7033

SOUTHERN COMPANY
Energy to Serve Your World™

August 14, 2009

PLANT WANSLEY
Dam Safety Surveillance
Quarterly Report
REA No. WN-08900

Mr. J. P. Heilbron
Plant Manager
Georgia Power Co.
Plant Wansley

Dear Mr. Heilbron:

Attached is the 1st Quarter 2009 report on Dam Safety Surveillance for Plant Wansley. The inspection of the Main Storage Pond, Ash Pond Separator Dike, Potable Water Pond and Detention Pond was performed on March 17 and 30, 2009 by Hugh Armitage of the SCG Hydro Services Group. Representatives for Plant McDonough accompanied Mr. Armitage on the inspections.

This report includes:

a) A review of the current instrumentation data;
b) The *1st Quarter – 2009 Dam Safety Inspection Report* summarizing the field observations and comments made during the March 17 and 30, 2009 inspections, and;
c) A copy of the current instrumentation plots.

The current recommendations from the 1st Quarter Inspection are described on the first page of the attached report. The description and status of recommendations from the previous quarterly inspection are also described on pages 1 and 2 of the attached report.

Should you have any questions, please contact Hugh Armitage at extension 8-506-7109.

Sincerely,

Joel Galt

Joel Galt
Hydro Services Supervisor

WAN-API 057

/hha

Attachments

xc: **<u>Georgia Power Company</u>**

S. J. Winston	(w/ attachment)
N. I. Dean	(w/ attachment)
B. Harcrow	(w/ attachment)

<u>Southern Company Services</u>

D. E. Jones	(w/attachment)
E. B. Allison	(w/ attachment)
J. H. Crisler	(w/ attachment)
B. J. Peterson	(w/attachments)
K. Friedel	(w/ attachments)

Hydro Service Wansley Notebook
Master File: WN-09900

Hydro Services Correspondence Notebook (w/attachments)

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Instrumentation Data Review
1st Quarter – 2009

A current assessment of instrumentation data reviewed up to the most recent readings of , at Plant Wansley is as follows.

Storage Pond:

Sta. 20+00: Piezometers are generally within their historic range and seem to be tracking the pond level.

Sta 37+50-1: Piezometers PP and TT3 experienced a significant drop in elevation in the spring. It is not known why this occurred, but the readings for July have returned to their historic levels. All of these piezometers appear to be in their historic range. All generally are tracking the pond level.

Sta 37+50-2: All of these piezometers appear to be in their historic range. They generally are tracking the pond level although most have not yet responded to the recent, modest (November, 2008) increase in elevation

Sta 37+50 Pipe Flows: These flows appear to be in their historic ranges. These flow rates will continue to be monitored to assess if any trends develop. They seem to be tracking the pond level.

Sta 47+50: The piezometers are within their historic range of measurement.

It is recommended that the flow rate at the toe drain at Station 39+00 be obtained at monthly intervals rather than the current 6 month schedule. This information will be useful when modifications to the drains at 37+50 are carried out.

Sta 58+00: The level at piezometer LLL has dropped to more a more consistent historic level, which may be in part related to the decrease in pond level. Repair of a leaking valve, as noted in the attached quarterly report, is required for piezometer LLL.

Relief Wells: The relief wells appear to be discharging in their historic range, but also in response to the lower pond level.

Sta 65+00: Piezometric levels at C, E and MM are within their historic ranges.

Sta 70+00: All of these piezometers are reading in their historic ranges.

Weir and Pipe Flows: Weir measurements at Sta. 11+20 and 49+00 indicate a return to their historic range since the last quarterly inspection report.

Separation Dike:

These piezometers are generally registering in their historic ranges. Piezometer BB has recently exhibited an elevated water level. In discussions with plant personnel, we understand that piezometer BB was covered over during construction of the gypsum ponds this year. The piezometer pipe appears to have been broken off at some point when it was uncovered. This may explain the "apparent" elevated water level, particularly if the measurements have been made from a lower reference elevation than previous measurements. Plant personnel are investigating and will advise Hydro Services.

Potable Water Pond Dike:
These piezometers were registering in their historic ranges and appear to respond to the decrease in the main pond level.

Plant Wansley

2009 - 1st Quarter Dam Safety Inspection Summary

Date of Inspection:	March 17 & March 30, 2009		**Inspection by:** H. Armitage
Weather:	3-17-09 - Sunny, light breeze	3-30-09 - Sunny	Tracy Duke (Fluor - 3-17-09)
Temperature:	3-17-09 - '50° F	3-30-09 - 40° F	Brandon Harcrow (GPC-3-30-09)
Rainfall (past 24 hrs):			Russell Poole (Flour- 3-30-09)

SUMMARY

1. No major dam safety issues that would impact the safety of the structures were observed during this inspection. Recommendations to address current and previous inspection observations are summarized below. Many of the current and previous recommendations are routine, on-going maintenance type activities.

ADDITIONAL COMMENTS

1. Plant personnel did a very good job in completing most of the recommendations from previous quarterly inspections.
2. A copy of the Plant Wansley instrumentation data and review comments are attached.

CURRENT RECOMMENDATIONS

No.	Description	Location	Status - Open/Closed
1	Grassed areas on slope should be fertilized to promote healthy & more robust grass growth.	Storage/Potable Water and Detention Pond	Open
2	Localized rutting on east dike from grass cutting equipment. Ruts to be filled in with soil and compacted and re-grassed	Storage Pond	Open
3	Localized bare spots on slopes need to be re-grassed to prevent further erosion and silt washing into ditches	Storage Pond	Open
4	Numerous rodent/animal burrow holes observed on downstream slopes (upstream slope at Detention Pond I). All require filling in. (Excerpt from FEMA Publication 473 - "Impact of Animals on Earthen Dams" . Copy forwarded to plant personnel, provides options for repair).	Storage Pond - Various locations along east dike (downstream)	Open
5	Numerous ant mounds observed on downstream slopes. Treatment required for ant mounds by fumigants or chemical methods as described in FEMA Publication 473 - "Impact of Animals on Earthen Dams". Copy forwarded to plant personnel, provides options for repair)	Storage Pond	Open
6	A truckload of a). GDOT #10 washed sand and b). washed #89 stone is required to replace depleted stockpiles.	Storage Pond	Open
7	Clean out debris and dirt in concrete lined toe ditches	Storage Pond - East Dike - Various locations	Open
8	Storage Pond - Sta 37+00 - Repair undermining at end of concrete lined ditch	Storage Pond - East Dike -Lower Slope	Open
9	Sta 45+00 & 49+00, 54+00 and Sta 57+00. Clean out ditch behind weirs and inside of the ends of drainage pipes.	Storage Pond- East Dike	Open
10	Several holes observed in bottom of concrete lined ditch and water spouting out. Should be investigated further. Repair may be required to mitigate undermining of slab.	Ash Pond Emergency Overflow	Open
11	End of concrete llined ditch is undermined. Needs to be repaired per recommendation in 5-28-08 inspection report (page 11 of 20).	Ash Pond Emergency Overflow	Open

STATUS OF PREVIOUS RECOMMENDATIONS

No.	Location, Description & Action Required	Status - Open/Closed
1	**Storage Pond - Spillway** - Downstream of end of spillway requires trees and bushes to be cut down so that flows are not restricted during flow. **Completed Satisfactorily**	Closed
2	**Detention Pond - Downstream Slope -** Small bushes and trees on downstream slope need to be cut down. Completed satisfactorily	Closed
3	**Storage Pond** -Cracks in concrete lined ditches should be cleaned out and caulked - **Pending completion**	Open
4	**Storage Pond - Downstream Slopes -** Rodent holes to be filled and fire ant mounds to be treated. **(See Current Recommendations 4 & 5)**	Closed
5	**Storage Pond - Downstream Slopes - Sta 19+00 & 22+00 and 37+50D** - Drain pipes need to be cleaned out and repaired. - **Pending Completion**	Open

CONFIDENTIAL BUSINESS INFORMATION

Plant Wansley

2009 - 1st Quarter Dam Safety Inspection Summary

STATUS OF PREVIOUS RECOMMENDATIONS (con't)

No.	Location, Description & Action Required	Status - Open/Closed
6	**Storage Pond - Downstream Slope - Sta 37+50 -** Hydro Services investigated wet area 1/29/09 and further options to address will be investigated. Plant personnel needs to monitor this area DAILY for any evidence of distress or unusual events, or movement of slope and contact Hydro Services immediately particularly when pool elev. 782-785 ft. **Pending Completion. Hydro Services has contacted Georgia Safe Dams Program to request an extension of time to review possible repair options.**	**Open**
7	**Storage Pond - Downstream Slope - approx. Sta 56+00 -** Damaged marker pole for toe drain needs to be repaired.	**Open**
8	**Storage Pond - Downstream Slope - approx. Sta 62+00 -** Damaged concrete ditch needs to be fixed and accumulated silt removed.	**Open**
9	**Storage Pond - Downstream Slope - Piezometer LLL -** Piezometer leak at spigot connection needs to be repaired. Ground surface is wet around piezometer - **Pending Completion.**	**Open**

OBSERVATIONS FOR 1st QUARTER INSPECTION

I - Storage Pond - North Dike - (Road to Recreational Area)		**Storage Pond Elev. 785' (3-30-09)**
	Observations - Comments	**Photograph No.**
1. Upstream Slope		
a. Condition	*Grass covered - Overall condition is good. No evidence of instability.*	*n/a*
b. Erosion/Sloughing	*Yes ( ) No (X)*	*n/a*
2. Crest		
a. Condition	*Gravel surfaced - No distress or potholes in road surface observed.*	*n/a*
3. Downstream Slope		
a. Condition	*Grass covered - Overall condition is good. No evidence of instability.*	*n/a*
b. Seepage/Wet Spots	*Yes ( ) No (X) - No seepage or wet spots observed on slope.*	*n/a*
c. Erosion/Sloughing	*Yes ( ) No (X)*	*n/a*
II - Storage Pond - East Dike (North Dike to Spillway)		
	Observations - Comments	**Photograph No.**
1. Upstream Slope		
a. Condition	*Rip-rap on upstream face looks satisfactory and no dam safety issues observed.*	*n/a*
b. Erosion/Sloughing	*Yes ( ) No (X) - No evidence of instability observed*	*n/a*
2. Crest		
a. Condition	*Gravel surfaced - No distress or potholes in road surface observed.*	*n/a*
3. Downstream Slope		
a. Condition	*Grass covered and at a length that permitted a good visual inspection. Ruts from grass cutting equipment need to be repaired **i.e. see Photo 1 @ Sta 0+00)**. Numerous bare spots on slopes and areas adjacent to concrete lined ditch need to be re-grassed to prevent further erosion and silt from washing into ditch (i.e. see Photo 2 @ ~Sta 6+10). Place soil (where necessary), compact and re-establish grass. Rodent holes observed at Sta. 7+00, 17+40 **(i.e. see Photo 3 @ Sta 7+00)**. Localized ant mounds observed on slopes. Need to be treated . All flagged for repair by plant personnel. **(See Recommendations 1, 2, 3, 4 and 5)***	**1, 2 and 3**
b. Seepage/Wet Spots	*Yes ( ) No (X) - No seepage or wet spots observed on slope.*	*n/a*
c. Erosion/Sloughing	*Yes ( ) No (X) - No evidence of instability.*	*n/a*
d. Concrete-Lined Drainage Ditch	*Concrete in good condition. Drain pipe at Sta. 19+00 need to be cleaned out still. New sections drain pipe required at drains at 19+00 and 22+00 to repair damaged/crushed outlets ends. **(See Previous Recommendation 7)***	*n/a*
e. Emergency Aggregate Stockpiles	*Yes (X) No ( ) - Needs tandem truckload of GDOT #10 washed sand and #89 stone. **(See Current Recommendations 6a) and 6b))***	*n/a*
III - Storage Pond - Spillway		
	Observations - Comments	**Photograph No.**
1. Spillway Abutment/Deck		
a. Condition	*Concrete condition is satisfactory.*	*n/a*
2. Spillway Floor		
a. Condition	*Concrete satisfactory*	*n/a*
3. Spillway Walls		
a. Condition	*Concrete satisfactory*	*n/a*
4. Spillway Gates		
a. Condition	*Looked satisfactory. Slight water flow on RHS of RHS gate at bottom. Possible a leaky seal. Plant to investigate when gates opened.*	**4**
5. Downstream of Spillway (Channel)		
a. Condition	*Vegetation downstream of spillway has been cleaned out satisfactorily.*	*n/a*

Plant Wansley

2009 - 1st Quarter Dam Safety Inspection Summary

IV - Storage Pond - Southeast Dike (Spillway to Separator Dike)

	Observations - Comments	Photograph No.
1. Upstream Slope		
a. Condition	*Rip-rap looks acceptable. No instability or beaching evident.*	n/a
b. Erosion/Sloughing	*Yes ( ) No (X)*	n/a
2. Crest		
a. Condition	*Gravel surfaced/Railway tracks - No distress observed along road surface .*	n/a
3. Downstream Slope		
3a - Upper Slope		
a. Condition	*Grass covered - looks satisfactory.*	n/a
b. Seepage/Wet Spots	*Yes ( ) No (X)*	n/a
c. Erosion/Sloughing	*Yes ( ) No (X) - No evidence of instability.*	n/a
3b - Mid-Slope Road & Drainage Ditch		
a. Road Condition	*Gravel surfaced - looks good. No distress or potholes in road surface observed.*	n/a
b. Concrete-Lined Drainage Ditch	*Concrete in good condition. Cleanout debris in concrete lined ditches.*	5
3c - Middle Slope		
a. Condition	*Grass covered. Satisfactory. No visual evidence of instability. Rodent hole near head wall in 4th Qtr 2008 has been repaired.*	n/a
b. Seepage/Wet Spots	*Yes ( ) No (X)*	n/a
c. Erosion/Sloughing	*Yes ( ) No (X)*	n/a
3d. Lower Road & Drainage Ditch		
a. Road Condition	*Gravel surfaced - looks good. No distress or potholes in road surface observed.*	n/a
b. Concrete-Lined Drainage Ditch	*Concrete condition is acceptable*	n/a
3e - Lower Slope		
a. Condition	*Grass covered - Grass at a length that permitted a good visual examination. Several bare areas where require repair and treat ant mound and rodent holes at various locations.* ***(See Current Recommendations 1, 3, 4 and 5)***	6
b. Seepage/Wet Spots	*Yes (X) No ( )* ***1.*** *Ground surface in the area of Sta 37+50 is wet. No change from 4th Qtr visit. Safe Dams requested a report and repairs be done to address this area by 6-30-09. SCG Hydro Services to request extension to complete investigation and repairs* ***(See photo 7)***. ***2.*** *Rodent hole flagged by plant personnel for repair near Sta 37+50.* ***3.*** *The area beneath Drain 37+50D was repaired - okay.* ***4***. *The area beneath the end of the concrete drainage ditch was repaired but is undermined again. Needs to be repaired per recommendation in 5-28-08 inspection report (page 11 of 20)* ***(See photo 8).*** ***5.*** *The marker sign for the toe drain near approx Sta 56+00 needs to be fixed.* ***6.*** *Area around Piezometer LL is wet. Appears that the valve is leaking and needs to be fixed.* ***(See Previous Recommendations 6, 7 and 9 and Current Recommendations 7 and 8)***	7 and 8
c. Erosion or Sloughing	*Yes ( ) No (X) - No evidence of instability. Some of the localized bare spots in grass cover have been re-seeded, however several other bare areas require same repair.*	n/a
d. Concrete Drainage Ditch	*Concrete condition is good.* ***Sta 45+00, 49+00, 54+00 and 57+00*** *- Clean-out of debris/leaves in drain pipe, ditch and behind weir is required.* ***(See Current Recommendations 9)***	n/a
e. Emergency Aggregate Stockpiles	*Yes (X) No ( ) - Need one truckload of GDOT washed # 89 stone* ***(See Current Recommendation 6b).)***	n/a
3f - Lower Concrete-Lined Drainage Ditch		
a. Condition	***Sta 62+00*** *- Portion of concrete channel is broken and needs to be repaired. Localized portion of concrete ditch needs to be cleaned out of silt and sandy material -* ***(See photo 9 and Previous Recommendation 8)***	9

CONFIDENTIAL BUSINESS INFORMATION

Plant Wansley

2009 - 1st Quarter Dam Safety Inspection Summary

V - Storage Pond/Ash Pond - Separator Dike		**Ash Pond Elev.** Not measured
	Observations- Comments	**Photograph No.**
1. Upstream Slope (Storage Pond)		
a. Condition	*Rip-Rap - Looks satisfactory. No evidence of instability.*	n/a
b. Erosion/Sloughing	*Yes ( ) No (X)*	n/a
2. Crest		
a. Condition	*Gravel surfaced and in good condition. A few minor ruts that should be monitored and repaired if condition worsens*	n/a
3. Downstream Slope (Ash Pond)		
3a. North End		
a. Condition	*Rip-Rap - Looks satisfactory. No evidence of instability*	n/a
b. Erosion/Sloughing	*Yes ( ) No (X)*	n/a
3b. South End - (No longer applicable due to Gypsum Pond/berm construction)		
a. Condition	*Concrete generally in good condition. Several localized areas where water flowing out of joints and holes in concrete.*	n/a
V - Ash Pond Emergency Overflow		**Ash Pond Elev. 799.5'**
	Observations- Comments	**Photograph No.**
1. Upstream Slope		
a. Condition	*Rip-Rap - Looks satisfactory. Grass portion of slope generally looks satisfactory,*	n/a
b. Erosion/Sloughing	*Yes (X) No ( ) - Minor erosion at toe of grassed portion of slope. Not serious at this time but condition should be monitored to assess whether condition deteriorate whiich will require repair.*	**10**
2. Crest		
a. Condition	*Gravel surfaced and in good condition.*	n/a
3. Downstream Slope		
a. Condition	*Rip-Rap - Looks satisfactory. No evidence of instability*	n/a
b. Erosion/Sloughing	*Yes ( ) No (X)*	n/a
4. Concrete Lined Emergency Spillway		
a. Condition	*Concrete in good condition.*	n/a
5. Concrete Lined Overflow Ditch		
a. Condition	*Concrete in good condition. Several localized areas where hole in concrete have water spouting out (See photo 11). **See Current Recommendation 10**. Downstream outlet end of concrete lined ditch is undermined. Needs to be repaired per recommendation in 5-28-08 inspection report (page 11 of 20) (See photo 12). **See Current Recommendation 11.***	**11 & 12**
VII- Potable Water Pond		**Potable Water Pond Elev. 801'**
	Observations - Comments	**Photograph No.**
1. Upstream Dike Slope (Potable Water)		
a. Condition	*Rip-rap on upstream face looks good.*	n/a
b. Erosion or Sloughing	*Yes (X) No ( ) - Localized, minor surface erosion. Re-seeding and mulching has been done tand grass is growing.*	n/a
c. Concrete Drainage Ditch	*Concrete in good condition. No obstructions in channel observed.*	n/a
2. Crest		
a. Condition	*Gravel surfaced - looks good. No distress or potholes in road surface observed.*	n/a
3. Downstream Dike Slope (Storage Pond)		
a. Condition	*Grass covered - Overall - looks good. No evidence of instability*	n/a
b. Seepage/Wet Spots	*Yes ( ) No (X) - No seepage or wet spots observed on slope.*	n/a
c. Erosion or Sloughing	*Yes (X) No ( ) - Localized, minor surface erosion. Re-seeding and mulching done and grass starting to grow.*	n/a
d. Concrete Drainage Ditch	*Yes ( ) No (X) - Condition of concrete satisfactory.*	n/a
4. Spillway Approach Channel		
a. Condition - General	*Small bushes/trees removed.*	n/a
b. Condition - Rip-Rap	*Good. No evidence of instability.*	n/a
c. Condition - Concrete	*Good.*	n/a
5. Spillway Structure - Abutments/Deck		
a. Condition	*Concrete in good condition.*	n/a
6 . Spillway Structure - Floor		
a. Condition	*Concrete in good condition*	n/a
7 . Spillway Structure - Walls		
a. Condition	*Concrete - Good*	n/a

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Plant Wansley

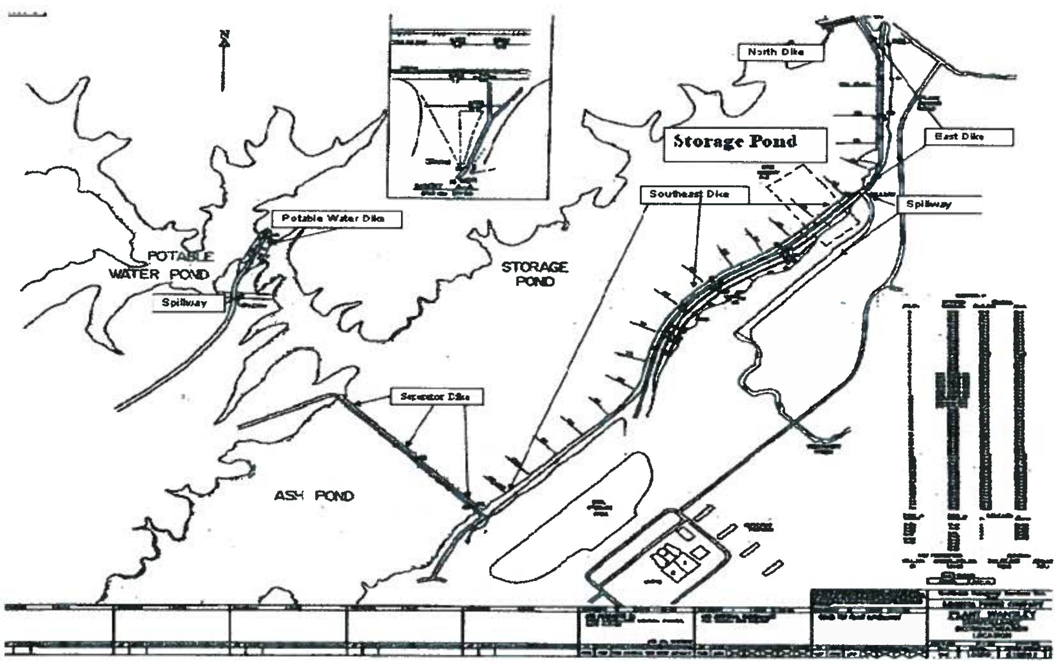
2009 - 1st Quarter Dam Safety Inspection Summary

VIII - Detention Pond

Observations- Comments		Photograph No.
1. Upstream Dike Slope		
a. Condition	*Rip-rap in good condition.*	*n/a*
b. Erosion/Sloughing	*Yes ( ) No (X) - Slope looks satisfactory, no visible instability observed*	*n/a*
2. Crest		
a. Condition	*Gravel surfaced and in good condition. No distress or potholes observed.*	*n/a*
3. Downstream Dike Slope		
a. Condition	*Grass-covered. Small bushes/trees have been cut down and grass has been cut. Looks satisfactory. No visible evidence or instability observed*	*n/a*
b. Visible Seepage or Wet Spots	*Yes (X) No ( ) - Localized, minor ponded water beyond toe of slope*	*n/a*
c. Erosion/Sloughing	*Yes ( ) No (X)*	*n/a*
4. Concrete Spillway Channel		
a. Concrete Condition	*Concrete is in good condition*	*n/a*
5.Spillway Outlet Channel		
a. Condition	*Rip-rap at outfall and outlet channel is in good condition. No issues observed.*	*n/a*

Hugh H. Armitage - Sr. Engineer
SCG - Hydro Services

Location Plan
Storage Pond and Potable Water Pond



Plant Wansley

2009 - 1st Quarter Inspection Photographs - March 17 and 30, 2009

(See accompanying report attached)

Photo No.	Description	
1	**Storage Pond - East Dike** - Localized wheel ruts/erosion need to be repaired on slope.	
2	**Storage Pond - East Dike** - Localized eriosion and bare areas on dike slope and adjacent to toe ditch. Re-establish grass cover.	
3	**Storage Pond - East Dike** - Localized rodent holes observed on slope need to be filled in.	
4	**Storage Pond - Spillway Gates** - Slight gap between wall and edge of gate allowing water through. Plant to investigate.	

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Plant Wansley

2009 - 1st Quarter Inspection Photographs - March 17 and 30, 2009

(See accompanying report attached)

Photo No.	Description	
5	**Storage Pond - East Dike -Toe Ditch - Mid-slope** - Bare spots on slope need to be re-graseed.	
6	**Storage Pond - East Dike -Lower Slope -** Bare spots on slope need to be re-graseed.	
7	**Storage Pond - East Dike - Lower Slope - Sta 37+50.** Condition unchanged from previous 4th Qtr visit.	
8	**Storage Pond - East Dike -Lower Slope -** Sta 37+00 - Repair undermining at end of concrete lined ditch	

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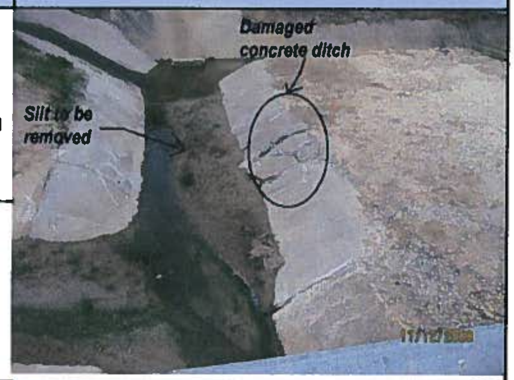
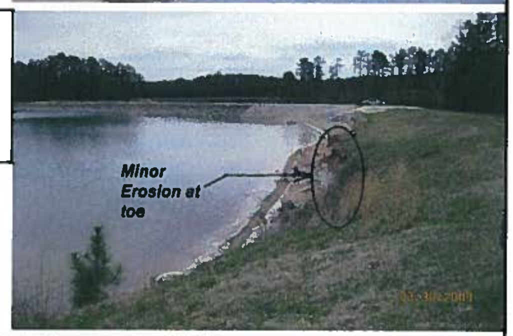
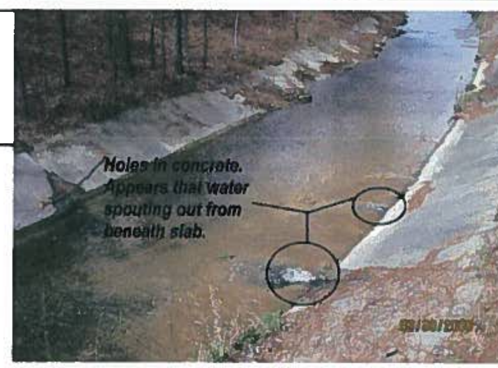
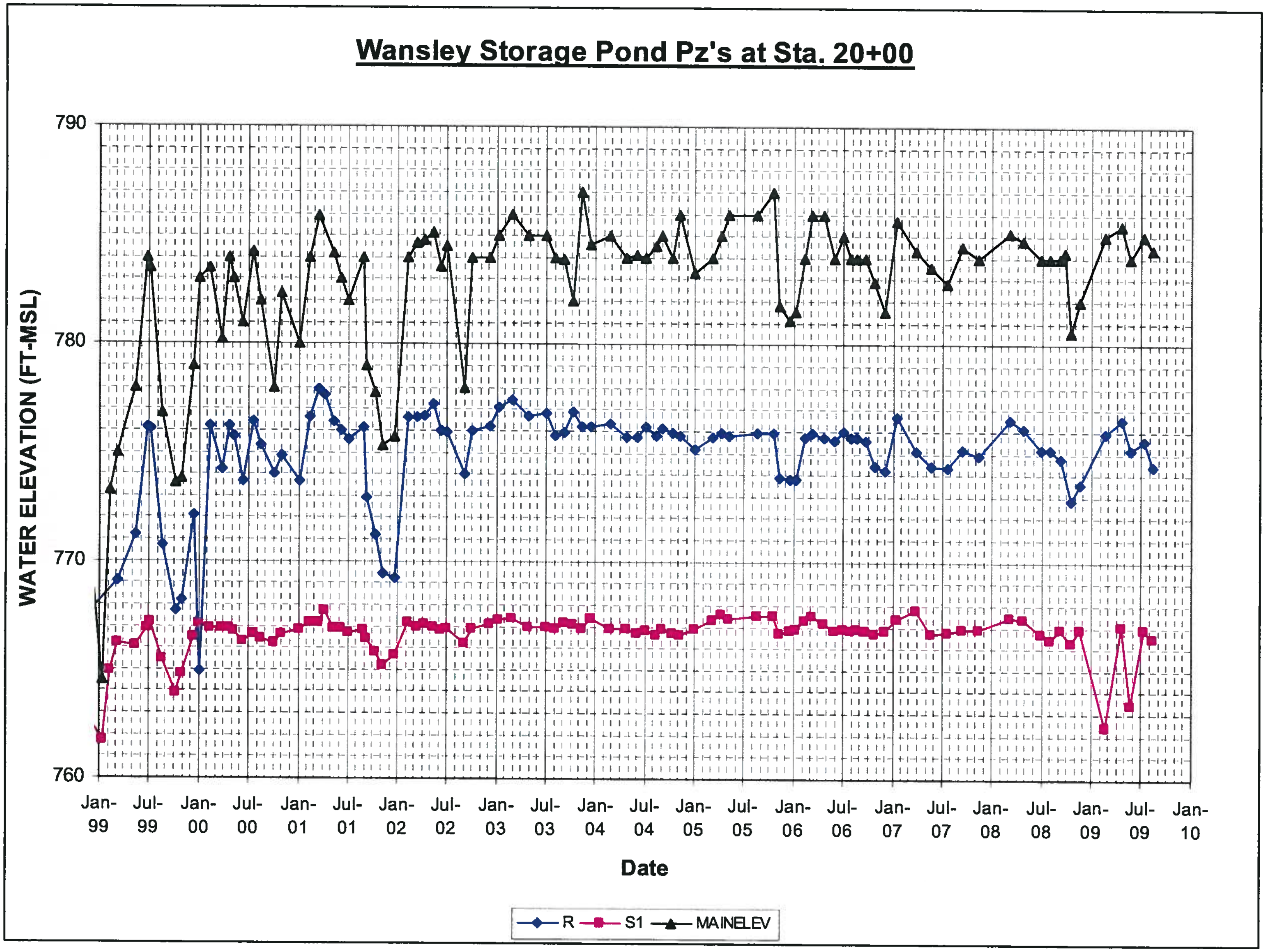
Plant Wansley

2009 - 1st Quarter Inspection Photographs - March 17 and 30, 2009

(See accompanying report attached)

Photo No.	Description	
9	**Storage Pond - Southeast Dike - Downstream-Lower Slope -Sta 62+00** - Damaged concrete needs repair and removal of silt removal at bottom of ditch.	
10	**Ash Pond- Emergency Overflow - Upstream** - Minor erosion at toe of slope at waterline. Shoud be monitored for further deterioration that will require repair	
11	**Ash Pond- Emergency Overflow - Bottom of Concrete Ditch** - Several holes in concrete and water spouting from hole. Needs to be investigated and repaired.	
12	**Ash Pond- Emergency Overflow - Downstream End** - Erosion at end of ditch resulting in underminig of concrete. Needs to be repaired.	



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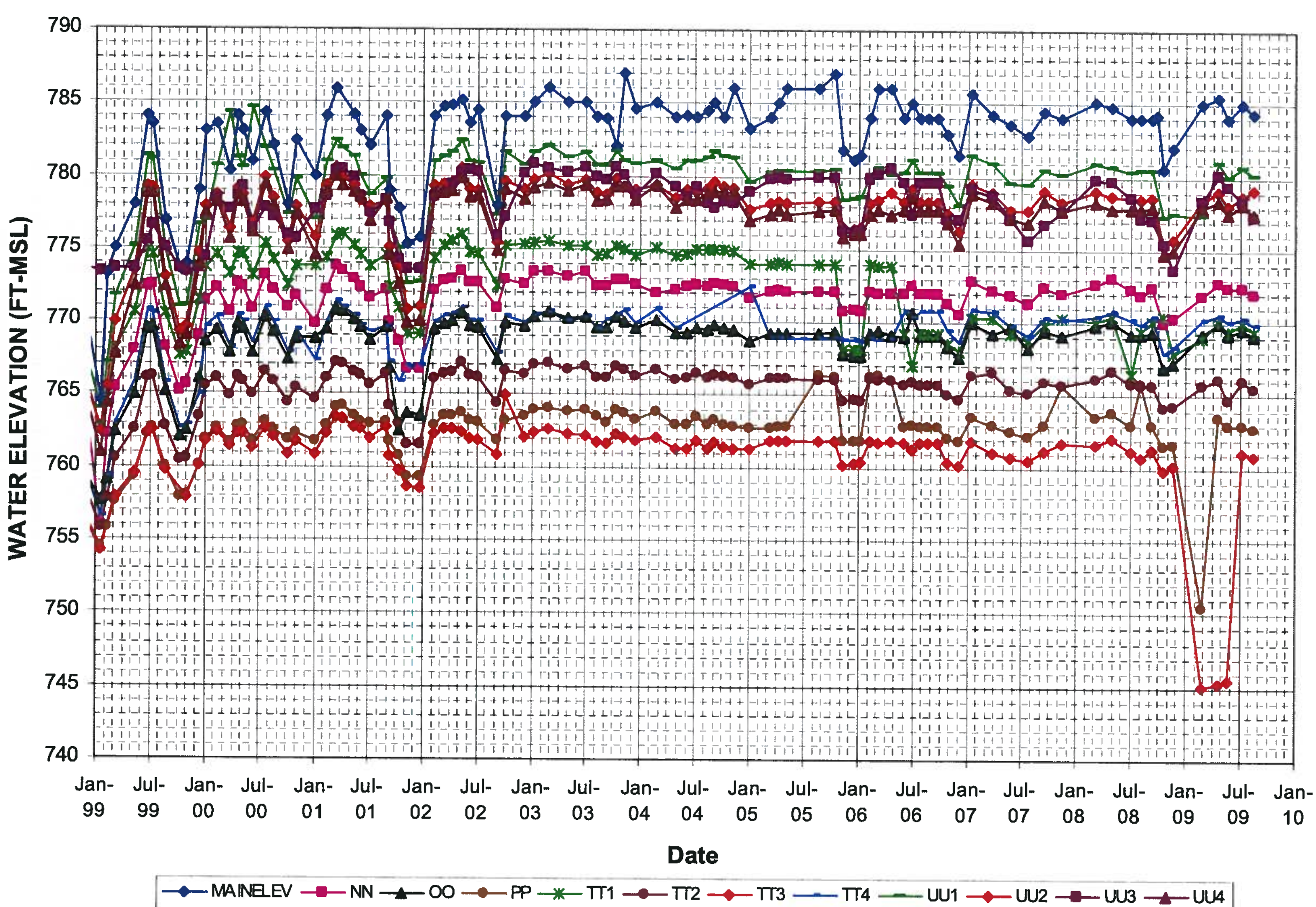
Plant Wansley Pz's at Sta. 37+50-1



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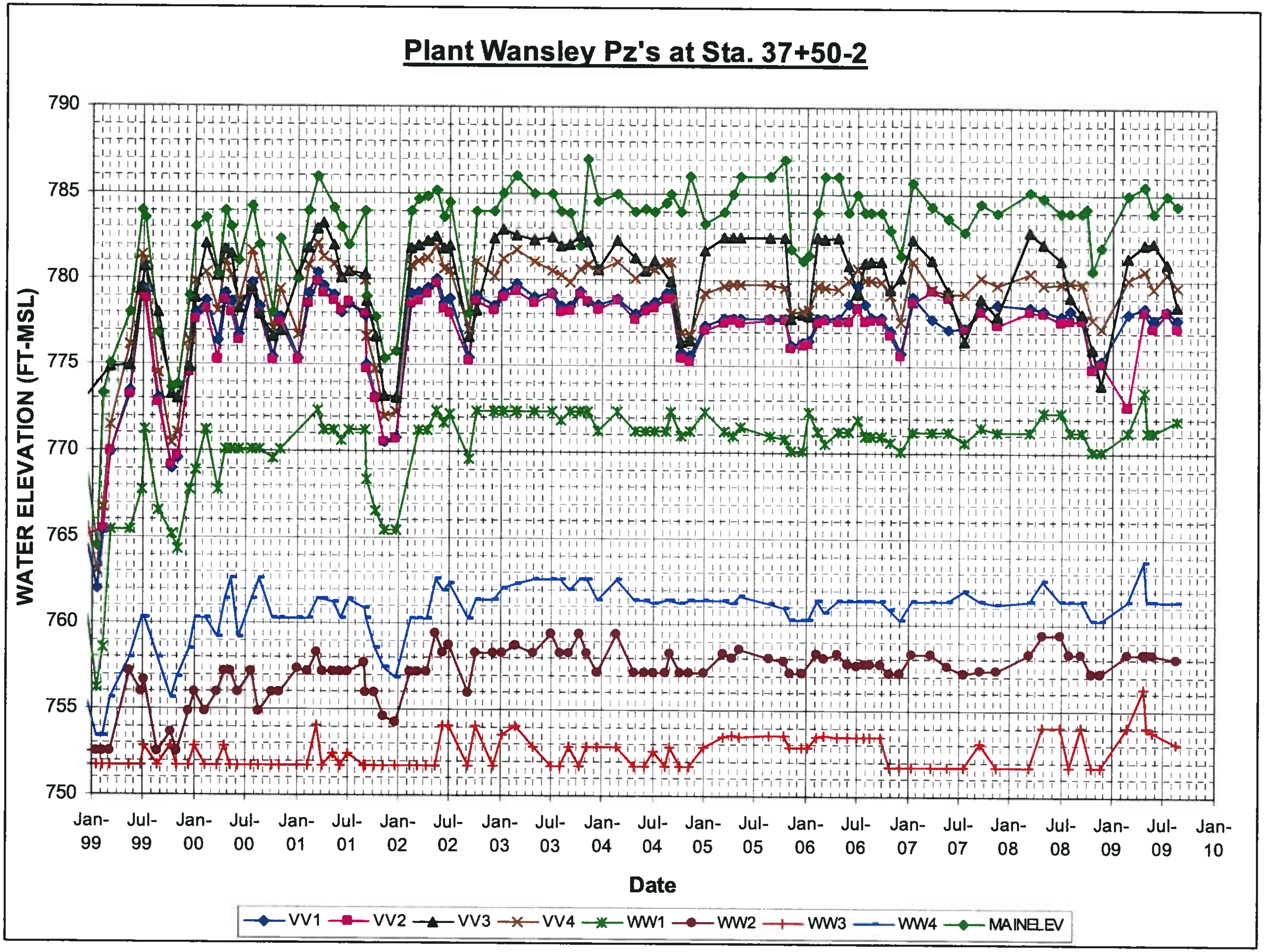

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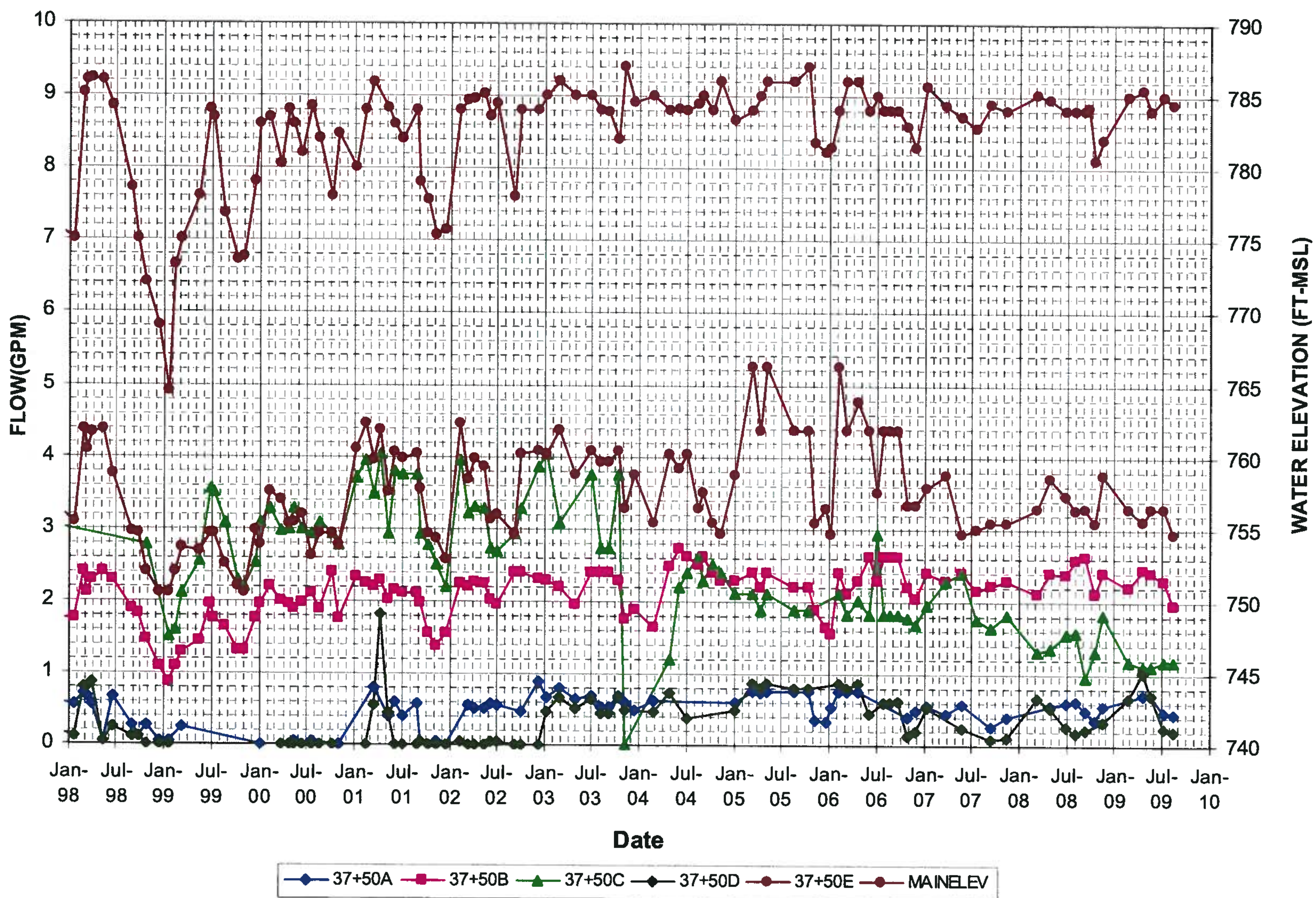
Plant Wansley Pipe Flows



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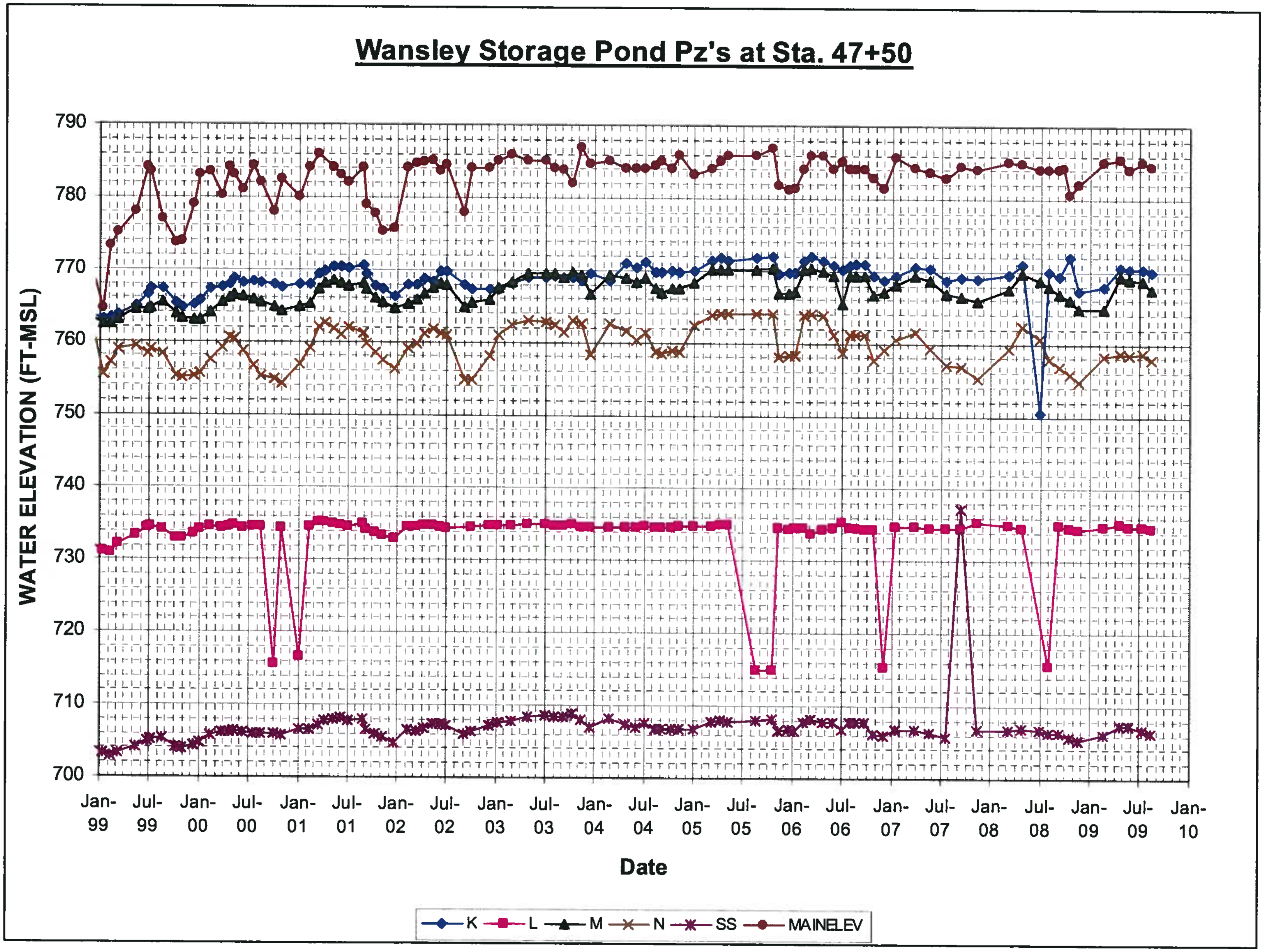

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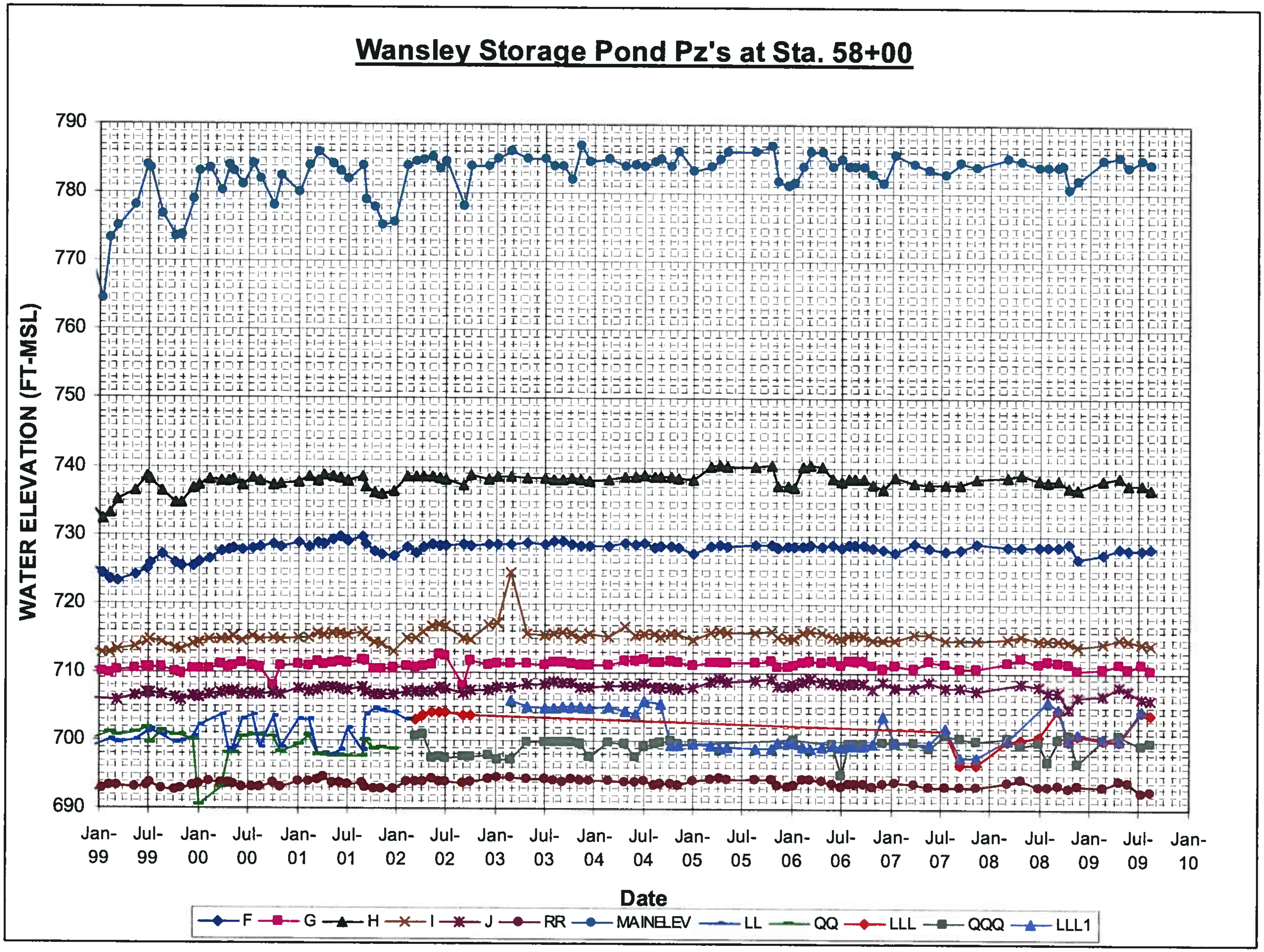

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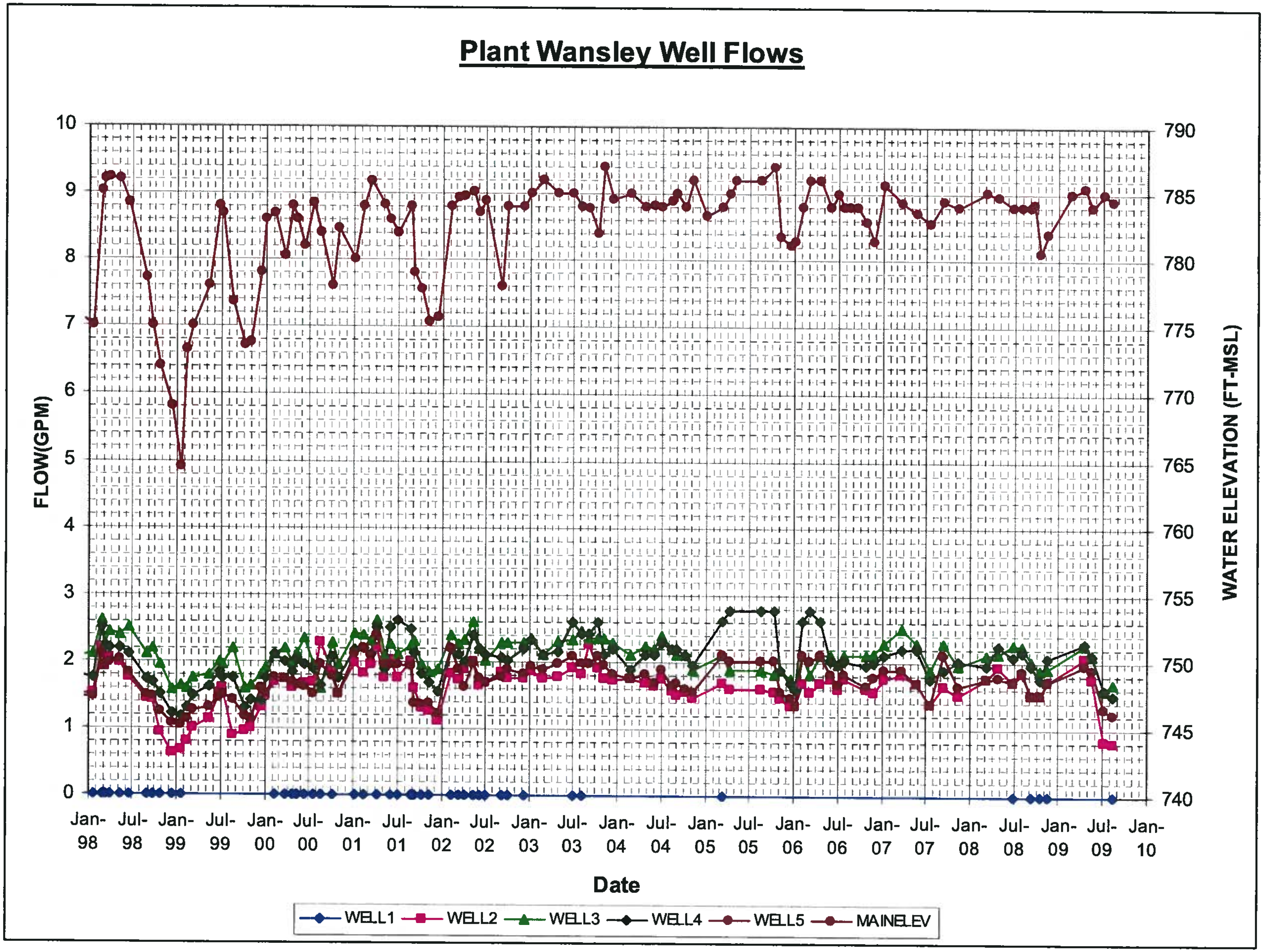

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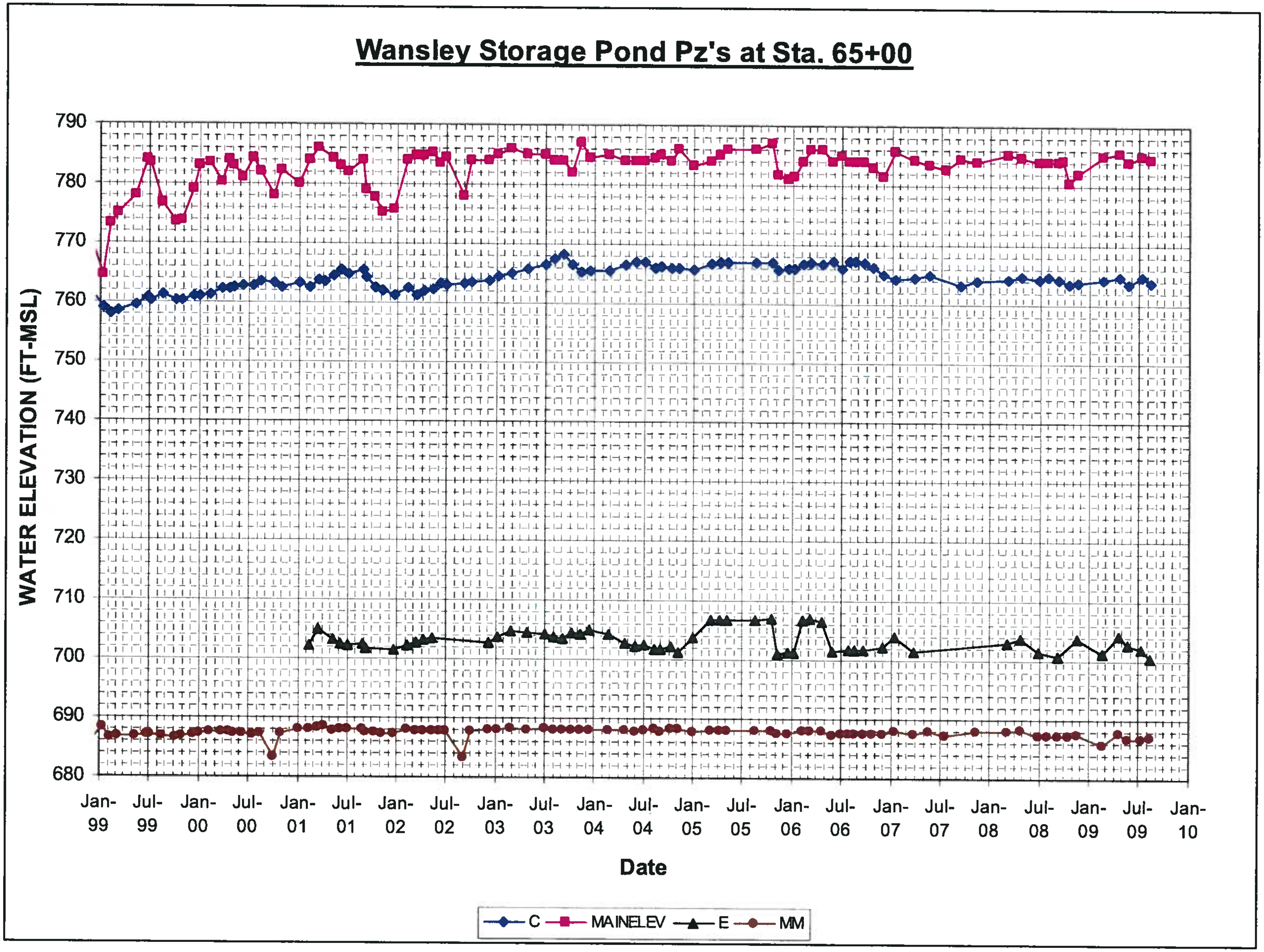

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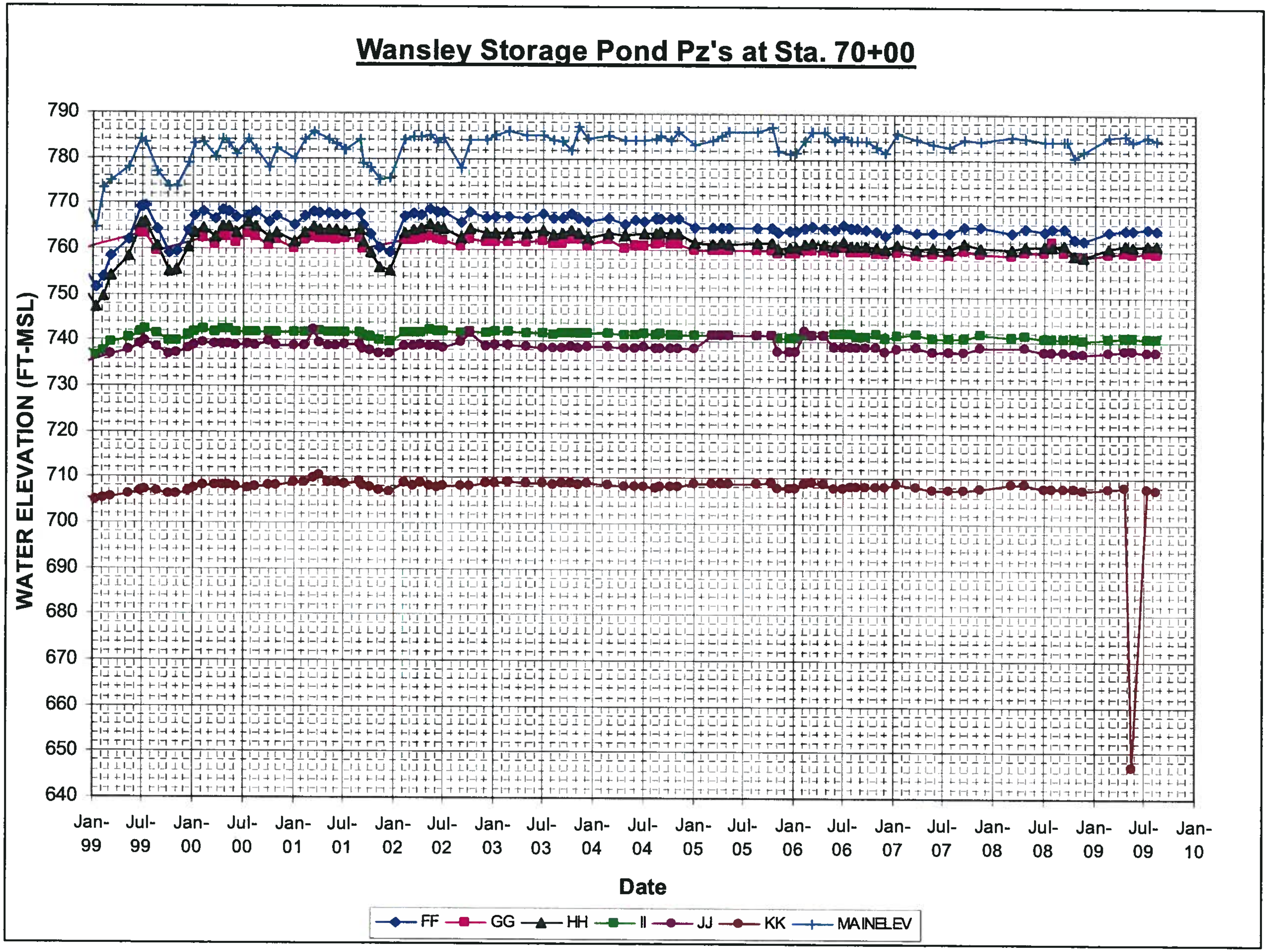

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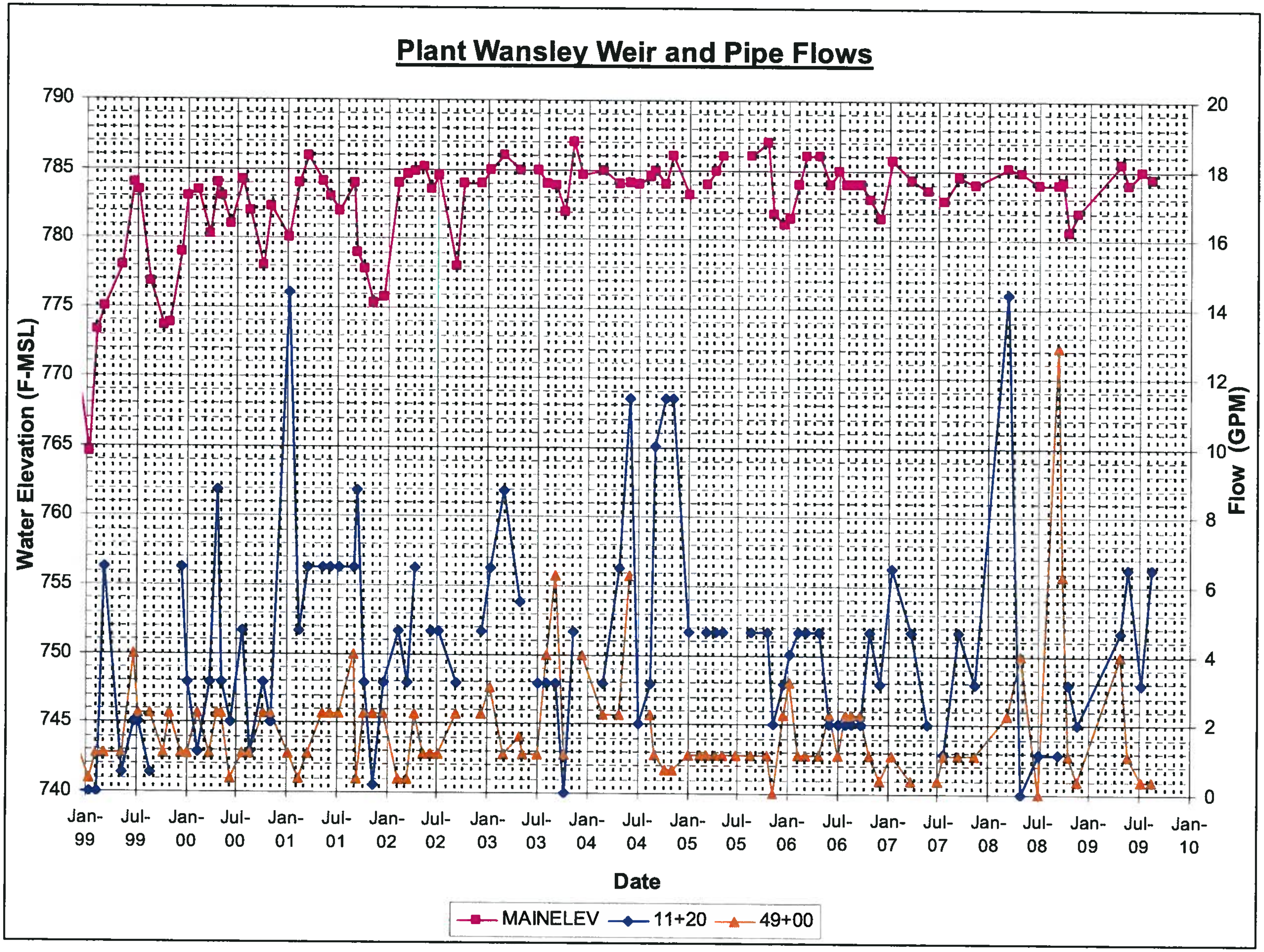

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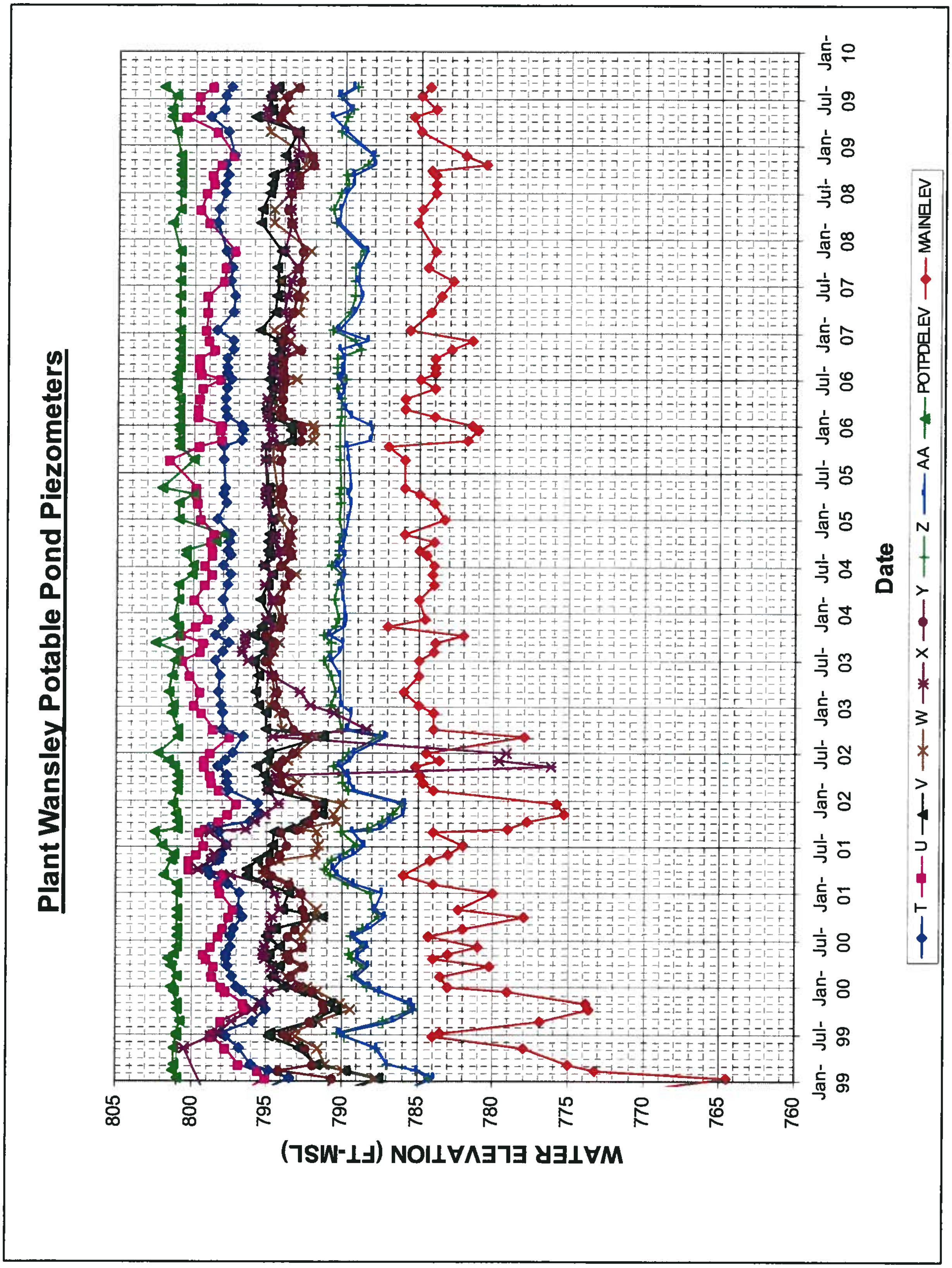

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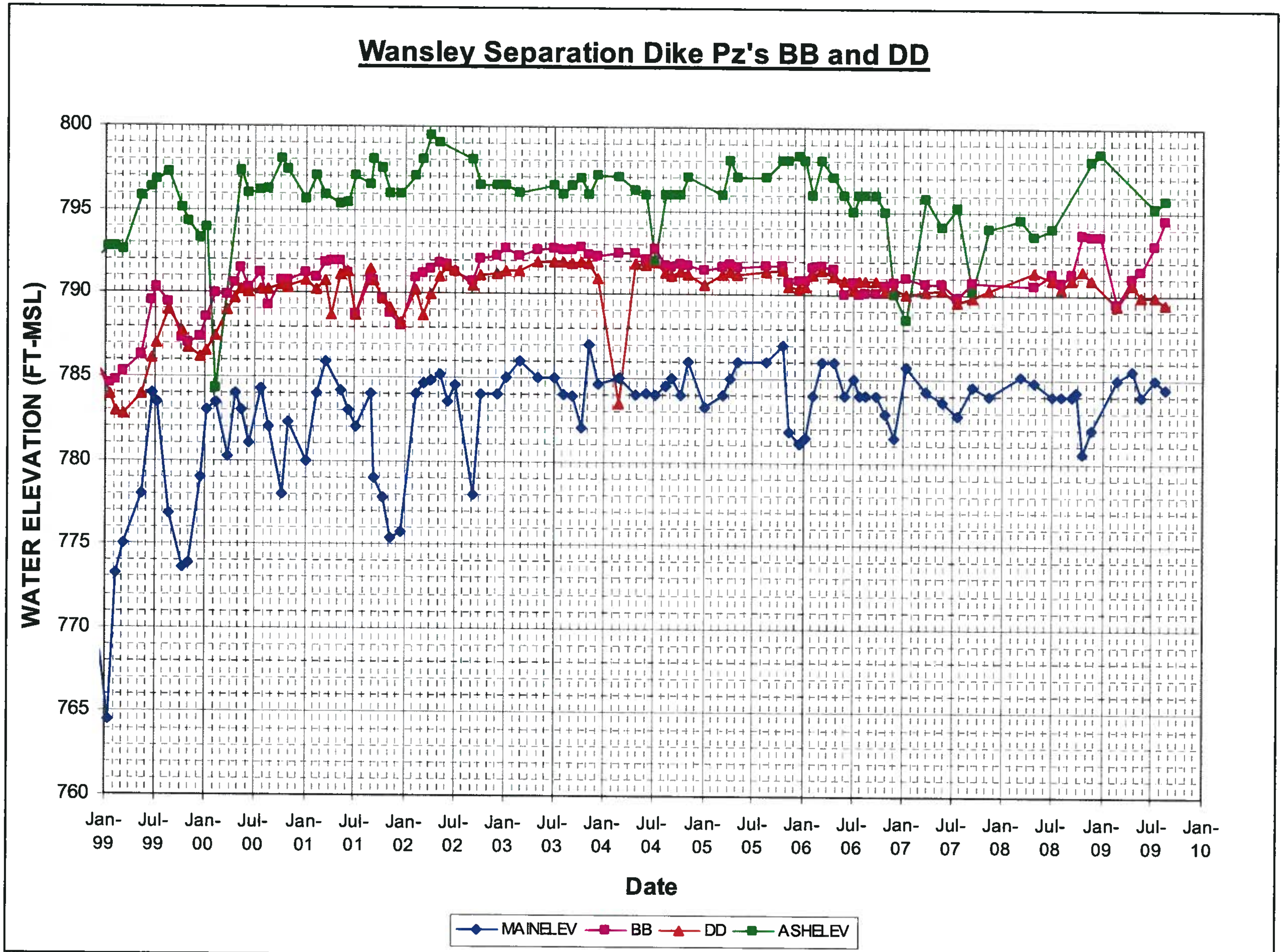
Wansley Separation Dike Pz's BB and DD



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CONFIDENTIAL BUSINESS INFORMATION

Southern Company Generation
Bin 10193
241 Ralph McGill Boulevard NE
Atlanta, Georgia 30308-3374

Tel 404.506.7033

SOUTHERN COMPANY
Energy to Serve Your World™

January 12, 2009

PLANT WANSLEY
Dam Safety Surveillance
Quarterly Report
REA No. WN-08900

Mr. J. P. Heilbron
Plant Manager
Georgia Power Co.
Plant Wansley

Dear Mr. Heilbron:

Attached is the 4th Quarter 2008 report on Dam Safety Surveillance for Plant Wansley. The inspection of the Main Storage Pond, Ash Pond Separator Dike, Potable Water Pond and Detention Pond was performed on November 12, 2008 by Hugh Armitage of the SCG Hydro Services Group. This inspection coincided with the annual inspection of the Storage Pond Main Dike by the Georgia Department of Natural Resources, Environmental Protection Division, Safe Dams Program (SDP). The inspections were coordinated with Mr. T. E. Wilson of Plant Wansley.

This report includes:

a) A review of the current instrumentation data;
b) A table summarizing visual observations made during the November 12, 2008 inspections. This report is supplemented with relevant site photographs; and
c) A copy of the current instrumentation data.

As a result of the 4th quarterly inspection, the following recommendations have been discussed with plant personnel and are shown in Table 1. The status for corrective action for previous 2008 recommendations are noted in Table 2.

TABLE -1 Recommendations from 4th Quarter Inspections

No.	Location and Description
1	**Storage Pond - Downstream Slopes -** Rodent holes to be filled and fire ant mounds to be treated. Locations flagged in field by plant personnel
2	**Storage Pond - Downstream Slopes - Sta 19+00 & 22+00 and 37+50D -** Drain pipes need to be cleaned out and repaired. Undermined concrete ditch to be repaired (per Hydro Services 5-28-08 letter).

No.	Location and Description
3	**Storage & Potable Water Ponds - Downstream Slopes - Sta 62+00 & other localized areas on slopes**. This is an on-going maintenance item.
4	**Storage Pond - Downstream Slope - Sta 37+50 -** Hydro Services to investigate wet area in 1st Qtr 2009. Plant personnel needs to monitor this area WEEKLY for any evidence of movement of slope and contact Hydro Services immediately if observed.
5	**Storage Pond - Downstream Slope - approx. Sta 56+00 -** Damaged marker pole for toe drain needs to be repaired.
6	**Storage Pond - Downstream Slope - approx. Sta 62+00 -** Damaged concrete ditch needs to be fixed and accumulated silt removed.
7	**Storage Pond - Downstream Slope - Piezometer LLL -** Piezometer leak at spigot connection needs to be repaired. Ground surface is wet around piezometer
9	**Detention Pond - Downstream Slope -** Small bushes and trees on downstream slope need to be cut down. Grass on slope needs to be cut. Source of ponded water downstream of toe needs to be investigated.

Table 2 - Recommendations from Previous 2008 Quarterly Inspections

No.	Location, Description & Action	Status Open/Closed
1	**Storage Pond - Spillway** - Downstream of end of spillway requires trees and bushes to be cut down so that flows are not restricted during flow. - **Pending Completion**	**Open**
2	**Detention Pond - Downstream Slope -** Small bushes and trees on downstream slope need to be cut down. Grass on slope needs to be cut - **Pending Completion**	**Open**
3	**Various Locations** -Cracks in concrete lined ditches should be cleaned out and caulked - **Pending completion**	**Open**

Should you have any questions, please contact Hugh Armitage at extension 8-506-7109.

Sincerely,

Joel Galt

Joel Galt
Hydro Services Supervisor

/hha

Attachments

xc: **Georgia Power Company**

T. E. Wilson (w/ attachment)
N. I. Dean (w/ attachment)

Southern Company Services

E. B. Allison (w/ attachment)
J. H. Crisler (w/ attachment)
F. J. Pryor (w/ attachment)

Hydro Service Wansley Notebook
Master File: WN-08900

Hydro Services Correspondence Notebook (w/attachments)

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CONFIDENTIAL BUSINESS INFORMATION

Instrumentation Data Review
4th Quarter – 2008

A current assessment of instrumentation data reviewed up to the most recent readings of November 18, 2008, at Plant Wansley is as follows.

Storage Pond:

Sta. 20+00: Piezometers are generally within their historic range and seem to be tracking the pond level.

Sta 37+50-1: All of these piezometers appear to be in their historic range. All generally are tracking the pond level.

Sta 37+50-2: All of these piezometers appear to be in their historic range. They generally are tracking the pond level although most have not yet responded to the recent, modest (November, 2008) increase in elevation

Sta 37+50 Pipe Flows: These flows appear to be in their historic ranges. These flow rates will continue to be monitored to assess if any trends develop. They seem to be tracking the pond level.

Sta 47+50: The piezometers are within their historic range of measurement.

It is recommended that the flow rate at the toe drain at Station 39+00 be obtained at monthly intervals rather than the current 6 month schedule. This information will be useful when modifications to the drains at 37+50 are carried out.

Sta 58+00: The level at piezometer LLL has dropped to more a more consistent historic level, which may be in part related to the decrease in pond level. Repair of a leaking valve, as noted in the attached quarterly report, is required for piezometer LLL.

Relief Wells: The relief wells appear to be discharging in their historic range, but also in response to the lower pond level.

Sta 65+00: Piezometric levels at C, E and MM are within their historic ranges.

Sta 70+00: All of these piezometers are reading in their historic ranges.

Weir and Pipe Flows: Weir measurements at Sta. 11+20 and 49+00 indicate a return to their historic range since the last quarterly inspection report.

Separation Dike:

These piezometers are generally registering in their historic ranges. Piezometer BB has recently exhibited an elevated water level. In discussions with plant personnel, we understand that piezometer BB was covered over during construction of the gypsum ponds this year. The piezometer pipe appears to have been broken off at some point when it was uncovered. This may explain the "apparent" elevated water level, particularly if the measurements have been made from a lower reference elevation than previous measurements. Plant personnel are investigating and will advise Hydro Services.

Potable Water Pond Dike:
These piezometers were registering in their historic ranges and appear to respond to the decrease in the main pond level.

CONFIDENTIAL BUSINESS INFORMATION

Plant Wansley

2008 - 4th Quarter Inspection Summary
Dam Safety Surveillance

Date of Inspection: November 12, 2008 | **Inspection by:** H. Armitage

Weather: Cloudy | **(Storage Pond Inspection)** T. Wilson - GPC

Temperature: ~48° to 64° F | T. Tucker - Fluor

Rainfall (past 24 hrs): 0 | A. Murray, S. Madichetty - Ga SDP

CONFIDENTIAL BUSINESS INFORMATION

SUMMARY

1. No major dam safety issues that would impact the safety of the structures were observed during this inspection. Recommendations to address current and previous inspection observations are summarized below. Many of the current and previous recommendations are routine, on-going maintenance type activities.

ADDITIONAL COMMENTS

1. Plant personnel did a very good job in completing most of the recommendations from previous quarterly inspections.
2. 4th Quarter Inspection done in conjunction with GA EPD Safe Dams Program 2009 Annual Inspection
3. A representative from the plant accompanied the inspectors and Hydro Services on the Storage Pond surveillance. The representative placed small flags where items that need to be corrected.
4. A copy of the Plant Wansley instrumentation data and review comments are attached.

CURRENT RECOMMENDATIONS - 4th Quarter Inspection

No.	Location and Description	Photo No.
1	**Storage Pond - Downstream Slopes -** Rodent holes to be filled and fire ant mounds to be treated. Locations flagged in field by plant personnel	3, 9 & 13
2	**Storage Pond - Downstream Slopes - Sta 19+00 & 22+00 and 37+50D -** Drain pipes need to be cleaned out and repaired. Undermined concrete ditch to be repaired (per Hydro Services 5-28-08 letter)	5, 6, 14 & 15
3	**Storage & Potable Water Ponds - Downstream Slopes - Sta 62+00 & other localized areas on slopes**. This is an on-going maintenance item.	11 & 22
4	**Storage Pond - Downstream Slope - Sta 37+50 -** Hydro Services to investigate wet area in 1st Qtr 2009. Plant personnel needs to monitor this area WEEKLY for any evidence of movement of slope and contact Hydro Services immediately if observed.	12
5	**Storage Pond - Downstream Slope - approx. Sta 56+00 -** Damaged marker pole for toe drain needs to be repaired.	16
6	**Storage Pond - Downstream Slope - approx. Sta 62+00 -** Damaged concrete ditch needs to be fixed and accumulated silt removed.	17
7	**Storage Pond - Downstream Slope - Piezometer LLL -** Piezometer leak at spigot connection needs to be repaired. Ground surface is wet around piezometer	18
9	**Detention Pond - Downstream Slope -** Small bushes and trees on downstream slope need to be cut down. Grass on slope needs to be cut. Source of ponded water downstream of toe needs to be investigated.	23 & 24

STATUS OF PREVIOUS RECOMMENDATIONS

No.	Location, Description & Action	Status Open/Closed
1	**Storage Pond - Spillway** - Downstream of end of spillway requires trees and bushes to be cut down so that flows are not restricted during flow. - **Pending Completion**	Open
2	**Detention Pond - Downstream Slope -** Small bushes and trees on downstream slope need to be cut down. Grass on slope needs to be cut - **Pending Completion**	Open
3	**Various Locations** -Cracks in concrete lined ditches should be cleaned out and caulked - **Pending completion**	Open
4	**Storage Pond - North Dike** - Warning sign needs to be re-mounted on pole - **Fixed - Okay**	Closed

Plant Wansley

2008 - 4th Quarter Inspection Summary

STATUS OF PREVIOUS RECOMMENDATIONS (continued)

No.	Location, Description & Action	Status Open/Closed
5	**Storage Pond & Potable Water Pond - General -** Localized bare spots on grass covered slopes need repair. Re-seeding and mulching required to prevent further surface erosion. **Many areas have been reseeded. This is an on-going maintenance item.**	**Closed**
6	**Storage Pond - East and SE Dike - Concrete Lined Ditches & Toe Drains -** Localized vegetation growth and debris needs to be removed from ditches so that flow isn't restricted from approx. Sta.1+60 to 3+50 and Sta. 5+00 to 23+50. Drains at Sta 73+00 & 74+00 need to be cleaned of silt and debris. - **Completed**	**Closed**
7	**Storage Pond - SE Dike (Southwest End) and Potable Water Pond (U/S Slope) -** Trees and bushes need to be cut down at toe of slopes to mitigate root growth (seepage path) into embankment - **Corrected**	**Closed**
8	**Storage Pond - SE Dike- Lower Slope -** Rodent holes on lower slope near Sta. 67+60 and 68+40 need to be filled in.- **Repaired**	**Closed**
9	**Separator Dike - Upstream & Downstream Slopes -** Localized erosion rills/gullies need to be repaired to mitigate further erosion. - **Fixed**	**Closed**
10	**Potable Water Pond Spillway** - Upstream end of spillway. (Approach channel) requires trees and bushes to be cut down and cleared so that flows are not restricted - **Larger trees/bushes have been cut down**	**Closed**
11	**General Comment & Sta 1+00 to 8+00 -** Remove accumulated vegetation from within concrete lined channels -Completed	**Closed**
12	**Sta. 75+00, 76+00 & 77+00** - Clean out end of finger drains - **Completed**	**Closed**
13	**Multiple Locations on slopes** -Fill in animal burrows - Rodent holes observed in 1st Qtr filled or could not be found during current inspection - **See Current Reco. 6 above**	**Closed**
14	Sta 73+00 & 74+00 - Bare spots on slope need to be re-seeded. - **Some area have become grown over with grass cover satisfactorily. See Current Reco. 2 above**	**Closed**
15	Sta. 66+00, 70+00 & 72+50 - Repair end of damaged toe drains - **The ends have been fixed.**	**Closed**
16	**Sta 62+00** - Clean Silt behind Weir - **Cleaned out**	**Closed**
17	**Separator Dike -** Runoff erosion at crest of upstream slope repaired	**Closed**
18	**Localized bare spots on slope** to be re-seeded (or covered with small rip-rap).	**Closed**
19	**Upstream Toe of Slope-** Vegetation needs to be cut down **- Bushes and trees cut down - ok**	**Closed**

CONFIDENTIAL BUSINESS INFORMATION

Plant Wansley

2008 - 4th Quarter Inspection Summary

OBSERVATIONS FOR 4th QUARTER INSPECTION

I - Storage Pond - North Dike - (Road to Recreational Area)		**Storage Pond Elev. 778.1'**
	Observations - Comments	**Photograph No.**
1. Upstream Slope		
a. Condition	*Grass covered - Overall condition is good. No evidence of instability.*	*n/a*
b. Erosion/Sloughing	*Yes ( ) No (X)*	*n/a*
2. Crest		
a. Condition	*Gravel surfaced - No distress or potholes in road surface observed. Sign has been re-mounted on post*	**1**
3. Downstream Slope		
a. Condition	*Grass covered - Overall condition is good. No evidence of instability.*	*n/a*
b. Seepage/Wet Spots	*Yes ( ) No (X) - No seepage or wet spots observed on slope.*	*n/a*
c. Erosion/Sloughing	*Yes ( ) No (X)*	*n/a*
II - Storage Pond - East Dike (North Dike to Spillway)		
	Observations - Comments	**Photograph No.**
1. Upstream Slope		
a. Condition	*Rip-rap on upstream face looks satisfactory and no dam safety issues observed.*	*n/a*
b. Erosion/Sloughing	*Yes ( ) No (X) - No instability observed*	*n/a*
2. Crest		
a. Condition	*Gravel surfaced - No distress or potholes in road surface observed.*	*n/a*
3. Downstream Slope		
a. Condition	*Grass covered - Overall - Grass has been cut. Localized bare spots noted on previous inspections have been re-seeded & straw placed over seed. Grass starting to grow in some places. (On-going maintenance issue). Rodent hole at Sta. 7+00 (photo 3), localized fire ant mounds. All flagged for repair by plant personnel.*	**2, 3**
b. Seepage/Wet Spots	*Yes ( ) No (X) - No seepage or wet spots observed on slope.*	*n/a*
c. Erosion/Sloughing	*Yes ( ) No (X) - No evidence of instability.*	*n/a*
d. Concrete-Lined Drainage Ditch	*Concrete in good condition. Localized vegetation growth and debris has been removed from ditches (photo 4). Good job done. Drain pipes at Sta. 19+00 and 22+00 need to be cleaned out and repaired (photos 4 and 5)*	**4, 5 & 6**
e. Emergency Aggregate Stockpiles	*Yes (X) No ( )*	
III - Storage Pond - Spillway		
	Observations - Comments	**Photograph No.**
1. Spillway Abutment/Deck		
a. Condition	*Concrete condition is satisfactory. Per Ga SDP letter 4-3-08, spall at left abutment has been repaired.*	**7**
2. Spillway Floor		
a. Condition	*Concrete satisfactory*	*n/a*
3. Spillway Walls		
a. Condition	*Concrete satisfactory*	*n/a*
4. Downstream of Spillway (Channel)		
a. Condition	*Vegetation downstream of spillway still needs to be cleared to prevent blockage/restriction of flow capacity of channel -* ***Pending activity.***	*n/a*

CONFIDENTIAL BUSINESS INFORMATION

Plant Wansley

2008 - 4th Quarter Inspection Summary

CONFIDENTIAL BUSINESS INFORMATION

IV - Storage Pond - Southeast Dike (Spillway to Separator Dike)

	Observations - Comments	Photograph No.
1. Upstream Slope		
a. Condition	*Rip-rap (size varies) on upstream slope looks acceptable. No instability or beaching evident. (SCG sent response to GA EPD-SDP letter 4/3/08. SCG will continue ongoing monitoring of rip-rap). Bushes and trees at toe of slope adjacent to separator dike have been cut down satisfactorily (See Photo 8).*	**8**
b. Erosion/Sloughing	*Yes ( ) No (X)*	*n/a*
2. Crest		
a. Condition	*Gravel surfaced/Railway tracks - No distress observed along road surface .*	*n/a*
3. Downstream Slope		
3a - Upper Slope		
a. Condition	*Grass covered - looks satisfactory. Grass recently cut so good visual examination possible.*	*n/a*
b. Seepage/Wet Spots	*Yes ( ) No (X)*	*n/a*
c. Erosion/Sloughing	*Yes ( ) No (X) - No evidence of instability.*	*n/a*
3b - Mid-Slope Road & Drainage Ditch		
a. Road Condition	*Gravel surfaced - looks good. No distress or potholes in road surface observed.*	*n/a*
b. Concrete-Lined Drainage Ditch	*Concrete in good condition. Vegetation in ditch/around drain at Sta. 73+00 has been removed satisfactorily.*	*n/a*
3c - Middle Slope		
a. Condition	*Grass covered. Satisfactory. No visual evidence of instability. New rodent hole encountered near head wall and was flagged by plant personnel.*	**9**
b. Seepage/Wet Spots	*Yes ( ) No (X)*	*n/a*
c. Erosion/Sloughing	*Yes ( ) No (X)*	*n/a*
3d. Lower Road & Drainage Ditch		
a. Road Condition	*Gravel surfaced - looks good. No distress or potholes in road surface observed.*	*n/a*
b. Concrete-Lined Drainage Ditch	*Concrete condition is acceptable*	*n/a*
3e - Lower Slope		
a. Condition	*Grass covered - Grass has recently been cut. Overall good coverage. Localized re-seeding has been carried out to fix bare spots Several additional areas require repair.*	**10 & 11**
b. Seepage/Wet Spots	*Yes (X) No ( ) **1.** Ground surface in the area of Sta 37+50 is wet. Minor and localized visible water ponded. **(photo 12)**. EPD inspector stated that corrective action be taken to address wet area by 6-2009. This issue was addressed in response letter to EPD dated 10-28-08. **2.** Rodent hole flagged by plant personnel for repair near Sta 37+50 **(photo 13)**. **3.** The area beneath Drain D is undermined and needs to be repaired **(photo 14)**. **4**. The area beneath the end of the concrete drainage ditch is undermined and needs to be repaired **(photo 15)**. **5.** The marker sign for the toe drain near approx Sta 56+00 needs to be fixed. Has been damaged. **(photo 16)**. **6.** Area around Piezometer LL is wet. Appears that the valve is leaking and needs to be fixed **(photo 17)**.*	**12, 13, 14 15, 16 and 17**
c. Erosion or Sloughing	*Yes ( ) No (X) - No evidence of instability. Some of the localized bare spots in grass cover have been re-seeded, however several other bare areas require same repair.*	*n/a*
d. Concrete Drainage Ditch	*Concrete condition is good. **Sta 49+00** - Clean-out of debris/leaves in drain pipe, ditch and behind weir is required.*	*n/a*
e. Emergency Aggregate Stockpiles	*Yes (X) No ( )*	*n/a*
3f - Lower Concrete-Lined Drainage Ditch		
a. Condition	***Sta 62+00** - Portion of concrete channel is broken and needs to be repaired. Localized portion of concrete ditch needs to be cleaned out of silt and sandy material*	**18**

Plant Wansley

2008 - 4th Quarter Inspection Summary

V - Storage Pond/Ash Pond - Separator Dike		Ash Pond Elev. 799.5'
	Observations- Comments	Photograph No.
1. Upstream Slope (Storage Pond)		
a. Condition	*Rip-Rap - Looks satisfactory. Size of stone on surface of slope varies. No evidence of instability.*	n/a
b. Erosion or Sloughing	*Yes (X) No ( ) - Localized, shallow erosion rills/gullies have been repaired (filled in with stone/rip-rap).*	19
2. Crest		
a. Condition	*Gravel surfaced and in good condition. New gravel has been placed on roadway.*	n/a
3. Downstream Slope (Ash Pond)		
3a. North End		
a. Condition	*Rip-Rap - Looks satisfactory. No evidence of instability*	n/a
b. Erosion or Sloughing	*Yes (X) No ( ) - Localized, shallow erosion rills/gullies have been repaired (filled in with stone/rip-rap).*	n/a
3b. South End - (No longer applicable due to Gypsum Pond/berm construction)		
a. Condition	*N/A - Recently constructed gypsum storage pond dike now abuts the south end of the separator dike.*	n/a

VII- Potable Water Pond		Potable Water Pond Elev. 801'
	Observations - Comments	Photograph No.
1. Upstream Dike Slope (Potable Water)		
a. Condition	*Rip-rap on upstream face looks good. Small trees and bushes at toe have been cut down.*	20
b. Erosion or Sloughing	*Yes (X) No ( ) - Localized, minor surface erosion. Re-seeding and mulching has been done to reestablish grass growth in bare areas.*	21
c. Concrete Drainage Ditch	*Concrete in good condition. No obstructions in channel observed.*	n/a
2. Crest		
a. Condition	*Gravel surfaced - looks good. No distress or potholes in road surface observed.*	n/a
3. Downstream Dike Slope (Storage Pond)		
a. Condition	*Grass covered - Overall - looks good. No evidence of instability*	n/a
b. Seepage/Wet Spots	*Yes ( ) No (X) - No seepage or wet spots observed on slope.*	n/a
c. Erosion or Sloughing	*Yes (X) No ( ) - Localized, minor surface erosion. Re-seeding and mulching required to re-establish vegetative growth.*	22
d. Concrete Drainage Ditch	*Yes ( ) No (X) - Condition of concrete satisfactory.*	n/a
4. Spillway Approach Channel		
a. Condition - General	*Small bushes/trees removed.*	n/a
b. Condition - Rip-Rap	*Good. No evidence of instability.*	n/a
c. Condition - Concrete	*Good.*	n/a
5. Spillway Structure - Abutments/Deck		
a. Condition	*Concrete in good condition.*	n/a
6 . Spillway Structure - Floor		
a. Condition	*Concrete in good condition*	n/a
7 . Spillway Structure - Walls		
a. Condition	*Concrete - Good*	n/a

CONFIDENTIAL BUSINESS INFORMATION

Plant Wansley

2008 - 4th Quarter Inspection Summary

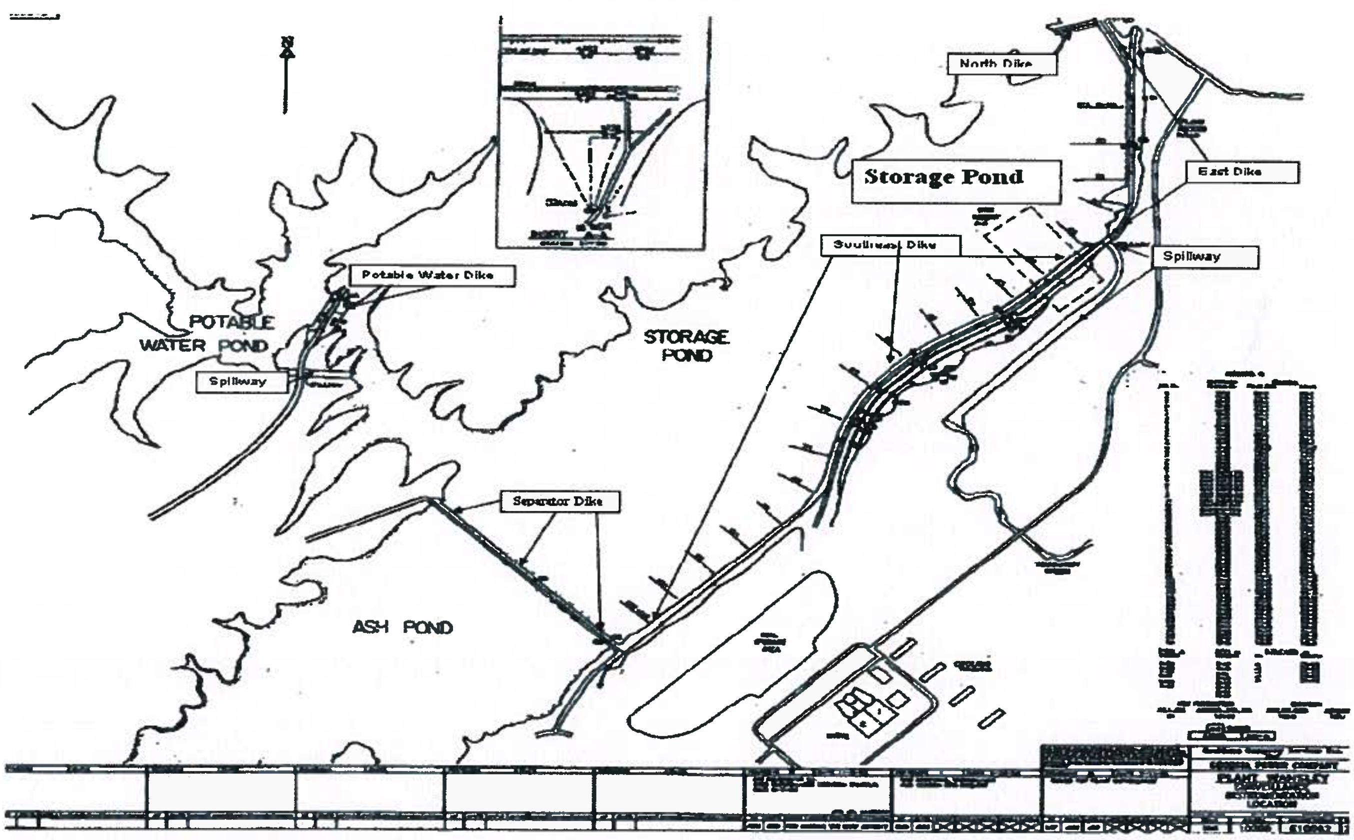
VIII - Detention Pond

	Observations- Comments	Photograph No.
1. Upstream Dike Slope		
a. Condition	*Rip-rap in good condition.*	*n/a*
b. Erosion/Sloughing	*Yes ( ) No (X) - Slope looks satisfactory, no visible instability observed*	*n/a*
2. Crest		
a. Condition	*Gravel surfaced and in good condition. No distress or potholes observed.*	*n/a*
3. Downstream Dike Slope		
a. Condition	*Grass-covered. Central area of slope has small bushes/trees that need to be removed. Grass requires cutting. No visible evidence or instability observed*	23
b. Visible Seepage or Wet Spots	*Yes (X) No ( ) - Localized, minor ponded water beyond toe of slope*	24
c. Erosion or Sloughing	*Yes ( ) No (X)*	*n/a*
4. Concrete Spillway Channel		
a. Concrete Condition	*Concrete is in good condition*	*n/a*
5.Spillway Outlet Channel		
a. Condition	*Rip-rap at outfall and outlet channel is in good condition. No issues observed.*	*n/a*

CONFIDENTIAL BUSINESS INFORMATION

Hugh H. Armitage - Sr. Engineer
SCG - Hydro Services

Location Plan
Storage Pond and Potable Water Pond



Plant Wansley

2008 - 4th Quarter Inspection Photographs - November 12, 2008

(See accompanying report attached)

Photo No.	Description	
1	**Storage Pond - N Dike** - Near Rec. Center Entrance - Notice sign re-mounted on post	
2	**Storage Pond - East Dike** - Localized areas have been re-seeded to re-establish grass on former bare areas	
3	**Storage Pond - East Dike** - Localized rodent holes to be filled in and fire ant mounds to be treated. The rodent holes and fire ant mounds were flagged by plant personnel	
4	**Storage Pond - East Dike** - Ditches cleaned out of debris/silt	

CONFIDENTIAL BUSINESS INFORMATION

Plant Wansley

2008 - 4th Quarter Inspection Photographs - November 12, 2008

(See accompanying report attached)

Photo No.	Description	
5	**Storage Pond - East Dike** - Drain pipe at Station 19+00 needs to be cleaned out. Drain needs to be extended to prevent future clogging	
6	**Storage Pond - East Dike** - Drain pipe at Station 22+00 needs to be fixed. Crushed end to be replaced/repaired	
7	**Storage Pond - Spillway** - Concrete spall on downstream wall has been fixed.	
8	**Storage Pond - Southeast Dike - Upstream** - Bushes and trees have been removed at toe of slope.	

Plant Wansley

2008 - 4th Quarter Inspection Photographs - November 12, 2008

(See accompanying report attached)

Photo No.	Description	
9	**Storage Pond- Southeast Dike - Downstream -** Sta 64+00 - Rodent Hole to be repaired.	
10	**Storage Pond- Southeast Dike - Downstream -** Sta 64+00 - Areas of slope have been repaired by re-seeding to re-establish grass cover.	
11	**Storage Pond- Southeast Dike - Downstream -** Near Sta 62+00 - Bare area on slope to be seeded to re-establish grass cover.	
12	**Storage Pond - Southeast Dike - Downstream-** Lower Slope at Sta 37+ 50. - EPD Safe Dams Program stated that a repair of wet area required by June 2009	

CONFIDENTIAL BUSINESS INFORMATION

Plant Wansley

2008 - 4th Quarter Inspection Photographs - November 12, 2008

(See accompanying report attached)

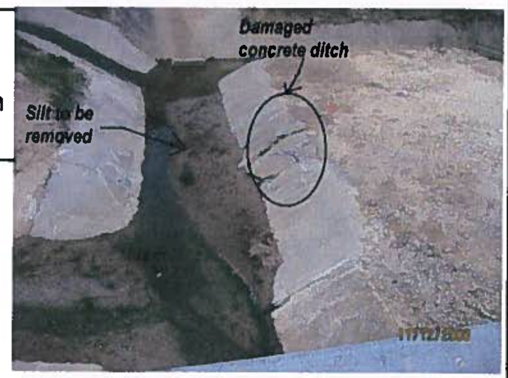
Photo No.	Description	
13	**Storage Pond - Southeast Dike - Downstream-Lower Slope at Sta 37+ 50**. Rodent hole to be repaired. Flagged by field personnel.	
14	**Storage Pond - Southeast Dike - Downstream-Lower Slope at Sta 37+ 50 Drain D** - Undermining at end of concrete drainage pipe requires repair.	
15	**Storage Pond - Southeast Dike - Downstream-Lower Slope at Sta 37+ 50** - Undermining at end of concrete drainage ditch requires repair. (See repair procedure in letter of May 28, 2008)	
16	**Storage Pond - Southeast Dike - Downstream - Lower Slope at Sta 56+00** - Damaged drain marker to be replaced	

CONFIDENTIAL BUSINESS INFORMATION

Plant Wansley

2008 - 4th Quarter Inspection Photographs - November 12, 2008

(See accompanying report attached)

Photo No.	Description	
17	**Storage Pond - Southeast Dike - Downstream - Lower Slope -** Wet area around Piezometer LLL. Appears that drain valve is leaking. Needs to be repaired.	
18	**Storage Pond - Southeast Dike - Downstream-Lower Slope -Sta 62+00** - Damaged concrete needs repair and removal of silt removal at bottom of ditch.	
19	**Storage Pond - Spearator Dike- Upstream and Downstream** - Erosion gullies have been repaired with stone/rip-rap	
20	**Potable Water Pond- Upstream Slope -** Small trees and bushes have been cut down at downstream toe.	

CONFIDENTIAL BUSINESS INFORMATION

Plant Wansley

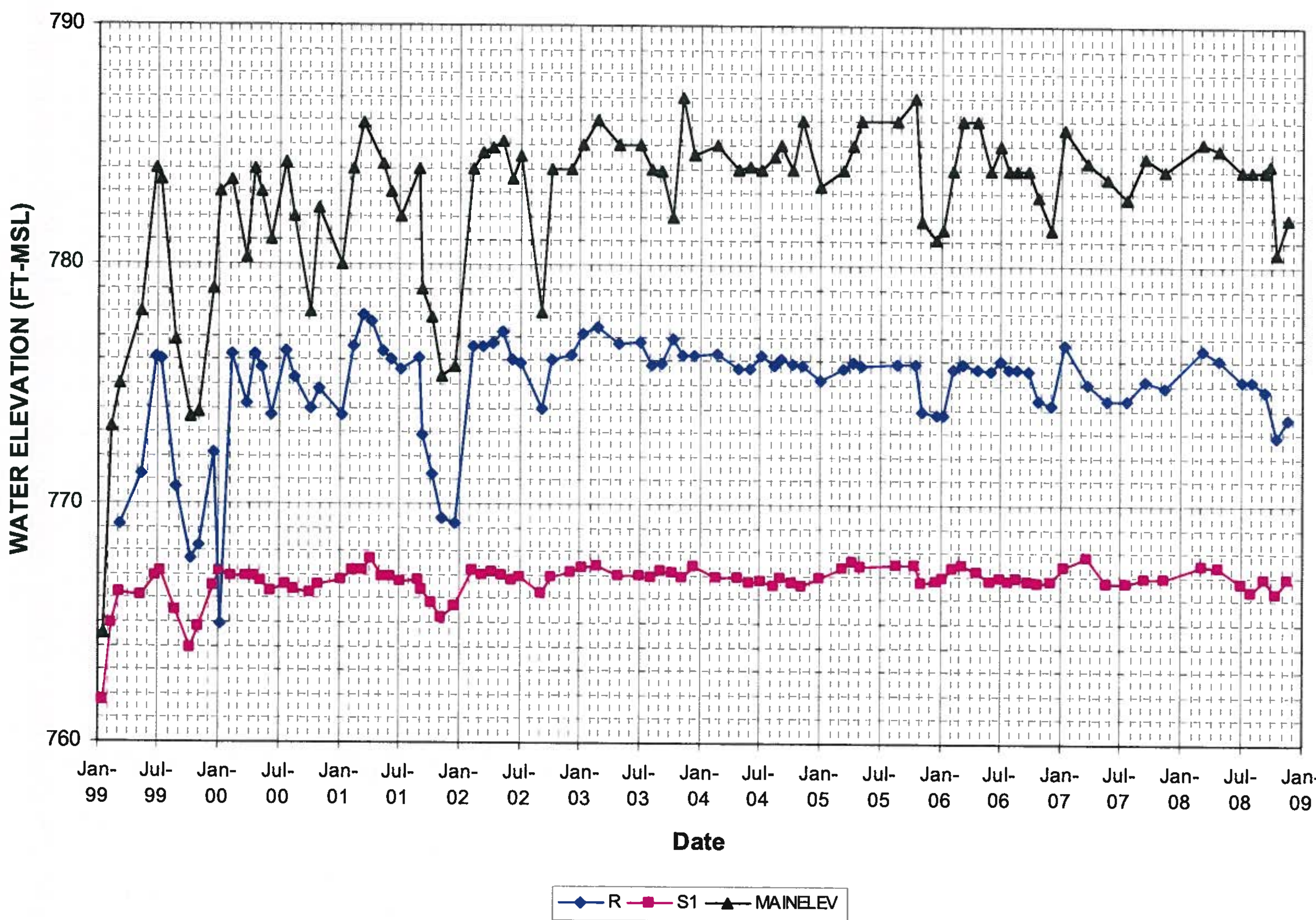
2008 - 4th Quarter Inspection Photographs - November 12, 2008

(See accompanying report attached)

Photo No.	Description	
21	**Potable Water Pond- Upstream Slope -** Localized bare areas have been re-seeded and grass is starting to grow.	
22	**Potable Water Pond- Downstream Slope -** Localized bare areas need to re-seeded and grass reestablished	
23	**Detention Pond - Downstream Slope**. Small trees to be removed. Grass and weeds to be cut.	
24	**Detention Pond**- Downstream - Localized wet areas downsteam of toe of slope. Need to investigate source of water. Plant to coordinate with Hydro Services.	

CONFIDENTIAL BUSINESS INFORMATION

Wansley Storage Pond Pz's at Sta. 20+00



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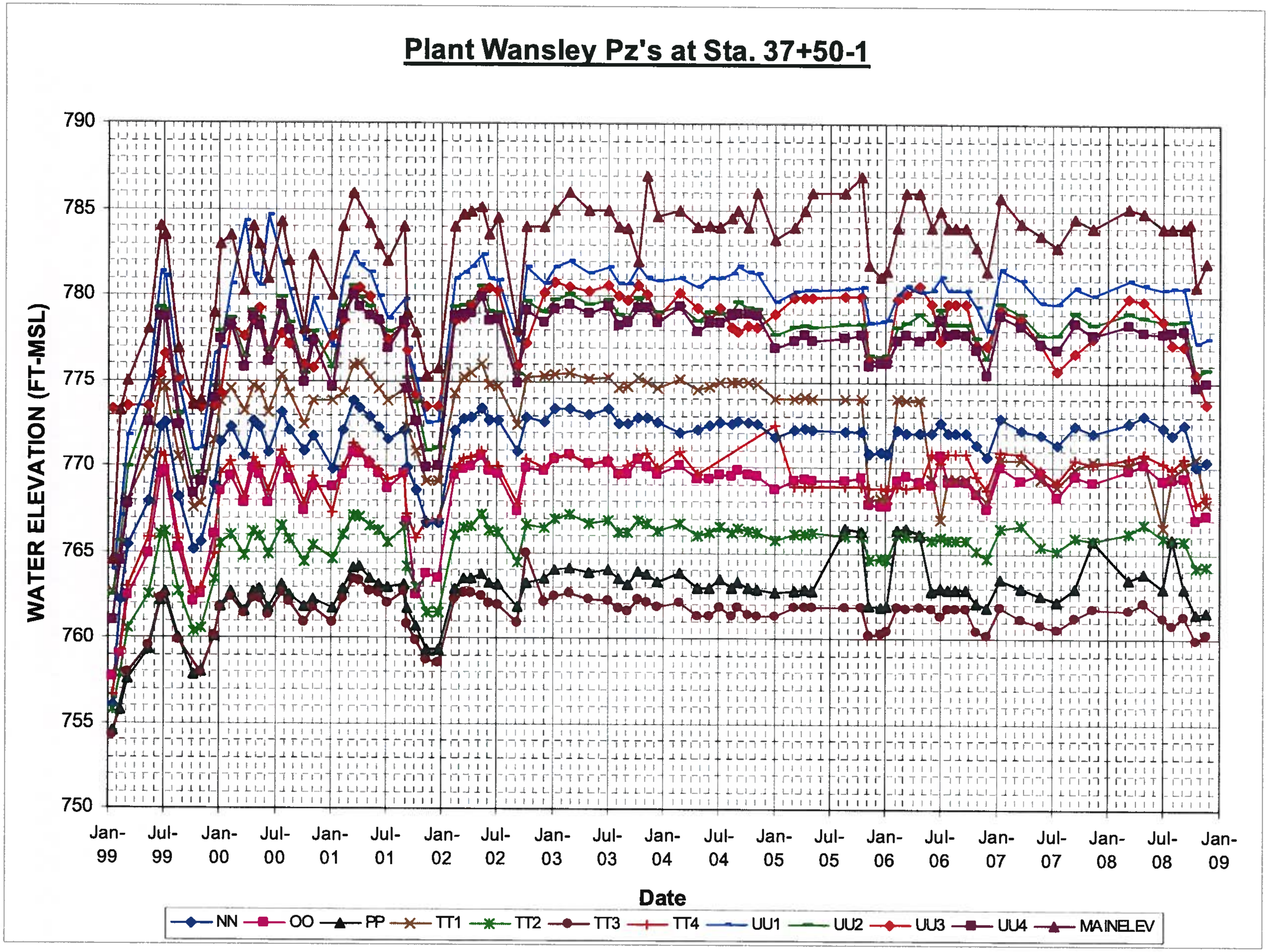

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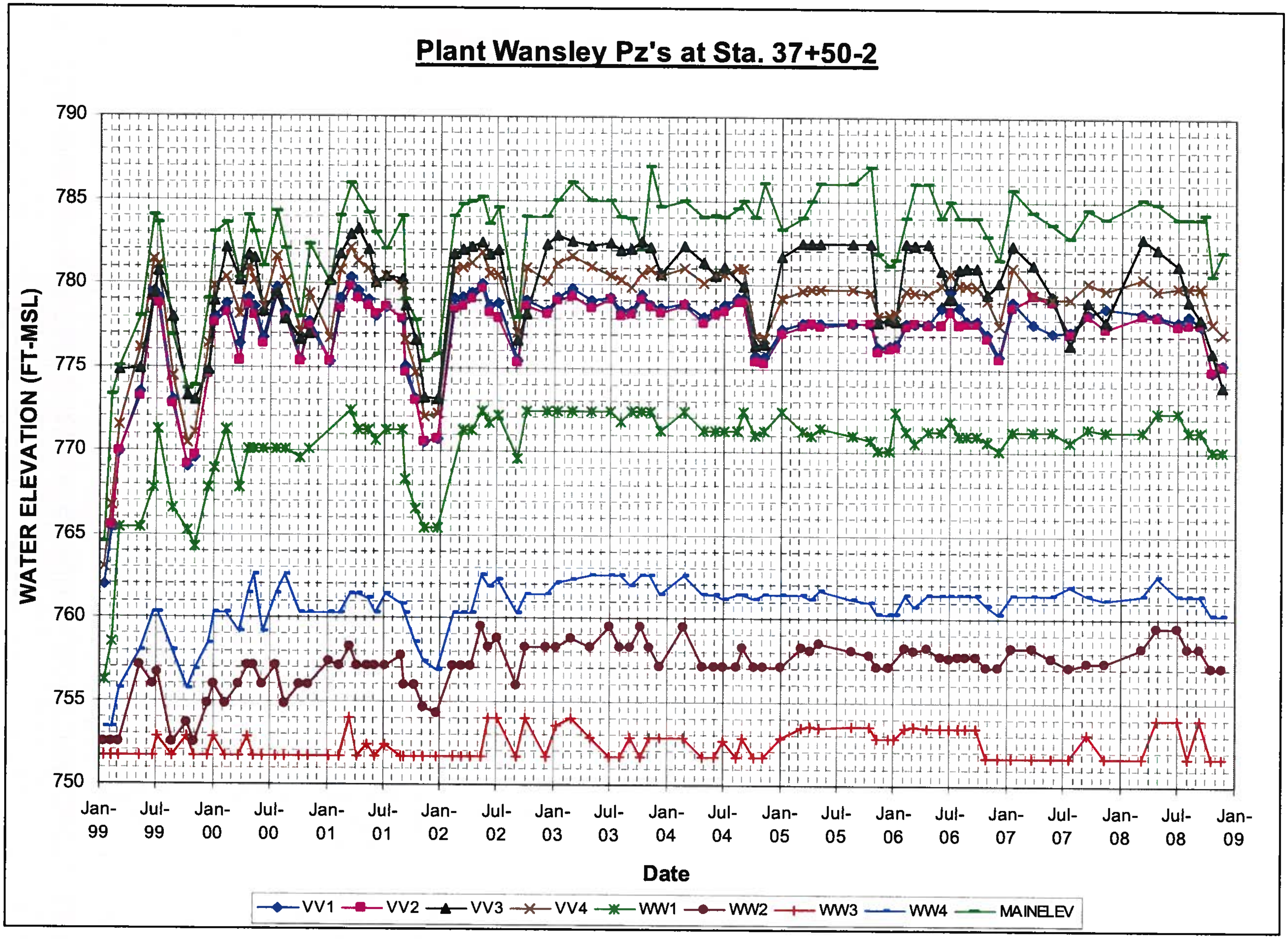

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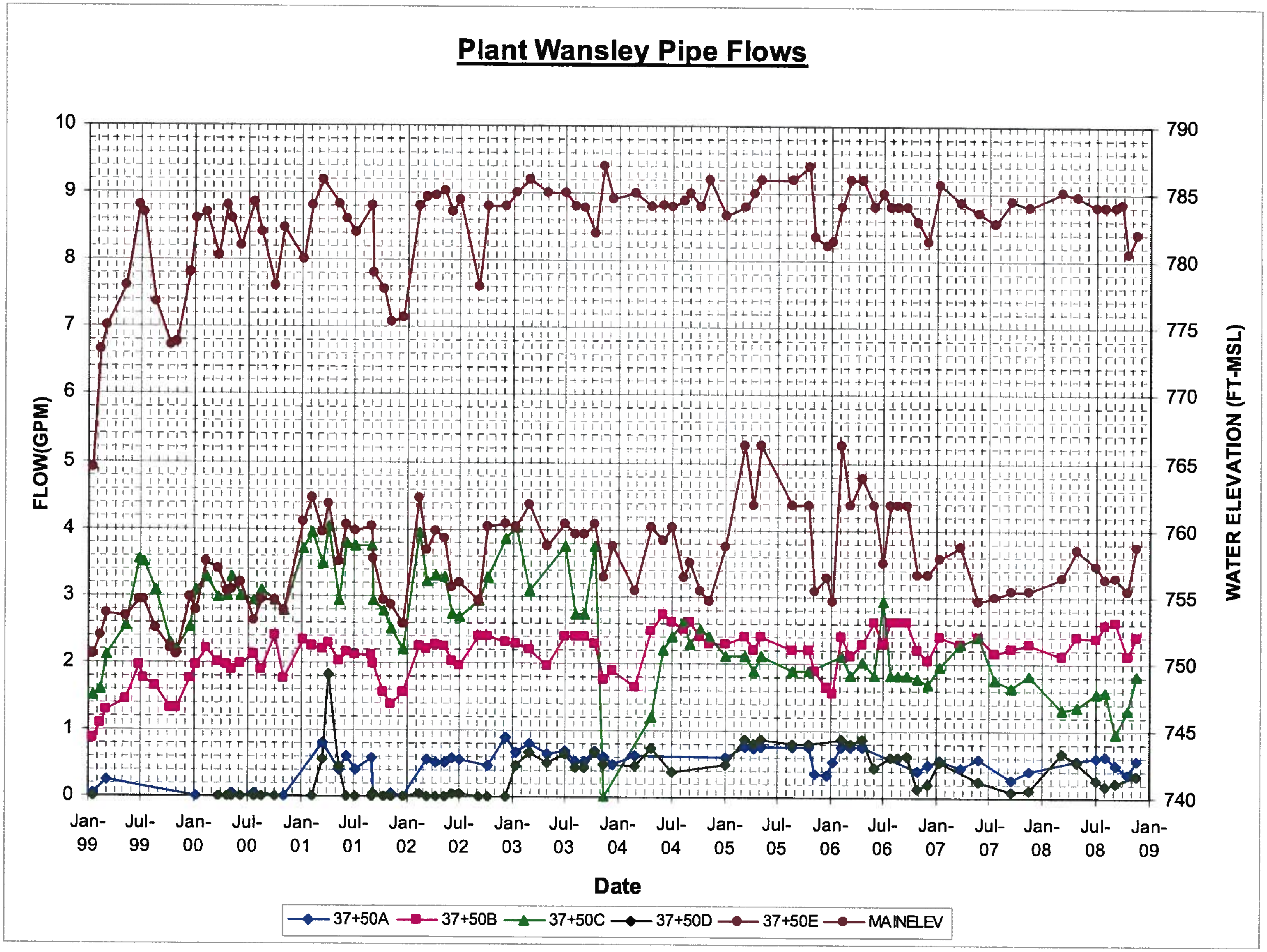

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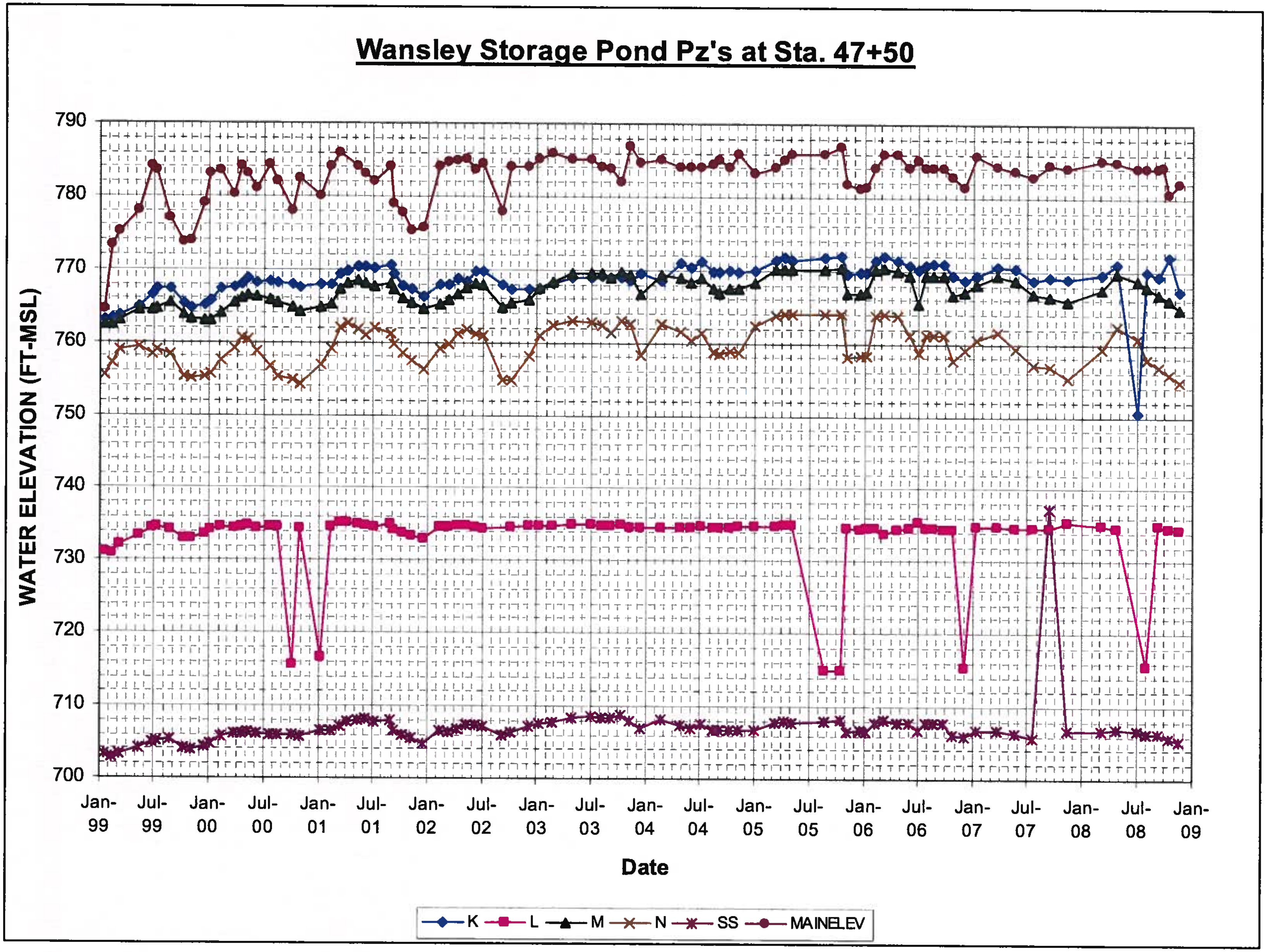

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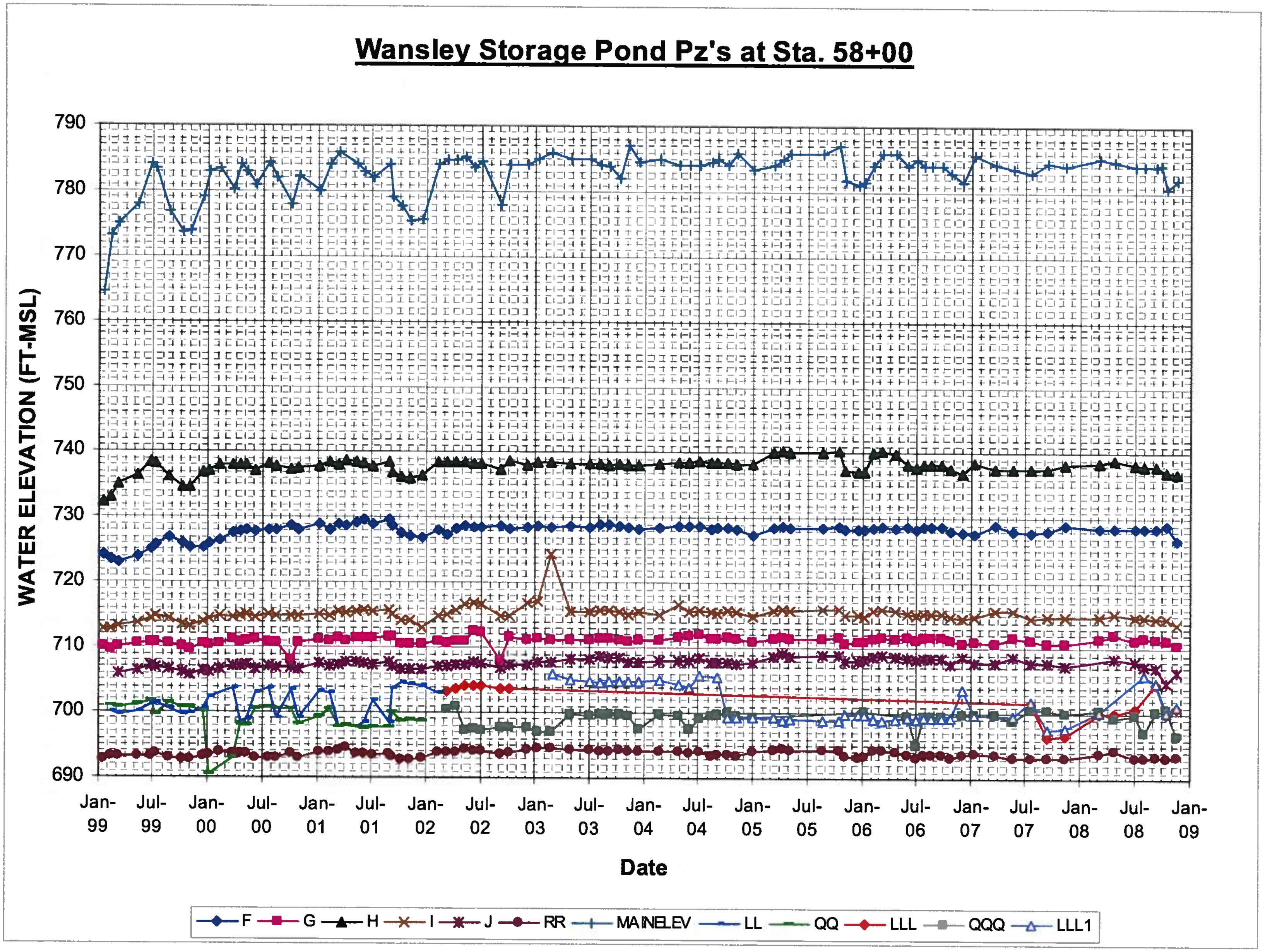

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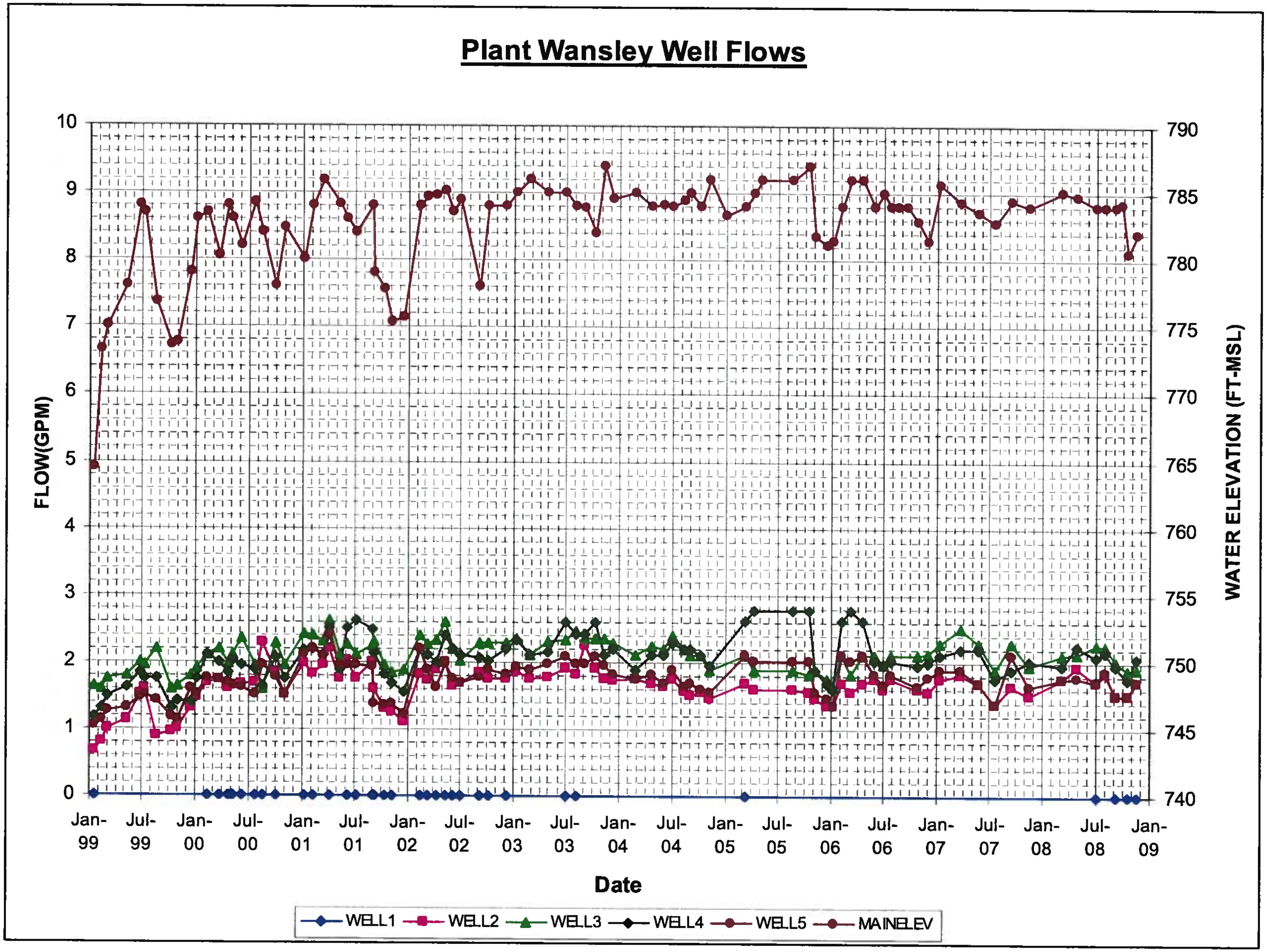

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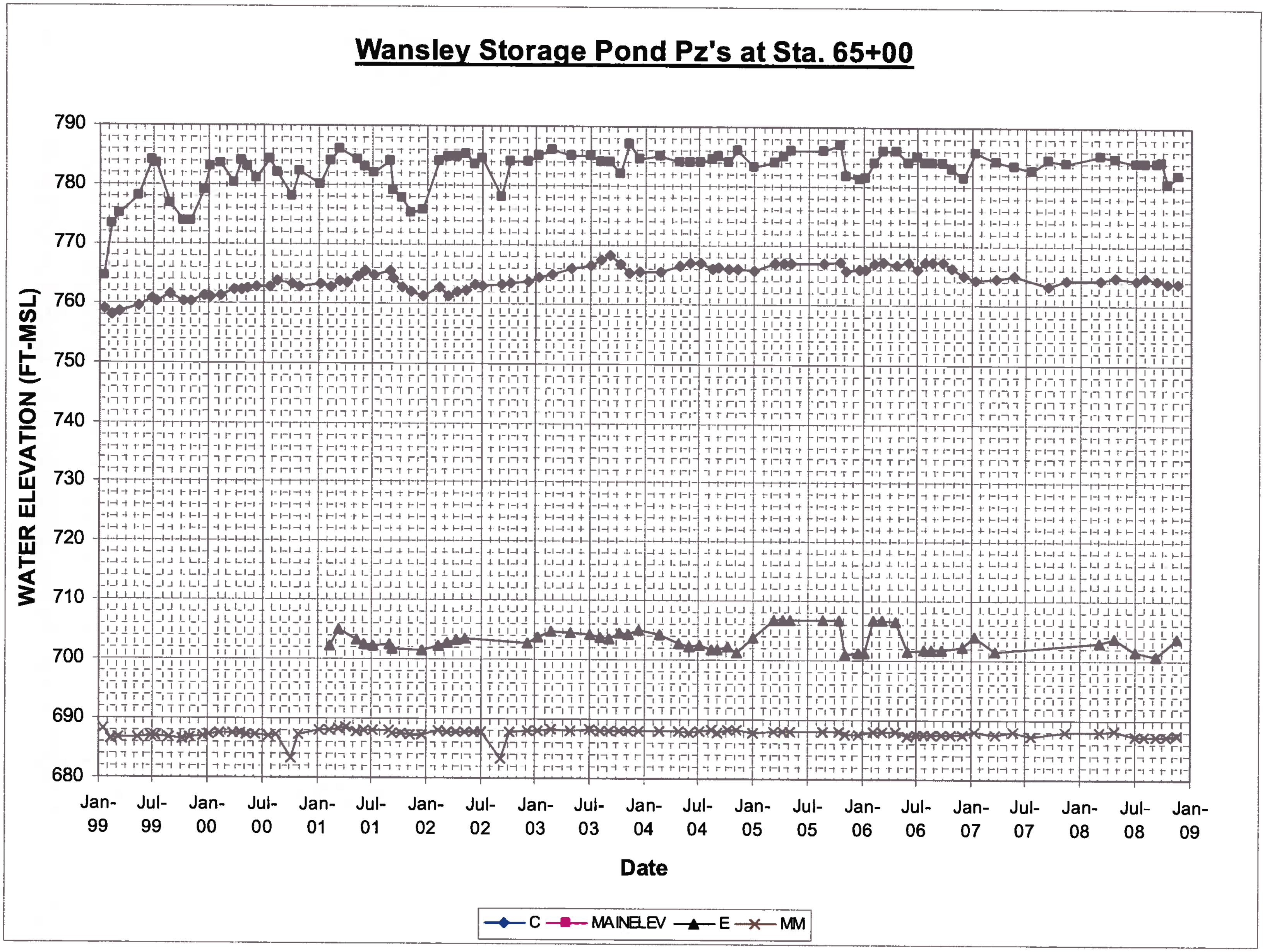

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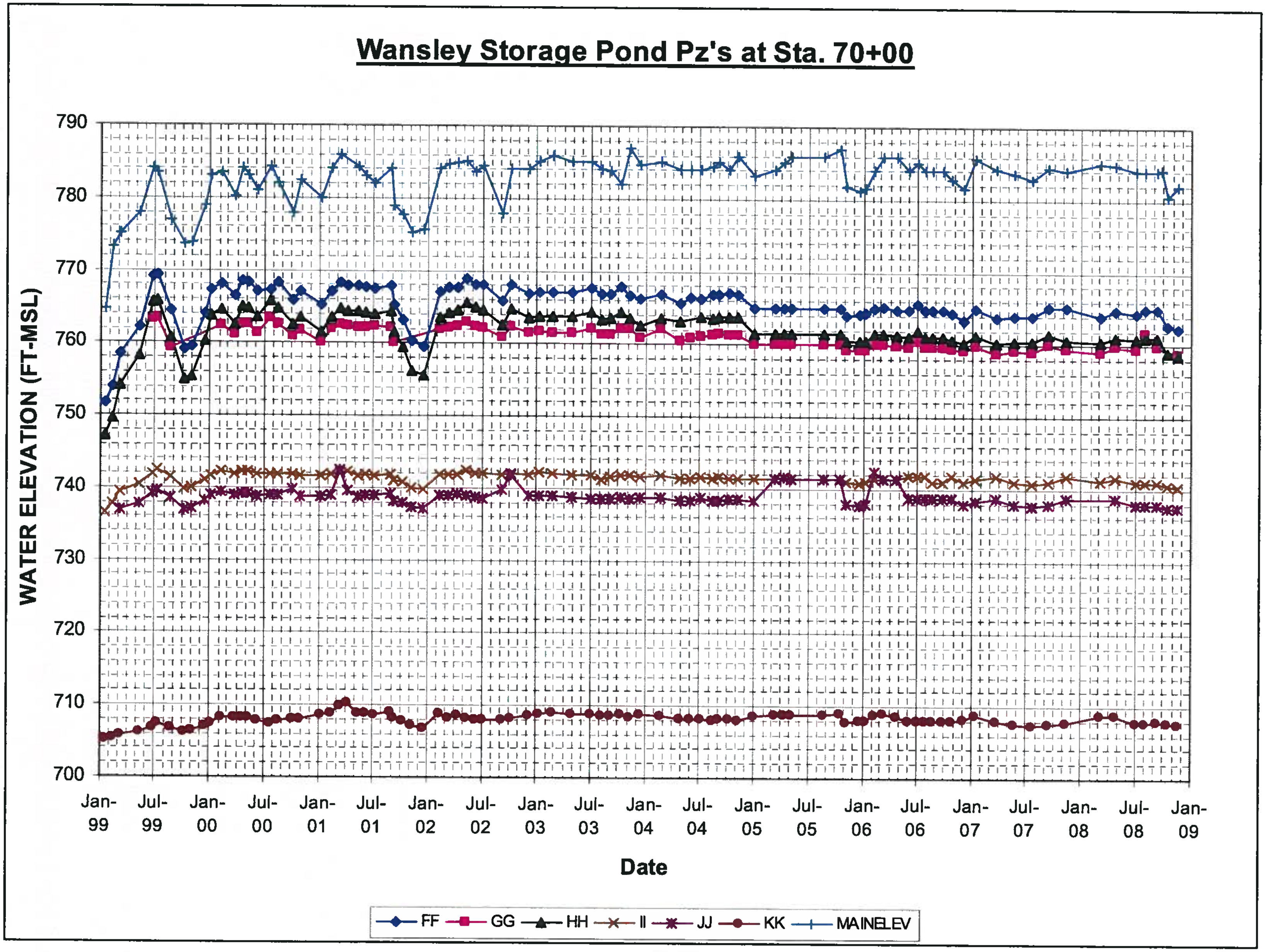

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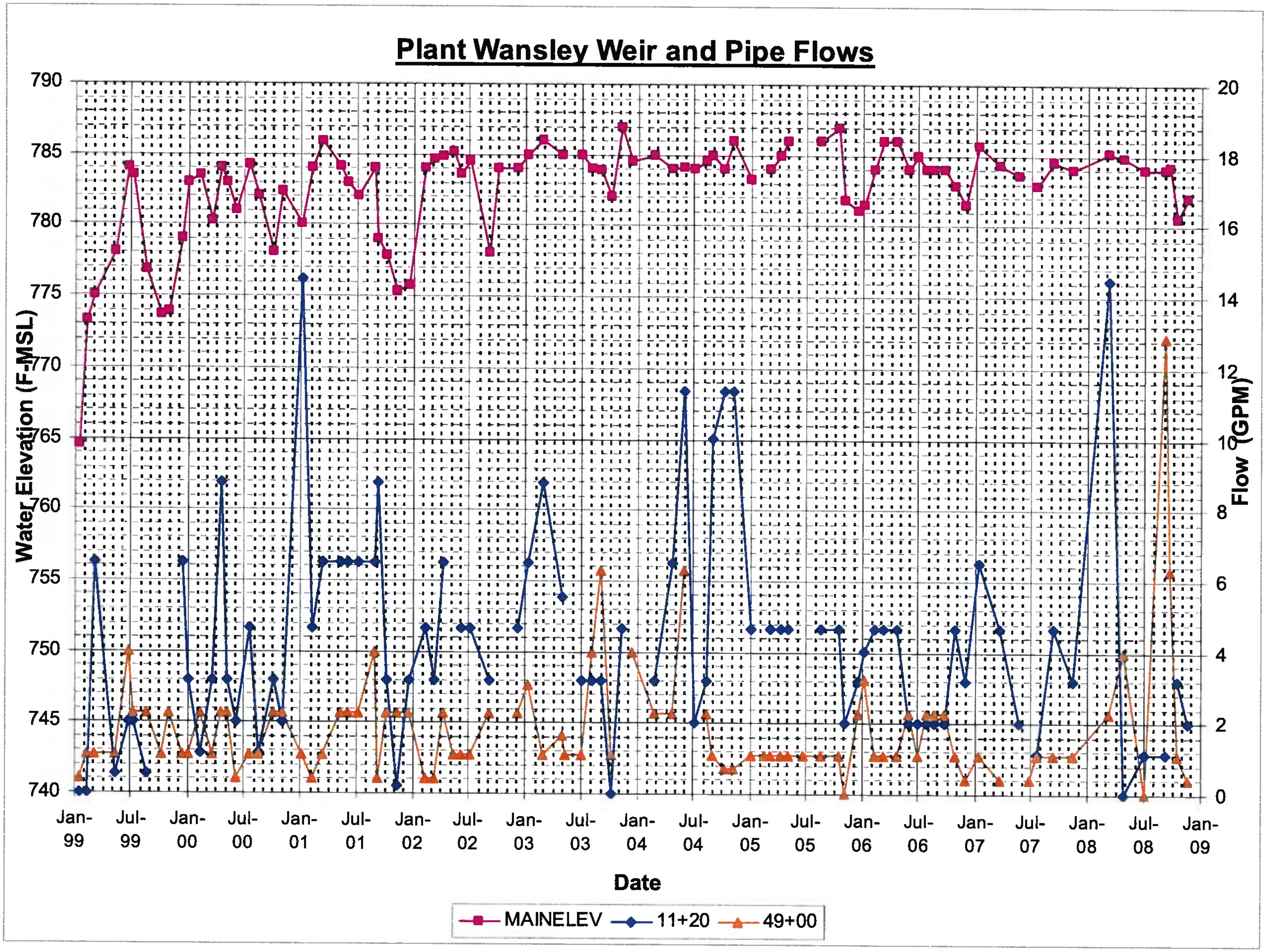

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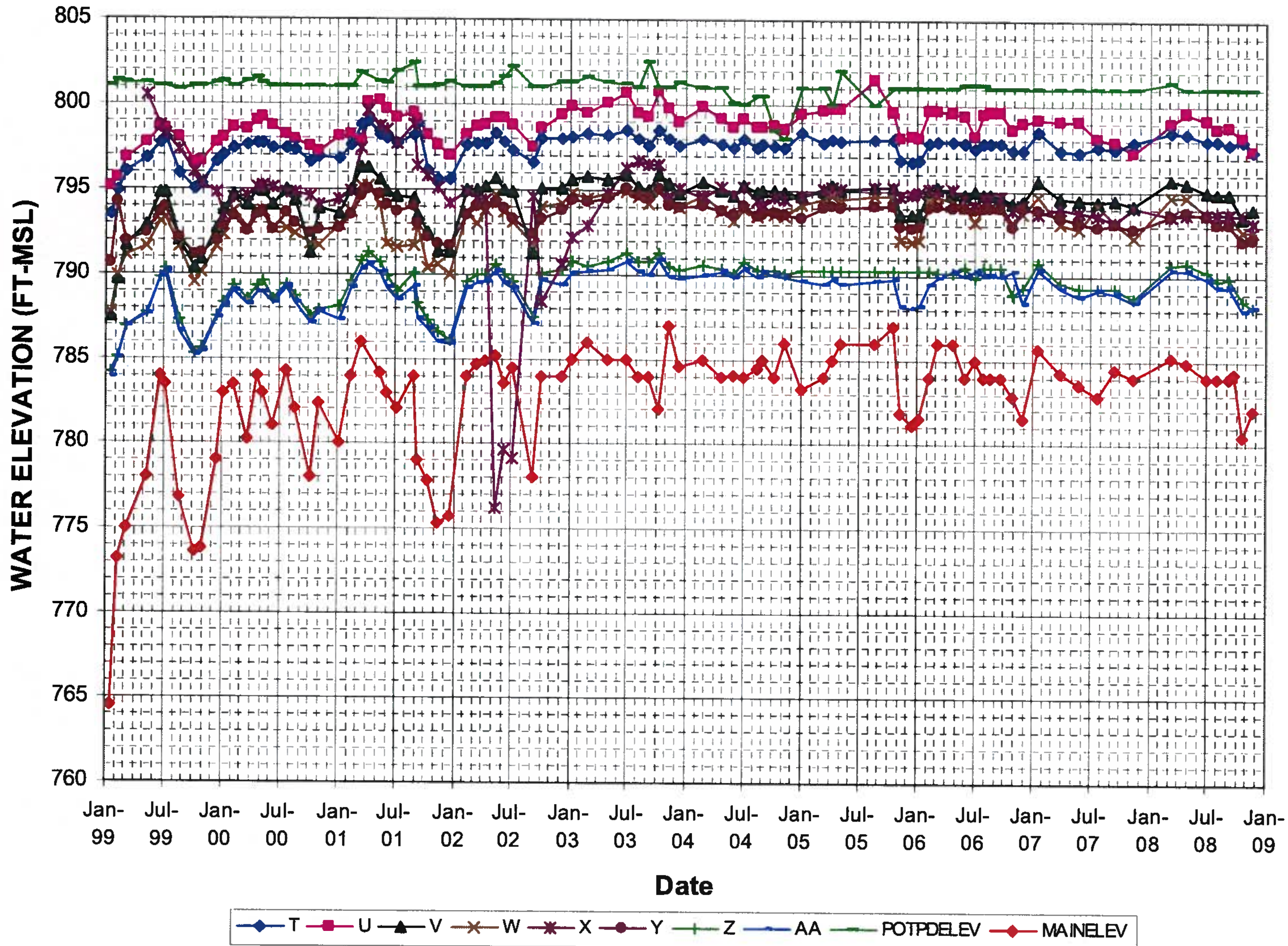
Plant Wansley Potable Pond Piezometers



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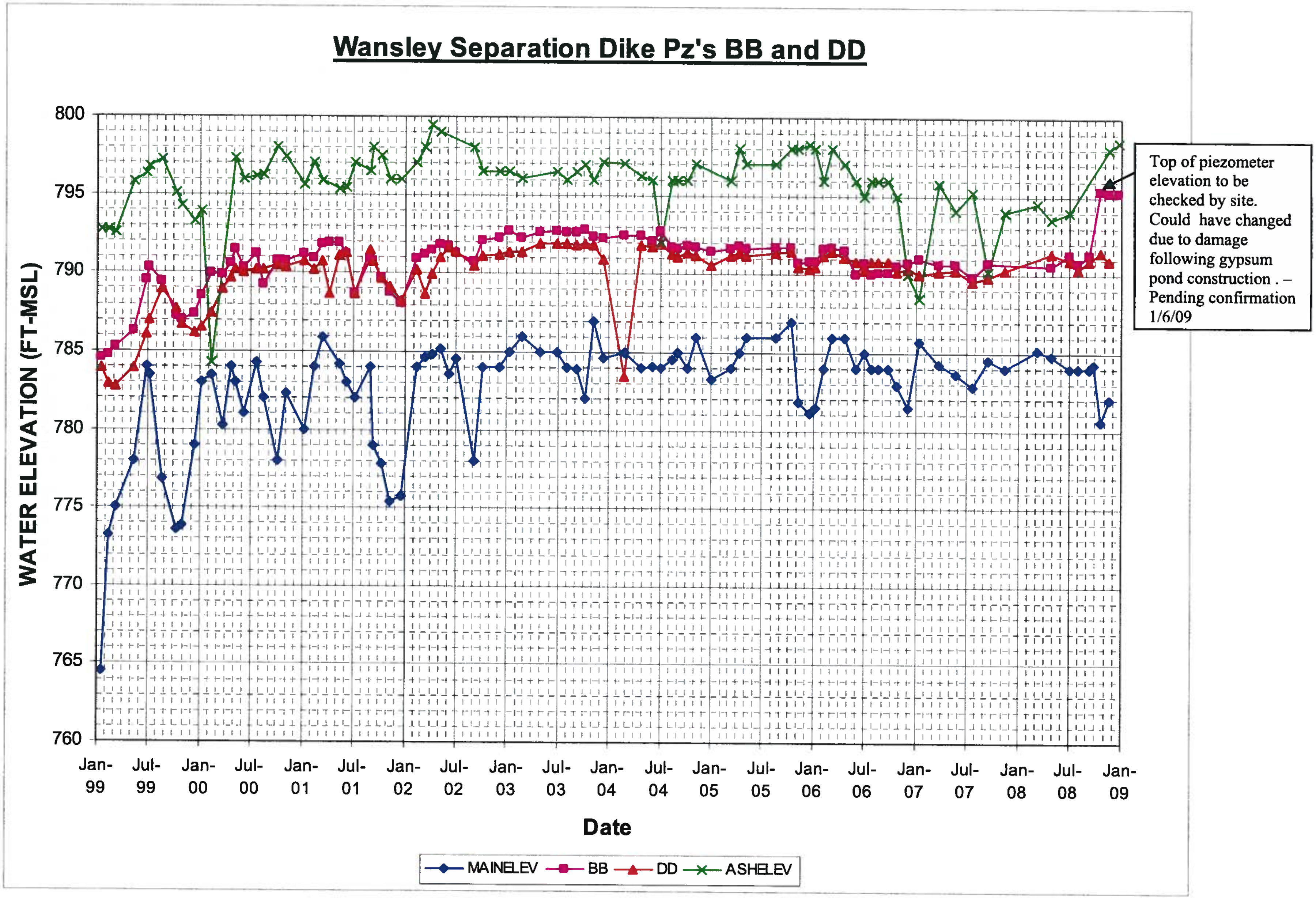

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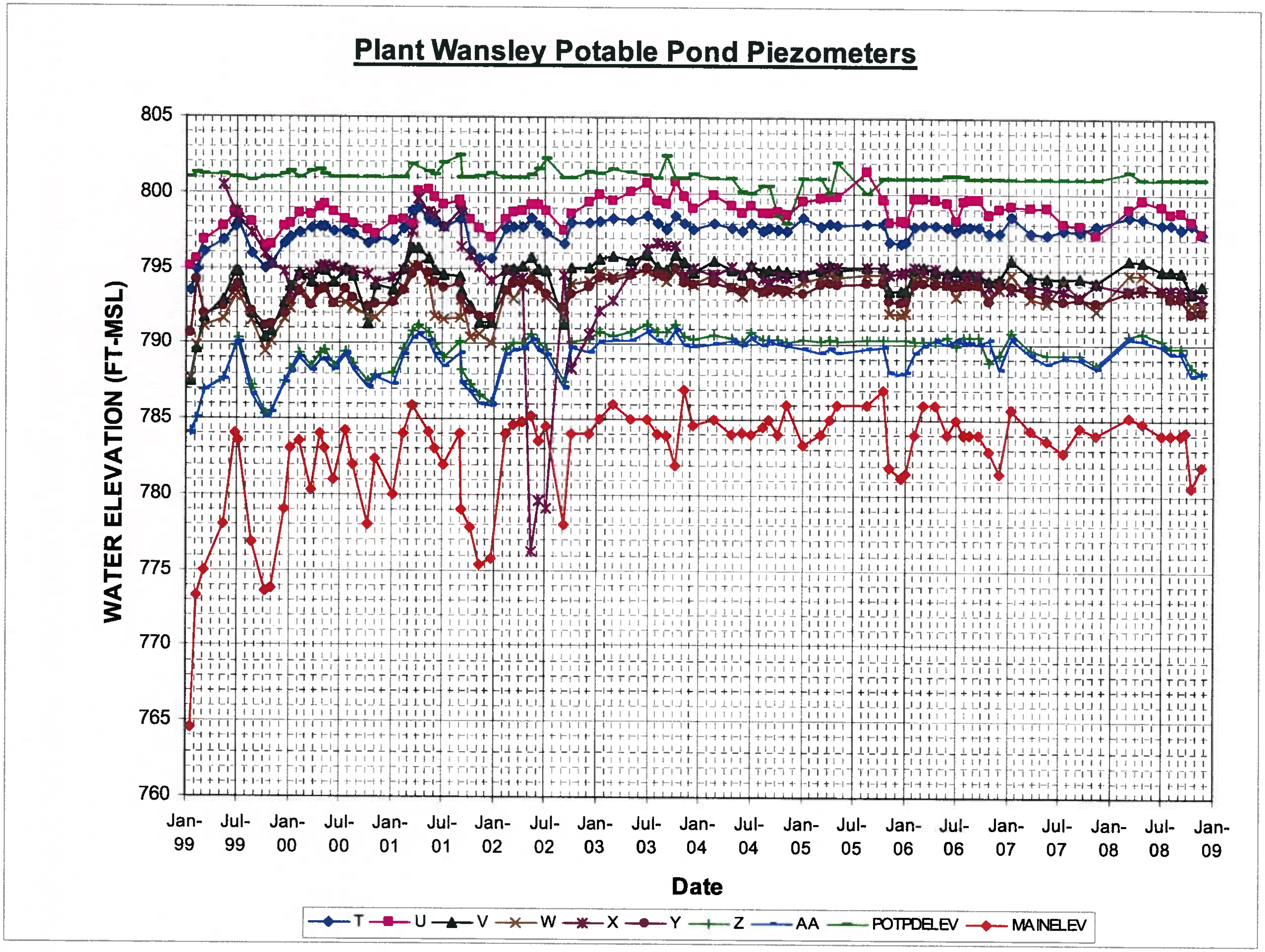

CONFIDENTIAL BUSINESS INFORMATION

Southern Company Generation
Bin 10193
241 Ralph McGill Boulevard NE
Atlanta, Georgia 30308-3374

Tel 404.506.7033

SOUTHERN COMPANY
Energy to Serve Your World™

September 9, 2008

PLANT WANSLEY
Dam Safety Surveillance
Quarterly Report
REA No. WN-08900

Mr. J. P. Heilbron
Plant Manager
Georgia Power Co.
Plant Wansley

Dear Mr. Heilbron:

Attached is the 3rd quarter 2008 report on Dam Safety Surveillance for Plant Wansley. The inspection of the main Storage Pond, Ash Pond Separator Dike, Potable Water Pond and Detention Pond was performed on July 22, 2008 by Hugh Armitage of the SCG Hydro Services Group. The inspections were coordinated with Mr. T. E. Wilson and Mr. N. I. Dean of Plant Wansley.

This report includes:

a) A review of the current instrumentation data;
b) A table summarizing visual observations made during the July 22, 2008 inspections. The table includes current recommendations and a status update for recommendations contained in the previous quarterly report. This report is supplemented with relevant site photographs; and
c) A copy of the current instrumentation data.

Should you have any questions, please contact Hugh Armitage at extension 8-506-7109.

Sincerely,

Joel Galt

Joel Galt
Hydro Services Supervisor

/hha

Attachments

WAN-API 055

CONFIDENTIAL BUSINESS INFORMATION

xc: **<u>Georgia Power Company</u>**

T. E. Wilson (w/ attachment)
N. I. Dean (w/ attachment)

<u>Southern Company Services</u>

D. E. Jones (w/attachment)
E. B. Allison (w/ attachment)
J. H. Crisler (w/ attachment)
F. J. Pryor (w/ attachment)

Hydro Service Wansley Notebook
Master File: WN-08900

Hydro Services Correspondence Notebook (w/attachments)

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CONFIDENTIAL BUSINESS INFORMATION

Instrumentation Data Review
3rd Quarter – 2008

A current assessment of instrumentation data reviewed up to the most recent readings of July 31, 2008 at Plant Wansley, is as follows.

Storage Pond:

Sta. 20+00: Piezometers are within their historic range. Both seem to track the pond level.

Sta 37+50: All of these piezometers appear to be in their historic range. All generally seem to track the pond level.

Sta 37+50 Pipe Flows: These flows appear to be in their historic ranges. These flow rates will continue to be monitored to assess if any trends develop.

Sta 47+50: With the exception of L, the other piezometers are within their historic range of measurement. Piezometer L experienced a sharp decline at the end of July 2008. However, a reading taken on September 8, 2008, indicated that the level is back to within it's historic range. Piezometer K re-bounded to its more historic value in July 2008.

It is recommended that the flow rate at the toe drain at Station 39+00 be obtained at monthly intervals rather than the current 6 month schedule. This information will be useful when modifications to the drains at 37+50 are carried out.

Sta 58+00: LLL1 has continued to display an increasing rise in the piezometric level in July 2008. This trend will continue to be monitored on a monthly basis. The other piezometers are generally within their historic range.

Relief Wells: The relief wells appear to be discharging in their historic range.

Sta 65+00: Piezometric levels at C, E and MM are within their historic ranges.

Sta 70+00: All of these piezometers are reading in their historic ranges.

Weir and Pipe Flows: Weir measurements at Sta. 49+00 have indicated a higher than normal flow the past two measurements (July 31 and September 8, 2008). It is recommended that site personnel continue to measure/monitor the flow rate at this weir on a weekly basis to see if this rate is sustained or reverts back to its historic range. Please keep SCG Hydro Services advised.

Separation Dike:

These piezometers are registering in their historic ranges. They exhibit a muted relationship with the storage pond elevation but little relationship to the ash pond elevation.

Potable Water Pond Dike:

These piezometers were registering in their historic ranges.

Plant Wansley

2008 - 3rd Quarter Inspection Summary

Dam Safety Surveillance

Date of Inspection:	July 22, 2008		**Inspection by:** H. Armitage
Weather:	Sunny to Mostly Cloudy	**CONFIDENTIAL BUSINESS INFORMATION**	
Temperature:	~75° to 91° F		
Rainfall (past 24 hrs):	0.74"		

SUMMARY

1. No major dam safety issues that would impact the safety of the structures were observed during this inspection. Recommendations to address current and previous inspection observations are summarized below. Generally, these recommendations are routine, on-going maintenance type activities.

ADDITIONAL COMMENTS

1. Plant personnel do a very good job of maintaining the embankment slopes at the different ponds at the site.
2. A copy of the Plant Wansley instrumentation data and review comments are attached.

CURRENT RECOMMENDATIONS - 3rd Quarter Inspection

No.	Location and Description	Photo No.
1	**Storage Pond - North Dike** - Warning sign needs to be re-mounted on pole	1
2	**Storage Pond & Potable Water Pond - General** - Localized bare spots on grass covered slopes need repair. Re-seeding and mulching required to prevent further surface erosion.	2, 6,16, 21
3	**Storage Pond - East and SE Dike - Concrete Lined Ditches & Toe Drains** - Localized vegetation growth and debris needs to be removed from ditches so that flow isn't restricted from approx. Sta.1+60 to 3+50 and Sta. 5+00 to 23+50. Vegetation removal required at outlet of Drain at Sta. 19+00. Drains at Sta 73+00 & 74+00 need to be cleaned of silt and debris.	4, 5 & 12
4	**Storage Pond Spillway** - Downstream of end of spillway requires trees and bushes to be cut down and cleared so that flows are not restricted during flow.	8
5	**Storage Pond - SE Dike (South End) and Potable Water Pond (U/S Slope)** - Trees and bushes need to be cut down at toe of slopes to mitigate root growth (seepage path) into embankment.	10 & 20
6	**Storage Pond - SE Dike- Lower Slope** - Rodent holes on lower slope near Sta. 67+60 and 68+40 need to be filled in.	14
7	**Storage Pond - SE Dike- Lower Slope** - Sta 37+50 - Wet area and small scarp on slope needs to be monitored for any signs of movement on a weekly basis.	15
8	**Storage Pond - SE Dike- Lower Slope - Sta 39+00.** Increase the flow measurement frequency at the drain at Sta 39+00 **to monthly** rather than the current 6 month schedule. This information will be useful when modifications to the drains at 37+50 are carried out.	n/a
9	**Separator Dike - Upstream & Downstream Slopes -** Localized erosion rills/gullies need to be repaired to mitigate further erosion.	17 & 18
10	**Potable Water Pond Spillway** - Upstream end of spillway. Approach channel) requires trees and bushes to be cut down and cleared so that flows are not restricted.	22
11	**Detention Pond - Downstream Slope -** Small bushes and trees on slope need to be cut down. Grass on slope needs to be cut.	24

PREVIOUS RECOMMENDATIONS - 1st Quarter Inspection

No.	Description & Action	Location	Status Open/Closed
1	**General Comment & Sta 1+00 to 8+00** - Remove accumulated vegetation from within concrete lined channels - **Pending Completion - See Current Reco. 3 above - See photos 4, 5 & 12).**	Storage Pond	**Open**
2	**Various Locations** -Cracks in concrete lined ditches should be cleaned out and caulked - **Pending completion**	Storage Pond	**Open**
3	**Sta. 75+00, 76+00 & 77+00** - Clean out end of finger drains - **Completed.**	Storage Pond	**Closed**
4	**Multiple Locations on slopes** -Fill in animal burrows - Rodent holes observed in 1st Qtr filled or could not be found during current inspection - **See Current Reco. 6 above - See Photo 14).**	Storage Pond	**Closed**

Plant Wansley

2008 - 3rd Quarter Inspection Summary

PREVIOUS RECOMMENDATIONS - 1st Quarter Inspection - **Continued**

No.	Description & Action	Location	Status Open/Closed
5	Sta 73+00 & 74+00 - Bare spots on slope need to be re-seeded. - **Some area have become grown over with grass cover satisfactorily. See Current Reco. 2 above. (photos 2, 6 ,16 and 20)**	Storage Pond	**Closed**
6	Sta. 66+00, 70+00 & 72+50 - Repair end of damaged toe drains - **The ends have been fixed.**	Storage Pond	**Closed**
7	**Sta. 62+50 - near toe of slope** - Bare spots on slope need to be reseeded sand mulched. **See Current Reco. 2 above (Photos 2, 6, 16, & 20)**	Storage Pond	**Open**
8	**Sta 62+00** - Clean Silt behind Weir - **Cleaned out**	Storage Pond	**Closed**
9	**Sta 19+00** - Clean out vegetation of outlet of toe drain - **Pending completion**	Storage Pond	**Open**
10	**Sta 37+00** - Undermining at end of concrete channel - **Pending completion**	Storage Pond	**Open**
11	**Separator Dike -** Runoff erosion at crest of upstream slope. **- Pending completion - See Current Rec. 9 - See photos 17 & 18)**	Separator Dike	**Open**
12	**Localized bare spots on slope** to be re-seeded (or covered with small rip-rap). **Pending completion (See Current Reco. 2 above)**	Potable Water Pond	**Open**
13	**Upstream Toe of Slope-** Vegetation needs to be cut down **- Pending completion - See Current Reco. 5 above - See photos 5 &10)**	Potable Water Pond	**Open**

CONFIDENTIAL BUSINESS INFORMATION

Plant Wansley

2008 - 3rd Quarter Inspection Summary

OBSERVATIONS FOR 3rd QUARTER INSPECTION

I - Storage Pond - North Dike - (Road to Recreational Area)		Storage Pond Elev. 783.6'
	Observations - Comments	Photograph No.
1. Upstream Slope		
a. Condition	*Grass covered - Overall condition is good. No evidence of instability.*	*n/a*
b. Erosion/Sloughing	*Yes ( ) No (X) - No beaching observed.*	*n/a*
2. Crest		
a. Condition	*Gravel surfaced - looks good. No distress or potholes in road surface observed. Warning sign needs to be re-mounted onto pole.*	*1*
3. Downstream Slope		
a. Condition	*Grass covered - Overall condition is good. No evidence of instability. Localized bare spots on slope where re-seeding/mulching required to prevent further erosion.*	2
b. Visible Seepage or Wet Spots	*Yes ( ) No (X) - No seepage or wet spots observed on slope.*	*n/a*
c. Erosion or Sloughing	*Yes ( ) No (X)*	*n/a*

II - Storage Pond - East Dike (North Dike to Spillway)		
	Observations - Comments	Photograph No.
1. Upstream Slope		
a. Condition	*Rip-rap on upstream face looks satisfactory and no dam safety issues observed. - No beaching observed. Rip Rap varies in size.*	*n/a*
b. Erosion/Sloughing	*Yes ( ) No (X)*	*n/a*
2. Crest		
a. Condition	*Gravel surfaced - looks good. No distress or potholes in road surface observed.*	*n/a*
3. Downstream Slope		
a. Condition	*Grass covered - Overall - looks good. Grass cutting in progress. Localized bare spots need to be re-seeded & mulched (photo 6 - Sta 11+20)*	3 & 6
b. Visible Seepage or Wet Spots	*Yes ( ) No (X) - No seepage or wet spots observed on slope.*	*n/a*
c. Erosion or Sloughing	*Yes ( ) No (X)*	*n/a*
d. Concrete-Lined Drainage Ditch	*Concrete in good condition. Localized vegetation growth and debris needs to be removed from ditches so that flow isn't restricted from approx. Sta.1+60 to 3+50 and Sta. 5+00 to 23+50.*	4 & 5
e. Emergency Aggregate Stockpiles	*Yes (X) No ( )*	7

III - Storage Pond - Spillway		
	Observations - Comments	Photograph No.
1. Spillway Abutment/Deck		
a. Condition	*Concrete condition is satisfactory. Per Ga SDP letter 4-3-08, crack in left abutment needs to be repaired, just downstream of the gate needs to be fixed. SCG Hydro Services to review during next site inspection.*	*n/a*
2. Spillway Floor		
a. Condition	*Concrete condition is satisfactory*	*n/a*
3. Spillway Walls		
a. Condition	*Concrete condition is satisfactory*	*n/a*
4. Downstream of Spillway (Channel)		
a. Condition	*Vegetation downstream of spillway needs to be cleared to prevent blockage/restriction of flow capacity of channel*	8

CONFIDENTIAL BUSINESS INFORMATION

Plant Wansley

2008 - 3rd Quarter Inspection Summary

IV - Storage Pond - Southeast Dike (Spillway to Separator Dike)

	Observations - Comments	Photograph No.
1. Upstream Slope		
a. Condition	*Rip-rap (size varies) on upstream slope looks acceptable. No instability or beaching evident. (SCG to assess condition per GA EPD-SDP letter 4/3/08). Bushes and trees at toe of slope need to be cut down to prevent potential instability issues at toe of slope (see Photo 10)*	**9, 10**
b. Erosion or Sloughing	*Yes ( ) No (X)*	*n/a*
2. Crest		
a. Condition	*Gravel surfaced/Railway tracks - No distress or potholes observed in road surface .*	*n/a*
3. Downstream Slope		
3a - Upper Slope		
a. Condition	*Grass covered - looks satisfactory. No evidence of instability observed.*	**11**
b. Visible Seepage or Wet Spots	*Yes ( ) No (X) - No seepage or wet spots observed on slope.*	*n/a*
c. Erosion or Sloughing	*Yes ( ) No (X) - No evidence of instability.*	*n/a*
3b - Mid-Slope Road & Drainage Ditch		
a. Road Condition	*Gravel surfaced - looks good. No distress or potholes in road surface observed.*	*n/a*
b. Concrete-Lined Drainage Ditch	*Concrete in good condition. Vegetation in ditch/around drain at Sta. 73+00 needs to be removed so that flow isn't restricted. Localized areas where grass growing and silt has built up on bottom of drainage ditch. Removal of vegetation and silt required*	**12**
3c - Middle Slope		
a. Condition	*Grass covered. Satisfactory. No visual evidence of instability. Previous rodent hole filled in.*	**13**
b. Visible Seepage or Wet Spots	*Yes ( ) No (X)*	*n/a*
c. Erosion or Sloughing	*Yes ( ) No (X)*	*n/a*
3d. Lower Road & Drainage Ditch		
a. Road Condition	*Gravel surfaced - looks good. No distress or potholes in road surface observed.*	*n/a*
b. Concrete-Lined Drainage Ditch	*Concrete condition is acceptable*	*n/a*
3e - Lower Slope		
a. Condition	*Grass covered - Overall - looks good. Grass requires cutting but this did not affect satisfactory visual assessment. Several rodent holes at Stations 67+60 (near headwall) and 68+40 - see photo 14.*	**14**
b. Visible Seepage or Wet Spots	*Yes (X) No ( ) - Wet spot observed at ground surface on lower slope at Sta 37+50. A localized area where a minor slough was observed. Plant personnel were advised of observation and they will routinely monitor condition.*	**15**
c. Erosion or Sloughing	*Yes ( ) No (X) - No evidence of instability. Localized bare spots in grass cover adjacent to drainage ditch and other localized other areas.*	**16**
d. Concrete Drainage Ditch	*Concrete condition is good. Vegetation in ditch at Sta. 73+00 needs to be removed so that flow ditch is not restricted.*	*n/a*
e. Emergency Aggregate Stockpiles	*Yes (X) No ( )*	*n/a*
3f - Lower Concrete-Lined Drainage Ditch		
a. Condition	*Condition is acceptable*	*n/a*

CONFIDENTIAL BUSINESS INFORMATION

Plant Wansley

2008 - 3rd Quarter Inspection Summary

V - Storage Pond/Ash Pond - Separator Dike		Pond Elev. 783.6'
	Observations- Comments	**Photograph No.**
1. Upstream Slope (Storage Pond)		
a. Condition	*Rip-Rap - Looks satisfactory. Size of stone on surface of slope varies. No evidence of instability.*	*n/a*
b. Erosion or Sloughing	*Yes (X) No ( ) - Localized, shallow erosion rills/gullies need to be repaired (filled in with stone/rip-rap).*	17
2. Crest		
a. Condition	*Gravel surfaced and in good condition. No distress or potholes observed on road surface. Clean up of mud on road from construction vehicles required.*	*n/a*
3. Downstream Slope (Ash Pond)		
3a. North End		
a. Condition	*Rip-Rap - Looks satisfactory. Size of stone on surface of slope varies. No evidence of instability*	*n/a*
b. Erosion or Sloughing	*Yes (X) No ( ) - Localized, shallow erosion rills/gullies need to be repaired (filled in with stone/rip-rap).*	18
3b. South End - (No longer applicable due to Gypsum Pond/berm construction)		
a. Condition	*N/A - Recently constructed gypsum storage pond dike now abuts the south end of the separator dike.*	19

VI- Potable Water Pond		Potable Water Pond Elev. 806'
	Observations - Comments	**Photograph No.**
1. Upstream Dike Slope (Potable Water)		
a. Condition	*Rip-rap on upstream face looks good. Small trees and bushes at toe need to be cut down to maintain integrity of embankment toe.*	20
b. Erosion or Sloughing	*Yes (X) No ( ) - Localized, minor surface erosion. Re-seeding and mulching to reestablish vegetative growth.*	21
c. Concrete Drainage Ditch	*Concrete in good condition. No obstructions in channel observed.*	*n/a*
2. Crest		
a. Condition	*Gravel surfaced - looks good. No distress or potholes in road surface observed.*	*n/a*
3. Downstream Dike Slope (Storage Pond)		
a. Condition	*Grass covered - Overall - looks good. Localized, minor surface erosion. Re-seeding and mulching to reestablish vegetative growth.*	*n/a*
b. Visible Seepage or Wet Spots	*Yes ( ) No (X) - No seepage or wet spots observed on slope.*	*n/a*
c. Erosion or Sloughing	*Yes (X) No ( ) - Localized, minor surface erosion. Re-seeding and mulching to reestablish vegetative growth.*	*n/a*
d. Concrete Drainage Ditch	*Yes ( ) No (X) - Condition of concrete satisfactory. and no further erosion noticed & are stable at this time.*	*n/a*
4. Spillway Approach Channel		
a. Condition - General	*Small bushes/trees to be removed to prevent restriction of flow in channel.*	22
b. Condition - Rip-Rap	*Good. No evidence of instability.*	*n/a*
c. Condition - Concrete	*Good.*	*n/a*
5. Spillway Structure - Abutments/Deck		
a. Condition	*Concrete in good condition.*	*n/a*
6 . Spillway Structure - Floor		
a. Condition	*Concrete in good condition*	*n/a*
7 . Spillway Structure - Walls		
a. Condition	*Concrete - Good*	*n/a*

Plant Wansley

2008 - 3rd Quarter Inspection Summary

VII - Detention Pond

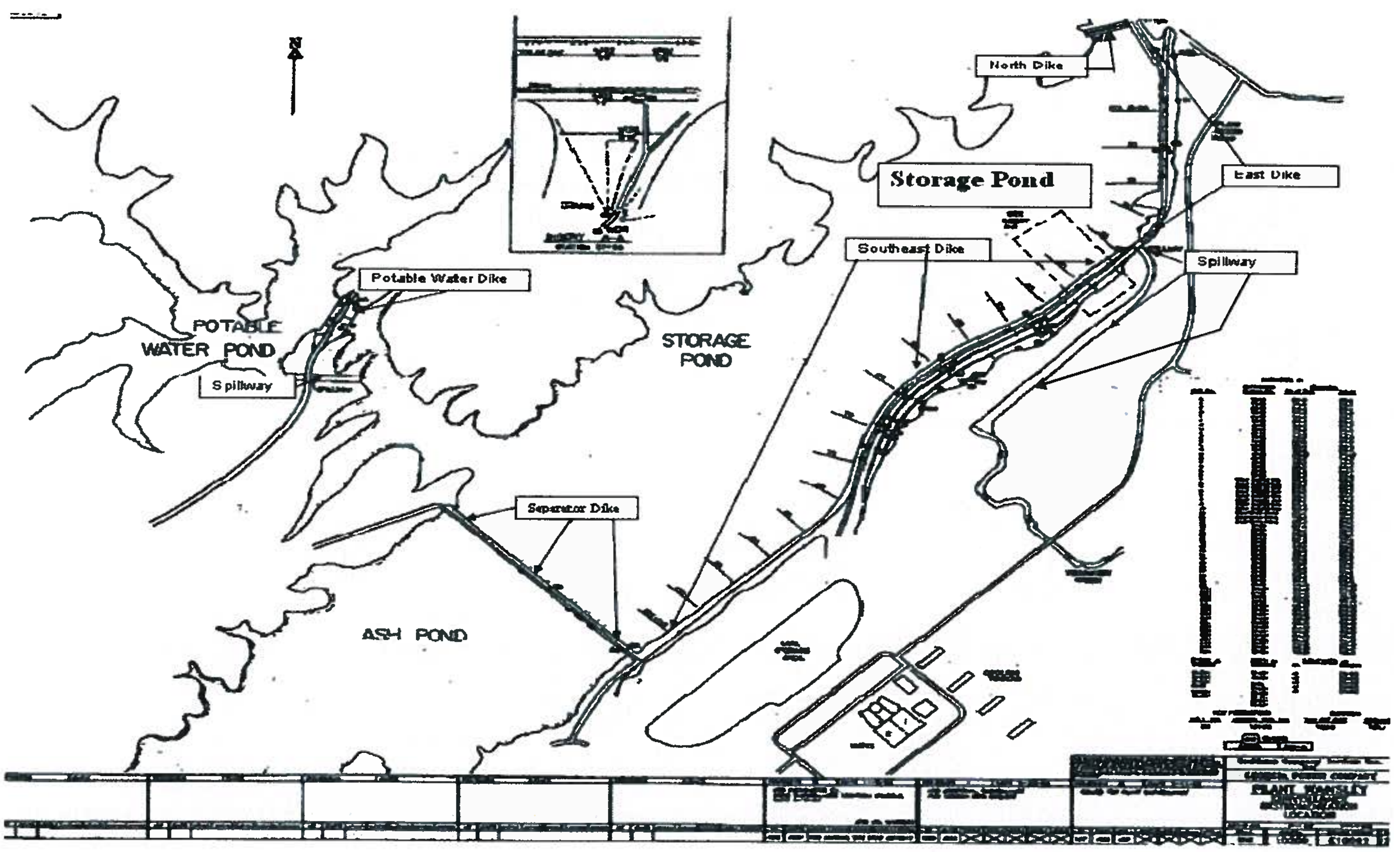
Observations- Comments		Photograph No.
1. Upstream Dike Slope		
a. Condition	*Rip-rap in good condition. Pond being dredged during visit. Pond level below normal level.*	23
b. Erosion or Sloughing	*Yes ( ) No (X) - Slope looks satisfactory, no visible instability observed*	*n/a*
2. Crest		
a. Condition	*Gravel surfaced and in good condition. No distress or potholes observed.*	*n/a*
3. Downstream Dike Slope		
a. Condition	*Well grass-covered. Needs cutting but this did not prevent good visual examination. Small bushes/trees need to be removed. No visible evidence or instability observed*	24
b. Visible Seepage or Wet Spots	*Yes ( ) No (X)*	*n/a*
c. Erosion or Sloughing	*Yes ( ) No (X)*	*n/a*
4. Concrete Spillway Channel		
a. Concrete Condition	*Concrete is in good condition*	*n/a*
5.Spillway Outlet Channel		
a. Condition	*Rip-rap at outfall and outlet channel is in good condition. No issues observed.*	25

CONFIDENTIAL BUSINESS INFORMATION

Hugh H. Armitage - Sr. Engineer

SCG - Hydro Services

Location Plan
Storage Pond and Potable Water Pond



Plant Wansley

2008 - 3rd Quarter Inspection Photographs - July 22, 2008

(See accompanying report attached)

Photo No.	Description	
1	Storage Pond - N Dike - Near Rec. Center Entrance - Warning sign needs to be re-mounted.	
2	Storage Pond - N. Dike -Localized bare spots in grass cover. Re-establish grass to prevent erosion.	
3	Storage Pond - E. Dike - Downstream slope in good condition	
4	Storage Pond - E. Dike - D/S slope - Toe Ditch - Localized vegetation and debris needs removal so that flow isn't restricted. (Sta.1+60 to 3+50).	

CONFIDENTIAL BUSINESS INFORMATION

Plant Wansley

2008 - 3rd Quarter Inspection Photographs - July 22, 2008

(See accompanying report attached)

Photo No.	Description	
5	Storage Pond - East Dike - Concrete lined toe ditches - Vegetation/Debris needs to be cleaned out of ditch (Approx Sta. 5+00 to 23+50)	
6	'Storage Pond - East Dike - Bare spots on slope to be re-seeded to prevent further erosion. Sta 11+20	
7	Storage Pond - East Dike - Emergency Stockpiles of coarse and fine aggregate	
8	Storage Pond -Spillway - Vegetation downstream of end of spillway needs to be cleared.	

CONFIDENTIAL BUSINESS INFORMATION

Plant Wansley

2008 - 3rd Quarter Inspection Photographs - July 22, 2008

(See accompanying report attached)

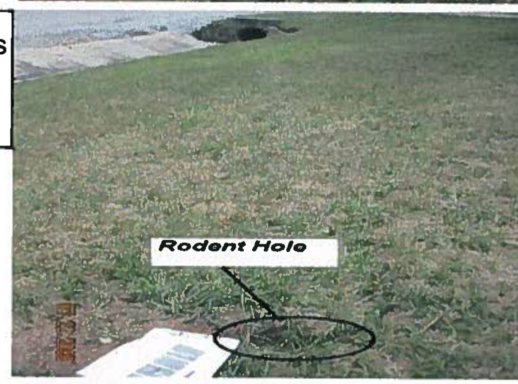
Photo No.	Description	
9	Storage Pond - Southeast Dike - Upstream Slope - Rip-rap varies in size from gravel size to 18"-24", occasional 24" to 36" nominal size. Per GA Safe Dams letter of 4-3-08, this will be addressed by SCG Hydro Services.	
10	Storage Pond - Southeast Dike - South end near Separator Dike. Bushes and trees need to be removed at toe of slope.	
11	Storage Pond - Southeast Dike - Downstream (D/S) - Upper Slope looks satisfactory	
12	Storage Pond - Southeast Dike- D/S -Silt and debris removal required at outlet of Drain at Sta. 73+00 and 74+00	

CONFIDENTIAL BUSINESS INFORMATION

Plant Wansley

2008 - 3rd Quarter Inspection Photographs - July 22, 2008

(See accompanying report attached)

Photo No.	Description	
13	Storage Pond - Southeast Dike D/S - Previous rodent hole has been filled in.	
14	Storage Pond - Southeast Dike D/S - Rodent Holes on lower slope at approx. Sta 67+60 (near headwall) and Sta 68+40 need to be filled	
15	Storage Pond - Southeast Dike D/S - Sta. 37+50 - Ground surface was damp/wet. A localized area was observed where minor scarp indicating surface movement may have occurred. This area to be monitored routinely by plant for evident of on-going movement.	
16	Storage Pond - Southeast Dike D/S - Localized bare spots on lower slope that need to be reseeded/mulched to prevent further erosion.	

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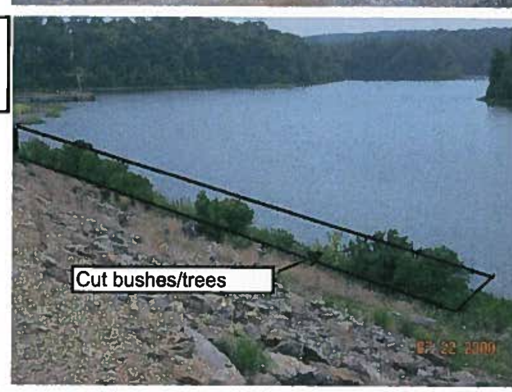
Plant Wansley

2008 - 3rd Quarter Inspection Photographs - July 22, 2008

(See accompanying report attached)

Photo No.	Description	
17	Storage/Ash Pond - Separator Dike - Upstream Slope. No evidence of instabilty or distress. Minor erosion rills/gullies need to be filled in.	
18	Storage/Ash Pond - Separator Dike - Downstream Slope - Localized erosion rills/gullies need to be repaired to prevent further erosion.	
19	Storage/Ash Pond - Separator Dike - South End. Gypsum Storage pond berm on right side of photo.	
20	Potable Water Pond- Upstream Slope. Small trees/bushes at toe need to be removed.	

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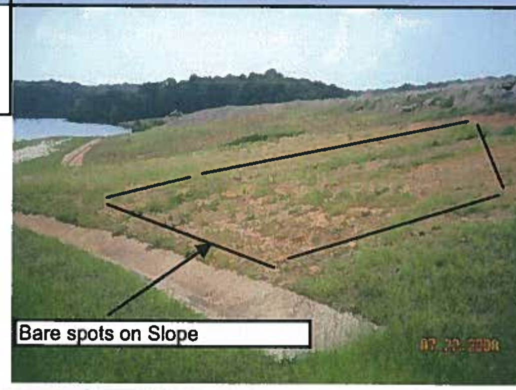
Plant Wansley

2008 - 3rd Quarter Inspection Photographs - July 22, 2008

(See accompanying report attached)

Photo No.	Description	
21	Potable Water Pond- Upstream Slope. Localized bare spots on slope. Re-establish vegetation to prevent further erosion	
22	Potable Water Pond-Spillway Approach Channel-Remove small trees/bushed within channel.	
23	Detention Pond - Upstream Slope - Rip-rap in good condition, no visible evidence of instabilty.	
24	Detention Pond - Downstream Slope - Good grass cover, but needs to be cut. Small trees/bushes on slope need to be cut down.	

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Plant Wansley

2008 - 3rd Quarter Inspection Photographs - July 22, 2008

(See accompanying report attached)

Photo No.	Description	
25	Detention Pond - Outfall Channel - Rip-rap and channel are in good condition. No erosion or instability observed.	

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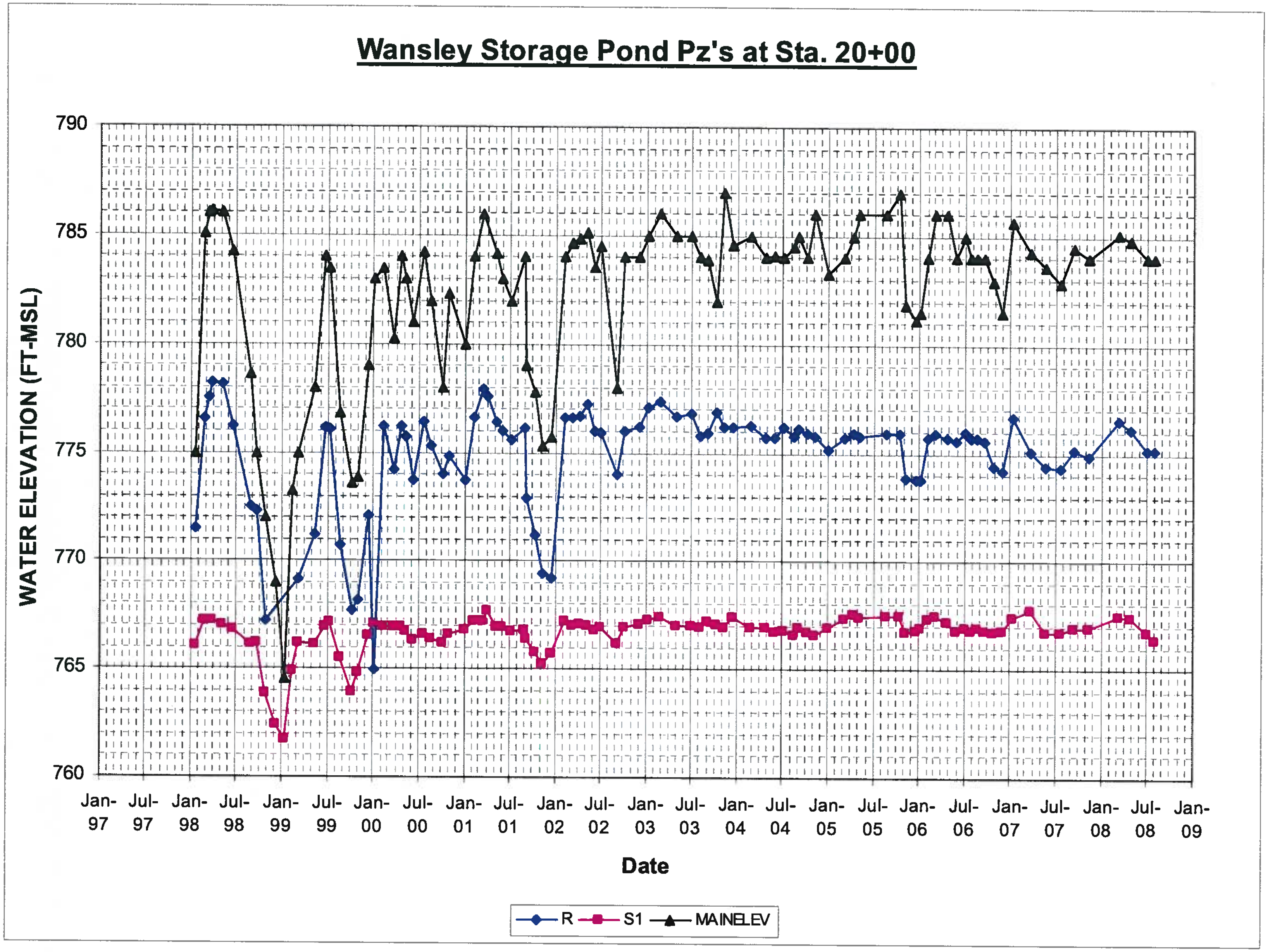

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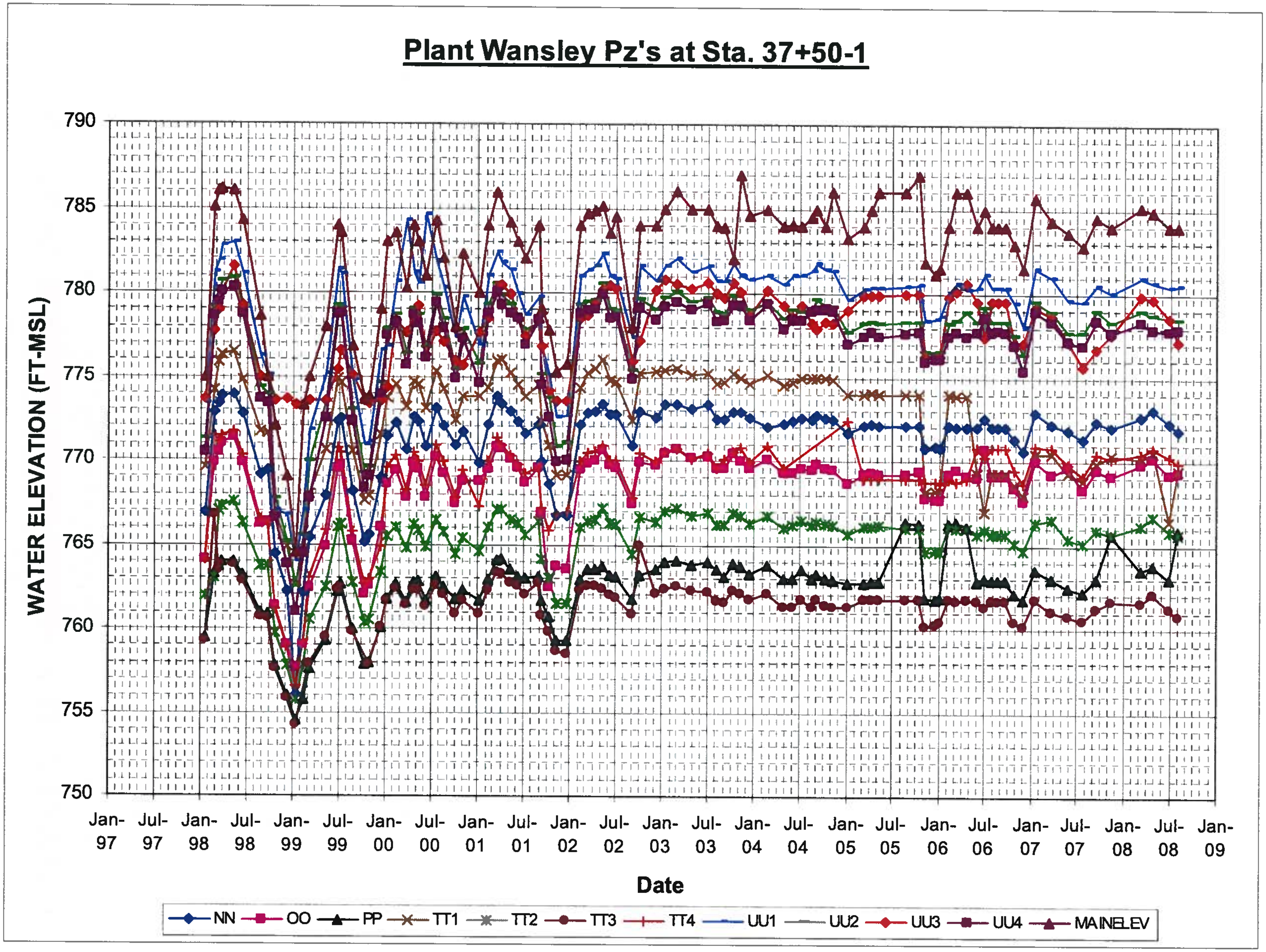

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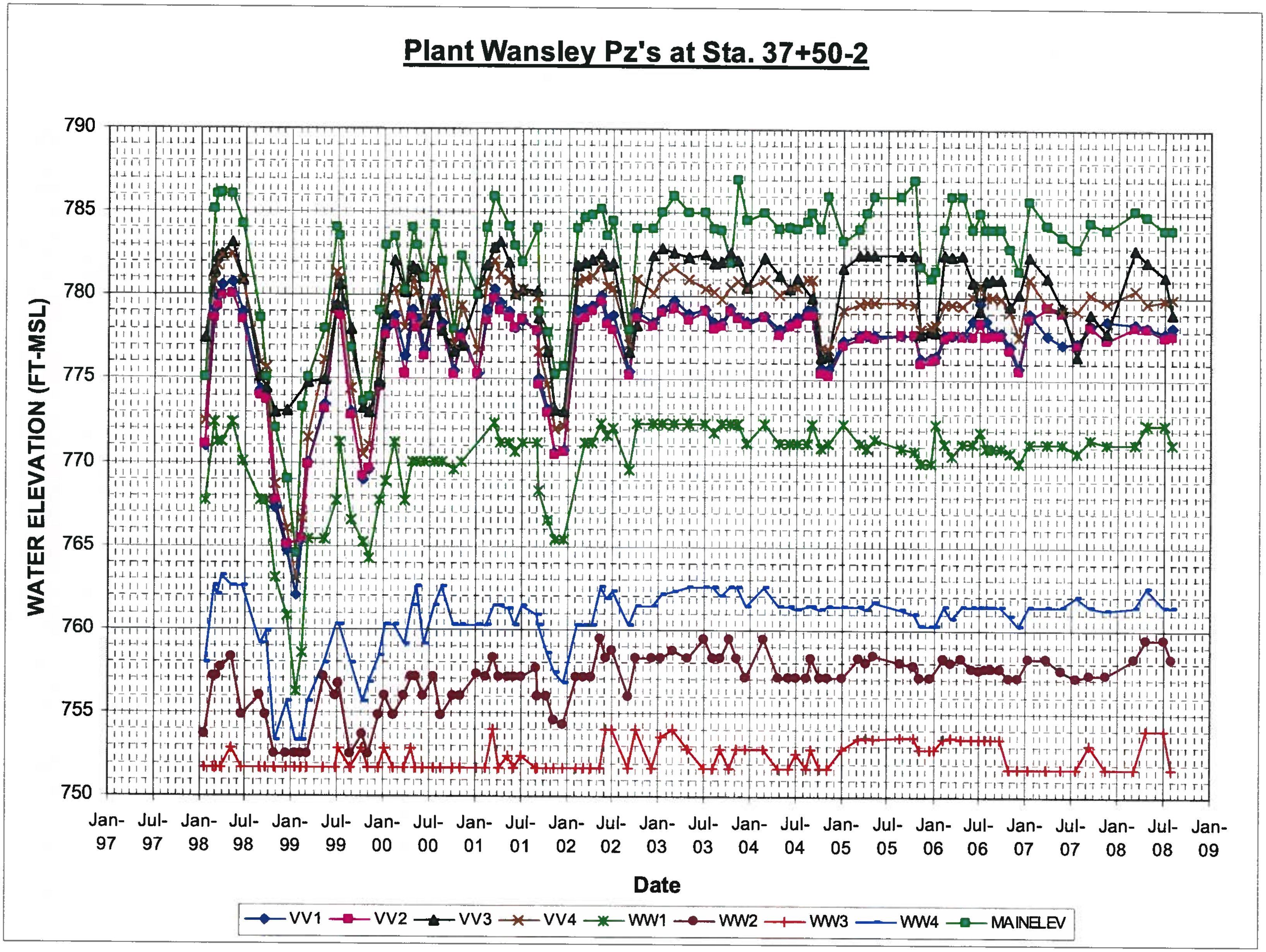

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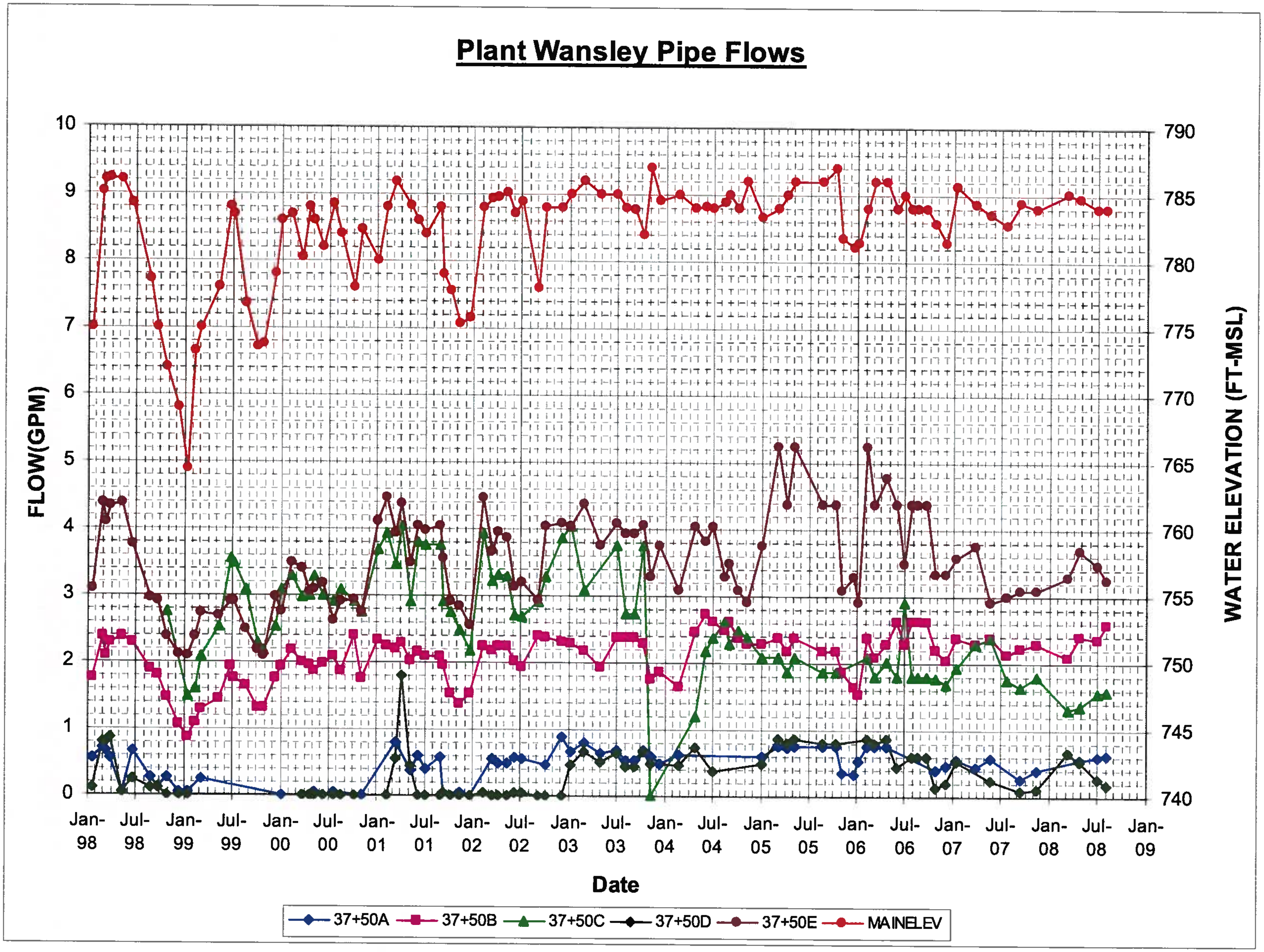

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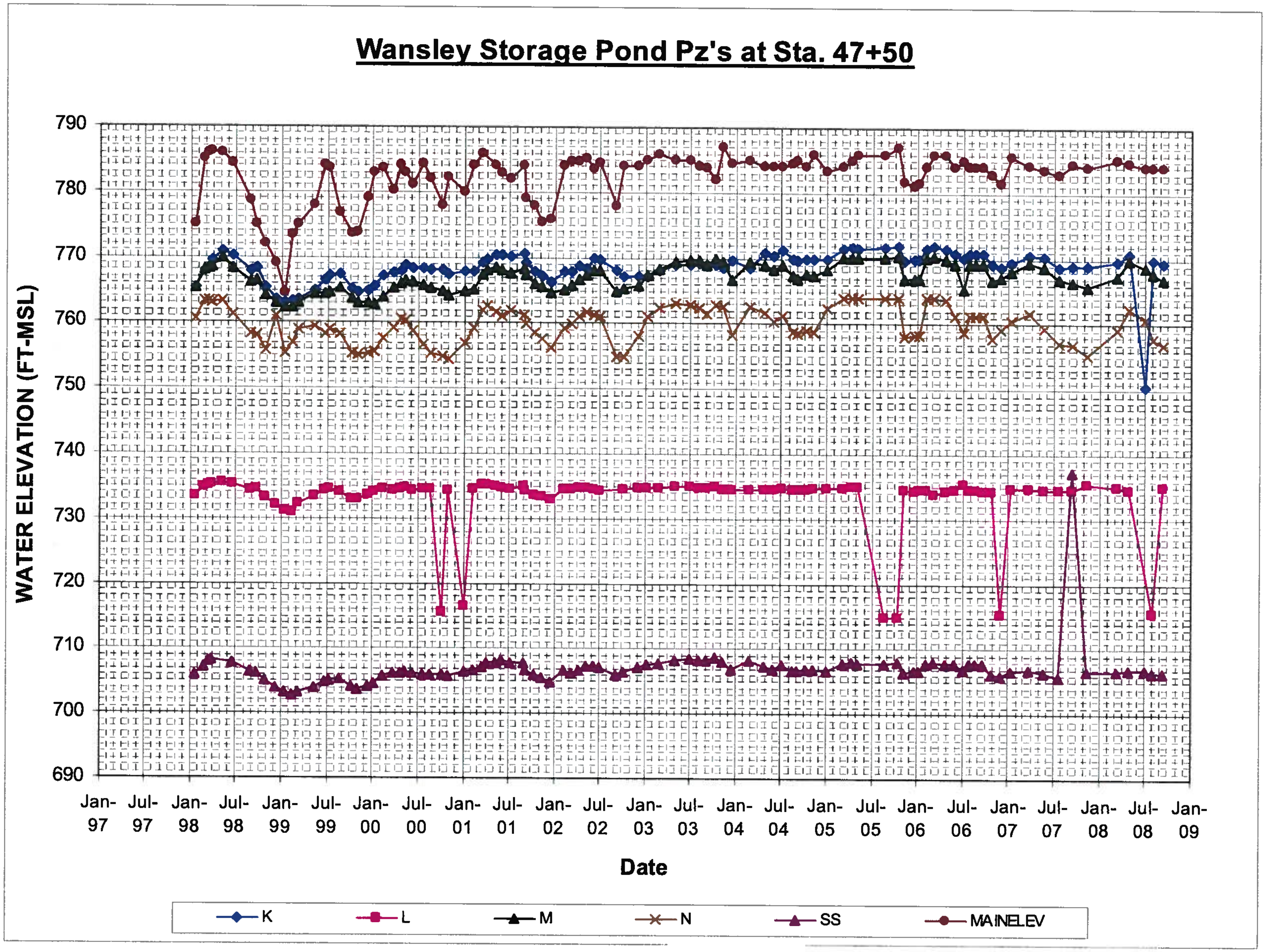

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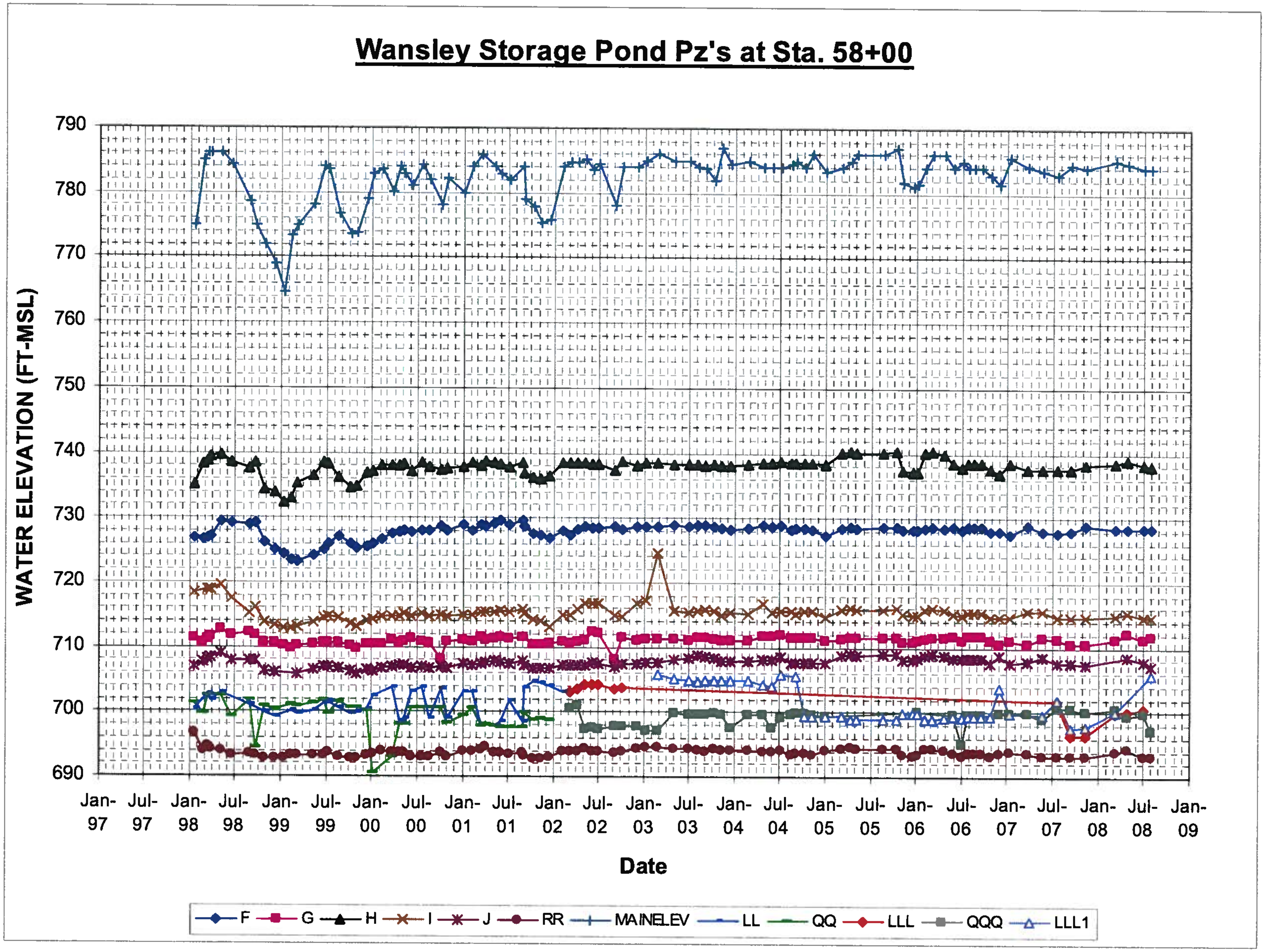

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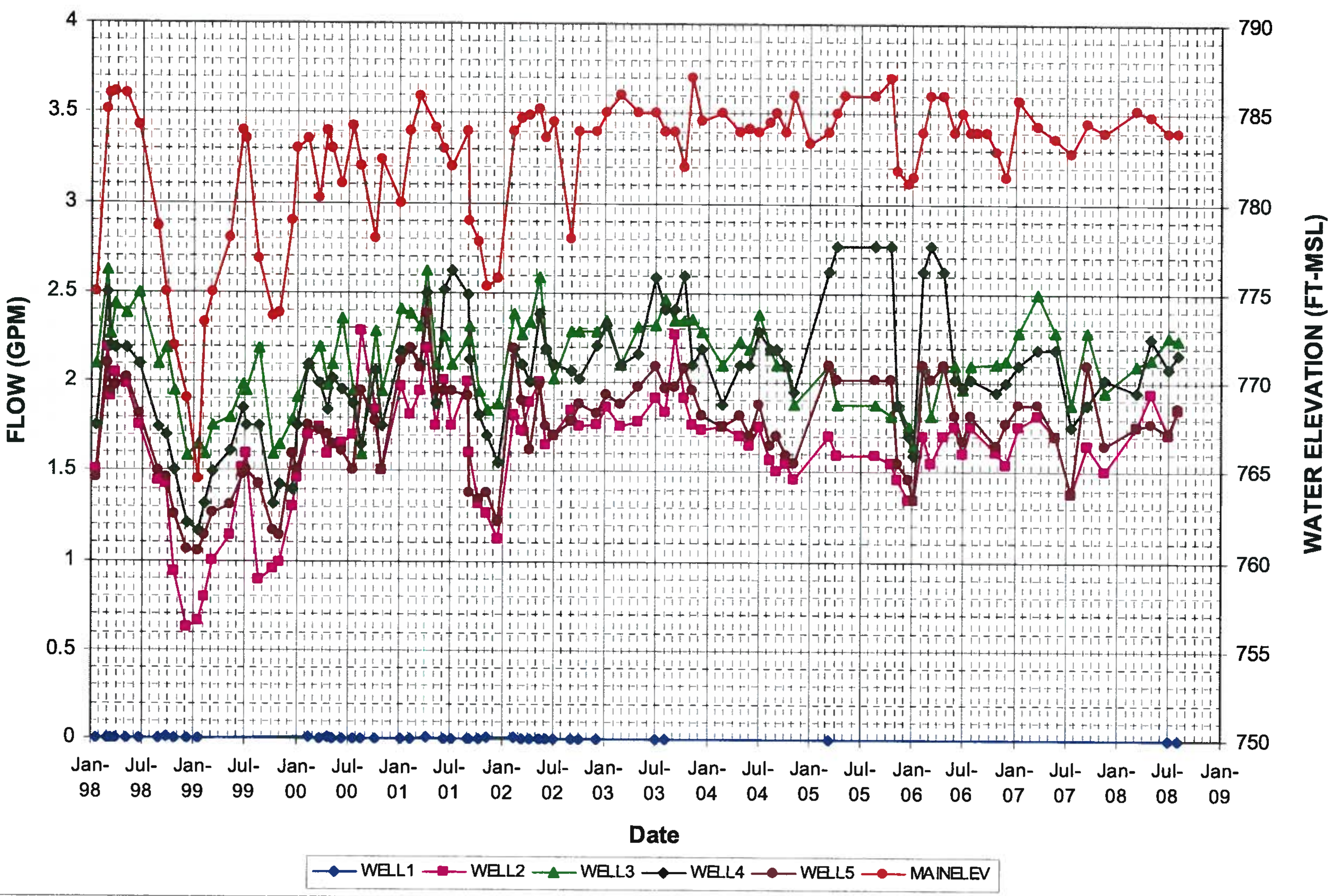
Plant Wansley Well Flows



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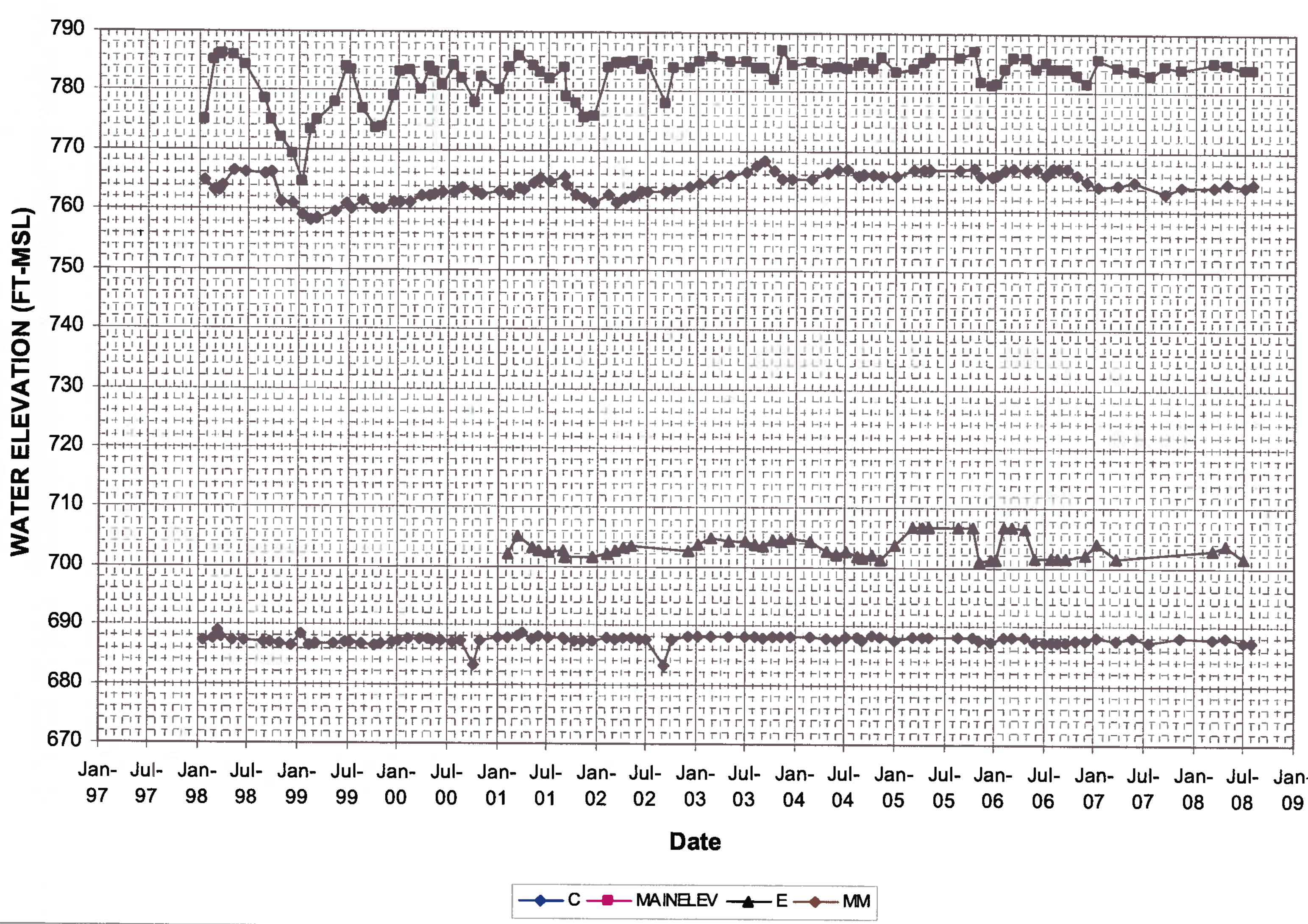
Wansley Storage Pond Pz's at Sta. 65+00



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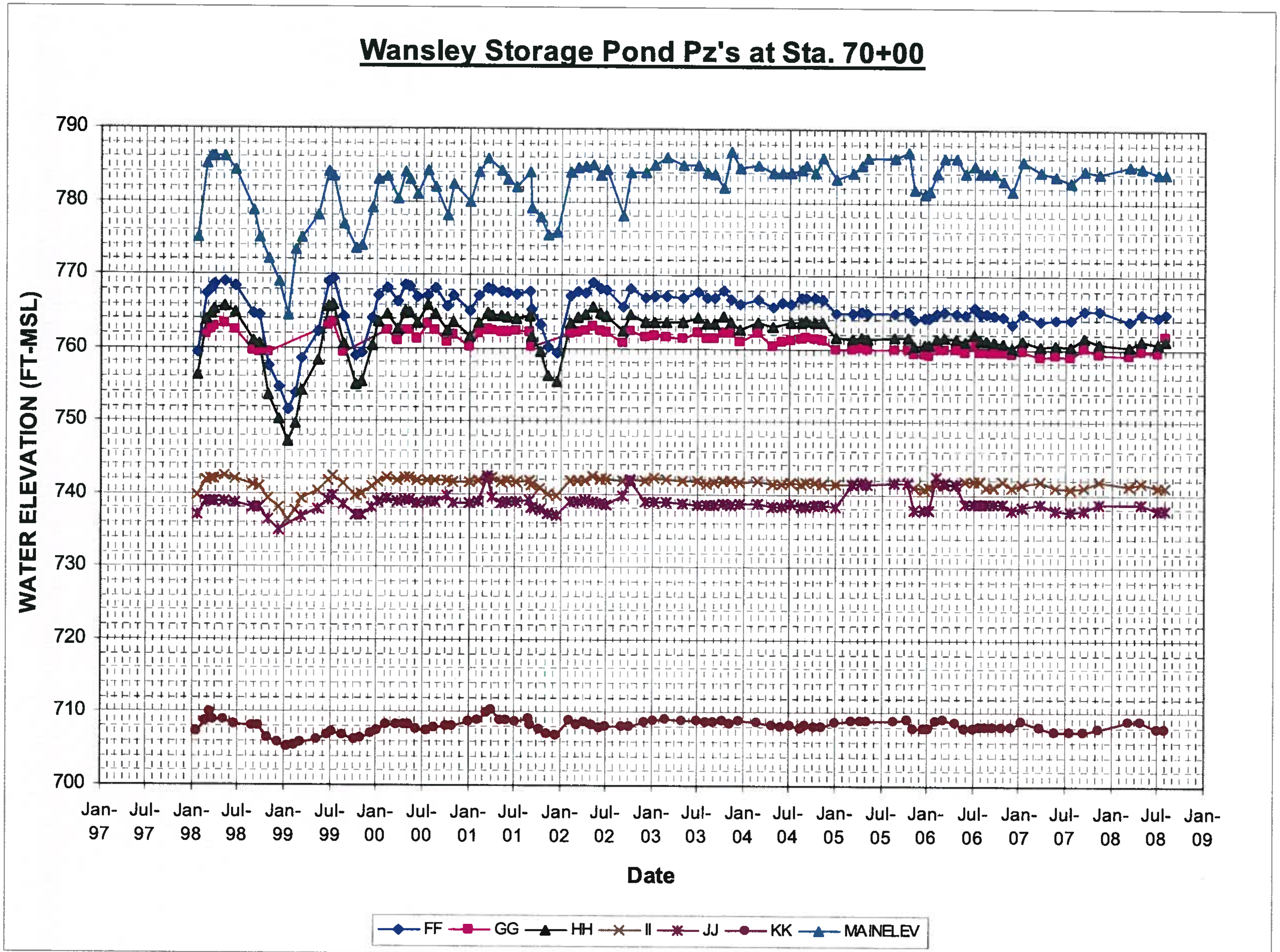

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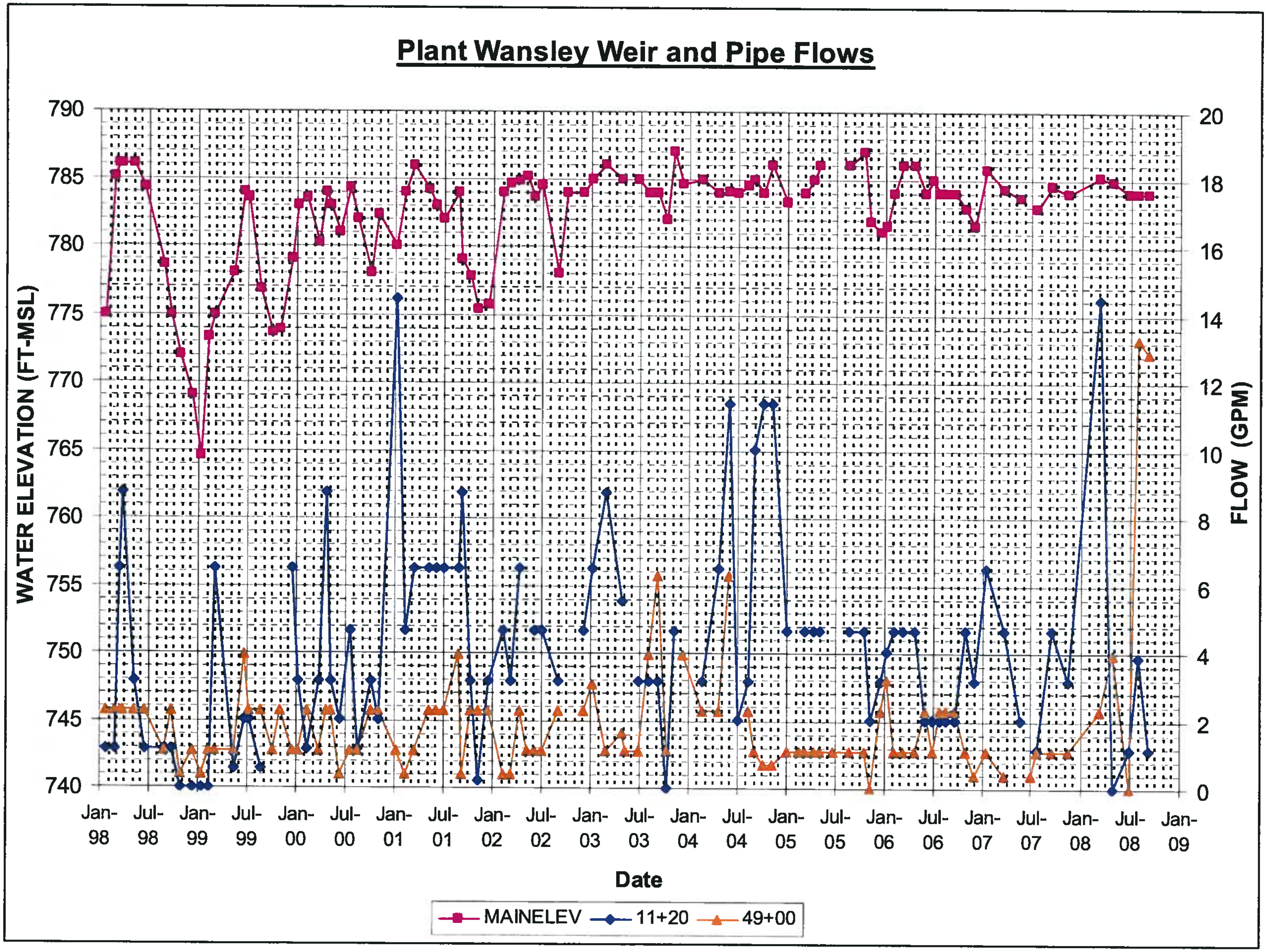

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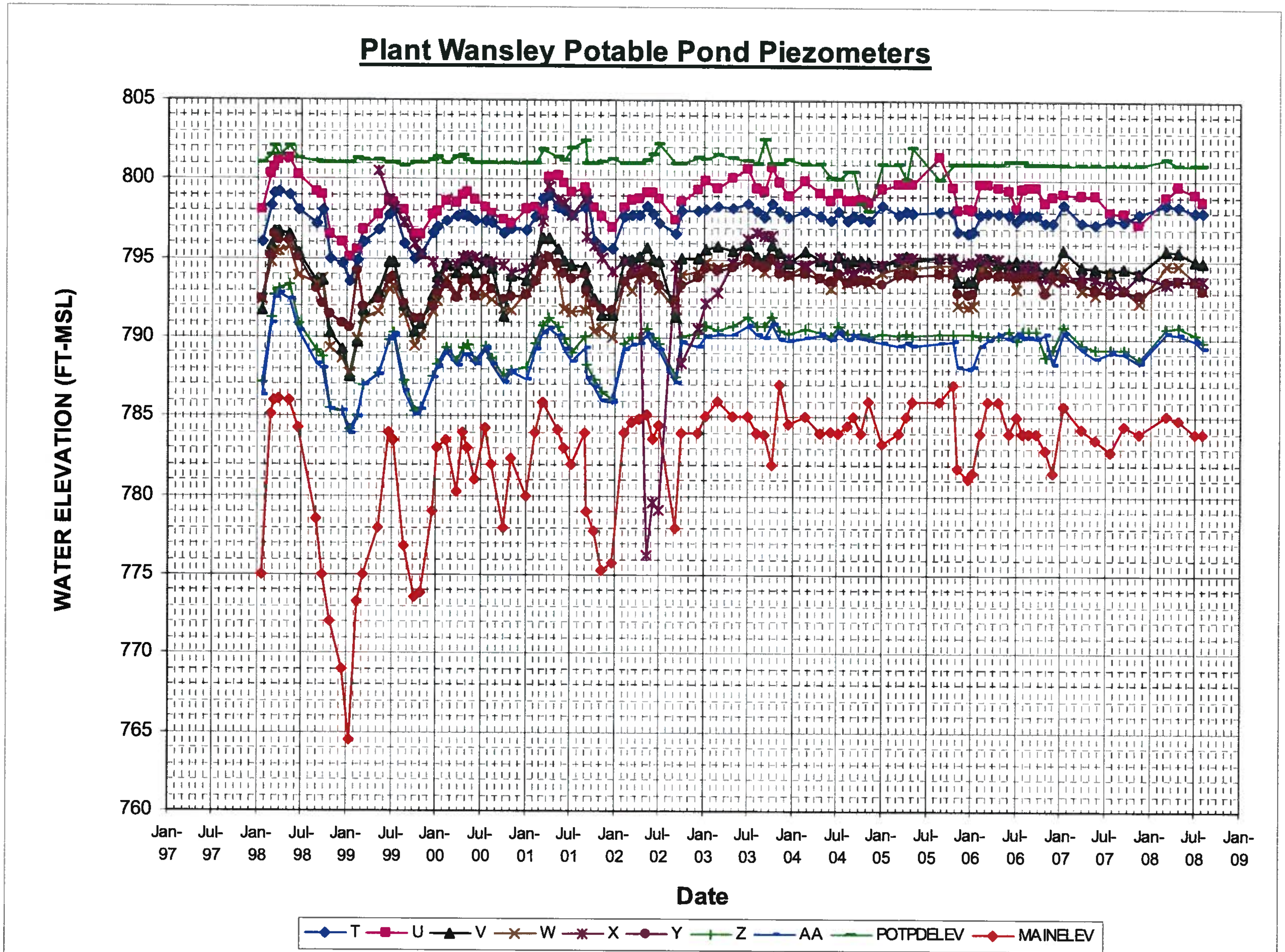

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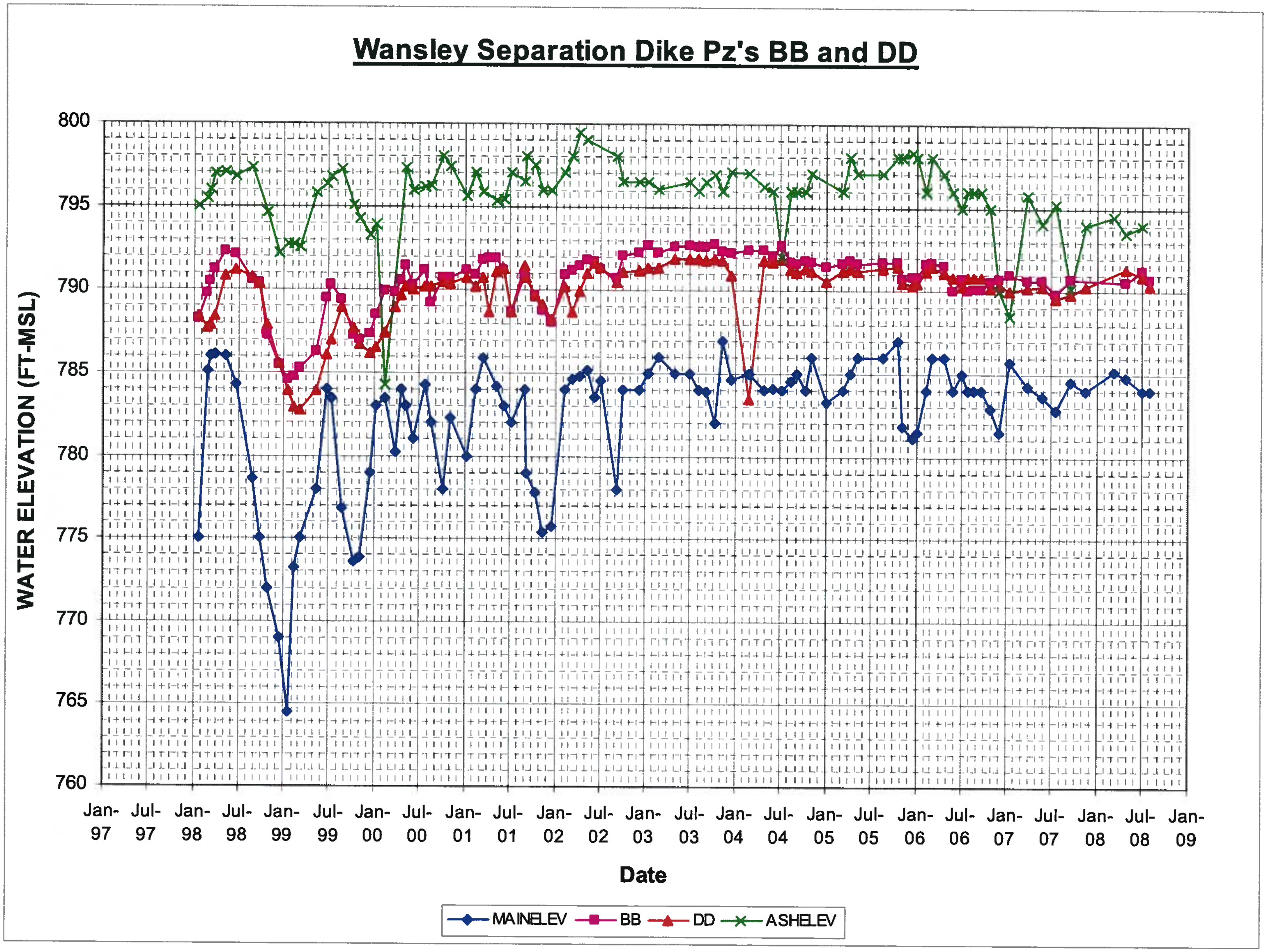

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Southern Company Generation
Bin 10193
241 Ralph McGill Boulevard NE
Atlanta, Georgia 30308-3374

Tel 404.506.7033

SOUTHERN COMPANY
Energy to Serve Your World™

May 28, 2008

Plant Wansley
Dam Safety Surveillance
Quarterly Report
REA No. WN-08900

Mr. J. P. Heilbron
Plant Manager
Georgia Power Co.
Plant Wansley

Dear Mr. Heilbron:

Attached is the first 2008 quarterly report on Dam Safety Surveillance for Plant Wansley, prepared by the SCG Hydro Services Group. The report includes observations of site conditions made during our inspection, plots of surveillance data, and our interpretation of this data. The inspection of the Storage Pond Main Dike was carried out on March 10, 2008 in conjunction with the Georgia Department of Natural Resources, Environmental Protection Division, Safe Dams Program (SDP) annual inspection.

No major dam safety issues that would immediately impact the safety of the structures were discovered during this inspection. However, there are a number of maintenance items that should be addressed soon to assure the continued safety and performance of the structures. These items are identified in the report.

Should you have any questions, please do not hesitate to contact me at extension 8-506-7033.

Sincerely,

Joel Galt

Joel Galt
Hydro Services Supervisor

WAN-API 054

Attachments

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/hha

xc: **Georgia Power Company**

T. E. Wilson (w/ attachment)
N. I. Dean (w/ attachment)

Southern Company Services

E. B. Allison (w/ attachment)
J. H. Crisler (w/ attachment)
F. J. Pryor (w/ attachment)

Hydro Service Wansley Notebook
Master File: WN-08900

T:\Quarterly Reports\Fossil Plants\2008\Wansley\08 - Qtr 1 - Wansley Surveillance Report Transmittal.doc

INSTRUMENTATION

Following are observations from the review of the dam safety instrumentation at Plant Wansley.

Storage Pond:

Sta. 20+00: Piezometers are within their historic range. Both seem to track the pond level.

Sta 37+50: All of these piezometers appear to be in their historic range. All seem to track pond level.

Sta 37+50 Pipe Flows: These flows appear to be in their historic ranges. The flow at 37+50C seems to be in a recent declining phase, and is at its lowest flow rate in the past four years. These flow rates will continue to be monitored to assess if any trends develop.

Sta 47+50: The relatively high reading measured in September 2007 on SS, appears to have been an anomaly since subsequent readings up to April 2008 have been within the historic range of past measurements. The other piezometers are within their historic range of measurement.

Sta 58+00: LLL1 and LLL have increased slightly since the 3rd quarter 2007 report and are generally within their historic range as is the case with the other piezometers.

Relief Wells: The relief wells appear to be discharging in their historic range. The flow appears to vary with the pond elevation with the exception of well 1.

Sta 65+00: Measurement of the piezometric level at E has resumed since the 3rd Quarter report. C, E and M are within their historic ranges.

Sta 70+00: All of these piezometers are reading in their historic ranges.

Weir and Pipe Flows: With the recent exception of the measurements weir at 49+00 and 11+20 (March/April 2008), both weirs appeared to be flowing in their historic ranges with the exception of the past 2 months During the inspection it was noted that the weirs at Sta. 62+00 and 57+00 were silted up. These weirs should be cleaned out and allowed to stabilize before each reading. Reading them when they are silted up produces bad data.

Separation Dike:
These piezometers are registering in their historic ranges. They exhibit a muted relationship with the storage pond elevation but little relationship to the ash pond elevation.

Potable Water Pond Dike:
These piezometers were registering in their historic ranges.

INSPECTIONS

On March 10, 2008, Joel Galt and Hugh Armitage of Southern Company Generation (SCG) Hydro Services conducted a dam safety inspection of the dikes at Plant Wansley. The inspection of the Storage Pond Main Dike was carried out in conjunction with the Georgia Department of Natural Resources, Environmental Protection Division, Safe Dams Program (SDP) annual inspection. Mr. Terry Wilson of Georgia Power Company accompanied SCG and SDP personnel on the inspection of the Storage Pond Main Dike. The weather was clear and warm. Approximately 2 to 3 inches of rain had fallen in the area the week preceding the inspection, but conditions were generally dry on the day of the inspection.

No major dam safety issues that would immediately impact the safety of the structures were discovered during this inspection. There are a number of maintenance items that should be addressed soon to assure the continued safety and performance of the structures. If not addressed in a timely manner, these things can become more costly to fix. The actions suggested are in **bold text**. These issues can be addressed as time and resources permit, but should be addressed within the next three months.

The site personnel that have the best opportunity to thoroughly inspect the dikes are the mowing crew. During the next mowing of the dikes, it would be a good idea to have the mowing crew flag any ant mounds and animal burrows that they come across. Then the mounds could be poisoned and the burrows filled in. However, safety considerations should be foremost.

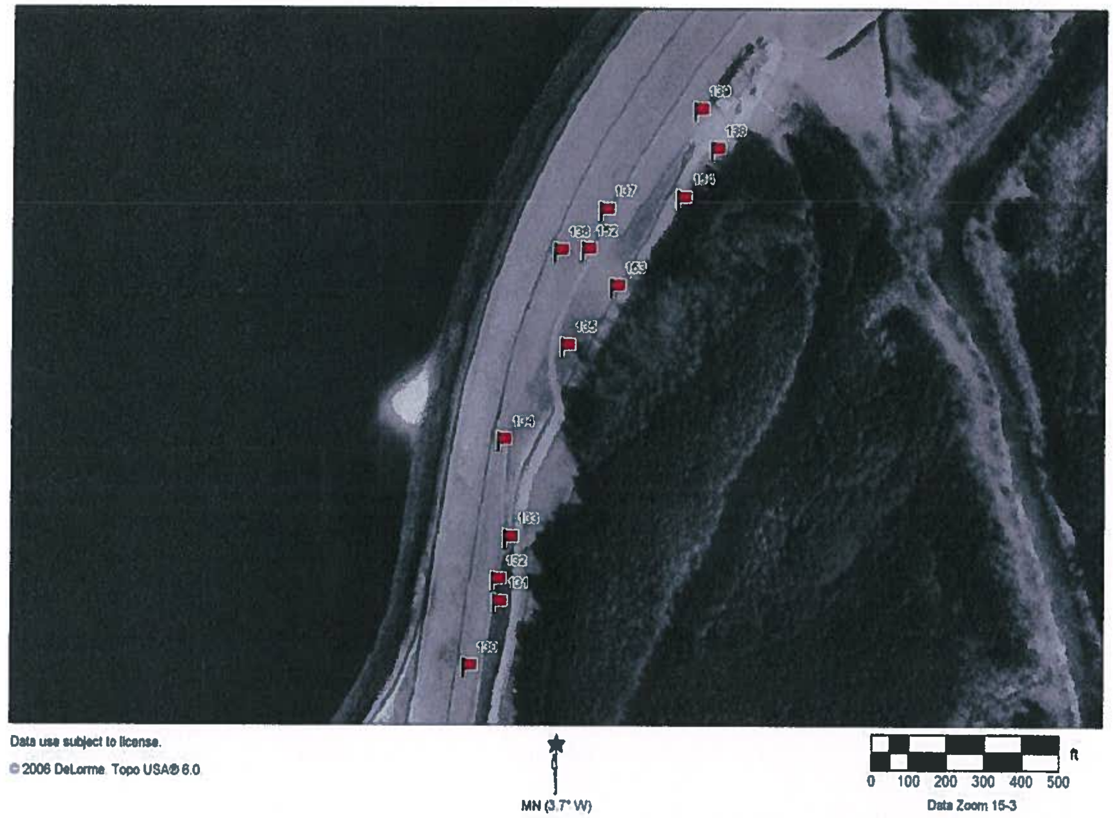
The upstream slopes of the main dike, the east dike and separator dikes were examined from a boat. The downstream slopes and the remainder of the upstream slopes at the other ponds were inspected by traversing along the downstream slope and/or making observations from the crest of the dikes.

During this inspection at the Main Storage Dam, we made use of a GPS unit to capture the locations, using waypoints, of items described in the text. The waypoints are indicated by red flags and numbers on an aerial photo of the subject structure. The paragraph describing this location begins with the waypoint number. In some cases, these flags and numbers have tended to overlap, obscuring some of the numbers. Some waypoints were taken for reference, so that all flags on the aerial photos do not necessarily indicate the location of an item described in the text. With experience, we hope that the method can be refined and will result in a report that is more valuable to the user.

Storage Pond - Main Dike

The text for this segment is arranged as if the reader is moving from southwest to northeast along the main storage dike and then to the spillway and then back along the toe of the slope towards the southwest.

LOWER MAIN DIKE



General Comment – **Remove all accumulated vegetation within concrete lined channels**

Pt. 130 – Cracks in concrete lined channel. **Cracks like this should be cleaned out of dirt and caulked (using a appropriate caulking material)**. This will prevent water infiltration and progressive undermining beneath the concrete,

Pt. 131 – Sta. 77+00 – Localized build-up of grass, silt and debris. **Requires clean out of the outlet end of the finger drain.**

Sta. 76+60 – **Animal Burrow needs to be filled in.**

Pt. 132 – Sta. 76+00 - Localized build-up of grass, silt and debris. **Requires clean out of the outlet end of the finger drain.**

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Sta. 75+00 – Localized build-up of grass, silt and debris. **Requires clean out of the outlet end of the toe drain.**

Sta. 73+00 to 74+00 – Bare spots on slope. **Re-seed and mulch areas to re-establish grass cover to mitigate surface erosion.**

Pt. 133 (Approx. 75+50)
Pt. 134 (Sta. 73+00)
Pt. 135, 136 (pictured at right) and 137 (~Sta 66+67)

Animal burrows need to be filled in.

Sta. 72+50 and 70+00 (pictured) and 66+00 – End of toe and finger drains damaged by mowers. **Repair ends of drains (i.e. add new section of pipe or beat back into shape). Provide markers to prevent re-occurrence**

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Pt. 138 (Sta 62+00) – Silted up behind weir. **Clean out dirt from around weir**

Pt. 139 (~Sta. 62+50) – Bare spots on slope. **Re-seed and mulch areas to re-establish grass cover to mitigate surface erosion.**

UPPER MAIN DIKE

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Pt. 140 (~Sta. 57+00) – Build-up of silt at weir. **Clean out dirt around weir.**

Pt 141 (~Sta 53+00) – **Animal burrow needs to be filled in.**

Pt. 142 (~Sta. 45+00) – **Three animal burrows at headwall need to be filled in.**

Pt. 143 (approx Sta. 40+00) – Rip-Rap on upstream slope of main dike.

Pt 144 – Rip-Rap on upstream slope of separator dike.

STORAGE POND - EAST DIKE

Pt. 145 – Sta. 1+00 to 8+00 – **Clear debris from finger drains at Sta. 1+00 & Sta. 7+00 and clean out bottom of concrete lined channel of silt/sand and miscellaneous.**

(Note: Pt. 146 – not shown on plan – same comment as Pt. 147 below)

Pt. 147 – Minor seepage into concrete channel (~ Sta. 12+50).

Pt. 148 (~Sta. 15+00) Finger drain dry, but localized seepage into channel. **Localized grass in channel needs to be removed.**

Pt. 149 – (Sta 19+00) – **Finger drain blocked at this location and needs to be cleaned out.**

Pt. 150 – Build-up of grass and debris in channel, (restriction of flow through channel). **Debris/grass needs to be cleaned out of channel**

<u>Storage Pond Main Dike/Spillway</u>

Pt. 151 – Localized minor vegetation observed at floor of spillway. **Remove vegetation from weephole and other various locations in the spillway floor.**

Sta. 37+50 – Progressive undermining of concrete paving. **Requires repair to mitigate further ground loss and future damage to pavement. (See attached Sketch No. 1 below for proposed repair option)**

Pt 152 (Sta. 68+00) –Bare spots in slope **Localized re-seeding to re-establish grass cover.**

Pt 153 – Animal burrow just upslope from concrete drainage channel (approx Sta. 68+00). **Requires repair/filled in.**

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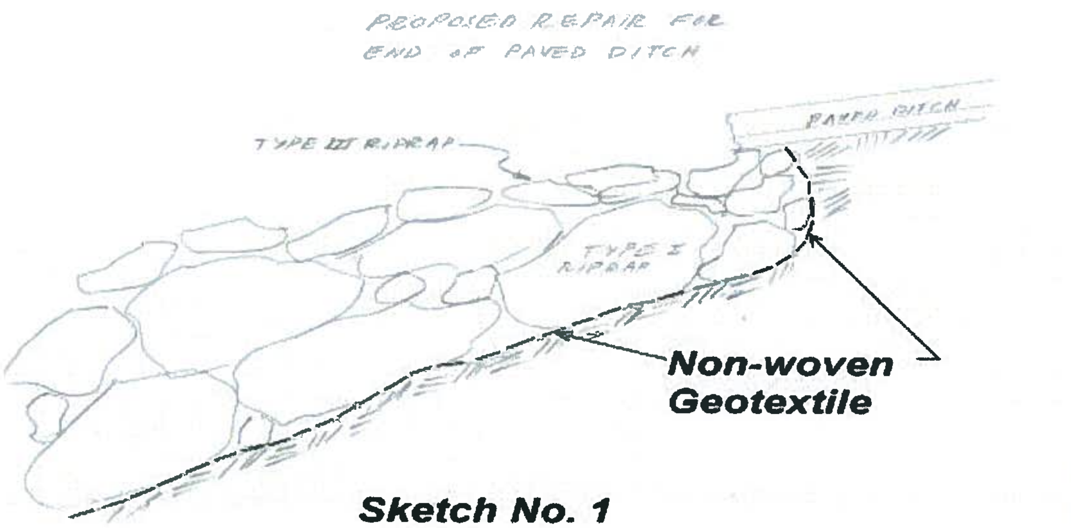
Pt 154 – Stockpiles of emergency coarse and fine aggregate drainage materials looks good

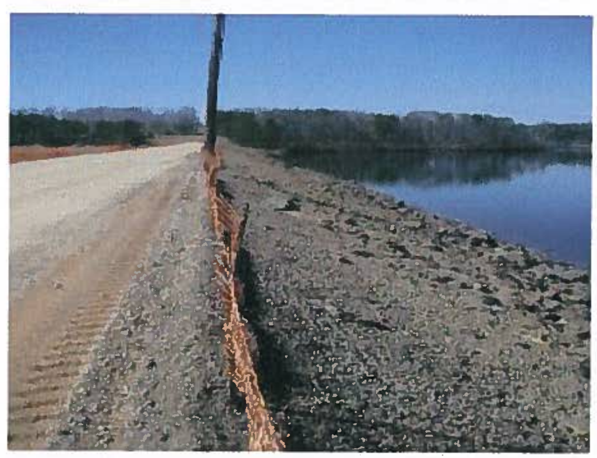


Sketch No. 1

Separator Dike

Upstream slope generally looks satisfactory although surface runoff is causing localized erosion near top of slope.

Localized re-grading required to flatten over steepened upper portion of slope and to provide positive drainage to minimize over-slope flows (which will result in progressive erosion along slope)



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Crest of Upstream Slope - **Localized erosion rill needs to be repaired with #57 stone.**

Potable Water Pond Dike

Localized bare spots on slope. **Repair either by re-seeding to re-establish grass cover or place small rip-rap/stone).**

(See Updated Status from Third Quarter Report –Location 092, for items to be completed)

Vegetation growth at toe of upstream slope. **Cut down and remove vegetation (grass/bushes)**

(See Updated Status from Third Quarter Report – Location 089, for items to be completed).

Ash Pond Emergency Overflow

Repair of downstream outfall completed

(See Updated Status from Third Quarter Report – 094).

Rip-rap on upstream and downstream slopes overall looks good. No evidence of recent erosion or instability. Brush has been cleared since 3rd Quarter 2007.

(See Updated Status from Third Quarter Report – Location 095, for items to be completed).

Detention Pond

Vegetation on downstream slope. **Remove/cut down vegetation/brush/small trees for a distance of 30 ft. out from toe of slope.**

(See Updated Status from Third Quarter Report – Location 099, for items to be completed).

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Tree and brush adjacent to spillway should be cleared.

(See Updated Status from Third Quarter Report – Location 100, for items to be completed).

UPDATED STATUS (Reference - 3rd Quarter Report dated October 27, 2007)

073 The cleanout pipes for the subsurface drain at Sta 69+00 do not have covers on them. **These pipes should be covered.**
3-10-08 – Pipes capped

075 The stockpile of granular material west of the makeup water pump station appears to have gotten smaller than it should be. **It would be a good idea to add one load of sand, one load of #89 stone and two loads of #57 stone.**
3-10-08 – No Change

062 At the paved ditch at the toe of the maximum section of the storage pond dike, the slopes of the ditch have become overgrown with tall weeds and woody brush. **This vegetation should be cleared or poisoned.**
3-10-08 - Brush cleared

062 The brush growing up between the steps has also made walking on the stairs to the relief well flow measurement platform hazardous. **This brush should be removed. The weir in the paved ditch at this location is clogged with silt and should be cleaned out.**
3-10-08 - Brush cleared

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066 An animal burrow was noted next to the paved ditch at Sta 45+00. There is some woody brush in this area that should also be cut. Brush and tall grass provide cover for burrowing animals and therefore encourage their burrowing. **The animal should be trapped or gassed and the burrow should be packed with gravel and/or foamed. The brush should be cleared.**
3-10-08 – Brush cleared but burrow still observed

068 The toe of the dike at Sta 37+50 was very boggy as usual. In May, Hydro Services had Dr. Rene Rodriguez conduct geophysical testing of this area to try to determine the flow path of the water. Dr. Rodriguez' results and a drawing of the finger drain system correlate to indicate that the source of the water may be a buried finger drain with no outlet to the surface. **Hydro Services will work with plant management to plan an exploration of this area with the aim of locating the buried drain and installing a pipe to provide relief to this groundwater.**

069 The weir at Sta 37+50 is silted up and should be cleared so that it can be read properly.
3-10-08 – Weir cleared of silt

070 The emergency granular material stockpiles at Sta 37+50 are overgrown with weeds and brush. This vegetation might hinder access to the materials in an emergency. **The stockpiles should be sprayed to kill the weeds.**
3-10-08 – weeds and grass cleared. Sand and stone replenished, but need another load of #89 stone

077 The stoplogs for the spillway are stored on the dike adjacent to the spillway sitting on some timbers. The skin side of the stoplogs is down, allowing rainwater to stand in the stoplog. This causes corrosion and shortens the life of the stoplogs. It would be a good idea to examine the stoplogs for loss of section due to corrosion, repair and paint them if necessary, **and store them skin side up to reduce the potential for corrosion. 3-10-08 – Unchanged**

Storage Pond – East Dike

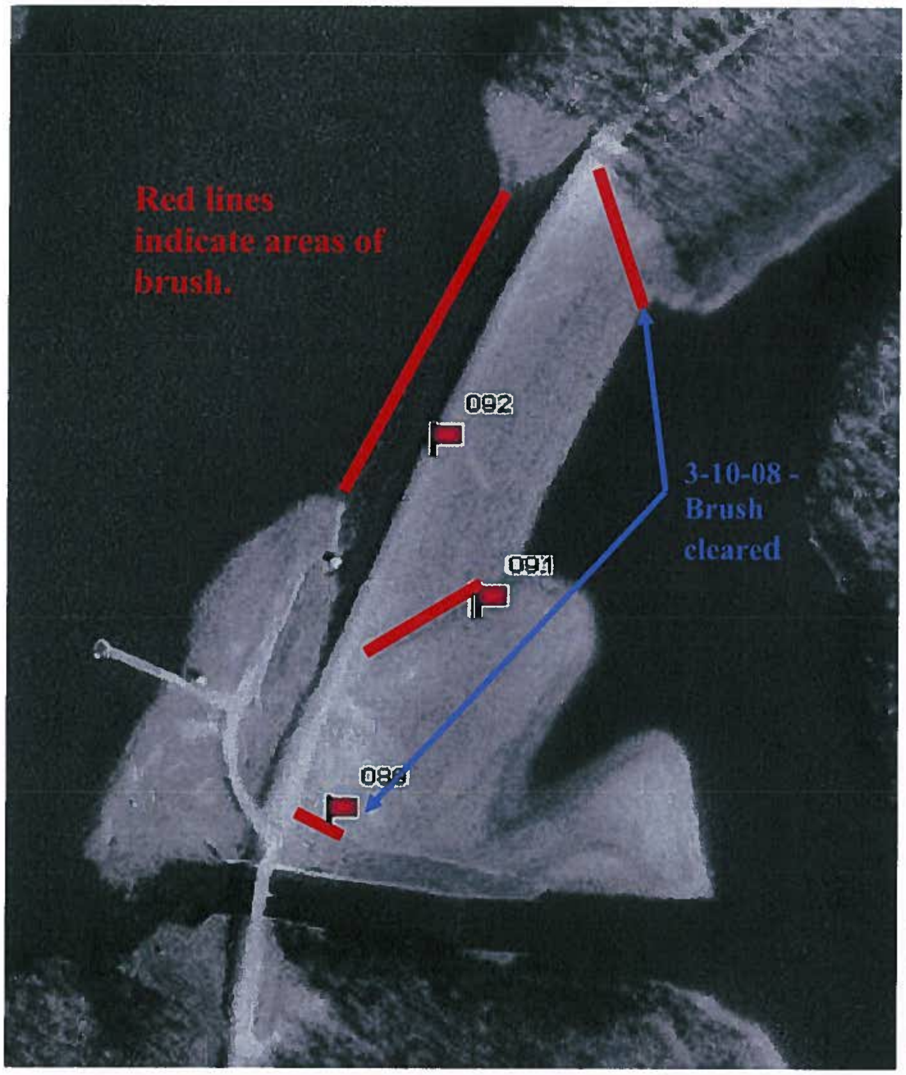
081 There are some small trees and woody brush growing at the heel (upstream) of the east dike at this point. **This vegetation should be cut or poisoned.** (about Sta 7+00?)
3-10-08 – Vegetation cleared

082 Tall grass and woody brush are growing on both sides of the paved ditch at the toe of the east dike from Sta 5+00 to Sta 20+00. **This vegetation should be cut down.**
3-10-08 – Vegetation cleared

083 The granular material stockpiles downstream of the east dike have become overgrown with weeds. The sand will not be useable due to roots. **The stockpile should be sprayed with poison and a load of sand added.** (about Sta 10+00)
3-10-08 – Vegetation removed and stone added to stockpile

Potable Water Pond Dike

3-10-08 - Brush cleared downstream of the dike but brush needs to be cleared on upstream toe of slope

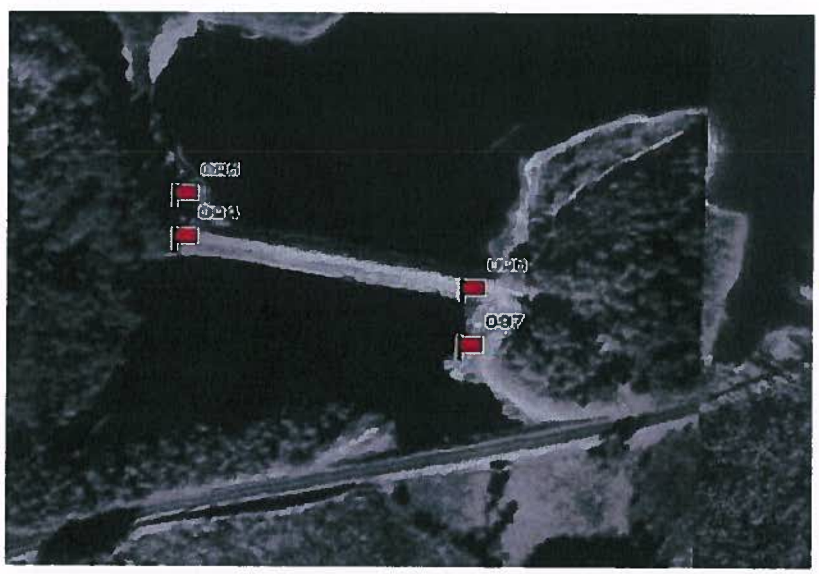


089 An eroded area was noted on the downstream slope just east of the spillway. This appears to be the result of runoff from the roadway passing through the riprap and running down this area instead of into the adjacent paved ditch. **It would be a good idea to add some rock to the eroded area to protect it from further erosion and to add some rock to the riprap at the top of the slope to try to direct the runoff into the existing paved ditch. There are also some small trees growing in this area. These should be cut or poisoned.**
3-10-08 – Trees and bushes removed and gravel placed in rip rap. Some additional rock required to cover bare spots

091 On the downstream side of the dike there is a growth of tall grass and woody brush along the east and west contacts of the dike with the natural ground. **This vegetation should be cut or poisoned.** **3-10-08 – Brush cleared at both locations**

092 The upstream slope of the dike is rip rapped. There is a fair amount of grass growing in the riprap. **This grass should be poisoned.** There is a stand of brush along the upstream edge of the dike. **This brush should be removed.**
3-10-08 – No work yet.

Ash Pond Emergency Overflow



094 The downstream outfall for the paved ditch has been undermined. Storm flows from the ditch undermine the ditch liner and will eventually remove the soil supporting the end of the ditch liner causing the liner to fail. **This area should be reinforced by placing Type I riprap in the pond at the outfall and choking that with Type III riprap. See sketch below.**
3-10-08 – Work completed

095 The upstream spillway of the paved ditch has been repaired with Type III riprap, but **the riprap needs to be dressed to match the contours of the paved ditch**. The current layout could result in uneven flows over the riprap and subsequent erosion
3-10-08 – No change

096 There is woody brush growing on the east end of the dike on the downstream side. **This brush should be cut or poisoned.**
3-10-08 – Brush has been cut

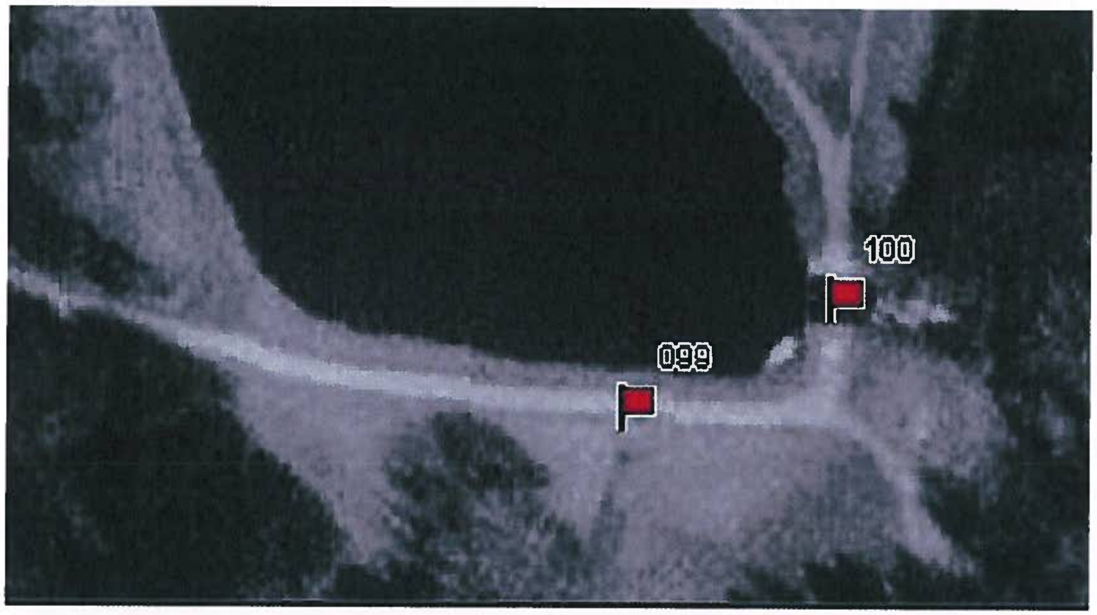
There is a bare spot adjacent to paved ditch near the location noted above. **This area should be armored with Type III riprap on a 4" bed of #57 stone. 3-10-08 – Still required**

098 There is woody brush growing in various locations around the perimeter of the pond on the downstream side of the skimmer wall. This brush could make recovery efforts difficult in the event of an oil spill to the ash pond. **This brush should be cut or poisoned. 3-10-08 – Brush cleared**

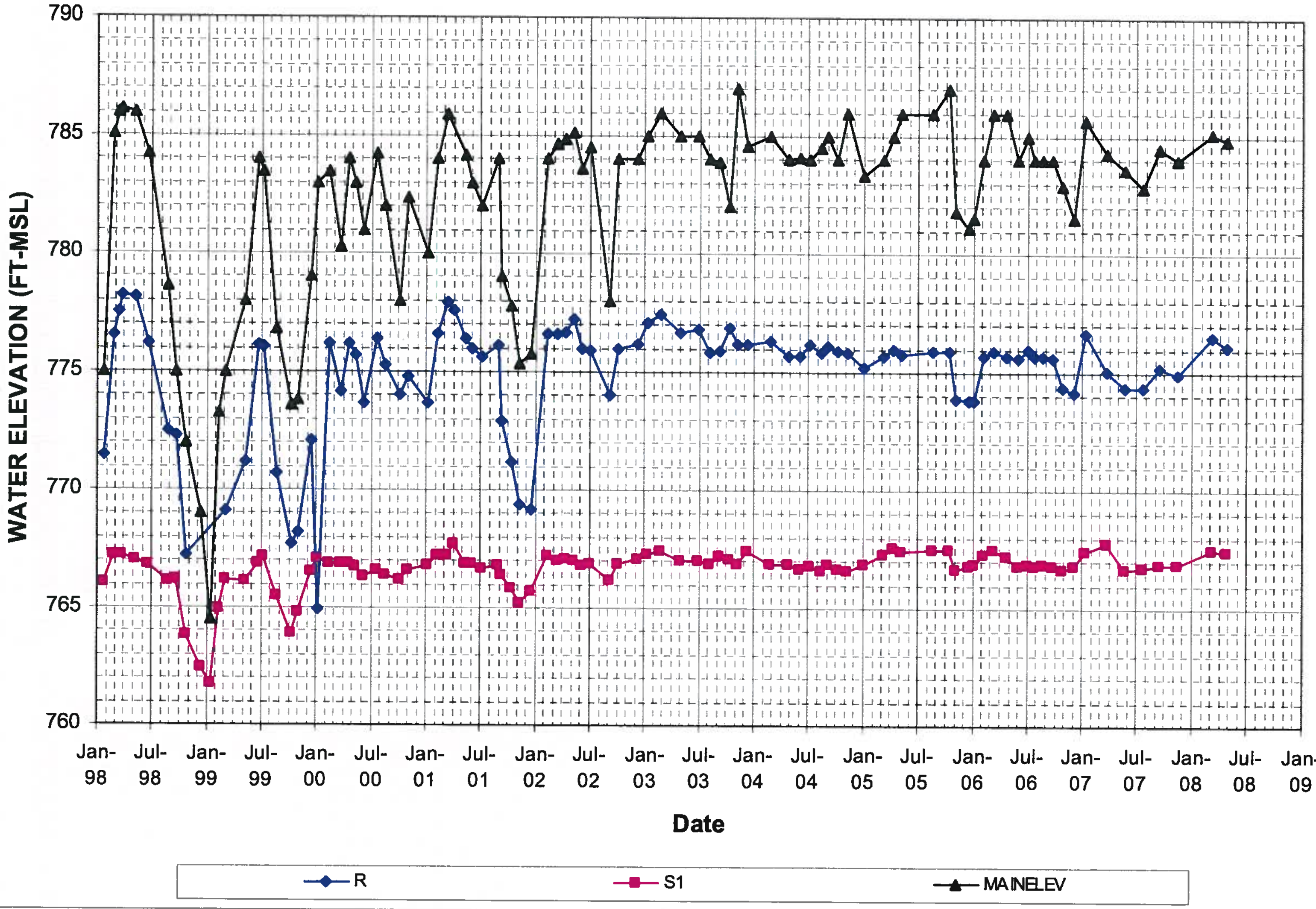
Detention Pond

099 The tall grass and small trees growing on the downstream side of the dike should be cut for a distance of 30 feet out from the toe. 3-10-08 – No work yet.

100 The tree and brush growing adjacent to the edge of the spillway should be cleared. 3-10-08 – No work yet.



Wansley Storage Pond Pz's at Sta. 20+00



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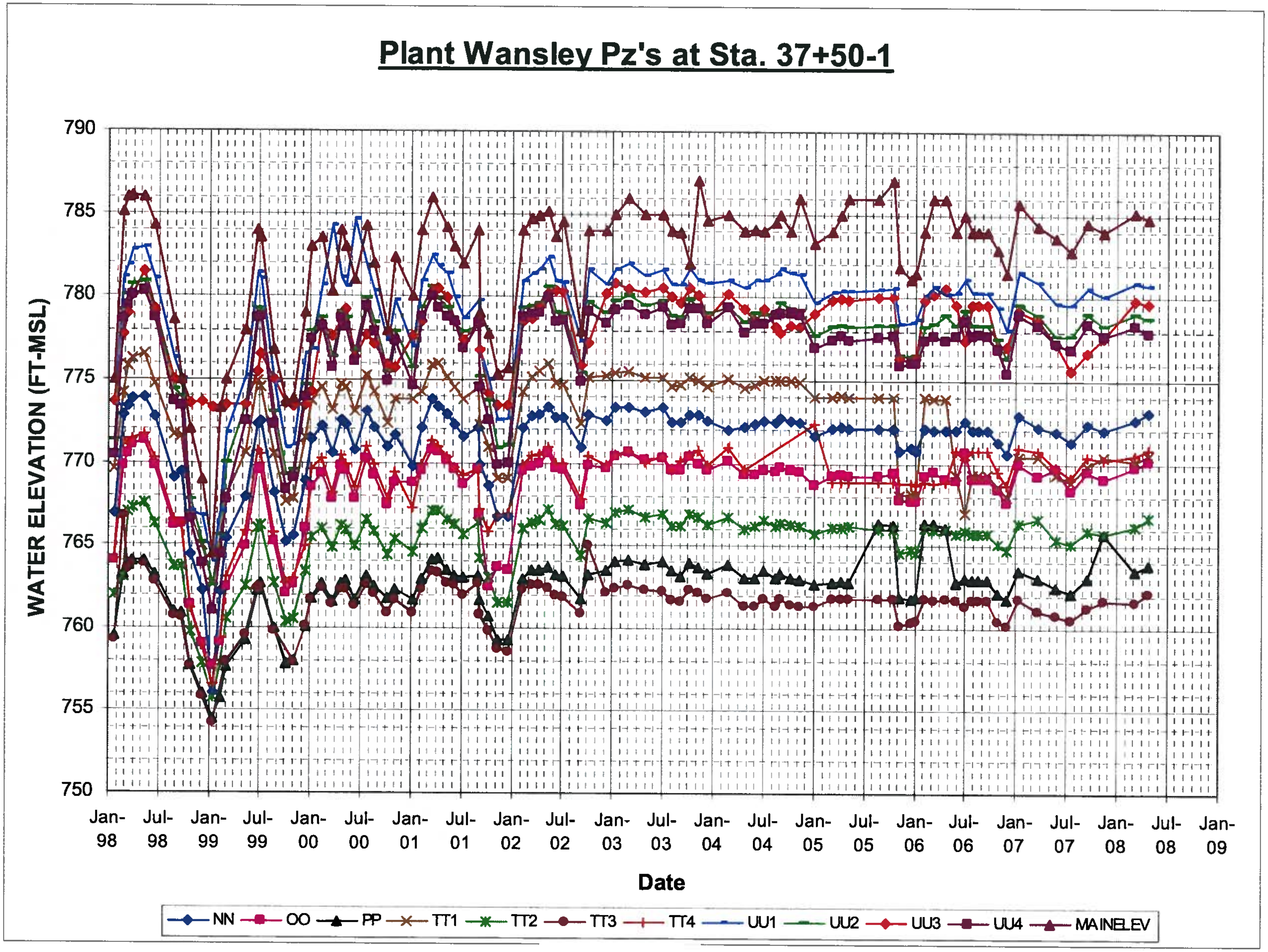

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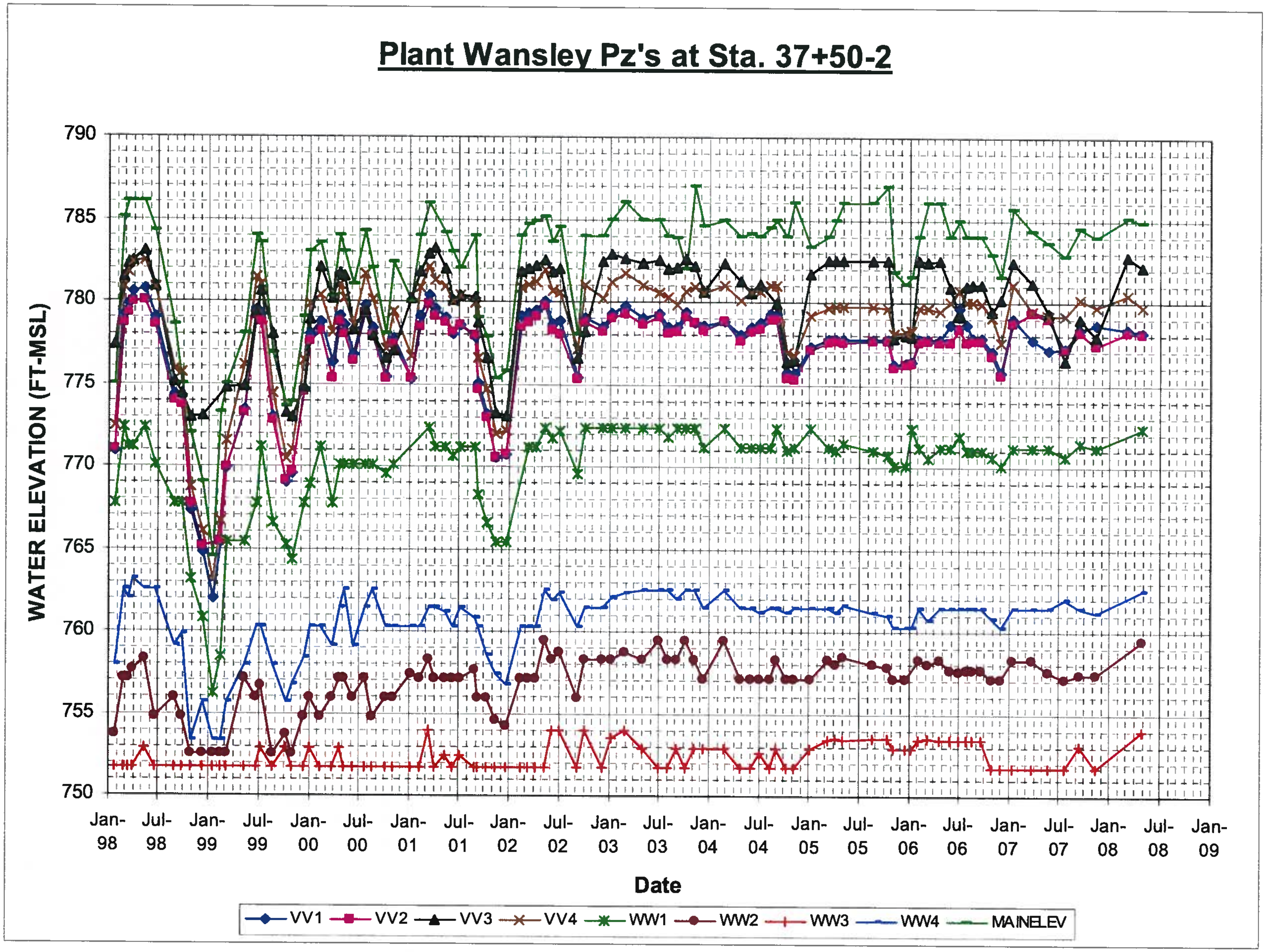

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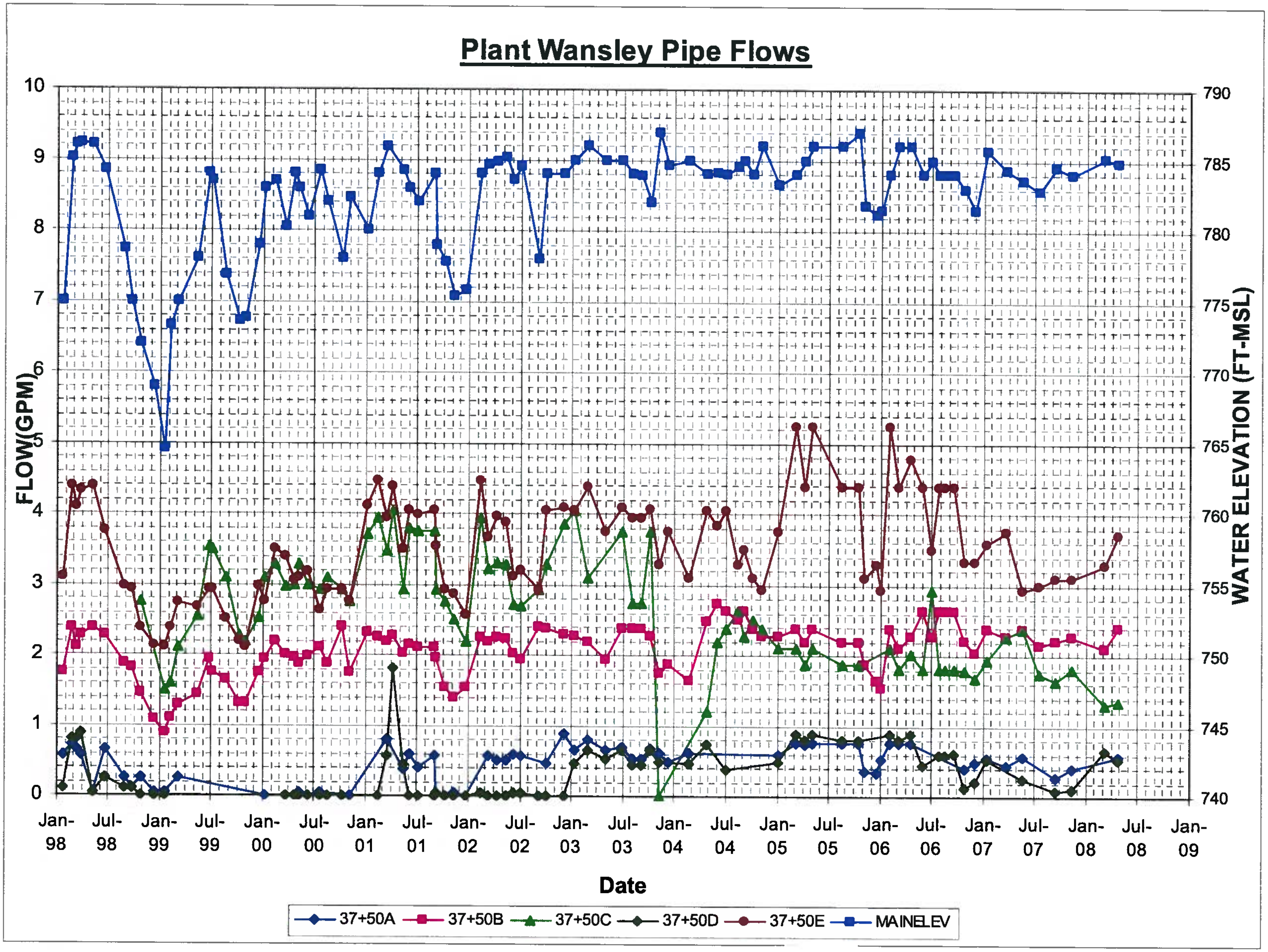

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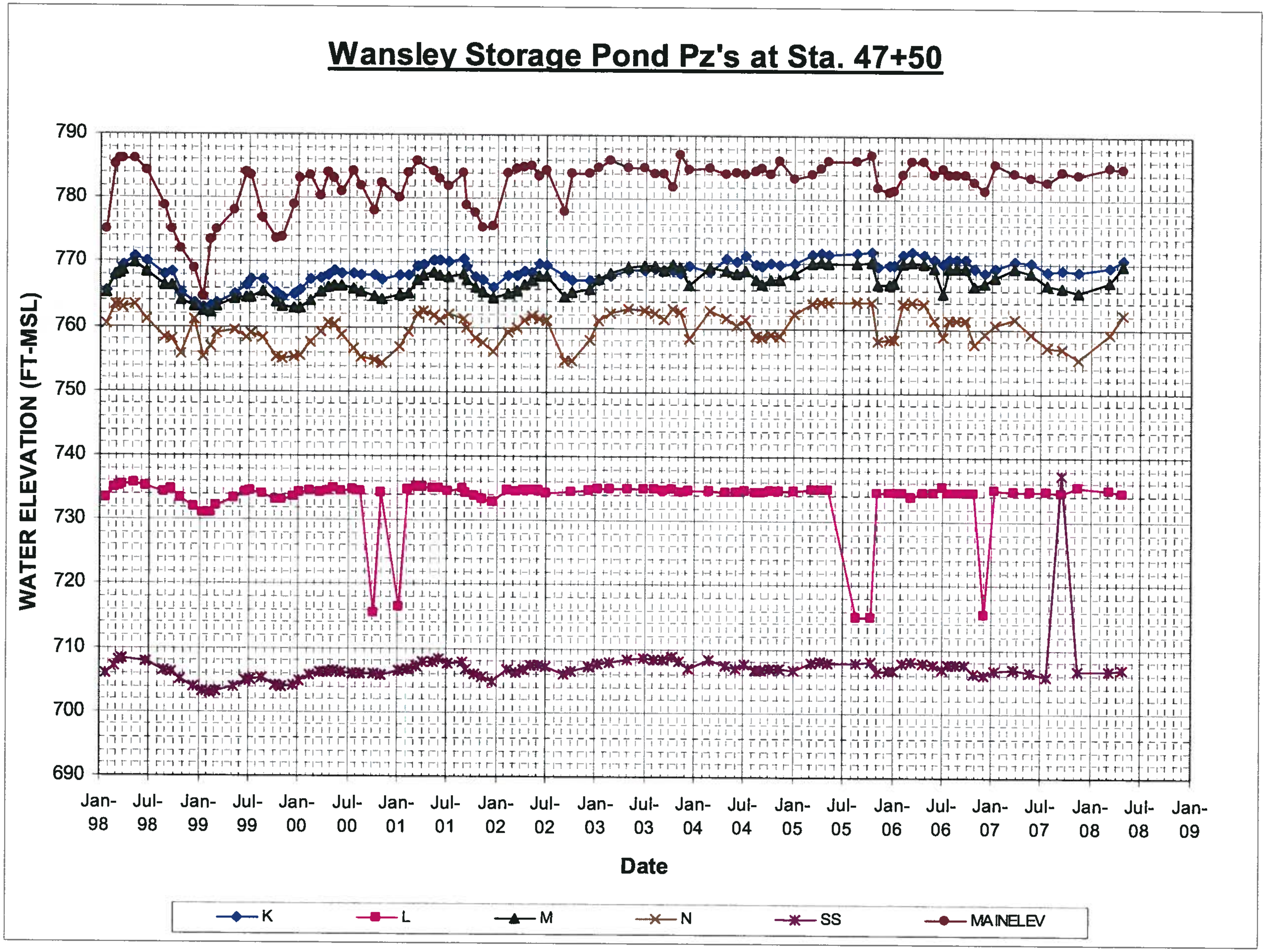

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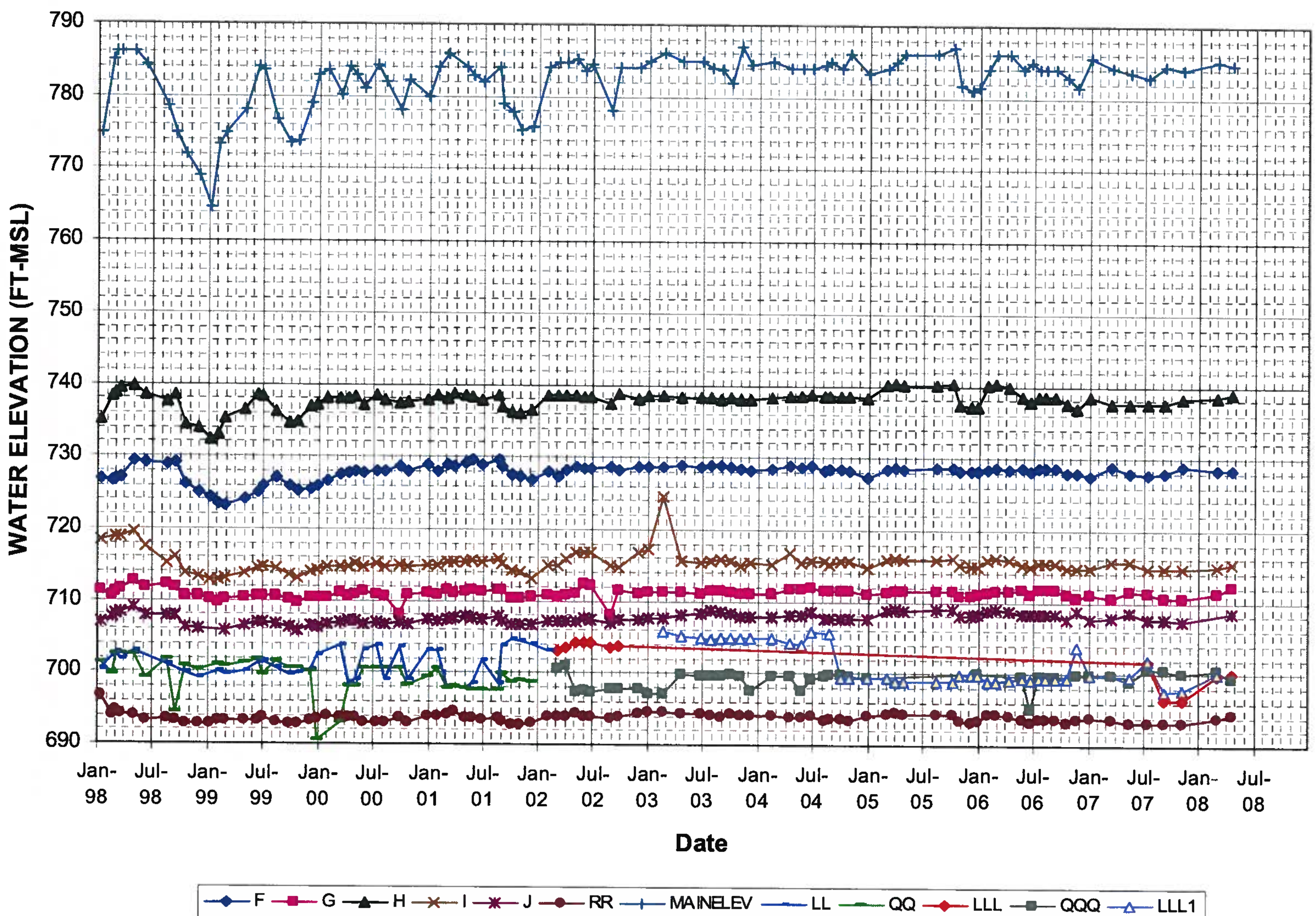
Wansley Storage Pond Pz's at Sta. 58+00



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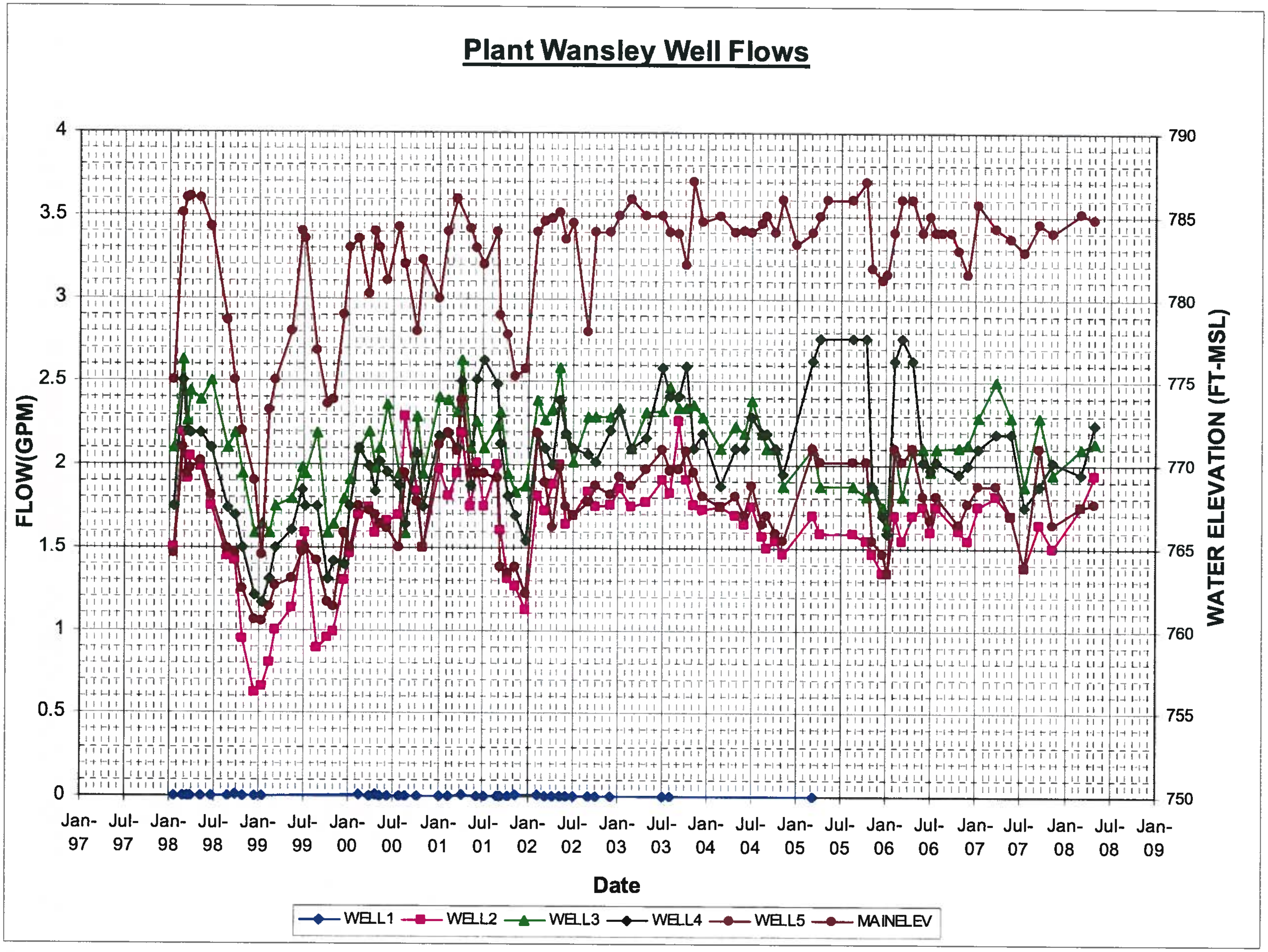

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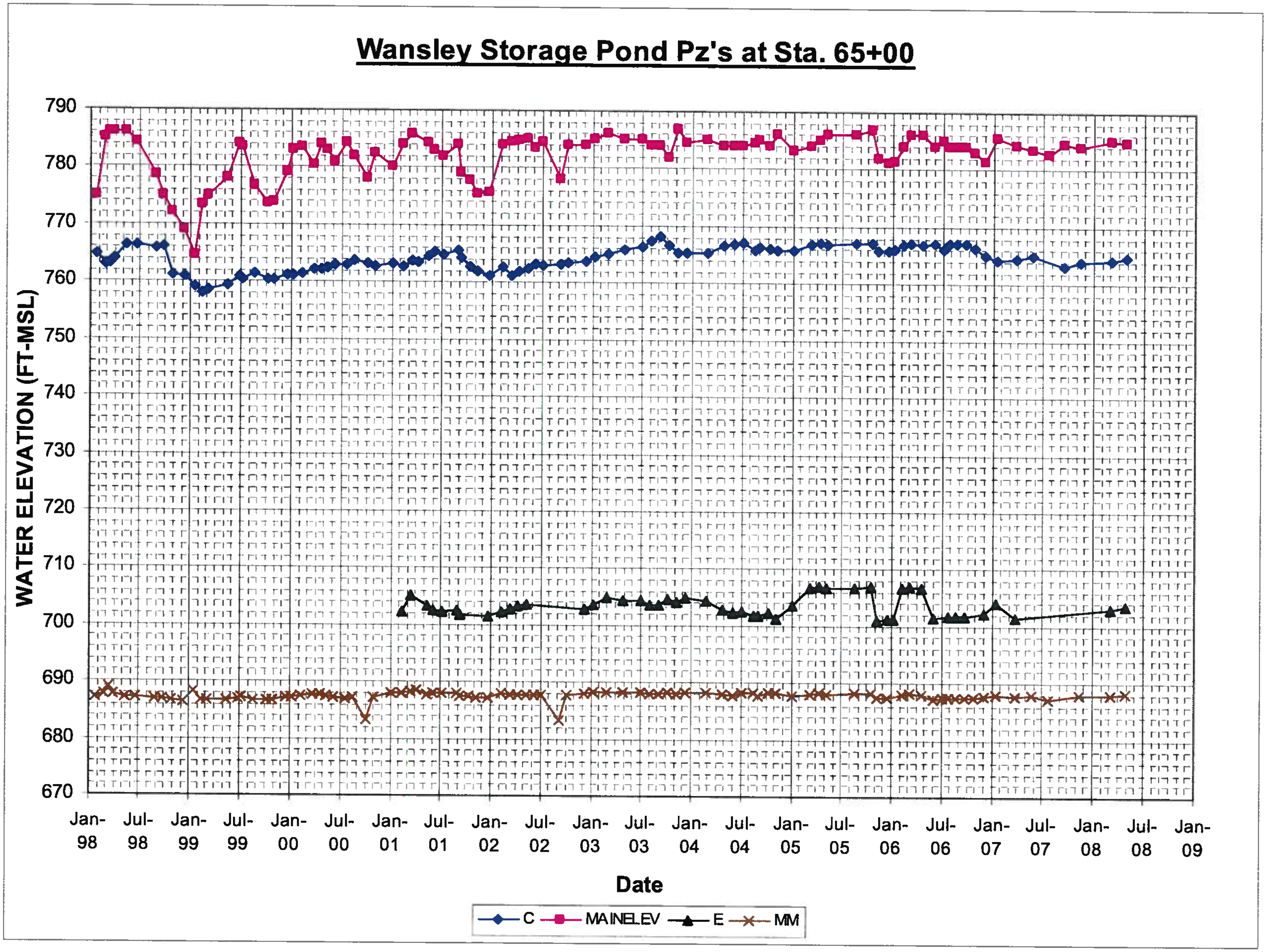

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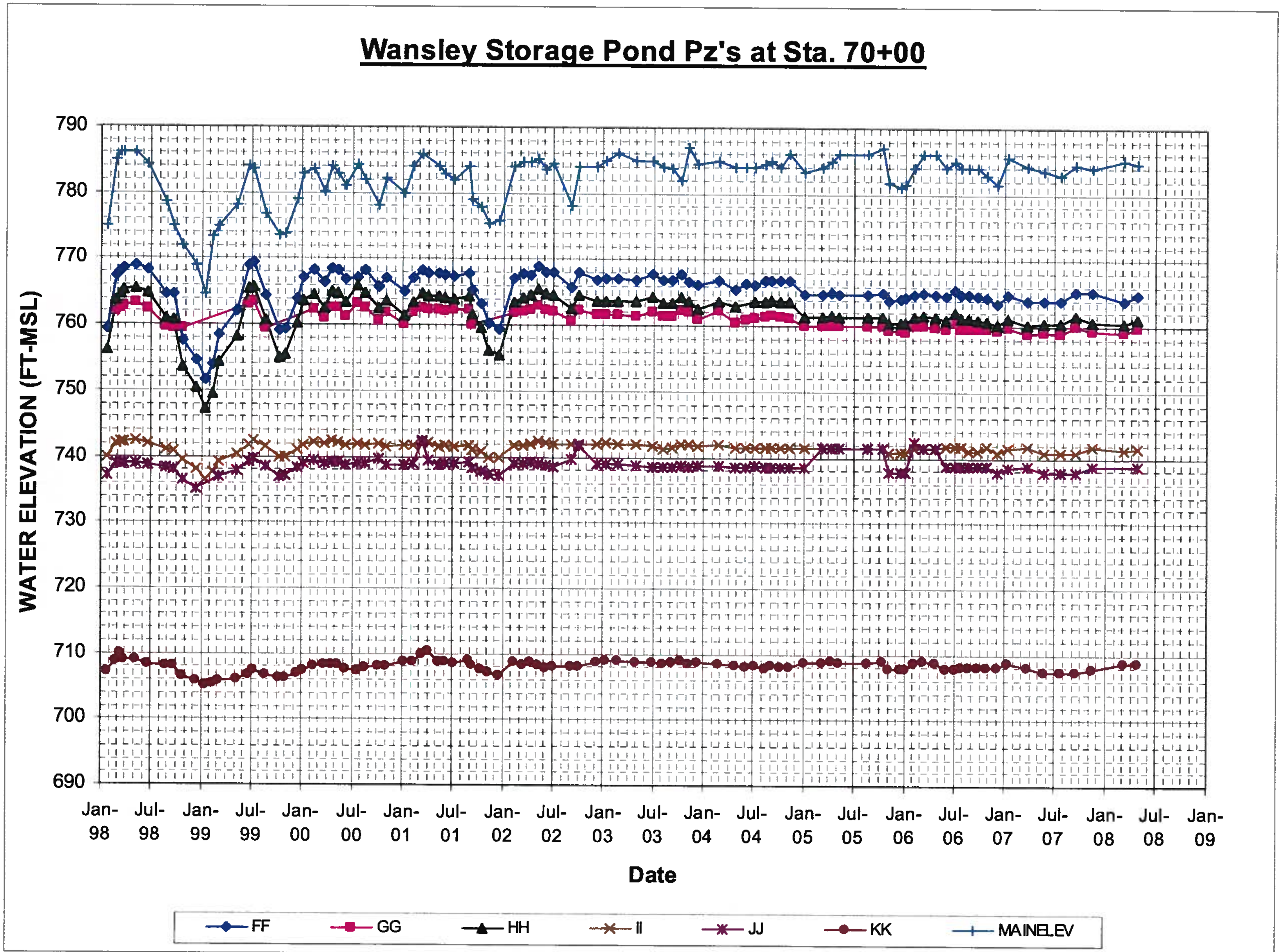

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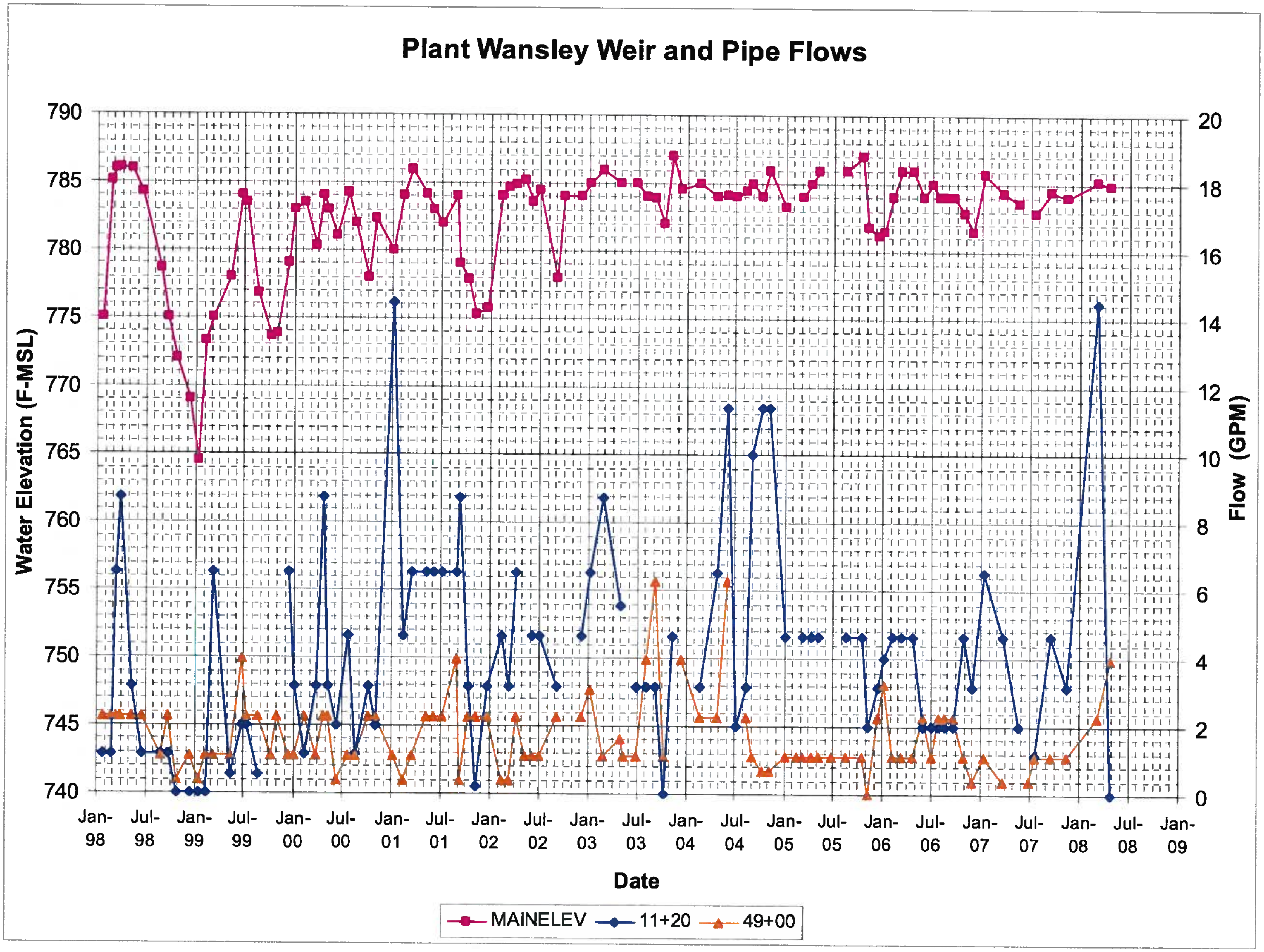

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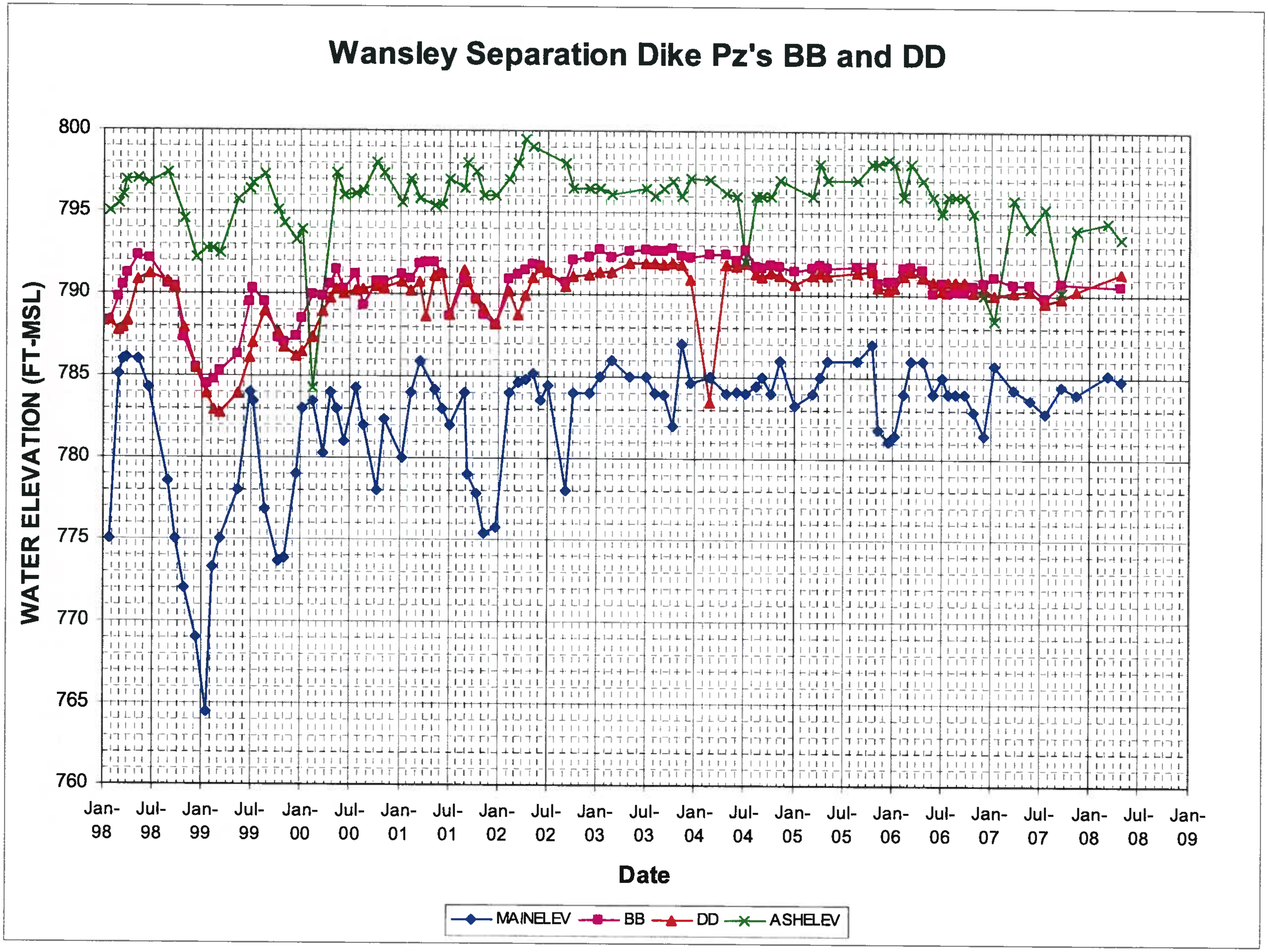

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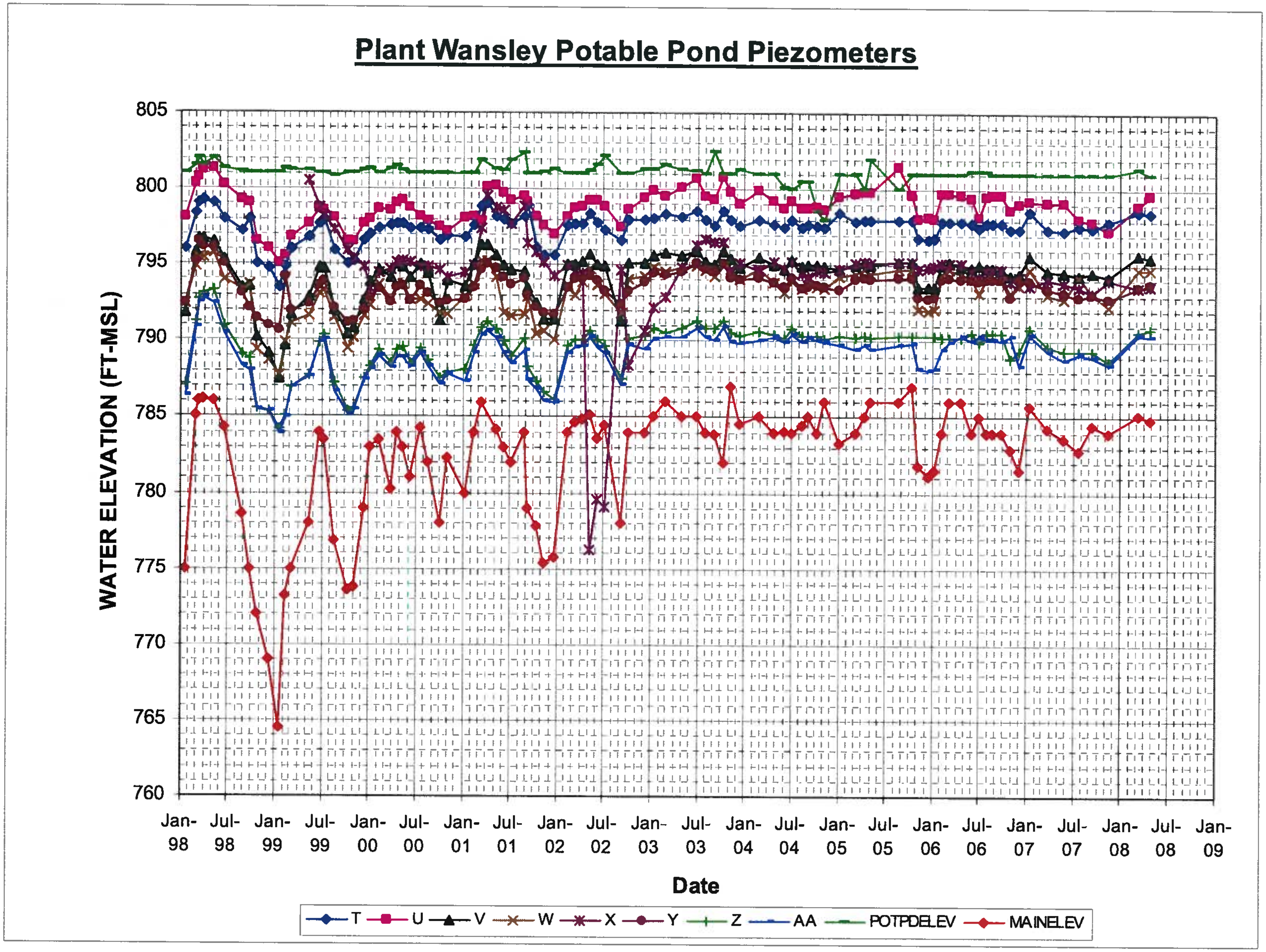

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P L A N T   W A N S L E Y

EARTH EMBANKMENTS

FINAL REPORT

AND

APPENDICES

GEORGIA POWER COMPANY
CIVIL ENGINEERING DEPARTMENT

MAY, 1975

TABLE OF CONTENTS

APPENDICES

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Appendix I	Compilation of Preliminary Reports and Investigations
Appendix II	Procedures for Quality Control
Appendix III	Designation of Quality Control Responsibility
Appendix IV	East Dike Daily Inspection Progress Reports
Appendix V	Storage Pond Dike, Separation Dam, Potable Water Supply Dam, Soils Reports

VOLUME 2

Appendix A	East Dike, Compaction Reports
Appendix B	Storage Pond Dike, Compaction Reports

VOLUME 3

Appendix C	Separation Dike, Compaction Reports
Appendix D	Potable Water Supply Dam, Compaction Reports

INTRODUCTION

The following narrative and attached appendices are in response to letter, Southern Services, dated February 27, 1975, requesting a compilation of design and construction data for the earth dams at Plant Wansley. Specifically, the letter requested information on the following:

a. Dam construction history.

b. Identification of borrow pits used for various portions of the dam.

c. Field compaction control and results summary.

d. Sources of riprap, filter material.

e. Identification of all Georgia Power Company, Law Engineering and Contractor personnel who inspected or supervised the work with the dates of their involvement.

Detailed studies on all of the earth dam portions of the project are on file with Southern Services, and are listed by date and title in Appendix I. The plans and specifications for the project, including the as-built drawings, are also available. The narrative report will therefore be relatively brief, but will be supported by the specific reports and detailed studies made throughout the design and construction period either by reference or in appendices. The appendices also contain daily and weekly reports, and field control data, if reference to these details should ever be required.

The information in the report was assembled by T.B. Chaudhary in the form of a preliminary document. It was reviewed and revised in the Civil Engineering Department of Georgia Power Company. In accord with the items "a" through "e" above, the report initially discusses the general construction history, including the personnel involved in the construction, inspection and supervision of the dam and dikes. Subsequent sections describe in more detail the construction of the various dike or dam segments. The data on compaction control and test results for each segment is appended, as well as selected photographs taken during earthwork construction. Special paragraphs on stone protection, which comprised an important part of the dike construction, are included.

CONSTRUCTION HISTORY

Field supervision of the project for Georgia Power Company throughout the construction period was under the direction of Mr. C.B. Head, Project Superintendent, and Mr. R.S. Ponsell, Civil Supervisor.

In early spring of 1972, Georgia Power Company selected Southland Constructors, Inc., as contractor for all grading work, including the dike and dam construction. Mr. Simpson Faulkner, President of Southland, was in charge of the Southland work until the end of January 1975, when he was replaced by Mr. Bobby Slaughter.

The survey work was initially done by Riley-Park-Hayden, who were later replaced by a Georgia Power Company survey group.

Law Engineering Testing Company was selected to provide a quality control program to assure that the grading work was performed in accordance with the plans and specifications, and to report any situation requiring special engineering attention. They assigned Mr. Michael R. Turner as Project Site Engineer to oversee all grading work. A team of soil technicians, including Law Engineering Testing Company and Georgia Power Company employees, was organized to observe and test the compaction of all fill work under the direction of Mr. Turner.

On May 1, 1972, the first compaction test strips were placed to evaluate the performance of the compaction equipment proposed to be used for the grading work. Law and Georgia Power Company's project construction group formulated procedures for Quality Control during fill placement for the dike construction (refer to Appendix #2). The procedure required that all phases of dike construction be witnessed by the civil group or their consultants.

On September 19, 1972, the contractor started stripping operations for the East Dike between Stations 0+00 and 22+00. Mr. Edward O. Prescott, Soils

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Engineer, Law Engineering Testing Company, was assigned to the project on September 25, 1972, to assist Mr. Turner, and to be responsible for the East Dike construction inspection. Mr. Prescott remained at the site until December 5, 1972 when construction of the East Dike was suspended because of inclement weather. When the work resumed on February 20, 1973, Mr. Jay Budde, Soils Engineer, LETCo, assumed Mr. Prescott's responsibilities. Mr. Budde remained on the site until March 5, 1973.

On February 23, 1973, Mr. Beadles of LETCo met with Messrs. Ponsell and Edwards of Georgia Power. As a result of this meeting, Mr. Charles Edwards of Georgia Power was assigned to assume the responsibilities of earth construction inspection and testing. Mr. Turner assisted Mr. Edwards until he became familiar with the inspection and testing operations. Mr. T.B. Chaudhary of LETCo was designated to provide consultation to Mr. Edwards on an as-requested basis. These changes of engineerng and inspection responsibilities are summarized in letters of confirmation dated March 1 and March 15, 1973 (Appendix #3). Under Mr. Edwards' supervision, the Separation and Storage Pond Dikes were partially completed, and the major portion of preparation and cleaning of the Potable Water Dam abutments was done.

Mr. Edwards requested assistance during a part of the foundation preparation for the Separation Dike. Mr. Thomas L. Cross (from June 5 to June 29, 1973) and Mr. David Bourne (from July 2 to August 17, 1973), both of LETCo, assisted Mr. Edwards during this phase of inspection. Mr. Edwards resigned from the Georgia Power Company on February 21, 1974. Mr. T.B. Chaudhary assumed the engineering inspection responsibilities for the remaining earth work related construction.

During this assignment, the Separation Dike was completed. Yellowdirt Creek was diverted for Potable Water Supply Dam construction, and the Potable Water Supply Dam was completed. Mr. Chaudhary was re-assigned on April 18, 1975, and the last section of the Storage Pond Dike, between Stations 50 and 70, was completed under the supervision of Georgia Power personnel.

CONSTRUCTION MATERIALS

Prior to and concurrent with construction, extensive explorations were conducted to identify and classify the soil and rock materials to be used for embankment construction. Reports for each of these detailed investigations are on file and are listed in Appendix I.

In brief, the site geology and soil profile are typical of much of the Southeastern Piedmont. The plant area and embankments are entirely within the Brevard Zone, which is a pronounced geologic lineament of deformed rocks extending from Alabama northeastward into North Carolina. The rocks at the site are biotite gneisses and schists, typically striking northeast with a southeast dip. Where sound and unweathered, they are highly competent, but because of pronounced foliation, they break into flat particles when excavated and crushed. However, this characteristic is not sufficiently detrimental to prevent the rock from being entirely adequate for riprap, bedding material, sub-ballast, and road base. It was not used for concrete aggregate.

Upland soils throughout the site are residual from in-place weathering of the underlying parent rock. These soils were used in the construction of the dikes and dams, and are generally sandy, micaceous, silts and silty, micaceous, fine sand. The upper layer, however, was more clayey because of advanced weathering of the minerals, and is generally described as red-brown, sandy, silty, clay or sandy, clayey silts.

In the valleys of the streams and smaller drainage features, alluvial soils cover the valley floors. These are primarily silts and fine sands, with pockets of soft, organic muck soils which required removal before placing embankments. They were not used for embankment fills.

Sources for embankment materials were explored prior to construction and are described in detail in appropriate reports (Appendix I). The location and approximate available yards in each area are shown on Drawing H-10061 and on the respective contract drawings. As more than one borrow area might be used at one time for several portions of the dam work, it is not reasonable to attempt to identify each portion of the embankments with a definite elevation of a specific borrow area. However, the daily and weekly reports for each of the structures identify the borrow areas and embankment stations being placed at the time of the report, and the source of the material at any station or elevation could be determined from these reports if necessary (Appendices IV and V). Air photos taken during construction are also helpful in identifying the borrow areas.

The residual soils from the borrow areas produced exceptionally fine embankments. Little difficulty was encountered in securing the required 100% compaction, with densitities averaging 100 to 110 lbs. per cu.ft. (See test reports, Appendices A through D). The strength of the material was demonstrated in several instances where trenches for drains were excavated with a backhoe, producing dense, vertical, soil walls. Laboratory tests made on soil samples taken from the embankment indicated strengths and permeabilities equal to or exceeding the design parameters (Appendix I, Reports 62 and 63).

Stone slope protection in the form of riprap and bedding material represented a substantial part of the cost of the embankment construction, and every attempt was made to secure the necessary rock from the site with a minimum of haul distance. Grading for the plant site required considerable excavation below top of sound rock, and the blasted gneiss was stockpiled for later use

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as riprap. Although the foliation of the gneiss produced blasted rock with a tendency toward flat particles, this feature was not sufficiently serious to effect its suitability for stone embankment protection. The blasted rock was stockpiled at the plant site after excavation until it was needed as riprap. Generally, the rock was reasonably well graded, and when placed on the embankment it was entirely satisfactory for embankment protection. The occasional stones which were too large for the specified riprap sizes were broken at the stockpile by a drop ball.

All riprap for the separation dike, and a portion of that required for the storage pond dam, was secured from the excavation stockpile. This supply was eventually depleted, and a quarry was opened in the storage pond area to provide the remainder of the rock needed for the storage pond dikes. All rock for the potable water supply dam was secured from a quarry opened for that purpose between the embankment and the spillway.

Bedding material between the embankment soil and the riprap layer was manufactured by crushing rock secured from site grading. The 3/8 inch crusher run material was mixed with 25% off-site white sand to produce a blend which was satisfactory with respect to gradation requirements. Riprap and bedding were placed on the dikes as follows:

<u>Separation Dike, Pool Side:</u>

a. Three feet of riprap on 1 foot of bedding up to elevation 745.

b. Two feet of riprap, without bedding, from elevation 745 to elevation 780.

c. Two feet of riprap on 1 foot of bedding from elevation 780 to top of embankment.

<u>Separation Dike, Ash pond Side:</u>

Two feet of riprap from 775 berm to top of embankment. Bedding material (12") from El. 790 to top. No rock protection below El. 775.

Potable Water Supply Dam:

Potable Water Side - 24" riprap with no bedding to El. 795. From El. 795 to top 24" riprap on 12" of bedding.

Storage Pond Side - 24" riprap with no bedding to El. 780. From El. 780 to top 24" riprap on 12" of bedding.

Storage Pond Dam:

All embankment protected by 2 feet of riprap with 1 foot of bedding above El. 780. Areas of natural ground between embankment sections not protected.

On most embankment projects it is difficult to secure compaction at the edge of each compacted lift. When riprap and bedding is placed against such uncompacted material, and saturation occurs after the pool is impounded, slumping occurs which is often mistakenly attributed to riprap failure. On the Wansley embankments this was avoided by overbuilding the fill and then removing the loose exterior soil with a Gradall. Bedding material and riprap were then placed by building the embankment about 12 feet above the previously placed riprap; dumping the stone on top of the embankment; and placing the required bedding and riprap with the Gradall. This procedure resulted in a dense, well graded rock mass without underlying loose embankment fill.

By planned use of available site materials, adequate rock protection for the Wansley embankments has been secured at minimum cost.

EMBANKMENTS

East Dike - The Storage Pond Dike from Stations 0 through 22 is referred to as the East Dike. Construction started on September 19, 1972, with stripping of the entire dike section and additional undercutting of soft material between Station 9+00 and 20+00 prior to proof rolling the foundation subgrade. Mr. Turner witnessed the proof rolling operation prior to fill placement. In conformance with the construction procedures, a LETCo engineer, Mr. Prescott, was assigned the responsibility of construction inspection of the East Dike, starting September 25, 1972.

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On September 22, 1972, it was discovered that the upstream face of the dike was constructed on a 2(H):1(V) slope rather than 3:1, as specified. The contractor was directed to correct the slopes by benching in the addition width of the dike. (Appendix IV).

Excavation for the longitudinal drain between Station 7+50 and 9+50 was started on September 22. Initially, vertical sand drains (18" in diameter) were installed from Stations 7+65 through 11+65. Each drain was advanced to the natural ground and backfilled with concrete sand densified using concrete vibrators. After installation of the vertial drains, the specified longitudinal drains were constructed using a #57 stone core encased in one foot of concrete sand. All vertical, longitudinal, and transverse drains were constructed in this manner according to the specifications. To determine the effectiveness of the internal drains, a flow test was conducted on October 11, 1972. Water poured into the longitudinal drain at Station 17+10 started flowing through the transverse drain at Station 16+15, indicating that the drain was operational and effective (Appendix IV).

Because of inclement weather, construction of the East Dike was suspended on December 6, 1972. When work resumed on February 20, 1973, Mr. Prescott was replace d by Mr. Budde. With the exception of bedding and riprap placement on the upstream face, the dike was essentially completed by March 5, 1973. The bedding (1 foot thick) and riprap (2 feet thick) was placed in December 1974 and January 1975. This work was done according to the plans and specifications.

Detailed daily inspection reports for the East Dike are included in the "Dike Construction Progress Report," Appendix IV. The compaction test reports are attached as Appendix A.

<u>Storage Pond Dike</u> - The dike between Stations 22 and 110 was referred to during construction as Storage Pond Dike. The main fill embankment extends from Station 33 to Station 85. The section from Station 85 to 110 is primarily cut, and low embankment extends from Stations 95 and 98, and from Stations 105

to 108. Rock was blasted to obtain the specified elevation between Station 85 and 98 and from 109 to 110.

A cofferdam was constructed from Stations 60 to 70 and Yellowdirt Creek was diverted through the minor diversion ditch shown on Plan H-12350. Subsequently, the major diversion ditch was excavated. Presplit rock blasting techniques were required through the ridge for this excavation. The foundation was then cleaned and leveling concrete fill placed to the specified pipe invert elevation. Daniel Construction Company installed the twin steel pipe culverts and encased them in structural concrete. The north end of the twin steel pipes was extended with corrugated metal pipes. After diversion culverts were completed, Yellowdirt Creek was diverted through the pipes.

To facilitate dewatering of the remaining dike foundation at this location, several ditches were excavated and water pumped from a sump located at the south end of the dike. For dewatering the west side of the culvert, another sump was maintained to the left of the major diversion ditch. All alluvial soil (consisting of clay, sand, and gravel) was removed to rock beneath the entire dike foundation. After satisfactory clean-up of the foundation, select silty clay was used to start the embankment. The first layer of the fill was rolled with a penumatic tire roller to obtain better compaction on the uneven rock surface.

Fill placement proceeded satisfactorily and all internal vertical, longitudinal and transverse drains were installed according to plan (except as noted below) using sand purchased from T&L Company and rock manufactured at the site. The elevations of the longitudinal and transverse drain between Stations 54 and 70 were changed by Georgia Power Company's survey group. The actual elevation changes were noted on the plan and forwarded to Southern Services.

Daily compaction reports for the Storage Pond Dike are attached as Appendix B.

Separation Dike - Detailed exploration and design studies for the Separation Dike are contained in Communication No. 39, Appendix I. The diversion scheme and construction drawings are shown on Dwgs. H-12364 through H-12366, and Dwgs. H-12396 through H-12398.

The plans required the removal of all alluvial soils and all sand and gravel from the core area, and the removal of the alluvial material only from under the balance of the embankment. Initial work on stripping began on May 17, 1973, and details of the construction of the embankment are contained in the reports shown in Appendix V. In brief, a 48-inch corregated metal pipe was installed for diversion of the creek. The upstream portion of the embankment, Stage 1, was constructed, after stripping, to El. 745. The core area in the flood plain was then undercut to weathered rock, and fill was compacted onto the inspected rock surface. Drainage was accomplished with open ditches and pumping from sumps. The location of the ditches and sumps are shown on report dated September 14, 1973, Appendix V.

Soils used for embankment fill were lean clays and silts obtained from borrow areas as described in the weekly reports (Appendix V) and compaction reports (Appendix C). Unit weights average 100 to 110 lbs per cu.ft., and 100% density was obtained. During September and October, 1973, sandy material was encountered in the borrow areas. Samples of the material was placed in the dike were obtained, and laboratory tests were conducted. The results showed the materials to be satisfactory with respect to design parameters (Communications 62 and 63, Appendix I).

On May 2, 1974, a dam was constructed to stop the water flow through the diversion pipe and both ends of the pipe were plugged with approximately 8 feet of concrete. The foundations for the balance of the dike were prepared, and fill placement continued. The procedures for tying in the second stage construction with the first stage dike are described in letter dated September 28, 1973, Appendix V. The horizontal drainage blankets shown on Dwg. H-12365 were constructed, using at first sand from Yellowdirt Creek, later supplemented by sand purchased from T&L Company of Whitesburg, Georgia.

Stone protection was placed on the embankment as described in the preceeding section of this report under "Construction Materials."

Potable Water Supply Dam - Details of the exploration and design for the Potable Water Supply Dam are described in Communications Nos. 43,44,46,47, and 53. Initial stripping began during the first week of November 1973 under the field supervision of Charles Edwards. Excavation of the valley section and the abutments was generally according to Dwg. H-12352, except that over-excavation of the east abutment produced a near vertical face from top of rock at about elevation 740 to overburden at 780. This face was later dressed back as the embankment was placed to produce a sloping contact between the fill and the weathered rock abutment (see attached photos).

Both abutments contained rock outcrops which would have prevented proper compaction of the embankment fill. These were blasted with light charges during foundation preparation to permit proper compaction of the fill against the abutment.

The 72" concrete pipe which will provide permanent control of the Potable Water Supply Pond was used for diversion of the creek (Dwg. H-12356). To control the stream flow during construction of the concrete pipe, the contractor constructed a wooden wall parallel to the stream channel. Holes 8" in diameter were drilled on about 10' centers for anchoring vertical wooden posts.

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Tongue and groove joint laggings were then installed between the posts and anchored with sand bags. The creek was diverted to the east side of the wall, providing a fairly dry area for the construction of the concrete pipe. (See attached photographs for diversion details.)

All sand and gravel, alluvium, and broken rock debris were removed from the pipe foundatin and fill concrete placed to the specified elevation. After completion of the foundation work, the concrete pipe was installed and the lower half encased in concrete. Daniel Construction Company then built the north and south head walls and apron. The water was diverted through the pipe and a cofferdam constructed at the north end of the proposed dam to obtain a dry working area on both sides of the pipe.

The west side of the pipe area was cleaned first. Concrete was placed in any narrow slots in the foundation rock to facilitate the initial fill compaction. The first layer of embankment was selected clayey material compacted with pneumatic tired equipment. The fill was placed to the level of the top of the pipe. The east side of the pipe was then cleaned, leveled and similarly filled. When the embankment level reached the vertical cut described previously, the bank was sloped to allow better fill compaction and bond to the abutment.

The sand plug and sand-gravel drains were installed on both sides of the concrete pipe accodring to Dwg. H-12356. All upstream and downstream horizontal sand blankets were installed as specified with sand purchased from T&L Company. Stone protection for both upstream and downstream embankment slopes was 12" of bedding material and 24" of riprap. The bedding material was manufactured from the stockpile stone, and riprap stone was secured from a quarry opened for that purpose west of the embankment.

Southland Power Constructors excavated the spillway channel, the lower end of which required blasting of rock to obtain the specified elevation. The spillway structure itself was built by Daniel Construction Company.

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SUMMARY

The material contained in this report is intended to briefly furnish information on the personnel who supervised the inspection of the embankments, together with sufficient data to permit identification of the reports which are available for all portions of the project. If it should ever become necessary to review the construction details of any part of the embankment, the proper field inspection report contained in these appendices, together with the project plans and the appropriate portions of the specifications, should be sufficient to identify the records and the procedures used for that part of the project.

Dam embankments constructed of compacted Piedmont soils on properly prepared Piedmont foundations have an excellent performance record. The Wansley foundations are strong and relatively impervious, and the residual Piedmont soils, properly compacted, make excellent embankment fill. The Wansley embankments were conservatively designed, with adequate provisions for foundation and embankment drainge, and with heavy riprap protection against wave action. There is no feature of the construction which should ever be a cause for concern. However, if it should become necessary at some future date to investigate a feature or area of the work, the design studies and the plans and specifications, together with the construction records contained herein, should be adequate for determination of the problem and to indicate any necessary remedial work.

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11 App. II

LAW ENGINEERING TESTING COMPANY

Geotechnical and Materials Engineers

412 PLASTERS AVENUE, N.E. / ATLANTA, GEORGIA 30324 / (404) 873-4761

PROCEDURES FOR QUALITY CONTROL DURING FILL PLACEMENT FOR DIKE CONSTRUCTION

GENERAL

(1) All phases of dike construction will be witnessed by the civil group or their consultants to verify that the specifications and design drawings are adhered to and to verify that conditions in the field are similar to those upon which the designs were based. No changes in the specifications or designs will be made without prior approval of the design group of Georgia Power Co.

(2) A soil technician will be assigned to specific areas of dike construction on a full-time basis to carry out the work as prescribed in this procedure.
Note: The contractor must notify the soils technician in advance of his initiating any work in areas of dike construction.

(3) The soil technician and site soil engineer will have authority to stop all dike construction in a given area if the design specifications and drawings are not being followed.

FILL CONTROL

(4) All areas to receive fill will be thoroughly inspected by the site soils engineer to verify that adequate stripping of topsoil and organic debris is performed.

(5) During filling, the earth moving operations will be continuously monitored visually and with testing to verify that proper soils are being utilized and that adequate compaction is being achieved.

(6) At least one (1) density test will be made for each approximate 1500 yards of fill placed.

(7) The nuclear density gage shall be utilized in monitoring the inplace density of the fill material. However, approximately twenty percent of tests made with the nuclear device will be verified by conventional sand cone or shelby tube methods, as described in the Quality Assurance Manual.

(8) If the dry density obtained by the nuclear gage method varies by more than 4 lbs. from that of the conventional method, an additional conventional test will be made. The average density of the two (2) conventional method tests will then be compared with the average of the previous five (5) tests with the nuclear gage on that particular fill lift. If the average densities obtained by this procedure vary by less than 4 lbs., the tests will be considered valid. If they vary by more than 4 lbs. the site soils engineer will be consulted as to need for further testing of the suitability of the fill.

(9) Generally, the density as determined by the nuclear density gage will be that which will be compared with the compaction curves for determination of suitability of compaction.

(10) The density of the fill will be considered failing if a degree of compaction of less than 100 percent of the Standard Proctor Maximum dry density is obtained. Additional densification of the fill will be required if less than 100 percent is obtained.

INTERNAL DRAINS

(11) The construction of the internal drains shall be continuously observed by a soils engineer from the civil group to verify that the drain locations are as required and that proper thicknesses of the required materials are installed.

(12) The materials in the drains shall be compacted to the suitability of the soils engineer.

(13) Fine aggregate and coarse aggregates being utilized in drain construction will be tested each day to verify that their gradation is in compliance with the design requirements.

(14) On an occasional basis, the soils engineer will inject water into the drains prior to their being covered with fill to verify that they will perform satisfactorily.

RIP-RAP PLACEMENT

(15) The installation of rip-rap will be continuously observed by an engineer or technician from the soil group.

(16) He will verify that the required thicknesses of both the cushion blanket of fine stone and outer layer of armor stone are placed.

(17) The cushion blanket material will be tested daily to verify that its gradation is in compliance with the specifications.

(18) The armor stone will be visually inspected and volume measurements of pieces made to verify that its general gradation and maximum stone size are in compliance with the specifications.

QUALITY CONTROL
[illegible] STEAM PROJECT
CIVIL
ELEC
MECH
FILE
LAW ENGINEERING TESTING COMPANY

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From App. V.
[initials]

September 28, 1973

Mr. G. B. Dougherty
Southern Services Inc.
P. O. Box 2625
Birmingham, Alabama 35202

Subject: Borrow Material And Construction Procedures For The Plant Wansley Separation Dam

Dear Mr. Dougherty:

After encountering low density borrow material (90 to 95 pounds per cubic foot dry density) and very sandy material, we decided that additional testing was needed. A two-foot lift of the sandy material was placed on the upstream edge of the separation dam. Six undisturbed samples were obtained on September 27. These samples were sent to Law Engineering Testing Company for triaxial testing.

As soon as the weather permits, a two-foot lift of the low density material will be placed. This test lift will only cover an area sufficiently large enough to obtain the same compactive effort as is applied to large fill areas. We will obtain six more undisturbed samples for triaxial testing. Until we obtain the test results and your written approval, this low density material will only be placed in one six-inch lift per ten feet of fill. No additional sandy material will be used until we get your written approval.

All triaxial test results and all in-place density test results on the separation dam will be forwarded to you. After the results of these triaxial tests are obtained, we will decide on a definite schedule of triaxial testing. We plan to obtain five additional undisturbed samples of the normal specified fill material for triaxial testing as soon as filling resumes on the separation dam.

As to your question on tying the Stage I Construction to the remaining fill, we plan to continuously bench into the sloping fill. We will have a dozer cut into the existing fill until we obtain material that has the specified density as verified by in-place density tests. Close observation is provided by me and the field technicians to assure that this operation is performed correctly. It is simple to visualize that a proper benching operation requires that, at all times, the compacted material into which the horizontal bench is cut must be showing on the vertical portion of the bench cut.

CONFIDENTIAL BUSINESS INFORMATION

Mr. G. B. Dougherty -- 9-28-73

When tying the fill to the existing abutments, several procedures are used. Steep abutments are cut back as much as possible. The existing natural ground is scarified completely before fill placement starts. The abutment is benched, if necessary. The rollers continuously run from the fill material onto the abutment. Since the sheeps foot or grid roller leaves the upper six inches of the compacted fill in a loose state, successive layers are fused together in a continual process, insuring an excellent seal between the existing abutment and the placed fill.

Yours very truly,

GEORGIA POWER COMPANY

Charles A. Edwards
Senior Engineering Associate

CAE:esw

cc: Mr. R. S. Ponsell
Mr. Don Foster
Quality Assurance File

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

From APPC 2-5-76

PROJECT: Lumsley
JOB NO.:
AREA: [illegible]

Night Shift

DATE: 10 5 73
DENSITY STANDARD COUNT: [illegible]
MOISTURE STANDARD COUNT: [illegible]

(A) Test Number	1	2	3	4	5	6	7	8
(B) Probe Depth	6"							
(C) Dens. Count	432	444	436	437	432	428	436	426
(D) C ÷ Std Count								
(E) Wet Wt. (lb/ft^3)	127.0	125.5	126.5	126.5	127.0	127.5	126.6	128.0
(F) Moist Count	1260	1208	1224	12[illegible]	1264	1218	1222	[illegible]
(G) F ÷ Std Count								
(H) Wt. Moist (lbs)	25.4	24.2	24.6	21.8	25.4	25.2	24.6	[illegible]
(I) Dry Wt.	101.6	101.3	101.9	101.7	101.[illegible]	102.3	101.9	[illegible]
(J) Proctor Wt.	100	100	100	100	[illegible]	100		
(K) % Comp. I ÷ J	100	100	100	100	100			
(L) % Moist								
(N) Location	18+00 ℄ →	[illegible]70 →	20+[illegible] 80' ℄ →	[illegible] →	[illegible]	[illegible]	[illegible]	[illegible]
(O) Elev.	744	745	749	750	753	754	754	750

Compaction Required [illegible]

CONFIDENTIAL BUSINESS INFORMATION

Technician [illegible]

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT: WANSLEY
JOB NO.:
AREA: SEPARATION DAM

DATE: OCT 4, 1973
DENSITY STANDARD COUNT: 231
MOISTURE STANDARD COUNT: 1271

(A) Test Number	1A	2A	3A	4A	5A			
(B) Probe Depth								
(C) Dens. Count	408	406	392	416	396			
(D) C ÷ Std Count								
(E) Wet Wt. (lb/ft^3)	130.0	130.2	132.0	129.0	131.5			
(F) Moist Count	1130	990	980	1060	1060			
(G) F ÷ Std Count	22.4	19.1	18.9	20.8	20.8			
(H) Wt. Moist (lbs)								
(I) Dry Wt.	107.6	111.1	113.1	108.2	110.7			
(J) Proctor Wt.								
(K) % Comp. I ÷ J	FOR TRIAXIAL TESTING							
(L) % Moist								
(N) Location	5+00 150' L ℄	4+25 135' L ℄	3+25 135' LT ℄	3+00 160 LT ℄	3+75 160 LT ℄			
(O) Elev.	759	762	767	768	767			

Compaction Required

CONFIDENTIAL BUSINESS INFORMATION

Technician M. K

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT: [illegible]
JOB NO.:
AREA: [illegible]

[illegible] Sheet

DATE: 10 7 [illegible]
DENSITY STANDARD COUNT: [illegible]
MOISTURE STANDARD COUNT: [illegible]

(A) Test Number	9	10	11	12	13	[illegible]	[illegible]	[illegible]
(B) Probe Depth								
(C) Dens. Count	422	[illegible]	[illegible]	[illegible]	412	414	924	[illegible]
(D) C ÷ Std Count								
(E) Wet Wt. (lb/ft3)	[illegible]	129.0	127.5	[illegible]	129.5	[illegible]	128.[illegible]	130.0
(F) Moist Count	1134	1090	[illegible]	1119	1084	[illegible]	1108	[illegible]
(G) F ÷ Std Count								
(H) Wt. Moist (lbs)	[illegible]	21.5	19.1	22.0	[illegible]	[illegible]		[illegible]
(I) Dry Wt.	[illegible]	107.5	108.4	[illegible]	108.2	[illegible]	[illegible]	[illegible]
(J) Proctor Wt.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			[illegible]
(K) % Comp. I ÷ J	[illegible]	100	[illegible]	102	[illegible]	[illegible]	[illegible]	[illegible]
(L) % Moist								
(N) Location	24+[illegible] 40'L ℄	[illegible] →	22+[illegible] 100'L ℄	[illegible] →	23+25 35'L ℄	[illegible] →	[illegible] 150'L ℄	[illegible] →
(O) Elev.	746	747	746	745	746	747	[illegible]	[illegible]

Compaction Required 100%

CONFIDENTIAL BUSINESS INFORMATION

Technician VD/10

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT: Wansley
JOB NO.:
AREA: scrubber NIGHT SHIFT

DATE: 10-8-73
DENSITY STANDARD COUNT: 231
MOISTURE STANDARD COUNT: 1211

(A) Test Number	9	10	11	12	13	14	15	16
(B) Probe Depth								
(C) Dens. Count	426	434	442	428	446	444	434	444
(D) C ÷ Std Count								
(E) Wet Wt. (lb/ft^3)	128.0	126.5	125.5	127.5	125.0	125.5	126.5	125.5
(F) Moist Count	1236	1268	1214	1226	1210	1228	[illegible]	1236
(G) F ÷ Std Count								
(H) Wt. Moist (lbs)	25.0	24.2	24.2	24.8	24.2	24.8	25.0	25.0
(I) Dry Wt.	103.0	102.3	101.3	102.7	100.8	100.7	101.5	100.5
(J) Proctor Wt.	100	100	100	100	100	100	[illegible]	100
(K) % Comp. I ÷ J	100	100	100	100	100	[illegible]	[illegible]	100
(L) % Moist								
(N) Location	23+00 90' R ℄	23+20 →	24+50 25' R ℄	24+[illegible] →	25+50 ℄	26+[illegible] →	27+[illegible] 6' L	27+85 →
(O) Elev.	[illegible]	[illegible]	754	75[illegible]	754	7[illegible]	755	756

Compaction Required 100%

CONFIDENTIAL BUSINESS INFORMATION

Technician WD/TO

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT: WANSLEY
JOB NO.:
AREA: ~~SED~~ DAM

DATE: 10/8/73
DENSITY STANDARD COUNT:
MOISTURE STANDARD COUNT:
DAY SHIFT

(A) Test Number	17	18	19	20				
(B) Probe Depth	6"			6"				
(C) Dens. Count	466	502	506					
(D) C ÷ Std Count								
(E) Wet Wt. (lb/ft^3)	122.5	118.5	118.0					
(F) Moist Count	1040	928	984					
(G) F ÷ Std Count								
(H) Wt. Moist (lbs)	20.3	17.8	18.9					
(I) Dry Wt.	102.2	100.7	99.1					
(J) Proctor Wt.	101.0	101.0	101.0					
(K) % Comp. I ÷ J	100+	99.8	98.3					
(L) % Moist			REROLLED					
(N) Location	17+90 3' R ℄	19+50 160' R ℄	19+30 170' R ℄					
(O) Elev.	710	718	717					

Compaction Required 100%

CONFIDENTIAL BUSINESS INFORMATION

Technician N.L. & C.F.

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT: Wansley
JOB NO.:
AREA: Sep Dam   Night Shift

DATE: 10-7-73
DENSITY STANDARD COUNT: 231
MOISTURE STANDARD COUNT: 1271

(A) Test Number	1	2	3	4	5	6	7	8
(B) Probe Depth	6"							
(C) Dens. Count	464	448	452	444	446	438	442	452
(D) C ÷ Std Count								
(E) Wet Wt. (lb/ft^3)	123.0	125.0	124.5	125.5	125.0	126.0	125.5	124.5
(F) Moist Count	1158	1174	1160	1202	1158	1240	1200	1125
(G) F ÷ Std Count								
(H) Wt. Moist (lbs)	23.2	23.4	23.2	24.0	23.2	25.0	24.0	22.4
(I) Dry Wt.	98.8	101.6	101.3	101.5	101.5	101.0	[illegible]	[illegible]
(J) Proctor Wt.	100	100	100	100	100	100	[illegible]	[illegible]
(K) % Comp. I ÷ J	~~100~~ 99	100+	100+	100+	100	100+	[illegible]+	100+
(L) % Moist	REROLLED							
(N) Location	17+50 30'R ℄	17+65 →	18+75 ℄	18+85 →	20+00 50'L ℄	[illegible] →	[illegible] 20'L ℄	[illegible]
(O) Elev.	740	741	742	745	751	752	[illegible]	4

Compaction Required 100 %

CONFIDENTIAL BUSINESS INFORMATION

Technician VD

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT: Wansley
JOB NO.:
AREA: Sep. Dam

D

DATE: 10-7-73
DENSITY STANDARD COUNT: 2.31
MOISTURE STANDARD COUNT: 1271

(A) Test Number	1	2	3	4	5	6	7	8
(B) Probe Depth								
(C) Dens. Count	498	462	478	490	458	470	496	488
(D) C ÷ Std Count								
(E) Wet Wt. (lb/ft^3)	119.0	123.2	121.5	120.0	123.7	122.2	119.2	120.0
(F) Moist Count	1260	1100	990	1170	1080	1120	1000	1010
(G) F ÷ Std Count								
(H) Wt. Moist (lbs)	25.4	21.7	19.1	23.4	21.3	22.2	19.2	19.6
(I) Dry Wt.	93.6	101.5	102.4	96.6	102.4	100.0	100.0	100.4
(J) Proctor Wt.	92	100	100	99	102	100	100	100
(K) % Comp. I ÷ J	100	100	100	100	10[illegible]	[illegible]		
(L) % Moist								
(N) Location	20+00 100 LT ℄	→ +15	22+00 →	+15	24+00 →	+15	26+00	→ +15
(O) Elev.	755	754	753	752	753	752	751	750

Compaction Required ____________

Technician M. K.

CONFIDENTIAL BUSINESS INFORMATION

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT: WAnsley
JOB NO.:
AREA: SeP DAM

Night Shift

DATE: 10-6-77
DENSITY STANDARD COUNT: 231
MOISTURE STANDARD COUNT: 1271

(A) Test Number	1	2	3	4	5	6	7	8
(B) Probe Depth	6"							
(C) Dens. Count	402	426	418	[illegible]	410	416	406	422
(D) C ÷ Std Count								
(E) Wet Wt. (lb/ft^3)	131.0	127.5	129.0	[illegible]	130.0	129.0	130.0	125.5
(F) Moist Count	1202	1180	1219	1152	940	[illegible]	1116	[illegible]
(G) F ÷ Std Count								
(H) Wt. Moist (lbs)	24.0	23.6	24.2	[illegible]	18.0	21.1	22.2	[illegible]
(I) Dry Wt.	107.0	103.9	104.8	[illegible]	112.0	107.9	107.8	108.2
(J) Proctor Wt.	106.3	103	103	103	110	106.3	[illegible]	106.3
(K) % Comp. I ÷ J	100	100	100	[illegible]	[illegible]	100	[illegible]	[illegible]
(L) % Moist								
(N) Location	17+50 30' L	17+60 →	18+75 160' L	15+85 →	19+80 10' L	[illegible] →	[illegible] 125' L	[illegible] →
(O) Elev.	740	741	742	743	[illegible]	[illegible]	[illegible]	[illegible]

Compaction Required 100

Technician [illegible]

CONFIDENTIAL BUSINESS INFORMATION

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT: W.Ansley
JOB NO.:
AREA: Spillway

Night Shift

DATE: 10-7-73
DENSITY STANDARD COUNT: 231
MOISTURE STANDARD COUNT: 1271

(A) Test Number	9	10	11	12	13	14	15	16
(B) Probe Depth	6"							
(C) Dens. Count	432	428	442	436	434	426	426	436
(D) C ÷ Std Count								
(E) Wet Wt. (lb/ft^3)	127.0	127.5	125.5	126.5	126.5	127.3	126.0	126.5
(F) Moist Count	1228	1226	1202	1216	1222	1240	1222	1238
(G) F ÷ Std Count								
(H) Wt. Moist (lbs)	24.8	24.8	24.0	24.6	24.6	25.0	24.8	25.0
(I) Dry Wt.	102.2	102.7	101.5	101.9	101.9	102.3	101.2	101.5
(J) Proctor Wt.	100	100	100	100	100	[illegible]	[illegible]	100
(K) % Comp. I ÷ J	100	100	100	100	100	[illegible]	[illegible]	100
(L) % Moist								
(N) Location	19+75 40' L ℄	19+85 →	21+50 20' R ℄	21+65 →	24+75 ℄	24+85 →	26+[illegible] 25' R ℄	[illegible] →
(O) Elev.	750	751	754	755	756	757	757	756

Compaction Required 100%

Technician [illegible]

CONFIDENTIAL BUSINESS INFORMATION

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT: Wansley
JOB NO.:
AREA: Sep. Dam

DATE: 10-8-73
DENSITY STANDARD COUNT: 231
MOISTURE STANDARD COUNT: 1271
DAY SHIFT

(A) Test Number	1	2	3	4	5	6	7	8
(B) Probe Depth								
(C) Dens. Count	430	450	436	442	456	462	442	436
(D) C ÷ Std Count								
(E) Wet Wt. (lb/ft³)	127.2 127.2	124.7 124.7	126.2	125.7	124.0	123.2	125.2	126.2
(F) Moist Count	1040	1100	1030	1010	1120	1020	1000	990
(G) F ÷ Std Count								
(H) Wt. Moist (lbs)	20.3	21.7	20.1	19.6	22.2	20.0	19.3	19.1
(I) Dry Wt.	106.9	103.0	106.1	106.1	101.8	103.2	105.9	106.1
(J) Proctor Wt.	103	103	103	103	101	103	103	103
(K) % Comp. I ÷ J	100+	100+	100+	100+	100+	100+	100+	100+
(L) % Moist	19.5	22.0						
(N) Location	27+00 50Lt ℄	27+15 →	25+00 60Lt ℄	25+15 →	23+00 30Lt ℄	23+15 →	21+00 ℄	21+20 →
(O) Elev.	755	754	755	754	754	753	752	751

Compaction Required 100

Technician

CONFIDENTIAL BUSINESS INFORMATION

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT: WANSLEY
JOB NO.:
AREA: SEPARATION DAM

DATE: 10/8/73
DENSITY STANDARD COUNT: 231
MOISTURE STANDARD COUNT: [illegible]
DAY SHIFT

(A) Test Number	9	10	11	12	13	14	15	16
(B) Probe Depth	6"							6"
(C) Dens. Count	432	450	440	466	450	460	430	472
(D) C ÷ Std Count								
(E) Wet Wt. (lb/ft^3)	127.0	124.5	126.0	122.5	124.5	123.5	127.5	122.0
(F) Moist Count	1440	1396	1346	1336	1464	1114	1014	1196
(G) F ÷ Std Count								
(H) Wt. Moist (lbs)	29.6	28.7	27.5	27.3	30.1	22.0	19.6	19.3
(I) Dry Wt.	97.4	95.8	98.5	95.2	94.4	101.5	107.9	102.7
(J) Proctor Wt.	95.0	95.0	95.0	95.0	92.0	101.0	107.0	101.0
(K) % Comp. I ÷ J	100+	100+	100+	100+	100+	100+	100+	100+
(L) % Moist	LIGHT WEIGHT MATERIAL							
(N) Location	26+50 160'L℄	25+50 160'L℄	24+50 160'L℄	23+50 160'L℄	22+50 160'L℄	18+00 110'R℄	18+20 120'R℄	17+70 70'R℄
(O) Elev.	757	758	759	760	755	715	716	711

Compaction Required 100%

Technician M.K. C.E. 9-13

CONFIDENTIAL BUSINESS INFORMATION

2-5-76

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT:
JOB NO.:
AREA: Sep Dam

DATE: 9-27-73
DENSITY STANDARD COUNT: 231
MOISTURE STANDARD COUNT: 1271

Page 3

(A) Test Number	9	10	11	12	13	14		
(B) Probe Depth								
(C) Dens. Count	406	412	436	424	412	430		
(D) C ÷ Std Count								
(E) Wet Wt. (lb/ft^3)	130.0	129.5 127.6	126.5 126.3	128.0	129.5	127.0		
(F) Moist Count	1290	1280	1400	1320	1470	1380		
(G) F ÷ Std Count								
(H) Wt. Moist (lbs)	26.2	25.9	28.7	26.8	30.3	28.3		
(I) Dry Wt.	103.8	103.6	97.8	101.2	99.2	98.7		
(J) Proctor Wt.	100	100	98	100	95	98		
(K) % Comp. I ÷ J	100	100	100	100	100	100		
(L) % Moist								
(N) Location	100 L 72 12+00	→ 12+20	100 L 72 13+00	→ 13+20	125 L 72 13+50	→ 13+70		
(O) Elev.	710	711	706	705	707	706		

Compaction Required 100

Technician M. K.

CONFIDENTIAL BUSINESS INFORMATION

WORK SHEET

GEORGIA POWER COMPANY

FIELD DENSITY TEST (Shelby Tube Method)

Client ______________________ Date ______________

Project ______________________ Job / lab no. ______________

TEST NO.	W. W. SAMPLE & MOLD	WT. MOLD	W. W. SAMPLE	W. W. CU. FT.	W. W. MOIST SAMPLE	D. W. MOIST SAMPLE	W. MOIST	% MOIST	DRY DENSITY	*	% COMP.	LOCATION
10				127.8		83.6		19.3	106.6			See [illegible] 3
12				126.3				22.9	103.0			

* Tests Compared To:

Compaction Curve No. ______ Maximum ______ pcf. Optimum Moisture ______ %

Compaction Required ______ %

Mold Volume Factor ______

Not to be typed

Work performed by ______

CONFIDENTIAL BUSINESS INFORMATION

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT: [illegible]
JOB NO.:
AREA: [illegible]

DATE: 9-[illegible]-75
DENSITY STANDARD COUNT: 231
MOISTURE STANDARD COUNT: [illegible]

(A) Test Number	1	2	3	4	5	6		
(B) Probe Depth								
(C) Dens. Count	[illegible]	434	[illegible]	[illegible]	[illegible]	410		
(D) C ÷ Std Count								
(E) Wet Wt. (lb/ft^3)	128.2	[illegible]	[illegible]	[illegible]	[illegible]	122.7		
(F) Moist Count	1070	[illegible]	[illegible]	[illegible]	[illegible]	9[illegible]		
(G) F ÷ Std Count								
(H) Wt. Moist (lbs)	21.5	14.3	[illegible]	[illegible]	[illegible]	1.5		
(I) Dry Wt.	107.7	108.7	[illegible]	[illegible]	112.3	[illegible]2.2		
(J) Proctor Wt.	[illegible]	[illegible]	10[illegible]	[illegible]	[illegible]	[illegible]		
(K) % Comp. I ÷ J	102	[illegible]3	102	[illegible]	[illegible]	[illegible]		
(L) % Moist	20.0	[illegible]	[illegible]	[illegible]	7	[illegible]		
(N) Location	2+75 135 LT [illegible]	[illegible] 135 LT [illegible]	[illegible] F4C [illegible]	[illegible] 7[illegible]	[illegible]	[illegible] 65 [illegible]		
(O) Elev.	7[illegible]	[illegible]	[illegible]53	7[illegible]		[illegible]0		

Compaction Required 100%

Technician [illegible]

CONFIDENTIAL BUSINESS INFORMATION

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT: Wansley
JOB NO.:
AREA: Seperation Dam

DATE: ~~Sept~~ 22-1975
DENSITY STANDARD COUNT: 262
MOISTURE STANDARD COUNT: 1522

(A) Test Number	1	2	3	4	5	6	7	8
(B) Probe Depth	6"	←					→	6"
(C) Dens. Count	460	438	450	440	464	458	486	470
(D) C ÷ Std Count	126.4	129.5	128.0	128.9	126.5	127.0	123.9	125.5
(E) Wet Wt. (lb/ft^3)	~~23~~							
(F) Moist Count	1432	1422	1630	1472	1504	1548	1466	1386
(G) F ÷ Std Count								
(H) Wt. Moist (lbs)	23.2	23.0	27.0	24.0	24.7	25.4	23.8	22.3
(I) Dry Wt.	103.2	106.5	101.0	104.9	101.8	101.6	100.1	103.2
(J) Proctor Wt.	103	106	100	103	100	100	100	103
(K) % Comp. I ÷ J	100%	100%	100%	100%	100%	100%	100%	100%
(L) % Moist								
(N) Location	~~Left ℄~~ 60 FT Lt ℄ Sta 12+00	60 Ft Lt. ℄ Sta 12+15	Left ℄ 60 Ft Sta 13+05	60' Lt ℄ Sta 13+20	50' Lt ℄ Sta 14+30	~~50~~ Lt ℄ Sta 14+45	50' Lt ℄ Sta 15+05	50' Lt ℄ Sta 15+20
(O) Elev.	710 ~~12+00~~ ~~708~~ 710	711 ~~709~~ ~~707~~ ~~711~~	709	708	702	702	697	698

Compaction Required 100%

Technician A.N.L.

CONFIDENTIAL BUSINESS
INFORMATION

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT: Wansley
JOB NO.:
AREA: Seppum

Night

DATE: 9-26-73
DENSITY STANDARD COUNT: 231
MOISTURE STANDARD COUNT: 1271

(A) Test Number	1	2	3	4	5	6	7	8
(B) Probe Depth	6"							
(C) Dens. Count	408	422	416	412	406	408	418	420
(D) C ÷ Std Count								
(E) Wet Wt. (lb/ft³)	130.0	128.5	129.0	129.5	130.5	130.0	129.0	128.5
(F) Moist Count	1172	1194	1204	1192	1204	1188	1156	1182
(G) F ÷ Std Count								
(H) Wt. Moist (lbs)	23.4	23.8	24.0	23.8	24.0	23.8	23.2	23.6
(I) Dry Wt.	106.6	104.7	105.0	105.7	106.5	106.2	105.8	104.9
(J) Proctor Wt.	105	105	105	105	105	105	105	105
(K) % Comp. I ÷ J	100	100	100	100	100	100	100	100
(L) % Moist								
(N) Location	11+00 50'R ℄	11+15 →	12+50 80'R ℄	12+66 →	13+75 100'R ℄	13+85 →	14+25 30'R ℄	14+50 →
(O) Elev.	701	702	657	658	652	653	651	652

Compaction Required 100%

Technician V.D./T.D.

CONFIDENTIAL BUSINESS
INFORMATION

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT: Wansley
JOB NO.:
AREA: Seepdam

Night

DATE: 9-27-73
DENSITY STANDARD COUNT: 271
MOISTURE STANDARD COUNT: 1271

(A) Test Number	9	10	11	12	13	14	15	16
(B) Probe Depth								
(C) Dens. Count	402	412	408	406	398	416	404	414
(D) C ÷ Std Count								
(E) Wet Wt. (lb/ft^3)	131.0	129.5	130.0	130.0	131.5	129.0	130.5	129.5
(F) Moist Count	1174	1192	1216	1204	1090	1144	1216	1186
(G) F ÷ Std Count								
(H) Wt. Moist (lbs)	23.4	23.8	24.6	24.0	[illegible]	22.7	24.6	23.8
(I) Dry Wt.	107.6	105.7	105.4	106.0	110.0	106.3	105.9	105.7
(J) Proctor Wt.	106.5	[illegible]	105	106.3	[illegible]	106.3	[illegible]	[illegible]
(K) % Comp. I ÷ J	100	100	100	[illegible]	100	100	100	100
(L) % Moist								
(N) Location	11+75 100R ℄	11+85 →	12+50 ℄	12+65 →	13+25 50'R ℄	13+35 →	14+00 20'L ℄	14+10 →
(O) Elev.	704	705	758	759	694	653	651	652

Compaction Required 100%

Technician VD/TO

CONFIDENTIAL BUSINESS INFORMATION

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT: [illegible]
[redacted].: [illegible]
AREA: [illegible]

DATE: [illegible]
DENSITY STANDARD COUNT:
MOISTURE STANDARD COUNT:

(A) Test Number	[illegible]	2	[illegible]	[illegible]	[illegible]	6	7	8
(B) Probe Depth								
(C) Dens. Count	[illegible]	127	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	124
(D) C ÷ Std Count								
(E) Wet Wt. (lb/ft^3)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
(F) Moist Count	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	122
(G) F ÷ Std Count								
(H) Wt. Moist (lbs)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
(I) Dry Wt.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
(J) Proctor Wt.	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	
(K) % Comp. I ÷ J	[illegible]	[illegible]	102	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
(L) % Moist								
(N) Location	12+75 [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
(O) Elev.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Compaction Required [illegible]

Technician [illegible]

CONFIDENTIAL BUSINESS
INFORMATION

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT: [illegible]
JOB NO.: [illegible]
AREA: [illegible]

DATE: [illegible]
DENSITY STANDARD COUNT:
MOISTURE STANDARD COUNT:

(A) Test Number								
(B) Probe Depth								
(C) Dens. Count	[illegible]	[illegible]	[illegible]					
(D) C ÷ Std Count								
(E) Wet Wt. (lb/ft^3)	[illegible]	[illegible]	[illegible]	[illegible]				
(F) Moist Count	[illegible]	[illegible]	[illegible]	[illegible]				
(G) F ÷ Std Count								
(H) Wt. Moist (lbs)	[illegible]	[illegible]	[illegible]	15.0				
(I) Dry Wt.	102.1	[illegible]	[illegible]	99.5				
(J) Proctor Wt.	[illegible]	[illegible]	[illegible]	[illegible]				
(K) % Comp. I ÷ J	102	[illegible]	[illegible]	[illegible]				
(L) % Moist								
(N) Location	12+50 100 LT [illegible]	12+70 →	13+50 [illegible] LT [illegible]	[illegible]				
(O) Elev.	[illegible]	[illegible]	[illegible]	[illegible]				

Compaction Required [illegible]

Technician [illegible]

CONFIDENTIAL BUSINESS INFORMATION

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT: Wansley
JOB NO.:
AREA: Sep Dam

DATE: 9-25-73
DENSITY STANDARD COUNT: 231
MOISTURE STANDARD COUNT: 1271

(A) Test Number	1	2	3	4	5	6	7	8
(B) Probe Depth	6"							
(C) Dens. Count	452	446	428	434	418	436	432	444
(D) C ÷ Std Count								
(E) Wet Wt. (lb/ft^3)	124.5	125.0	127.5	126.5	128.5	126.5	127.0	125.5
(F) Moist Count	1202	1224	1234	1224	1148	1196	1192	1206
(G) F ÷ Std Count								
(H) Wt. Moist (lbs)	24.0	24.2	24.8	24.6	20.6	24.0	23.8	24.2
(I) Dry Wt.	100.5	100.8	102.7	101.9	107.9	102.5	103.2	101.3
(J) Proctor Wt.	100	100	100	100	106.3	100	100	100
(K) % Comp. I ÷ J	100	100	100	100	100	100	100	100
(L) % Moist								
(N) Location	10+50 ℄	10+80 →	11+50 80' R ℄	11+75 →	12+75 100' L ℄	12+85 →	14+00 25' R ℄	14+20 →
(O) Elev.	712	713	712	713	712	713	713	714

Compaction Required 100%

Technician VD / JD

CONFIDENTIAL BUSINESS INFORMATION

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT: W Ansley
JOB NO.:
AREA: Sep Dam

DATE: 9-26-73
DENSITY STANDARD COUNT: 231
MOISTURE STANDARD COUNT: 1271

(A) Test Number	9	10	11	12	13	14	15	16
(B) Probe Depth	6"							
(C) Dens. Count	460	454	436	442	416	452	456	458
(D) C ÷ Std Count								
(E) Wet Wt. (lb/ft^3)	123.5	124.0	126.5	125.5	129.0	124.5	124.0	123.5
(F) Moist Count	1178	1196	1232	1192	1012	1222	1180	1168
(G) F ÷ Std Count								
(H) Wt. Moist (lbs)	23.6	23.8	24.8	23.8	19.6	24.6	23.6	23.4
(I) Dry Wt.	99.9	100.2	101.7	101.7	109.4	99.9	100.4	100.1
(J) Proctor Wt.	100	100	100	100	108	100	100	100
(K) % Comp. I ÷ J	100	100	100	100	100	100	100	100
(L) % Moist								
(N) Location	10+50 40' L ℄	10+60 →	12+00 100' R ℄	12+10 →	13+00 100' L ℄	13+20 →	14+75 ℄	14+80 →
(O) Elev.	713	714	714	715	714	715	714	715

Compaction Required 100%

Technician VD/TO

CONFIDENTIAL BUSINESS INFORMATION

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT: Winsley
JOB NO.:
AREA: [illegible] Dam

DATE: 9/[illegible]
DENSITY STANDARD COUNT: [illegible]
MOISTURE STANDARD COUNT: [illegible]

(A) Test Number	1	2	3	4	5	6	7	8
(B) Probe Depth								
(C) Dens. Count	430	458	461	[illegible]	[illegible]	[illegible]	452	428
(D) C ÷ Std Count								
(E) Wet Wt. (lb/ft^3)	127.2 128	[illegible]	[illegible]	[illegible]	126.7	[illegible]	124.2	127.5
(F) Moist Count	1060	1060	970	[illegible]	[illegible]	1010	[illegible]	1020
(G) F ÷ Std Count								
(H) Wt. Moist (lbs)	20.6	20.5	16.7	[illegible]	21.1	19.	17.8	[illegible]
(I) Dry Wt.	106.4	[illegible]	104.5	[illegible]	[illegible]	[illegible] 6	[illegible]	[illegible] 7.6
(J) Proctor Wt.	[illegible] 4	104	[illegible]	98	[illegible]	104	[illegible]	[illegible] 7
(K) % Comp. I ÷ J	102	101	100	[illegible]	102	10	102	1
(L) % Moist	19.5 17.0							
(N) Location	27+50 5' Lt ℄ →	[illegible]	[illegible] 10' Lt ℄ →	[illegible]	25+50 [illegible] ℄ →	25+15	[illegible]	[illegible]
(O) Elev.	749	748	[illegible]	[illegible]	747	746	[illegible]	[illegible]

Compaction Required 100

Technician [illegible]

CONFIDENTIAL BUSINESS INFORMATION

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT: [illegible]
JOB NO.:
AREA: Sep [illegible]

DATE: [illegible]
DENSITY STANDARD COUNT: [illegible]
MOISTURE STANDARD COUNT: [illegible]

(A) Test Number	17	18						
(B) Probe Depth								
(C) Dens. Count	[illegible]50	[illegible]12						
(D) C ÷ Std Count								
(E) Wet Wt. (lb/ft^3)	124.7	125.7						
(F) Moist Count	1120	1100						
(G) F ÷ Std Count	22.2	21.7						
(H) Wt. Moist (lbs)	1625	[illegible]40						
(I) Dry Wt.	100	100						
(J) Proctor Wt.	103	104						
(K) % Comp. I ÷ J								
(L) % Moist								
(N) Location	21400 9017E	21420 — ″						
(O) Elev.	746	745						

Compaction Required 101

Technician [illegible]

CONFIDENTIAL BUSINESS
INFORMATION

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT: [illegible]
JOB NO.:
AREA: [illegible]

DATE: 9/25/72
DENSITY STANDARD COUNT: 231
MOISTURE STANDARD COUNT: 1271

(A) Test Number	[illegible]	10	11	[illegible]	13	14	15	16
(B) Probe Depth								
(C) Dens. Count	[illegible]	[illegible]	448	[illegible]	460	430	418	428
(D) C ÷ Std Count								
(E) Wet Wt. (lb/ft^3)	122.5	[illegible]	125.0	[illegible]	123.5	127.2	[illegible]	[illegible]
(F) Moist Count	[illegible]	[illegible]	1220	[illegible]	[illegible]	1040	[illegible]	1060
(G) F ÷ Std Count								
(H) Wt. Moist (lbs)	23.2	[illegible]	[illegible]	116	25	23.3	[illegible]	[illegible]
(I) Dry Wt.	99.3	[illegible]	100.4	[illegible]	[illegible]	106.9	94.7	[illegible]
(J) Proctor Wt.	98.0	104	[illegible]	106	98	104	[illegible]	[illegible]
(K) % Comp. I ÷ J	100	100	[illegible]	114	100	103	[illegible]	103
(L) % Moist								
(N) Location	22+50 30' L + 4 →	22+50 →	[illegible] 100' L + 2 →	23+ 5 →	23+15 122' L 2 →	23+50 →	22+50 30' L 9 →	22+85 →
(O) Elev.	746	745	74[illegible]	[illegible]	74[illegible]	748	[illegible]	[illegible]

Compaction Required [illegible]

Technician [illegible] K

CONFIDENTIAL BUSINESS INFORMATION

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT: W. Ansley
JOB NO.:
AREA: Sep Dam

DATE: 9-27-73
DENSITY STANDARD COUNT: 231
MOISTURE STANDARD COUNT: 1276

(A) Test Number	1	2	3	4	5	6	7	8
(B) Probe Depth	6"							
(C) Dens. Count	482	494	486	466	492	488	478	484
(D) C ÷ Std Count								
(E) Wet Wt. (lb/ft^3)	121.0	119.5	120.5	122.0	119.5	120.5	121.5	120.5
(F) Moist Count	1050	1080	1062	1106	1028	1056	1092	1068
(G) F ÷ Std Count								
(H) Wt. Moist (lbs)	20.6	21.7	20.8	22.0	20.1	20.8	21.5	21.1
(I) Dry Wt.	100.4	98.2	99.7	100.0	99.4	99.7	100.0	99.4
(J) Proctor Wt.	* 100.0	98	* 100.0	100.0	98	100.0	100.0	98
(K) % Comp. I ÷ J	100	100	100	100	100	100	100	100
(L) % Moist								
(N) Location	19+75 150' L ℄	19+80 →	21+00 100' L ℄	21+15 →	22+75 220' L ℄	23+00 →	24+00 225' L ℄	25+15 →
(O) Elev.	753	754	755	756	755	756	721	722

* NEW PROCTOR

Compaction Required 100 90

Technician JD/TO

CONFIDENTIAL BUSINESS INFORMATION

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT: W Ansley
JOB NO.:
AREA: Sep Dam

DATE: 9-25-73
DENSITY STANDARD COUNT: 231
MOISTURE STANDARD COUNT: 1271

(A) Test Number	9	10	11	12	13	14	15	16
(B) Probe Depth	6"							
(C) Dens. Count	466	482	464	468	472	446	438	454
(D) C ÷ Std Count								
(E) Wet Wt. (lb/ft^3)	122.5	121.0	123.0	122.5	122.0	125.0	126.0	124.0
(F) Moist Count	1084	1048	1102	1014	1020	958	976	982
(G) F ÷ Std Count								
(H) Wt. Moist (lbs)	21.3	20.6	21.7	19.6	19.9	19.3	18.9	18.9
(I) Dry Wt.	101.2	100.4	101.3	102.9	102.1	105.7	107.1	105.1
(J) Proctor Wt.	100	100	100	100	100	103	106	103
(K) % Comp. I ÷ J	100	100	100	100	100	100	100	100
(L) % Moist								
(N) Location	20+50 80' L ℄	20+65 →	22+50 150' L ℄	22+60 →	24+00 100' L ℄	24+15 →	25+75 165' L ℄	25+85 →
(O) Elev.	759	757	758	759	758	759	760	759

Compaction Required 100%

Technician VD/70

CONFIDENTIAL BUSINESS INFORMATION

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT: WANSLEY
JOB NO.:
AREA: SEPARATION DAM

DATE: SEPT 24, 1973
DENSITY STANDARD COUNT: 262
MOISTURE STANDARD COUNT: 1572

(A) Test Number	1	2	3	4	5	6	7	8
(B) Probe Depth	6"							
(C) Dens. Count	456	464	496	494	428	468	460	444
(D) C ÷ Std Count								
(E) Wet Wt. (lb/ft^3)	127.5	126.5	123.0	123.0	130.5	126.0	126.7	126.7
(F) Moist Count	1564	1530	1418	1454	1192	1288	1480	[illegible]
(G) F ÷ Std Count								
(H) Wt. Moist (lbs)	25.8	25.0	23.0	23.8	18.8	20.5	24.2	[illegible]
(I) Dry Wt.	101.7	101.5	100.0	99.2	111.7	105.5	102.5	106.7
(J) Proctor Wt.	100.0	100.0	100.0	98.0	110.0	105.0	[illegible]	[illegible]
(K) % Comp. I ÷ J	100+%	100+%	100%	100+%	100+%	100%	[illegible]	[illegible]
(L) % Moist								
(N) Location	22+00 100' LT. ℄	22+30 90' LT. ℄	24+50 100' LT. ℄	24+70 90' LT. ℄	27+00 80' LT. ℄	27+20 70' LT. ℄	27+00 80' LT ℄	27+20 →
(O) Elev.	755	754	753	753	755	754	738	737

Compaction Required 100%

Technician R. DUKE + C.E.

CONFIDENTIAL BUSINESS
INFORMATION

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT: Wansley
JOB NO.:
AREA: Separation Dam

DATE: 9/24/73
DENSITY STANDARD COUNT: 262
MOISTURE STANDARD COUNT: 1522

(A) Test Number	9	10	11	12	13	14	15	16
(B) Probe Depth								
(C) Dens. Count	431	[illegible]	426	[illegible]	430	438	452	434
(D) C ÷ Std Count			1.62	1.73	1.64	1.67	1.73	1.66
(E) Wet Wt. (lb/ft^3)	[illegible]	[illegible]	131.4	[illegible]	130.5	[illegible]	[illegible]	130.0
(F) Moist Count	[illegible]	[illegible]	1340	[illegible]	[illegible]	1280	[illegible]	[illegible]
(G) F ÷ Std Count								
(H) Wt. Moist (lbs)	22.0	[illegible]	21.5	[illegible]	[illegible]	[illegible]	19.0	[illegible]
(I) Dry Wt.	109.0	109.8	108.5	[illegible]	109.8	[illegible]	[illegible]	108.3
(J) Proctor Wt.	107	107	107	[illegible]	107	107	107	107
(K) % Comp. I ÷ J	101	103	102	101	103	102	[illegible]	101
(L) % Moist								
(N) Location	[illegible] 300 Lt. ⟶	[illegible]	20+00 125 Rt ⟶	[illegible]	20+50 175 Rt ⟶	[illegible]	21+00 225 Rt	[illegible]
(O) Elev.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	720	[illegible]	[illegible]

Compaction Required 100

Technician [illegible]

CONFIDENTIAL BUSINESS INFORMATION

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT: Wansley
JOB NO.:
AREA: Intake - access Road

DATE: Sept 23-1983
DENSITY STANDARD COUNT: 831
MOISTURE STANDARD COUNT: 1221

(A) Test Number	1	2	3	4	5	6	7	8
(B) Probe Depth	6"	6"	6"	6"	6"	6"	6"	6"
(C) Dens. Count	424	432	464	500	432	456	474	480
(D) C ÷ Std Count			123.0					
(E) Wet Wt. (lb/ft^3)	128.0	127.0	~~954~~	~~[illegible]~~ 119.0	127.0	124.0	122.0	121.0
(F) Moist Count			954					
(G) F ÷ Std Count	1160	1140	~~18.3~~		1126	1036	980	1026
(H) Wt. Moist (lbs)	23.2	22.7	18.3	13.4	22.3	20.2	~~19~~ 18.9	19.9
(I) Dry Wt.	104.8	104.3	104.7	105.6	104.9	103.8	103.1	101.1
(J) Proctor Wt.	103	103	103	103	103	103	103	100
(K) % Comp. I ÷ J	100%	100%	100%	100%	100%	100%	100%	100%
(L) % Moist								
(N) Location	20' Lt ℄ Facing North 125' North of downstream cell	20' Lt ℄ Facing North 100' North of downstream cell	20' Lt ℄ Facing north 40' North of downstream cell	21' Lt ℄ Facing North 55' North of downstream cell	12' Lt ℄ Facing North 30' North of downstream cell	12' Lt ℄ Facing North 45' North of downstream cell	12' Rt ℄ Facing North 120' North	12' Lt ℄ Facing North 135' of downstream cell
(O) Elev.	~~682~~ 678	~~680~~ 687	~~683~~ 672	684 682	683	682	683	684

Compaction Required 100%

Technician A. N. L.

CONFIDENTIAL BUSINESS INFORMATION

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

2-5-76

PROJECT: [illegible]
JOB NO.:
AREA: [illegible]

DATE: 9-22-73
DENSITY STANDARD COUNT: 2231
MOISTURE STANDARD COUNT: 1271

(A) Test Number	9	10	11	12	13	14	15	16
(B) Probe Depth	6"							
(C) Dens. Count	454	442	434	448	454	462	446	426
(D) C ÷ Std Count								
(E) Wet Wt. (lb/ft^3)	124.0	126.0	126.5	125.0	124.0	123.5	125.0	126.5
(F) Moist Count	1022	1094	1070	1054	982	966	1035	1056
(G) F ÷ Std Count								
(H) Wt. Moist (lbs)	19.9	21.5	21.1	20.6	18.9	18.7	17.8	20.3
(I) Dry Wt.	104.1	104.5	105.4	104.4	105.1	104.8	107.2	106.2
(J) Proctor Wt.	113	103	103	103	103	103	106.3	106.3
(K) % Comp. I ÷ J	100	100	100	100	100	100	100	100
(L) % Moist								
(N) Location	21+50 200' L ℄	21+60 →	22+75 100' L ℄	23+00 →	24+80 120' L ℄	25+00 →	26+50 25' ...	26+65 →
(O) Elev.	759	760	762	763	764	763	764	765

Compaction Required 100%

Technician UD

CONFIDENTIAL BUSINESS INFORMATION

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT: [illegible]
JOB NO.: 7
AREA: [illegible]

DATE: [illegible]
DENSITY STANDARD COUNT: [illegible]
MOISTURE STANDARD COUNT: [illegible]

(A) Test Number	1	2	3	4	5	6	7	8
(B) Probe Depth	6"							
(C) Dens. Count	502	466	456	462	448	454	428	436
(D) C ÷ Std Count								
(E) Wet Wt. (lb/ft^3)	118.5	123.0	124.0	123.5	125.0	124.0	125.0	126.5
(F) Moist Count	1150	1132	1168	1126	1098	1062	1038	1104
(G) F ÷ Std Count								
(H) Wt. Moist (lbs)	23.0	22.4	23.4	22.4	21.7	20.8	20.3	21.7
(I) Dry Wt.	95.5	100.6	100.6	101.1	103.3	103.2	104.7	104.8
(J) Proctor Wt.	100	100	100	100	103	103	103	103
(K) % Comp. I ÷ J	96	100	100	100	100	100	100	100
(L) % Moist	Rerolled							
(N) Location	23+50 230' ℄	23+60	25+00 275' ℄	25+20	23+00 250' ℄	22+25	19+00 160' ℄	19+20
(O) Elev.	741	742	742	743	740	739	758	759

Compaction Required 100 %

Technician VD

CONFIDENTIAL BUSINESS INFORMATION

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT: ______
JOB NO.: ______
AREA: Sep Dam

DATE: 7-22-75
DENSITY STANDARD COUNT: ______
MOISTURE STANDARD COUNT: ______

(A) Test Number	9	10	11	12	13	14	15	16
(B) Probe Depth								
(C) Dens. Count	454	430	430	438	480	440	[illegible]	428
(D) C ÷ Std Count								
(E) Wet Wt. (lb/ft^3)	124.2	127.2	127.2	[illegible]	121.2	[illegible]	121.5	127.5
(F) Moist Count	1060							
(G) F ÷ Std Count			[illegible]	1050	1060	[illegible]	[illegible]	1040
(H) Wt. Moist (lbs)	20.8	22.2	21.1	20.6	20.8	[illegible]	[illegible]	21.3
(I) Dry Wt.	103.4	105.0	106.1	105.6	100.4	[illegible]	102.2	107.2
(J) Proctor Wt.	100	103	103	103	100	[illegible]	100	105
(K) % Comp. I ÷ J	103	102	103	103	100	[illegible]	[illegible]	[illegible]
(L) % Moist								
(N) Location	26+00 1149 ℄ -	25+15 ℄	25+00 1527 ℄	25+15 ℄	23+50 ℄	[illegible] ℄	[illegible] ℄ -	[illegible] F
(O) Elev.	750	749	749	748	744	[illegible]3	[illegible]39	738

Compaction Required 100

Technician [illegible]

CONFIDENTIAL BUSINESS INFORMATION

GEORGIA POWER COMPANY – SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT: ______
JOB NO.: ______
AREA: Saf Dam

DATE: [illegible]
DENSITY STANDARD COUNT: ______
MOISTURE STANDARD COUNT: ______

(A) Test Number	1	2	3	4	5	6	7	8
(B) Probe Depth								
(C) Dens. Count	[illegible]	118	5?6	480	540	520	418	[illegible]
(D) C ÷ Std Count								
(E) Wet Wt. (lb/ft^3)	131.0	128.7	[illegible]	121.2	114.7	116.7	128.7	127.0
(F) Moist Count	1240	1030	990	1080	1060	[illegible]	1010	1000
(G) F ÷ Std Count								
(H) Wt. Moist (lbs)	25.0	19.9	16.9	21.2	20.8	20.3	19.6	[illegible]
(I) Dry Wt.	106.0	108.8	99.1	100.0	94.0	96.4	109.1	107.7
(J) Proctor Wt.	104	107	98	98	94	94.0	107	107
(K) % Comp. I ÷ J	102	102	101	102	100	102	102	101
(L) % Moist								
(N) Location	25+00 100 LT ℄ →	25+15 →	23+50 110 LT ℄ →	23+30 →	21+50 25 LT ℄ →	21+70 →	20+?? 50 RT ℄ →	[illegible] →
(O) Elev.	718	747	746	745	746	745	745	744

Compaction Required ______

Technician [illegible]

CONFIDENTIAL BUSINESS INFORMATION

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT: Wansley
JOB NO.:
AREA: Sep Dam

DATE: 9-21-73
DENSITY STANDARD COUNT: 231
MOISTURE STANDARD COUNT: 1271

(A) Test Number	1	2	3	4	5	6	7	8
(B) Probe Depth	6"							
(C) Dens. Count	438	426	434	428	430	470	466	460
(D) C ÷ Std Count								
(E) Wet Wt. (lb/ft^3)	126.0	127.5	126.5	125.0	127.0	122.5	122.5	123.5
(F) Moist Count	1156	1166	1098	1156	1120	932	916	926
(G) F ÷ Std Count								
(H) Wt. Moist (lbs)	23.2	23.4	21.7	23.2	22.2	17.8	17.5	17.8
(I) Dry Wt.	102.8	104.1	105.8	101.8	104.8	104.7	105.0	105.7
(J) Proctor Wt.	100	100	105.2	100	105.2	[illegible]	[illegible]	[illegible]
(K) % Comp. I ÷ J	100	100	100	100	100	100	[illegible]	[illegible]
(L) % Moist								
(N) Location	19+00 30' Lt	19+20 →	21+51 80' Lt	21+75 →	23+75 75' Lt	23+80 →	25+30 20' Lt	25+60 →
(O) Elev.	730	731	733	734	740	741	752	753

Compaction Required 100%

Technician UD/TO

CONFIDENTIAL BUSINESS INFORMATION

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT: Wansley
JOB NO.:
AREA: Sep Dam

DATE: 9-22-75
DENSITY STANDARD COUNT: 231
MOISTURE STANDARD COUNT: [illegible]

(A) Test Number	9	10	11	12	13	14	15	16
(B) Probe Depth	6"							
(C) Dens. Count	424	430	460	466	428	416	424	[illegible]
(D) C ÷ Std Count								
(E) Wet Wt. (lb/ft^3)	128.0	127.0	123.5	125.5	127.5	129.0	122.0	123.5
(F) Moist Count	1162	1164	972	1128	1168	1202	[illegible]	[illegible]
(G) F ÷ Std Count								
(H) Wt. Moist (lbs)	23.2	23.2	18.7	22.4	23.4	24.0	17.8	18.0
(I) Dry Wt.	104.8	103.8	104.8	103.1	104.1	105.0	104.2	105.5
(J) Proctor Wt.	103	103	103	103	103	[illegible]	[illegible]	[illegible]
(K) % Comp. I ÷ J	100	100	100	100	100	[illegible]	[illegible]	[illegible]
(L) % Moist								
(N) Location	18+60 100' L ℄	18+75 →	20+50 ℄ →	20+60 →	22+50 30' L ℄	22+60 →	24+75 125' L ℄	24+80 →
(O) Elev.	732	733	734	735	742	752	751	750

Compaction Required 100%

Technician W.D./T.O.

CONFIDENTIAL BUSINESS INFORMATION

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT: ____________
JOB NO.: ____________
AREA: Sep Dam

DATE: 9-21-73
DENSITY STANDARD COUNT: ____________
MOISTURE STANDARD COUNT: ____________

(A) Test Number	1	2	3	4	5	6	7	8
(B) Probe Depth								
(C) Dens. Count	430	420	440	478	450	452	400	418
(D) C ÷ Std Count								
(E) Wet Wt. (lb/ft^3)	127.2	128.5	126.0	121.5	124.5	123.2	121.0	128.7
(F) Moist Count	1100	1080		1260	1180	1200	[illegible]	1080
(G) F ÷ Std Count								
(H) Wt. Moist (lbs)	21.7	21.3	28.7	25.4	23.5	26.4	21.5	21.3
(I) Dry Wt.	105.5	107.2	97.3	96.1	101.0	96.8	107.5	106.4
(J) Proctor Wt.	103	105	94	94	98	94	[illegible]	[illegible]
(K) % Comp. I ÷ J	103	102	100	100	100	100	[illegible]	[illegible]
(L) % Moist								
(N) Location	20+00 25 LT ℄ →	20+15	21+00 25' LT ℄ →	21+20	23+00 ℄ →	[illegible]	24+50 ℄ →	[illegible]
(O) Elev.	730	729	734	733	742	741	752	751

Compaction Required 100

Technician M. K

CONFIDENTIAL BUSINESS INFORMATION

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT: Wansley
JOB NO.:
AREA: SE PD HM

DATE: 9-21-73
DENSITY STANDARD COUNT: 231
MOISTURE STANDARD COUNT: 1271

(A) Test Number	9	10	11	12	13	14	15	16
(B) Probe Depth	6"							
(C) Dens. Count	448	454	456	442	438	448	432	464
(D) C ÷ Std Count								
(E) Wet Wt. (lb/ft^3)	125.0	124.0	124.0	125.5	126.0	125.0	123.5	123.0
(F) Moist Count	1212	1194	1216	1182	1232	1068	1020	1011
(G) F ÷ Std Count								
(H) Wt. Moist (lbs)	24.2	23.8	24.6	23.6	24.8	21.1	19.9	19.9
(I) Dry Wt.	100.8	100.2	99.4	101.9	101.2	103.9	103.6	103.1
(J) Proctor Wt.	100	100	98	100	100	103	103	103
(K) % Comp. I ÷ J	100	100	100	100	100	100	100	100
(L) % Moist								
(N) Location	18+50 80' Lℓ	18+60 →	19+75 175' Lℓ	20+00 →	21+75 110' Lℓ	22+00 →	23+50 100' Lℓ	23+65 →
(O) Elev.	757	756	759	758	762	761	762	761

Compaction Required 100%

Technician UD/TG

CONFIDENTIAL BUSINESS INFORMATION

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT: ____________
JOB NO.: ____________
AREA: Sep Dam

DATE: 9/21/73
DENSITY STANDARD COUNT: ____________
MOISTURE STANDARD COUNT: ____________

(A) Test Number	9	10	11	12	13	14	15	16
(B) Probe Depth								
(C) Dens. Count							492	510
(D) C ÷ Std Count								
(E) Wet Wt. (lb/ft^3)	126.0	127.2	128.2	129.5	128.7	126.5	109.7	117.7
(F) Moist Count	1100	1060	1110	1030	1060	980	1120	1050
(G) F ÷ Std Count	'							
(H) Wt. Moist (lbs)	21.7	20.8	22.0	20.1	20.8	13.9	13.6	20.6
(I) Dry Wt.	104.3	106.4	106.2	109.4	107.9	107.6	96.1	97.1
(J) Proctor Wt.	103	103	103	106	106	106	94	94.0
(K) % Comp. I ÷ J	101	103	103	103	102	102	102	103
(L) % Moist								
(N) Location	26+75 200 RT ℄	26+60 →	25+25 200 RT ℄	25+16 →	22+50 190 RT ℄	21+70 →	20+50 180' RT ℄	20+65 →
(O) Elev.	725	726	723	722	720	721	720	721

Compaction Required 100

CONFIDENTIAL BUSINESS INFORMATION

Technician MK

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT: ____________
JOB NO.: ____________
AREA: Sep Dam

DATE: 9-20-77
DENSITY STANDARD COUNT: ____________
MOISTURE STANDARD COUNT: ____________

(A) Test Number	1	2	3	4	5	6	7	8
(B) Probe Depth								
(C) Dens. Count	436	420	410	416	442	448	[illegible]	458
(D) C ÷ Std Count								
(E) Wet Wt. (lb/ft^3)	126.5	128.5	131.0	129.0	[illegible]	125.0	[illegible]	123.7
(F) Moist Count	1160	1080	1000	1100	[illegible]	[illegible]	[illegible]	1180
(G) F ÷ Std Count								
(H) Wt. Moist (lbs)	23.2	21.3	19.3	21.7	25.0	[illegible]	[illegible]	[illegible]
(I) Dry Wt.	103.3	107.2	111.7	107.3	100.7	99.6	[illegible]	[illegible]
(J) Proctor Wt.	[illegible]	103	108	104	98	98	98	98
(K) % Comp. I ÷ J	102	104	104	103	102	102	[illegible]	102
(L) % Moist								
(N) Location	25+50 100 LT ℄ →	[illegible] →	23+50 90 LT ℄ →	23+35 →	21+50 100 LT ℄ →	21+50 →	19+80 105 LT ℄ →	19+65 →
(O) Elev.	745	746	738	737	733	732	728	727

Compaction Required 100

Technician MK

CONFIDENTIAL BUSINESS INFORMATION

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT: Wansley
JOB NO.:
AREA: Spillway

DATE: 7-20-73
DENSITY STANDARD COUNT: 231
MOISTURE STANDARD COUNT: 1271

(A) Test Number	1	2	3	4	5	6	7	8
(B) Probe Depth	6"							
(C) Dens. Count	396	408	466	444	412	406	458	448
(D) C ÷ Std Count								
(E) Wet Wt. (lb/ft^3)	131.5	130.0	123.0	125.5	129.5	130.0	123.5	125.0
(F) Moist Count	1138	1092	1108	1100	1084	1120	1106	1088
(G) F ÷ Std Count								
(H) Wt. Moist (lbs)	22.7	21.5	22.0	21.7	21.3	22.2	22.0	21.5
(I) Dry Wt.	108.8	108.5	101.0	103.8	108.2	107.8	100.5	103.5
(J) Proctor Wt.	108	108	100	100	108	108	100	100
(K) % Comp. I ÷ J	100	100	100	100	100	100	100	100
(L) % Moist								
(N) Location	2+30 ℄	2+50 →	3+50 150' Rt ℄	3+65 →	4+75 75' Rt ℄	4+80 →	6+50 130' Rt	6+60 →
(O) Elev.	766	765	764	763	763	762	762	761

Compaction Required 100 %

Technician VD/TO

CONFIDENTIAL BUSINESS INFORMATION

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT: ____________
JOB NO.: ____________
AREA: Sep Dam

DATE: 7-20-73
DENSITY STANDARD COUNT: 771
MOISTURE STANDARD COUNT: 1371

(A) Test Number	9	10	11	12	13	14	15	16
(B) Probe Depth								
(C) Dens. Count	440	436	430	478	404	412	426	408
(D) C ÷ Std Count								
(E) Wet Wt. (lb/ft^3)	126.0	126.7	127.0	121.5	130.5	129.5	127.7	130.0
(F) Moist Count	1100	930	1000	920	1030	1050	1010	1090
(G) F ÷ Std Count								
(H) Wt. Moist (lbs)	21.7	17.8	19.3	17.5	20.1	20.6	19.6	21.3
(I) Dry Wt.	104.3	108.9	107.7	104.0	110.4	108.9	108.1	108.7
(J) Proctor Wt.	103	107	107	103	107	107	107	107
(K) % Comp. I ÷ J	101	102	101	101	103	102	101	102
(L) % Moist								
(N) Location	3+00 80 LT ℄ →	3+20	6+00 90 LT ℄ →	6+10	6+30 95 LT ℄	3+00 75' RT ℄ →	3+15	6+00 80 RT ℄
(O) Elev.	765	764	757	756	755	768	767	754

Compaction Required 100

Technician M. K.

CONFIDENTIAL BUSINESS INFORMATION

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT: Wansley
JOB NO.:
AREA: sep Dam

DATE: 9-19-73
DENSITY STANDARD COUNT: 231
MOISTURE STANDARD COUNT: 1271

(A) Test Number	1	2	3	4	5	6	7	8
(B) Probe Depth								
(C) Dens. Count	420	426	422	448	416	444	426	458
(D) C ÷ Std Count								
(E) Wet Wt. (lb/ft^3)	128.5	128.5	128.5	125.0	129.0	125.5	128.0	124.0
(F) Moist Count	880	1022	1074	1176	1006	1142	1014	1096
(G) F ÷ Std Count								
(H) Wt. Moist (lbs)	16.6	19.9	21.1	23.6	19.6	22.7	19.6	21.7
(I) Dry Wt.	111.9	108.6	107.4	101.4	109.4	102.8	108.4	102.3
(J) Proctor Wt.	108	108	108	100	108	100	108	100
(K) % Comp. I ÷ J	100	100	100	100	100	100	100	100
(L) % Moist								
(N) Location	19+25 135' Rt	19+35 →	20+50 160' Rt	20+60 →	21+40 140' Rt	21+50 →	22+75 125' Rt	22+85 →
(O) Elev.	756	755	756	755	756	757	756	757

Compaction Required 100%

Technician VD/TD

CONFIDENTIAL BUSINESS INFORMATION

GEORGIA POWER COMPANY – SOILS
NUCLEAR DENSITY METER WORK SHEET

ROJECT: Wansley
OB NO.:
REA: Sep Dam

DATE: 9-20-73
DENSITY STANDARD COUNT: [illegible]
MOISTURE STANDARD COUNT: [illegible]

A) Test Number	9	10	11	12	13	14	/	
B) Probe Depth								
C) Dens. Count	432	424	428	454	448	452		
D) C ÷ Std Count								
E) Wet Wt. (lb/ft^3)	127.0	128.0	127.5	124.0	125.0	124.5		
F) Moist Count	948	1074	984	1072	1016	1066		
G) F ÷ Std Count								
H) Wt. Moist (lbs)	18.5	19.6	18.9	21.1	19.9	19.6		
I) Dry Wt.	108.5	108.4	108.6	102.9	105.1	104.9		
J) Proctor Wt.	108	108	108	100	105	105		
K) % Comp. I ÷ J	100	100	100	100	100	100		
L) % Moist								
N) Location	23+50 125' Lt	23+60 130' Lt	24+10 140' Lt	24+15 →	22+75 165' Lt	22+60 →		
O) Elev.	757	758	758	759	756	757		

ompaction Required 100 %

Technician UD/TO

CONFIDENTIAL BUSINESS INFORMATION

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT: ____________
JOB NO.: ____________
AREA: Storage Pond & RR #1

DATE: 9/19/73
DENSITY STANDARD COUNT: [illegible]
MOISTURE STANDARD COUNT: [illegible]

(A) Test Number	1	2	3	4	5	6	7	8
(B) Probe Depth								
(C) Dens. Count	450	434	496	490	456	488	470	462
(D) C ÷ Std Count								
(E) Wet Wt. (lb/ft³)	123.5	126.7	[illegible]	[illegible]	124.0	120.2	122.5	123.2
(F) Moist Count	1170	1080	1060	1090	1100	1050	1020	[illegible]
(G) F ÷ Std Count								
(H) Wt. Moist (lbs)	23.4	20.8	[illegible]	21.5	21.7	20.6	19.9	19.9
(I) Dry Wt.	100.1	105.9	[illegible]	98.5	103.3	99.6	102.6	104.3
(J) Proctor Wt.	[illegible]	105	[illegible]	98	103	99	[illegible]	103
(K) % Comp. I ÷ J	100	100	[illegible]	100	100	100	100	100
(L) % Moist								
(N) Location	97+75 25' RT ℄ →	95+91	97+25 30' RT ℄ →	97+70	100+50 35' RT ℄ →	100+70	99+50 40' RT ℄ →	99+25
(O) Elev.	800	801	803	802	800	802	803	803

Compaction Required 100%

CONFIDENTIAL BUSINESS INFORMATION

Technician [signature]

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT: WANSLEY
JOB NO.:
AREA: [illegible] R/R #1

DATE: 9/19/73
DENSITY STANDARD COUNT:
MOISTURE STANDARD COUNT:

(A) Test Number	9	10	11	12	One more for luck 13			
(B) Probe Depth								
(C) Dens. Count	396	424	452	410	420			
(D) C ÷ Std Count								
(E) Wet Wt. (lb/ft^3)	131.5	128.0	124.0	129.7	128.5			
(F) Moist Count	1180	1210	1030	1040	1100			
(G) F ÷ Std Count								
(H) Wt. Moist (lbs)	23.6	24.2	20.1	20.3	21.7			
(I) Dry Wt.	109.9	103.8	103.9	109.4	106.8			
(J) Proctor Wt.	106	103	103	106	103			
(K) % Comp. I ÷ J	104	101	101	103	104			
(L) % Moist								
(N) Location	96+60 ℄	96+70 5 LT ℄	96+80 5 RT ℄	95+50 20 RT ℄	95+67 21 RT ℄			
(O) Elev.	803	802	801	802	801			

Compaction Required 100 +

Technician MK

CONFIDENTIAL BUSINESS INFORMATION

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT: W ANSLEY
JOB NO.:
AREA: [illegible]

DATE: [illegible]/13/73
DENSITY STANDARD COUNT:
MOISTURE STANDARD COUNT:

(A) Test Number	1	2	3	4	5	6		
(B) Probe Depth								
(C) Dens. Count	462	452	446	460	486	501		
(D) C ÷ Std Count								
(E) Wet Wt. (lb/ft³)	123.2	124.7	125.2	121.0	120.7	118.5		
(F) Moist Count	1200	1240	980	1150	1130	[illegible]		
(G) F ÷ Std Count								
(H) Wt. Moist (lbs)	24.0	25.0	18.9	23.0	22.4	24.2		
(I) Dry Wt.	99.2	99.7	106.3	98.0	98.3	94.3		
(J) Proctor Wt.	98	98	106	98.0	98.	92		
(K) % Comp. I ÷ J	100	100	100	100	100	100		
(L) % Moist								
(N) Location	11+25 30 RT ℄ →	11+40 →	12+50 40' RT ℄ →	12+70 →	11+70 88 LT ℄ →	11+90 →		
(O) Elev.	698	699	700	699	696	695		

Compaction Required 100%

Technician [illegible]

CONFIDENTIAL BUSINESS INFORMATION

2-5-76

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT: W Nw3/Pe
JOB NO.:
AREA: [illegible]

DATE: 9-22-73
DENSITY STANDARD COUNT: 2?31
MOISTURE STANDARD COUNT: 1211

(A) Test Number	9	10	11	12	13	14	15	16
(B) Probe Depth	6"							
(C) Dens. Count	454	442	434	448	454	462	446	[illegible]
(D) C ÷ Std Count								
(E) Wet Wt. (lb/ft^3)	124.0	126.0	126.5	125.0	124.0	123.5	125.0	126.5
(F) Moist Count	1022	1094	1070	1059	982	966	1025	[illegible]
(G) F ÷ Std Count								
(H) Wt. Moist (lbs)	19.9	21.5	21.1	20.6	18.9	18.7	17.5	20.3
(I) Dry Wt.	104.1	104.5	105.4	104.4	105.1	[illegible]	107.2	106.2
(J) Proctor Wt.	113	103	103	103	103	[illegible]	106.3	106.3
(K) % Comp. I ÷ J	100	100	100	100	100	100	100	100
(L) % Moist								
(N) Location	21+50 260'L ₵	21+60 →	22+75 100'L₵	23+00 →	24+50 120'L ₵	25+00 →	26+50 75'L	26+65 →
(O) Elev.	759	760	762	763	764	763	764	763

Compaction Required 100%

Technician LD

CONFIDENTIAL BUSINESS
INFORMATION

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT:
JOB NO.:
AREA: [illegible]

DATE: 9-22-73
DENSITY STANDARD COUNT:
MOISTURE STANDARD COUNT:

(A) Test Number	9	10	11	12	13	14	15	16
(B) Probe Depth								
(C) Dens. Count	454	430	430	438	480	440	[illegible]	178
(D) C ÷ Std Count								
(E) Wet Wt. (lb/ft^3)	124.2	127.2	127.2	[illegible]	121.2	[illegible]	121.5	[illegible]
(F) Moist Count	1060							
(G) F ÷ Std Count	[illegible]		[illegible]	1050	1060	1020	[illegible]	[illegible]
(H) Wt. Moist (lbs)	20.8	22.2	21.1	21.0	[illegible]	[illegible]	[illegible]	[illegible]
(I) Dry Wt.	103.4	105.0	106.1	105.6	[illegible]	[illegible]	102.2	[illegible]
(J) Proctor Wt.	100	103	103	103			100	[illegible]
(K) % Comp. I ÷ J	103	102	103	103	[illegible]	[illegible]	[illegible]	[illegible]
(L) % Moist								
(N) Location	26400 [illegible]	26415 -B	25400 1521 Q	[illegible] -B	[illegible] Q	[illegible]	[illegible]	[illegible]
(O) Elev.	[illegible]	[illegible]	742	[illegible]	[illegible]4	[illegible]3	39	38

Compaction Required [illegible]

Technician [illegible]

CONFIDENTIAL BUSINESS INFORMATION

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT: ____________
JOB NO.: ____________
AREA: Sap [illegible]

DATE: 9/[illegible]/[illegible]
DENSITY STANDARD COUNT: ____________
MOISTURE STANDARD COUNT: ____________

(A) Test Number	1	2	3	4	5	6	7	8
(B) Probe Depth								
(C) Dens. Count	400	418	5[illegible]6	480	540	520	418	4[illegible]
(D) C ÷ Std Count								
(E) Wet Wt. (lb/ft^3)	131.0	128.7	[illegible]	121.2	114.[illegible]	116.7	128.7	127.[illegible]
(F) Moist Count	1240	1020	8[illegible]	1060	1060	10[illegible]	1010	1000
(G) F ÷ Std Count								
(H) Wt. Moist (lbs)	25.0	19.9	16.9	21.2	[illegible]	20.5	19.[illegible]	1[illegible]
(I) Dry Wt.	105.0	108.8	99.1	100.0	94.0	76.9	109.1	107.[illegible]
(J) Proctor Wt.	104	107	96	78	94	94.0	107	107
(K) % Comp. I ÷ J	102	102	101	102	100	102	102	101
(L) % Moist								
(N) Location	25400 100 LT ℄ →	25415	[illegible] 100 LT ℄	[illegible] F	[illegible]450 25 LT ℄	21470 →	[illegible] 50 RT ℄ →	[illegible]
(O) Elev.	748	747	746	745	746	745	745	[illegible]

Compaction Required ____________

Technician [illegible]

CONFIDENTIAL BUSINESS INFORMATION

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT: Wansley
JOB NO.:
AREA: Sep Dam

DATE: 9-22-73
DENSITY STANDARD COUNT: 231
MOISTURE STANDARD COUNT: 1271

(A) Test Number	9	10	11	12	13	14	15	16
(B) Probe Depth	6"							
(C) Dens. Count	424	430	460	466	428	416	477	[illegible]
(D) C ÷ Std Count								
(E) Wet Wt. (lb/ft^3)	125.0	127.0	123.5	122.5	127.5	129.0	122.0	[illegible]
(F) Moist Count	1162	1164	972	1128	[illegible]	1203	[illegible]	[illegible]
(G) F ÷ Std Count								
(H) Wt. Moist (lbs)	23.2	23.2	18.0	22.4	23.4	24.0	17.8	18.[illegible]
(I) Dry Wt.	104.8	103.8	104.8	103.1	104.1	103.6	104.2	[illegible]
(J) Proctor Wt.	103	103	103	103	[illegible]	[illegible]	[illegible]	[illegible]
(K) % Comp. I ÷ J	100	100	100	100	100	[illegible]	[illegible]	100
(L) % Moist								
(N) Location	18+60 100'Lt	18+75 →	20+50 ¢	20+60 →	22+50 30'Lt	22+60 →	24+75 125'Lt	24+80 →
(O) Elev.	732	733	734	733	752	752	751	[illegible]

Compaction Required 100%

Technician UD/TO

CONFIDENTIAL BUSINESS
INFORMATION

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT: Wansley
JOB NO.:
AREA: [illegible]

DATE: 9 21 73
DENSITY STANDARD COUNT: [illegible]
MOISTURE STANDARD COUNT: [illegible]

(A) Test Number	1	2	3	4	5	6	7	8
(B) Probe Depth	6"							
(C) Dens. Count	502	466	456	462	448	454	448	436
(D) C ÷ Std Count								
(E) Wet Wt. (lb/ft^3)	118.5	123.0	124.0	123.5	125.0	124.0	125.0	126.5
(F) Moist Count	1150	1132	1168	1126	1095	1062	1038	1104
(G) F ÷ Std Count								
(H) Wt. Moist (lbs)	23.0	22.4	23.4	22.4	21.7	20.8	20.3	21.7
(I) Dry Wt.	95.5	100.6	100.6	101.1	103.3	103.2	104.7	104.8
(J) Proctor Wt.	100	100	100	100	103	103	103	103
(K) % Comp. I ÷ J	96	100	100	100	100	100	100	100
(L) % Moist	Rerolled							
(N) Location	23+50 230' Lt	23+60	25+00 275' Lt	25+20	23+00 230' Lt	22+25	19+00 160' Lt	19+20
(O) Elev.	741	742	742	743	740	739	758	759

Compaction Required 100%

Technician VD

CONFIDENTIAL BUSINESS INFORMATION

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT: Wansley
JOB NO.:
AREA: Sep Dam

DATE: 9-21-73
DENSITY STANDARD COUNT: 231
MOISTURE STANDARD COUNT: 1271

(A) Test Number	1	2	3	4	5	6	7	8
(B) Probe Depth	6"							
(C) Dens. Count	438	426	434	448	430	470	466	460
(D) C ÷ Std Count								
(E) Wet Wt. (lb/ft^3)	126.0	127.5	126.5	125.0	127.0	122.5	122.5	123.5
(F) Moist Count	1156	1166	1098	1156	1120	932	916	926
(G) F ÷ Std Count								
(H) Wt. Moist (lbs)	23.2	23.4	21.7	23.2	22.2	17.8	17.5	17.8
(I) Dry Wt.	102.8	104.1	105.8	101.8	104.8	104.7	105.0	105.7
(J) Proctor Wt.	100	100	105	100	[illegible]	[illegible]	[illegible]	[illegible]
(K) % Comp. I ÷ J	100	100	100	100	[illegible]	[illegible]	[illegible]	[illegible]
(L) % Moist								
(N) Location	19+00 30' Lt	19+20 →	21+50 80' Lt	[illegible] →	[illegible] 75' Lt	[illegible] →	[illegible] 20' Lt	[illegible] →
(O) Elev.	730	731	733	734	[illegible]	741	752	[illegible]

Compaction Required 100%

CONFIDENTIAL BUSINESS INFORMATION

Technician UD/TO

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT: ______
JOB NO.: ______
AREA: Sup Dam

DATE: 9-21-73
DENSITY STANDARD COUNT: ______
MOISTURE STANDARD COUNT: ______

(A) Test Number	1	2	3	4	5	6	7	8
(B) Probe Depth								
(C) Dens. Count	430	420	440	478	450	462	400	418
(D) C ÷ Std Count								
(E) Wet Wt. (lb/ft^3)	127.2	128.5	126.0	121.5	124.5	123.2	131.0	128.7
(F) Moist Count	1100	1060		1260	1180	1300	1090	1380
(G) F ÷ Std Count								
(H) Wt. Moist (lbs)	21.7	21.3	28.7	25.4	23.5	26.4	21.5	21.3
(I) Dry Wt.	105.5	107.2	97.3	96.1	101.0	96.8	109.5	106.4
(J) Proctor Wt.	103	105	94	94	98	94	107	105
(K) % Comp. I ÷ J	103	102	100	100	100	100	[illegible]	[illegible]
(L) % Moist								
(N) Location	20+00 25 LT ℄ →	20+15 →	21+00 25' LT ℄ →	21+[illegible] →	23+00 ℄ →	23+15 →	24+50 ℄ →	[illegible] →
(O) Elev.	730	729	734	[illegible]	742	741	752	757

Compaction Required 100

Technician M. K

CONFIDENTIAL BUSINESS INFORMATION

GEORGIA POWER COMPANY — SOILS
NUCLEAR DENSITY METER WORK SHEET

PROJECT: Wansley
JOB NO.:
AREA: Sep Dam

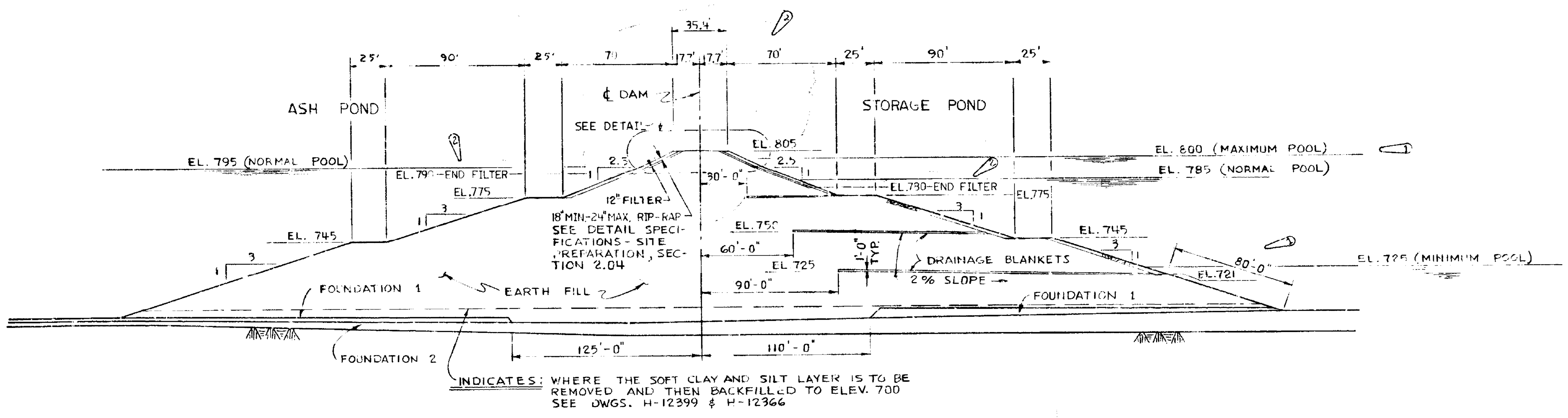
DATE: 9-21-73
DENSITY STANDARD COUNT: 231
MOISTURE STANDARD COUNT: 1271

(A) Test Number	9	10	11	12	13	14	15	16
(B) Probe Depth	6"							
(C) Dens. Count	448	454	456	442	438	448	462	464
(D) C ÷ Std Count								
(E) Wet Wt. (lb/ft^3)	125.0	124.0	124.0	125.5	126.0	125.0	123.5	123.0
(F) Moist Count	1212	1194	1216	1182	1232	1068	1020	1016
(G) F ÷ Std Count								
(H) Wt. Moist (lbs)	24.2	23.8	24.6	23.6	24.8	21.1	19.9	19.9
(I) Dry Wt.	100.8	100.2	99.4	101.9	101.2	103.9	103.6	103.1
(J) Proctor Wt.	100	100	98	100	100	103	103	103
(K) % Comp. I ÷ J	100	100	100	100	100	100	100	100
(L) % Moist								
(N) Location	18+50 80' Lt	18+60 →	19+75 175' Lt	20+00 →	21+75 110' Lt	22+00 →	23+50 100' Lt	23+65 →
(O) Elev.	757	756	759	755	762	761	762	761

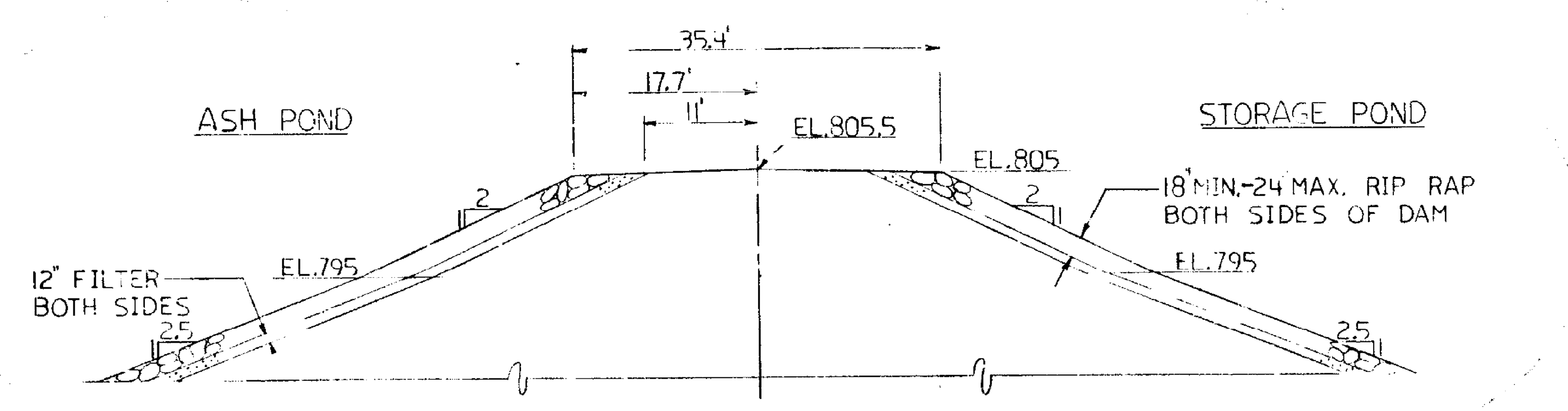
Compaction Required 100%

Technician UD/TG

CONFIDENTIAL BUSINESS INFORMATION



SECTION G-G (H-12399)
1" = 40'-0"



TYPICAL TOP OF DAM DETAIL
SCALE: 1"=10'-0"

SOIL DESCRIPTION

EARTH FILL	CLAYEY SANDY SILT
RIP - RAP	ROCK AGGREGATE
DRAINAGE BLANKET	SAND AND GRAVEL FROM BORROW PIT LOCATIONS SELECTED FOR HIGH PERMEABILITY
FOUNDATION 1	SAND AND GRAVEL (ALLUVIUM)
FOUNDATION 2	SANDY MICACEOUS SILT (RESIDUAL)

NOTE :
1. FOR THE LOCATION OF THE SECTION SHOWN, PLEASE REFER TO DWG. H-12399.
2. THIS DESIGN IS BASED ON THE ASSUMPTION THAT THE WATER LEVEL IN STORAGE POND SIDE ONLY WILL FLUCTUATE FROM EL.785 TO EL.720.
3. FOR ADDITIONAL NOTES CONCERNING SOIL MATERIALS TO BE USED IN DAM SEE DWG. H-12396.

REFERENCES: SEPARATION DAM

H-12364 — DIVERSION SCHEME — STAGE DRAWINGS & SECTIONS
H-12366 — CONSTRUCTION DIVERSION SCHEME — STAGE DRAWINGS & PLANS
H-12396 — STABILITY ANALYSIS. SHEET 1 OF 3
H-12397 — " " , SHEET 2 OF 3
H-12398 — " " , SHEET 3 OF 3
H-12399 — GENERAL ARRANGEMENT WITH EXCAVATION LIMITS

SOUTHERN SERVICES, INC.
FOR
GEORGIA POWER CO., ATLANTA, GA.
GENERAL ENGINEERING DEPARTMENT

PLANT WANSLEY
SEPARATION DAM
SECTION & DETAILS

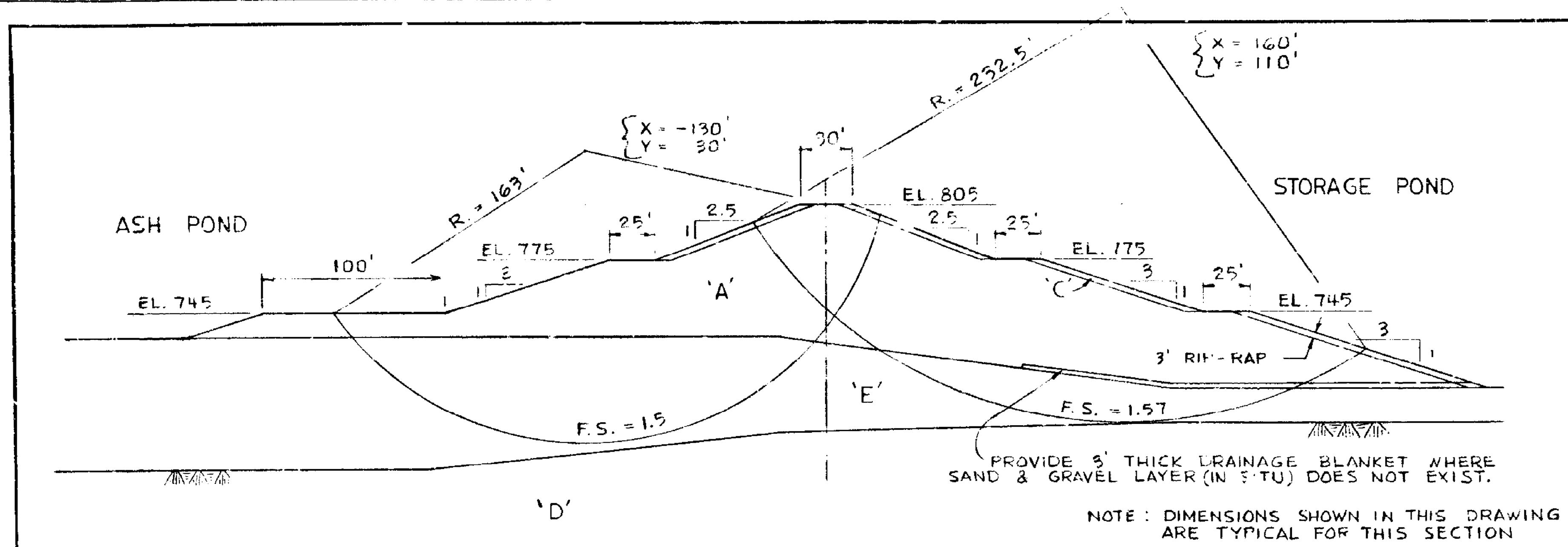
NO	DATE	BY	REVISIONS
2	11-26-73	JMS	WIDEN TOP OF DAM, ADDED TYPICAL DAM DETAIL, AND SET LENGTH OF FILTER MATERIAL ON SIDE SLOPES
1	6-22-73	WDF	GENERAL

APPROVALS: 4/6/73; 4-13-73

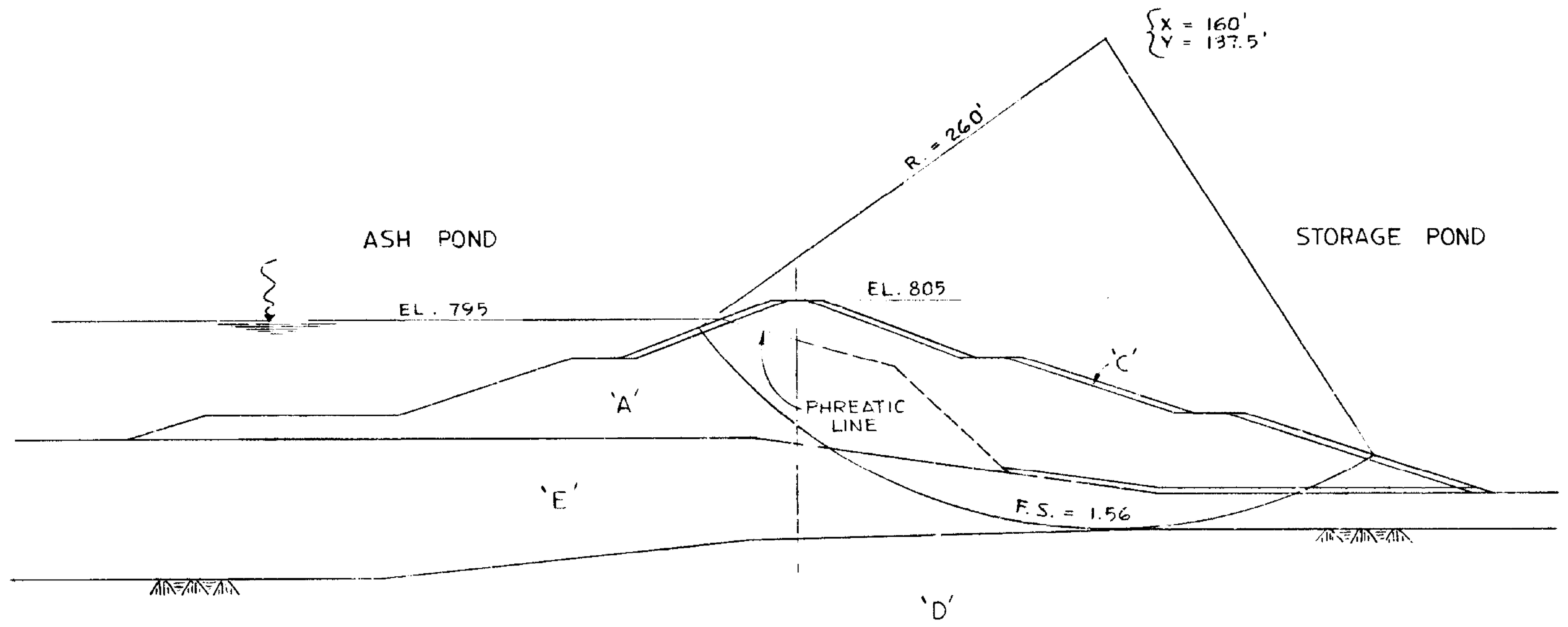
DSGN. J.M. | DR. W.D.F. | CH'K J.M.
SCALE: AS SHOWN | DATE: 4-?-73
DRAWING NUMBER — LOCATION: 10-209 | SHEET NO. H-12365

CONFIDENTIAL BUSINESS INFORMATION
WAN-API 006

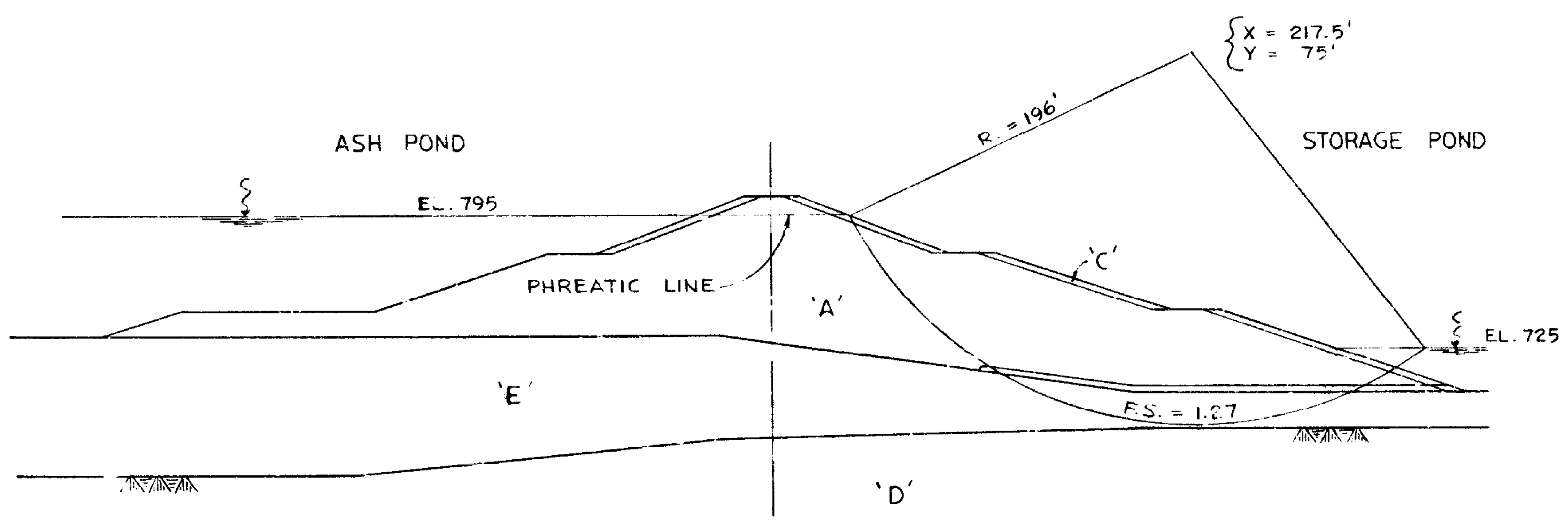
30X



UNDER CONSTRUCTION



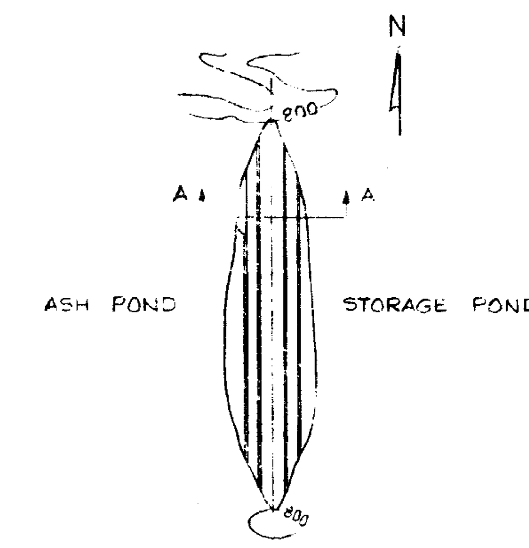
STEADY SEEPAGE



STORAGE POND DRAWDOWN EL. 795 – EL. 725

CIRCLE ANALYSIS

SECTION A-A



KEY PLAN
NOT TO SCALE

TOTAL STRESS
SOIL CHARACTERISTICS

TYPE SOIL	CONSTRUCTION			STEADY SEEPAGE & DRAWDOWN		
	γ_m LBS/CU.FT.	ϕ DEGREES	C LBS/SQ.FT.	γ_m LBS/CU.FT.	ϕ DEGREES	C LBS/SQ.FT.
EMB. FILL (A)	124	26.5	1200	124	19	1400
FILTER (B)	130	40	0	130	40	0
RIP-RAP (C)	130	38	0	130	38	0
BEDROCK (D)	150	40	3000	150	40	3000
FDN. 1 (E)	112	8	550	112	12	700

NOTES:

1. SAFETY FACTORS SHOWN ARE THE MINIMUM FOR EACH CONDITION. COMPLETE COMPUTER RESULTS AVAILABLE FROM SOUTHERN SERVICES, INC.

2. SAFETY FACTORS DO NOT INCLUDE BENEFIT FROM DEPOSIT OF ASH.

3. SOIL CHARACTERISTICS FROM LAW ENGINEERING AND TESTING CO. THROUGH GEORGIA POWER CO.

4. MATERIALS RECOMMENDED BY LETCO FOR EMBANKMENT FILLS ARE: a. FINE TO MEDIUM SANDY SILT (WEST BORROW); b. STIFF TO HARD FINE TO MEDIUM SANDY MICACEOUS SILT (NORTH BORROW); c. PARTIALLY WEATHERED ROCK (LETCO REPORT NO. 40. OCT. 1972).
   USE OF FINE TO COARSE SAND AND HIGHLY MICACEOUS SOILS IN THE EMBANKMENT SHOULD BE AVOIDED. HOWEVER, SAND CAN BE USED IN THE DRAINS.

5. EMBANKMENT FILLS SHALL BE COMPACTED AT LEAST TO SECURE THE DESIGN STRENGTH CHARACTERISTICS USED IN THE ANALYSIS OF SLOPES. FIELD CONTROL SHOULD ENSURE THE DESIGN STRENGTH OF THE MATERIALS USED IN THE DESIGN.

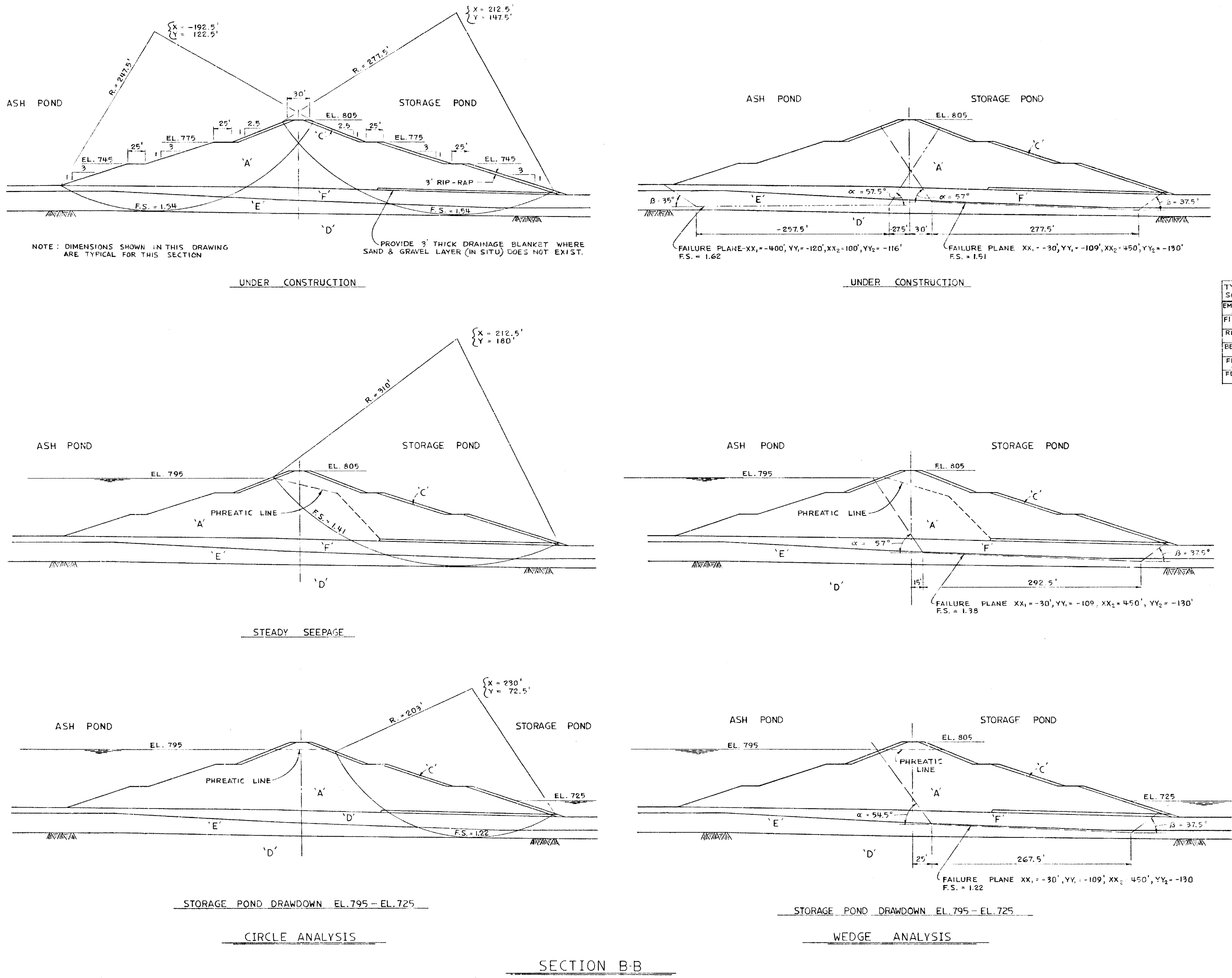
GEORGIA POWER CO., ATLANTA, GA.
GENERAL ENGINEERING DEPARTMENT
PLANT WANSLEY
SEPARATION DIKE
STABILITY ANALYSIS-SHEET 1 OF 3

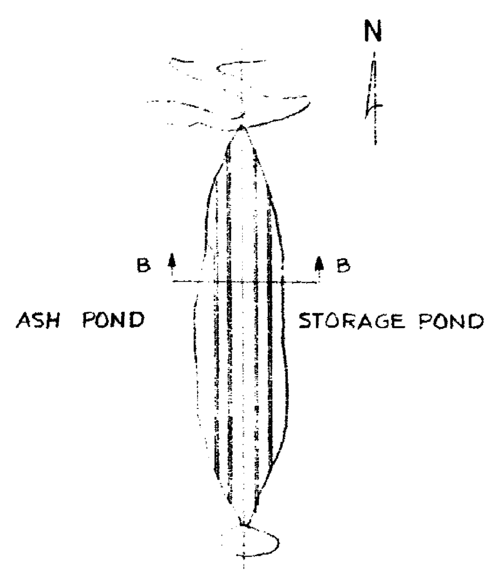
REVISIONS: NO.	DATE	BY	APPROVALS	DSGN	DR.	CH'K
			F.S. Duncan 8-6-73	J.M.	W.C.P.	J.M.

SCALE 1" = 50'-0" DATE 6-7-73
DRAWING NUMBER
LOCATION 10-209 SHEET NO. H-12396

RETURN TO HYDRO

30X





KEY PLAN
NOT TO SCALE

TOTAL STRESS
SOIL CHARACTERISTICS

TYPE SOIL	CONSTRUCTION γ_m LBS/CU.FT.	CONSTRUCTION ϕ DEGREES	CONSTRUCTION C LBS/SQ.FT.	STEADY SEEPAGE & DRAWDOWN γ_m LBS/CU.FT.	STEADY SEEPAGE & DRAWDOWN ϕ DEGREES	STEADY SEEPAGE & DRAWDOWN C LBS/SQ.FT.
EMB. FILL (A)	12.4	26.5	1200	124	19	1400
FILTER (B)	130	40	0	130	40	0
RIP-RAP (C)	130	30	8	130	30	8
BEDROCK (D)	150	40	3000	150	40	3000
FDN. 1 (E)	112	8	550	112	12	700
FDN. 2 (F)	120	12	1300	120	12	1300

NOTE:
FOR GENERAL NOTES SEE DWG. H-12396.

GEORGIA POWER CO., ATLANTA, GA.
GENERAL ENGINEERING DEPARTMENT
PLANT WANSLEY
SEPARATION DIKE
STABILITY ANALYSIS-SHEET 2 OF 3

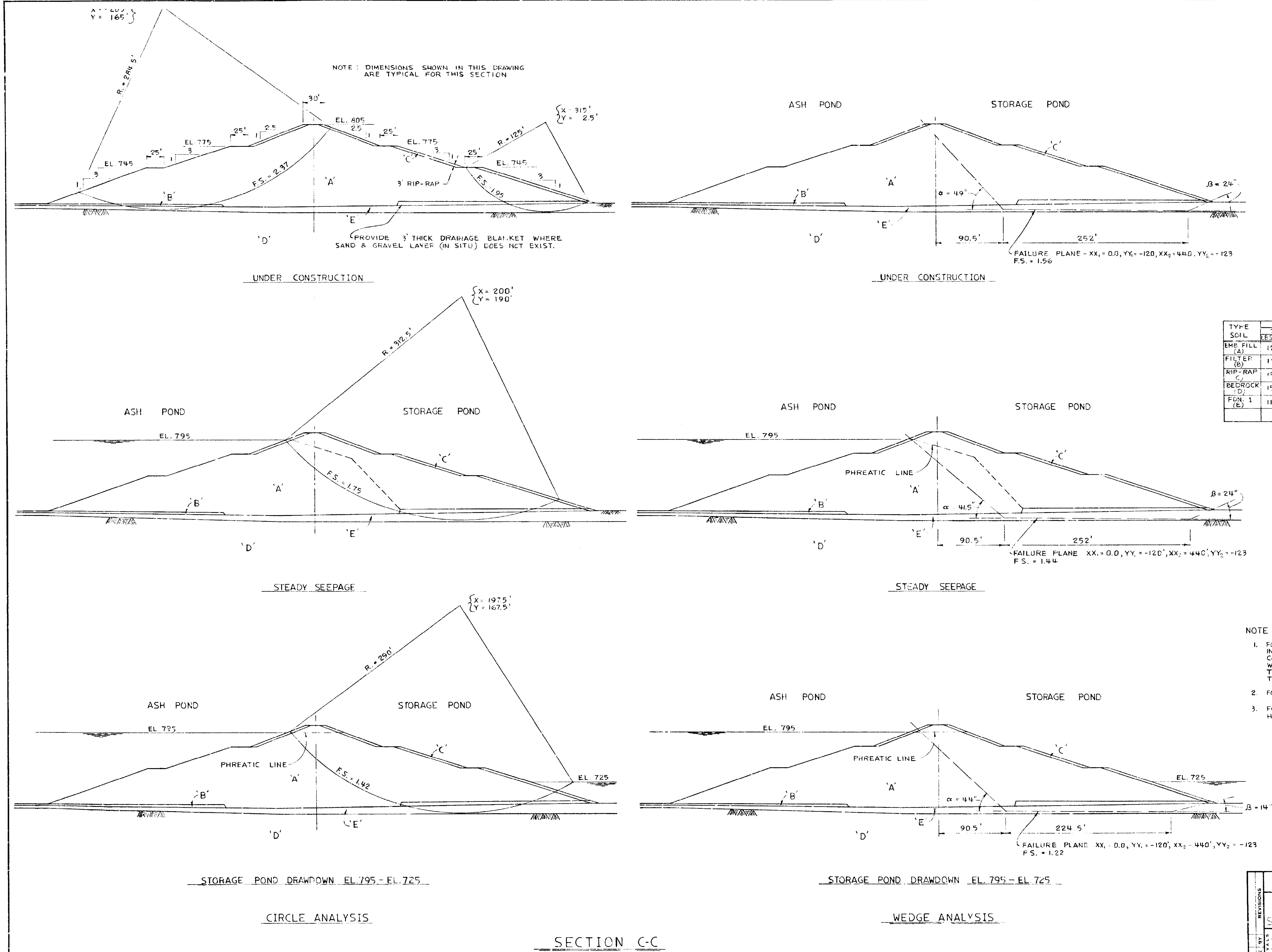
NO | DATE | BY | REVISIONS

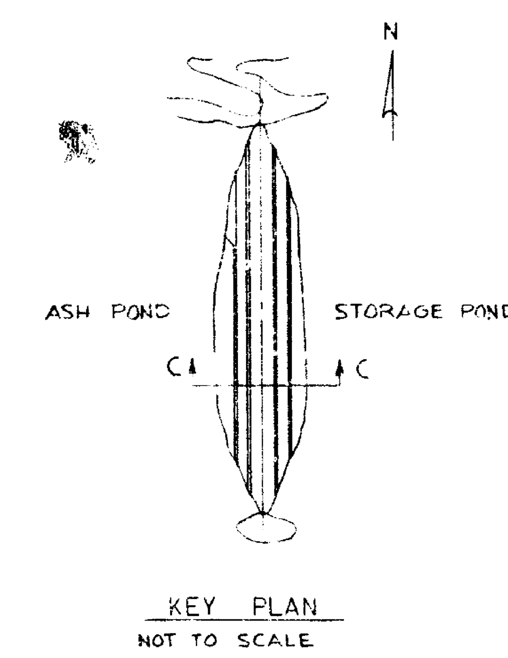
APPROVALS: [illegible] / [illegible] / [illegible] 8-6-73

DSGN. J.M. | DR. WDP | CH'K J.M.
SCALE 1" = [illegible] | DATE 6-7-73
DRAWING NUMBER
LOCATION 10-209 | SHEET NO. H-12397

RETURN TO HYDRO

30X





TOTAL STRESS
SOIL CHARACTERISTICS

TYPE SOIL	CONSTRUCTION γ_m LBS/CU.FT.	CONSTRUCTION ϕ DEGREES	CONSTRUCTION C LBS/SQ.FT.	STEADY SEEPAGE & DRAWDOWN γ_m LBS/CU.FT.	STEADY SEEPAGE & DRAWDOWN ϕ DEGREES	STEADY SEEPAGE & DRAWDOWN C LBS/SQ.FT.
EMB. FILL (A)	124	26.5	1200	124	19	1400
FILTER (B)	130	40	0	130	40	0
RIP-RAP (C)	130	38	0	130	38	0
BEDROCK (D)	150	40	3000	150	40	3000
FDN. 1 (E)	112	8	550	112	12	700

NOTE:

1. FOR SECTION C-C ONLY, MATERIAL "B" EXISTS IN SITU. PROPER CARE SHALL BE TAKEN TO COMPACT THIS MATERIAL IN ACCORDANCE WITH THE SPECIFICATIONS. FIELD INSPECTION MUST BE MADE TO INSURE EXISTENCE OF THIS MATERIAL AS SHOWN.
2. FOR GENERAL NOTES SEE DWG. H-12396.
3. FOR CONSTRUCTION DETAILS SEE DWG. H-12365.

GEORGIA POWER CO., ATLANTA, GA.
GENERAL ENGINEERING DEPARTMENT
PLANT WANSLEY
SEPARATION DIKE
STABILITY ANALYSIS-SHEET 3 OF 3

REVISIONS	APPROVALS	DSGN.	DR.	CH'K
NO. DATE BY	8-6-73	JM	WDF	JM
		SCALE.		DATE 6-7-73
		DRAWING NUMBER LOCATION 10-207		SHEET NO. H-12396

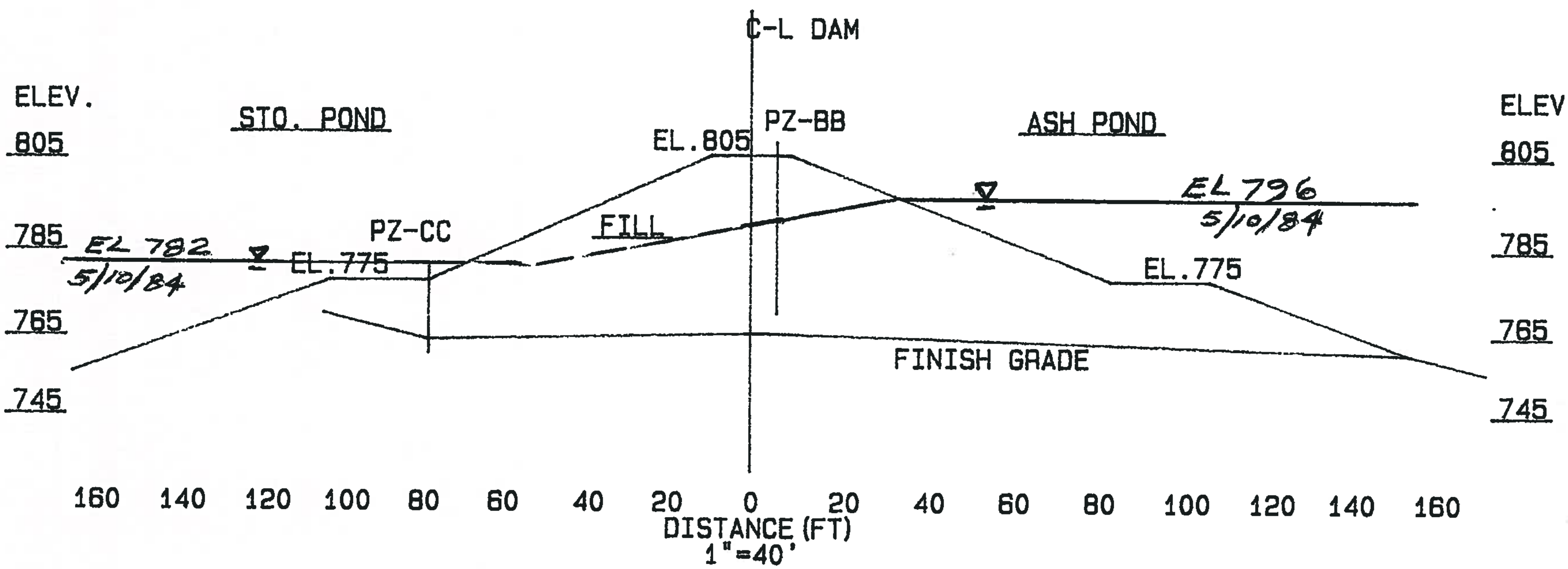
RETURN TO HYDRO

30X

PLANT WANSLEY

SEPARATION DAM

STA 2+00



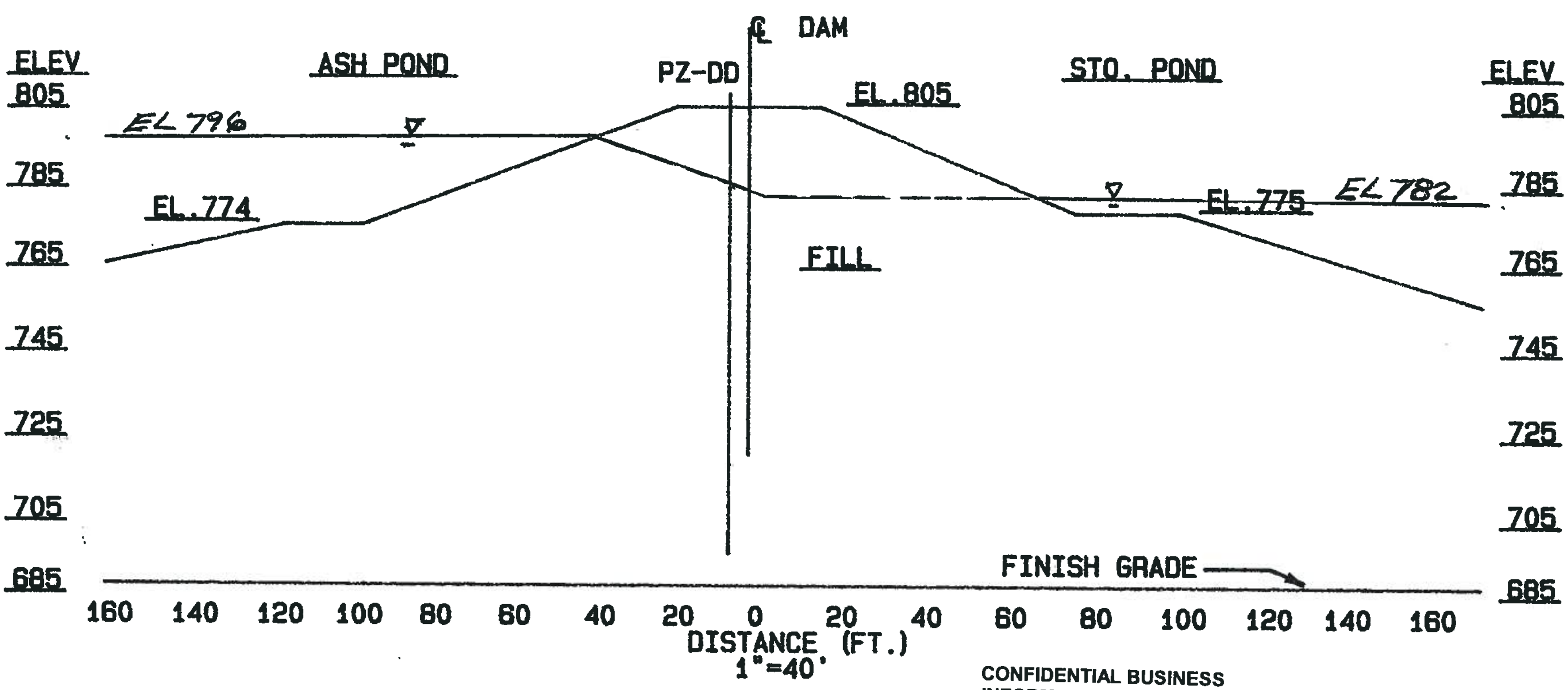
CONFIDENTIAL BUSINESS INFORMATION

WAN-API 044

67

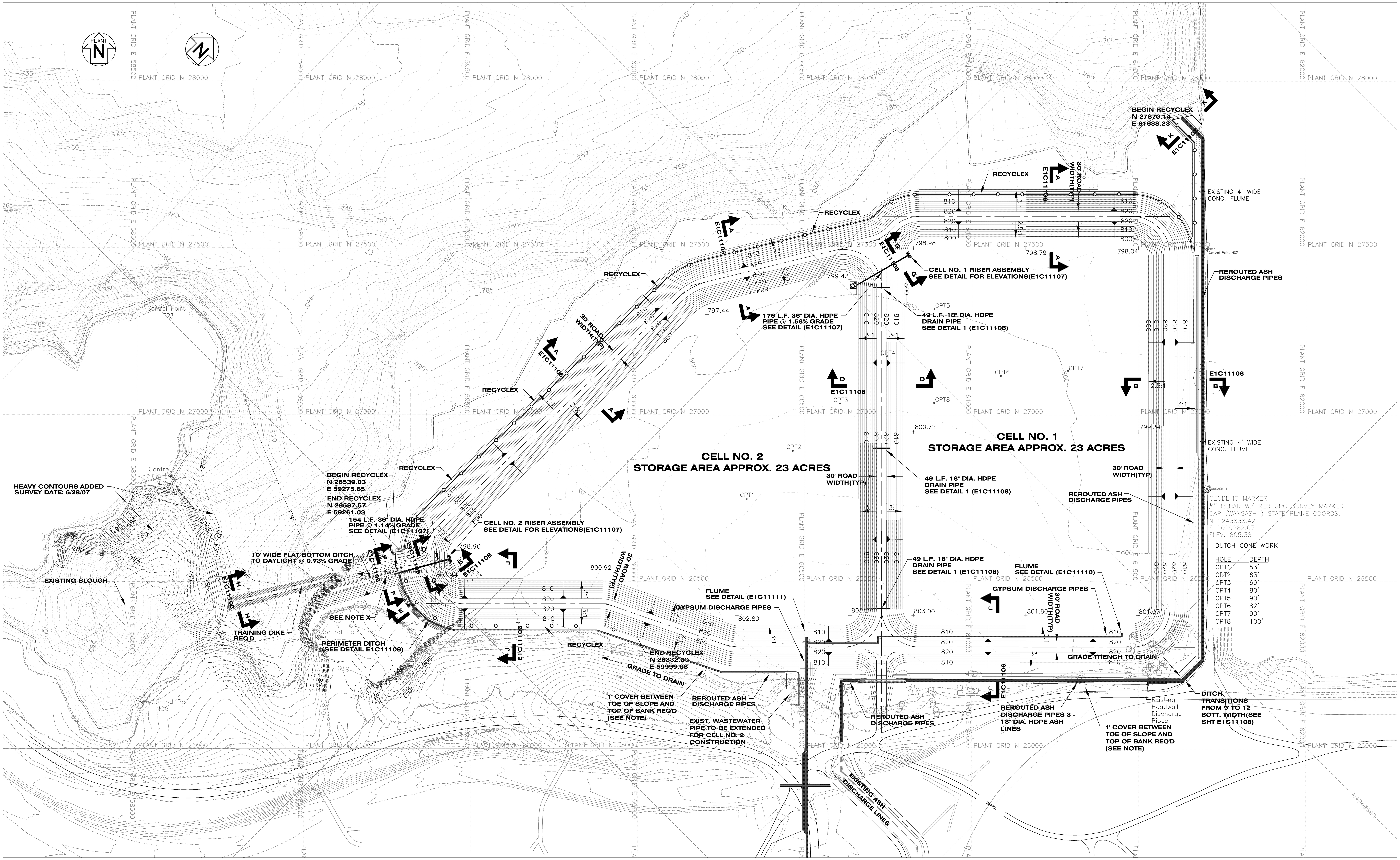
PLANT WANSLEY

SEPARATION DAM
STA. 12+50



CONFIDENTIAL BUSINESS INFORMATION

68



GENERAL ARRANGEMENT AND SITE PLAN

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

CONFIDENTIAL BUSINESS INFORMATION
WAN-API 015

GENERAL NOTES

1. FOR DRAWING INDEX, NOTES, AND SPECIFICATIONS SEE E1C11100.
2. ALONG THE TOE OF DIKE, ALL EXPOSED ASH SHALL BE COVERED WITH 1 FOOT OF SOIL COVER. (SC/SM, MH/ML)
3. WASTE WATER DISCHARGE PIPES TO BE TEMPORARILY EXTENDED TO FACILITATE DIKE CONSTRUCTION. THESE PIPES WILL BE LATER REMOVED TO PERMANENTLY END IN THE DISCHARGE DITCH FROM CELL NO. 2.

Southern Company Generation
Engineering and Construction Services
FOR
Georgia Power Company

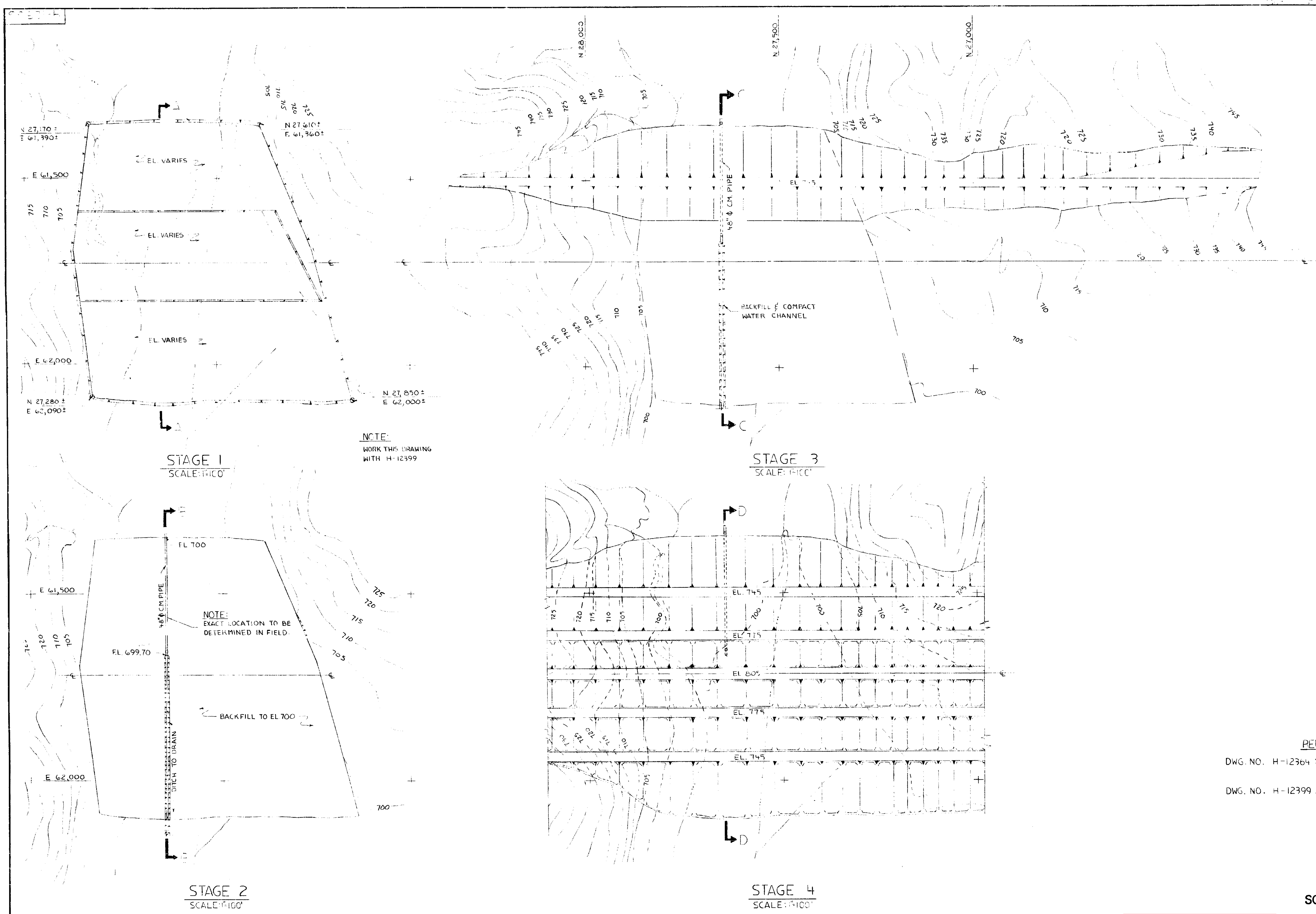
PLANT WANSLEY UNITS 1 & 2
FGD PROJECT

SHORT TERM GYPSUM DISPOSAL
GENERAL ARRANGEMENT AND SITE PLAN

REVISION	DATE	JOB NO.	EWO	BY	CHK'D	CIVIL APPR	ELECT APPR	I/C APPR	MECH APPR	DISC MGR
1 GENERAL REVISION ISSUED FOR CONSTRUCTION	8-10-07	C07510	3059DE	JWM	PMG	DHF				CKT
0 ISSUED FOR CONSTRUCTION	7-27-07	C07510	3059DE	JWM	PMG	AMW	RKC	KAH	MTB	CKT

SCALE	PROJ I.D.	DRAWING NUMBER	SH	CONT'D	REV
1"=100'		E1C11102	1	FINAL	1

ANSI E- 44x34 Acad2004



NOTE:
WORK THIS DRAWING WITH H-12399

REFERENCES
DWG. NO. H-12364 : SEPARATION DAM CONSTRUCTION DIVERSION SCHEME STAGE DRAWINGS, SECTIONS
DWG. NO. H-12399 : SEPARATION DAM PLAN AND SECTIONS.

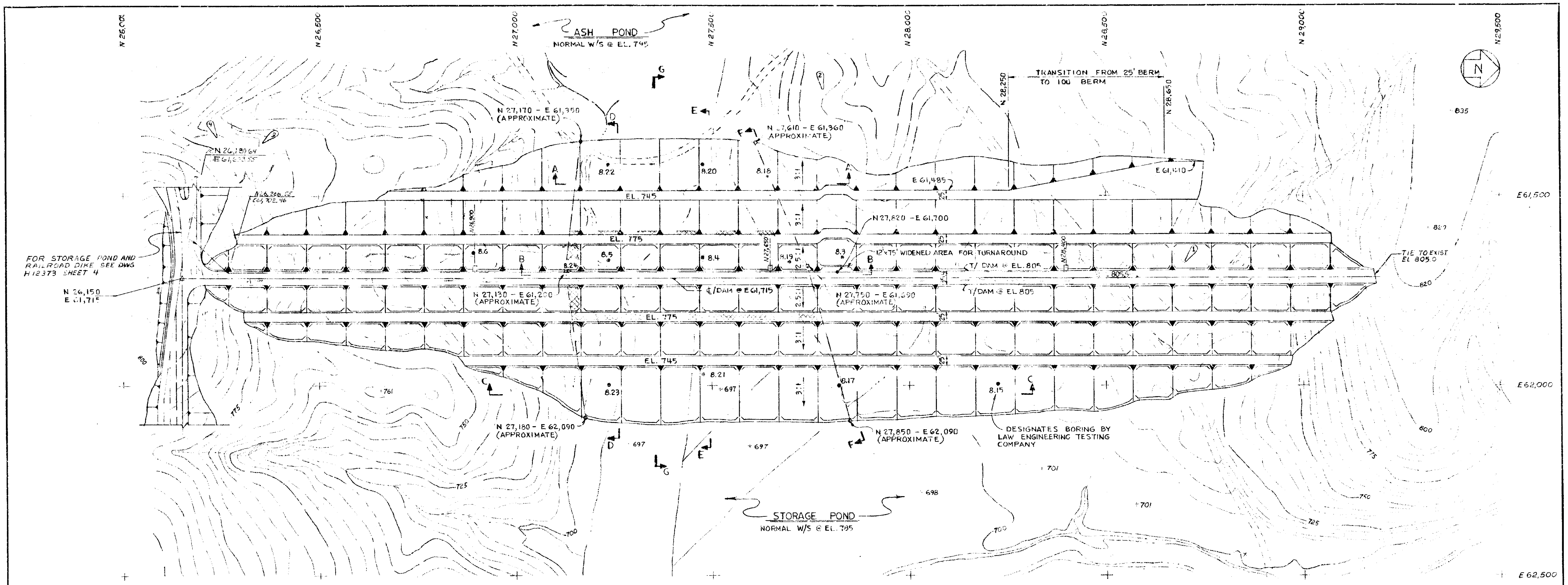
CONFIDENTIAL BUSINESS INFORMATION
WAN-API 007

SOUTHERN SERVICES INC.
FOR
GEORGIA POWER CO. ATLANTA GA.
GENERAL ENGINEERING DEPARTMENT

SUBJECT: SEPARATION DAM-CONSTRUCTION DIVERSION SCHEME STAGE DWGS. PLANS
SCALE: 1"=100'
DRAWN: CDL
LOCATION: 10-209
SHEET NO: H-12366

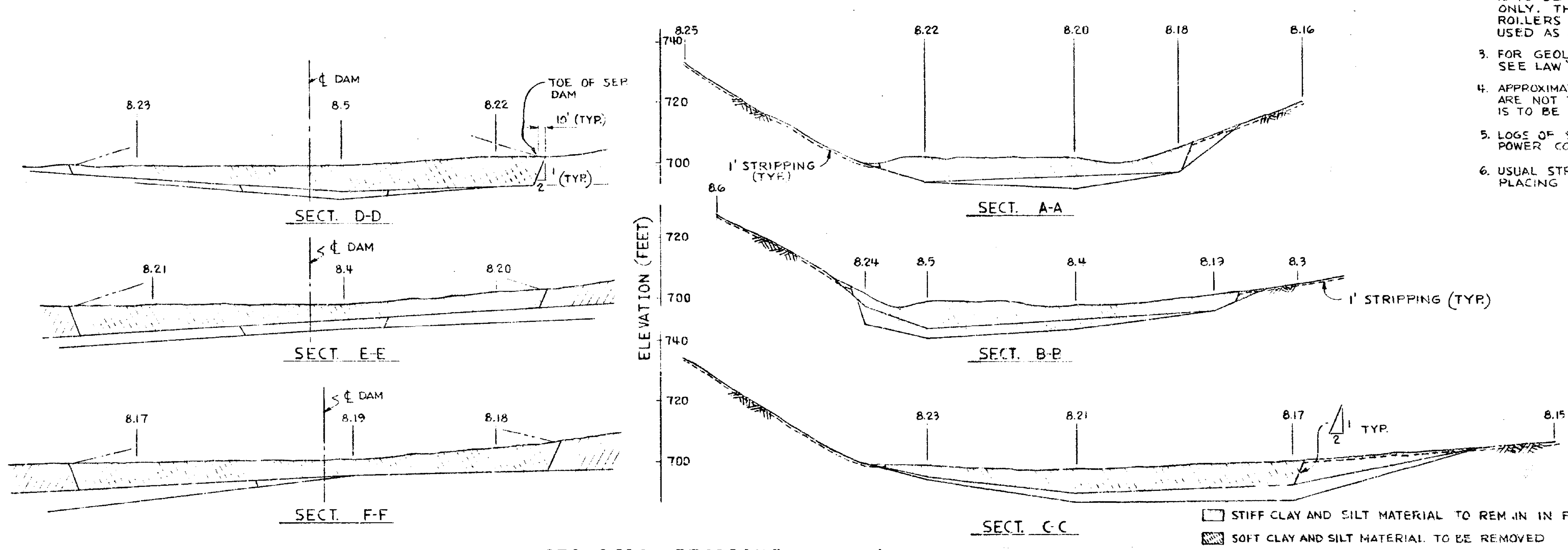
RETURN TO HYDRO

30X



PLAN OF SEPARATION DAM

1" = 100'-0"



GEOLOGIC SECTIONS

HORIZ. SCALE: 1" = 100'-0"
VERT. SCALE: 1" = 20'-0"

- STIFF CLAY AND SILT MATERIAL TO REMAIN IN PLACE
- SOFT CLAY AND SILT MATERIAL TO BE REMOVED
- SAND AND GRAVEL MATERIAL TO BE REMOVED
- SAND AND GRAVEL MATERIAL TO REMAIN IN PLACE

NOTE:

1. SOFT TO VERY SOFT ALLUVIUM (CLAY AND SILT) IS TO BE REMOVED UNDER THE SUPERVISION OF THE FIELD ENGINEER. THE APPROXIMATE BOUNDARY IS SHOWN BY THE SHADED AREA. LEAVE STIFF CLAY AND SILT IN PLACE.
2. SAND AND GRAVEL LAYER BELOW THE CLAY AND SILT IS TO BE REMOVED FROM THE HATCHED AREA ONLY. THE REST WILL BE CONSOLIDATED BY ROLLERS BEFORE PLACING EMBANKMENT FILL AND USED AS A DRAINAGE BLANKET.
3. FOR GEOLOGIC CROSS SECTIONS & OTHER RELATED DETAILS SEE LAW'S COMMUNICATION NO. 39; FIGURES 1-5,9.
4. APPROXIMATE LOCATION OF LIMITS OF MATERIAL TO BE REMOVED ARE NOT TO BE CONSTRUED AS EXACT. ACTUAL EXCAVATION IS TO BE DETERMINED BY NATURE OF THE MATERIAL.
5. LOGS OF SOIL BORINGS MAY BE OBTAINED FROM GEORGIA POWER COMPANY OR SOUTHERN SERVICES INC.
6. USUAL STRIPPING SHOULD BE DONE AS NECESSARY BEFORE PLACING THE FILL.

REFERENCES: SEPARATION DAM

- H-12364 — DIVERSION SCHEME — STAGE DRAWINGS & SECTIONS
- H-12365 — SECTION & DETAILS
- H-12366 — CONSTRUCTION DIVERSION SCHEME — STAGE DRAWINGS & PLANS
- H-12373 — STORAGE POND DAM, SHEET 4
- H-12396 — STABILITY ANALYSIS, SHEET 1 OF 3
- H-12397 — " " , SHEET 2 OF 3
- H-12398 — " " , SHEET 3 OF 3
- H 12237 — GEN. ARRANGEMENT, ASH PIPE ROUTING

SOUTHERN SERVICES, INC.
FOR
GEORGIA POWER CO., ATLANTA, GA.
GENERAL ENGINEERING DEPARTMENT

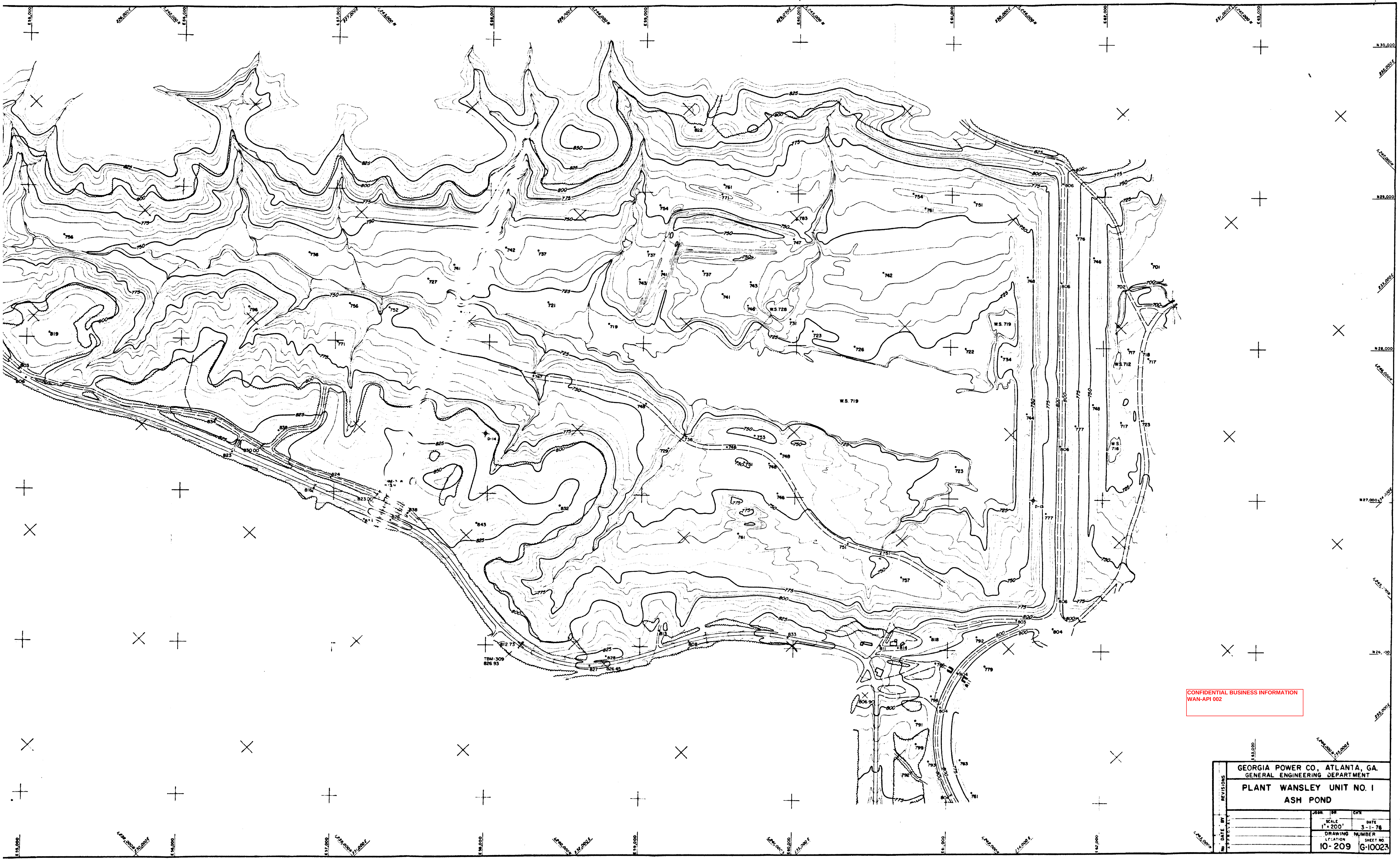
PLANT WANSLEY
SEPARATION DAM-GENERAL ARRANGEMENT WITH LIMITS OF EXCAVATION

NO.	DATE	BY	REVISIONS
4	3-11-76	VAB	RELOCATED ¢ ASH PIPING
3	5-5-75	JMC	RELOCATED ¢ ASH PIPING
2	3/20/75	CDL	ADDED ¢ ASH PIPING

APPROVALS: 4/4/73; F. F. Duncan 4-13-73

DSGN. JJM | DR. WDP | CH'K JM
SCALE AS SHOWN | DATE 4-3-73
DRAWING NUMBER: LOCATION 10-209 | SHEET NO. H-12399

30 X



GEORGIA POWER CO., ATLANTA, GA.
GENERAL ENGINEERING DEPARTMENT

PLANT WANSLEY UNIT NO. 1
ASH POND

No	DATE	BY	REVISIONS

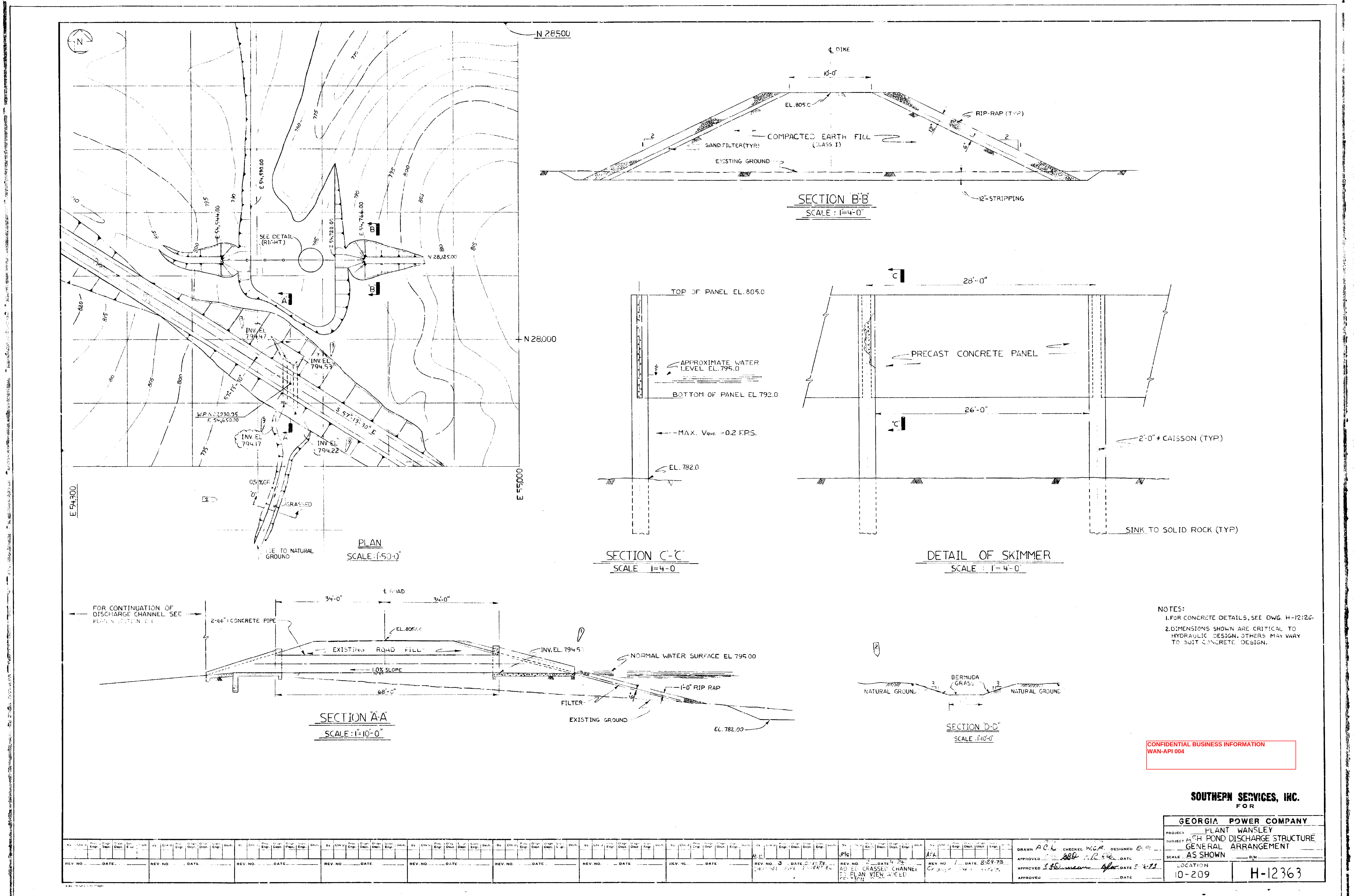
APPROVALS

JSGN.	DR.	CH'K
SCALE 1" = 200'		DATE 3-1-76

DRAWING NUMBER

LOCATION	SHEET NO.
10-209	G-10023

G-10023


N 28500
N 28,000
E 54,300
E 55,000
SEE DETAIL (RIGHT)
N 28,125.00
INV. EL. 794.47
INV. EL. 794.53
INV. EL. 794.17
INV. EL. 794.22
S 57°19'30" E
0.5% GR.
GRASSED
TIE TO NATURAL GROUND
PLAN
SCALE: 1"=50'-0"
℄ DIKE
10'-0"
EL. 805.0
RIP-RAP (TYP)
COMPACTED EARTH FILL (CLASS I)
SAND FILTER (TYP)
EXISTING GROUND
12" STRIPPING
SECTION B-B
SCALE: 1"=4'-0"
TOP OF PANEL EL. 805.0
APPROXIMATE WATER LEVEL EL. 795.0
BOTTOM OF PANEL EL. 792.0
MAX. Vave = 0.2 F.P.S.
EL. 782.0
SECTION C-C
SCALE 1"=4'-0"
28'-0"
PRECAST CONCRETE PANEL
26'-0"
2'-0" ϕ CAISSON (TYP)
SINK TO SOLID ROCK (TYP)
DETAIL OF SKIMMER
SCALE: 1"=4'-0"
FOR CONTINUATION OF DISCHARGE CHANNEL SEE PLAN & SECTION D-D
℄ ROAD
34'-0"
34'-0"
2-66" ϕ CONCRETE PIPE
EL. 805.0
EXISTING ROAD FILL
INV. EL. 794.5
1.0% SLOPE
68'-0"
NORMAL WATER SURFACE EL. 795.00
1'-0" RIP RAP
FILTER
EXISTING GROUND
EL. 782.00
SECTION A-A
SCALE: 1"=10'-0"
BERMUDA GRASS
NATURAL GROUND
NATURAL GROUND
SECTION D-D
SCALE: 1"=10'-0"
NOTES:
1. FOR CONCRETE DETAILS, SEE DWG. H-12126.
2. DIMENSIONS SHOWN ARE CRITICAL TO HYDRAULIC DESIGN. OTHERS MAY VARY TO SUIT CONCRETE DESIGN.
CONFIDENTIAL BUSINESS INFORMATION
WAN-API 004
SOUTHERN SERVICES, INC.
FOR
GEORGIA POWER COMPANY
PROJECT PLANT WANSLEY
SUBJECT ASH POND DISCHARGE STRUCTURE
GENERAL ARRANGEMENT
SCALE AS SHOWN
LOCATION 10-209
H-12363
REV. NO. 3 CHANGED ...
ADDED GRASSED CHANNEL TO PLAN VIEW, ADDED SECTION D-D
8-29-73

30X

SOUTHERN COMPANY

Engineering and Construction Services Calculation

Calculation Number: TV-WN-ECS3201-001

Project/Plant: Plant Wansley Ash Pond	**Unit(s):** Units 1-2	**Discipline/Area:** ES&EE
Title/Subject: Slope Stability Analyses of Ash Pond Separation Dike		
Purpose/Objective: Analyze slope stability of Ash Pond Separation Dike		
System or Equipment Tag Numbers: NA	**Originator:** Wayne Wang	

Contents

Revision Record

Rev. No.	Description	Originator Initial / Date	Reviewer Initial / Date	Approver Initial / Date
0	Issued for Information	WW/8-6-10	GHM/8-10-10	JCP/8-10-10

Notes:

Purpose of Calculation

Plant Wansley has disposed of coal combustion by-products (ash) in one main storage impoundment since 1976. The Plant Wansley ash pond was commissioned in 1975. The separation dike (ash pond dike) was installed in 1975 between the ash pond and the downstream storage water pond. The dike was constructed to a crest elevation of El. 805 with 2.3 (H):1(V) and 3 (H):1(V) upstream and downstream slopes, intermediate berms at El. 775 and El. 745, and a maximum height of approximately 105 feet.

The purpose of this calculation is to determine the stability of the separation dike of the Ash Pond.

Methodology

The calculation was performed using the following methods and software:

GeoStudio 2007 (Version 7.16, Build 4840), Copyright 1991-2008, GEO-SLOPE International, Ltd.

Bishop, Ordinary, Janbu, and Morgenstern-Price analytical methods were run. Morgenstern-Price was reported.

Criteria and Assumptions

The slope stability models were run using the following assumptions and design criteria:

- According to the USGS earthquake acceleration probability maps for the vicinity of Plant Wansley, and "Pseudostatic Coefficient for Use in Simplified Seismic Slope Stability Evaluation" published in *Journal of Geotechnical and Geoenvironmental Engineering, ASCE September 2009* by *Jonathan Bray* and *Thaleia Travasarou*, a seismic load of 0.15g was used in the analyses.
- The current required minimum criteria (factors of safety) were taken from US Corps of Engineers Manual EM 1110-2-1902, October 2003 and the Georgia Department of Natural Resources, Environmental Protection, Rules for Dam Safety, Rule 391-3-8-09 Standards for the Design and Evaluation of Dams.
- The soil properties of unit weight, phi angle, and cohesion were obtained from triaxial shear testing performed on UD samples of the dike fill material obtained during drilling in July 2010 and from parameters used during the 1973 stability analysis indicated on Drawings H12396 - H12398. The triaxial shear testing was performed according to ASTM D 4767.
- Properties for ash were based on laboratory testing performed on undisturbed and remolded samples of ash from various plants and on previous project experience.
- The data obtained from piezometers BB and DD was used to provide phreatic data for the slope stability analysis for the separation dike.
- The cross-section of the dike was obtained using the following sources:

1) Original design Drawing No. H12365 Section G-G.
2) A boring conducted in July 2010.

The following soil properties were used in the analyses:

	Dry Unit Weight (pcf)	Moist Unit Weight (pcf)	Effective Stress Parameters		Total Stress Parameters	
			Internal Friction Angle	Cohesion (psf)	Internal Friction Angle	Cohesion (psf)
Embankment Fill	102	123	32	140	29	400
Foundation Soil	--	112	37	0	24	80
Foundation (Gravel Filter)	--	130	40	0	40	0
Sluiced Ash	--	80	10	0	10	0
Rock	--	150	40	3000	40	3000

As shown on drawing H-12398, the 1973 stability analysis used unconsolidated - undrained (UU) strength parameters of c = 700 psf and phi = 12° for the foundation soils under a steady state loading condition. The Law Engineering Testing Company Report dated April 3, 1972, reported results for a consolidated – undrained (CU) triaxial shear test performed on a foundation sample from Boring 8.12, sample depth of 14 ft to 16 ft, or approximate Elev. 696. The total and effective parameters from this test were used in this 2010 analysis.

The following hydraulic information was used in the analyses:

Elevation (ft)	Min. Pool	Normal Pool	Max. Pool
Ash Pond	--	795	802.6
Storage Pond	725	780	--

Based on Georgia Power's (GP) Land Department Drawing M-187-6, Plant Wansley Ash Pond – August 2005 Survey, the top elevation of the ash in the impoundment is approximately El. 765. The normal pool is El. 795. The maximum surcharge pool is El. 802.6 which corresponds to the crest elevation of the emergency spillway. According to the Plant Wansley Ash Pond Storm Water Analysis prepared by SCG Hydro Services, the storage capacity of the ash pond from, conservatively, El. 799 to El. 802.6 is 1044 ac-ft, 2.22 times the storage necessary for the 100 year, 24 hour storm event. For our analysis, we assumed that rapid drawdown would occur from El 802.6 of the maximum surcharge pool to El. 795, the normal pool elevation.

The normal (and maximum) pool elevation of the storage water pond is El. 780. This maximum level constraint has been established to minimize the occurrence of excessive seepage conditions along the downstream slope/toe of the dike. Based on the 1973 original slope analyses shown on

GP Drawings H12396 –H12398, the minimum pool is El. 725. We assume conservatively that rapid drawdown occurs from El. 780 to El. 725.

Summary of Conclusions

The following table lists the factors of safety for various slope stability failure conditions. All conditions are steady state except where noted. Construction cases were not considered. Based on the results of these analyses, the dike is stable. The minimum factor of safety for each load case was taken from the USACOE EM 1110-2-1902 (2003) or the Georgia Department of Natural Resources, Environmental Protection, Rules for Dam Safety, Rule 391-3-8-09 Standards for the Design and Evaluation of Dams.

Failure Conditions	Computed Factor of Safety	Required Minimum Factor of Safety[1]
Downstream Steady State	1.9	1.5
Downstream Seismic	1.2	1.1
Downstream Maximum Surcharge Pool (Ash Pond)	1.7	1.4
Upstream Rapid Drawdown (Ash Pond)	1.9	1.3
Downstream Rapid Drawdown (Storage Pond)	1.4	1.3

[1] US Corps of Engineers Manual EM 1110-2-1902, October 2003

The analyses show that in all cases the separation dike is stable. Safety factors for all cases were acceptable and exceeded the minimum safety factors required.

Design Inputs/References

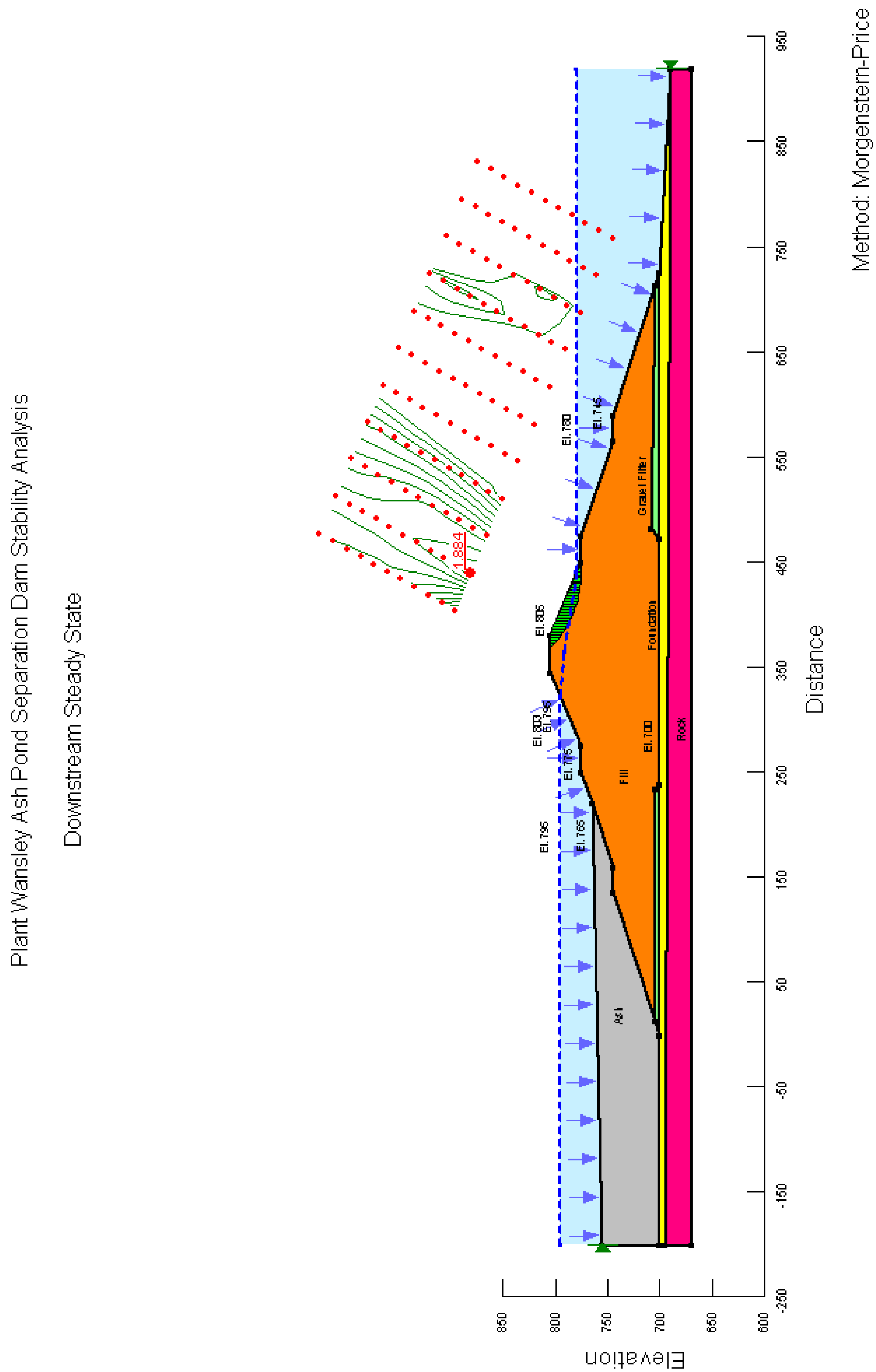
USGS Earthquake Hazards website, http://www.usgs.gov/hazards/earthquakes/.
NOAA website, http://www.srh.noaa.gov/ffc/html/rva.php.
Georgia Department of Natural Resources, Environmental Protection, Rules for Dam Safety.
GPC Land Department Drawing M-187-6 Plant Wansley Ash Pond – August 2005 Survey
GPC Drawing H10027 Project Location Map
GPC Drawing H12363 - Plant Wansley Ash Pond Discharge Structure General Arrangement
GPC Drawing H12364 - Plant Wansley Separation Dike Construction
GPC Drawing H12365 - Plant Wansley Separation Dike section and Details
GPC Drawing H12366 - Plant Wansley Separation Dike Construction
GPC Drawing H12396 - Plant Wansley Separation Dike Stability Analysis – Sheet 1 of 3
GPC Drawing H12397 - Plant Wansley Separation Dike Stability Analysis – Sheet 2 of 3
GPC Drawing H12398 - Plant Wansley Separation Dike Stability Analysis – Sheet 3 of 3
GPC Drawing H12399 - Plant Wansley Separation Dike General Arrangement
SCG Hydro Services - Dam Safety Surveillance, 4th Quarter 2009 Report, Plant Wansley

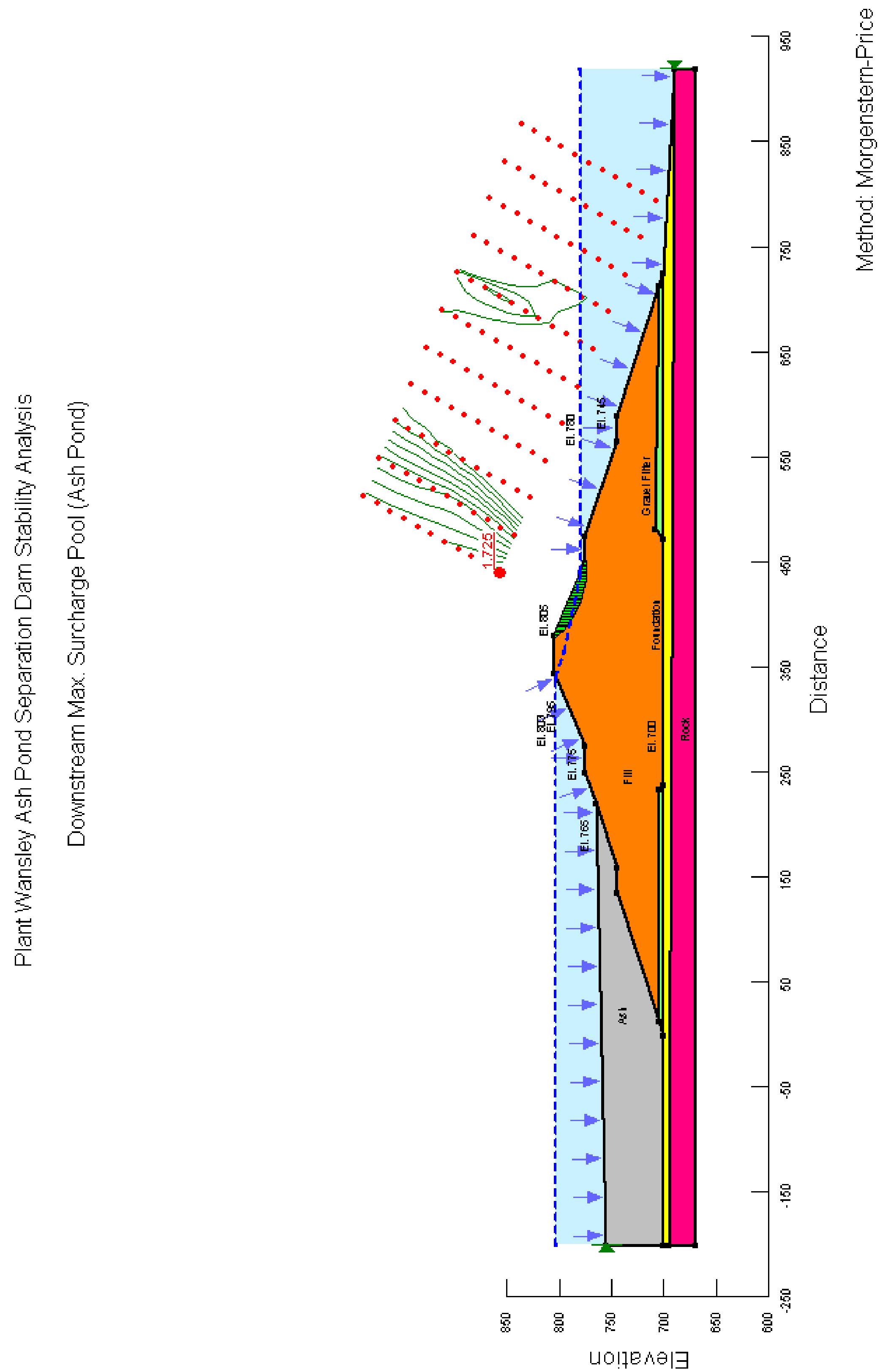
Evaluate Storm Water Capacity of Wansley Ash Pond by SCG Hydro Services – August 2010

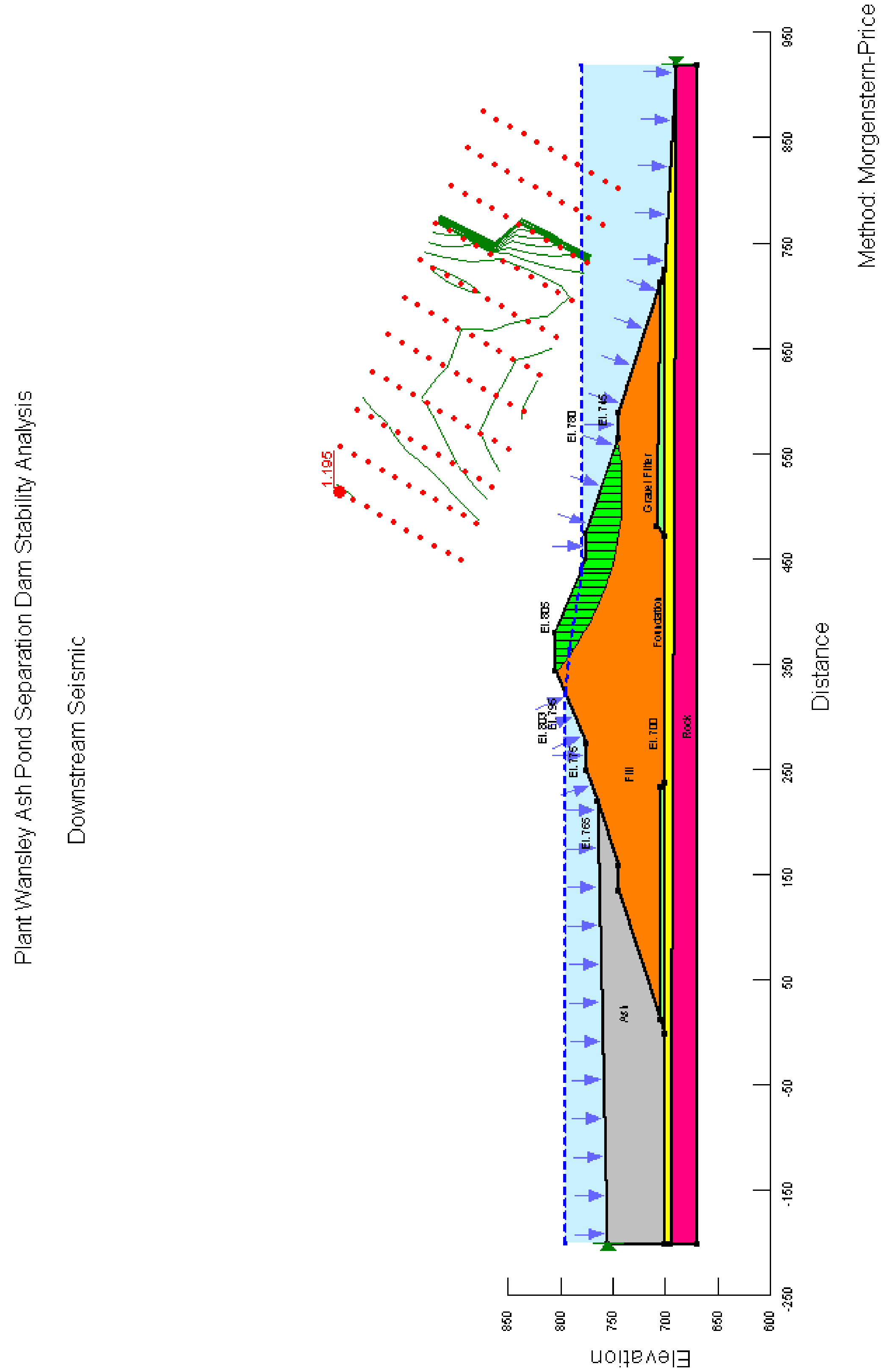
Body of Calculation

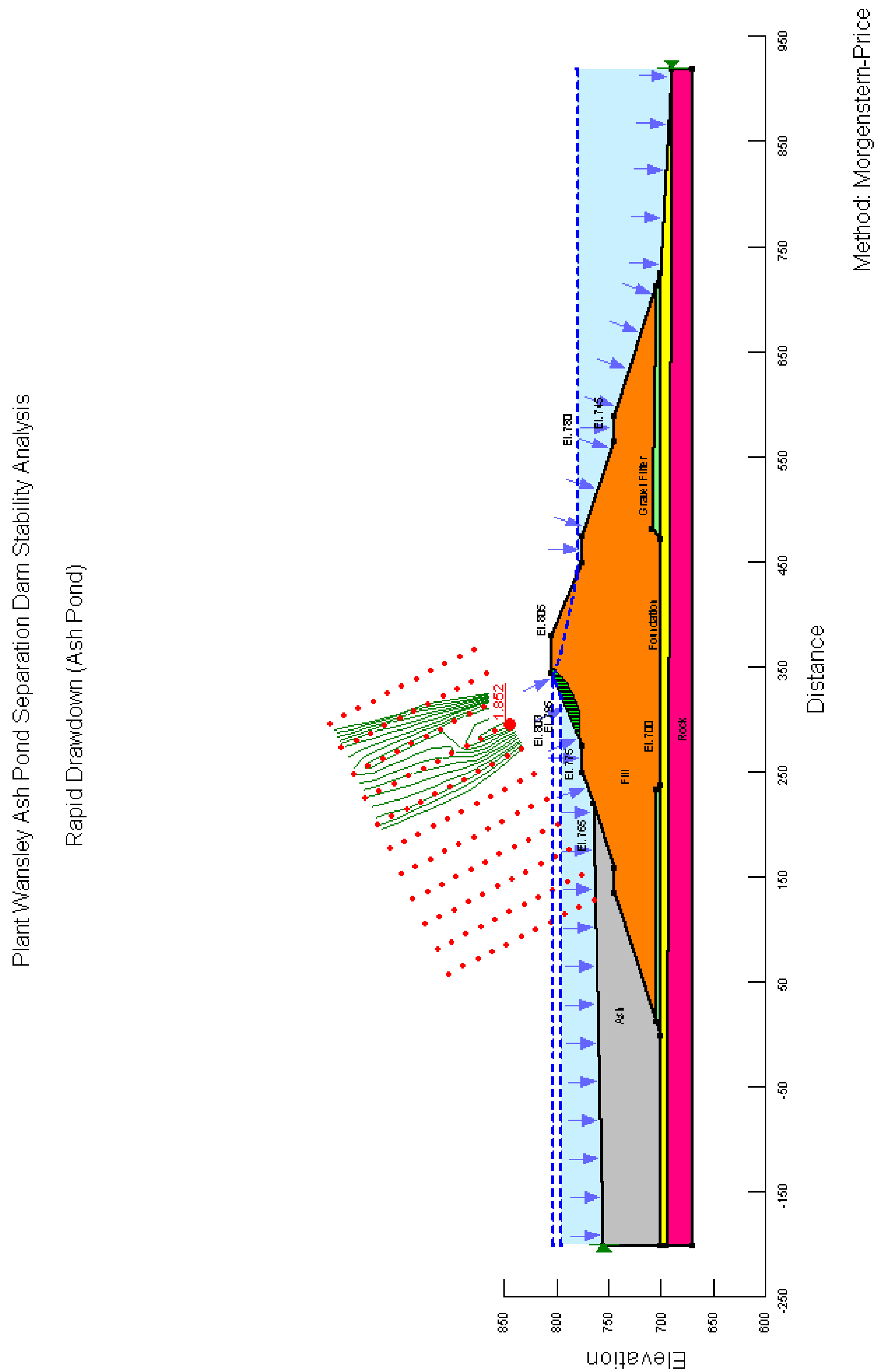
Calculation consists of Slope-W modeling attached.

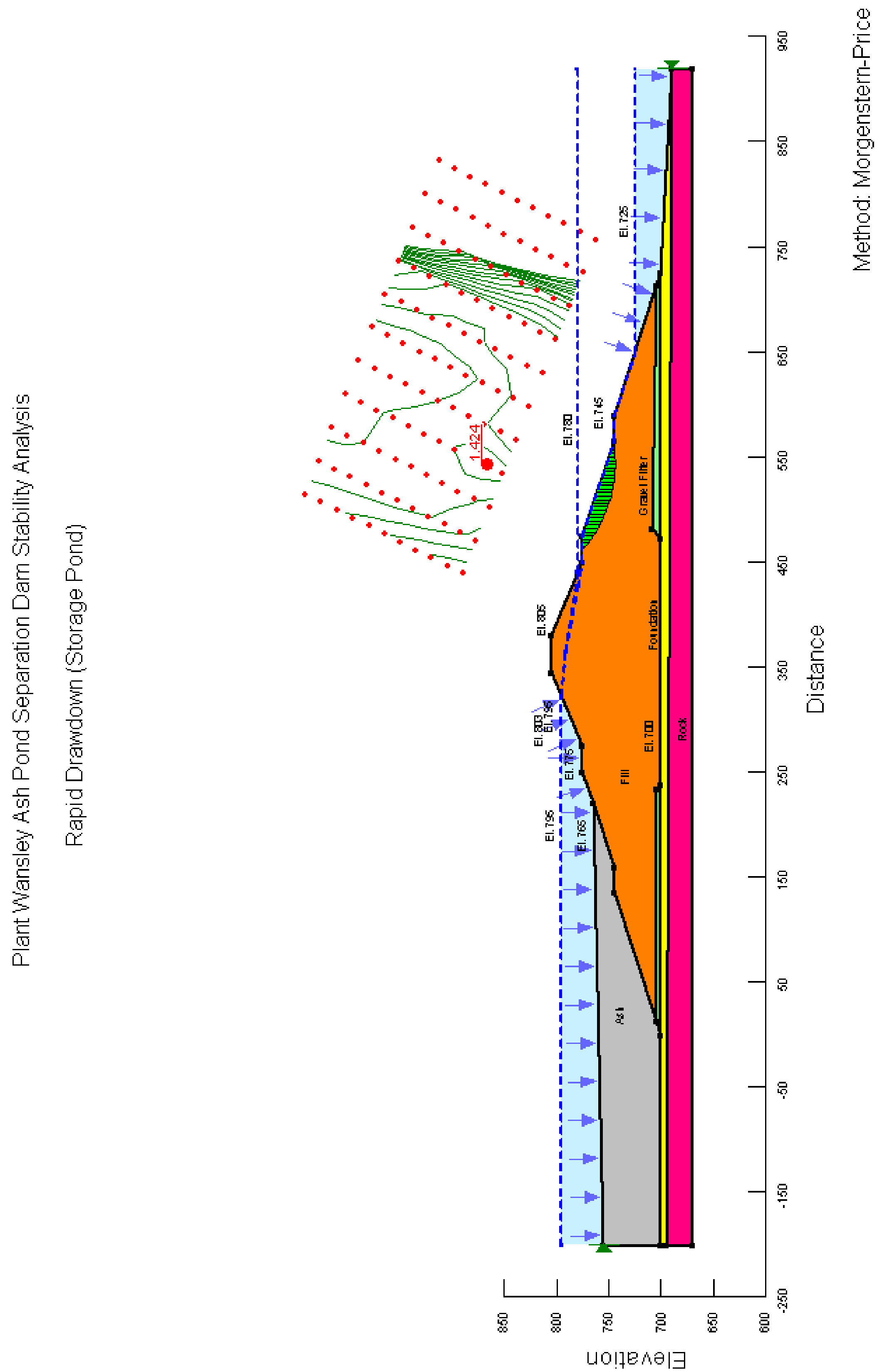
Confidential Business Information


Plant Wansley Ash Pond Separation Dam Stability Analysis
Downstream Steady State
Method: Morgenstern-Price
1.884
El. 795
El. 765
El. 775
El. 805
El. 780
El. 745
El. 700
Ash
Fill
Foundation
Gravel Filter
Rock
Distance
Elevation
-250
-150
-50
50
150
250
350
450
550
650
750
850
950
600
650
700
750
800
850


Plant Wansley Ash Pond Separation Dam Stability Analysis
Downstream Max. Surcharge Pool (Ash Pond)
Method: Morgenstern-Price
1.725
Ash
Fill
Foundation
Gravel Filter
Rock
Distance
Elevation

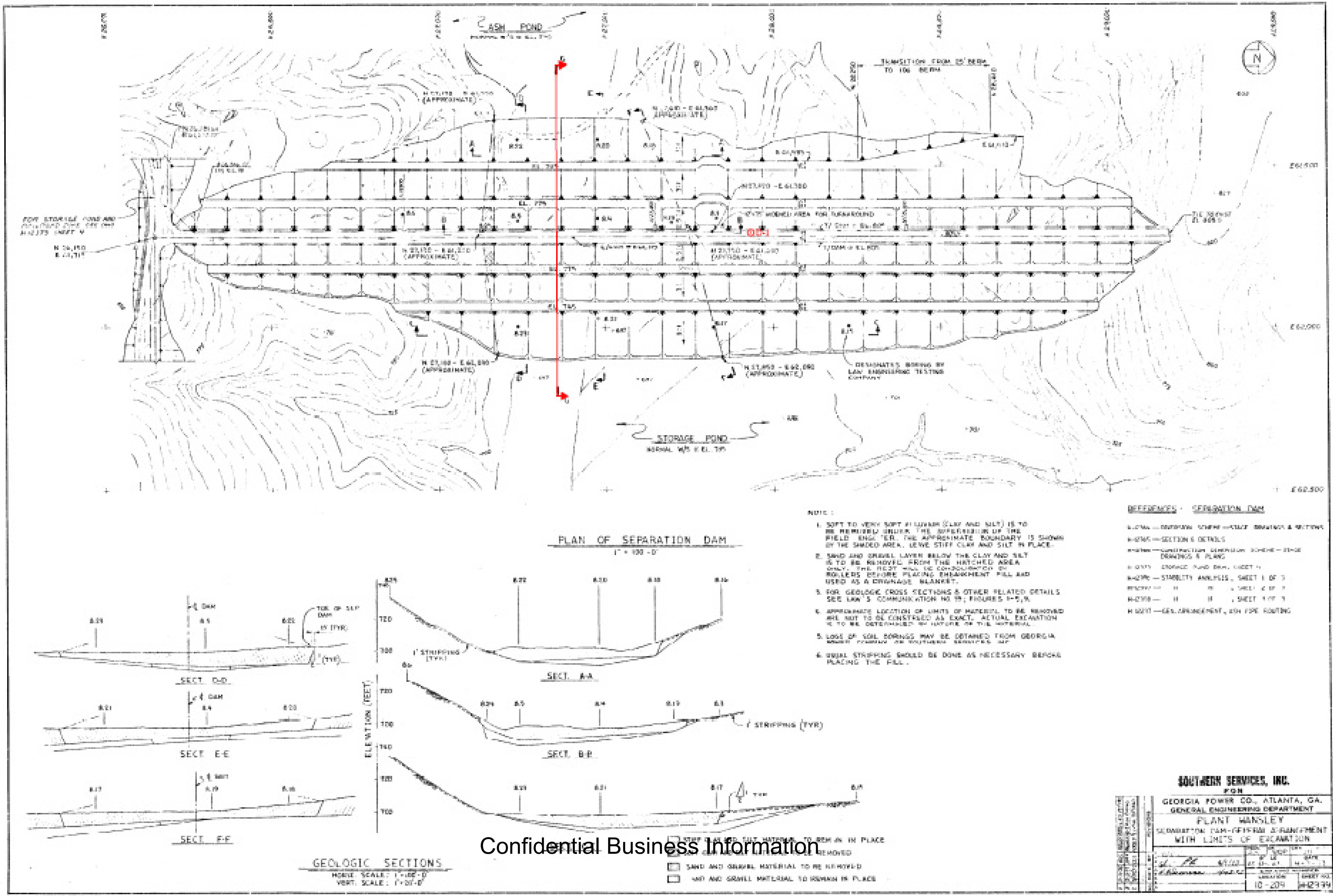

Plant Wansley Ash Pond Separation Dam Stability Analysis
Downstream Seismic
Method: Morgenstern-Price
1.195
Distance
Elevation
Ash
Fill
Foundation
Gravel Filter
Rock
El. 700
El. 805
El. 765
El. 775
El. 745
El. 780


Plant Wansley Ash Pond Separation Dam Stability Analysis
Rapid Drawdown (Ash Pond)
Method: Morgenstern-Price
1.852
Fill
Foundation
Gravel Filter
Rock
Ash
Distance
Elevation


Plant Wansley Ash Pond Separation Dam Stability Analysis
Rapid Drawdown (Storage Pond)
Method: Morgenstern-Price
1.424
El. 795
El. 765
El. 775
El. 803
El. 795
El. 805
El. 780
El. 745
El. 725
El. 700
Ash
Fill
Foundation
Gravel Filter
Rock
Distance
Elevation
-250
-150
-50
50
150
250
350
450
550
650
750
850
950
600
650
700
750
800
850

Attachment A

Figure - Boring Location


ASH POND
TRANSITION FROM 25' BERM TO 10' BERM
STORAGE POND
PLAN OF SEPARATION DAM
NOTE:
1. SOFT TO VERY SOFT ALLUVIUM (CLAY AND SILT) IS TO BE REMOVED UNDER THE SUPERVISION OF THE FIELD ENGINEER. THE APPROXIMATE BOUNDARY IS SHOWN BY THE SHADED AREA. LEAVE STIFF CLAY AND SILT IN PLACE.
2. SAND AND GRAVEL LAYER BELOW THE CLAY AND SILT IS TO BE REMOVED FROM THE HATCHED AREA ONLY. THE REST WILL BE CONSOLIDATED BY ROLLERS BEFORE PLACING EMBANKMENT FILL AND USED AS A DRAINAGE BLANKET.
3. FOR GEOLOGIC CROSS SECTIONS & OTHER RELATED DETAILS SEE LAW'S COMMUNICATION NO 19; FIGURES 1-5,9.
4. APPROXIMATE LOCATION OF LIMITS OF MATERIAL TO BE REMOVED ARE NOT TO BE CONSTRUED AS EXACT. ACTUAL EXCAVATION IS TO BE DETERMINED BY NATURE OF THE MATERIAL.
5. LOGS OF SOIL BORINGS MAY BE OBTAINED FROM GEORGIA POWER COMPANY OR SOUTHERN SERVICES, INC.
6. USUAL STRIPPING SHOULD BE DONE AS NECESSARY BEFORE PLACING THE FILL.
REFERENCES - SEPARATION DAM
SECTION & DETAILS
STABILITY ANALYSIS, SHEET 1 OF 3
GEN. ARRANGEMENT, ASH PIPE ROUTING
SECT. D-D
SECT. E-E
SECT. F-F
SECT. A-A
SECT. B-B
ELEVATION (FEET)
1' STRIPPING (TYP.)
GEOLOGIC SECTIONS
SAND AND GRAVEL MATERIAL TO BE REMOVED
SAND AND GRAVEL MATERIAL TO REMAIN IN PLACE
SOUTHERN SERVICES, INC.
FOR
GEORGIA POWER CO., ATLANTA, GA.
GENERAL ENGINEERING DEPARTMENT
PLANT HANSLEY
SEPARATION DAM-GENERAL ARRANGEMENT WITH LIMITS OF EXCAVATION
10-209
H23994

Attachment B

Soil Log

SOUTHERN COMPANY
Energy to Serve Your World™

DRILLING LOG

GEOLOGICAL SERVICES

Hole No. D-1

SITE	**Plant Wansley Seperation Dyke**			HOLE DEPTH	**106**	SURF.ELEV.	806
LOCATION	Plant Wansley			COORDINATES N	27943.78	E	61716.41
ANGLE	0	BEARING	0	CONTRACTOR	Ranger	DRILL NO.	N/A
DRILLING METHOD	H.S.A.	NO. SAMPLES	21			NO. U.D. SAMPLES	4
CASING SIZE	N/A	LENGTH	N/A	CORE SIZE	N/A	TOTAL % REC.	N/A
WATER TABLE DEPTH	26'	ELEV.	N/A	TIME AFTER COMP.	17 hours	DATE TAKEN	7/8/2010
TYPE GROUT	Portland	QUANTITY	N/A	MIX	1:1	DRILLING START DATE	7/7/2010
DRILLER	Justen Crowe	RECORDER	Korey Young	APPROVED	Korey Young	DRILLING COMP. DATE	7/7/2010

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	% Rec	RQD
0									
1							T.O.B. water level was 62'		
2									
3									
4									
5		red brown micacous SILT (ML)	1	3.5-5	11-12-14	26			
6									
7									
8									
9									
10		red brown micacous SILT (ML)	2	8.5-10	7-6-8	14			
11									
12									
13									
14									
15		red brown micacous SILT (ML)	3	13.5-15	8-10-12	22			
16									
17									
18							UD 16-18.5		
19									
20		red brown micacous SILT (ML)	4	18.5-20	8-13-17	30			
21									
22							UD 21-23.5		
23									
24									

Form GS9901 7-26-2004

SOUTHERN COMPANY
Energy to Serve Your World

DRILLING LOG

GEOLOGICAL SERVICES

Hole No. D-1

SITE Plant Wansley Seperation Dyke TOTAL DEPTH 106 SURF.ELEV. 806

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	% Rec	RQD
25		red brown micacous SILT (ML)	5	23.5-25	7-12-10	22			
26									
27									
28									
29									
30		red brown micacous SILT (ML)	6	28.5-30	8-10-12	22			
31									
32									
33									
34									
35		red brown micacous SILT (ML)	7	33.5-35	6-8-9	17			
36									
37									
38									
39									
40		red brown micacous SILT (ML)	8	38.5-40	6-9-13	22			
41									
42									
43									
44									
45		red brown micacous SILT (ML)	9	43.5-45	7-9-12	21			
46									
47							UD 46-47.5 short push due to hard material		
48									
49									
50		red brown micacous SILT (ML	10	48.5-50	7-9-10	19			
51									
52							UD 51-53 short push due to hard materia		
53									
54									
55		red brown micacous SILT (ML	11	53.5-55	5-7-12	19			
56									

Form GS9901 7-26-2004

SOUTHERN COMPANY
Energy to Serve Your World

DRILLING LOG

GEOLOGICAL SERVICES

Hole No. D-1

SITE **Plant Wansley Seperation Dyke** TOTAL DEPTH **106** SURF.ELEV. 806

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	% Rec	RQD
57									
58									
59									
60		multi colored sandy SILT (ML)	12	58.5-60	5-10-16	26			
61									
62									
63									
64									
65		brown gray micacous SILT (ML)	13	63.5-65	7-16-14	30			
66									
67									
68									
69									
70		brown gray micacous SILT (ML)	14	68.5-70	7-14-16	30			
71									
72									
73									
74									
75		brown gray micacous SILT (ML)	15	73.5-75	7-12-15	27			
76									
77									
78									
79									
80		tan fine sandy SILT (ML)	16	78.5-80	6-12-17	29			
81									
82									
83									
84									
85		brown micacous SILT (ML	17	83.5-85	7-16-13	29			
86									
87									
88									

Form GS9901 7-26-2004

SOUTHERN COMPANY
Energy to Serve Your World

DRILLING LOG

GEOLOGICAL SERVICES

Hole No. D-1

SITE Plant Wansley Seperation Dyke TOTAL DEPTH 106 SURF.ELEV. 806

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	% Rec	RQD
89									
90		pink brown micacous SILT (ML)	18	88.5-90	13-20-22	42			
91									
92									
93									
94									
95		tan brown micacous SILT (ML)	19	93.5-95	9-13-19	32			
96									
97									
98									
99									
100		tan brown silty CLAY (CL)	20	98.5-100	9-12-15	27			
101									
102									
103									
104									
105		tan orange clayey fine SAND (SC)	21	103-5-105	12-18-23	41			
106									
107		Auger Refusal @ 106'							
108									
109									
110									
111									
112									
113									
114									
115									
116									
117									
118									
119									
120									

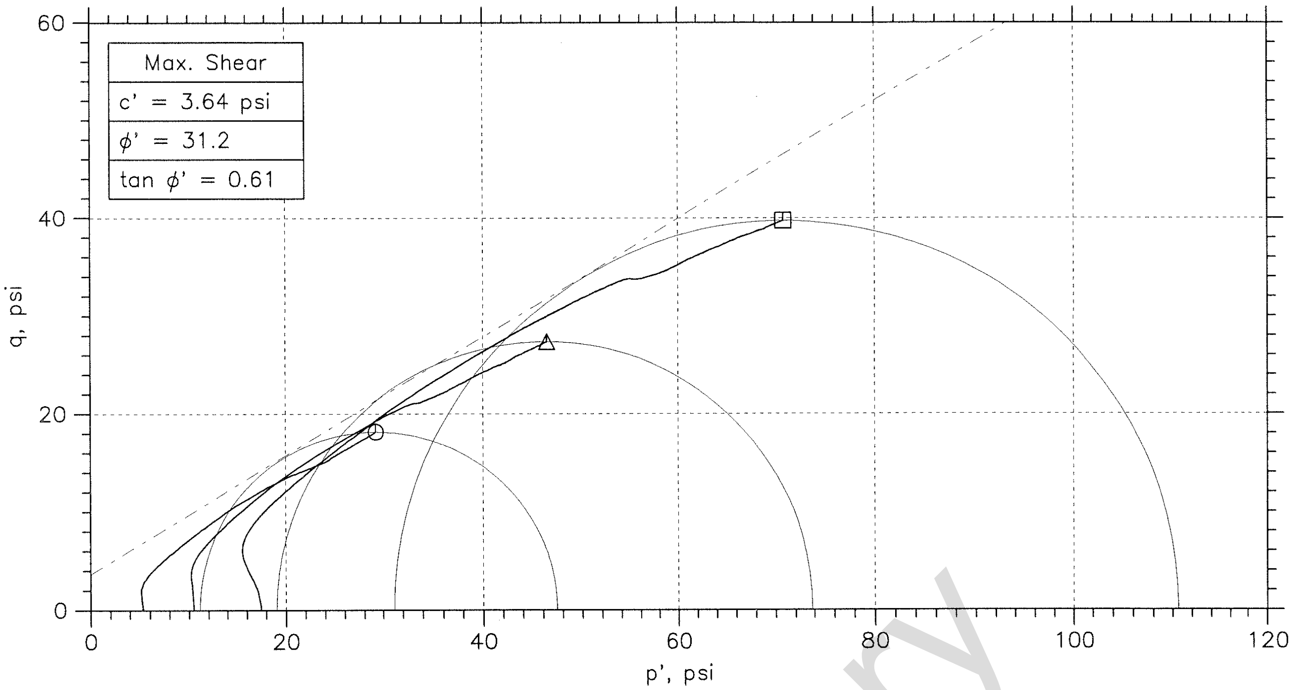
Form GS9901 7-26-2004

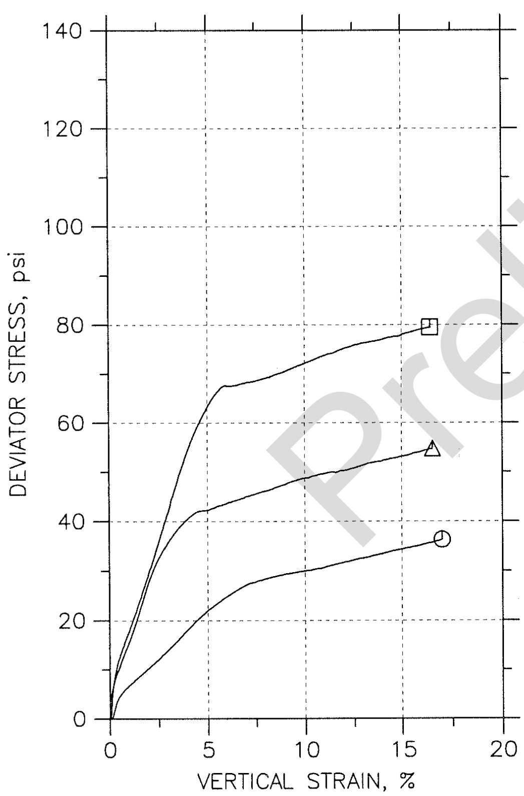
Attachment C

Soil Laboratory Analyses by MACTEC Engineering and Consulting.

Confidential Business Information

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767

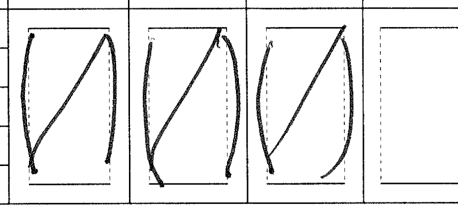




Symbol		○	△	□	
Sample No.		UD	UD	UD	
Test No.		10353.1	10353.2	10353.3	
Depth		21-23.3 ft	21-23.3 ft	21-23.3 ft	
Initial	Diameter, in	2.865	2.872	2.873	
	Height, in	5.57	5.973	5.572	
	Water Content, %	19.2	19.7	20.4	
	Dry Density, pcf	104.7	101.1	101.1	
	Saturation, %	87.8	82.2	84.8	
	Void Ratio	0.58	0.636	0.636	
Before Shear	Water Content, %	21.8	23.5	23.1	
	Dry Density, pcf	104.8	102.	102.6	
	Saturation*, %	100.0	100.0	100.0	
	Void Ratio	0.578	0.622	0.613	
	Back Press., psi	120.	110.	110.	
Ver. Eff. Cons. Stress, psi		5.252	10.5	17.49	
Shear Strength, psi		18.14	27.35	39.71	
Strain at Failure, %		17	16.5	16.4	
Strain Rate, %/min		0.05	0.05	0.05	
B-Value		0.96	0.93	0.95	
Estimated Specific Gravity		2.65	2.65	2.65	
Liquid Limit		---	---	---	
Plastic Limit		---	---	---	

MACTEC

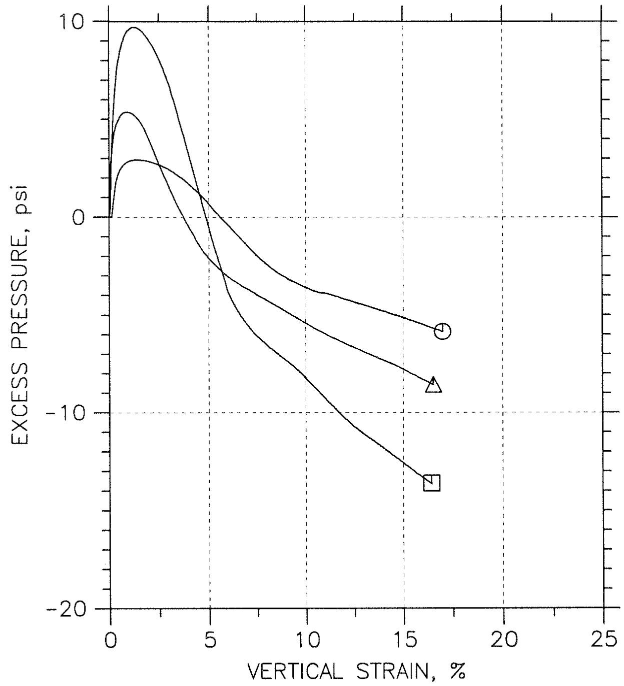
Project: Plant Wansley Ash Pond
Location: D-1
Project No.: 6152100244
Boring No.: D-1
Sample Type: Undisturbed
Description: Brown Silty Sand
Remarks: ASTM D4767-04

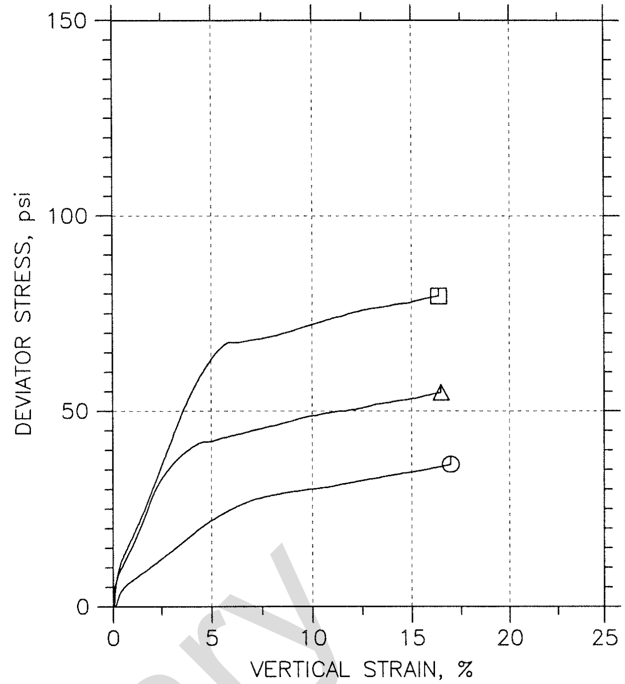


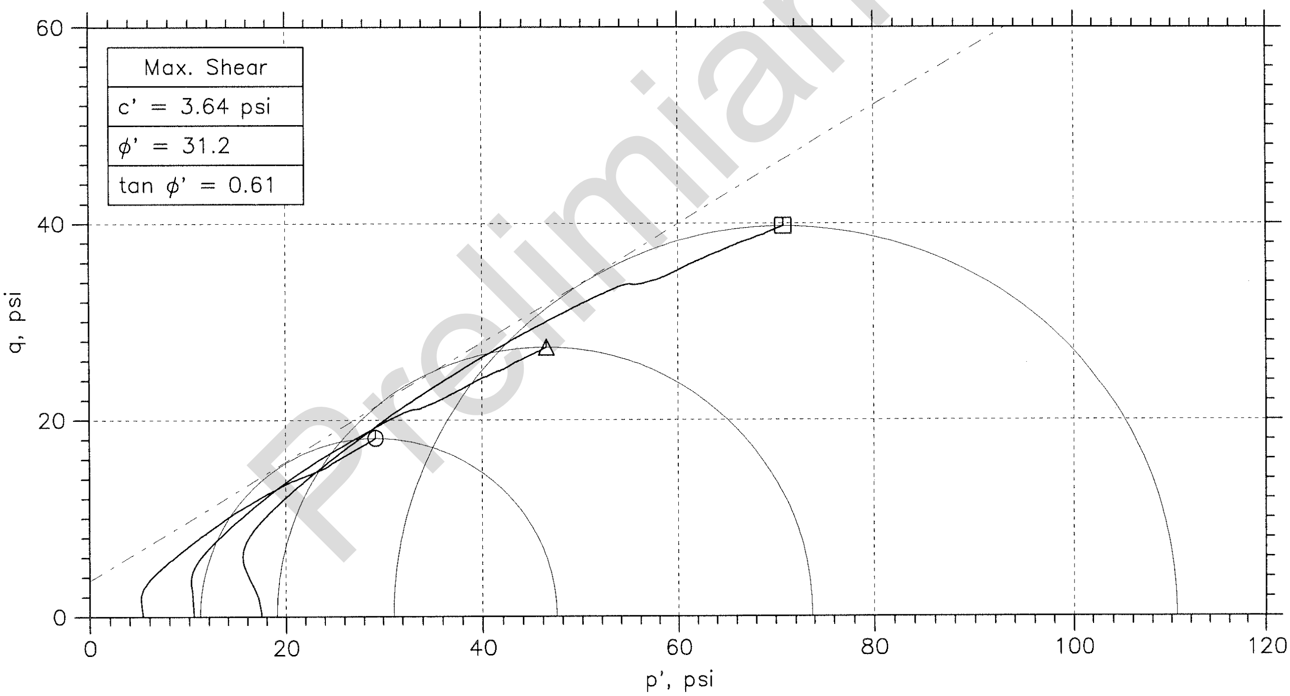
Phase calculations based on start and end of test.
* Saturation is set to 100% for phase calculations.

Thu, 29-JUL-2010 14:56:56

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767





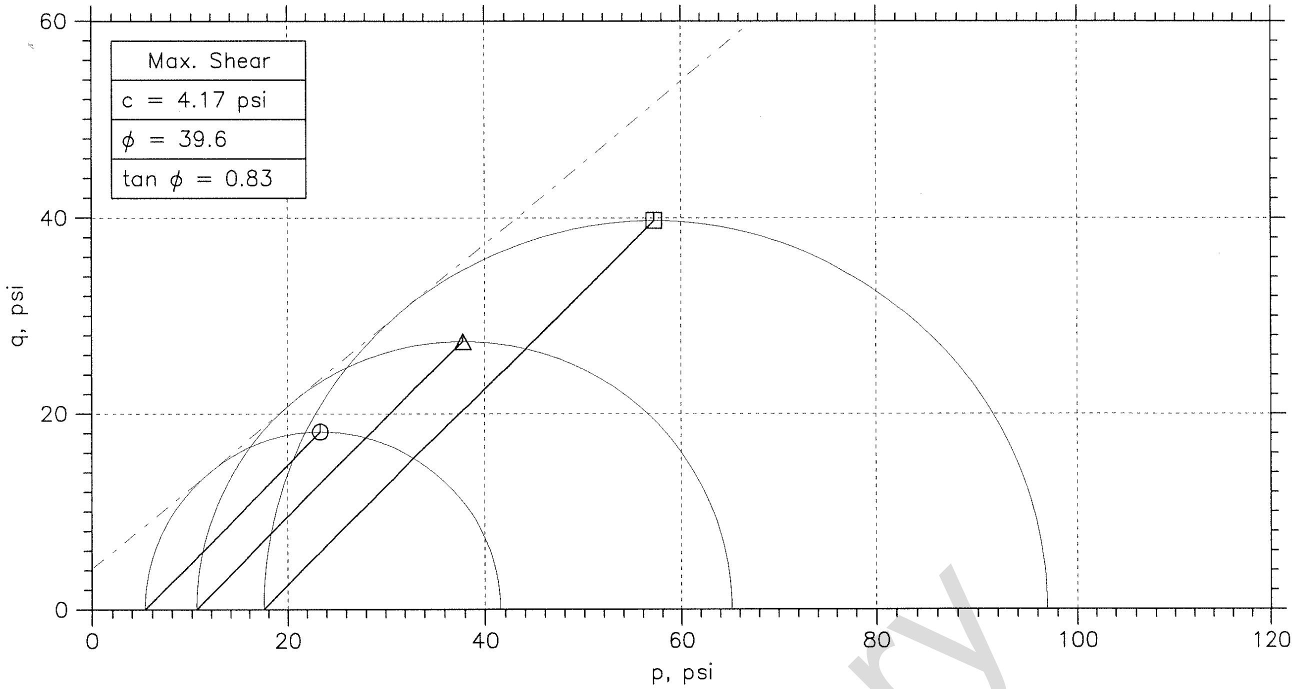


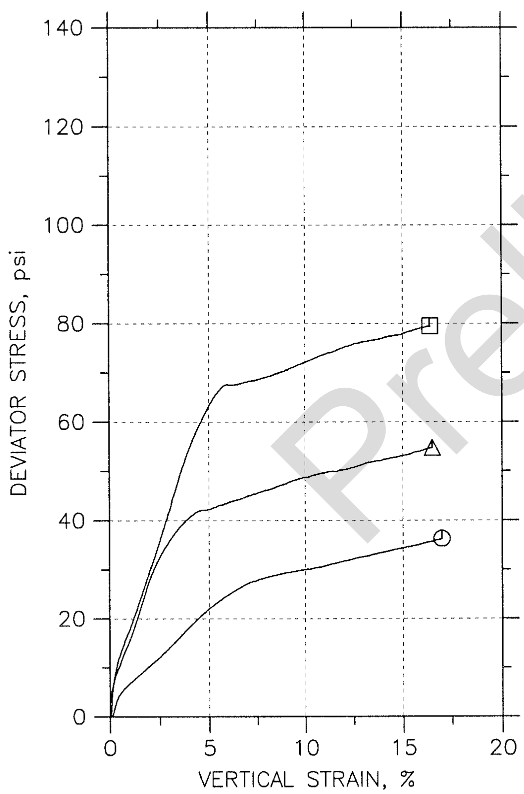
	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
○	UD	10353.1	21-23.3 ft	JW	7/26/10			10353.1_2581.dat
△	UD	10353.2	21-23.3 ft	JW	7/26/10			10353.2a_2582.dat
□	UD	10353.3	21-23.3 ft	JW	7/26/10			10353.3a_2583.dat

MACTEC

Project: Plant Wansley Ash Pond	Location: D-1	Project No.: 6152100244
Boring No.: D-1	Sample Type: Undisturbed	
Description: Brown Silty Sand		
Remarks: ASTM D4767-04		

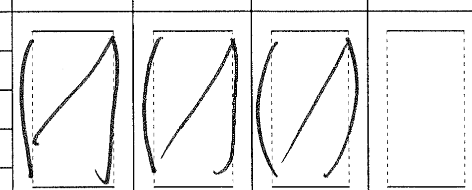
CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767





Symbol		○	△	□	
Sample No.		UD	UD	UD	
Test No.		10353.1	10353.2	10353.3	
Depth		21-23.3 ft	21-23.3 ft	21-23.3 ft	
Initial	Diameter, in	2.865	2.872	2.873	
	Height, in	5.57	5.973	5.572	
	Water Content, %	19.2	19.7	20.4	
	Dry Density, pcf	104.7	101.1	101.1	
	Saturation, %	87.8	82.2	84.8	
	Void Ratio	0.58	0.636	0.636	
Before Shear	Water Content, %	21.8	23.5	23.1	
	Dry Density, pcf	104.8	102.	102.6	
	Saturation*, %	100.0	100.0	100.0	
	Void Ratio	0.578	0.622	0.613	
	Back Press., psi	120.	110.	110.	
Ver. Eff. Cons. Stress, psi		5.252	10.5	17.49	
Shear Strength, psi		18.14	27.35	39.71	
Strain at Failure, %		17	16.5	16.4	
Strain Rate, %/min		0.05	0.05	0.05	
B-Value		0.96	0.93	0.95	
Estimated Specific Gravity		2.65	2.65	2.65	
Liquid Limit		---	---	---	
Plastic Limit		---	---	---	

MACTEC	Project: Plant Wansley Ash Pond
	Location: D-1
	Project No.: 6152100244
	Boring No.: D-1
	Sample Type: Undisturbed
	Description: Brown Silty Sand
	Remarks: ASTM D4767-04

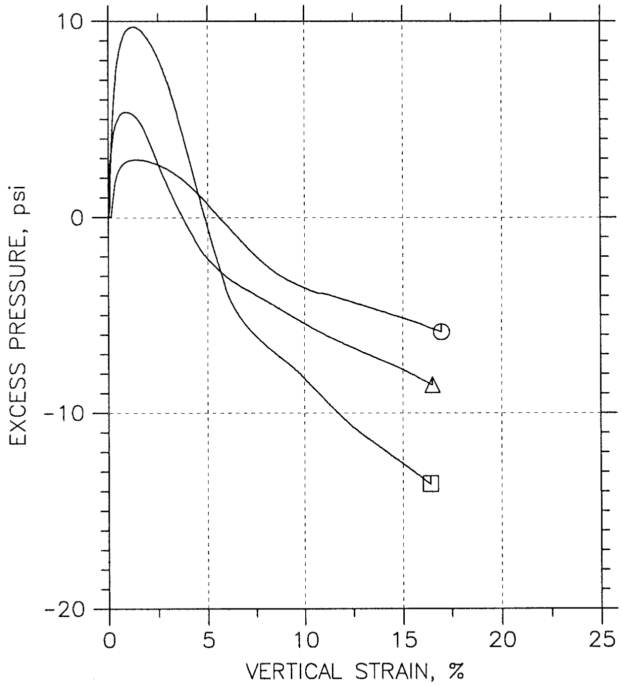


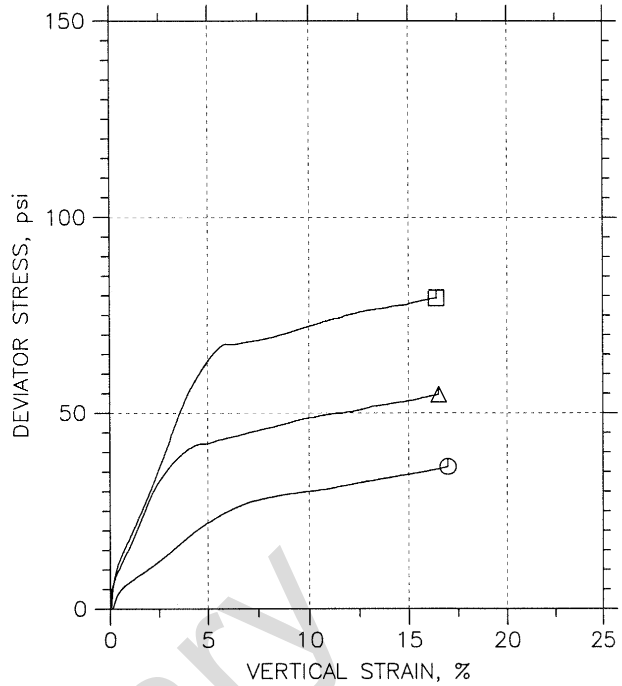
Thu, 29-JUL-2010 14:16:22

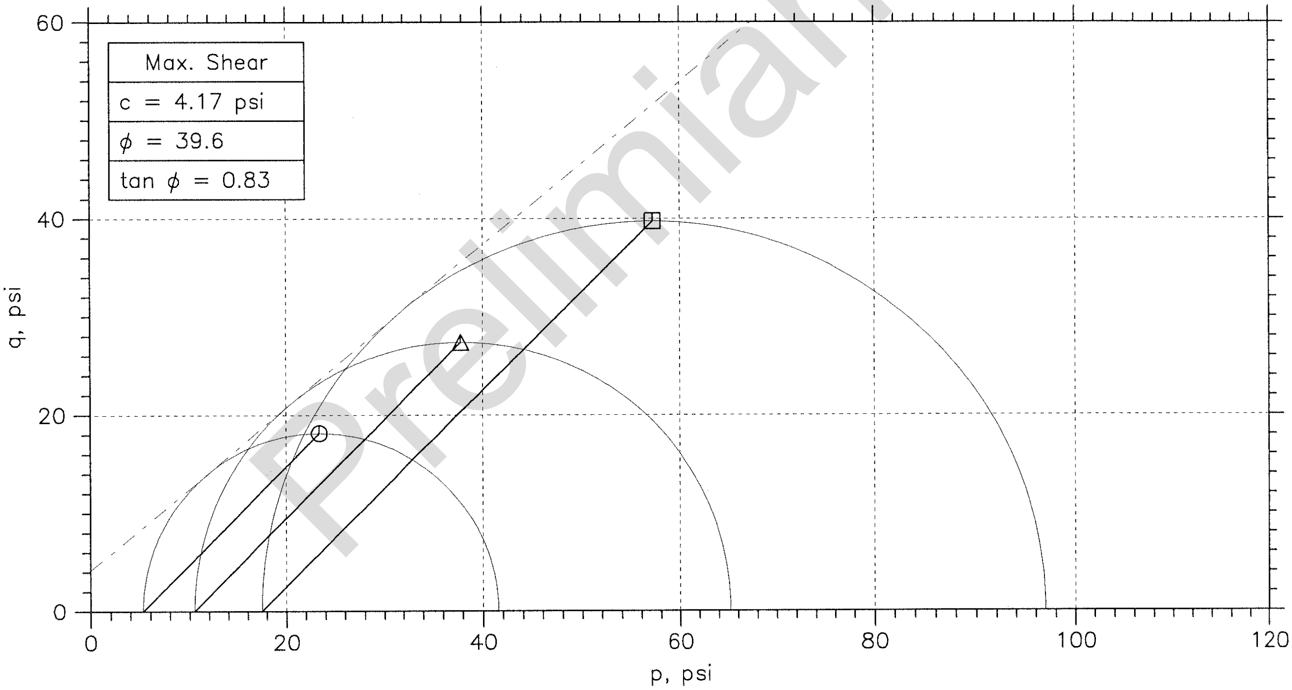
Phase calculations based on start and end of test.

* Saturation is set to 100% for phase calculations.

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



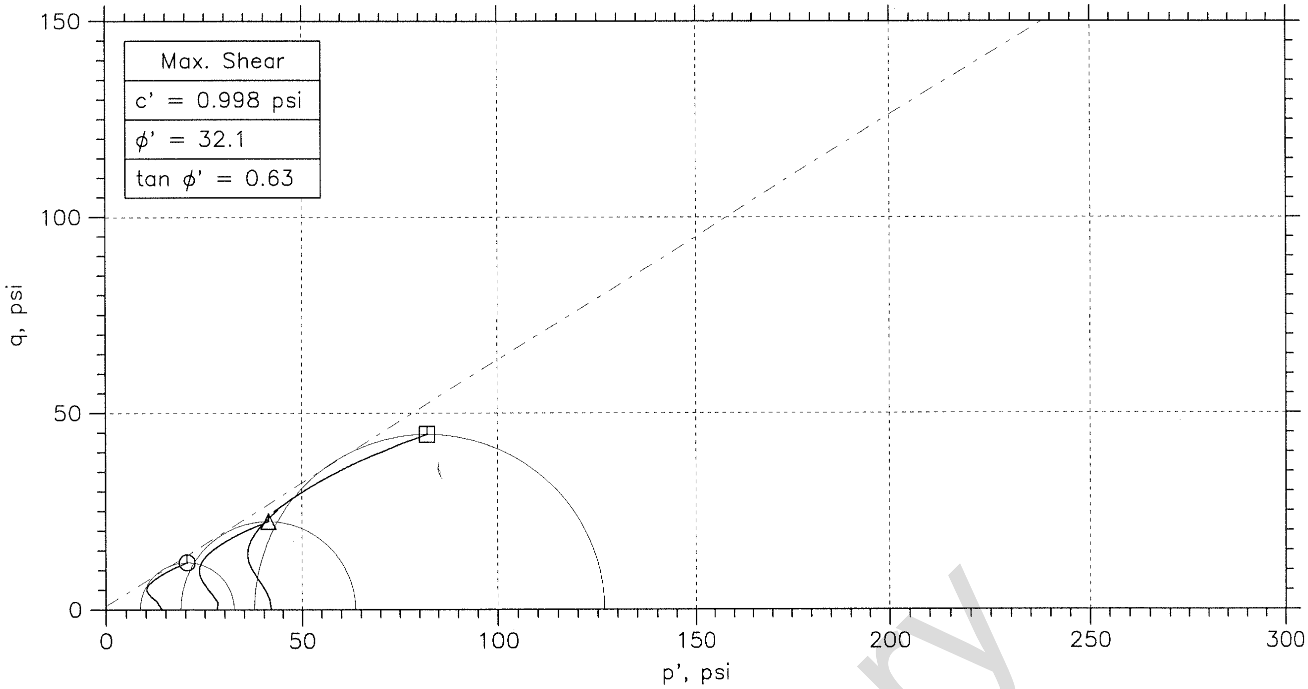


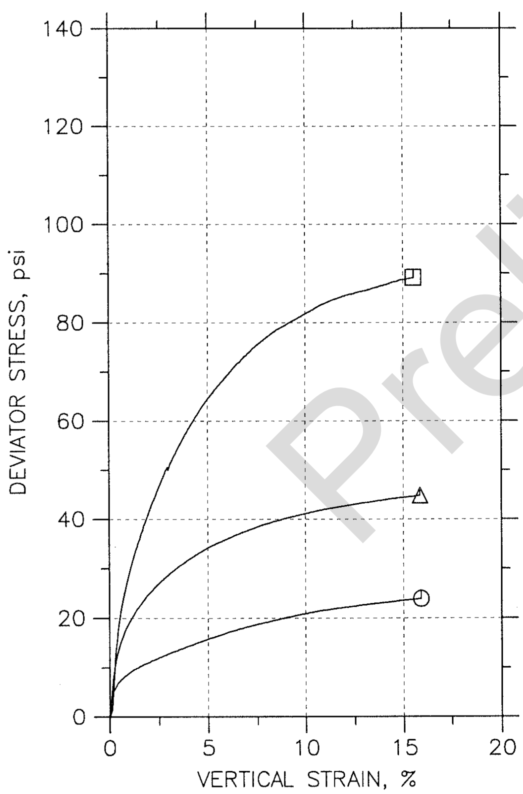


	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
○	UD	10353.1	21-23.3 ft	JW	7/26/10			10353.1_2581.dat
△	UD	10353.2	21-23.3 ft	JW	7/26/10			10353.2a_2582.dat
□	UD	10353.3	21-23.3 ft	JW	7/26/10			10353.3a_2583.dat

MACTEC	Project: Plant Wansley Ash Pond	Location: D-1	Project No.: 6152100244
	Boring No.: D-1	Sample Type: Undisturbed	
	Description: Brown Silty Sand		
	Remarks: ASTM D4767-04		

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767





Symbol		○	△	□	
Sample No.		UD	UD	UD	
Test No.		10352.1	10352.2	10352.3	
Depth		51-53 ft	51-53 ft	51-53 ft	
Initial	Diameter, in	2.843	2.872	2.872	
	Height, in	5.56	5.955	5.562	
	Water Content, %	23.3	22.5	19.3	
	Dry Density, pcf	97.62	99.59	107.4	
	Saturation, %	88.9	90.2	94.8	
	Void Ratio	0.695	0.661	0.54	
Before Shear	Water Content, %	25.5	23.9	20.1	
	Dry Density, pcf	98.7	101.3	108.	
	Saturation*, %	100.0	100.0	100.0	
	Void Ratio	0.676	0.633	0.532	
	Back Press., psi	120.	110.	100.	
Ver. Eff. Cons. Stress, psi		14.	27.99	42.	
Shear Strength, psi		11.93	22.38	44.54	
Strain at Failure, %		15.9	15.8	15.5	
Strain Rate, %/min		0.05	0.05	0.05	
B-Value		0.96	0.92	0.96	
Estimated Specific Gravity		2.65	2.65	2.65	
Liquid Limit		---	---	---	
Plastic Limit		---	---	---	

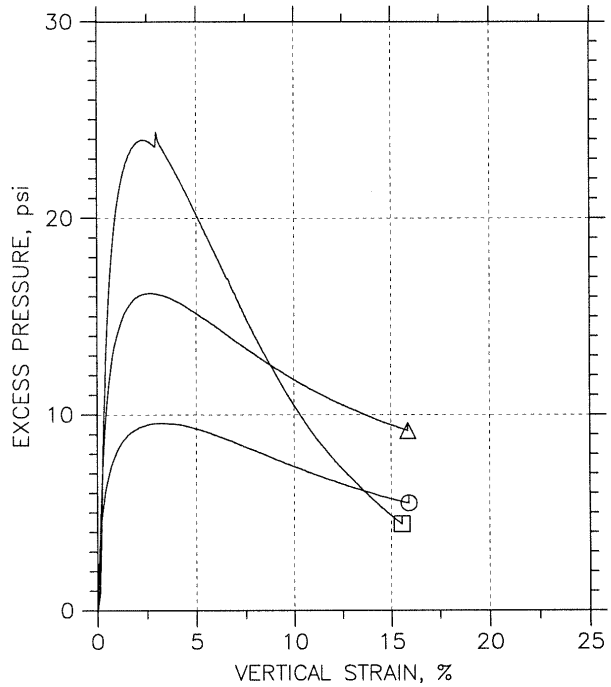
MACTEC	Project: Plant Wansley Ash Pond
	Location: D-1
	Project No.: 6152100244
	Boring No.: D-1
	Sample Type: Undisturbed
	Description: Brown Silty Sand
	Remarks: ASTM D4767-04

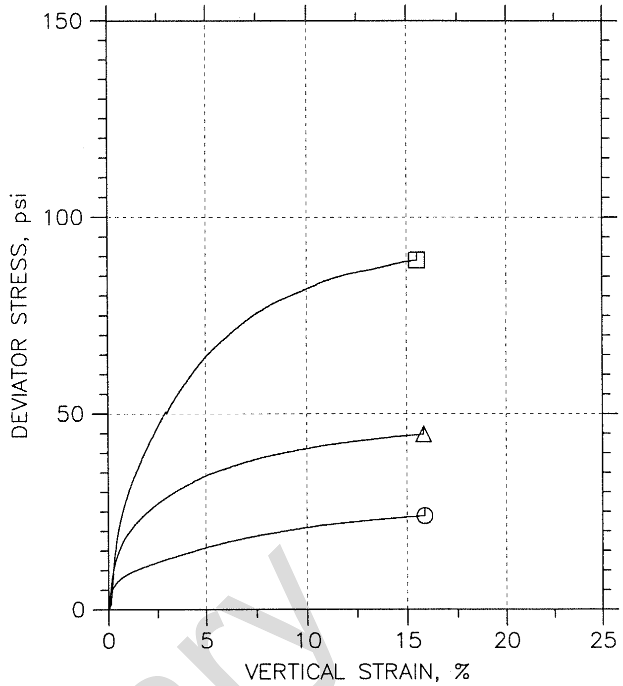
Phase calculations based on start and end of test.

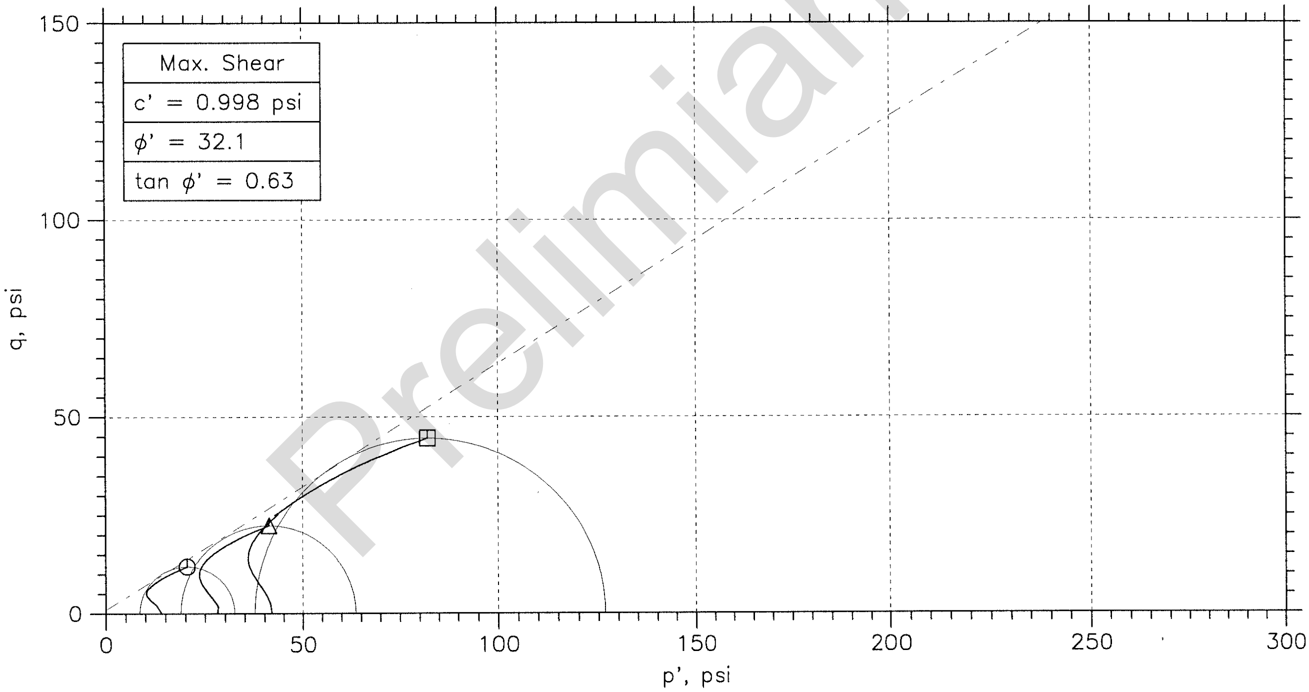
* Saturation is set to 100% for phase calculations.

Thu, 29-JUL-2010 14:56:24

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



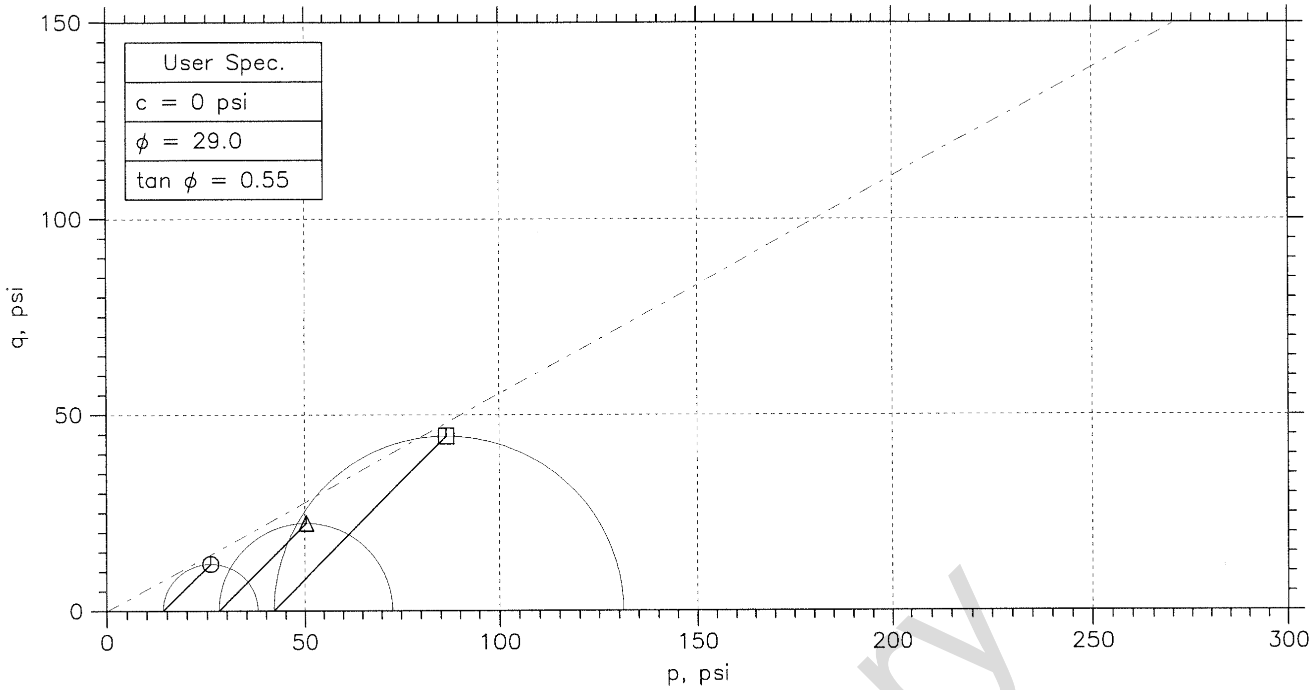


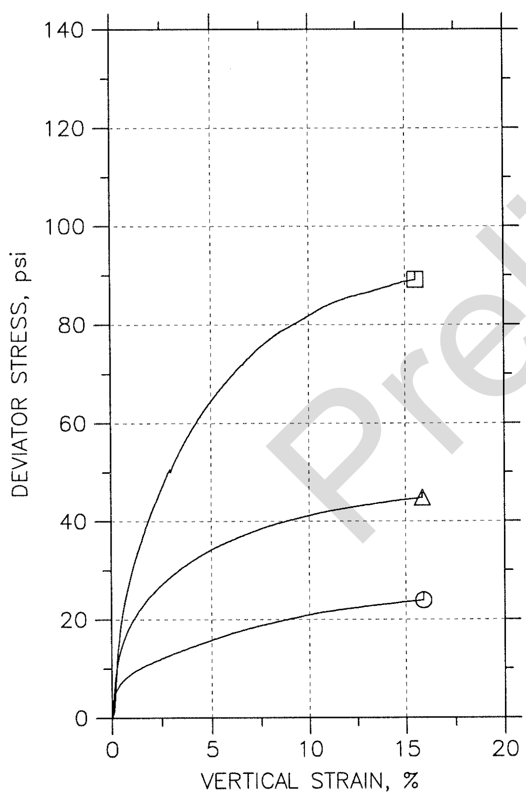


	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
○	UD	10352.1	51-53 ft	JW	7/23/10			10352.1a_2581.dat
△	UD	10352.2	51-53 ft	JW	7/23/10			10352.2a_2582.dat
□	UD	10352.3	51-53 ft	JW	7/23/10			10352.3a_2583.dat

MACTEC			
	Project: Plant Wansley Ash Pond	Location: D-1	Project No.: 6152100244
	Boring No.: D-1	Sample Type: Undisturbed	
	Description: Brown Silty Sand		
	Remarks: ASTM D4767-04		

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767





Symbol		○	△	□	
Sample No.		UD	UD	UD	
Test No.		10352.1	10352.2	10352.3	
Depth		51-53 ft	51-53 ft	51-53 ft	
Initial	Diameter, in	2.843	2.872	2.872	
	Height, in	5.56	5.955	5.562	
	Water Content, %	23.3	22.5	19.3	
	Dry Density, pcf	97.62	99.59	107.4	
	Saturation, %	88.9	90.2	94.8	
	Void Ratio	0.695	0.661	0.54	
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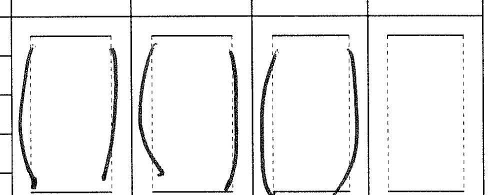
	Dry Density, pcf	98.7	101.3	108.	
	Saturation*, %	100.0	100.0	100.0	
	Void Ratio	0.676	0.633	0.532	
	Back Press., psi	120.	110.	100.	
Ver. Eff. Cons. Stress, psi		14.	27.99	42.	
Shear Strength, psi		11.93	22.38	44.54	
Strain at Failure, %		15.9	15.8	15.5	
Strain Rate, %/min		0.05	0.05	0.05	
B-Value		0.96	0.92	0.96	
Estimated Specific Gravity		2.65	2.65	2.65	
Liquid Limit		---	---	---	
Plastic Limit		---	---	---	

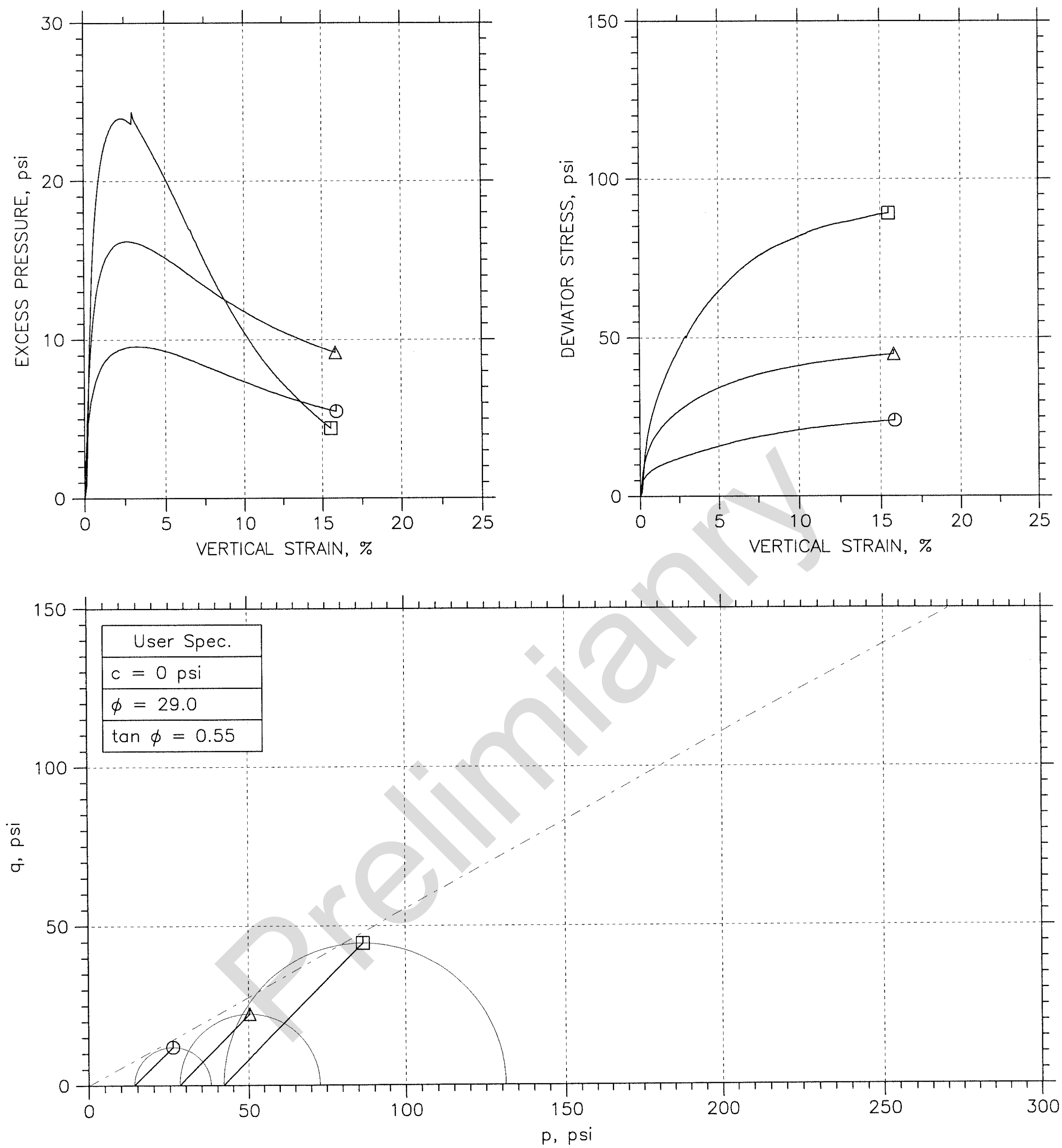
MACTEC



Project: Plant Wansley Ash Pond
Location: D-1
Project No.: 6152100244
Boring No.: D-1
Sample Type: Undisturbed
Description: Brown Silty Sand
Remarks: ASTM D4767-04
Phase calculations based on start and end of test.
* Saturation is set to 100% for phase calculations.

Thu, 29-JUL-2010 14:25:23

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



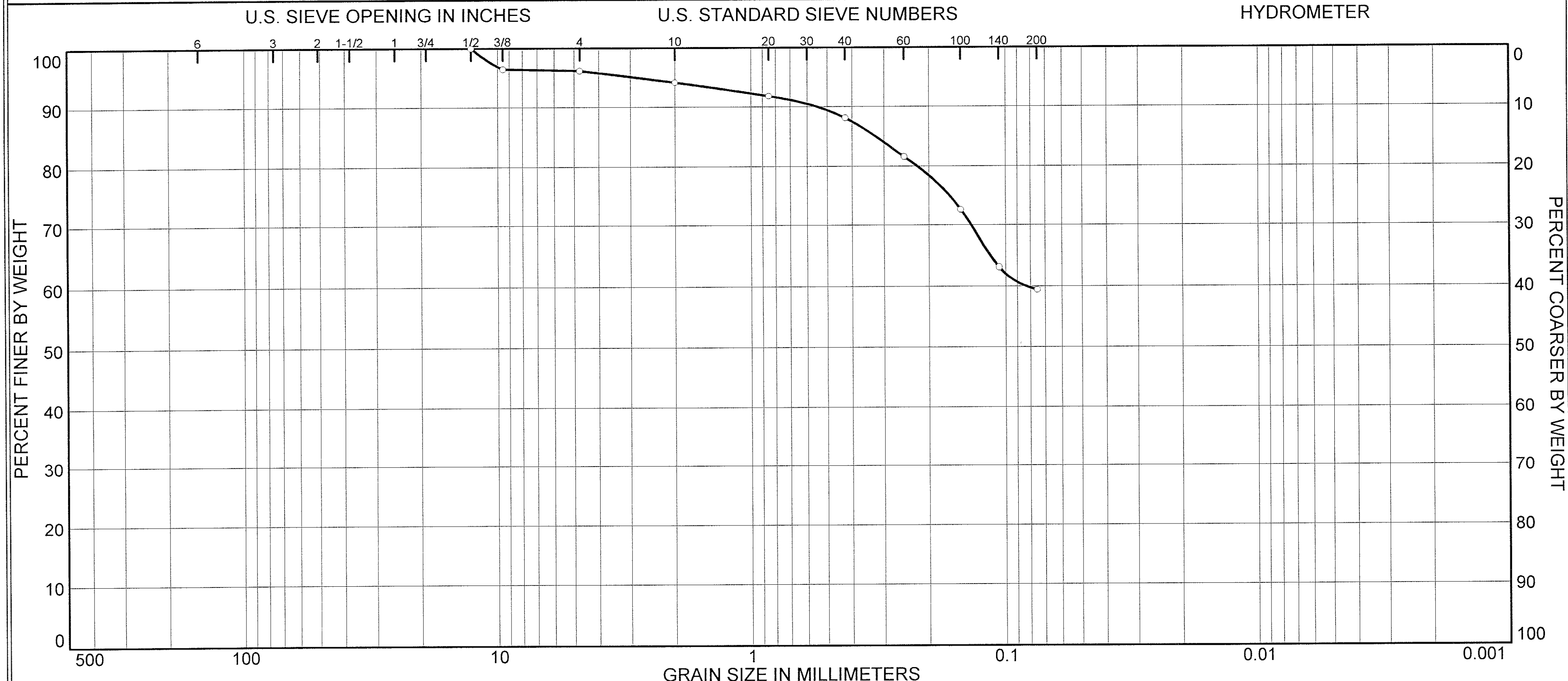
	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
○	UD	10352.1	51-53 ft	JW	7/23/10			10352.1a_2581.dat
△	UD	10352.2	51-53 ft	JW	7/23/10			10352.2a_2582.dat
□	UD	10352.3	51-53 ft	JW	7/23/10			10352.3a_2583.dat

MACTEC			
	Project: Plant Wansley Ash Pond	Location: D-1	Project No.: 6152100244
	Boring No.: D-1	Sample Type: Undisturbed	
	Description: Brown Silty Sand		
	Remarks: ASTM D4767-04		

Thu, 29-JUL-2010 14:25:23

Confidential Business Information

Particle Size Distribution ASTM D422-63 (2007)



% COBBLES	% GRAVEL		% SAND			% FINES	
	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
0.0	0.0	3.8	2.0	6.1	28.7	59.4	

SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
D-1	UD	21-23.3 ft	8/4/10		Brown Silty Sand			

Client

Project Plant Wansley Ash Pond

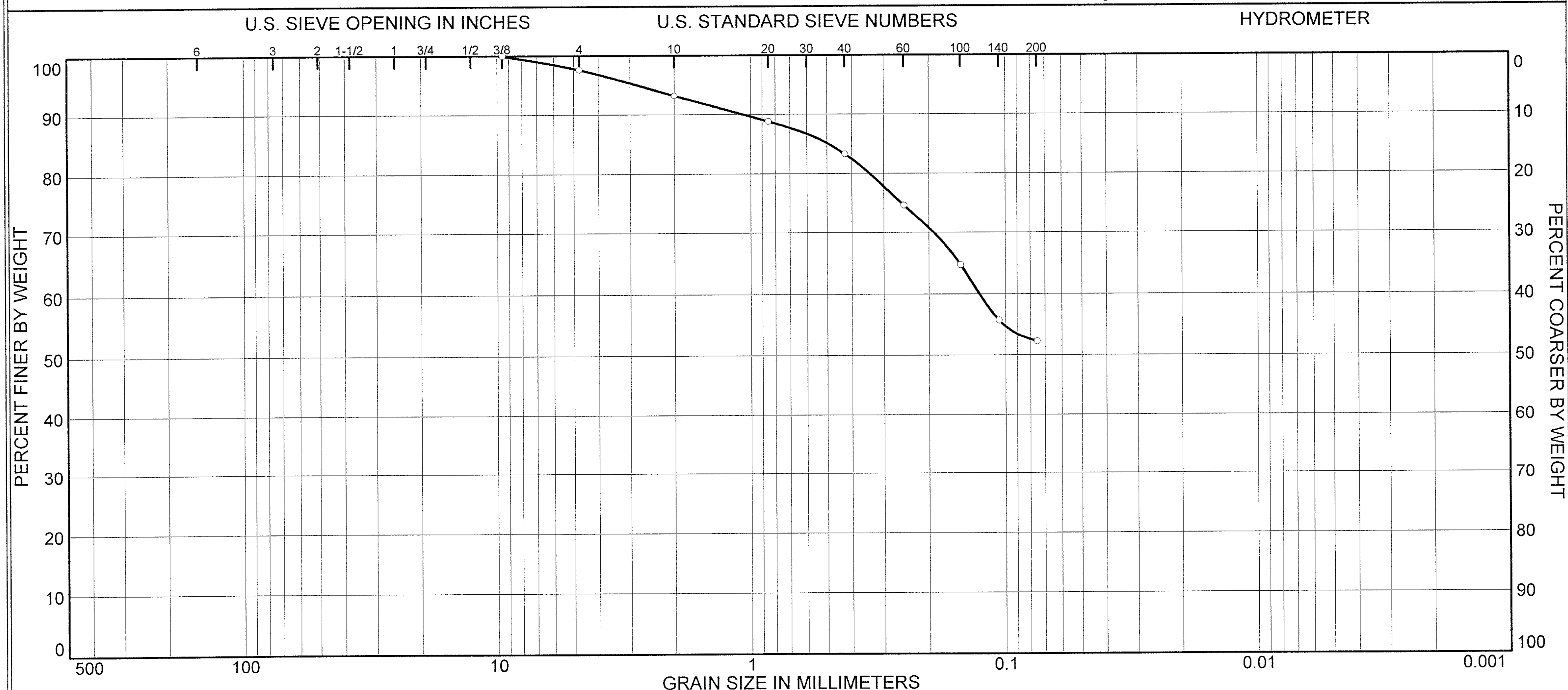
Project No. 6152-10-0244 10353

MACTEC ENGINEERING AND CONSULTING, INC.

Tested By: EH Reviewed By: JW

Confidential Business Information

Particle Size Distribution ASTM D422-63 (2007)



% COBBLES	% GRAVEL		% SAND			% FINES	
	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
0.0	0.0	2.4	4.4	9.9	31.0	52.3	

SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
D-1	UD	51-53 ft	8/4/10		Brown Silty Sand			

Client

Project Plant Wansley Ash Pond

Project No. 6152-10-0244 10352

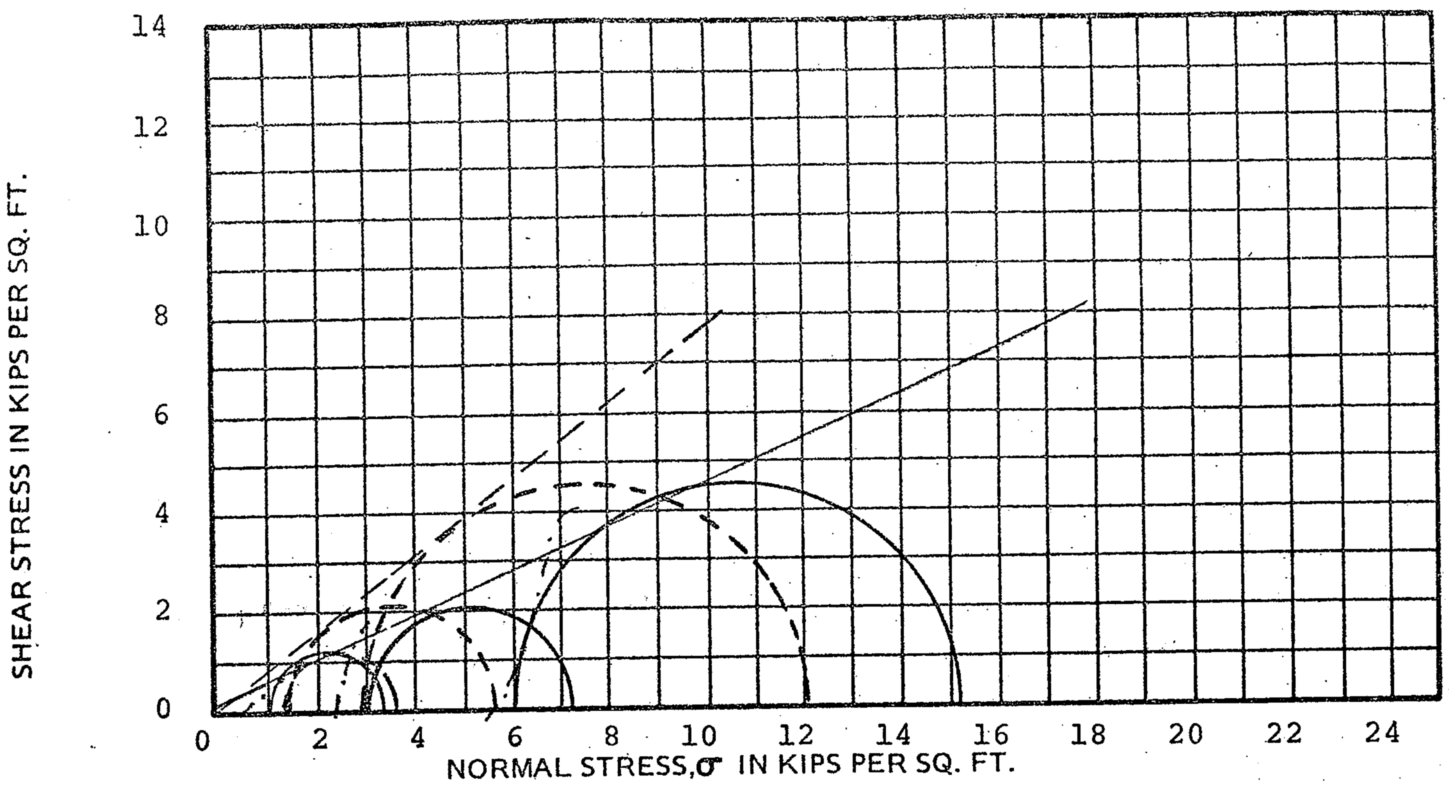
MACTEC ENGINEERING AND CONSULTING, INC.

Tested By: EH Reviewed By: JW

Confidential Business Information

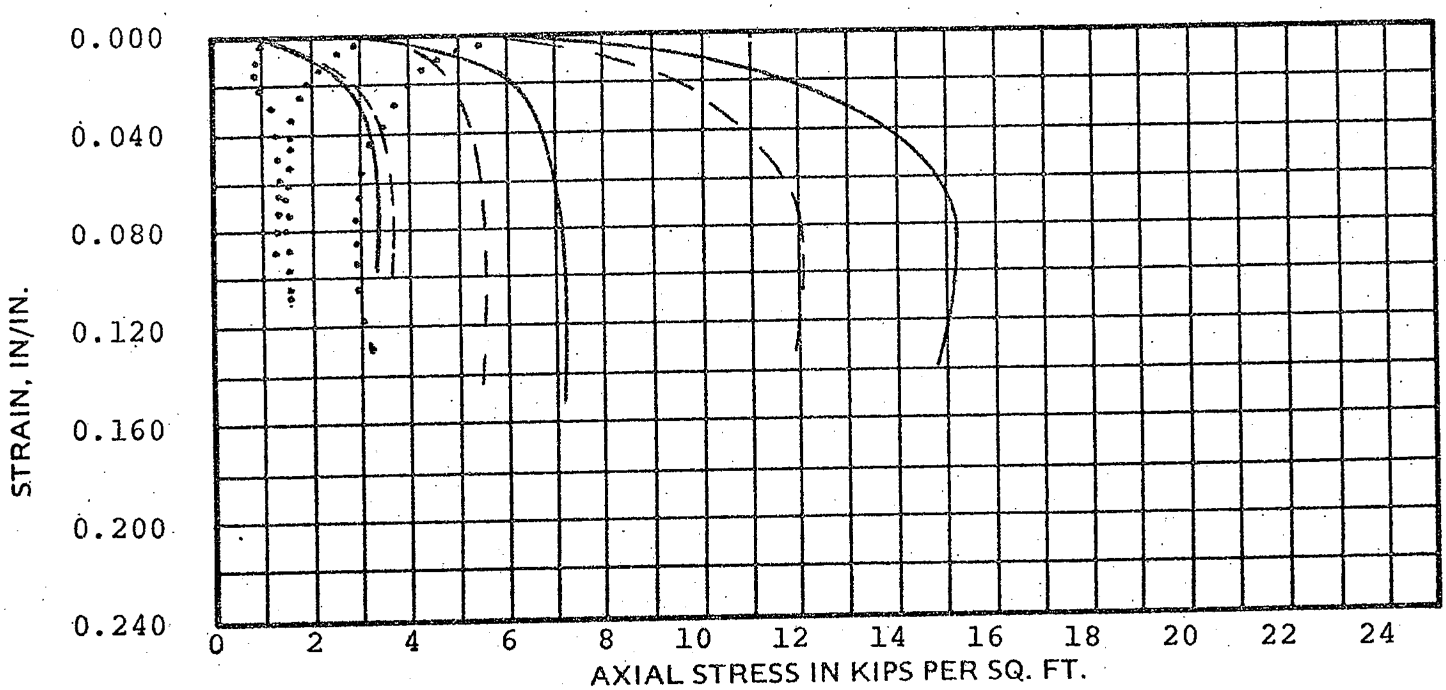
Attachment D

Historic Soil Laboratory Analyses by Law Engineering Testing Company



MOHR DIAGRAMS

EXCESS PORE PRESSURE IN KIPS PER SQ. FT.



STRESS-STRAIN AND PORE PRESSURE-STRAIN CURVES

EFFECTIVE COHESION, $\bar{c}$ 0

EFFECTIVE SHEAR ANGLE, $\bar{\Phi}$ 37.5

TOTAL COHESION, c 0.08 KSF

TOTAL SHEAR ANGLE, Φ 24

———— Total σ_1

-------- Effective σ_1

.... Effective σ_3

Stress Path

SATURATED, CONSOLIDATED UNDRAINED TRIAXIAL SHEAR TEST WITH PORE PRESSURE MEASUREMENTS

SAMPLE NO. UD BORING NO. B-8.12

DEPTH 14-16 JOB NO. SA-268

[redacted]

LAW ENGINEERING TESTING COMPANY

SOUTHERN COMPANY

Engineering and Construction Services Calculation

Calculation Number:
TV-WN-ECS3201-002

Project/Plant:	Unit(s):	Discipline/Area:
Plant Wansley CCB Facilities		Geotechnical
Title/Subject: Liquefaction Potential of Separation Dike and Temporary Gypsum Cells Analysis; Seismic Stability of Temporary Gypsum Cells		
Purpose/Objective: Evaluate the potential for soils to liquefy under earthquake shaking; evaluate seismic stability of temporary gypsum cells.		
System or Equipment Tag Numbers: NA	**Originator:** Benjamin J. Gallagher, P.E.	

Contents

Revision Record

Rev. No.	Description	Originator Initial / Date	Reviewer Initial / Date	Approver Initial / Date
0	Issued for Information	BJG/08-06-10	GHM/08-06-10	JCP/08-09-10

Notes:

WAN-API 073

Purpose of Calculation

At Plant Wansley, combustion byproducts, ash and gypsum, are stored in on-site facilities. Ash is sluiced to a pond formed by a cross-valley dike of compacted soil, and called the “separation dike”. Gypsum is sluiced to temporary impoundment dewatering cells located within the ash pond. The dikes for the dewatering cells were constructed on top of previously sluiced ash. The location of the dewatering cells is shown on the Location Plan, Attachment F.

Summary of Conclusions

One test boring (D-1) was performed in the separation dike as part of the 2010 slope stability evaluation. SPT tests were generally performed at five-foot increments throughout the boring. The liquefaction potential was calculated for each five-foot SPT test interval.

Eight CPT soundings were performed within the area of the temporary gypsum cells in support of the facility design in 2006. The reported equivalent N60 value was characterized at five-foot intervals and the liquefaction potential was calculated at each five-foot interval. The fines content of the ash material was assumed based on test results on ash from Plant Bowen (Sani, 1991) and our experience with fly ash materials. The results of the liquefaction potential analysis are summarized on the attached table.

In the separation dike, all soils have a factor of safety against liquefaction of at least 1.4. A variety of sources interpret these data differently. We understand the FERC considers a factor of safety of 1.1 acceptable. However, other sources recommend performing post-earthquake stability analyses with reduced strengths for some materials with factors of safety greater than 1. For example, the current MSHA Engineering and Design Manual: Coal Refuse Disposal Facilities recommends that earthquake-reduced strengths be applied to soil with factors of safety less than 1.4. Based on liquefaction potential analysis from Boring D-1, the separation dike soils are not subject to appreciable strength loss due to earthquake shaking.

At the temporary gypsum facility, the analysis indicates that the ash foundation materials are potentially susceptible to liquefaction, having factors of safety that generally ranged from 0.8 to 1.3 based the preconstruction CPT soundings. Although the analysis indicates the foundation materials are susceptible to liquefaction during the design earthquake (return period of 2475 years), the likelihood of a strong, liquefaction-inducing earthquake event is low. During more common, smaller earthquake events, the potential for liquefaction is significantly less. For earthquakes below magnitude 5.95, all factors of safety are 1.1 or greater (assuming the same 0.134g PGA). Similarly, for earthquakes with peak accelerations below 0.095g, all factors of safety are 1.1 or greater (assuming the same magnitude 6.85). We believe that, if deformations due to a strong earthquake event were to occur, these deformations would most likely form in dikes located facing the ash pond due to the thinning of the foundation ash away from the center of the pond. Should material be released from the ash pond side of the gypsum facility, it would likely be completely contained within the ash pond.

For the temporary gypsum facility dikes, the pseudostatic limit-equilibrium analysis indicates a factor of safety of 0.8**.** This is less than the minimum factor of safety (FS=1.1) specified by the Georgia Safe Dams Program. While the pseudostatic method can provide evidence of stability under earthquake shaking, it is not well suited to analyzing critical cases due to the conservative static application of earthquake forces. Neither the presence of pseudostatic, limit-equilibrium a factor of safety of less than 1, or the potential occurrence of liquefied soils beneath the facility, directly indicate that a dike breach will form or that deformation of the dike under design earthquake loading will be severe enough to release materials from the facility. A deformation-type stability analysis that incorporates earthquake-reduced strengths would be necessary to evaluate the impact of earthquake events on the facility. Due to these certain limitations on the current data (described below), a detailed deformation-type analysis is not considered appropriate at this time.

These liquefaction potential results are for CPT soundings located in the center of the facility, and not directly beneath the dikes. In addition, the CPT soundings were completed prior to construction and it is likely that there has been some increase in ash density, and liquefaction resistance, as a result of construction of the facility and consolidation of the underlying materials. As such, the preconstruction CPT results may not be entirely representative of the current conditions beneath the dikes of the temporary gypsum dewatering cells.

The state-of-the-art for evaluation of liquefaction potential in silty soil material (like fly ash) incorporates SPT testing. There is also a well established relationship between corrected tip resistance from CPT soundings and liquefaction potential in clean sands. However, according to Idriss and Boulanger (2004), there is not yet a consensus on the direct use of CPT in evaluation of liquefaction potential of silty soils. As such, a correlation between CPT and SPT data and established SPT methods were used in the liquefaction potential analysis. Use of this correlation adds a measure of uncertainty to the results, because, to our knowledge, the correlation hasn't been extensively tested to verify it is applicable to the specific, somewhat unusual conditions (sluiced fly ash) present at the site.

For the temporary gypsum storage facility, Southern Company plans to complete additional studies to confirm the post-construction conditions beneath the dikes, to verify the liquefaction potential analyses, and to evaluate the deformation of the dike following the design earthquake. These studies will include the following:

- Test borings through the existing dike and into natural soil, performed in accordance with current field methods for liquefaction and stability analyses;
- Low disturbance samples that a representative of the in-situ ash materials;
- Shear strength testing to evaluate the ultimate and post-earthquake residual strength of the ash; and
- Stability evaluation incorporating earthquake-reduced strengths and deformation analyses where appropriate.

We anticipate completion of the additional studies by December 31, 2010.

Methodology

Liquefaction potential was assessed using procedures outlined in the 2004 paper by Idriss and Boulanger titled, "*Semi-Empirical Procedures for Evaluating Liquefaction Potential During Earthquakes*". The SPT test data collected for the recent slope stability study (ES 1840) was used to evaluate liquefaction potential. Supplemental information regarding SPT correction factors was obtained from the 2001 paper by Youd and Idriss "*Liquefaction Resistance of Soils: Summary Report From The 1996 NCEER and 1998 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils*" and ASTM D 6066-04. The reported factor of safety is the ratio of the cyclic resistance ratio (CRR) to the cyclic stress ratio (CSR).

The limit-equilibrium slope stability was evaluated using the following methods and software:

GeoStudio 2007 (Version 7.16, Build 4840), Copyright 1991-2010, GEO-SLOPE International, Ltd.

The software was utilized in general accordance with the procedures for analyzing slope stability using software described in Soil Strength and Slope Stability (2005) by Duncan and Wright. The Morgenstern-Price method was used for analysis. Failure circles were searched using the grid and radius method. Software optimization of the critical slip surface was not performed.

The stability analysis was performed using the pseudostatic method and Geostudio 2007 software. Because the pseudostatic method applies the earthquake acceleration as a constant force, unrealistic stability analyses can result if the peak ground acceleration or spectral seismic acceleration is directly applied as the pseudostatic acceleration (Kh). In this calculation, the mapped, site-modified, spectral seismic acceleration was used to calculate the pseudostatic acceleration (Kh) following the procedure described in "*Pseudostatic Coefficient for use in Simplified Seismic Slope Stability Evaluation*" (2009) by Bray and Travasarou.

Criteria and Assumptions

The liquefaction analysis criteria:

1. The peak acceleration at the top of the separation dike is 0.251g as derived from the 2002 USGS-mapped, site-modified, short-period spectral acceleration at Plant Wansley (2% chance of exceedance over 50 years).

2. The peak acceleration at the top of the temporary gypsum cell dike is 0.335g as derived from the 2002 USGS-mapped, site-modified, short-period spectral acceleration at Plant Wansley (2% chance of exceedance over 50 years). The corresponding pseudostatic acceleration coefficient (Kh) is 0.133g based on an allowable crest displacement of 2 inches using the Bray and Travasarou procedure.

3. The peak acceleration at the top of the gypsum cell foundation is 0.134g as derived from the 2002 USGS-mapped, site-modified, peak ground acceleration at Plant Wansley (2% chance of exceedance over 50 years).

4. The design earthquake is magnitude 6.85, as determined by the 2009 USGS mapped earthquake with a 2% probability of exceedance over 50 years and located within 300 kilometers of Plant Wansley.

Design Inputs/References

1. SPT Test Boring and Lab Data, Ash Pond Stability Evaluation, August 2010
2. CPT Soundings, Temporary Gypsum Cell Foundation, October 2006
3. USGS Probabilistic Earthquake Hazard Data for Plant Wansley (N33.415, W85.051)
4. Sani, Alice, et al., Southern Company Services, Inc., 1991, *Plant Bowen, Ash Stacking Operations, Georgia Power Company*, Birmingham, AL

Body of Calculation

Attached.

Separation Dike			GWT= 7			Magnitude= 6.85			
depth	total stress	effective vertical stress	amax	alpha	beta	rd	csr	msf	csr 7.5
5	500	500	0.251	-0.052372	0.00641	0.991575	0.161775	1.186858	0.136306
10	1000	812.8	0.251	-0.136777	0.015951	0.972864	0.195279	1.186858	0.164534
15	1500	1000.8	0.251	-0.235935	0.027168	0.951386	0.232642	1.186858	0.196015
20	2000	1188.8	0.251	-0.348175	0.039852	0.927565	0.254597	1.186858	0.214513
25	2500	1376.8	0.251	-0.471605	0.053766	0.901851	0.267172	1.186858	0.225109
30	3000	1564.8	0.251	-0.604143	0.068653	0.874704	0.273597	1.186858	0.230522
35	3500	1752.8	0.251	-0.743557	0.084235	0.846583	0.275799	1.186858	0.232377
40	4000	1940.8	0.251	-0.887495	0.100222	0.817933	0.275032	1.186858	0.231731
45	4500	2128.8	0.251	-1.033532	0.116316	0.789176	0.272169	1.186858	0.229319
50	5000	2316.8	0.251	-1.179207	0.132219	0.760706	0.267846	1.186858	0.225677
55	5500	2504.8	0.251	-1.322062	0.147633	0.732879	0.262548	1.186858	0.221213
60	6000	2692.8	0.251	-1.459692	0.162273	0.706013	0.256653	1.186858	0.216246
65	6500	2880.8	0.251	-1.589774	0.175865	0.680385	0.250462	1.186858	0.21103
70	7000	3068.8	0.251	-1.710118	0.188158	0.656234	0.244217	1.186858	0.205767
75	7500	3256.8	0.251	-1.818694	0.198921	0.63376	0.238112	1.186858	0.200624
80	8000	3444.8	0.251	-1.913672	0.207955	0.613129	0.232308	1.186858	0.195734
85	8500	3632.8	0.251	-1.993451	0.215092	0.594477	0.226934	1.186858	0.191206
90	9000	3820.8	0.251	-2.056687	0.220198	0.577914	0.222095	1.186858	0.187129
95	9500	4008.8	0.251	-2.102313	0.223179	0.56353	0.217878	1.186858	0.183576
100	10000	4196.8	0.251	-2.12956	0.22398	0.551398	0.214355	1.186858	0.180607
105	10500	4384.8	0.251	-2.137969	0.222585	0.54158	0.211587	1.186858	0.178275

Temporary Gypsum Facility Foundation			GWT= 5			Magnitude= 6.85			
depth	total Stress	effective vertical stress	amax	alpha	beta	rd	csr	msf	csr 7.5
5	500	500	0.134	-0.052372	0.00641	0.991575	0.086366	1.186858	0.072769
10	1000	812.8	0.134	-0.136777	0.015951	0.972864	0.104252	1.186858	0.087839
15	1500	1000.8	0.134	-0.235935	0.027168	0.951386	0.124199	1.186858	0.104645
20	2000	1188.8	0.134	-0.348175	0.039852	0.927565	0.13592	1.186858	0.114521
25	2500	1376.8	0.134	-0.471605	0.053766	0.901851	0.142634	1.186858	0.120178
30	3000	1564.8	0.134	-0.604143	0.068653	0.874704	0.146064	1.186858	0.123067
35	3500	1752.8	0.134	-0.743557	0.084235	0.846583	0.147239	1.186858	0.124058
40	4000	1940.8	0.134	-0.887495	0.100222	0.817933	0.14683	1.186858	0.123713
45	4500	2128.8	0.134	-1.033532	0.116316	0.789176	0.145301	1.186858	0.122425
50	5000	2316.8	0.134	-1.179207	0.132219	0.760706	0.142994	1.186858	0.120481
55	5500	2504.8	0.134	-1.322062	0.147633	0.732879	0.140165	1.186858	0.118098
60	6000	2692.8	0.134	-1.459692	0.162273	0.706013	0.137018	1.186858	0.115446
65	6500	2880.8	0.134	-1.589774	0.175865	0.680385	0.133713	1.186858	0.112661
70	7000	3068.8	0.134	-1.710118	0.188158	0.656234	0.130379	1.186858	0.109852
75	7500	3256.8	0.134	-1.818694	0.198921	0.63376	0.12712	1.186858	0.107106
80	8000	3444.8	0.134	-1.913672	0.207955	0.613129	0.124021	1.186858	0.104495
85	8500	3632.8	0.134	-1.993451	0.215092	0.594477	0.121152	1.186858	0.102078
90	9000	3820.8	0.134	-2.056687	0.220198	0.577914	0.118569	1.186858	0.099901
95	9500	4008.8	0.134	-2.102313	0.223179	0.56353	0.116317	1.186858	0.098004
100	10000	4196.8	0.134	-2.12956	0.22398	0.551398	0.114437	1.186858	0.09642

Hammer Efficency: 60 % (assumed)
Borehole diameter: 6 inches
Sampler: (Standard upset wall, no liners)

D-1																	
Depth	N	Hammer Efficency	Borehole Diameter	Rod Length	Sampler	N60	Effective Stress	Alpha	Cn	N1 60	Fines Content	N1 60 CS	CRR	C sigma	K sigma	CRR	CRR/CSR
5	26	1	1.05	0.75	1.1	22.52	500	0.326848	1.573193	35.43	59	37.00	1.749643	0.268736	1	1.749643	>5
10	14	1	1.05	0.75	1.1	12.13	812.8	0.45565	1.507233	18.28	59	23.88	0.265819	0.125035	1	0.265819	1.6
15	22	1	1.05	1	1.1	25.41	1000.8	0.347393	1.271906	32.32	59	37.00	1.749643	0.227104	1	1.749643	>5
20	30	1	1.05	1	1.1	34.65	1188.8	0.295771	1.166329	40.41	59	37.00	1.749643	0.371847	1	1.749643	>5
25	22	1	1.05	1	1.1	25.41	1376.8	0.369236	1.147823	29.17	59	34.77	1.05729	0.194987	1	1.05729	4.7
30	22	1	1.05	1	1.1	25.41	1564.8	0.378463	1.09732	27.88	59	33.49	0.826916	0.183996	1	0.826916	3.6
35	17	1	1.05	1	1.1	19.64	1752.8	0.433809	1.058903	20.79	59	26.40	0.327289	0.137503	1	0.327289	1.4
40	22	1	1.05	1	1.1	25.41	1940.8	0.394562	1.011926	25.71	59	31.32	0.581094	0.16752	1	0.581094	2.5
45	21	1	1.05	1	1.1	24.26	2128.8	0.41058	0.974701	23.64	59	29.25	0.441578	0.153816	0.9904	0.445858	1.9
50	19	1	1.05	1	1.1	21.95	2316.8	0.435565	0.937962	20.58	52	26.20	0.321435	0.136409	0.979942	0.328014	1.5
55	19	1	1.05	1	1.1	21.95	2504.8	0.441671	0.905378	19.87	52	25.48	0.301914	0.132739	0.970126	0.311211	1.4
60	26	1	1.05	1	1.1	30.03	2692.8	0.386657	0.891362	26.77	52	32.38	0.684588	0.175225	0.947882	0.722229	3.3
65	30	1	1.05	1	1.1	34.65	2880.8	0.360719	0.876662	30.38	52	35.99	1.375105	0.206367	0.924692	1.487094	>5
70	30	1	1.05	1	1.1	34.65	3068.8	0.36599	0.854965	29.62	52	35.24	1.165412	0.199173	0.914726	1.274056	>5
75	27	1	1.05	1	1.1	31.19	3256.8	0.394444	0.825035	25.73	52	31.34	0.583282	0.16763	0.918264	0.635201	3.2
80	29	1	1.05	1	1.1	33.50	3444.8	0.383531	0.811774	27.19	52	32.81	0.734151	0.17847	0.902962	0.813048	4.2
85	29	1	1.05	1	1.1	33.50	3632.8	0.388135	0.793215	26.57	52	32.18	0.663089	0.17373	0.896308	0.739801	3.9
90	42	1	1.05	1	1.1	48.51	3820.8	0.298328	0.82439	39.99	52	37.00	1.749643	0.360469	0.766664	2.282151	>5
95	32	1	1.05	1	1.1	36.96	4008.8	0.374031	0.77099	28.50	52	34.11	0.928217	0.189117	0.868499	1.06876	>5
100	27	1	1.05	1	1.1	31.19	4196.8	0.416457	0.734425	22.90	52	28.52	0.405884	0.149333	0.889318	0.456399	2.5
105	41	1	1.05	1	1.1	47.36	4384.8	0.317406	0.779453	36.91	15	37.00	1.749643	0.29346	0.769635	2.273341	>5

Hammer Efficency: CPT
Borehole diameter: CPT
Sampler: CPT

WDAC1																
Depth	N	Hammer Efficency	Borehole Diameter	Rod Length	Sampler	N60	Effective Stress	Alpha	Cn	N1 60	Fines Content	N1 60 CS	CRR	C sigma	K sigma	CRR	CRR/CSR
5	9	1	1	1	1	9.00	500	0.483595	1.7	15.30	1	15.30	0.158662	0.112037	1	0.158662	2.2
10	5	1	1	1	1	5.00	812.8	0.562753	1.659826	8.30	12	12.04	0.132724	0.086551	1	0.132724	1.5
12	2	1	1	1	1	2.00	1000.8	0.648072	1.566261	3.13	85	8.73	0.109384	0.069508	1	0.109384	1.0
20	3	1	1	1	1	3.00	1188.8	0.627399	1.385935	4.16	85	9.75	0.116346	0.072991	1	0.116346	1.0
25	4	1	1	1	1	4.00	1376.8	0.611814	1.256641	5.03	30	10.92	0.124577	0.075856	1	0.124577	1.0
30	5	1	1	1	1	5.00	1564.8	0.59917	1.158388	5.79	30	11.69	0.130139	0.078351	1	0.130139	1.1
35	6	1	1	1	1	6.00	1752.8	0.588433	1.080727	6.48	30	12.38	0.135297	0.080602	1	0.135297	1.1
30	6	1	1	1	1	6.00	1940.8	0.594192	1.018014	6.11	85	11.70	0.130254	0.079379	1	0.130254	1.1
45	6	1	1	1	1	5.00	2128.8	0.59917	1.158388	5.79	85	11.69	0.130139	0.078351	1	0.130139	1.1
50	8	1	1	1	1	8.00	2316.8	0.57578	0.918822	7.35	85	12.95	0.139607	0.083428	0.987733	0.141341	1.2

WDAC2																	
Depth	N	mmer Efficie	ehole Diam	Rod Length	Sampler	N60	fective Stre	Alpha	Cn	N1 60	ines Conter	N1 60 CS	CRR	C sigma	K sigma	CRR	CRR/CSR
5	9	1	1	1	1	9.00	500	0.483595	1.7	15.30	1	15.30	0.158662	0.112037	1	0.158662	2.2
10	5	1	1	1	1	5.00	812.8	0.562753	1.659826	8.30	30	14.19	0.149468	0.086551	1	0.149468	1.7
12	4	1	1	1	1	4.00	1000.8	0.595252	1.510018	6.04	30	11.94	0.131973	0.079158	1	0.131973	1.3
20	4	1	1	1	1	4.00	1188.8	0.604258	1.369351	5.48	30	11.37	0.127836	0.077327	1	0.127836	1.1
25	5	1	1	1	1	5.00	1376.8	0.592194	1.247469	6.24	30	12.13	0.133443	0.079799	1	0.133443	1.1
30	6	1	1	1	1	6.00	1564.8	0.581956	1.153506	6.92	30	12.82	0.138617	0.082024	1	0.138617	1.1
35	7	1	1	1	1	7.00	1752.8	0.572979	1.078525	7.55	85	13.14	0.141146	0.08408	1	0.141146	1.1
30	7	1	1	1	1	7.00	1940.8	0.579031	1.01755	7.12	85	12.72	0.137861	0.082683	1	0.137861	1.1
45	5	1	1	1	1	5.00	2128.8	0.615537	0.962312	4.81	85	10.41	0.120909	0.075151	0.99531	0.121479	1.0
50	8	1	1	1	1	8.00	2316.8	0.57578	0.918822	7.35	85	12.95	0.139607	0.083428	0.987733	0.141341	1.2
55	8	1	1	1	1	8.00	2504.8	0.580513	0.877524	7.02	85	12.61	0.137079	0.082348	0.981467	0.139668	1.2
60	6	1	1	1	1	6.00	2692.8	0.612251	0.833514	5.00	85	10.60	0.122251	0.075772	0.977463	0.125069	1.1

WDAC3																	
Depth	N	Hammer Efficency	Borehole Diameter	Rod Length	Sampler	N60	Effective Stress	Alpha	Cn	N1 60	Fines Content	N1 60 CS	CRR	C sigma	K sigma	CRR	CRR/CSR
5	8	1	1	1	1	8.00	500	0.500776	1.7	13.60	1	13.60	0.144714	0.105307	1	0.144714	2.0
10	3	1	1	1	1	3.00	812.8	0.610561	1.7	5.10	12	8.84	0.110118	0.076096	1	0.110118	1.3
12	4	1	1	1	1	4.00	1000.8	0.595252	1.510018	6.04	30	11.94	0.131973	0.079158	1	0.131973	1.3
20	5	1	1	1	1	5.00	1188.8	0.584094	1.355062	6.78	30	12.67	0.137503	0.081549	1	0.137503	1.2
25	10	1	1	1	1	10.00	1376.8	0.51655	1.212728	12.13	1	12.13	0.133404	0.099802	1	0.133404	1.1
30	12	1	1	1	1	8.00	1564.8	0.580513	0.877524	7.02	1	12.61	0.137079	0.082348	0.981467	0.139668	1.1
35	4	1	1	1	1	4.00	1752.8	0.623946	1.085802	4.34	85	9.94	0.11763	0.073607	1	0.11763	0.9
30	5	1	1	1	1	5.00	1940.8	0.610687	1.018519	5.09	85	10.69	0.122901	0.076072	1	0.122901	1.0
45	7	1	1	1	1	7.00	2128.8	0.584479	0.964179	6.75	85	12.34	0.135029	0.081465	0.994916	0.135719	1.1
50	6	1	1	1	1	6.00	2316.8	0.604051	0.915011	5.49	85	11.08	0.12575	0.077369	0.988624	0.127197	1.1
55	5	1	1	1	1	5.00	2504.8	0.623914	0.868994	4.34	85	9.94	0.117643	0.073613	0.983433	0.119624	1.0
60	6	1	1	1	1	6.00	2692.8	0.612251	0.833514	5.00	85	10.60	0.122251	0.075772	0.977463	0.125069	1.1
65	8	1	1	1	1	8.00	1000.8	0.523609	1.436945	11.50	85	17.09	0.17476	0.097521	1	0.17476	1.7

WDAC4																	
Depth	N	Hammer Efficency	Borehole Diameter	Rod Length	Sampler	N60	Effective Stress	Alpha	Cn	N1 60	Fines Content	N1 60 CS	CRR	C sigma	K sigma	CRR	CRR/CSR
5	7	1	1	1	1	7.00	500	0.519068	1.7	11.90	1	11.90	0.131712	0.098976	1	0.131712	1.8
10	3	1	1	1	1	3.00	812.8	0.610561	1.7	5.10	85	10.69	0.122954	0.076096	1	0.122954	1.4
12	3	1	1	1	1	3.00	1000.8	0.61918	1.535241	4.61	85	10.20	0.119462	0.074474	1	0.119462	1.1
20	4	1	1	1	1	4.00	1188.8	0.604258	1.369351	5.48	85	11.07	0.125658	0.077327	1	0.125658	1.1
25	5	1	1	1	1	5.00	1376.8	0.592194	1.247469	6.24	85	11.83	0.131208	0.079799	1	0.131208	1.1
30	6	1	1	1	1	6.00	1564.8	0.581956	1.153506	6.92	85	12.52	0.136326	0.082024	1	0.136326	1.1
35	7	1	1	1	1	7.00	1752.8	0.572979	1.078525	7.55	85	13.14	0.141146	0.08408	1	0.141146	1.1
30	3	1	1	1	1	3.00	1940.8	0.649674	1.019712	3.06	85	8.65	0.108895	0.069252	1	0.108895	0.9
45	3	1	1	1	1	3.00	2128.8	0.653664	0.960025	2.88	85	8.47	0.107706	0.068623	0.995717	0.108169	0.9
50	5	1	1	1	1	5.00	2316.8	0.619921	0.912878	4.56	85	10.16	0.119173	0.074338	0.989069	0.12049	1.0
55	10	1	1	1	1	10.00	2504.8	0.555863	0.882406	8.82	85	14.42	0.151295	0.088299	0.980127	0.154363	1.3
60	10	1	1	1	1	10.00	2692.8	0.560562	0.846428	8.46	85	14.06	0.148374	0.087099	0.974094	0.15232	1.3
65	8	1	1	1	1	8.00	2880.8	0.588908	0.806618	6.45	85	12.05	0.132809	0.0805	0.970624	0.136828	1.3
85	7	1	1	1	1	7.00	3068.8	0.605509	0.771636	5.40	85	11.00	0.125111	0.07708	0.966999	0.129381	1.2
75	5	1	1	1	1	5.00	3256.8	0.636971	0.733018	3.67	85	9.26	0.112971	0.071336	0.965217	0.117042	1.1
80	12	1	1	1	1	12.00	3444.8	0.555231	0.73942	8.87	85	14.47	0.151697	0.088463	0.951901	0.159362	1.5

WDAC5																	
Depth	N	Hammer Efficency	Borehole Diameter	Rod Length	Sampler	N60	Effective Stress	Alpha	Cn	N1 60	Fines Content	N1 60 CS	CRR	C sigma	K sigma	CRR	CRR/CSR
5	4	1	1	1	1	4.00	500	0.604258	1.369351	5.48	1	11.07	0.125658	0.077327	1	0.125658	1.7
10	5	1	1	1	1	5.00	812.8	0.562753	1.659826	8.30	30	14.19	0.149468	0.086551	1	0.149468	1.7
12	5	1	1	1	1	5.00	1000.8	0.574485	1.488462	7.44	85	13.04	0.140315	0.083728	1	0.140315	1.3
20	4	1	1	1	1	4.00	1188.8	0.604258	1.369351	5.48	85	11.07	0.125658	0.077327	1	0.125658	1.1
25	6	1	1	1	1	6.00	1376.8	0.574577	1.23929	7.44	30	13.33	0.142599	0.083706	1	0.142599	1.2
30	4	1	1	1	1	4.00	1564.8	0.618294	1.163837	4.66	85	10.25	0.11981	0.074638	1	0.11981	1.0
35	5	1	1	1	1	5.00	1752.8	0.605274	1.083131	5.42	85	11.01	0.125213	0.077126	1	0.125213	1.0
30	5	1	1	1	1	5.00	1940.8	0.610687	1.018519	5.09	85	10.69	0.122901	0.076072	1	0.122901	1.0
45	12	1	1	1	1	12.00	2128.8	0.522258	0.967931	11.62	85	17.21	0.175902	0.09795	0.993887	0.176984	1.4

WDAC6																	
Depth	N	Hammer Efficency	Borehole Diameter	Rod Length	Sampler	N60	Effective Stress	Alpha	Cn	N1 60	Fines Content	N1 60 CS	CRR	C sigma	K sigma	CRR	CRR/CSR
5	6	1	1	1	1	6.00	500	0.53872	1.7	10.20	1	10.20	0.11946	0.092972	1	0.11946	1.6
10	5	1	1	1	1	5.00	812.8	0.562753	1.659826	8.30	1	8.30	0.106548	0.086551	1	0.106548	1.2
12	4	1	1	1	1	4.00	1000.8	0.595252	1.510018	6.04	30	11.94	0.131973	0.079158	1	0.131973	1.3
20	4	1	1	1	1	4.00	1188.8	0.604258	1.369351	5.48	85	11.07	0.125658	0.077327	1	0.125658	1.1
25	2	1	1	1	1	2.00	1376.8	0.66112	1.27999	2.56	85	8.15	0.105599	0.067476	1	0.105599	0.9
30	5	1	1	1	1	5.00	1564.8	0.59917	1.158388	5.79	85	11.39	0.127938	0.078351	1	0.127938	1.0
35	5	1	1	1	1	5.00	1752.8	0.605274	1.083131	5.42	85	11.01	0.125213	0.077126	1	0.125213	1.0
30	5	1	1	1	1	5.00	1940.8	0.610687	1.018519	5.09	85	10.69	0.122901	0.076072	1	0.122901	1.0
45	5	1	1	1	1	5.00	2128.8	0.615537	0.962312	4.81	85	10.41	0.120909	0.075151	0.99531	0.121479	1.0
50	5	1	1	1	1	5.00	2316.8	0.619921	0.912878	4.56	85	10.16	0.119173	0.074338	0.989069	0.12049	1.0
55	5	1	1	1	1	5.00	2504.8	0.623914	0.868994	4.34	85	9.94	0.117643	0.073613	0.983433	0.119624	1.0
60	6	1	1	1	1	6.00	2692.8	0.612251	0.833514	5.00	85	10.60	0.122251	0.075772	0.977463	0.125069	1.1
65	6	1	1	1	1	6.00	1000.8	0.555955	1.469488	8.82	85	14.41	0.151237	0.088275	1	0.151237	1.4
85	10	1	1	1	1	10.00	3068.8	0.568988	0.783796	7.84	30	13.73	0.145769	0.085027	0.963596	0.151276	1.4
75	7	1	1	1	1	7.00	3256.8	0.608835	0.743143	5.20	30	11.10	0.12584	0.076429	0.962733	0.130711	1.2
80	5	1	1	1	1	5.00	3444.8	0.639682	0.706235	3.53	85	9.13	0.112063	0.070881	0.961461	0.116555	1.1

WDAC7																	
Depth	N	Hammer Efficency	Borehole Diameter	Rod Length	Sampler	N60	Effective Stress	Alpha	Cn	N1 60	Fines Content	N1 60 CS	CRR	C sigma	K sigma	CRR	CRR/CSR
5	5	1	1	1	1	5.00	500	0.560091	1.7	8.50	1	8.50	0.107874	0.087218	1	0.107874	1.5
10	5	1	1	1	1	5.00	812.8	0.562753	1.659826	8.30	12	12.04	0.132724	0.086551	1	0.132724	1.5
12	3	1	1	1	1	3.00	1000.8	0.61918	1.535241	4.61	85	10.20	0.119462	0.074474	1	0.119462	1.1
20	5	1	1	1	1	5.00	1188.8	0.584094	1.355062	6.78	85	12.37	0.135225	0.081549	1	0.135225	1.2
25	4	1	1	1	1	4.00	1376.8	0.611814	1.256641	5.03	85	10.62	0.122431	0.075856	1	0.122431	1.0
30	4	1	1	1	1	4.00	1564.8	0.618294	1.163837	4.66	85	10.25	0.11981	0.074638	1	0.11981	1.0
35	4	1	1	1	1	4.00	1752.8	0.623946	1.085802	4.34	85	9.94	0.11763	0.073607	1	0.11763	0.9
30	2	1	1	1	1	2.00	1940.8	0.674283	1.020467	2.04	85	7.64	0.102233	0.065544	1	0.102233	0.8
45	2	1	1	1	1	2.00	2128.8	0.677661	0.958588	1.92	85	7.51	0.101439	0.065065	0.995939	0.101853	0.8
50	4	1	1	1	1	4.00	2316.8	0.637432	0.910531	3.64	85	9.24	0.112815	0.071258	0.989522	0.114009	0.9
55	7	1	1	1	1	7.00	2504.8	0.593943	0.874875	6.12	85	11.72	0.130372	0.079431	0.982123	0.132745	1.1
60	4	1	1	1	1	4.00	2692.8	0.644437	0.825573	3.30	85	8.90	0.11052	0.070096	0.979151	0.112874	1.0
65	5	1	1	1	1	5.00	1000.8	0.574485	1.488462	7.44	85	13.04	0.140315	0.083728	1	0.140315	1.3
85	5	1	1	1	1	5.00	3068.8	0.634067	0.762259	3.81	85	9.41	0.113967	0.07183	0.969247	0.117583	1.1
75	5	1	1	1	1	4.00	3256.8	0.644437	0.825573	3.30	85	8.90	0.11052	0.070096	0.979151	0.112874	1.1
80	4	1	1	1	1	4.00	3444.8	0.655471	0.700198	2.80	85	8.40	0.107182	0.068341	0.962842	0.111318	1.1
85	7	1	1	1	1	7.00	3632.8	0.61487	0.692817	4.85	85	10.44	0.121179	0.075276	0.955071	0.126879	1.2
90	6	1	1	1	1	6.00	3820.8	0.63061	0.664845	3.99	85	9.58	0.115184	0.072427	0.953117	0.12085	1.2

WDAC8																	
Depth	N	Hammer Efficency	Borehole Diameter	Rod Length	Sampler	N60	Effective Stress	Alpha	Cn	N1 60	Fines Content	N1 60 CS	CRR	C sigma	K sigma	CRR	CRR/CSR
5	10	1	1	1	1	10.00	500	0.467345	1.7	17.00	1	17.00	0.173906	0.119245	1	0.173906	2.4
10	5	1	1	1	1	5.00	812.8	0.562753	1.659826	8.30	1	8.30	0.106548	0.086551	1	0.106548	1.2
12	4	1	1	1	1	4.00	1000.8	0.595252	1.510018	6.04	85	11.63	0.129754	0.079158	1	0.129754	1.2
20	4	1	1	1	1	4.00	1188.8	0.604258	1.369351	5.48	85	11.07	0.125658	0.077327	1	0.125658	1.1
25	5	1	1	1	1	5.00	1376.8	0.592194	1.247469	6.24	85	11.83	0.131208	0.079799	1	0.131208	1.1
30	5	1	1	1	1	5.00	1564.8	0.59917	1.158388	5.79	85	11.39	0.127938	0.078351	1	0.127938	1.0
35	10	1	1	1	1	10.00	1752.8	0.532455	1.072774	10.73	12	14.46	0.151673	0.094805	1	0.151673	1.2
30	10	1	1	1	1	10.00	1940.8	0.539162	1.016332	10.16	12	13.90	0.147101	0.092845	1	0.147101	1.2
45	8	1	1	1	1	8.00	2128.8	0.57061	0.965014	7.72	30	13.62	0.144835	0.08464	0.994718	0.145604	1.2
50	8	1	1	1	1	8.00	2316.8	0.57578	0.918822	7.35	30	13.25	0.141935	0.083428	0.987733	0.143698	1.2
55	12	1	1	1	1	12.00	2504.8	0.533458	0.886866	10.64	1	10.64	0.122583	0.094507	0.97873	0.125247	1.1
60	12	1	1	1	1	12.00	2692.8	0.538429	0.852018	10.22	12	13.96	0.147589	0.093055	0.972322	0.15179	1.3
65	8	1	1	1	1	8.00	1000.8	0.523609	1.436945	11.50	85	17.09	0.17476	0.097521	1	0.17476	1.7
85	8	1	1	1	1	8.00	3068.8	0.592659	0.775893	6.21	85	11.80	0.130985	0.079701	0.965877	0.135612	1.2
75	8	1	1	1	1	8.00	3256.8	0.596162	0.74775	5.98	85	11.58	0.129327	0.078969	0.961495	0.134506	1.3
80	8	1	1	1	1	8.00	3444.8	0.599442	0.721857	5.77	85	11.37	0.127814	0.078296	0.957429	0.133497	1.3
85	8	1	1	1	1	8.00	3632.8	0.602526	0.697941	5.58	85	11.18	0.126425	0.077673	0.95364	0.132571	1.3
90	8	1	1	1	1	8.00	3820.8	0.605431	0.675769	5.41	85	11.00	0.125145	0.077095	0.950095	0.131718	1.3
95	10	1	1	1	1	8.00	4008.8	0.57061	0.965014	7.72	85	13.62	0.144835	0.08464	0.994718	0.145604	1.5
100	12	1	1	1	1	12.00	4196.8	0.568496	0.656157	7.87	85	13.47	0.143678	0.085146	0.936892	0.153356	1.6

Plant Wansley Separation Dike and Temporary Gypsum Facility

Evaluation of Liquefaction Potential in SPT Test Borings and CPT Soundings

prepared by Ben Gallagher, 8/5/2010

Separation Dike		
	D-1	
Depth	SPT N-value	Factor of Safety
5	26	>5
10	14	1.6
15	22	>5
20	30	>5
25	22	4.7
30	22	3.6
35	17	1.4
40	22	2.5
45	21	1.9
50	19	1.5
55	19	1.4
60	26	3.3
65	30	>5
70	30	>5
75	27	3.2
80	29	4.2
85	29	3.9
90	42	>5
95	32	>5
100	27	2.5
105	41	>5

Note: Reported N-values are uncorrected field values

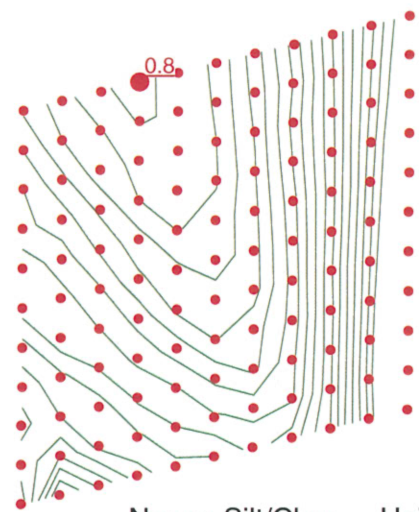
Temp. Gypsum Facility Foundatior																
	WDAC1		WDAC2		WDAC3		WDAC4		WDAC5		WDAC6		WDAC7		WDAC8	
Depth	SPT N-value	Factor of Safety	SPT N-value	Factor of Safety	SPT N-value	Factor of Safety	SPT N-value	Factor of Safety	SPT N-value	Factor of Safety	SPT N-value	Factor of Safety	SPT N-value	Factor of Safety	SPT N-value	Factor of Safety
5	9	2.2	9	2.2	8	2.0	7	1.8	4	1.7	6	1.6	5	1.5	10	2.4
10	5	1.5	5	1.7	3	**1.3**	3	1.4	5	1.7	5	**1.2**	5	1.5	5	**1.2**
15	2	**1.0**	4	**1.3**	4	**1.3**	3	**1.1**	5	**1.3**	4	**1.3**	3	**1.1**	4	**1.2**
20	3	**1.0**	4	**1.1**	5	**1.2**	4	**1.1**	4	**1.1**	4	**1.1**	5	**1.2**	4	**1.1**
25	4	**1.0**	5	**1.1**	10	**1.1**	5	**1.1**	6	**1.2**	2	**0.9**	4	**1.0**	5	**1.1**
30	5	**1.1**	6	**1.1**	12	**1.1**	6	**1.1**	4	**1.0**	5	**1.0**	4	**1.0**	5	**1.0**
35	6	**1.1**	7	**1.1**	4	**0.9**	7	**1.1**	5	**1.0**	5	**1.0**	4	**0.9**	10	**1.2**
40	6	**1.1**	7	**1.1**	5	**1.0**	3	**0.9**	5	**1.0**	5	**1.0**	2	**0.8**	10	**1.2**
45	6	**1.1**	5	**1.0**	7	**1.1**	3	**0.9**	12	1.4	5	**1.0**	2	**0.8**	8	**1.2**
50	8	**1.2**	8	**1.2**	6	**1.1**	5	**1.0**			5	**1.0**	4	**0.9**	8	**1.2**
55			8	**1.2**	5	**1.0**	10	**1.3**			5	**1.0**	7	**1.1**	12	**1.1**
60			6	**1.1**	6	**1.1**	10	**1.3**			6	**1.1**	4	**1.0**	12	**1.3**
65					8	1.7	8	**1.3**			6	1.4	5	**1.3**	8	1.7
70							7	**1.2**			10	1.4	5	**1.1**	8	**1.2**
75							5	**1.1**			7	**1.2**	5	**1.1**	8	**1.3**
80							12	1.5			5	**1.1**	4	**1.1**	8	**1.3**
85													7	**1.2**	8	**1.3**
90													6	**1.2**	8	**1.3**
95															10	1.5
100															12	1.6

Note: Reported N-values are correlations from CPT sounding data.

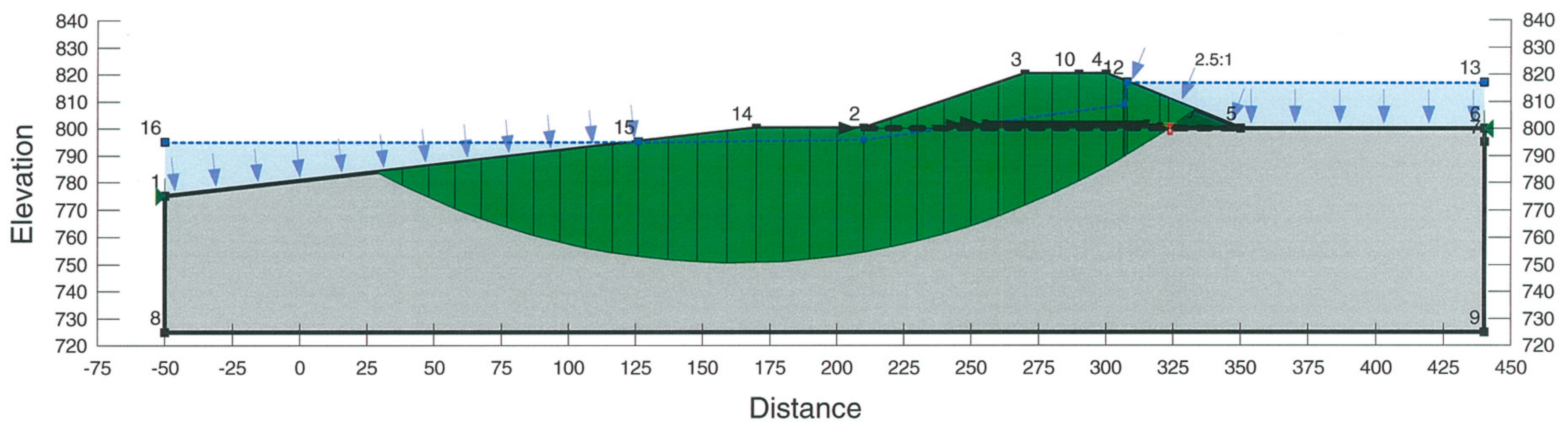
Factor of Safety = Cyclic Resistance Ratio (CRR) divided by the Cyclic Shear Stress Ratio (CSR)

This evaluation was performed following the using the procedures described by Idriss and Boulanger in the paper titled "Semi-emprical procedures for evaluating liquefaction potential during earthquakes " dated January 2004 and the jourr article titled "Liquefaction Resistance of Soils: Summary report fromthe 1996 NCEER and 1998 NCEER/NSF Workshops on evaluation of liquefaction resistance of soils" by Youd and Idriss dated April 2001. For the ash pond dike, an acceleration value of 0.251 was selected based on the site-modified, short-period spectral acceleration from 2002 USGS probabilistic maps for 2% exceedence over 50 years. For the gypsum cell foundation, maximum acceleration value of 0.134 was selected based on the site-modified, peak ground acceleration from 2002 USGS probabilistic maps for 2% exceedence over 50 years. USGS mapped earthquake probability indicated magnitude 6.85 earthquake for a return

Title: Wansley Temp. Gypsum Facility Dike
TV-WN-ECS3201-002
Name: Downstream, 0.133g no liquefaction
Method: Morgenstern-Price
Search Method: Grid and Radius
Optimization: No
Last Edited By: Gallagher, Benjamin J.



Name: Silt/Clay Unit Weight: 120 pcf Cohesion: 0 psf Phi: 25.1 °
Name: Saprolite Unit Weight: 120 pcf Cohesion: 0 psf Phi: 28.4 °
Name: Ash Unit Weight: 100 pcf Cohesion: 0 psf Phi: 20 °



Project Name = Plant Wansley Ash Dike
Conterminous 48 States
2003 NEHRP Seismic Design Provisions
Latitude = 33.414822
Longitude = -85.051088
Spectral Response Accelerations Ss and S1
Ss and S1 = Mapped Spectral Acceleration Values
Site Class B - Fa = 1.0 ,Fv = 1.0
Data are based on a 0.05000000074505806 deg grid spacing

Period (sec)	Sa (g)
0.2	0.210 (Ss, Site Class B)
1.0	0.082 (S1, Site Class B)

Conterminous 48 States
2003 NEHRP Seismic Design Provisions
Latitude = 33.414822
Longitude = -85.051088
Spectral Response Accelerations SMs and SM1
SMs = Fa x Ss and SM1 = Fv x S1
Site Class C - Fa = 1.2 ,Fv = 1.7

Period (sec)	Sa (g)
0.2	0.251 (SMs, Site Class C)
1.0	0.139 (SM1, Site Class C)

Conterminous 48 States
2003 NEHRP Seismic Design Provisions
Latitude = 33.414822
Longitude = -85.051088
Design Spectral Response Accelerations SDs and SD1
SDs = 2/3 x SMs and SD1 = 2/3 x SM1
Site Class C - Fa = 1.2 ,Fv = 1.7

Period (sec)	Sa (g)
0.2	0.168 (SDs, Site Class C)
1.0	0.092 (SD1, Site Class C)

Conterminous 48 States
2003 NEHRP Seismic Design Provisions
Latitude = 33.414822
Longitude = -85.051088
MCE Response Spectrum for Site Class B
Ss and S1 = Mapped Spectral Acceleration Values
Site Class B - Fa = 1.0 ,Fv = 1.0

Period (sec)	Sa (g)	Sd (inches)
0.000	0.084	0.000
0.078	0.210	0.012
0.200	0.210	0.082
0.389	0.210	0.310
0.400	0.204	0.319
0.500	0.163	0.398
0.600	0.136	0.478
0.700	0.117	0.558
0.800	0.102	0.637
0.900	0.091	0.717
1.000	0.082	0.797
1.100	0.074	0.877
1.200	0.068	0.956
1.300	0.063	1.036
1.400	0.058	1.116
1.500	0.054	1.195
1.600	0.051	1.275
1.700	0.048	1.355
1.800	0.045	1.434
1.900	0.043	1.514
2.000	0.041	1.594

Conterminous 48 States
2003 NEHRP Seismic Design Provisions
Latitude = 33.414822
Longitude = -85.051088
Site Modified Response Spectrum for Site Class C
SMs = FaSs and SM1 = FvS1
Site Class C - Fa = 1.2 ,Fv = 1.7

Period (sec)	Sa (g)	Sd (inches)
0.000	0.101	0.000

0.200	0.251	0.098
0.552	0.251	0.747
0.600	0.231	0.813
0.700	0.198	0.948
0.800	0.173	1.084
0.900	0.154	1.219
1.000	0.139	1.355
1.100	0.126	1.490
1.200	0.116	1.626
1.300	0.107	1.761
1.400	0.099	1.896
1.500	0.092	2.032
1.600	0.087	2.167
1.700	0.082	2.303
1.800	0.077	2.438
1.900	0.073	2.574
2.000	0.069	2.709

Conterminous 48 States
2003 NEHRP Seismic Design Provisions
Latitude = 33.414822
Longitude = -85.051088
MCE Response Spectrum for Site Class B
Ss and S1 = Mapped Spectral Acceleration Values
Site Class B - Fa = 1.0 ,Fv = 1.0

Period (sec)	Sa (g)	Sd (inches)
0.000	0.084	0.000
0.078	0.210	0.012
0.200	0.210	0.082
0.389	0.210	0.310
0.400	0.204	0.319
0.500	0.163	0.398
0.600	0.136	0.478
0.700	0.117	0.558
0.800	0.102	0.637
0.900	0.091	0.717
1.000	0.082	0.797
1.100	0.074	0.877
1.200	0.068	0.956
1.300	0.063	1.036
1.400	0.058	1.116
1.500	0.054	1.195
1.600	0.051	1.275
1.700	0.048	1.355
1.800	0.045	1.434
1.900	0.043	1.514
2.000	0.041	1.594

Conterminous 48 States
2003 NEHRP Seismic Design Provisions
Latitude = 33.414822
Longitude = -85.051088
Site Modified Response Spectrum for Site Class D
SMs = FaSs and SM1 = FvS1
Site Class D - Fa = 1.6 ,Fv = 2.4

Period (sec)	Sa (g)	Sd (inches)
0.000	0.134	0.000

0.200	0.335	0.131
0.584	0.335	1.117
0.600	0.326	1.147
0.700	0.280	1.339
0.800	0.245	1.530
0.900	0.217	1.721
1.000	0.196	1.912
1.100	0.178	2.104
1.200	0.163	2.295
1.300	0.151	2.486
1.400	0.140	2.677
1.500	0.130	2.869
1.600	0.122	3.060
1.700	0.115	3.251
1.800	0.109	3.442
1.900	0.103	3.634
2.000	0.098	3.825

```
#USGS-NSHMP Earthquake probabilities in vicinity of -85.05_d_E
#Site x,y  -85.050  33.410 Rmax= 300.0 km. Report on mean rates and Poisson Pr
#Rates below are annual; probabilities, however, correspond to time T
#    M  Int_ARate   Cumul_ARate  Int_Prob Cumul_Prob for T=   50.0 yrs
    7.65 .42882E-05 .42882E-05 .21440E-03 .21440E-03
    7.55 .27687E-05 .70569E-05 .13840E-03 .35280E-03
    7.45 .20784E-04 .27840E-04 .10387E-02 .13911E-02
    7.35 .38744E-04 .66586E-04 .19354E-02 .33237E-02
    7.25 .20940E-04 .87525E-04 .10464E-02 .43667E-02
    7.15 .41521E-04 .12905E-03 .20739E-02 .64316E-02
    7.05 .86061E-04 .21511E-03 .42938E-02 .10698E-01
    6.95 .39607E-04 .25471E-03 .19784E-02 .12655E-01
    6.85 .75909E-04 .33062E-03 .37883E-02 .16395E-01
    6.75 .14700E-03 .47762E-03 .73229E-02 .23598E-01
    6.65 .62236E-04 .53985E-03 .31070E-02 .26631E-01
    6.55 .12103E-03 .66087E-03 .60332E-02 .32504E-01
    6.45 .22780E-03 .88868E-03 .11326E-01 .43461E-01
    6.35 .96840E-04 .98552E-03 .48303E-02 .48081E-01
    6.25 .30601E-03 .12915E-02 .15184E-01 .62535E-01
    6.15 .23079E-03 .15223E-02 .11473E-01 .73290E-01
    6.05 .43623E-03 .19585E-02 .21575E-01 .93285E-01
    5.95 .18182E-03 .21404E-02 .90498E-02 .10149E+00
    5.85 .57674E-03 .27171E-02 .28425E-01 .12703E+00
    5.75 .43616E-03 .31532E-02 .21572E-01 .14586E+00
    5.65 .82440E-03 .39777E-02 .40382E-01 .18035E+00
    5.55 .35046E-03 .43281E-02 .17370E-01 .19459E+00
    5.45 .11117E-02 .54398E-02 .54066E-01 .23814E+00
    5.35 .13835E-02 .68233E-02 .66837E-01 .28906E+00
    5.25 .17218E-02 .85451E-02 .82486E-01 .34770E+00
    5.15 .00000E+00 .85451E-02 .00000E+00 .34770E+00
    5.05 .21428E-02 .10688E-01 .10160E+00 .41397E+00
```

Plant Wansley Separation Dike by: Ben Gallagher
Pseudostatic Coefficent from USGS PSHA
Based on Bray and Travasarou (2007)

Height of Slope	105	ft	a=	3.608236217
Shear Wave Velocity of Slide Mass (Vs)	1000	ft/sec	b=	4.845939045
Period of Slide Mass (Ts)	0.42	sec	**Pseudostatic Analysis**	
1.5 Ts	0.63	sec	**Kh=**	**0.121 g**
Earthquake Magnitude	6.85	M		
Spectral Acc	0.251	g	(Site Class C)	
Allowable Crest Dispacement	2	in		
episilon	0.66	(16% exceedance)		

Plant Wansley Temporary Gypsum Dike by: Ben Gallagher
Pseudostatic Coefficent from USGS PSHA
Based on Bray and Travasarou (2007)

Height of Slope	20	ft	a=	3.445710733
Shear Wave Velocity of Slide Mass (Vs)	1000	ft/sec	b=	4.420323081
Period of Slide Mass (Ts)	0.08	sec	**Pseudostatic Analysis**	
1.5 Ts	0.12	sec	**Kh=**	**0.133 g**
Earthquake Magnitude	6.85	M		
Spectral Acc	0.335	g	(Site Class D)	
Allowable Crest Dispacement	2	in		
episilon	0.66	(16% exceedance)		

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. D-1
Sheet 1 of 4

SITE	Plant Wansley Seperation Dyke			HOLE DEPTH	106	SURF.ELEV.	N/A
LOCATION	Plant Wansley	COORDINATES N	N/A			E	N/A
ANGLE	0	BEARING	0	CONTRACTOR	Ranger	DRILL NO.	N/A
DRILLING METHOD	H.S.A.	NO. SAMPLES	21			NO. U.D. SAMPLES	4
CASING SIZE	N/A	LENGTH	N/A	CORE SIZE	N/A	TOTAL % REC.	N/A
WATER TABLE DEPTH	26'	ELEV.	N/A	TIME AFTER COMP.	17 hours	DATE TAKEN	7/8/2010
TYPE GROUT	Portland	QUANTITY	N/A	MIX	1:1	DRILLING START DATE	7/7/2010
DRILLER	Justen Crowe	RECORDER	Korey Young	APPROVED	Korey Young	DRILLING COMP. DATE	7/7/2010

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	% Rec	RQD
0									
1							T.O.B. water level was 62'		
2									
3									
4									
5		red brown micacous SILT (ML)	1	3.5-5	11-12-14	26			
6									
7									
8									
9									
10		red brown micacous SILT (ML)	2	8.5-10	7-6-8	14			
11									
12									
13									
14									
15		red brown micacous SILT (ML)	3	13.5-15	8-10-12	22			
16									
17									
18							UD 16-18.5		
19									
20		red brown micacous SILT (ML)	4	18.5-20	8-13-17	30			
21									
22							UD 21-23.5		
23									
24									

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. D-1

SITE Plant Wansley Seperation Dyke TOTAL DEPTH 106 SURF.ELEV. N/A

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	% Rec	RQD
25		red brown micacous SILT (ML)	5	23.5-25	7-12-10	22			
26									
27									
28									
29									
30		red brown micacous SILT (ML)	6	28.5-30	8-10-12	22			
31									
32									
33									
34									
35		red brown micacous SILT (ML)	7	33.5-35	6-8-9	17			
36									
37									
38									
39									
40		red brown micacous SILT (ML)	8	38.5-40	6-9-13	22			
41									
42									
43									
44									
45		red brown micacous SILT (ML)	9	43.5-45	7-9-12	21			
46									
47							UD 46-47.5 short push due to hard material		
48									
49									
50		red brown micacous SILT (ML)	10	48.5-50	7-9-10	19			
51									
52							UD 51-53 short push due to hard material		
53									
54									
55		red brown micacous SILT (ML)	11	53.5-55	5-7-12	19			
56									

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Confidential Business Information

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. D-1

SITE Plant Wansley Seperation Dyke TOTAL DEPTH 106 SURF.ELEV. N/A

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	% Rec	RQD
57									
58									
59									
60		multi colored sandy SILT (ML)	12	58.5-60	5-10-16	26			
61									
62									
63									
64									
65		brown gray micacous SILT (ML)	13	63.5-65	7-16-14	30			
66									
67									
68									
69									
70		brown gray micacous SILT (ML)	14	68.5-70	7-14-16	30			
71									
72									
73									
74									
75		brown gray micacous SILT (ML)	15	73.5-75	7-12-15	27			
76									
77									
78									
79									
80		tan fine sandy SILT (ML)	16	78.5-80	6-12-17	29			
81									
82									
83									
84									
85		brown micacous SILT (ML)	17	83.5-85	7-16-13	29			
86									
87									
88									

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DRILLING LOG
GEOLOGICAL SERVICES

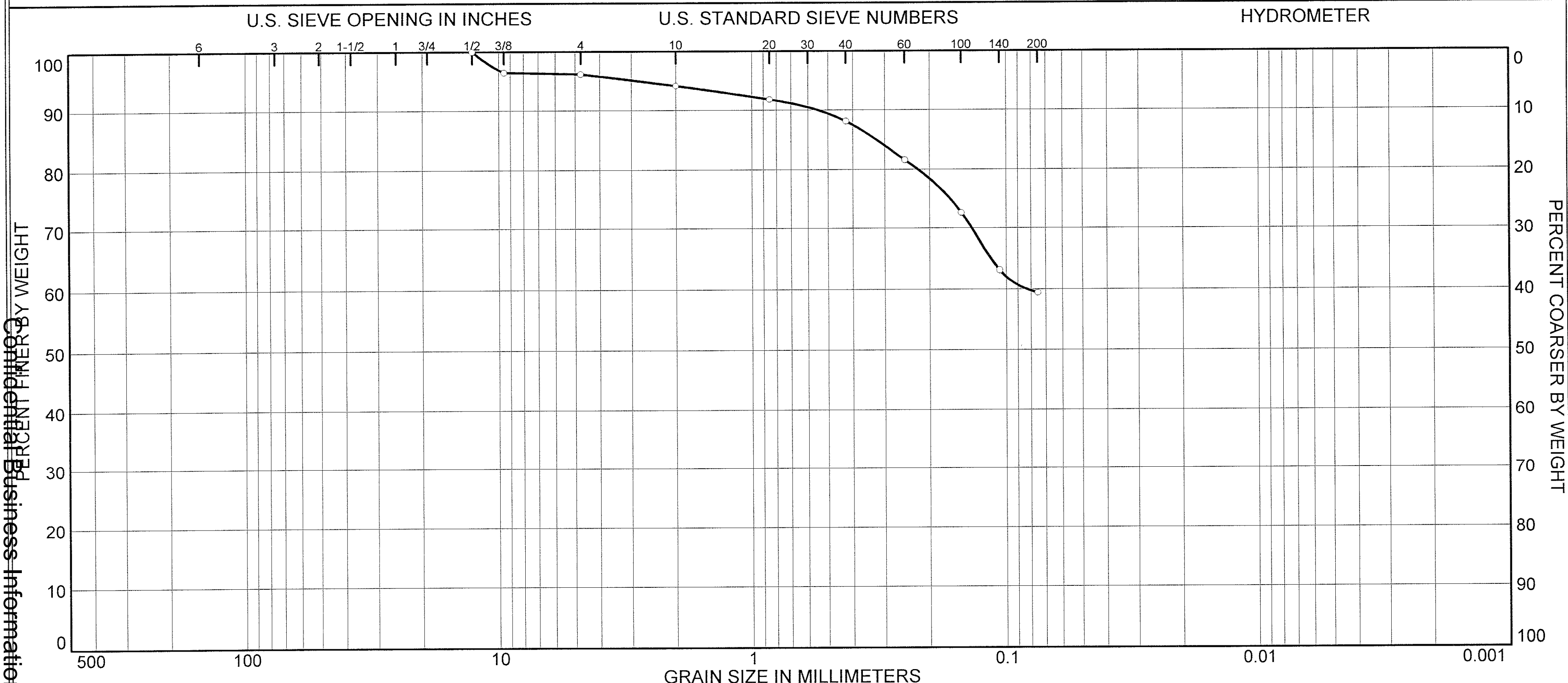
Hole No. D-1

SITE Plant Wansley Seperation Dyke TOTAL DEPTH 106 SURF.ELEV. N/A

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	% Rec	RQD
89									
90		pink brown micacous SILT (ML)	18	88.5-90	13-20-22	42			
91									
92									
93									
94									
95		tan brown micacous SILT (ML)	19	93.5-95	9-13-19	32			
96									
97									
98									
99									
100		tan brown silty CLAY (CL)	20	98.5-100	9-12-15	27			
101									
102									
103									
104									
105		tan orange clayey fine SAND (SC)	21	103-5-105	12-18-23	41			
106									
107		Auger Refusal @ 106'							
108									
109									
110									
111									
112									
113									
114									
115									
116									
117									
118									
119									
120									

Form GS9901 7-26-2004

Particle Size Distribution ASTM D422-63 (2007)



% COBBLES	% GRAVEL		% SAND			% FINES	
	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
0.0	0.0	3.8	2.0	6.1	28.7	59.4	

SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
D-1	UD	21-23.3 ft	8/4/10		Brown Silty Sand			

Client

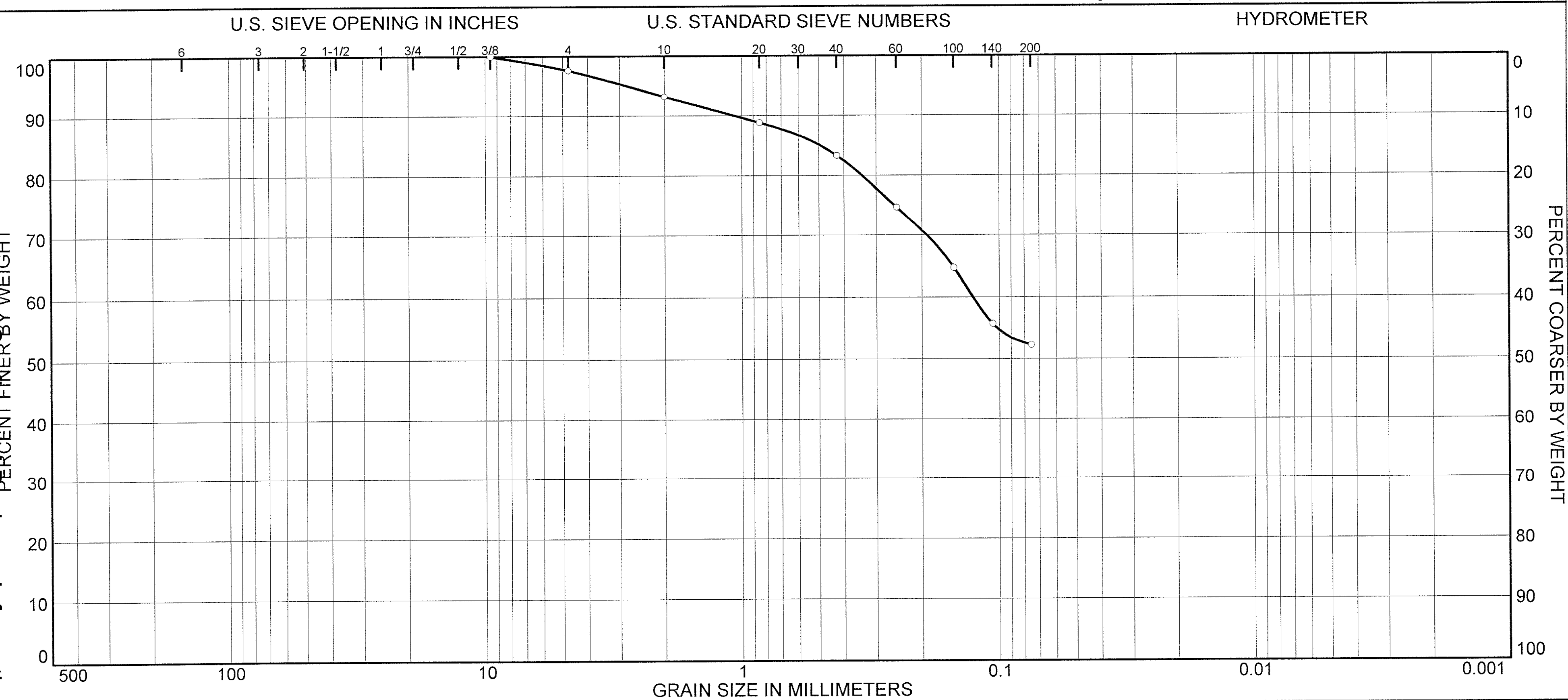
Project Plant Wansley Ash Pond

Project No. 6152-10-0244 10353

MACTEC ENGINEERING AND CONSULTING, INC.

Tested By: EH Reviewed By: JW

Particle Size Distribution ASTM D422-63 (2007)



% COBBLES	% GRAVEL COARSE	% GRAVEL FINE	% SAND COARSE	% SAND MEDIUM	% SAND FINE	% FINES SILT	% FINES CLAY
0.0	0.0	2.4	4.4	9.9	31.0	52.3	

SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
D-1	UD	51-53 ft	8/4/10		Brown Silty Sand			

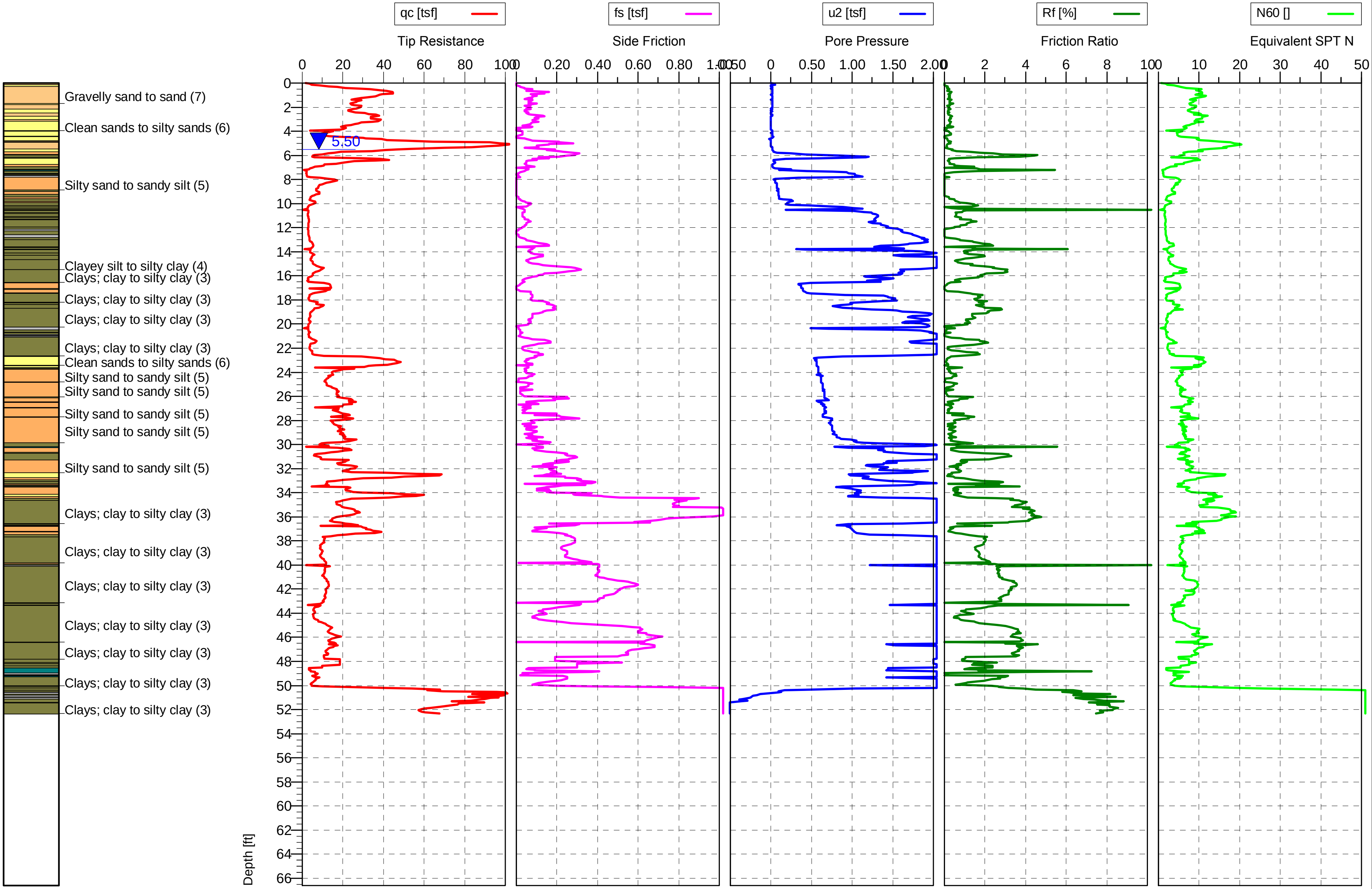
Client

Project Plant Wansley Ash Pond

Project No. 6152-10-0244 10352

MACTEC ENGINEERING AND CONSULTING, INC.

Tested By: EH Reviewed By: JW

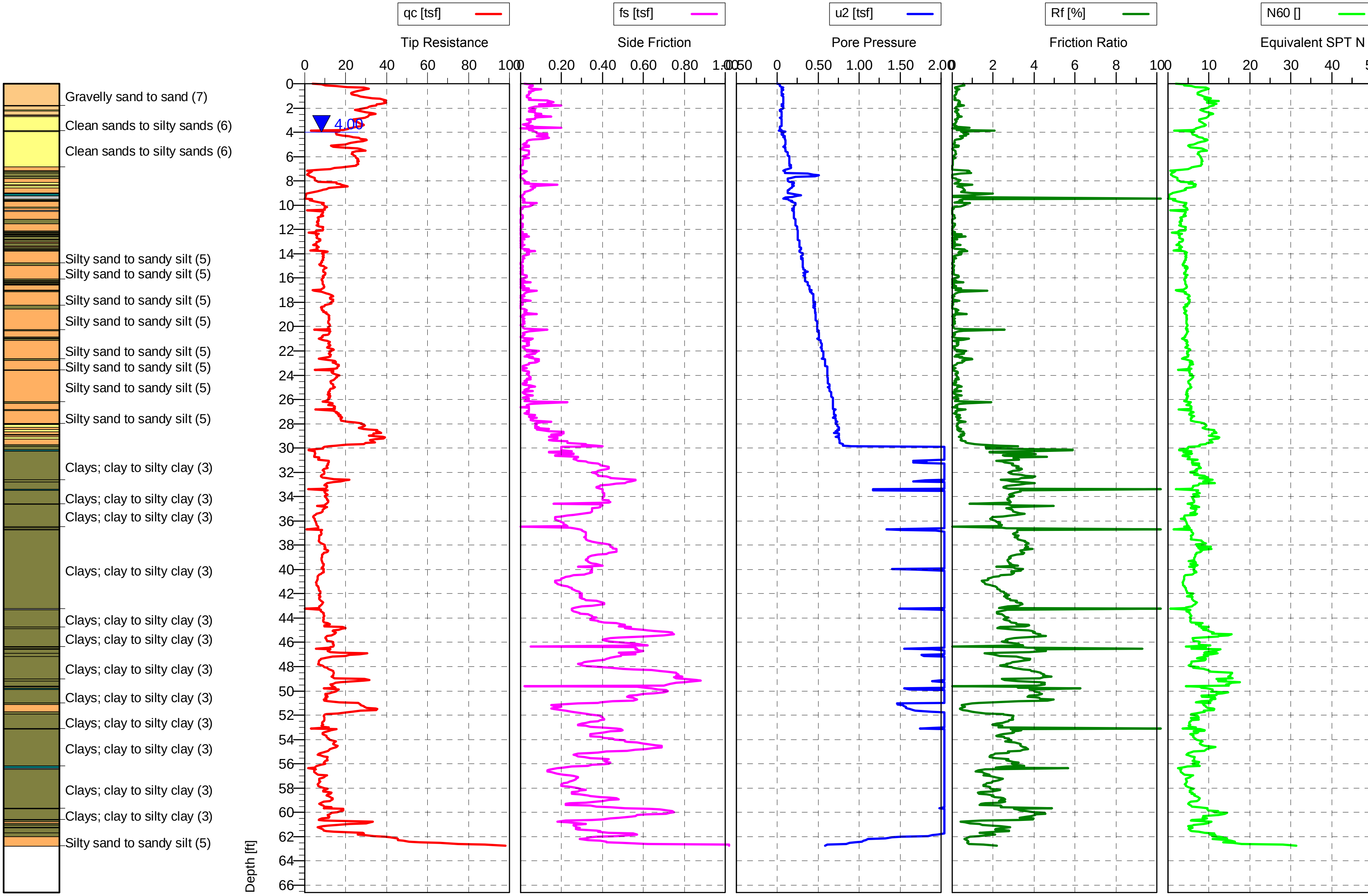


WPC

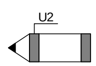
U2

Cone No: 0
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Location: Carrollton, ga	Position:	Ground level:	Test no: WDAC1
Project ID: SAV2-06-107	Client: Southern Company	Date: 10/5/2006	Scale: 1 : 140
Project: CPT at Plant Wansley		Page: 1/1	Fig:
Confidential Business Information		File: WDAC1.cpd	

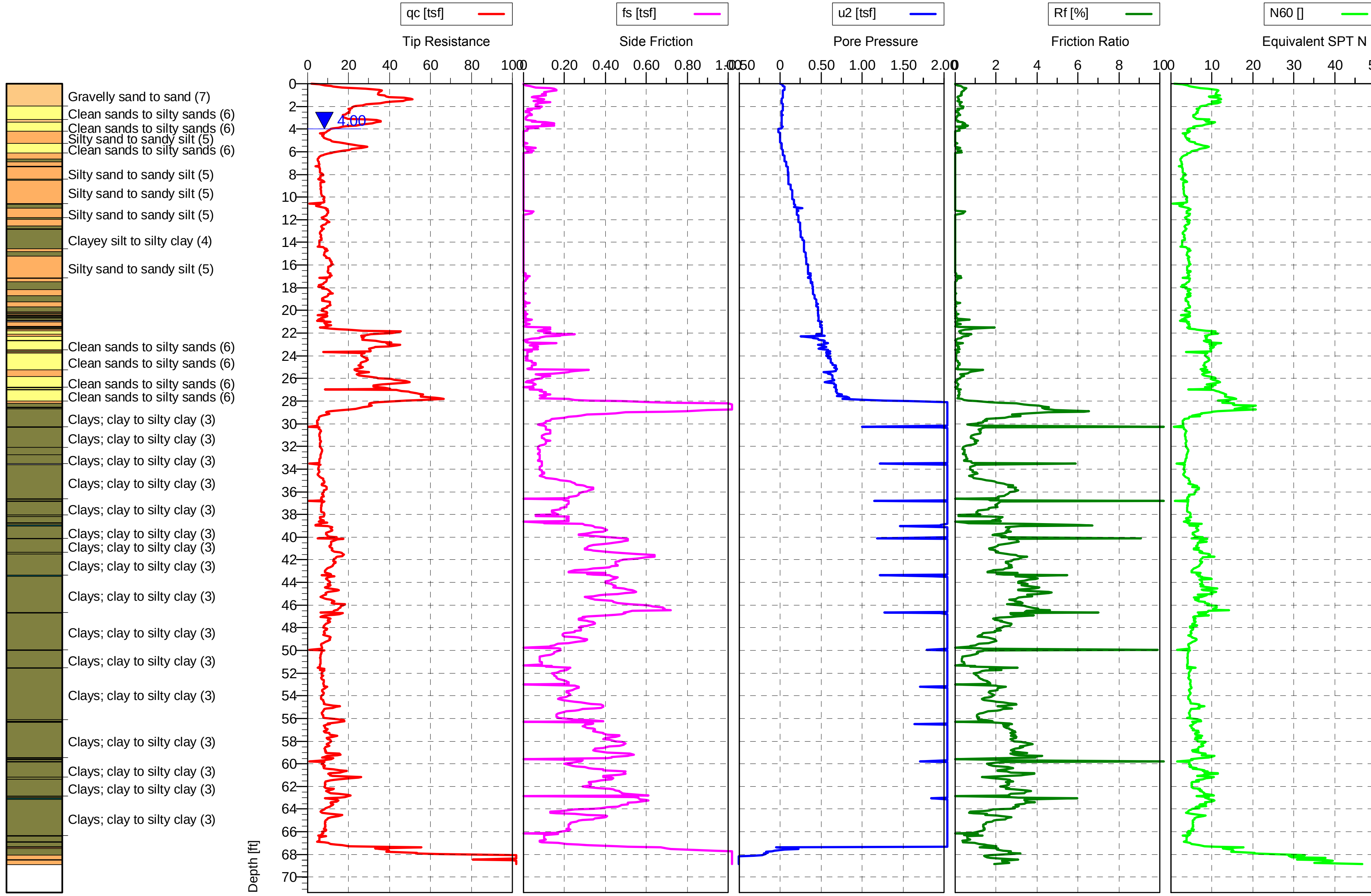


WPC



Cone No: 0
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Location: Carrollton, GA	Position:	Ground level:	Test no: WDAC2
Project ID: SAV2-06-107	Client: Southern Company	Date: 10/5/2006	Scale: 1 : 140
Project: CPT at Plant Wansley		Page: 1/1	Fig:
Confidential Business Information		File: WDAC2.cpd	

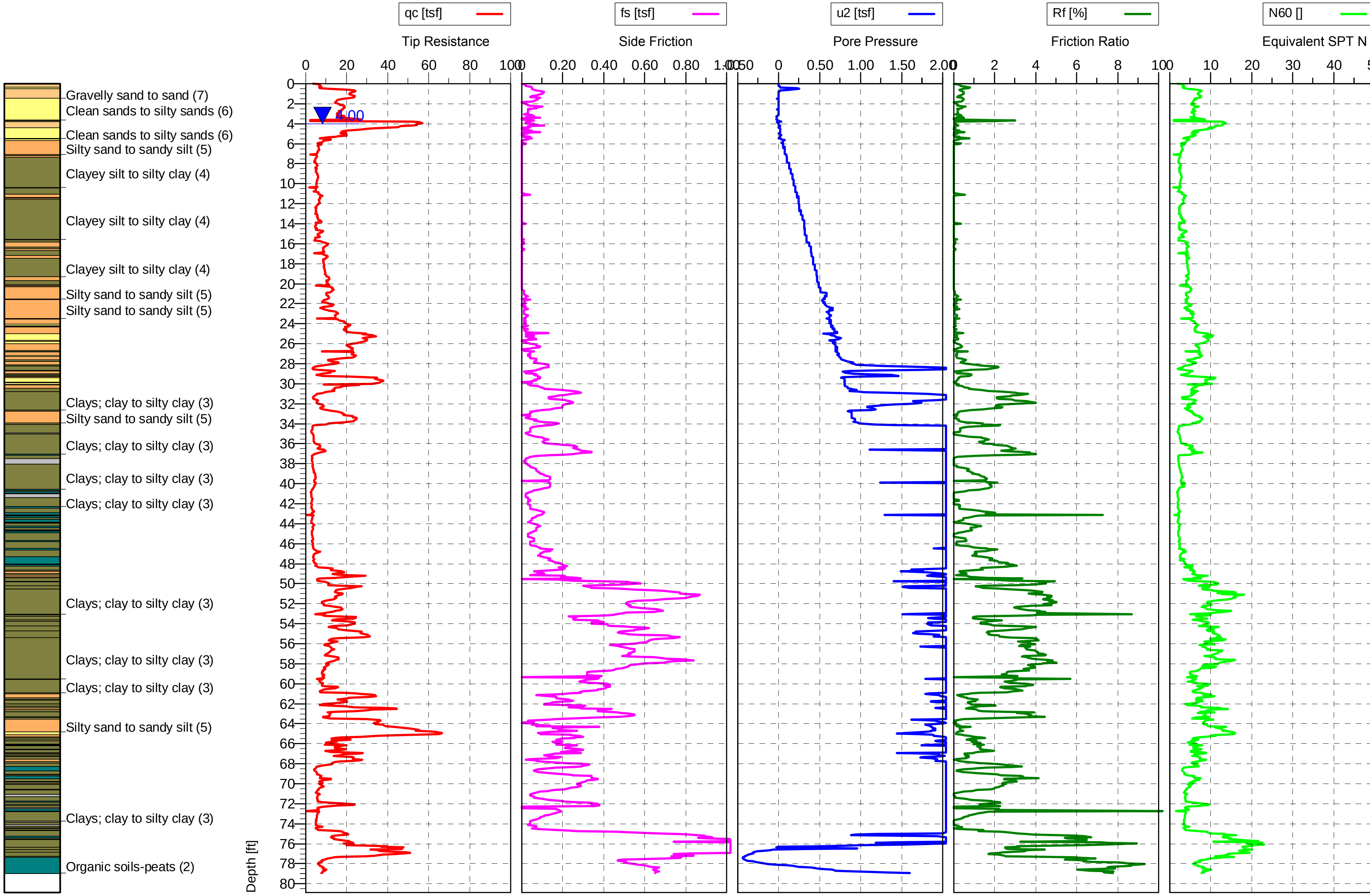


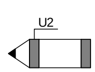
WPC

U2

Cone No: 0
Tip area [cm2]: 10
Sleeve area [cm2]: 150

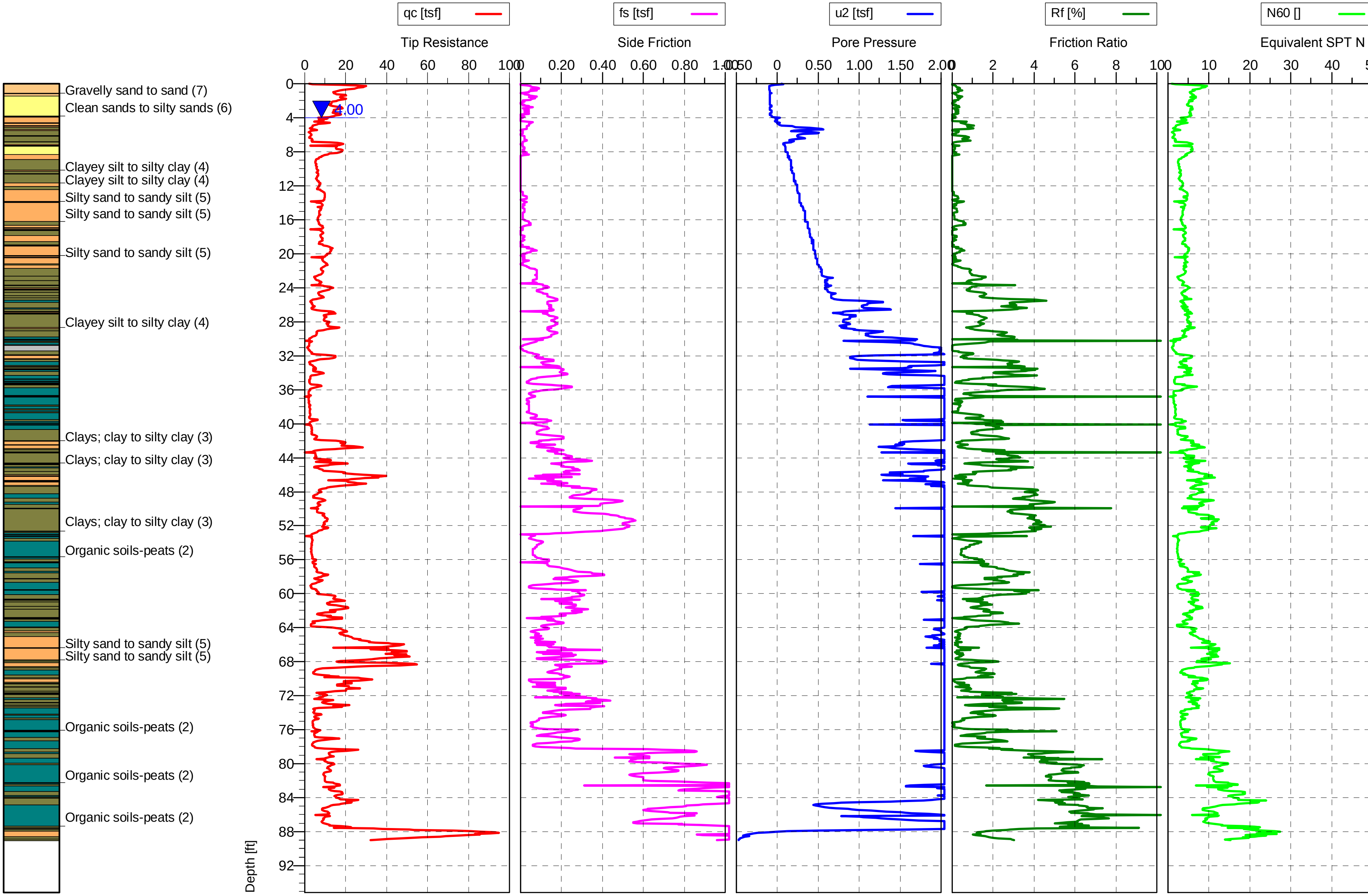
Location: Carrollton, GA	Position:	Ground level:	Test no: WDAC3
Project ID: SAV2-06-107	Client: Southern Company	Date: 10/5/2006	Scale: 1 : 150
Project: CPT at Plant Wansley		Page: 1/1	Fig:
Confidential Business Information		File: WDAC3.cpd	



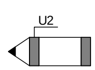


Cone No: 0
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Location: Carrollton, GA	Position:	Ground level:	Test no: WDAC4
Project ID: SAV2-06-107	Client: Southern Company	Date: 10/5/2006	Scale: 1 : 170
Project: CPT at Plant Wansley		Page: 1/1	Fig:
Confidential Business Information		File: WDAC4.cpd	

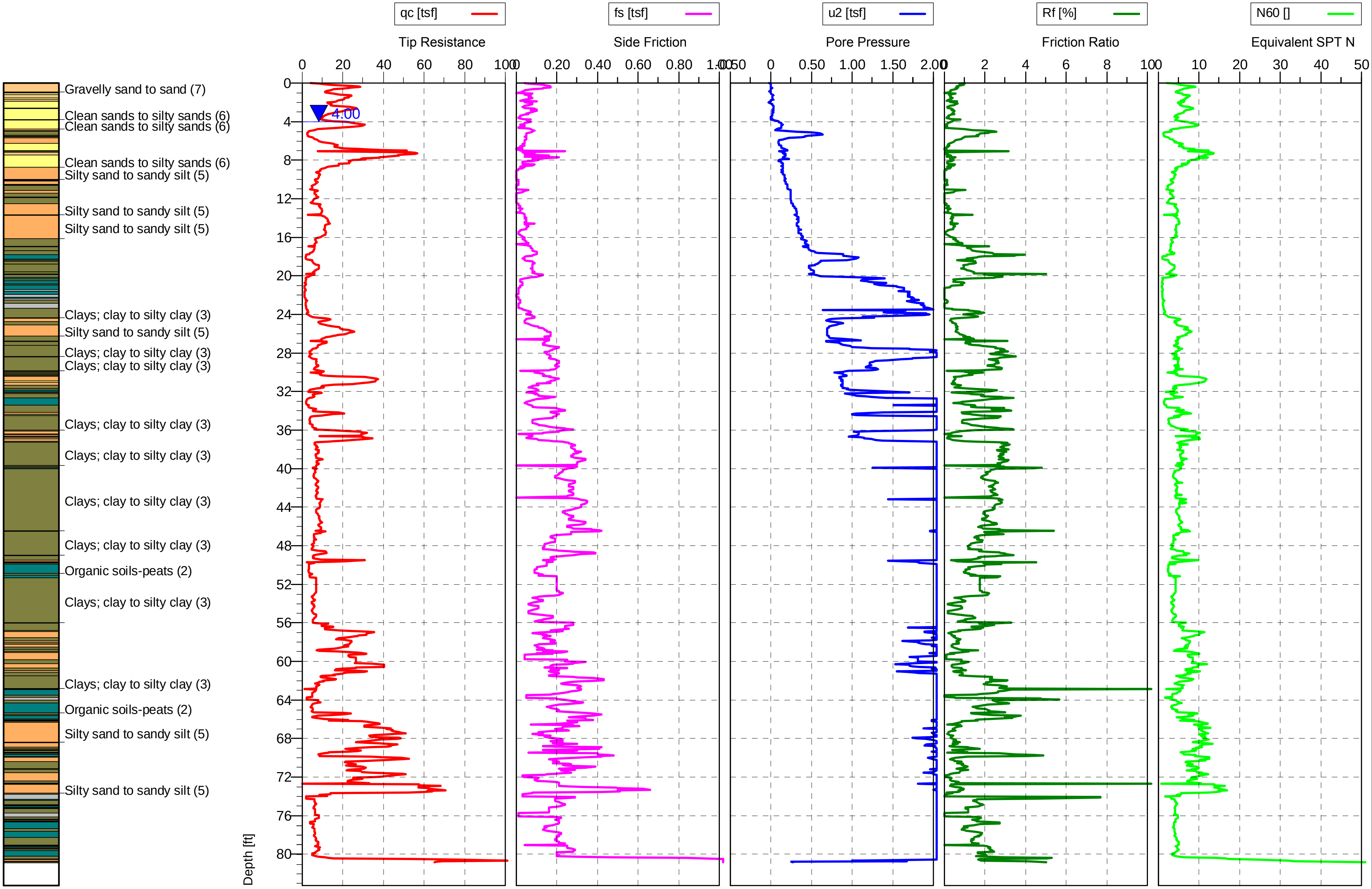


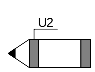
WPC



Cone No: 0
Tip area [cm2]: 10
Sleeve area [cm2]: 150

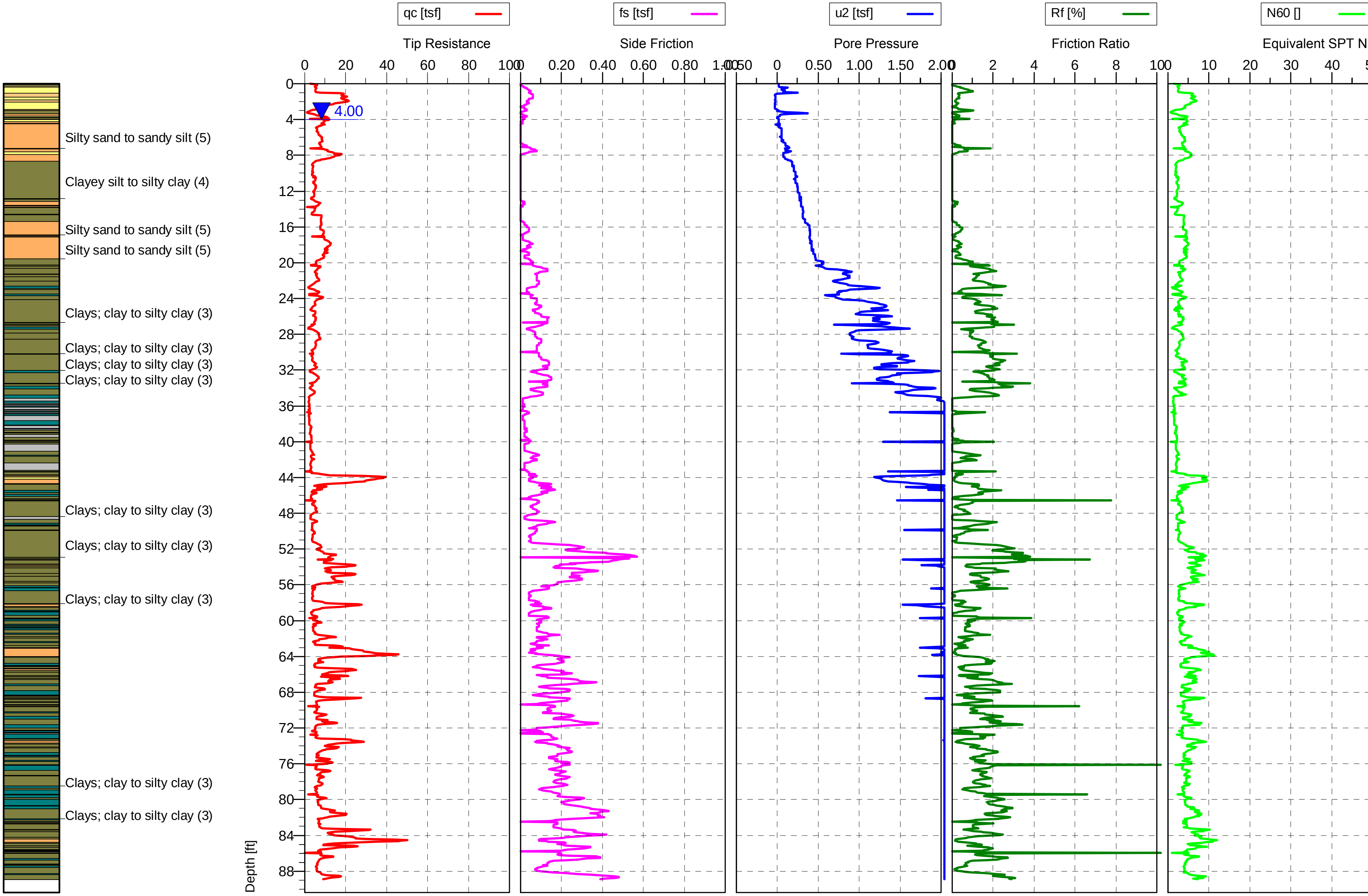
Location: Carrollton, GA	Position:	Ground level:	Test no: WDAC5
Project ID: SAV2-06-107	Client: Southern Company	Date: 10/5/2006	Scale: 1 : 200
Project: CPT at Plant Wansley		Page: 1/1	Fig:
Confidential Business Information		File: WDAC5.cpd	

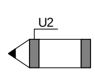




Cone No: 0
Tip area [cm2]: 10
Sleeve area [cm2]: 150

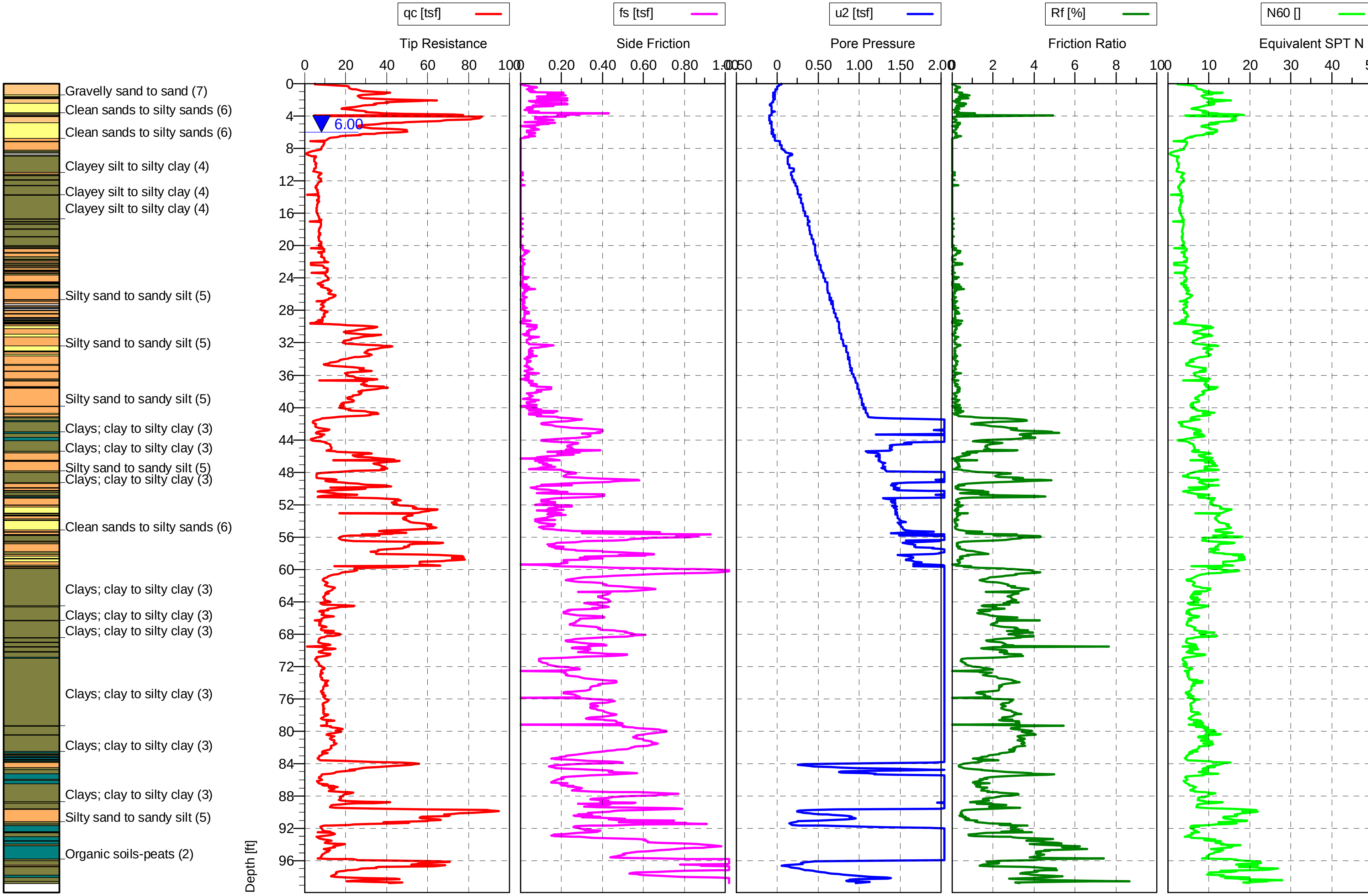
Location: Carrollton, GA	Position:	Ground level:	Test no: WDAC6
Project ID: SAV2-06-107	Client: Southern Company	Date: 10/5/2006	Scale: 1 : 175
Project: CPT at Plant Wansley		Page: 1/1	Fig:
Confidential Business Information		File: WDAC6.cpd	





Cone No: 0
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Location: Carrollton, GA	Position:	Ground level:	Test no: WDAC7
Project ID: SAV2-06-107	Client: Southern Company	Date: 10/5/2006	Scale: 1 : 190
Project: CPT at Plant Wansley		Page: 1/1	Fig:
Confidential Business Information		File: WDAC7.cpd	



U2

Cone No: 0
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Location: Carrollton, GA	Position:	Ground level:	Test no: WDAC8
Project ID: SAV2-06-107	Client: Southern Company	Date: 10/5/2006	Scale: 1 : 210
Project: CPT at Plant Wansley		Page: 1/1	Fig:
Confidential Business Information		File: WDAC8.cpd	

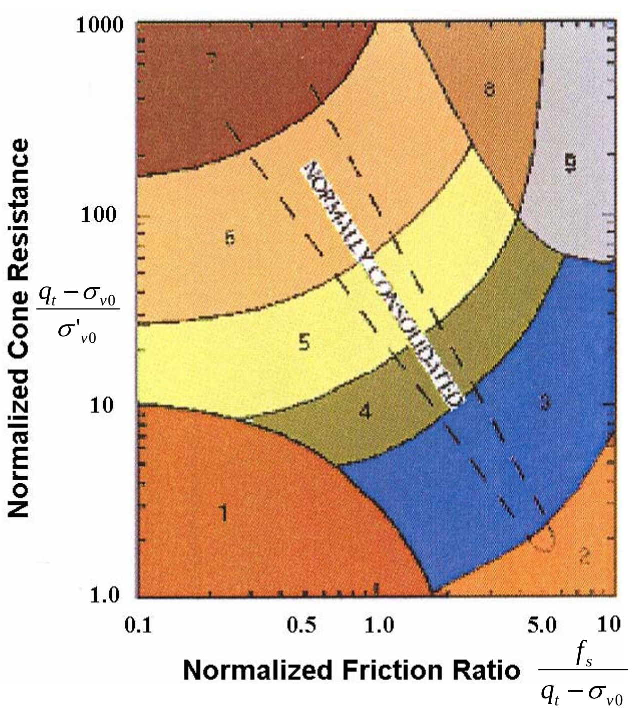
Cone Penetration Classification

The tip resistance (**q_c**) is measured as the maximum force over the projected area of the tip. It is a point stress related to the bearing capacity of the soil. The measured **q_c** must be corrected for porewater pressure effects (Lunne et al, 1997), especially in clays and silts where porewater pressures typically vary greatly from hydrostatic. This corrected value is known as **q_t**, which is reported in the Cone Penetration Test (CPT) Logs. The **u_2** position element is required for the measurement of penetration porewater pressures and the correction of tip resistance. The sleeve friction (**f_s**) is used as a measure of soil type and can be expressed by friction ratio: **$FR = f_s/q_t$**.

The estimated stratigraphic profiles included in the Cone Penetration Test (CPT) Logs are based on relationships between **q_t**, **f_s**, and **u_2**. The normalized friction ratio (**FR_N**) is calculated by using:

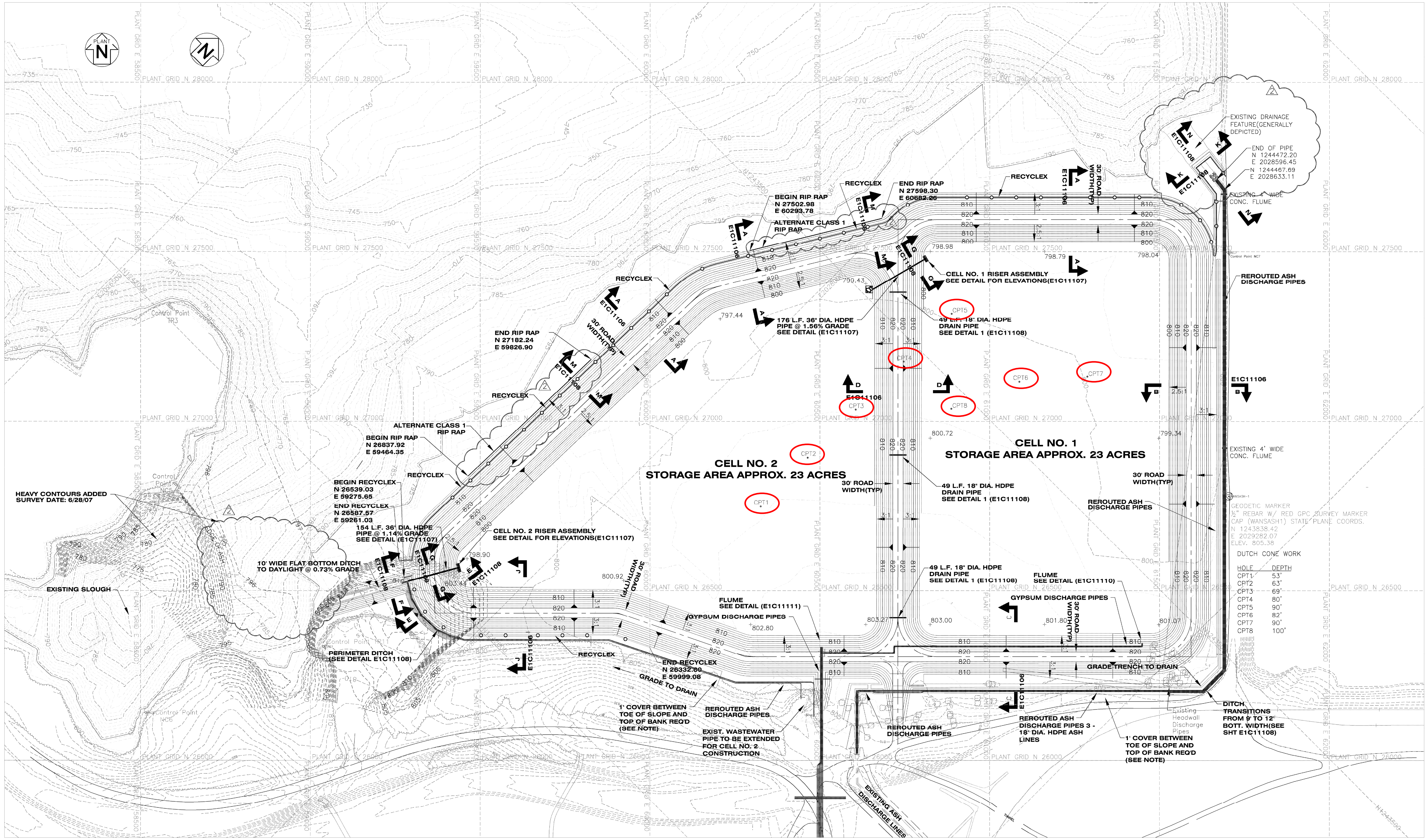
$$FR_N = \frac{f_s}{q_t - \sigma_{v0}'} \times 100\%$$

and is indicative of soil behavior and is used to classify the soil behavior type. Typically, cohesive soils, such as plastic silts and clays, have high **FR** values, low **q_t** values, and generate large excess penetration porewater pressures. Cohesionless soils, such as sands, have lower **FR** values, high **q_t** values, and typically do not generate excess penetration porewater pressures. The following graph (Robertson, 1990) presents one of the accepted correlations used to classify soils behavior types.



Zone	Qt/N	Description
1	2	Sensitive Fine Grained
2	1	Organic Soils-Peats
3	1.5	Clays-Clay to Silty Clay
4	2	Silt Mixture – Clayey Silty to Silty Clay
5	3	Sand Mixtures-Silty Sand to Sandy Silt
6	4.5	Sands-Clean Sand to Silty Sand
7	6	Gravelly Sand to Sand
8	1	Very Stiff Sand to Clayey Sand*
9	2	Very Stiff, Fine Grained*

(* Heavily Overconsolidated or Cemented)



GENERAL ARRANGEMENT AND SITE PLAN

GRAPHIC SCALE
100 0 50 100 200 400
(IN FEET)
1 inch = 100 ft.

GENERAL NOTES

1. FOR DRAWING INDEX, NOTES, AND SPECIFICATIONS SEE E1C11100.
2. ALONG THE TOE OF DIKE, ALL EXPOSED ASH SHALL BE COVERED WITH 1 FOOT OF SOIL COVER. (SC/SM, MH/ML)
3. WASTE WATER DISCHARGE PIPES TO BE TEMPORARILY EXTENDED TO FACILITATE DIKE CONSTRUCTION. THESE PIPES WILL BE LATER REMOVED TO PERMANENTLY END IN THE DISCHARGE DITCH FROM CELL NO. 2.

REVISION	DATE	DESCRIPTION	JOB NO.	EWO	BY	CHK'D	CIVIL APPR	ELECT APPR	I/C APPR	MECH APPR	DISC MGR
2	12-18-07	REMOVED TRAINING DIKE RELOCATED ASH DISCHARGE PIPES ADDED RIPRAP LOCATIONS ISSUED FOR CONSTRUCTION	C07510	3059DE	JWM	PMG	AMW				CKT
1	8-10-07	GENERAL REVISION ISSUED FOR CONSTRUCTION	C07510	3059DE	JWM	PMG	DHF				CKT
0	7-27-07	ISSUED FOR CONSTRUCTION	C07510	3059DE	JWM	PMG	AMW	RKC	KAH	MTB	CKT

Southern Company Generation
Engineering and Construction Services
FOR
Georgia Power Company

PLANT WANSLEY UNITS 1 & 2
FGD PROJECT

SHORT TERM GYPSUM DISPOSAL
GENERAL ARRANGEMENT AND SITE PLAN

SCALE	PROJ I.D.	DRAWING NUMBER	SH	CONT'D	REV
1"=100'		E1C11102	1	FINAL	2

ANSI E: 44x34 Acad2004

Calculation Cover Sheet

Southern Company Generation

Calculation Number SH-WN10911-01	
Project: Wansley	Discipline: Hydro Services
Objective	___Number
Subject/Title: Evaluate Stormwater Capacity of Ash Pond	
Originator's Signature: Frank L. Gray, Jr.	Date 8/4/2010 — Last Page Number 10

Contents

Topic	Page	Attachments (Computer Printouts, Technical Papers, Sketches, Correspondence, etc.)	Number of Pages
Purpose of Calculation/ Summary of Conclusions	1		
Criteria	1		
Major Equation Sources/ Derivation Methods	1		
Assumptions	1		
Listed References	1		
Body of Calculations	2-10		

Record of Revisions

Rev. No.	Description	Originator / Date	Reviewer / Date	Approver / Date
0	Initial Calcs	FLG 8/4/10	CRO 8/6/10	DJG 8-6-10

NOTES:

Form No. 9-363F

See Back for Instructions

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WAN-API 074

SOUTHERN COMPANY

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Design Calculations

Project Plant Wansley	Prepared By Fred L. Cox, Jr.	Date 8/1/2010
Subject/Title Evaluate Stormwater capacity of Ash Pond	Reviewed By Courtenay O'Mara CLO	Date 8/4/2010
	Calculation Number SH-WN10911-01	Sheet 1 of 10

1.0 Purpose of Calculation:

Determine the storm water handling capacity of the Wansley Ash Pond

2.0 Summary of Conclusions:

The Wansley Ash Pond can handle a 24 hour rainfall runoff of: 1) 16.9 inches of rainfall runoff, which is 2.13 times the 100 year storm, at the level of the emergency spillway crest, and 2) 23.5 inches of rain, which is 2.96 times the 100 year storm, at a level one foot below the crest of the dike. The probability of occurrence of these storms is exceedingly low. Based on these data and Georgia Power's tolerance for risk of this type of storm occurring, it is concluded that the capacity of the ash pond is far more than adequate.

3.0 Criteria:

See Section 7.0

4.0 References:

1. Georgia EPD Safe Dam Program Rules for Dam Safety
2. Dwg. 10-209-B1008, Plant Wansley Ash Pond Area-Volume Curve
3. Dwg. 10-209-E1C11102, Short Term Gypsum Disposal, General Arrangement and Site Plan
4. Georgia Stormwater Management Manual, Rainfall Table for Peachtree City
5. 4th Quarter - 2009 report on Dam Safety Surveillance for Plant Wansley
6. 2002 NPDES Co-Treatment Calculations

5.0 Assumptions:

See Section 7.0

6.0 Major Equation Sources/Derivation of Methods:

See Section 7.0

7.0 Body of Calculations

Ash Pond Data:

The Plant Wansley Ash Pond is not a Category I structure according to the Georgia EPD Safe Dam Program Rules for Dam Safety. Because of this; it is not required to pass the PMF, or some fraction of the PMF. A lesser storm event is acceptable.

Elevation – Volume – Area Data
(Drawing. 10-209-B10008) (See Figure 1, page 5)

Elevation	Volume Ac-Ft	Area Ac
790	12300	312
795	14000	333
800	15700	354
805	17400	375

Top of Dike: 805

Emergency Spillway Crest: 802.6

Pond Operating Level: See attached of 2000-2009 levels from 2009 4th Qtr Inspection Report. The Ash Pond level generally fluctuates between 795 and 799. (See Figure 2, page 6)

Drainage Area: 711 Acres (2002 Co-Treatment calculations)

Rainfall Data: From the Georgia Stormwater Management Manual rainfall tables, the closest city is Peachtree City (See Figure 3, page 7)

Return Period Yrs	24 Hour Intensity Inches/hour	24 Hour Rainfall Inches
2	.17	4.08
5	.21	5.04
10	.24	5.76
25	.28	6.72
50	.30	7.20
100	.33	7.92

Design Calculations

Project Plant Wansley	Prepared By Fred L. Cox, Jr.	Date 8/1/2010
Subject/Title Evaluate Stormwater capacity of Ash Pond	Reviewed By Courtenay O'Mara CAO	Date 8/4/2010
	Calculation Number SH-WN10911-01	Sheet 3 of 10

Gypsum Stacking Area in Ash Pond:

In 2007 a 62 acre gypsum stacking area was established in the Ash Pond. The gypsum is stacked above the pond surface. The volume used by this stack must be deducted from the available storage volume in the pond. See Figure 4, page 8, for a drawing of the stack and Figure 5, page 9, for an aerial photo of the ash pond and gypsum stack.

Analysis

Determine how man inches of runoff can be stored up to the crest of the emergency spillway.

Assume a conservatively high starting ash pond level of 799 (see Figure 2, page 6, for a plot of ash pond levels from 2000 – 2009).

Original volume from 799 to 802.6 (crest of emergency spillway) = 1224 ac-ft

Adjustment for gypsum stack = 1224 – (3.6ft x 62 acres) = 1000.8 ac-ft

Assuming 100 % runoff determine how many inches of rain can be stored

1000.8 ac-ft of storage / 711 ac of drainage = 1.408 ft of rain runoff storage available = 16.9 inches of rain storage available

16.9 inches of rain is 2.13 times the 100 year 24 hour rain (7.92 inches)

Determine how man inches of runoff can be stored up one foot of the top of the dike

Original volume from 799 to 804 (one foot below top dike) = 1700 ac-ft

Adjustment for gypsum stack = 1700 – (5ft x 62 ac) = 1390 ac-ft

Assuming 100 % runoff & neglecting emergency spillway discharge

1390 ac-ft of storage / 711 ac of drainage = 1.955 ft of rain runoff storage available = 23.5 inches of rain storage available

23.5 inches of rain is 2.96 times the 100 year 24 hour rain (7.92 inches)

This analysis conservatively neglects spillway discharge during the storm

Design Calculations

Project Plant Wansley	Prepared By Fred L. Cox, Jr.	Date 8/1/2010
Subject/Title Evaluate Stormwater capacity of Ash Pond	Reviewed By Courtenay O'Mara	Date 8/4/2010
	Calculation Number SH-WN10911-01	Sheet 4 of 10

Summary

The Wansley Ash Pond can handle a 24 hour rainfall runoff of: 1) 16.9 inches of rainfall runoff, which is 2.13 times the 100 year storm, at the level of the emergency spillway crest, and 2) 23.5 inches of rain, which is 2.96 times the 100 year storm, at a level one foot below the crest of the dike.

Figure 6 (see page 10) is a semilog plot of the 2 to 100 year 24 hour rainfall with a line fit extended out to 200 years. It is obvious from this plot that the 16.9 inch runoff capacity up to the crest of the emergency spillway, and the 23.5 inch runoff capacity up to one foot below the crest of the dike, have very low probabilities of occurrence (probability of occurrence in a given year = the inverse of the return period).

The probability of occurrence of these storms is exceedingly low. Based on these data and Georgia Power's tolerance for risk of this type of storm occurring, it is concluded that the capacity of the ash pond is far more than adequate.

Design Calculations

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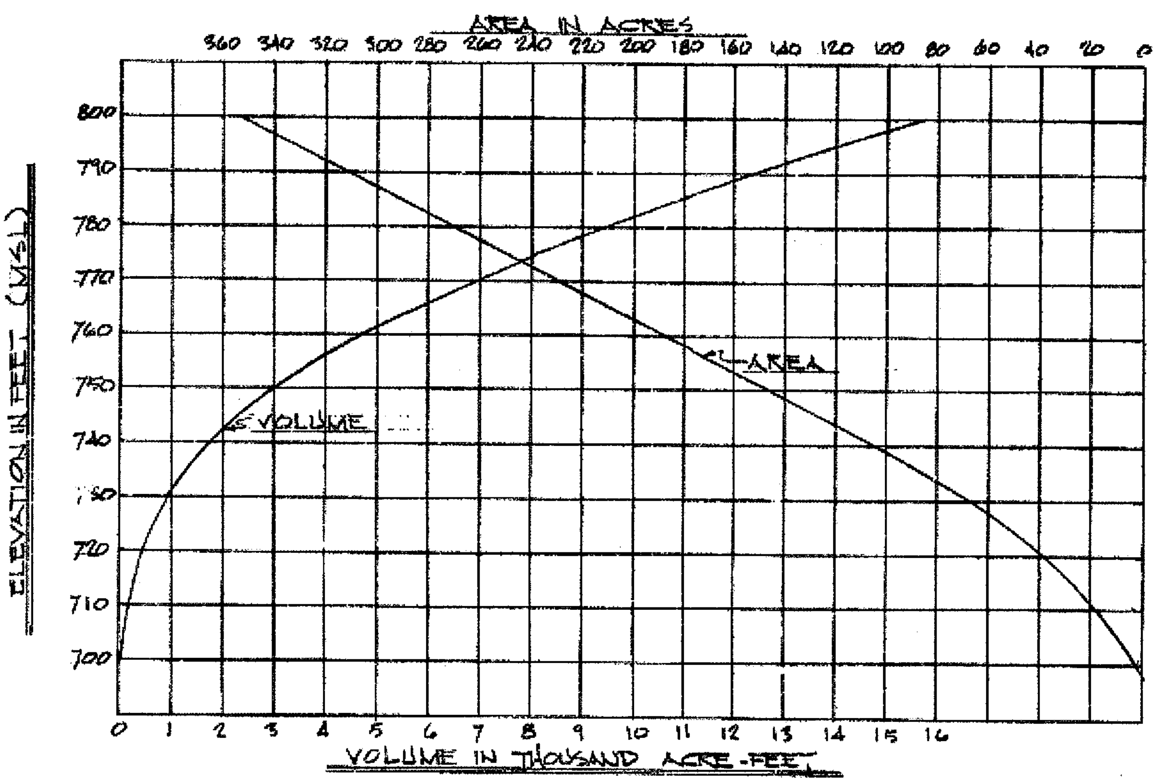
Subject/Title Evaluate Stormwater capacity of Ash Pond	Reviewed By Courtenay O'Mara	Date 8/4/2010
	Calculation Number SH-WN10911-01	Sheet 5 of 10

Figure 1:

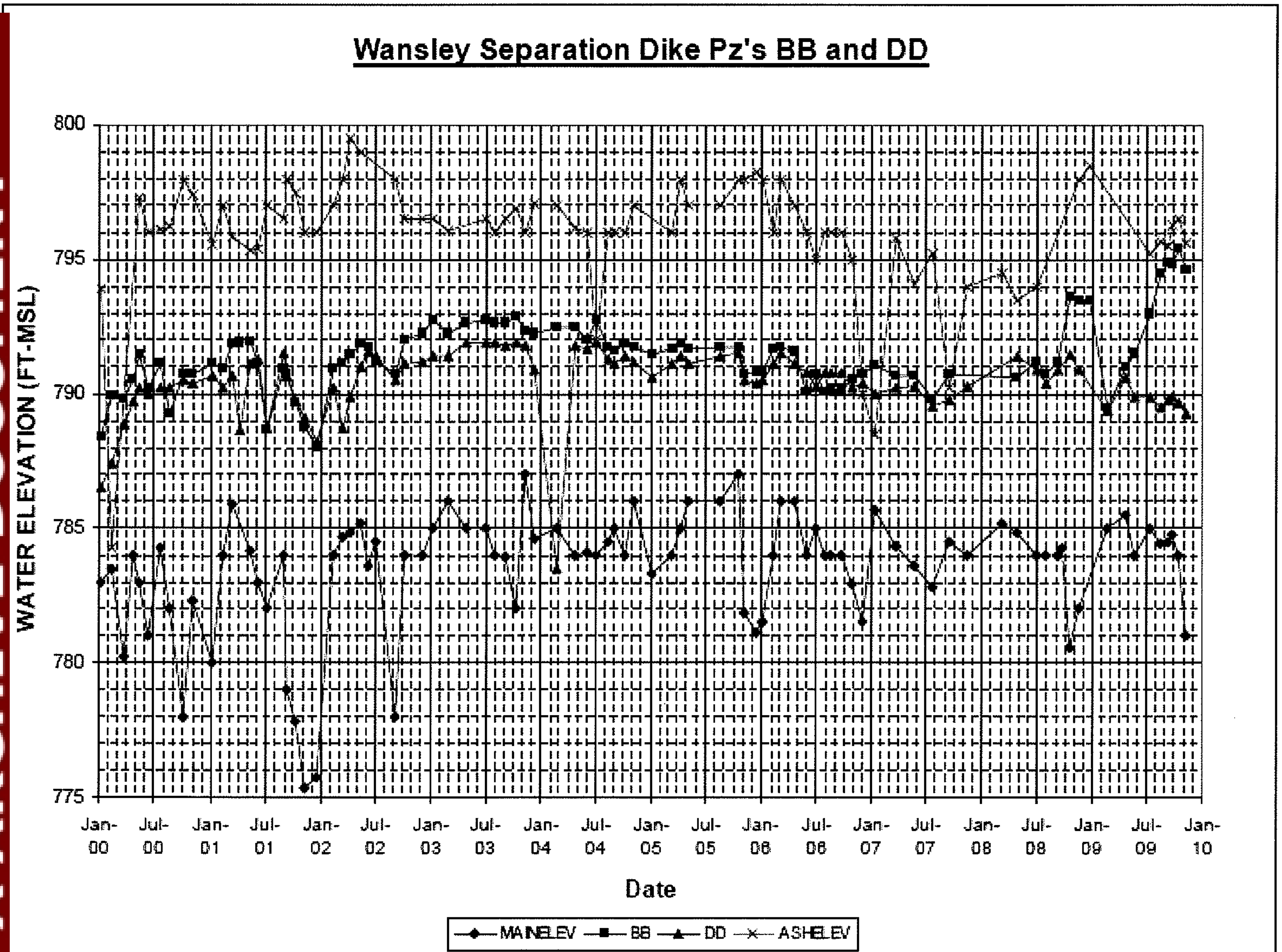


GEORGIA POWER CO., ATLANTA, GA. GENERAL ENGINEERING DEPARTMENT	GEORGIA POWER COMPANY PLANT WANSLEY ASH POND AREA-VOLUME CURVE
DRAWN BY JAS DATE 1-7-73 TRACED BY SCALE APPROVED	REVISIONS NUMBER: LOCATION 10-209 SHEET NO. B1000B

Design Calculations

Project Plant Wansley	Prepared By Fred L. Cox, Jr.	Date 8/1/2010
Subject/Title Evaluate Stormwater capacity of Ash Pond	Reviewed By Courtenay O'Mara	Date 8/4/2010
	Calculation Number SH-WN10911-01	Sheet 6 of 10

Figure 2:



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Design Calculations

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	Calculation Number SH-WN10911-01	Sheet 7 of 10

Figure 3:

Table A-10
Peachtree City

		Return Period						
		1	2	5	10	25	50	100
	n	0.7669	0.8184	0.7769	0.7471	0.7191	0.7243	0.7107
	a	38.81	57.93	61.46	61.89	64.80	74.70	77.93
	b	8	11	12	12	12	13	13
Hours	Minutes	Rainfall Intensity						
0.08	5	5.43	5.99	6.80	7.45	8.45	9.21	9.99
	6	5.13	5.70	6.51	7.14	8.11	8.85	9.61
	7	4.86	5.44	6.24	6.86	7.80	8.53	9.27
	8	4.63	5.20	6.00	6.60	7.52	8.23	8.95
	9	4.42	4.99	5.77	6.36	7.26	7.96	8.66
	10	4.23	4.79	5.57	6.15	7.02	7.71	8.39
	11	4.06	4.62	5.38	5.95	6.80	7.48	8.14
	12	3.90	4.45	5.20	5.76	6.59	7.26	7.91
	13	3.76	4.30	5.04	5.59	6.40	7.05	7.69
	14	3.63	4.16	4.89	5.43	6.22	6.86	7.49
0.25	15	3.50	4.03	4.75	5.28	6.06	6.69	7.30
	16	3.39	3.90	4.62	5.13	5.90	6.52	7.12
	17	3.29	3.79	4.49	5.00	5.75	6.36	6.95
	18	3.19	3.68	4.38	4.88	5.61	6.21	6.79
	19	3.10	3.58	4.27	4.76	5.48	6.07	6.64
	20	3.01	3.49	4.16	4.65	5.36	5.94	6.49
	21	2.93	3.40	4.06	4.54	5.24	5.81	6.36
	22	2.86	3.31	3.97	4.44	5.13	5.69	6.23
	23	2.79	3.23	3.88	4.35	5.03	5.57	6.10
	24	2.72	3.16	3.80	4.25	4.92	5.46	5.99
	25	2.66	3.08	3.72	4.17	4.83	5.36	5.87
	26	2.60	3.02	3.64	4.09	4.74	5.26	5.77
	27	2.54	2.95	3.57	4.01	4.65	5.16	5.66
	28	2.49	2.89	3.50	3.93	4.57	5.07	5.57
	29	2.43	2.83	3.43	3.86	4.49	4.98	5.47
0.50	30	2.38	2.77	3.37	3.79	4.41	4.90	5.38
	31	2.34	2.72	3.31	3.73	4.33	4.82	5.29
	32	2.29	2.67	3.25	3.66	4.26	4.74	5.21
	33	2.25	2.62	3.19	3.60	4.19	4.67	5.13
	34	2.21	2.57	3.14	3.54	4.13	4.59	5.05
	35	2.17	2.52	3.09	3.49	4.07	4.52	4.98
	36	2.13	2.48	3.04	3.43	4.00	4.46	4.90
	37	2.09	2.44	2.99	3.38	3.95	4.39	4.83
	38	2.06	2.40	2.94	3.33	3.89	4.33	4.77
	39	2.03	2.36	2.90	3.28	3.83	4.27	4.70
	40	1.99	2.32	2.85	3.23	3.78	4.21	4.64
	41	1.96	2.28	2.81	3.19	3.73	4.15	4.58
	42	1.93	2.25	2.77	3.14	3.68	4.10	4.52
	43	1.90	2.21	2.73	3.10	3.63	4.05	4.46
	44	1.87	2.18	2.69	3.06	3.58	4.00	4.40
0.75	45	1.85	2.15	2.66	3.02	3.54	3.95	4.35
	46	1.82	2.12	2.62	2.98	3.49	3.90	4.30
	47	1.80	2.09	2.59	2.94	3.45	3.85	4.25
	48	1.77	2.06	2.55	2.90	3.41	3.80	4.20
	49	1.75	2.03	2.52	2.87	3.37	3.76	4.15
	50	1.72	2.00	2.49	2.83	3.33	3.72	4.10
	51	1.70	1.98	2.46	2.80	3.29	3.67	4.06
	52	1.68	1.95	2.43	2.77	3.26	3.63	4.01
	53	1.66	1.93	2.40	2.74	3.22	3.59	3.97
	54	1.64	1.90	2.37	2.71	3.18	3.55	3.93
	55	1.62	1.88	2.34	2.68	3.15	3.52	3.88
	56	1.60	1.86	2.32	2.65	3.12	3.48	3.84
	57	1.58	1.83	2.29	2.62	3.08	3.44	3.81
	58	1.56	1.81	2.27	2.59	3.05	3.41	3.77
	59	1.54	1.79	2.24	2.56	3.02	3.37	3.73
1	60	1.53	1.77	2.22	2.54	2.99	3.34	3.69
2	120	0.97	1.19	1.44	1.60	1.85	2.07	2.24
3	180	0.69	0.82	1.02	1.16	1.33	1.47	1.62
6	360	0.40	0.49	0.61	0.70	0.81	0.91	0.98
12	720	0.24	0.29	0.36	0.42	0.48	0.53	0.58
24	1440	0.14	0.17	0.21	0.24	0.28	0.30	0.33

Design Calculations

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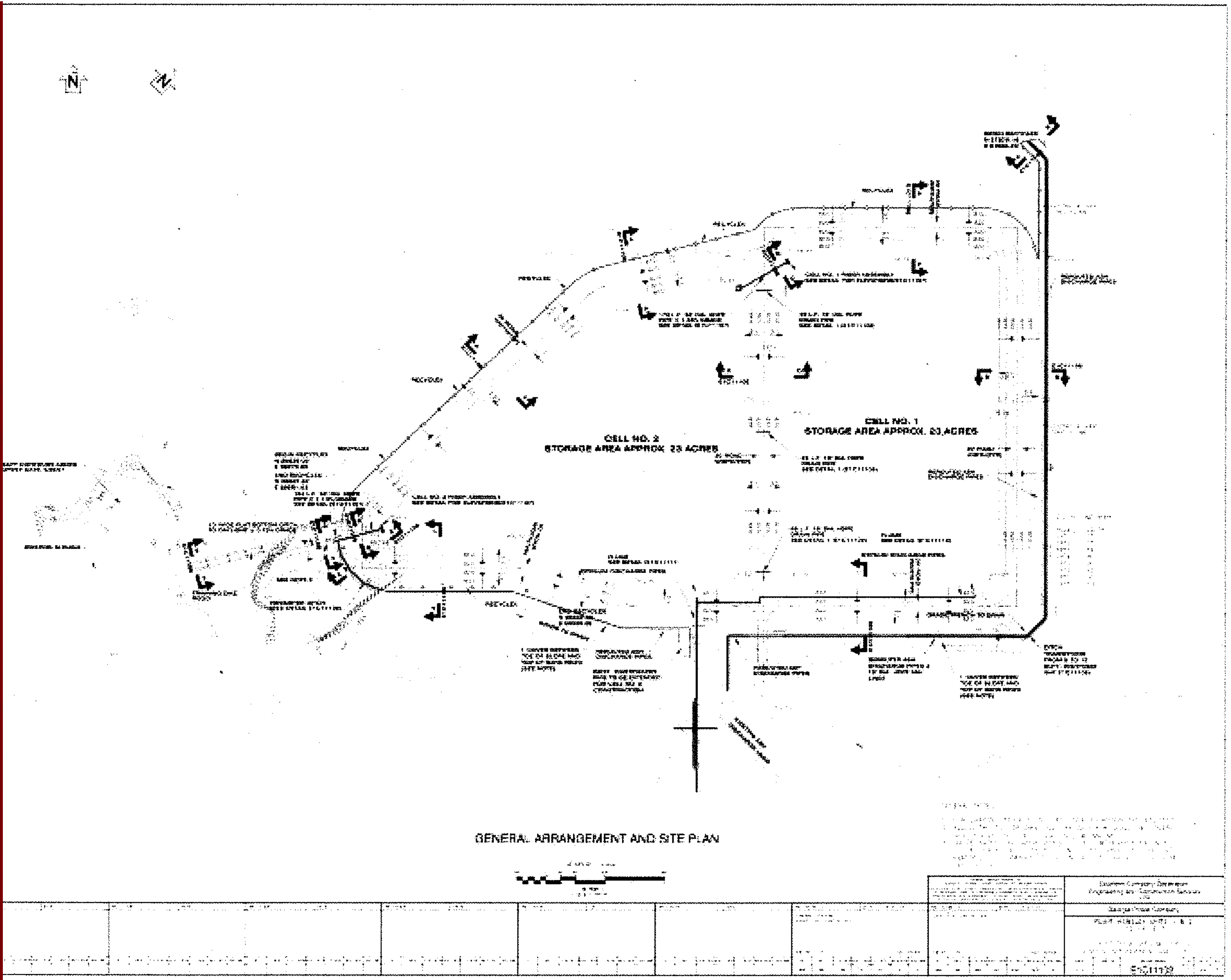
Project Plant Wansley	Prepared By Fred L. Cox, Jr.	Date 8/1/2010
Subject/Title Evaluate Stormwater capacity of Ash Pond	Reviewed By Courtenay O'Mara	Date 8/4/2010
	Calculation Number SH-WN10911-01	Sheet 8 of 10

Figure 4:



Design Calculations

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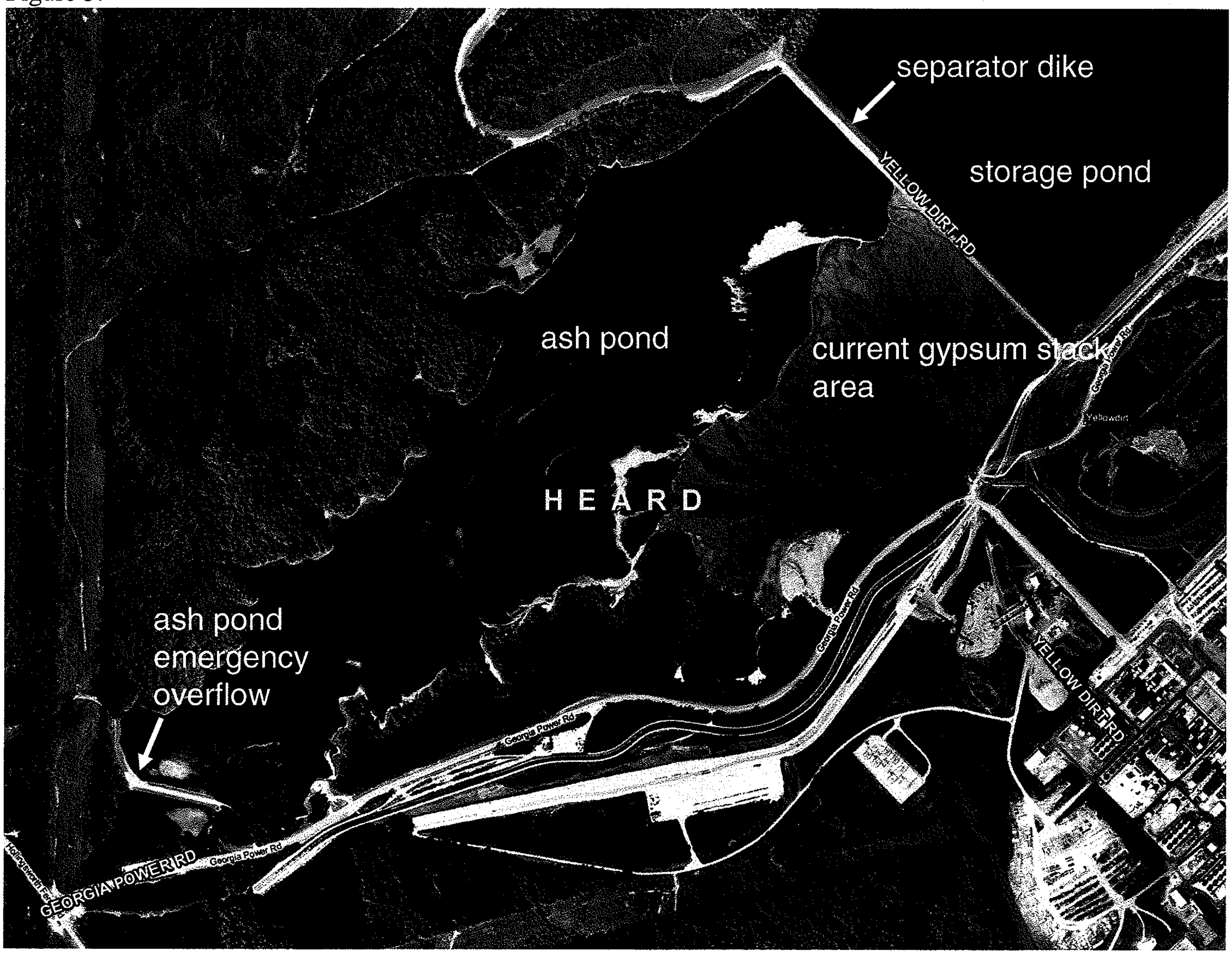
Subject/Title Evaluate Stormwater capacity of Ash Pond	Reviewed By Courtenay O'Mara	Date 8/4/2010
	Calculation Number SH-WN10911-01	Sheet 9 of 10

Figure 5:



Design Calculations

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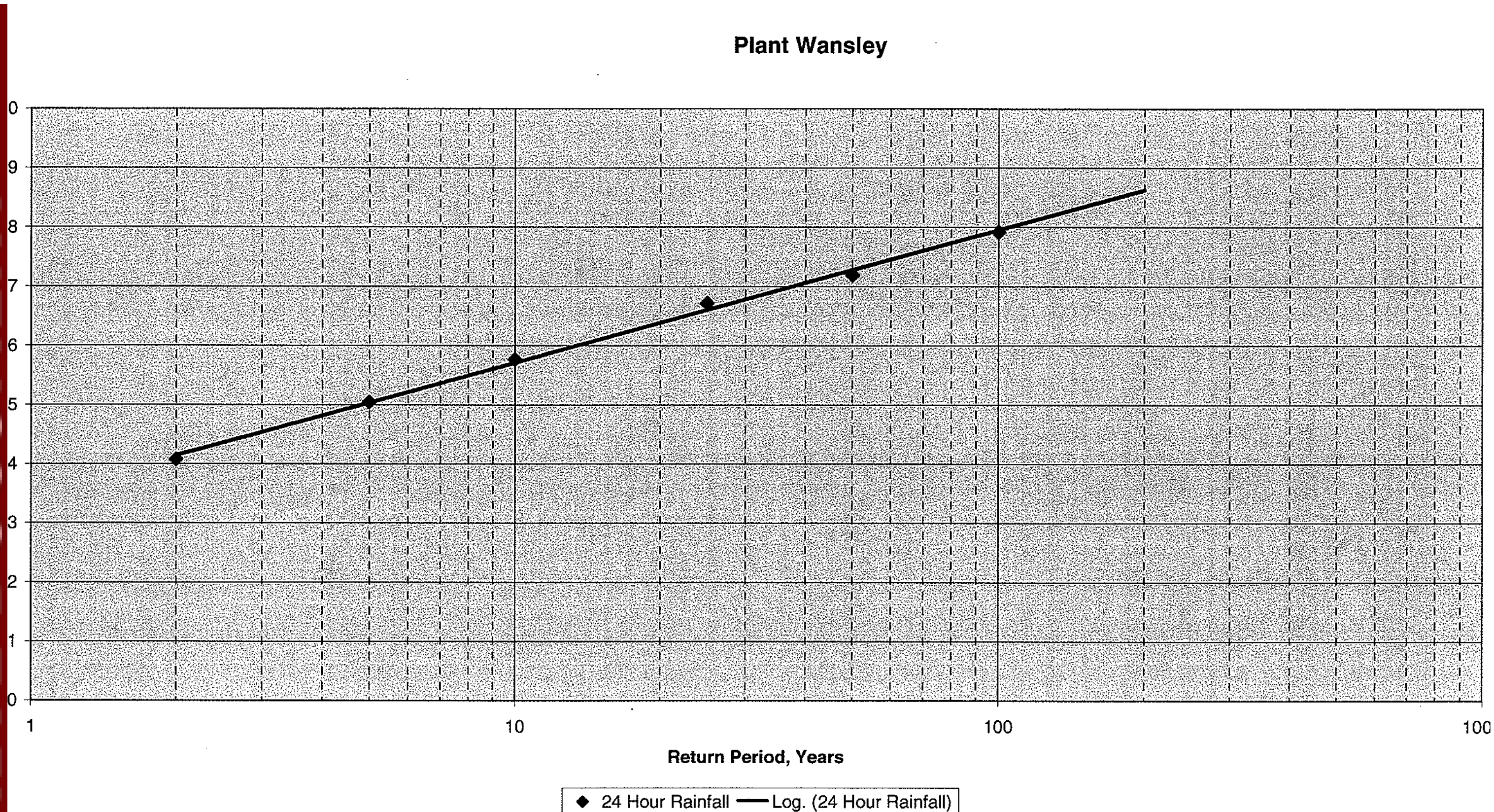
Figure 6:



Environmental Affairs
Bin 10221
241 Ralph McGill Boulevard NE
Atlanta, Georgia 30308-3374
Tel 404.506.7063

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CHARLOTTE, N.C.

GEORGIA POWER
A SOUTHERN COMPANY

DO NOT DISCLOSE

Confidential Business Information
Not Subject to Disclosure under the Freedom of Information Act

October 28, 2010

CERTIFIED MAIL

Mr. Fredrick Shmurak
Dewberry & Davis, Inc.
6135 Lakeview Road
Suite 150
Charlotte, NC 28269-2609

Re: Supplemental Production of Document Provided to EPA Contractor and Claims of Confidentiality

Dear Mr. Shmurak:

Enclosed is an updated Slope Stability Analyses for Georgia Power Plant Wansley West Dike (WAN-API 076). Georgia Power is providing this analysis under a claim of confidentiality for purposes of Part 2, Subpart B of EPA's regulations.

Sincerely

Tanya D. Blalock

Tanya D. Blalock

Enclosure

cc:
Charles H. Huling (letter only)
Stephen Hoffman, Environmental Protection Agency (letter only)

SOUTHERN COMPANY

Engineering and Construction Services Calculation

Calculation Number:
TV-WN-ECS3201-002

Project/Plant:	Unit(s):	Discipline/Area:
Plant Wansley Ash Pond	Units 1-2	ES&EE
Title/Subject: Slope Stability Analyses of the West Dike		
Purpose/Objective: Analyze slope stability of Ash Pond West Dike		
System or Equipment Tag Numbers:	**Originator:** Terri H. Hartsfield	

Contents

Revision Record

Rev. No.	Description	Originator Initial / Date	Reviewer Initial / Date	Approver Initial / Date
0	Issued for Information	THH/10-22-10	GHM/10-22-10	JCP/10-22-10

Notes:

WAN-API 076

Purpose of Calculation

Georgia Power Company's Plant Wansley has one pond, constructed in the early 1970s, divided by a separation dike. The eastern half of the pond is used as a storage water pond and the western half is used as an ash pond. Stability of the separation dike is addressed in a separate calculation. The purpose of this calculation is to check the stability of the West Dike of the ash pond using current software.

Methodology

The calculation was performed using the following methods and software:

GeoStudio 2007 (Version 7.16, Build 4840), Copyright 1991-2010, GEO-SLOPE International, Ltd.

The initial search method for minimum factors of safety (FOS) was the Grid and Radius Method. This method can provide a comprehensive search for the minimum FOS provided that the grid of centers and the radii limits are selected to include all probable entry and exits of the failure surface. Once the critical failure surface was identified by the Grid and Radius method, that surface was further optimized to allow for noncircular failure surfaces. Both Bishop analytical method and Morgenstern-Price analytical methods were run. Morgenstern-Price was reported.

Assumptions

The slope stability model was run using the following assumptions:

- The cross-section of the dike was obtained from the original design drawings.
- The dike was constructed to a crest elevation of El. 805 with 2.5(H):1(V) upstream and downstream slopes, and a maximum height of approximately 55 feet.
- According to the USGS earthquake acceleration probability maps for the vicinity of Plant Wansley, the ground motion having a 2% probability of exceedance in 50 years is 0.15 g. This is approximately equivalent to a 10% probability of exceedance in 250 years (USGS Earthquake Hazards Program website).
- The current required minimum criteria (factors of safety) were taken from US Corps of Engineers Manual EM 1110-2-1902, October 2003 and the Georgia Department of Natural Resources, Environmental Protection, Rules for Dam Safety, Rule 391-3-8-09 Standards for the Design and Evaluation of Dams.
- Normal pool in the ash pond is El. 795. Based on invert elevations of the drainage pipes, the tailwater elevation (downstream) is also El. 795. The maximum surcharge pool is El. 802.6 which corresponds to the crest elevation of the emergency spillway at the west dike. According to the Plant Wansley Ash Pond Storm Water Analysis prepared by SCG Hydro Services, the storage capacity of the ash pond from, conservatively, El. 799 to El. 802.6 is 1044 ac-ft, 2.22 times the storage necessary for the 100 year, 24 hour storm event. For this analysis, we assumed that rapid drawdown would occur from El 802.6 of the maximum surcharge pool to El. 795, the normal pool elevation.
- Properties for ash were based on laboratory testing performed on undisturbed and remolded samples of ash from various plants and on previous project experience.

- The soil properties of unit weight, phi angle, and cohesion were obtained from triaxial shear testing performed on UD samples of the dike fill material obtained during drilling in July 2010 and from parameters used during the 1973 stability analysis indicated on Drawings H12396 – H12398.
- Piezometers not installed in the west dike.
- Soil properties are as follows:

Soil Description	Moist Unit Weight (pcf)	Effective Stress Parameters		Total Stress Parameters	
		Cohesion (psf)	Phi Angle (degrees)	Cohesion (psf)	Phi Angle (degrees)
Embankment Fill	123	140	32	400	29
Foundation Soil	112	0	37	80	24
Sluiced Ash	80	0	10	0	10
Rock	130	0	40	0	40

Summary of Conclusions

The following table lists the factors of safety for various slope stability failure conditions. All conditions are steady state except where noted. Construction cases were not considered. Based on the results of these analyses all structures appear stable.

Failure Condition	Computed Factor of Safety	Required Minimum Factor of Safety
Downstream Steady State	2.0	1.5
Downstream Seismic	1.1	1.1
Upstream Steady State	2.0	1.5
Upstream Seismic	1.1	1.1
Downstream Maximum Surcharge	2.0	1.4[(1)]
Upstream Maximum Surcharge	1.9	1.4[(1)]
Upstream Rapid Drawdown (sub. toe)	1.9	1.3
Built Out Steady State Downstream	2.0	1.5
Built Out Seismic Downstream	1.1	1.1

Notes:

1 – Required minimum factors of safety based on Corps of Engineers Manual EM-1110-2-1902, October 2003

Design Inputs/References

Southern Company Calculation TV-WN-ECS3201-001, Slope Stability Analyses of Ash Pond Separation Dike

GPC Drawing H-12375, Plant Wansley Ash Pond Interceptor Channel Plan & Sections

GPC Drawing H-12363, Plant Wansley Ash Pond Discharge Structure General Arrangement

Body of Calculation

Calculation consists of Slope-W modeling attached.

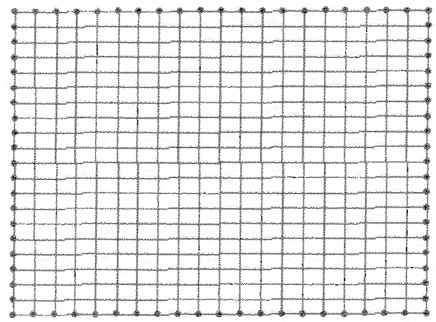
Attachments

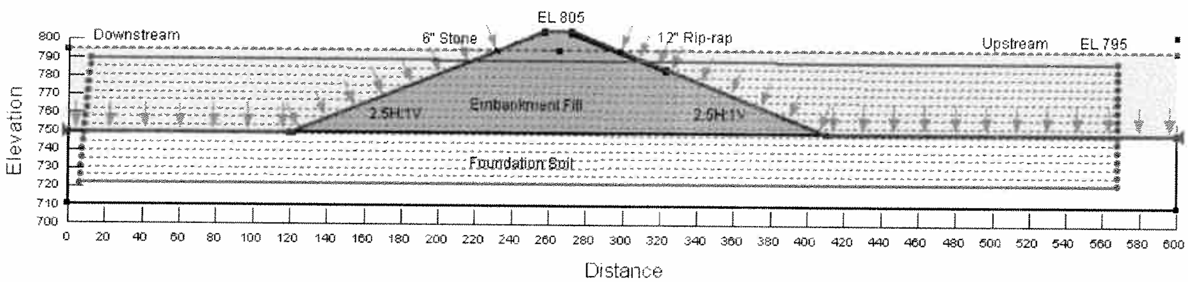
Plant Wansley
West Dike
Steady State - Upstream
Method: Morgenstern-Price
Optimize Critical Slip Surface Location: Yes

Name: Embankment Fill
Unit Weight: 123 pcf
Cohesion: 140 psf
Phi: 32 °

Name: Foundation Soil
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 37 °

Name: Gravel
Unit Weight: 130 pcf
Cohesion: 0 psf
Phi: 40 °



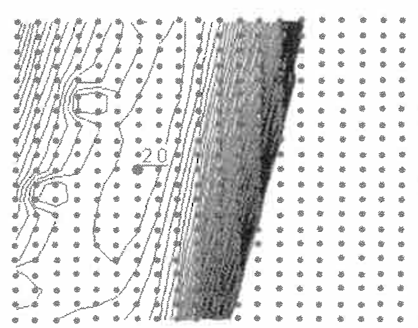


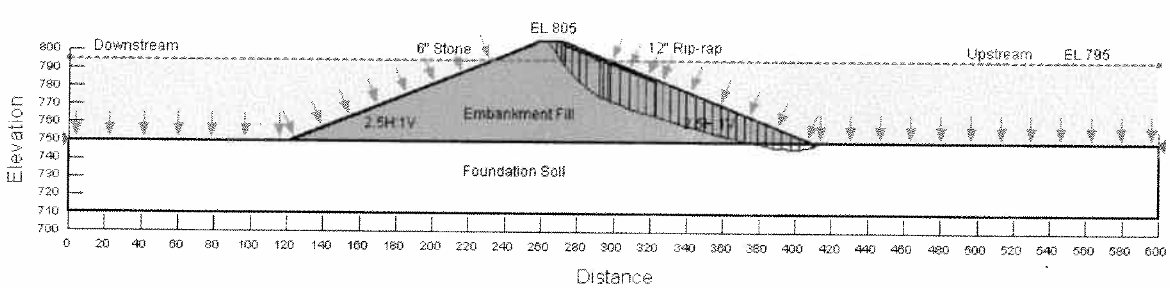
Plant Wansley
West Dike
Steady State - Upstream
Method: Morgenstern-Price
Optimize Critical Slip Surface Location: Yes

Name: Embankment Fill
Unit Weight: 123 pcf
Cohesion: 140 psf
Phi: 32 °

Name: Foundation Soil
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 37 °

Name: Gravel
Unit Weight: 130 pcf
Cohesion: 0 psf
Phi: 40 °





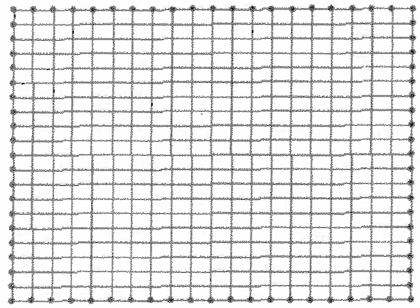
CONFIDENTIAL BUSINESS INFORMATION

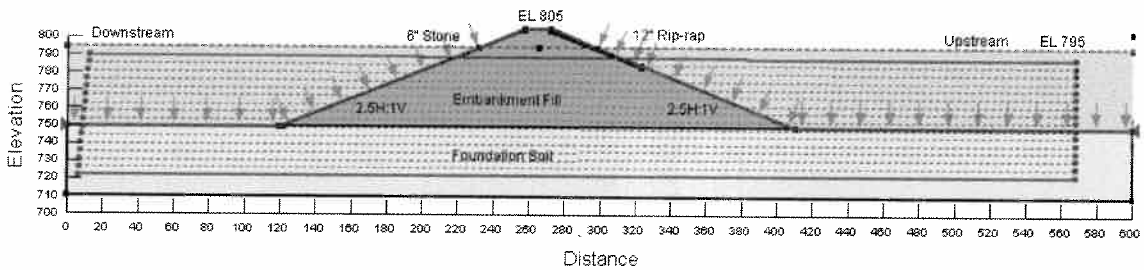
Plant Wansley
West Dike
Seismic - Upstream - 0.15g
Method: Morgenstern-Price
Optimize Critical Slip Surface Location: Yes

Name: Embankment Fill
Unit Weight: 123 pcf
Cohesion: 140 psf
Phi: 32 °

Name: Foundation Soil
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 37 °

Name: Gravel
Unit Weight: 130 pcf
Cohesion: 0 psf
Phi: 40 °



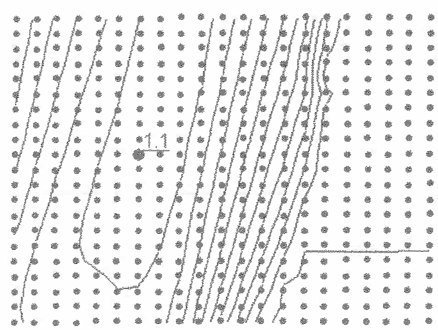


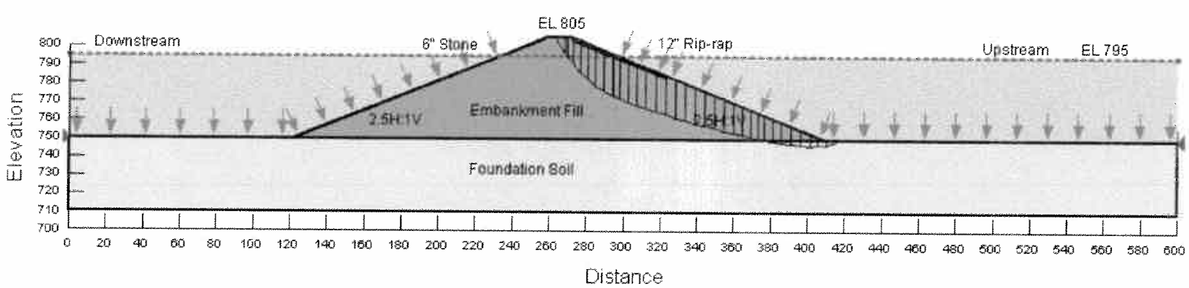
Plant Wansley
West Dike
Seismic - Upstream - 0.15g
Method: Morgenstern-Price
Optimize Critical Slip Surface Location: Yes

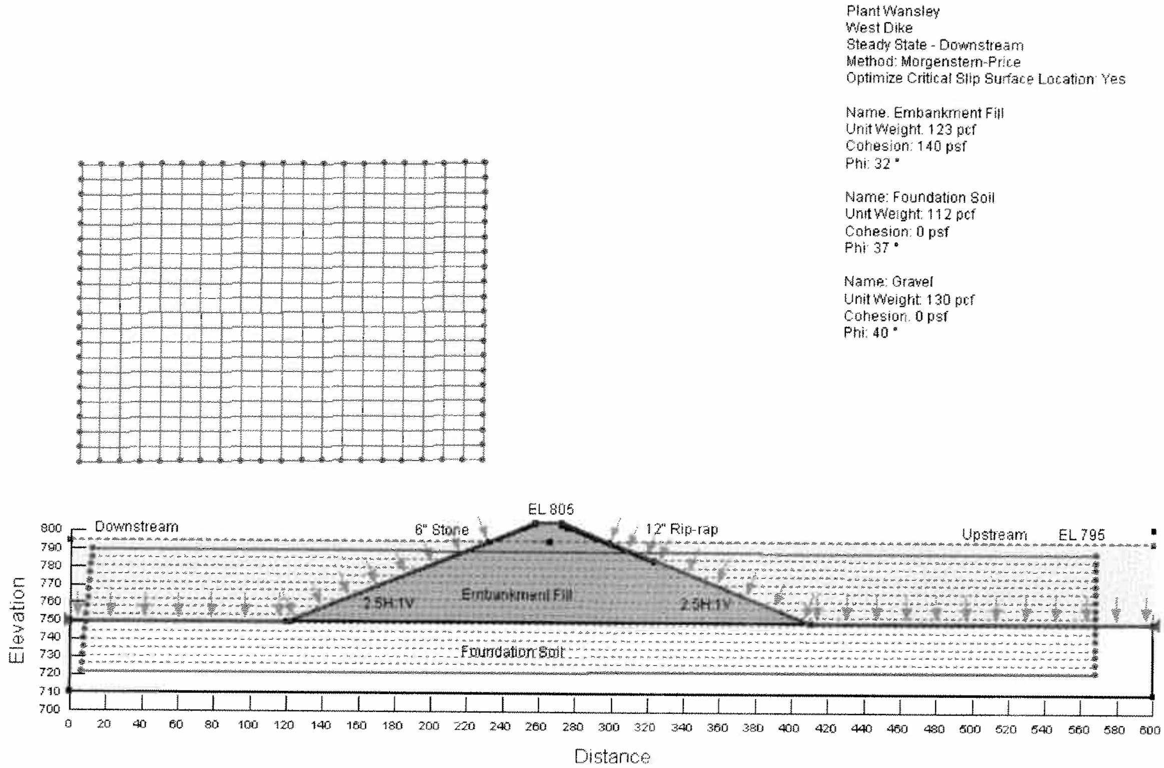
Name: Embankment Fill
Unit Weight: 123 pcf
Cohesion: 140 psf
Phi: 32 °

Name: Foundation Soil
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 37 °

Name: Gravel
Unit Weight: 130 pcf
Cohesion: 0 psf
Phi: 40 °





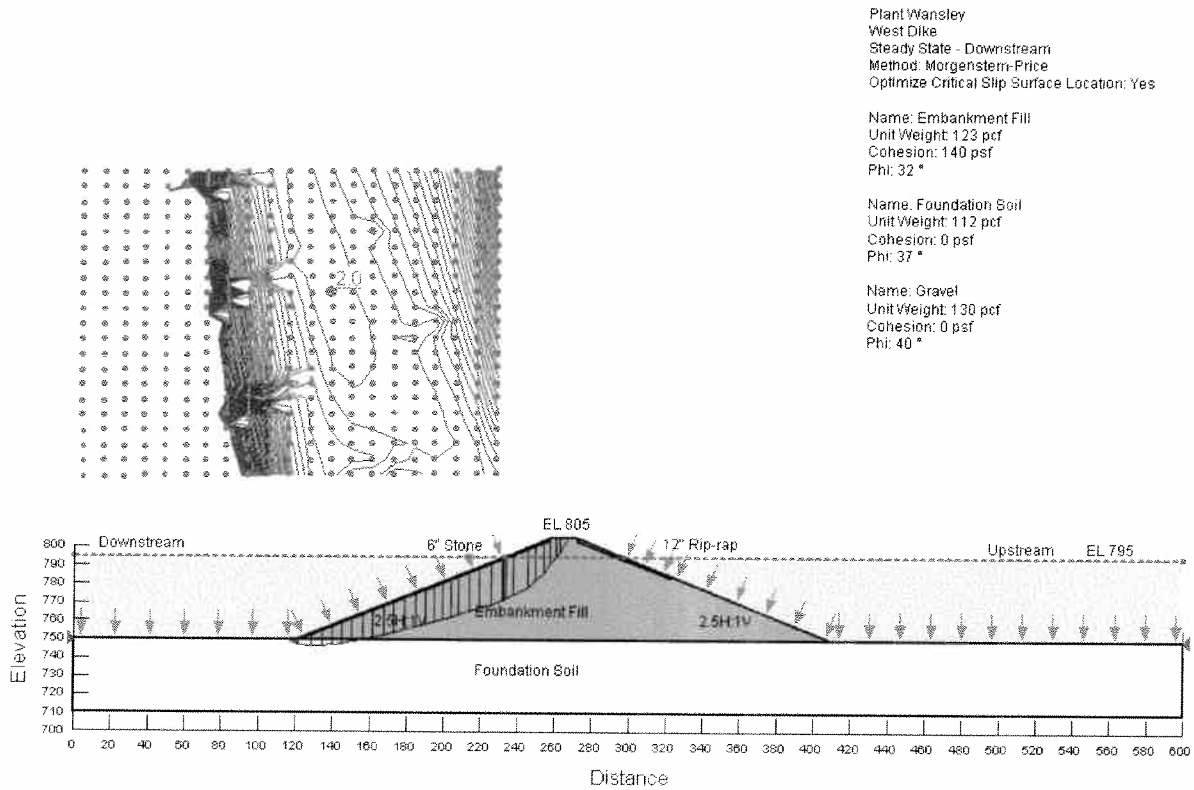

Plant Wansley
West Dike
Steady State - Downstream
Method: Morgenstern-Price
Optimize Critical Slip Surface Location: Yes

Name: Embankment Fill
Unit Weight: 123 pcf
Cohesion: 140 psf
Phi: 32 °

Name: Foundation Soil
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 37 °

Name: Gravel
Unit Weight: 130 pcf
Cohesion: 0 psf
Phi: 40 °

EL 805
Downstream
6" Stone
12" Rip-rap
Upstream
EL 795
2.5H:1V
Embankment Fill
2.5H:1V
Foundation Soil
Elevation
Distance

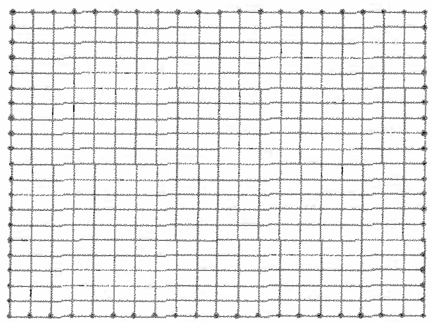

Plant Wansley
West Dike
Steady State - Downstream
Method: Morgenstern-Price
Optimize Critical Slip Surface Location: Yes

Name: Embankment Fill
Unit Weight: 123 pcf
Cohesion: 140 psf
Phi: 32 °

Name: Foundation Soil
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 37 °

Name: Gravel
Unit Weight: 130 pcf
Cohesion: 0 psf
Phi: 40 °

2.0
EL 805
Downstream
6" Stone
12" Rip-rap
Upstream
EL 795
Embankment Fill
2.5H:1V
Foundation Soil
Elevation
Distance

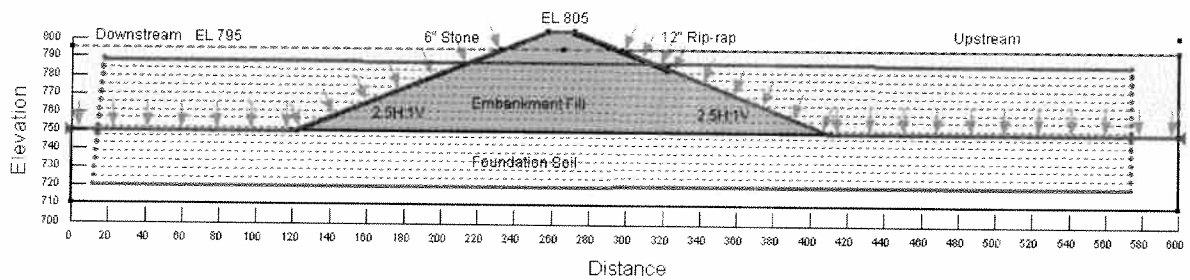


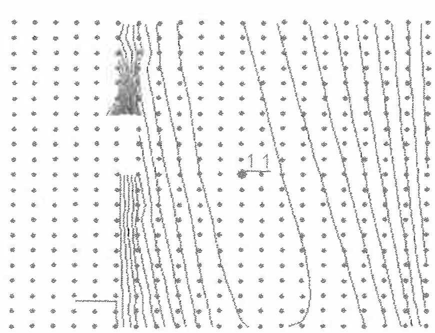
Plant Wansley
West Dike
Downstream Seismic
Seismic Load - 0.15g
Method: Morgenstern-Price
Optimize Critical Slip Surface Location: Yes

Name: Embankment Fill
Unit Weight: 123 pcf
Cohesion: 140 psf
Phi: 32 °

Name: Foundation Soil
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 37 °

Name: Gravel
Unit Weight: 130 pcf
Cohesion: 0 psf
Phi: 40 °





Plant Wansley
West Dike
Downstream Seismic
Seismic Load - 0.15g
Method: Morgenstern-Price
Optimize Critical Slip Surface Location: Yes

Name: Embankment Fill
Unit Weight: 123 pcf
Cohesion: 140 psf
Phi: 32 °

Name: Foundation Soil
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 37 °

Name: Gravel
Unit Weight: 130 pcf
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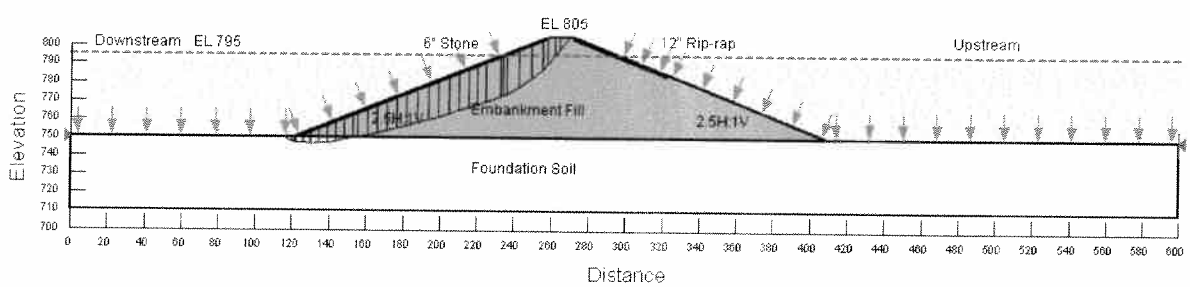
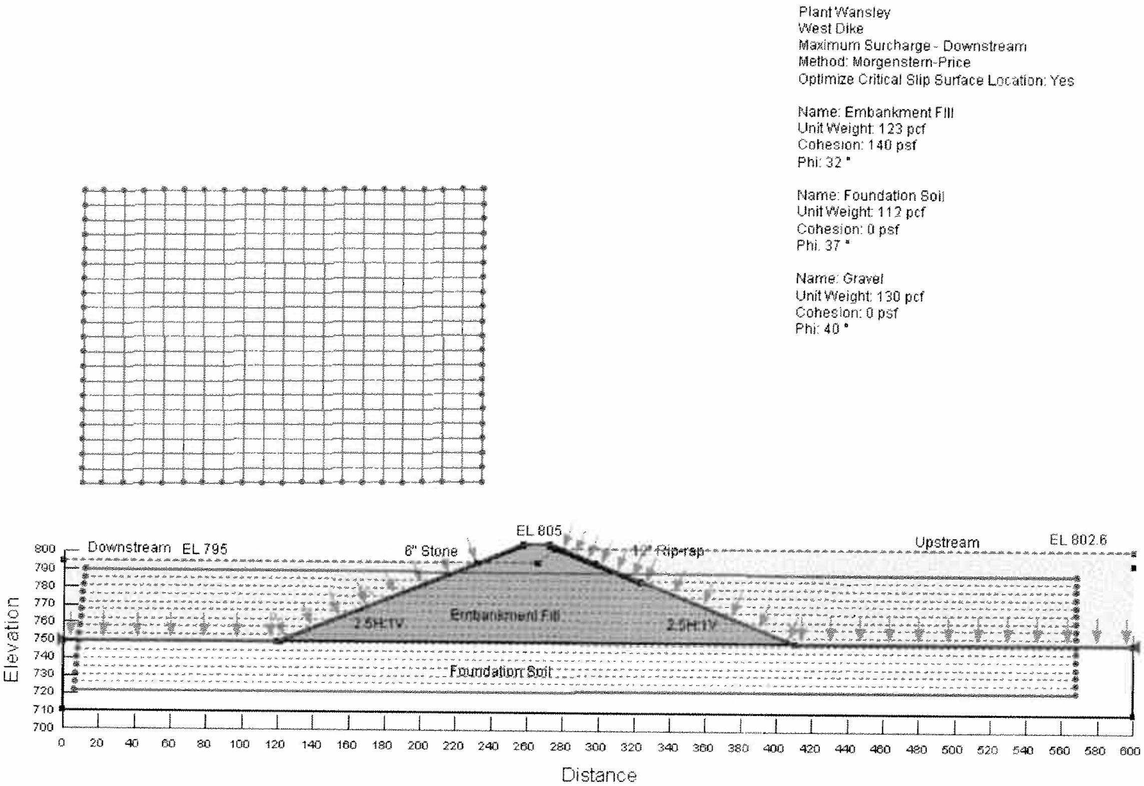
Phi: 40 °



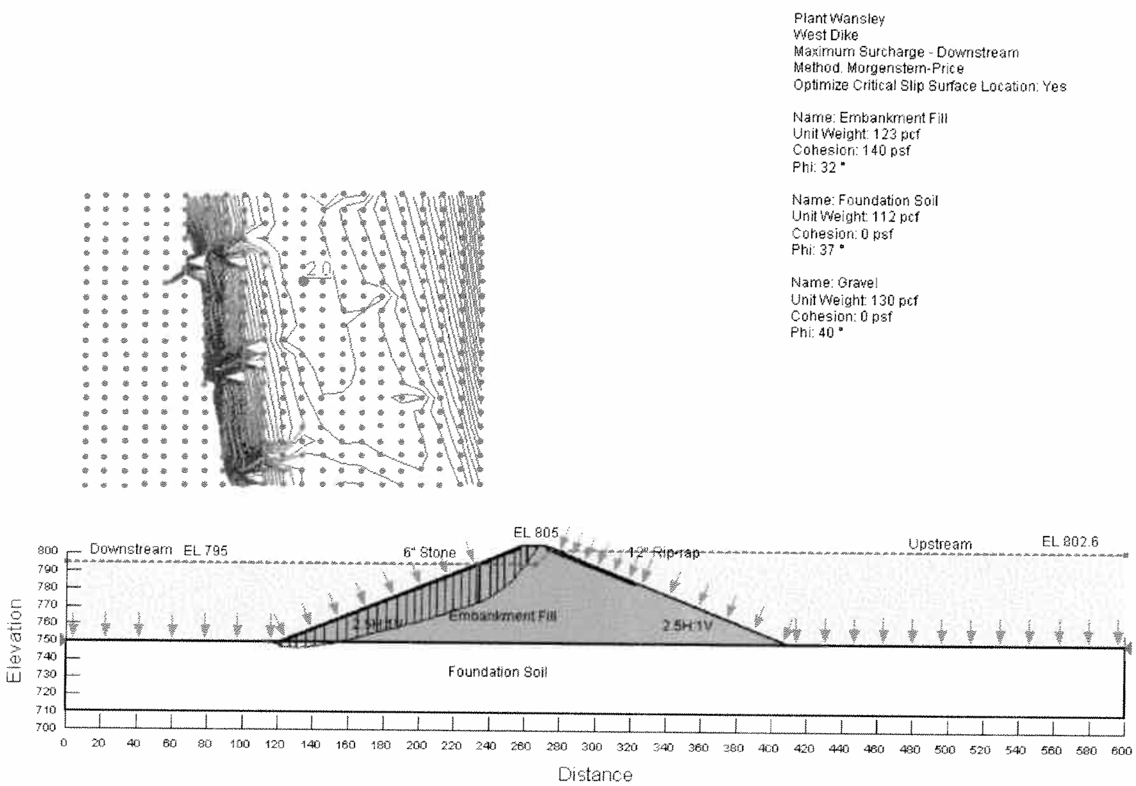

Plant Wansley
West Dike
Maximum Surcharge - Downstream
Method: Morgenstern-Price
Optimize Critical Slip Surface Location: Yes

Name: Embankment Fill
Unit Weight: 123 pcf
Cohesion: 140 psf
Phi: 32 °

Name: Foundation Soil
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 37 °

Name: Gravel
Unit Weight: 130 pcf
Cohesion: 0 psf
Phi: 40 °

Downstream EL 795
6" Stone
EL 805
12" Rip-rap
Upstream
EL 802.6
2.5H:1V
Embankment Fill
2.5H:1V
Foundation Soil
Elevation
Distance


Plant Wansley
West Dike
Maximum Surcharge - Downstream
Method: Morgenstern-Price
Optimize Critical Slip Surface Location: Yes

Name: Embankment Fill
Unit Weight: 123 pcf
Cohesion: 140 psf
Phi: 32 °

Name: Foundation Soil
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 37 °

Name: Gravel
Unit Weight: 130 pcf
Cohesion: 0 psf
Phi: 40 °

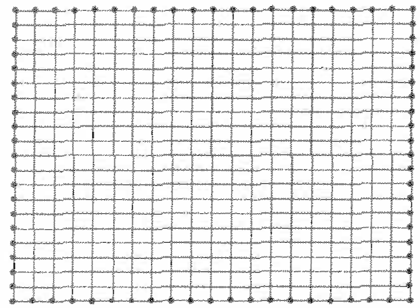
2.0
Downstream EL 795
6" Stone
EL 805
12" Rip-rap
Upstream
EL 802.6
Embankment Fill
2.5H:1V
Foundation Soil
Elevation
Distance

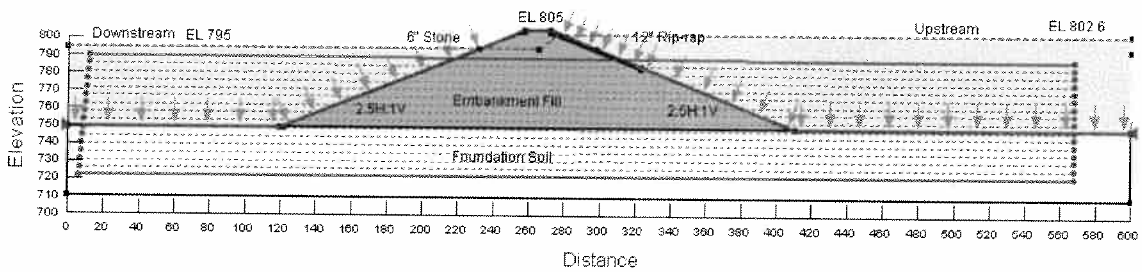
Plant Wansley
West Dike
Maximum Surcharge - Upstream
Method: Morgenstern-Price
Optimize Critical Slip Surface Location: Yes

Name: Embankment Fill
Unit Weight: 123 pcf
Cohesion: 140 psf
Phi: 32 °

Name: Foundation Soil
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 37 °

Name: Gravel
Unit Weight: 130 pcf
Cohesion: 0 psf
Phi: 40 °



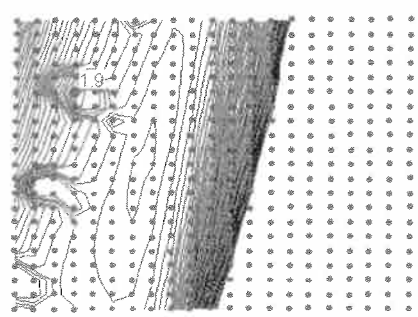


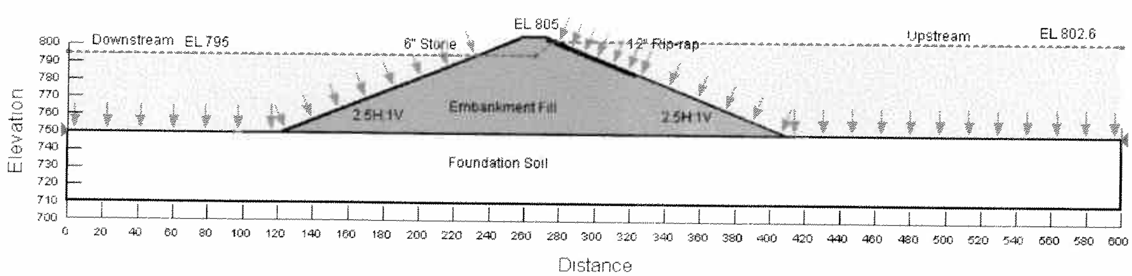
Plant Wansley
West Dike
Maximum Surcharge - Upstream
Method: Morgenstern-Price
Optimize Critical Slip Surface Location: Yes

Name: Embankment Fill
Unit Weight: 123 pcf
Cohesion: 140 psf
Phi: 32 °

Name: Foundation Soil
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 37 °

Name: Gravel
Unit Weight: 130 pcf
Cohesion: 0 psf
Phi: 40 °



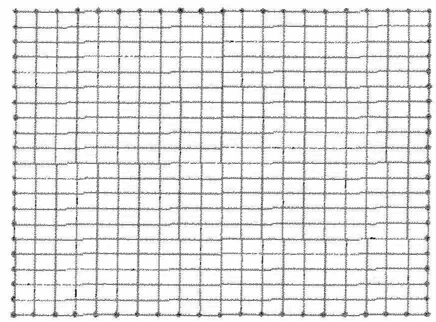


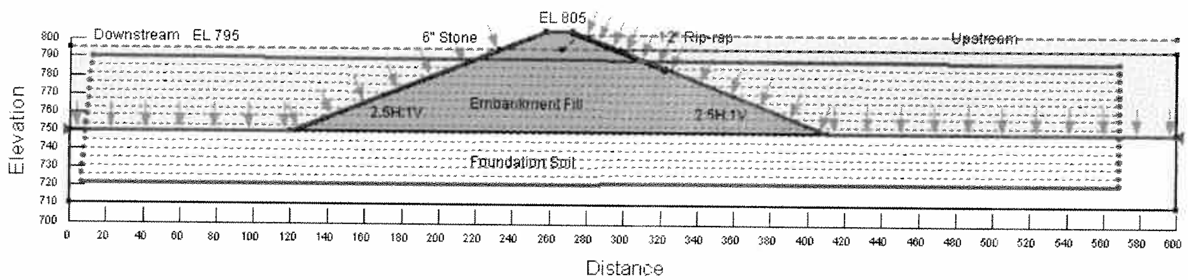
Plant Wansley
West Dike
Rapid Drawdown
Method: Morgenstern-Price
Optimize Critical Slip Surface Location: Yes

Name: Embankment Fill
Unit Weight: 123 pcf
Cohesion: 140 psf
Phi: 32 °

Name: Foundation Soil
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 37 °

Name: Gravel
Unit Weight: 130 pcf
Cohesion: 0 psf
Phi: 40 °



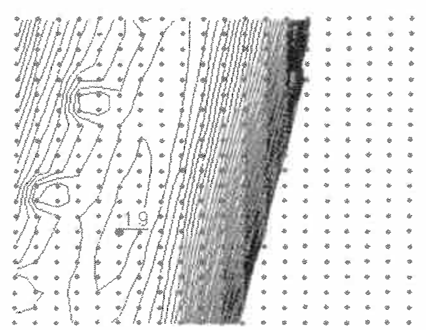


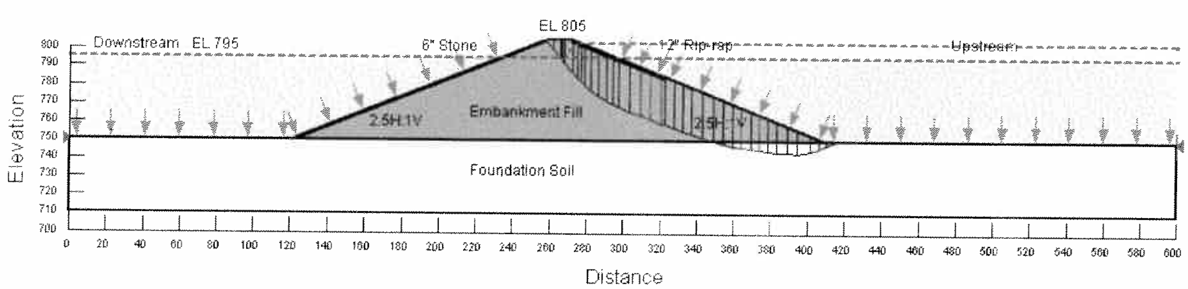
Plant Wansley
West Dike
Rapid Drawdown
Method: Morgenstern-Price
Optimize Critical Slip Surface Location: Yes

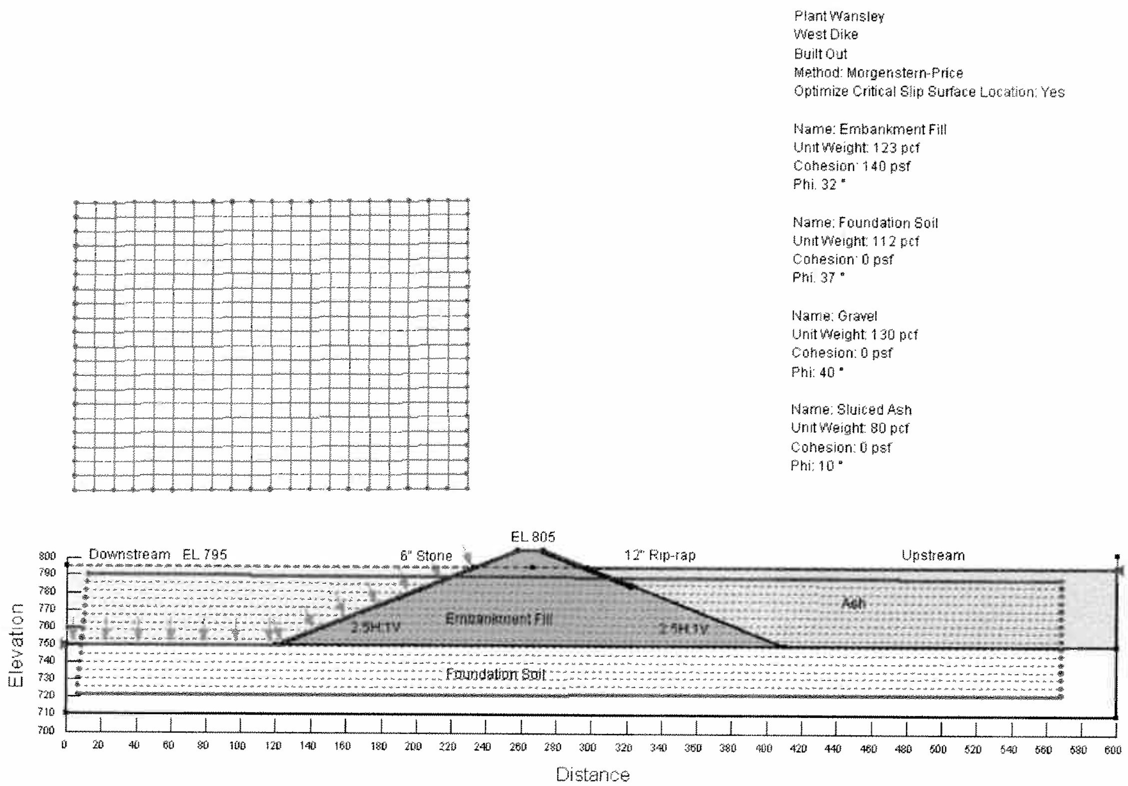
Name: Embankment Fill
Unit Weight: 123 pcf
Cohesion: 140 psf
Phi: 32 °

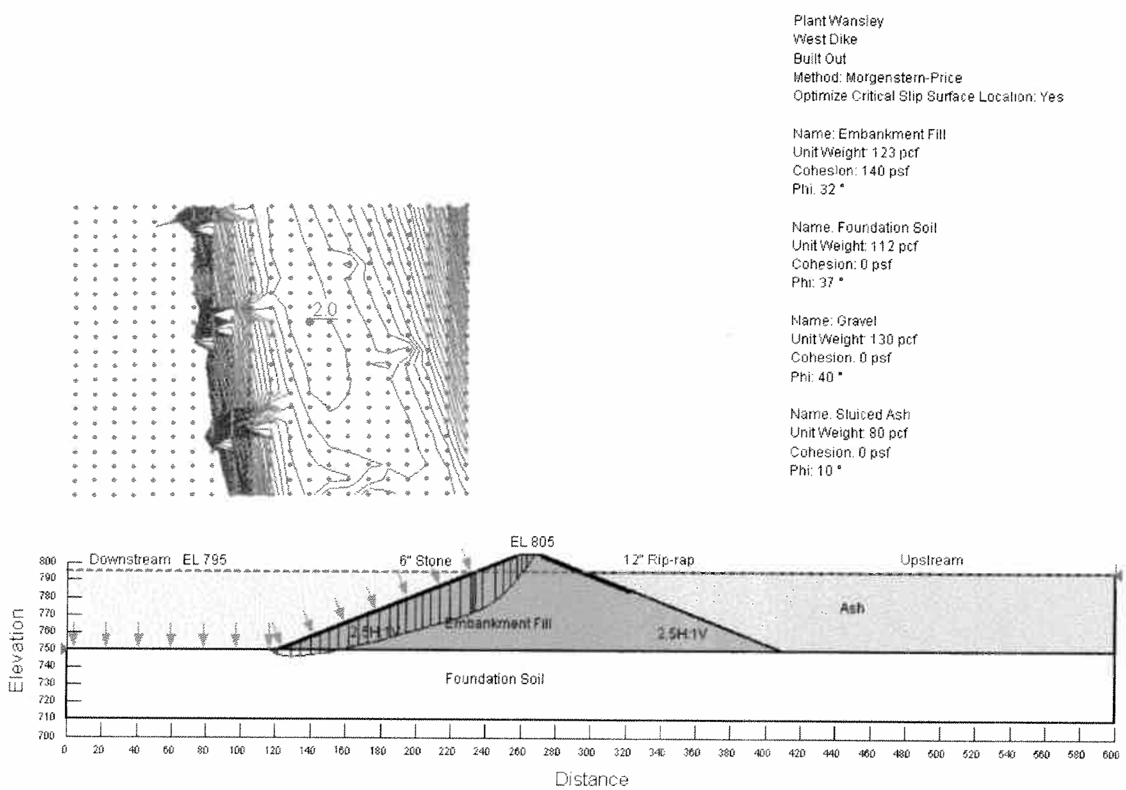
Name: Foundation Soil
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 37 °

Name: Gravel
Unit Weight: 130 pcf
Cohesion: 0 psf
Phi: 40 °

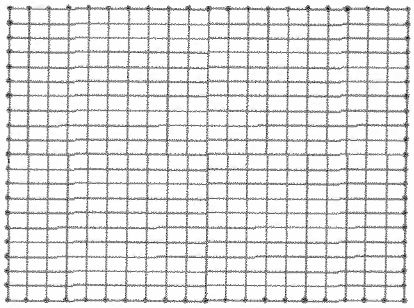





Plant Wansley
West Dike
Built Out
Method: Morgenstern-Price
Optimize Critical Slip Surface Location: Yes
Name: Embankment Fill
Unit Weight: 123 pcf
Cohesion: 140 psf
Phi: 32 °
Name: Foundation Soil
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 37 °
Name: Gravel
Unit Weight: 130 pcf
Cohesion: 0 psf
Phi: 40 °
Name: Sluiced Ash
Unit Weight: 80 pcf
Cohesion: 0 psf
Phi: 10 °
EL 805
Downstream EL 795
6" Stone
12" Rip-rap
Upstream
Ash
Embankment Fill
2.5H:1V
2.5H:1V
Foundation Soil
Elevation
Distance


Plant Wansley
West Dike
Built Out
Method: Morgenstern-Price
Optimize Critical Slip Surface Location: Yes
Name: Embankment Fill
Unit Weight: 123 pcf
Cohesion: 140 psf
Phi: 32 °
Name: Foundation Soil
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 37 °
Name: Gravel
Unit Weight: 130 pcf
Cohesion: 0 psf
Phi: 40 °
Name: Sluiced Ash
Unit Weight: 80 pcf
Cohesion: 0 psf
Phi: 10 °
2.0
EL 805
Downstream EL 795
6" Stone
12" Rip-rap
Upstream
Ash
Embankment Fill
2.5H:1V
2.5H:1V
Foundation Soil
Elevation
Distance

Plant Wansley
West Dike
Built Out
Seismic Load - 0.15g
Method: Morgenstern-Price
Optimize Critical Slip Surface Location: Yes

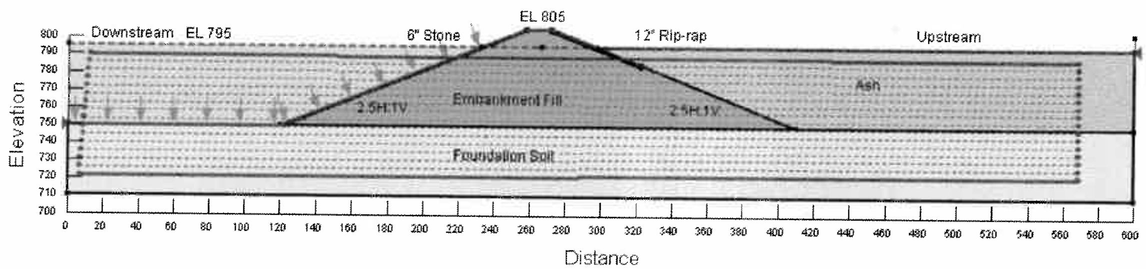


Name: Embankment Fill
Unit Weight: 123 pcf
Cohesion: 140 psf
Phi: 32 °

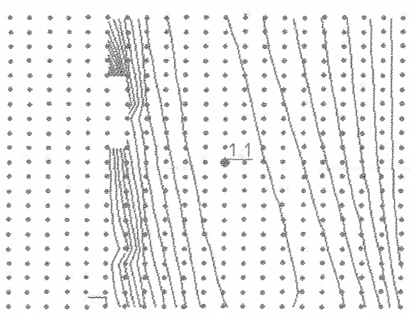
Name: Foundation Soil
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 37 °

Name: Gravel
Unit Weight: 130 pcf
Cohesion: 0 psf
Phi: 40 °

Name: Sluiced Ash
Unit Weight: 80 pcf
Cohesion: 0 psf
Phi: 10 °



Plant Wansley
West Dike
Built Out
Seismic Load - 0.15g
Method: Morgenstern-Price
Optimize Critical Slip Surface Location: Yes

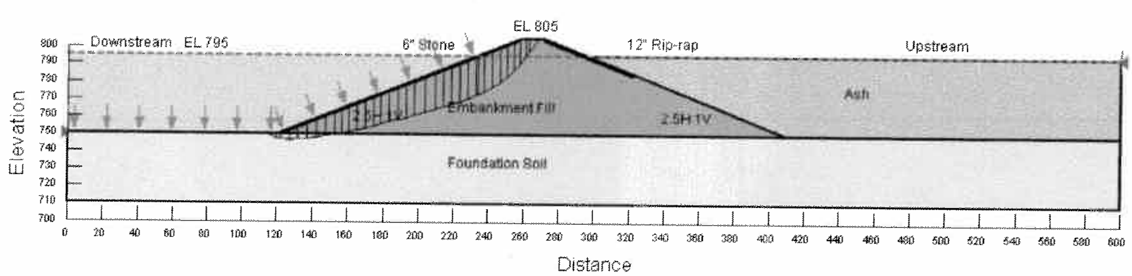


Name: Embankment Fill
Unit Weight: 123 pcf
Cohesion: 140 psf
Phi: 32 °

Name: Foundation Soil
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 37 °

Name: Gravel
Unit Weight: 130 pcf
Cohesion: 0 psf
Phi: 40 °

Name: Sluiced Ash
Unit Weight: 80 pcf
Cohesion: 0 psf
Phi: 10 °



Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name: Georgia Power - Wansley Date: 30 JUNE 2010
Unit Name: ASH Pond Operator's Name:
Unit I.D.: Hazard Potential Classification: High Significant Low
Inspector's Name: Frederic SHMURAK & JUSTIN STORY - Dewberry

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?	✓		18. Sloughing or bulging on slopes?		✓
2. Pool elevation (operator records)?	796.5		19. Major erosion or slope deterioration?		✓
3. Decant inlet elevation (operator records)?	800.29		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	802.57		Is water entering inlet, but not exiting outlet?		N/A
5. Lowest dam crest elevation (operator records)?	805.0		Is water exiting outlet, but not entering inlet?		N/A
6. If instrumentation is present, are readings recorded (operator records)?	✓ Monthly		Is water exiting outlet flowing clear?		N/A
7. Is the embankment currently under construction?		✓	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)?		N/A	From underdrain?		N/A
9. Trees growing on embankment? (If so, indicate largest diameter below)		✓	At isolated points on embankment slopes?		✓
10. Cracks or scarps on crest?		✓	At natural hillside in the embankment area?		✓
11. Is there significant settlement along the crest?		✓	Over widespread areas?		✓
12. Are decant trashracks clear and in place?		N/A	From downstream foundation area?		✓
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		✓	"Boils" beneath stream or ponded water?		✓
14. Clogged spillways, groin or diversion ditches?		✓	Around the outside of the decant pipe?		✓
15. Are spillway or ditch linings deteriorated?		✓	22. Surface movements in valley bottom or on hillside?		✓
16. Are outlets of decant or underdrains blocked?		✓	23. Water against downstream toe?	✓	
17. Cracks or scarps on slopes?		✓	24. Were Photos taken during the dam inspection?	✓	

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

Inspection Issue # Comments

1. Daily, Weekly, Quarterly, and Annual
2. N.P. WSE 795.0
15. Monitor U/S undermining potential & cracks along concrete channel (NOT A safety issue at this time)
20. No discharge from Pond (NONE observed Historically)
23. Cooling Water Pond & Storm Water Management Pond located along D/S toe of E & W dike respectively

EPA FORM -XXXX

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # GA0026778 INSPECTOR Dewberry
Date 30 JUN 2010

Impoundment Name Ash Pond
Impoundment Company Georgia Power
EPA Region IV
State Agency (Field Office) Addresss ________

Name of Impoundment Ash Pond
(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: CCW settling & storage

Nearest Downstream Town : Name Centralhatchee
Distance from the impoundment 3.6 miles SW (NOT DIRECTLY D/S)
Impoundment
Location: Longitude N 85 Degrees 02 Minutes 46 Seconds
Latitude W 33 Degrees 25 Minutes 09 Seconds
State GA County HEARD / Carrolton

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

If So Which State Agency? GA Safe Dams Program - category 2 dam

EPA Form XXXX-XXX, Jan 09

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.

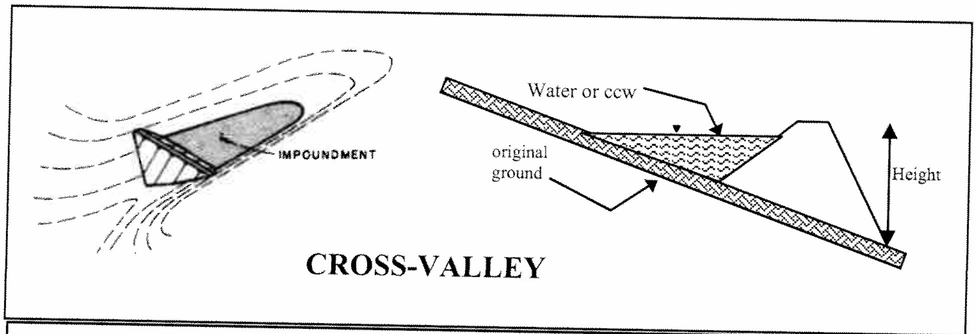
______ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns.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

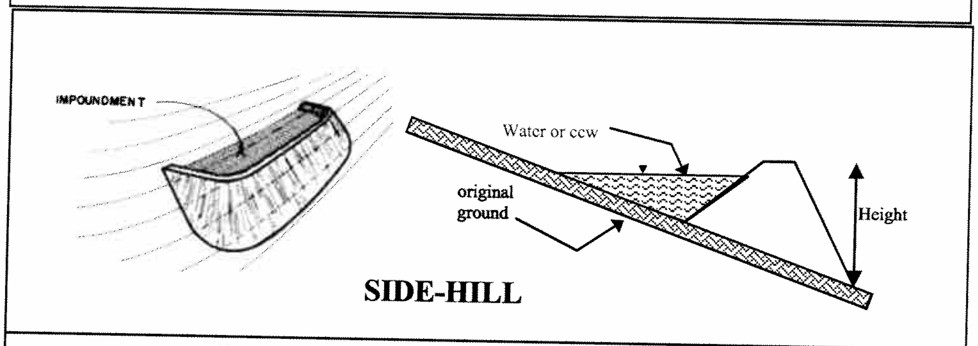
______ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

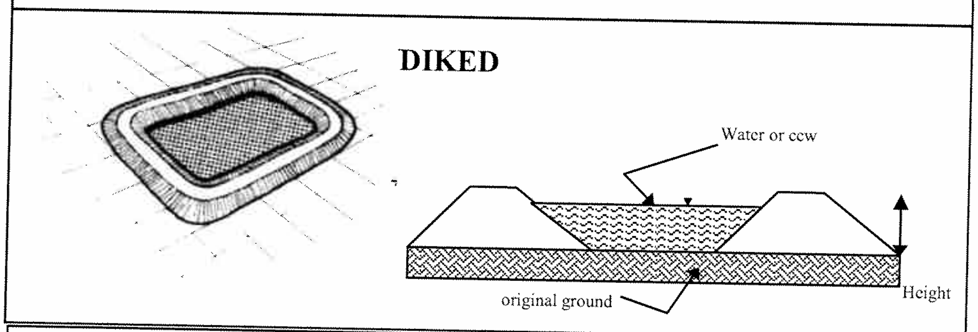
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

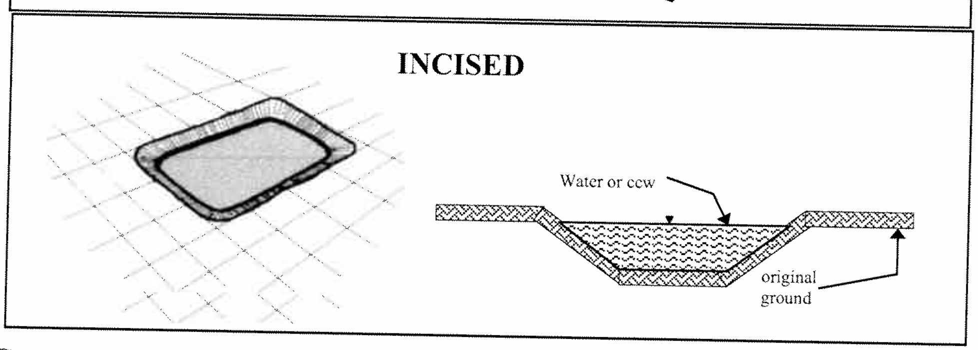
Georgia Safe Dams Program classified embankment system as Low Hazard Potential.

CONFIGURATION:









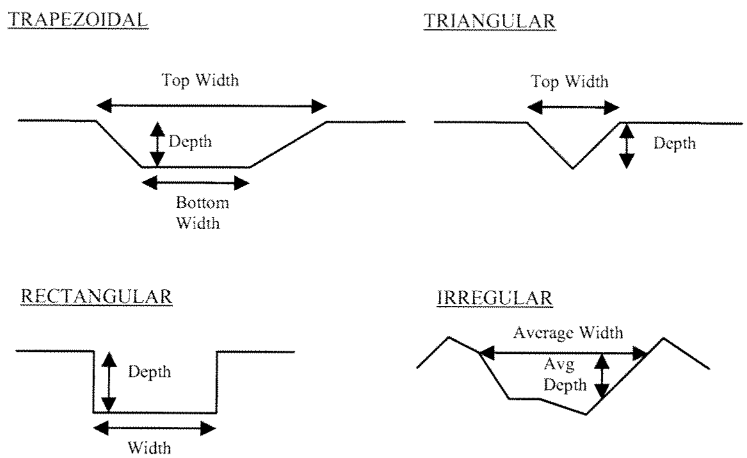
✓ Cross-Valley
_____ Side-Hill
_____ Diked
_____ Incised (form completion optional)
_____ Combination Incised/Diked

Embankment Height 110 feet Embankment Material Soil
Pool Area 343 acres Liner NONE
Current Freeboard 8.5 feet Liner Permeability N/A

TYPE OF OUTLET (Mark all that apply)

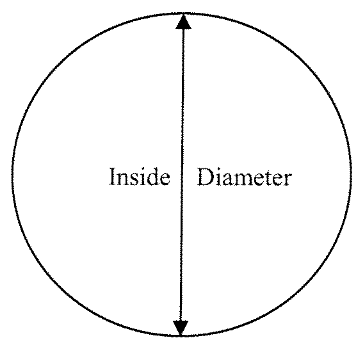
_____ **Open Channel Spillway**
__✓__ Trapezoidal   Emergency spillway
_____ Triangular
_____ Rectangular
_____ Irregular

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



_____ **Outlet**

_____ inside diameter



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

Is water flowing through the outlet? YES _______ NO _______

_____ **No Outlet**

__✓__ **Other Type of Outlet** (specify) BROAD CREST concrete weir and RCP CULVERT.
Primary spillway

The Impoundment was Designed By Southern company services

Has there ever been a failure at this site? YES ________ NO ✓

If So When? ________

If So Please Describe : ________

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

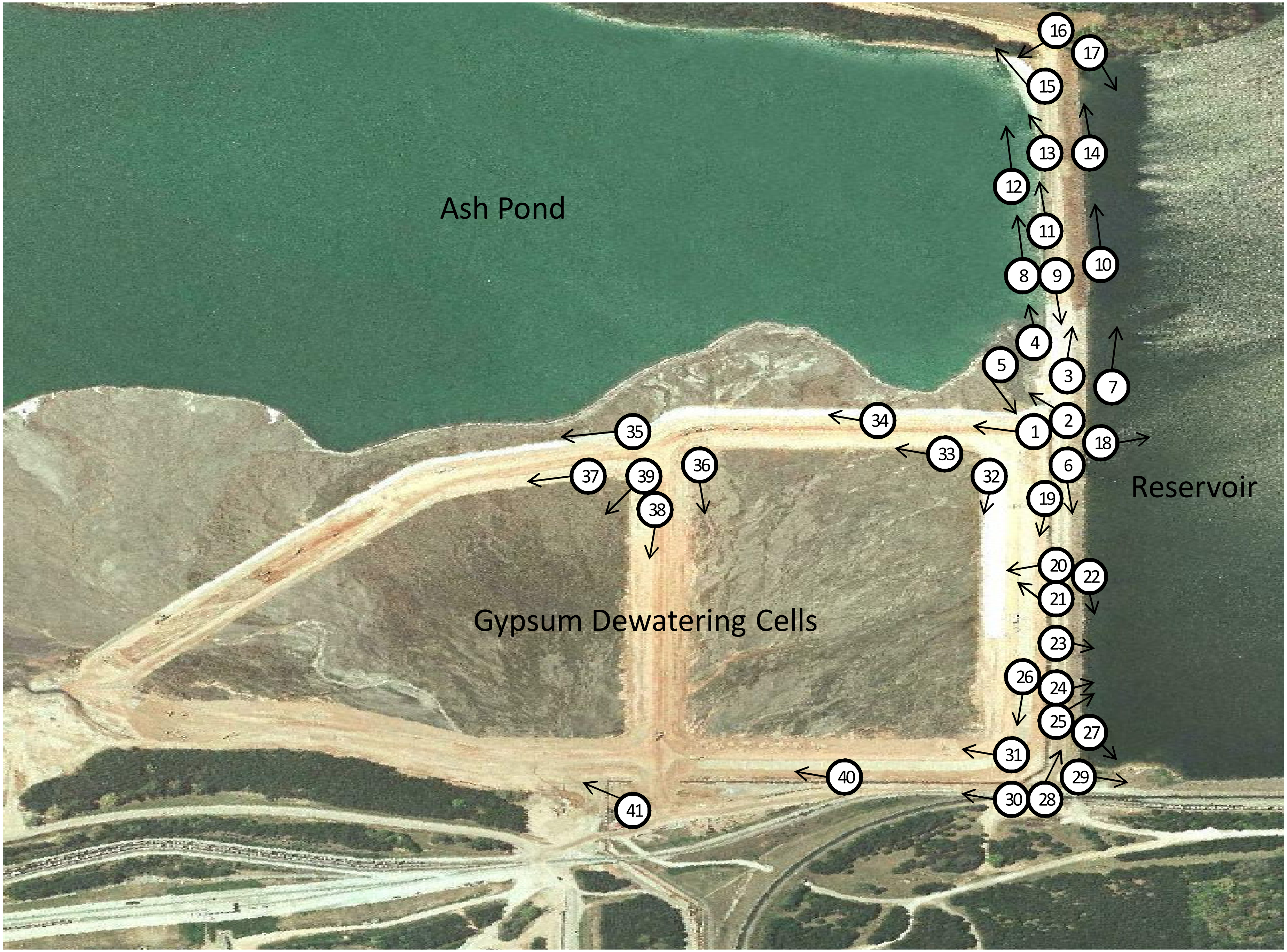
If So When? ____________________

IF So Please Describe: ____________________

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

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

If so Please Describe : ________



Ash Pond
Reservoir
Gypsum Dewatering Cells
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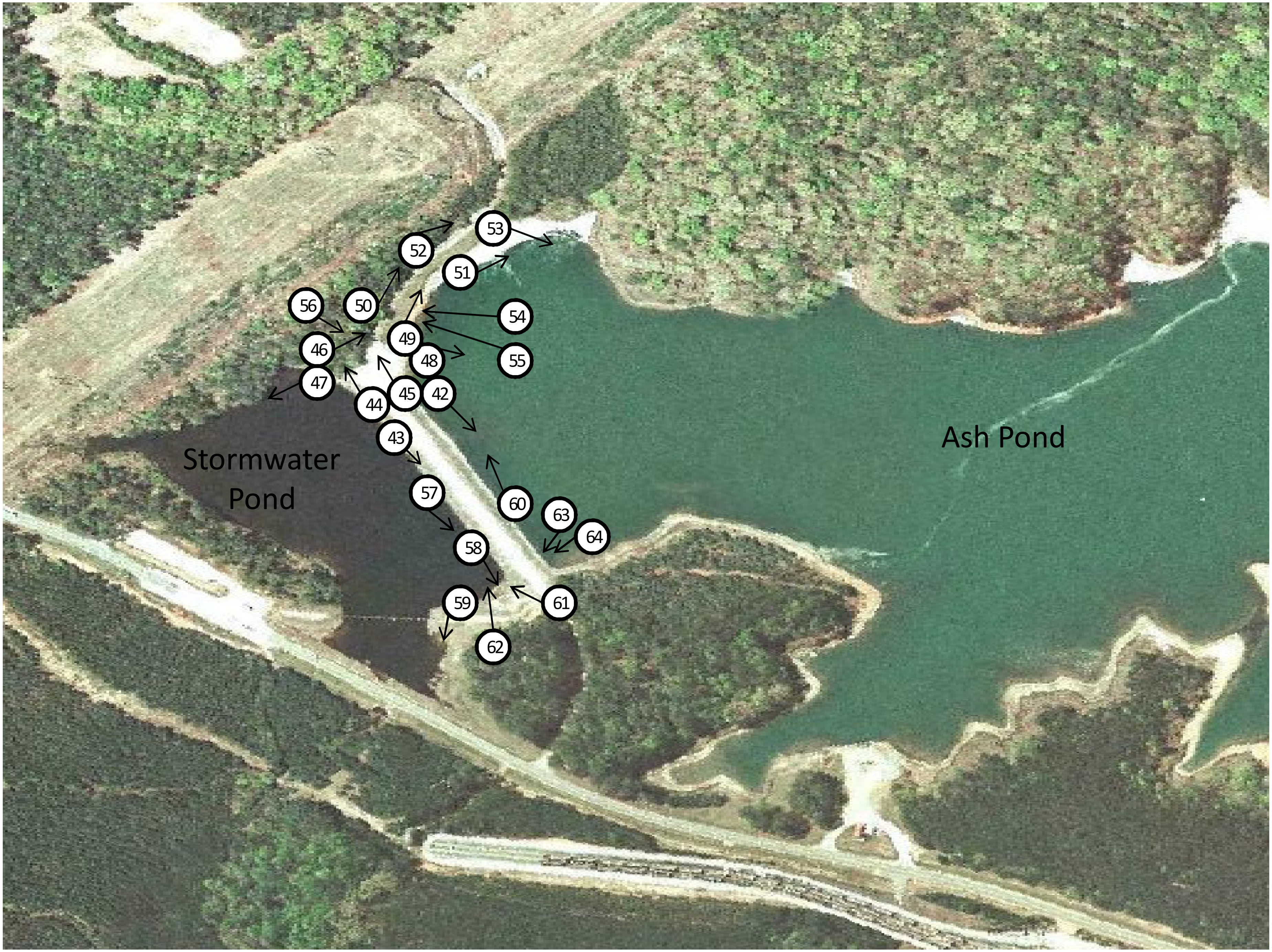
Stormwater
Pond
Ash Pond
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64

Photo 1: Upstream Slope adjacent to Gypsum Cells

Photo 2: Ash Pond inlet

Photo 3: Separation Dike Crest facing North

Photo 4: Close up where seeding occurred

Photo 5: Ash Pond Inlet

Photo 6: Separation Dike Crest downstream slope

Photo 7: Separation Dike downstream slope

Photo 8: Separation Dike upstream slope

Photo 9: Separation Dike upstream slope

Photo 10: Separation Dike downstream slope

Photo 11: Separation Dike upstream slope

Photo 12: Concrete ash piping support (not in use)

Photo 13: Separation Dike upstream slope

Photo 13B: Separation Dike upstream slope

Photo 14: Separation Dike downstream slope

Photo 15: Separation Dike left abutment upstream side

Photo 16: Separation Dike left abutment upstream side

Photo 17: Separation Dike left abutment downstream side

Photo 18: Erosion maintenance

Photo 19: Influent piping

Photo 20: Piezometer DD

Photo 21: Piezometer DD

Photo 22: Separation Dike downstream slope

Photo 23: Close up of downstream slope

Photo 24: Downstream slope erosion repair

Photo 25: Reservoir pond levels

Photo 26: Influent piping facing Gypsum Cells

Photo 27: Right abutment downstream slope

Photo 28: Separation Dike downstream slope

Photo 29: Right abutment facing reservoir

Photo 30: Influent piping

Photo 31: Piezometer BB

Photo 32: Gypsum Cell upstream slope

Photo 33: Gypsum Cell upstream slope

Photo 34: Gypsum Cell downstream slope facing Ash Pond

Photo 35: Gypsum Cell downstream slope facing Ash Pond

Photo 36: Gypsum Cell Discharge

Photo 37: Gypsum Cell upstream slope

Photo 38: Gypsum Cell upstream slope

Photo 39: Gypsum Cell upstream slope

Photo 40: Gypsum Cell downstream slope

Photo 41: Gypsum Cell downstream slope

Photo 42: Western Dike downstream slope

Photo 43: Western Dike downstream slope

Photo 44: Western Dike downstream slope

Photo 45: Western Dike overflow spillway

Photo 46: Stormwater channel

Photo 47: Stormwater channel discharge

Photo 48: Western Dike upstream slope

Photo 49: Western Dike upstream slope

Photo 50: Area adjacent to Western Dike

Photo 51: Area adjacent to Western Dike

Photo 52: Stormwater Channel

Photo 53: Western Dike upstream slope

Photo 54: Potential undermining at overflow

Photo 55: Potential undermining at overflow

Photo 56: Cracking along overflow channel

Photo 57: Western Dike downstream slope

Photo 58: Western Dike downstream slope

Photo 59: Stormwater Pond Dam

Photo 60: Stormwater pond

Photo 61: Western Dike outlet at Stormwater pond

Photo 62: Outlet at Stormwater pond

Photo 63: Western Dike outlet


Photo 64: Western Dike upstream slope and outlet