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Coal Combustion Residue Impoundment
Round 9 - Dam Assessment Report

Big Bend Power Station

Ash Management Units
Tampa Electric Company
Hillsborough County, Florida

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 CONCLUSIONS AND RECOMMENDATIONS

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

This assessment of the stability and functionality of the Big Bend Power Station Ash Management Units is based on a review of available documents and on the site assessment conducted by Dewberry personnel on March 1, 2011. We found the supporting technical documentation inadequate (Section 1.1.3). As detailed in Section 1.2, there are specific recommendations that may help to maintain a safe and trouble-free operation.

In summary, the Big Bend Power Station Ash Management Units are FAIR for continued safe and reliable operation due to lack of supporting technical documentation.

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

In early 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 residue. 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.

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EPA requested that utility companies identify all management units including surface impoundments or similar diked or bermed management units or management units designated as landfills that receive liquid-borne material used for the storage or disposal of residuals or by-products from the combustion of coal, including, but not limited to, fly ash, bottom ash, boiler slag, or flue gas emission control residuals. Utility companies provided information on the size, design, age and the amount of material placed in the units (See Appendix C).

The purpose of this report is **to evaluate the condition and potential of residue release from management units for hazard potential classification**. This evaluation included a site visit. Prior to conducting the site visit, a two-person team reviewed the information submitted to EPA, reviewed any relevant publicly available information from state or federal agencies regarding the unit hazard potential classification (if any) and accepted information provided via telephone communication with the management unit owner. Also, after the field visit, additional information was received by Dewberry & Davis LLC about the Big Bend management unit that were reviewed and used in preparation of this report.

This report presents the opinion of the assessment team as to the potential of catastrophic failure and reports on the condition of the management unit(s).

Note: The terms "embankment", "berm", "dike" and "dam" are used interchangeably within this report, as are the terms "pond", "basin", and "impoundment".

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 residue 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.

FINAL

Table of Contents

Page

INTRODUCTION, SUMMARY CONCLUSIONS AND RECOMMENDATIONS II

PURPOSE AND SCOPE II

1.0 CONCLUSIONS AND RECOMMENDATIONS 1-1

1.1 CONCLUSIONS 1-1

1.1.1 Conclusions Regarding the Structural Soundness of the Management Unit(s) 1-1

1.1.2 Conclusions Regarding the Hydrologic/Hydraulic Safety of the Management Unit(s) 1-2

1.1.3 Conclusions Regarding the Adequacy of Supporting Technical Documentation 1-2

1.1.4 Conclusions Regarding the Description of the Management Unit(s) 1-2

1.1.5 Conclusions Regarding the Field Observations 1-2

1.1.6 Conclusions Regarding the Adequacy of Maintenance and Methods of Operation 1-3

1.1.7 Conclusions Regarding the Adequacy of the Surveillance and Monitoring Program 1-3

1.1.8 Classification Regarding Suitability for Continued Safe and Reliable Operation 1-3

1.2 RECOMMENDATIONS 1-3

1.2.1 Recommendations Regarding the Structural Stability 1-4

1.2.2 Recommendations Regarding the Hydrologic/Hydraulic Safety 1-4

1.2.3 Recommendations Regarding the Field Observations 1-4

1.2.4 Recommendations Regarding the Maintenance and Methods of Operation 1-4

1.2.5 Recommendations Regarding the Surveillance and Monitoring Program 1-5

1.2.6 Recommendations Regarding Continued Safe and Reliable Operation 1-5

1.3 PARTICIPANTS AND ACKNOWLEDGEMENT 1-5

1.3.1 List of Participants 1-5

1.3.2 Acknowledgement and Signature 1-5

2.0 DESCRIPTION OF THE COAL COMBUSTION RESIDUE MANAGEMENT UNIT(S) 2-1

2.1 LOCATION AND GENERAL DESCRIPTION 2-1

2.2 COAL COMBUSTION RESIDUE HANDLING 2-2

2.2.1 Fly Ash 2-3

2.2.2 Bottom Ash 2-3

2.2.3 Boiler Slag 2-3

2.2.4 Flue Gas Desulfurization Sludge 2-4

2.3 SIZE AND HAZARD CLASSIFICATION 2-4

2.4 AMOUNT AND TYPE OF RESIDUALS CURRENTLY CONTAINED IN THE UNIT(S) AND MAXIMUM CAPACITY 2-5

2.5 PRINCIPAL PROJECT STRUCTURES 2-6

2.5.1 Earth Embankment 2-6

2.5.2 Outlet Structures 2-6

2.6 CRITICAL INFRASTRUCTURE WITHIN FIVE MILES DOWN GRADIENT 2-6

3.0 SUMMARY OF RELEVANT REPORTS, PERMITS, AND INCIDENTS 3-1

3.1 SUMMARY OF LOCAL, STATE, AND FEDERAL ENVIRONMENTAL PERMITS 3-1

3.2 SUMMARY OF SPILL/RELEASE INCIDENTS 3-1

FINAL

4.0 SUMMARY OF HISTORY OF CONSTRUCTION AND OPERATION 4-1

4.1 SUMMARY OF CONSTRUCTION HISTORY 4-1
4.1.1 Original Construction 4-1
4.1.2 Significant Changes/Modifications in Design since Original Construction 4-1
4.1.3 Significant Repairs/Rehabilitation since Original Construction 4-1
4.2 SUMMARY OF OPERATIONAL PROCEDURES 4-1
4.2.1 Original Operational Procedures 4-1
4.2.2 Significant Changes in Operational Procedures and Original Startup 4-1
4.2.3 Current Operational Procedures 4-2
4.2.4 Other Notable Events since Original Startup 4-2

5.0 FIELD OBSERVATIONS 5-1

5.1 PROJECT OVERVIEW AND SIGNIFICANT FINDINGS 5-1
5.2 NORTH BOTTOM ASH POND 5-1
5.2.1 Crest 5-1
5.2.2 Upstream/Inside Slope 5-2
5.2.3 Downstream/Outside Slope and Toe 5-2
5.2.4 Abutments and Groin Areas 5-3
5.3 SOUTH BOTTOM ASH POND 5-3
5.3.1 Crest 5-3
5.3.2 Upstream/Inside Slope 5-3
5.3.3 Downstream/Outside Slope and Toe 5-4
5.4 NORTH ECONOMIZER ASH POND 5-5
5.4.1 Crest 5-5
5.4.2 Upstream/Inside Slope 5-5
5.4.3 Outside Slope and Toe 5-6
5.5 SOUTH ECONOMIZER ASH POND 5-7
5.5.1 Crest 5-7
5.5.2 Upstream/Inside Slope 5-7
5.5.3 Downstream/Outside Slope and Toe 5-8
5.6 OUTLET STRUCTURES 5-9
5.6.1 Overflow Structure 5-9
5.6.2 Outlet Conduit 5-9
5.6.3 Emergency Spillway 5-9
5.6.4 Low Level Outlet 5-9

6.0 HYDROLOGIC/HYDRAULIC SAFETY 6-1

6.1 SUPPORTING TECHNICAL DOCUMENTATION 6-1
6.1.1 Flood of Record 6-1
6.1.2 Inflow Design Flood 6-1
6.1.3 Spillway Rating 6-1
6.1.4 Downstream Flood Analysis 6-2
6.2 ADEQUACY OF SUPPORTING TECHNICAL DOCUMENTATION 6-2
6.3 ASSESSMENT OF HYDROLOGIC/HYDRAULIC SAFETY 6-2

FINAL

7.0 STRUCTURAL STABILITY 7-1

7.1 SUPPORTING TECHNICAL DOCUMENTATION 7-1

7.1.1 Stability Analyses and Load Cases Analyzed 7-1

7.1.2 Design Parameters and Dam Materials 7-1

7.1.3 Uplift and/or Phreatic Surface Assumptions 7-1

7.1.4 Factors of Safety and Base Stresses 7-1

7.1.5 Liquefaction Potential 7-1

7.1.6 Critical Geological Conditions 7-2

7.2 ADEQUACY OF SUPPORTING TECHNICAL DOCUMENTATION 7-2

7.3 ASSESSMENT OF STRUCTURAL STABILITY 7-2

8.0 ADEQUACY OF MAINTENANCE AND METHODS OF OPERATION 8-1

8.1 OPERATING PROCEDURES 8-1

8.2 MAINTENANCE OF THE DAM AND PROJECT FACILITIES 8-1

8.3 ASSESSMENT OF MAINTENANCE AND METHODS OF OPERATIONS 8-1

8.3.1 Adequacy of Operating Procedures 8-1

8.3.2 Adequacy of Maintenance 8-1

9.0 ADEQUACY OF SURVEILLANCE AND MONITORING PROGRAM 9-1

9.1 SURVEILLANCE PROCEDURES 9-1

9.2 INSTRUMENTATION MONITORING 9-1

9.3 ASSESSMENT OF SURVEILLANCE AND MONITORING PROGRAM 9-1

9.3.1 Adequacy of Inspection Program 9-1

9.3.2 Adequacy of Instrumentation Monitoring Program 9-1

APPENDIX A

Doc 01: Ash Pond ICR Information
Doc 02: Big Bend Site Certification
Doc 03: Dike Stability Calculations
Doc 04: Ash Pond Level Summary
Doc 05: Ash Pond Drawings
Doc 06: TECO Site Layout

APPENDIX B

Doc 07: EPA Checklist TECO Big Bend N Bottom Ash
Doc 08: EPA Checklist TECO Big Bend N Economizer Ash
Doc 09: EPA Checklist TECO Big Bend S Bottom Ash
Doc 10: EPA Checklist TECO Big Bend S Economizer Ash

FINAL

1.0 CONCLUSIONS AND RECOMMENDATIONS

1.1 CONCLUSIONS

Conclusions are based on visual observations from a one-day site visit, March 1, 2011 and review of technical documentation provided by Tampa Electric Company (TECO). It should be noted that there were four (4) ponds observed as part of this assessment. There were 4 additional ponds identified in TECO's survey response (Long Term Fly Ash Pond, Settling Pond, North and South Recycling Ponds) that were not included in these analyses. The Long Term Fly Ash Pond was identified as a future pond site not currently receiving coal combustion residuals. The other 3 ponds are for process water recycling and not used for coal combustion residue (CCR) management. TECO did state that there may be some carryover of de minimus amounts of solids in these units by virtue of the fact that they receive contact runoff from process areas, but they do not receive sluiced coal combustion residuals. Two (2) of the assessed ponds receive bottom ash which is a fully recycled product at this facility. These were included in the assessment because, until the periodic recovery operation is underway (when they are drained and excavated), they function as impoundments for water and ash. The other two (2) assessed ponds receive economizer ash which is not recycled. These ponds are permanent disposal sites for the ash. One (1) of these ponds is currently inactive and undergoing closure activities. All sluice water is part of a closed loop recycle system at this facility. Sluice water is pumped to and from the ponds and used in the plant as process water.

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

The dike embankments appear to be structurally sound based on Dewberry engineers' observations during the site visit. However, a review of the engineering data provided by the owner's technical staff is inadequate and critical information was not provided. Dewberry notes that the plant is in a non-seismic zone, rated for 0 ground acceleration, therefore only static (normal) loading analyses are necessary.

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

No hydrologic or hydraulic analyses were provided to Dewberry. TEC has contracted with an engineering firm to perform hydraulic analyses of the ponds. TEC will make the results available to USEPA upon completion of the studies.

1.1.3 Conclusions Regarding the Adequacy of Supporting Technical Documentation

The supporting technical documentation is inadequate. Engineering documentation reviewed is referenced in Appendix A. The following documents were not provided:

- Hydrologic/Hydraulic Analysis
- Slope Stability analysis for static (normal) loading conditions using actual data instead of design parameters for the dike
- Surveillance, monitoring and inspection reports

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

The description of the management unit provided by the owner was an accurate representation of what Dewberry observed in the field.

1.1.5 Conclusions Regarding the Field Observations

Dewberry staff was provided access to all areas in the vicinity of the management unit required to conduct a thorough filed observation. The visible parts of the embankment dikes were observed to have no signs of overstress, significant settlement, shear failure, or other signs of instability. Embankments appear structurally sound. There are no apparent indications of unsafe conditions.

There was a minor tear in the South Economizer Ash Pond liner that needs to be repaired (this pond is inactive and closure procedures are underway). TEC indicated its liner repair and installation contractor will perform this repair in the near future.

1.1.6 Conclusions Regarding the Adequacy of Maintenance and Methods of Operation

The current maintenance and methods of operation appear to be adequate for the ash management units. There was no evidence of significant embankment repairs or prior releases observed during the field inspection.

1.1.7 Conclusions Regarding the Adequacy of the Surveillance and Monitoring Program

The surveillance program appeared to be inadequate. The management unit dikes are not instrumented. There is no established surveillance program other than staff visually observing the units daily. No documentation of past inspections or standard inspection procedures were provided. However, TEC informed USEPA that it is implementing a formal dam safety program for the Big Bend impoundments that is in conformance with the Florida Department of Environmental Protection Rule Chapter 62-672, F.A.C. in 2012. This program will include daily visual inspections and documentation of dam conditions.

1.1.8 Classification Regarding Suitability for Continued Safe and Reliable Operation

The S. Bottom Ash Pond, N. Bottom Ash Pond, N. Economizer Ash Pond, and S. Economizer Ash Pond are rated FAIR for continued safe and reliable operation due to the lack of supporting technical documentation. Based on the visual observation of the ash ponds they appeared to be in satisfactory condition, but without the documentation requested in section 1.2.3 below, there is no way of making an accurate assessment of the unit.

1.2 RECOMMENDATIONS

Dewberry has made a number of recommendations for this facility. During the completion of this report we received updated information from the owner's representative stating that for the recommended maintenance and repairs 'a work order has been initiated by the plant and the repair will be completed by mid-December 2011' and further for the recommended studies 'this will be performed in the 1st quarter of 2012'.

1.2.1 Recommendations Regarding the Structural Stability

The following issues need to be addressed with routine maintenance:

- Remediate the two minor depressions along the crest of the South Bottom Ash Pond;
- Repair the shear failure of the liner within the South Economizer Ash Pond.

1.2.2 Recommendations Regarding the Hydrologic/Hydraulic Safety

Hydrologic/Hydraulic analysis should be provided.

1.2.3 Recommendations Regarding the Supporting Technical Documentation

Supporting technical documentation is insufficient. The following documents need to be provided:

- Hydrologic/Hydraulic analyses (We understand the analyses are being performed).
- Slope stability analyses for steady state (normal) conditions for current (as-built) conditions of the embankments
- Documented inspection procedures

1.2.3 Recommendations Regarding the Field Observations

The following recommendations have been made based on the field observations:

- Repair the shear failure in the liner of the South Economizer Ash Pond.
- Maintain and prevent further expansion of woody vegetation onto the downstream slope of South Bottom Ash Pond;
- Remediate two minor depressions in South Bottom Ash Pond crest.

1.2.4 Recommendations Regarding the Maintenance and Methods of Operation

Where woody brush has established on the downstream slope of the South Bottom Ash Pond, maintain and prevent further expansion onto the slope. Repair liner on South Economizer Ash Pond.

1.2.5 Recommendations Regarding the Surveillance and Monitoring Program

Field observations should be recorded and documented at least on a monthly to quarterly basis. An annual observation should be performed and documented by a Professional Engineer licensed in the State of Florida. TECO commented that a new surveillance and monitoring program will be implemented in 2012 that addresses the above recommendations.

1.2.6 Recommendations Regarding Continued Safe and Reliable Operation

TEC is in the process of addressing the recommendations listed in this section. Continued safe and reliable operation should be enhanced upon completion of the repairs, changes in operation and maintenance procedures, confirmation that the pond will handle hydraulic loads under design precipitation/flood conditions, and completion of new static loading structural stability calculations demonstrating minimum Factors of Safety are met for current dike conditions.

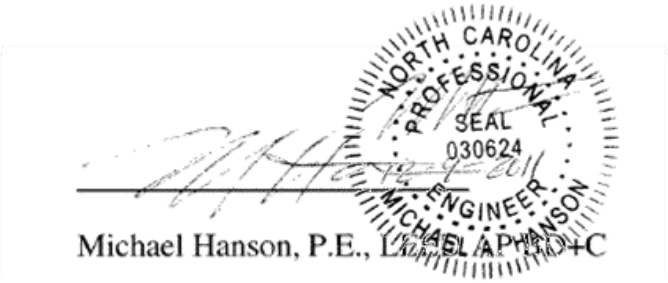
1.3 PARTICIPANTS AND ACKNOWLEDGEMENT

1.3.1 List of Participants

Karen, Zwolak, Tampa Electric Co. (TECO)
Randy Melton, Tampa Electric Co. (TECO)
Jim Dregne. FDEP – HW Southwest Dist.
Tim Bahr, FDEP-HWR
Steve Morgan, FDEP-Solid Waste
Michael Hanson, Dewberry
John Alford, Dewberry

1.3.2 Acknowledgement and Signature

I acknowledge that the S. Bottom Ash Pond, N. Bottom Ash Pond, N. Economizer Ash Pond, and S. Economizer Ash Pond management units referenced herein have been assessed on March 1, 2011.



FINAL

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

2.1 LOCATION AND GENERAL DESCRIPTION

The Big Bend Power Station is situated on Tampa Bay and is close to Apollo Beach, Florida. Figure 2.1a depicts a vicinity map around the Big Bend Plant while Figure 2.1b depicts an aerial view of the plant. An overall site layout map of the plant with management unit callouts is also included in Appendix A. (Doc 06: TECO Site Layout)

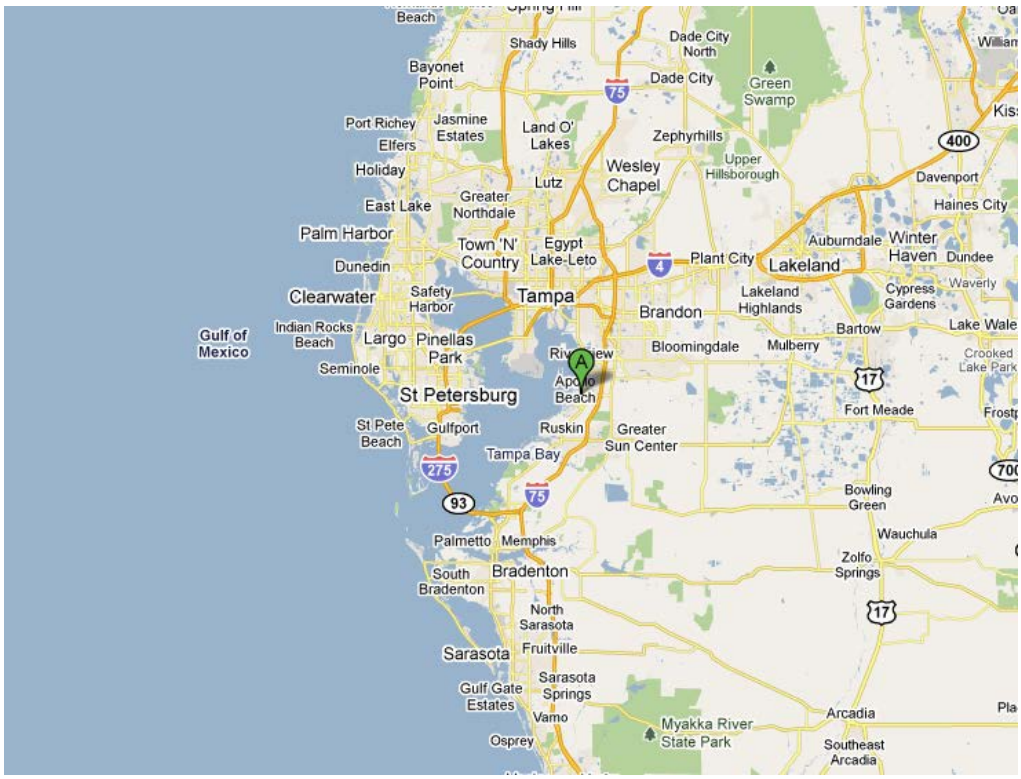


Figure 2.1 a: Big Bend Plant Vicinity Map

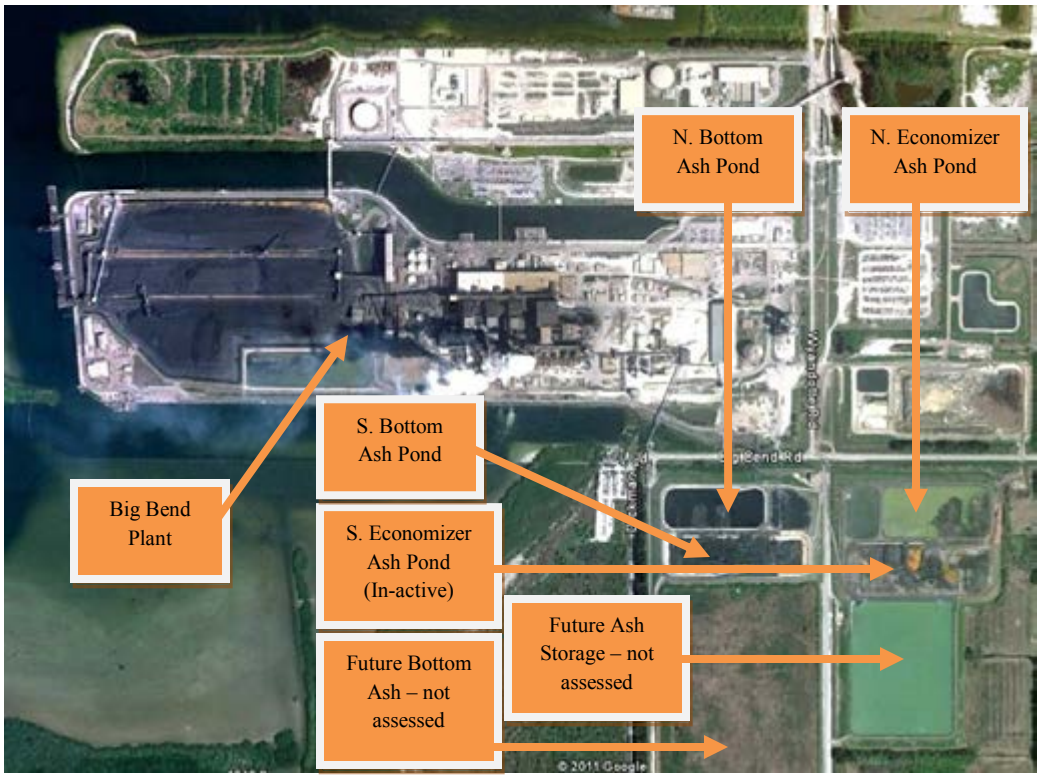


Figure 2.1 b: Big Bend Plant Aerial View

Table 2.1: Summary of Dam Dimensions and Size				
	North Bottom	**South Bottom**	**North Economizer**	**South Economizer**
Dam Height (ft)	25	25	25	25
Crest Width (ft)	20	20	20	20
Length (ft)	1,770	2,250	1,990	2,450
Side Slopes (upstream) H:V	2.6:1	2.6:1	2.6:1	2.6:1
Side Slopes (downstream) H:V	2.6:1	2.6:1	2.6:1	2.6:1

2.2 COAL COMBUSTION RESIDUE HANDLING

A general overview of the residue handling system was provided by plant personnel. Only ground based facilities were observed due to difficulty of access.

2.2.1 Fly Ash

Fly ash is collected at the base of the stack by an electrostatic precipitator. The collected ash is stored in hoppers and conveyed pneumatically to a silo. From the silo it is conveyed hydraulically in a pipe to the ash pond. The discharge into the ash pond is continuous.

Fly ash hopper

2.2.2 Bottom Ash

Bottom ash is collected from the furnace and conveyed through the same pipe as the fly ash into the ash pond.

2.2.3 Boiler Slag

Boiler slag is collected from the boiler and is sluiced into the same pipe that conveys fly and bottom ash into the ash pond.

Boiler where boiler slag is collected

2.2.4 Flue Gas Desulfurization Sludge

The Big Bend Plant has a flue gas desulfurization unit (i.e., scrubbers). All residuals from the scrubbers (gypsum) are dewatered and transported via covered belt to a bermed processing and temporary storage area south of the Bottom Ash Ponds. Ultimately, the gypsum is hauled offsite via truck.

2.3 SIZE AND HAZARD CLASSIFICATION

The ash pond is impounded by an earthen embankment system consisting of a dike configuration. Reference Table 2.1 for dam height, crest width, length and side slopes. The maximum storage volume corresponding to the top of the embankment for both the North and South Bottom Ash Pond is 7,500 cubic yards (4.6 acre-feet). At the time of the site visit, the North Bottom Ash Pond had approximately 5.7' feet of freeboard, while the South Bottom Ash Pond was drained for routine ash removal. The North Economizer Pond has a maximum storage volume corresponding to the top of the embankment of 87,000 (53.9 acre-feet) cubic yards while the South Economizer Pond has 161,000 cubic yards (99.8 acre-feet). (See Appendix A: Doc 01 – Ash Pond ICR Information). Based on impoundment storage capacity these impoundments are Small in size (see Table 2.3a).

Table 2.3a: USACE ER 1110-2-106 Size Classification		
	Impoundment	
Category	**Storage (Ac-ft)**	**Height (ft)**
Small	50 and < 1,000	25 and < 40
Intermediate	1,000 and < 50,000	40 and < 100
Large	> 50,000	> 100

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 or environmental losses. Losses are principally limited to the owner's property.

Table 2.3b: FEMA Federal Guidelines for Dam Safety Hazard Classification		
	Loss of Human Life	**Economic, Environmental, Lifeline Losses**
Low	None Expected	Low and generally limited to owner
Significant	None Expected	Yes
High	Probable. One or more expected	Yes (but not necessary for classification)

Considering the low probability of loss of life and/or environmental losses, should the fly ash dam system fail, a Federal Hazard Classification of **Low** appears to be appropriate for the S. Bottom Ash Pond, the N. Bottom Ash Pond, the S. Economizer Ash Pond and the N. Economizer Ash pond.

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

Bottom ash in the two bottom ash ponds is recycled and reused, so containment is temporary with periodic dewatering and mechanical removal of the ash. The two Economizer Ponds contain Fly Ash and Pyrites. These are permanent disposal areas. The storage capacity in the ponds is provided in Table 2.4. Drainage area is assumed to be the surface area of the ponds based on observations that the assessed management units are all perched.

Table 2.4: Maximum Capacity of Unit				
	North Bottom	**South Bottom**	**North Economizer**	**South Economizer**
Surface Area (acre)	5.7	6.0	5.5	7.4
Current Storage Capacity (cubic yards)	7,500	7,500*	87,000	161,000
Current Storage Capacity (acre-feet)	4.6	4.6	53.9	99.8
Total Storage Capacity (cubic yards)	Not Provided	Not Provided	Not Provided	Not Provided
Total Storage Capacity (acre-feet)	Not Provided	Not Provided	Not Provided	Not Provided
Crest Elevation (feet)	31	31	31	31
Normal Pond Level (feet)	25.29	25.9	27.3	N/A

*South Bottom Ash Pond is currently empty; 7,500 cubic yards is the value provided by TECO (Appendix A: Doc 01 – Ash Pond ICR Information & Appendix A: Doc 04 – Ash Pond Level Summary).

2.5 PRINCIPAL PROJECT STRUCTURES

2.5.1 Earth Embankment

The foundation material at the site is mostly fine sand with 5-10% silt. (Appendix A: Doc 03 – Dike Stability Calculations). Per construction drawings of the plant, the embankment appears to consist of structural fill, but no additional information was provided (Appendix A: Doc 05 – Ash Pond Drawings).

2.5.2 Outlet Structures

There is no discharge to an outside source for any of the ash ponds at this site. All water is recycled and reused in the plant.

2.6 CRITICAL INFRASTRUCTURE WITHIN FIVE MILES DOWN GRADIENT

Critical infrastructures were located using aerial photography and might not accurately represent what currently exists down-gradient of the site. See Figure 2.6 for an aerial view of critical infrastructure downstream of the Big Bend Plant. The Tampa Bay is located directly downstream of the site, and the discharge of the ponds would most likely not affect any infrastructure. Not all critical infrastructures are labeled for clarity purposes.

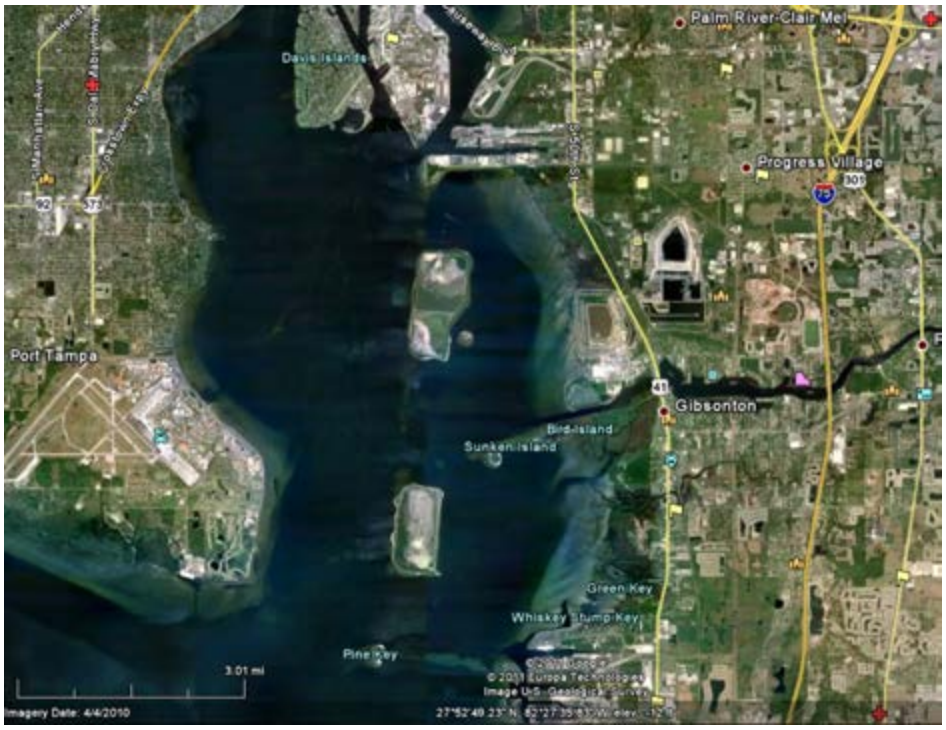


Figure 2.6: Critical Infrastructure Map

3.0 SUMMARY OF RELEVANT REPORTS, PERMITS, AND INCIDENTS

Summary of Reports on the Safety of the Management Unit

No internal or state reports were provided. The Big Bend Plant has no scheduled inspections or plans to implement a system; however, routine annual agency inspections are reported to be conducted and expected to continue (See Footnote 7 of Appendix A: Doc 01: Ash Pond ICR Information.).

3.1 SUMMARY OF LOCAL, STATE, AND FEDERAL ENVIRONMENTAL PERMITS

Discharge from the impoundment is regulated by the Florida Department of Environmental Protection (FDEP) and the Hillsborough County Environmental Protection Commission (HEPC) and the impoundment has been issued a National Pollutant Discharge Elimination Program (NPDES) Permit. Permit No. FL0000817 was issued March 17, 2005. (See Appendix A: Doc 02 – Big Bend Site Certification). Tampa Electric notified us through email that a timely application for renewal of this permit was submitted and is still under review; therefore, the previous permit remains in effect until the reissuance process is complete. The utility maintains a NPDES permit that includes the CCR impoundment despite the fact that the impoundment is currently zero discharge.

3.2 SUMMARY OF SPILL/RELEASE INCIDENTS

Data reviewed by Dewberry did not indicate any spills, unpermitted releases, or other performance related problems with the dam over the last 10 years.

4.0 SUMMARY OF HISTORY OF CONSTRUCTION AND OPERATION

4.1 SUMMARY OF CONSTRUCTION HISTORY

4.1.1 Original Construction

The ash ponds were commissioned in 1984. They were designed by a Professional Engineer (Appendix A: Doc 01 – Ash Pond ICR Information).

4.1.2 Significant Changes/Modifications in Design since Original Construction

The South Economizer Pond has been closed and is no longer receiving coal combustion residuals (CCR).

4.1.3 Significant Repairs/Rehabilitation since Original Construction

The North and South Bottom Ash Ponds were reconstructed and re-lined in accordance with a TECO and FDEP agreement in 2001. The North and South Economizer dikes and liners were repaired in 2002 according to a TECO and FDEP agreement (Appendix A: Doc 01 – Ash Pond ICR Information).

4.2 SUMMARY OF OPERATIONAL PROCEDURES

4.2.1 Original Operational Procedures

The North and South Bottom Ash Ponds were designed and operated to receive sluiced bottom ash from the plant. The water decanted from the ponds is recycled and pumped back into the plant. Periodically one of the ponds is taken offline, dewatered and all of the ash material is mechanically excavated for reuse.

The North and South Economizer Ponds were designed and operated to receive sluiced fly ash and pyrites for permanent disposal. The water decanted from the ponds is recycled and pumped back into the plant.

4.2.2 Significant Changes in Operational Procedures and Original Startup

The South Economizer Ash Pond was full at the time of the site visit. This pond has been taken offline for material recovery, and is not receiving material.

4.2.3 Current Operational Procedures

To the best of our knowledge, original operational procedures are in effect.

4.2.4 Other Notable Events since Original Startup

No additional information was provided.

5.0 FIELD OBSERVATIONS

5.1 PROJECT OVERVIEW AND SIGNIFICANT FINDINGS

Dewberry personnel Michael Hanson, P.E., LEED AP BD+C and John Alford, P.G., CFM performed a site visit on Tuesday, March 1, 2011.

The site visit began at 10:00 AM. The weather was overcast. Photographs were taken of conditions observed. Please refer to the Dam Inspection Checklist in Appendix C for additional information about site conditions. Selected photographs are included here for ease of visual reference. All pictures were taken by Dewberry personnel during the site visit.

Based on visual observation of the ash ponds they appeared to be in satisfactory condition.

5.2 NORTH BOTTOM ASH POND

5.2.1 Crest

The crest had no signs of depressions, tension cracking, or other indications of settlement or shear failure and appeared to be in satisfactory condition.

North Bottom Ash Pond Crest

5.2.2 Upstream/Inside Slope

No scarps, sloughs, depressions, bulging or other indications of slope instability or signs of erosion were observed.

North Bottom Ash Pond Interior Lined Slope

5.2.3 Downstream/Outside Slope and Toe

No scarps, sloughs, depressions, bulging or other indications of instability or signs of erosion were observed on the downstream/outside slope.

North Bottom Ash Pond Downstream Slope

5.2.4 Abutments and Groin Areas

The ash pond embankment consists of a dike system completely surrounding all four ponds. The earthen embankment does not abut existing hillsides, rock outcrops or other raised topographic features.

5.3 SOUTH BOTTOM ASH POND

5.3.1 Crest

The crest had no signs of tension cracking or other indications of settlement or shear failure and appeared to be in satisfactory condition. Two small depressions were noted that require repair during normal maintenance.

South Bottom Ash Pond Crest

5.3.2 Upstream/Inside Slope

No scarps, sloughs, depressions, bulging or other indications of slope instability or signs of erosion were observed.

South Bottom Ash Pond Interior Lined Slope

5.3.3 Downstream/Outside Slope and Toe

No scarps, sloughs, depressions, bulging or other indications of slope instability or signs of erosion were observed. Note overflow pipe shown in picture below is permanently capped.

South Bottom Ash Pond Downstream Slope

5.4 NORTH ECONOMIZER ASH POND

5.4.1 Crest

The crest had no signs of depressions, tension cracking, or other indications of settlement or shear failure and appeared to be in satisfactory condition.

North Economizer Crest

5.4.2 Upstream/Inside Slope

No scarps, sloughs, depressions, bulging or other indications of slope instability or signs of erosion were observed.

North Economizer Settling Pond Interior Slope and Influent Pipe

5.4.3 Outside Slope and Toe

No scarps, sloughs, depressions, bulging or other indications of slope instability or signs of erosion were observed.

North Economizer Downstream Slope

5.5 SOUTH ECONOMIZER ASH POND

5.5.1 Crest

The crest had no signs of depressions, tension cracking, or other indications of settlement or shear failure and appeared to be in satisfactory condition.

South Economizer Crest

5.5.2 Upstream/Inside Slope

No scarps, sloughs, depressions, bulging or other indications of slope instability or signs of erosion were observed. A minor shear failure of the liner was noted for repair during normal maintenance.

South Economizer Interior Lined Slope (Shear Failure In Liner)

5.5.3 Downstream/Outside Slope and Toe

No scarps, sloughs, depressions, bulging or other indications of slope instability or signs of erosion were observed.

South Economizer Downstream Slope

5.6 OUTLET STRUCTURES

5.6.1 Overflow Structure

No overflow structures are in use. There are existing pipes within the downstream embankments that once served as overflow structures, but have since been capped.

5.6.2 Outlet Conduit

No outlet conduit is present.

5.6.3 Emergency Spillway

No emergency spillway is present.

5.6.4 Low Level Outlet

No low level outlet is present.

6.0 HYDROLOGIC/HYDRAULIC SAFETY

6.1 SUPPORTING TECHNICAL DOCUMENTATION

6.1.1 Flood of Record

No documentation has been provided about the flood of record.

6.1.2 Inflow Design Flood

According to FEMA Federal Guidelines for Dam Safety, the 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 floodflow 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 low hazard small 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 50 year to 100 year frequency (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

No inflow design storm information was provided. However, since the facility has a contributing drainage area equal to the surface area of the impoundment and all water is recycled through the plant, it is anticipated the facility would not experience significant flood states.

6.1.3 Spillway Rating

No spillway rating was provided.

6.1.4 Downstream Flood Analysis

No downstream flood analysis was provided.

6.2 ADEQUACY OF SUPPORTING TECHNICAL DOCUMENTATION

Supporting documentation reviewed by Dewberry is inadequate. No hydrologic or hydrologic analysis was provided and there was no established inspection procedure provided.

6.3 ASSESSMENT OF HYDROLOGIC/HYDRAULIC SAFETY

It is assumed adequate capacity and freeboard exists to safely pass the design storm based on that fact that the ponds have a contributing drainage area equal to the surface area of the ponds. Since the water is recycled back into the plant no overflow would occur assuming all pumps remain operational.

FINAL

7.0 STRUCTURAL STABILITY

7.1 SUPPORTING TECHNICAL DOCUMENTATION

7.1.1 Stability Analyses and Load Cases Analyzed

Stability analysis calculations by Stone & Webster Engineering Corporation for the ash ponds dated April 13, 1981 were provided (Appendix A: Doc 03 – Dike Stability Calculations). The analyses were based on the design values, but not the actual conditions of the embankments. Section 7.1.4, Factors of Safety and Base Stresses, review the material from this analysis in more detail. Steady state (normal) loading conditions were analyzed. No seismic loading analysis was provided since this is a non-seismic zone.

7.1.2 Design Parameters and Dam Materials

The stability analysis by Stone & Webster provided theoretical shear strength properties based on assumptions. Without documentation that these assumption have been verified to be true, the provided documentation is inadequate. (Appendix A: Doc 03 – Dike Stability Calcs).

7.1.3 Uplift and/or Phreatic Surface Assumptions

An assumed phreatic surface can be found in Appendix A: Doc 03 – Dike Stability Calculations, but no documentation has been provided stating that the values are accurate.

7.1.4 Factors of Safety and Base Stresses

Factors of safety provided in Appendix A: Doc 03 are theoretical only and may not necessarily pertain to actual conditions of the site.

7.1.5 Liquefaction Potential

No documentation on the potential for liquefaction was provided.

7.1.6 Critical Geological Conditions

Based on the Geologic Maps of the State of Florida compiled by T.M. Scott (Map Series 147) and one dated 2001 which was revised on April 15, 2006 by David Anderson, the Big Bend Plant falls in the Pleistocene and Recent regions. The soils are primarily shelly sediments of Plio-Pleistocene.

7.2 ADEQUACY OF SUPPORTING TECHNICAL DOCUMENTATION

Structural stability documentation is inadequate. The documentation provided was based on assumptions for potential fill material. The slope stability analysis provided was for design or theoretical conditions, and no documentation was provided showing the embankments meet the design conditions. Documentation for the current conditions of the embankment needs to be provided for steady state (normal) loading analyses.

7.3 ASSESSMENT OF STRUCTURAL STABILITY

Overall, an accurate assessment of the structural stability of the dam cannot be determined based on the lack of supporting technical documentation that was provided.

8.0 ADEQUACY OF MAINTENANCE AND METHODS OF OPERATION

8.1 OPERATING PROCEDURES

The operating procedures are adequate. All water from the ash ponds is recycled through the plant. All bottom ash material is temporarily stored on site, dewatered, and hauled off site via truck for recycling. Economizer ash is permanently disposed in the ponds on site.

8.2 MAINTENANCE OF THE DAM AND PROJECT FACILITIES

The maintenance of the dam and project facilities was adequate, although a few maintenance items need to be addressed. Specifically, woody brush has established on the downstream slope of the South Bottom Ash Pond. TEC should remove the brush, and take steps to prevent further expansion of woody vegetation onto the slope. TEC needs to repair the liner on the South Economizer Ash Pond (see photo in Section 5.5.2).

8.3 ASSESSMENT OF MAINTENANCE AND METHODS OF OPERATIONS

8.3.1 Adequacy of Operating Procedures

Based on the assessments of this report, operating procedures appear to be adequate.

8.3.2 Adequacy of Maintenance

Based on the assessments of this report, maintenance procedures appear to be adequate.

9.0 ADEQUACY OF SURVEILLANCE AND MONITORING PROGRAM

9.1 SURVEILLANCE PROCEDURES

The surveillance procedures for this facility are inadequate. No inspection procedures were provided and it appears visual observations in the past have not been recorded.

9.2 INSTRUMENTATION MONITORING

The Big Bend ash impoundment dikes do not have an instrumentation monitoring system.

9.3 ASSESSMENT OF SURVEILLANCE AND MONITORING PROGRAM

9.3.1 Adequacy of Inspection Program

Based on the data reviewed by Dewberry, including observations during the site visit, the inspection program is inadequate. TEC is addressing this concern by incorporating quarterly dam safety inspections and an annual inspection into plant operations. TEC is also incorporating daily visual inspections of dike conditions into the plant's daily routine inspection program.

9.3.2 Adequacy of Instrumentation Monitoring Program

No dike instrumentation is present at the Big Bend ash ponds.

APPENDIX A

Document 1

Ash Pond ICR Information

Doc 01
Ash Pond ICR Information

ATTACHMENT 1

EPA COAL ASH INFORMATION REQUEST
TAMPA ELECTRIC (TECO) BIG BEND STATION DATA

EPA Question #	INFORMATION REQUESTED	BOTTOM ASH PONDS		ECONOMIZER ASH PONDS			SETTLING-RECYCLE PONDS		
		N. POND	S. POND	N. POND	S. POND	Long Term Flyash Pond	SETTLING POND	N. RECYCLE POND	S. RECYCLE POND
1	HAZARD RATING(High-H, Significant-S, Low-L, Less than Low-<L)	L[1]	L[1]	L[2]	L[2]	L[2]	L[3]	L[3]	L[3]
	RATING ESTABLISHED BY	TEC	TEC	TEC	TEC	TEC	TEC	TECO	TECO
	BASIS	NID Definitions	NID Definitions	NID Definitions	NID Definitions	NID Definitions	NID Definitions	NID Definitions	NID Definitions
	REGULATED BY (AGENCY)	FDEP/HEPC[4]	FDEP/HEPC	FDEP/HEPC	FDEP/HEPC	FDEP/HEPC	FDEP/HEPC	FDEP/HEPC	FDEP/HEPC
2	YEAR UNIT COMMISSIONED/EXPANDED	1984/2001[5]	1984/2001[5]	1984/2001[6]	1984/2001[6]	1984	2009 (New Unit)	2009 (New Unit)	2009 (New Unit)
3	MATERIALS STORED	BOTTOM ASH	BOTTOM ASH	FLYASH/ PYRITE	FLYASH/ PYRITE	Ash Residual	FGD/ASH Residuals	FGD/ASH Residuals	FGD/ASH Residuals
4	UNIT DESIGNED BY P.E. ?(Y/N)	Y	Y	Y	Y	Y	Y	Y	Y
	CONSTRUCTION SUPERVISED BY P.E.? (Y/N)	Y	Y	Y	Y	Y	Y	Y	Y
	INSPECTIONS UNDER P.E. SUPERVISION? (Y/N)	N	N	N	N	N	N/A (Future Operation)	N/A (Future Operation)	N/A (Future Operation)
5	WHEN STRUCTURAL INTEGRITY LAST DETERMINED	2001	2001	2002	2002	2002	2008	2008	2009
	CREDENTIALS OF INSPECTOR/ASSESSOR	P.E.	P.E.	P.E.	P.E.	P.E.	P.E.	P.E.	P.E.
	CORRECTIVE ACTIONS IDENTIFIED?	Dike Repair/ Liner Installation 2001	Dike Repair/ Liner Installation 2001	Liner Repaired 2002	Liner Repaired 2002	Minor Dike Erosion Repair 2002	New Dike Construction/Liner Installation	New Dike Construction/Liner Installation	New Dike Construction/Liner Installation
	SCHEDULE FOR FUTURE ASSESSMENTS	Monthly Visual Inspection	Monthly Visual Inspection	Monthly Visual Inspection	Monthly Visual Inspection	Monthly Visual Inspection	Monthly Visual Inspection	Monthly Visual Inspection	Monthly Visual Inspection
6	LAST AGENCY INSPECTION	Jan-09	Jan-09	Jan-09	Jan-09	Jan-09	Jan-09	Jan-09	Jan-09
	FUTURE INSPECTION SCHEDULED?	None Scheduled[7]	None Scheduled[7]	None Scheduled[7]	None Scheduled[7]	None Scheduled[7]	N	N	N
	INSPECTION REPORT?	None Issued	None Issued	None Issued	None Issued	None Issued	N	N	N
7	SAFETY ISSUES DISCOVERED WITHIN PREVIOUS YEAR?	None	None	None	None	None	N	N	N
	CORRECTIVE ACTIONS (DESCRIBE OR NONE)	None	None	None	None	None	None	None	None
8	SURFACE AREA OF MANAGEMENT UNIT (Acres)	5.7	6.0	5.5	7.4	12.0	1.0	2.6	8.6
	VOLUME CCP CURRENTLY STORED (cu. yds.)	7,500[8]	7,500[8]	87,000[9]	161,000[10]	de minimis	Future Use	Future Use	Future Use
	DATE OF VOLUME MEASUREMENT	Mar-09	Mar-09	Mar-09	Oct-07	Mar-09	Future Use	Future Use	Future Use
	MAXIMUM HEIGHT (Feet above natural grade to dam crest)	25	25	25	25	9	21	18	17 (2009 construction)
9	HISTORY OF SPILLS OR RELEASES	None	None	None	None	None	None	None	None
10	CURRENT LEGAL OWNER	TECO	TECO	TECO	TECO	TECO	TECO	TECO	TECO

FOOTNOTES

1 - Big Bend's Bottom Ash Ponds are dewatered and all material recovered for reuse on a bi-monthly basis. Constructed with compacted structural fill and 60 mil HDPE liners, factors of safety are expected to be high for these units.
2 - The Economizer Flyash Ponds contain a total of approximately 250,000 cu. yds. of material which is continuously dewatered and stored in a relatively dry condition.
The Long Term Flyash Pond is used for water overflow from the N. and S. Economizer Ash Ponds and would receive only de minimis amounts of ash in the overflow.
All three ponds constructed with compacted structural fill and 60 mil HDPE liners. Factors of safety are expected to be high for these units.
3 - The Big Bend Settling Recycle System is currently being replaced by agreement between TECO and the FDEP. System design features compacted structural fill and a composite liner system.
4 - FDEP - Florida Department of Environmental Protection HEPC - Hillsborough County Environmental Protection Commission
5 - Pond constructed in 1984. Dikes were reconstructed and the ponds were relined in accordance with TEC/FDEP Agreement in 2001.
6 - Pond constructed in 1984. Dikes and liner were repaired in accordance with TEC/FDEP Agreement in 2002.
7 - No inspection currently scheduled, but routine annual agency inspections are conducted and expected.
8 - Estimate of average total storage amount based on constant mining and filling cycle of the two ponds. (See Footnote 1)
9 - Current estimate based on Engineer's assessment performed October 2007 plus approximate 2008 production.
10 - Engineer's assessment performed October 2007. No further addition of material planned. TEC is also evaluating potential beneficial reuse opportunities for this stored material.

APPENDIX A

Document 2

Big Bend Site Certification

Doc 02
Bid Bend Site Certification

State of Florida Department of Environmental Protection
Tampa Electric Company
Big Bend Unit 4
PA 79-12O

CONDITIONS OF CERTIFICATION Modified 02/28/2007

Table of Contents

I. AIR 1

A. EMISSION LIMITATIONS 1
B. AIR MONITORING PROGRAM 5
C. STACK TESTING: 15
D. REPORTING 15

II. WATER DISCHARGES 16

A. PLANT EFFLUENTS AND RECEIVING BODY OF WATER 16
1. Receiving Body of Water (RBW) 16
2. Point of Discharge (P.O.D.) 16
3. Thermal Mixing Zone 16
4. Chemical Wastes 17
5. Coal Pile 17
6. Chlorine 17
7. pH 17
8. Polychlorinated Biphenyl Compounds 17
9. FGD Chloride Bleedstream 17
10. Boiler Blowdown 19
11. Gypsum Storage Area 19
12. Storm Water Runoff 19
13. Percolation Pond Overflow 19
B. WATER MONITORING PROGRAMS 20
1. Chemical Monitoring 20
2. Biological Monitoring 21

III. WATER USE 23

A. USE OF WATER 23
B. CONSUMPTIVE USE OF GROUNDWATER 23
C. EMERGENCY SHORTAGES 24
D. MONITORING AND REPORTING 24

IV. CONTROL MEASURES DURING CONSTRUCTION 24

A. STORMWATER RUNOFF 24
B. SANITARY WASTES 25
C. ENVIRONMENTAL CONTROL PROGRAM 25
D. DISCHARGE OF CONSTRUCTION DEWATERING EFFLUENT 25

V. SOLID WASTES 25

VI. OPERATION SAFEGUARDS 26

VII. SCREENING 26

VIII. POTABLE WATER SUPPLY SYSTEM 26

IX. TRANSFORMER AND ELECTRIC SWITCHING GEAR 26

X. TOXIC, DELETERIOUS, OR HAZARDOUS MATERIALS 27

XI. CONSTRUCTION IN WATERS OF THE STATE 27

A. INTAKE AND DISCHARGE 27
B. RELOCATION OF JACKSON BRANCH 27
C. NEWMAN BRANCH 28

XII. FGD/GYPSUM LANDFILL 28

XIII. TRANSMISSION LINES 29

XIV. CHANGE IN DISCHARGE 29

XV. NONCOMPLIANCE NOTIFICATION 29

XVI. FACILITIES OPERATION 29

XVII. ADVERSE IMPACT 30

XVIII. RIGHT OF ENTRY 30

XIX. REVOCATION OR SUSPENSION 30

XX. CIVIL AND CRIMINAL LIABILITY 30

XXI. PROPERTY RIGHTS 31

XXII. SEVERABILITY 31

XXVIII. DEFINITIONS 31

XXIV. REVIEW OF SITE CERTIFICATION 31

XXV. MODIFICATION OF CONDITIONS 32

XXVI. FLOOD CONTROL PROTECTION 32

XXVII. EFFECT OF CERTIFICATION 32

XXVIII. FINE MESH SCREENS 32

XXIX. NOISE 32

XXX. VARIANCES 33

XXXI. HISTORY 33

APPENDIX A NPDES PERMIT FL0000817 34

I. Air

The construction and operation of Big Bend Unit 4 at the Tampa Electric Company steam electric power plant site shall be in accordance with all applicable provisions of Chapters 62-4, 62-210, 62-212, 62-213, 62-214, 62-256, 62-257, 62-296, 62-297, 62-302, and 62-701, Florida Administrative Code, Air Construction Permits No. 0570039-020-AC, 0570039-025-AC, 0570039-026-AC and Title V permits 0570039-017-AV, 0570039-021-AV and any subsequent renewals, revisions or corrections to these permits. In addition to the foregoing, the licensee shall comply with the following conditions of certification:

A. Emission Limitations

1. Based on a maximum heat input of 4,330 million BTU per hour, stack emissions from Big Bend Unit 4 (Emission Unit 004) shall not exceed the following when burning coal or a coal/petroleum coke blend:

a. SO_2 - Sulfur dioxide emissions from Unit No. 4 when combusting solid fuel shall not exceed 0.82 lb/million Btu heat input and 10 percent of the potential combustion concentration (90 percent reduction). Based upon a heat input of 4330 million Btu/hour, SO_2 emissions shall not exceed 3551 lb/hr. Compliance with sulfur dioxide emission limitations and percent reduction requirements is determined on a 30-day rolling average basis. The sulfur dioxide emission standards apply at all times except during periods of startup, shutdown, or when both emergency conditions exist and the following procedures in specific condition I.A.15. are implemented.

b. NOx – Nitrogen dioxide

1. Existing limitations through May 31, 2007. Nitrogen dioxide emissions from Unit No. 4 when combusting bituminous or anthracite coal, or a coal/petroleum coke blend, shall not exceed 0.60 lb/million Btu heat input. Based upon a heat input of 4330 million Btu/hour, NO_x emissions shall not exceed 2598 lb/hr. These emission limits are based on a 30-day rolling average. These standards apply at all times except during periods of startup, shutdown, or malfunction.

2. Limitations after May 31, 2007. Nitrogen dioxide emissions from Unit No. 4 when combusting bituminous or anthracite coal, or a coal/petroleum coke blend, shall not exceed 0.10 lb per million Btu heat input. Based upon a heat input limit of 4330 million Btu/hour, NO_x emissions shall not exceed 433 lb/hour. These emission limits are based on a 30-day rolling average.

c. Particulates - 0.03 lb. per million BTU heat input. This standard applies at all times except during periods of startup, shutdown, or malfunction. Based on the maximum permitted heat input rate listed in Specific Condition I.A.1., particulate matter emissions from Unit No. 4 shall not exceed 129.9 lbs/hour, 3118 lbs/day, and 569.0 tons/year.

d. Visible emissions - 20% (6-minute average), except one 6-minute period per hour of not more than 27% opacity.

e. Carbon monoxide (CO) emissions from Unit No. 4 shall not exceed 0.029 lb/million Btu heat input, and shall not exceed 124 lb/hr.

2. The height of the boiler exhaust stack for Unit 4 shall not be less than 490 ft. above grade.

3. Particulate emissions from the coal handling facilities:

a. Pursuant to Chapter 1-3.62 Rules of the Environmental Protection Commission of Hillsborough County, visible emissions shall not exceed 20% opacity for any unconfined emission unit in the fuel yard. Unconfined emissions as defined by Rule 62-296.200, F.A.C., shall include the static fuel piles, etc.

Pursuant to Rule 62-296.711(2), F.A.C., visible emissions shall not exceed 5 percent opacity for the remaining emission units in the fuel yard. Initial and subsequent visible emissions compliance tests shall be demonstrated using EPA Reference Method 9, 40 CFR Part 60, Appendix A, Visual Determination of Fugitive Emissions from Material Sources (July 1, 1993 version). All testing shall be done within 90 days of completing reconfiguration of the fuel yard and prior notification of testing shall be submitted in writing at least 15 days beforehand to the EPC of Hillsborough County. Particulate emissions shall be controlled by use of control devices.

b. The licensee must submit to the Department within ten (10) working days after it becomes available, copies of technical data pertaining to the selected particulate emissions control for the coal handling facility. These data should include, but not be limited to, guaranteed efficiency and emission rates and major design parameters such as air/cloth ratio and flow rate. The Department may, upon review of these data, disapprove the use of such device if the Department determines the selected control device to be inadequate to meet the emission limits specified in 3(a) above. Such disapproval shall be issued within 30 days of receipt of the technical data.

c. The fuel pile operations are subject to Rule 62-296.310(3), F.A.C., Unconfined Emissions of Particulate Matter. Reasonable precautions to minimize unconfined particulate matter shall be in accordance with Rule 62-296.310(3)(c), F.A.C., and may include, but shall not be limited to, the coating of roads and construction sites used by contractors and regrassing or watering areas of disturbed fuel.

d. From each fuel transloading source/emissions point (i.e., off-loading and loading of fuel), the maximum hourly transloading transfer of fuel shall not exceed 4,000 tons, 24-hour rolling average.

e. From each fuel transloading source/emissions point, (i.e., off-loading and loading of fuel), the maximum annual transloading transfer of fuel shall not exceed 1,428,030 tons.

f. The number of railcars and trucks and the quantity of fuel loaded by each fuel transloading source/emissions point (i.e., off-loading and loading of fuel) shall be recorded, maintained, and kept on file for a minimum of two years. The annual quantity of fuel loaded by each fuel transloading source/emissions point shall be submitted in an annual operation report (AOR) to the Environmental Protection Commission of Hillsborough County by March 1 of each year for the previous year's operation.

4. Particulate emissions from limestone and flyash handling shall not exceed the following:

a. Limestone silos - 0.05 lb/hr.

b. Limestone hopper/transfer conveyors - 0.65 lb/hr.

c. Flyash handling system - 0.2 lb/hr.

5. Visible emissions from the following facilities shall be limited to 5% opacity: (a) limestone and flyash handling system, (b) limestone day silos and (c) flyash silos.

6. Compliance with opacity limits of the facilities listed in Condition 5 will be determined by EPA reference method 9 (Appendix A, 40 CFR 60).

7. Construction shall reasonably conform to the plans and schedule given in the application.

8. The licensee shall report any delays in construction and completion of the project to the Department's Southwest District Office.

9. Reasonable precautions to prevent fugitive particulate emissions during construction, such as coating of roads and construction sites used by contractors, will be taken by the licensee.

10. Operation:

a. Normal operation: The only fuels fired in Unit No. 4 shall be coal or a coal/petroleum coke blend containing a maximum of 20.0% petroleum coke by weight. The vanadium content of the petroleum coke fired shall not exceed 2660 ppm. The ash content of the petroleum coke fired shall not exceed 0.76% by weight on a dry basis. The licensee shall maintain and submit to the Department, and to the

Environmental Protection Commission of Hillsborough County, on an annual basis for the years 2001, 2002, 2003, 2004, and 2005 data demonstrating that removal of the sulfur content limit and the revision of the vanadium content limit in the petroleum coke fired did not result in a significant increase in the representative actual annual emissions of any regulated pollutant.

b. Other operation: In addition to the fuels allowed to be burned during normal operation, Unit No. 4 may also burn new No. 2 fuel oil during startup, shutdown, flame stabilization and during the start of an additional solid fuel crusher on an already operating unit. Evaporation of up to 150,000 gallons per year, total at the facility, is allowed of non-hazardous, but potentially HAP-emitting, mineral acid solution boiler chemical cleaning waste which was generated on site.

c. Coal shall not be burned in Unit No. 4 unless both the electrostatic precipitator and limestone scrubber are operating properly.

d. Coal burned in Unit No. 4 shall be washed before it is transported to the plant site. TEC shall maintain records of all coal washing and preparation activities for any coal which is to be fired in Big Bend Unit No. 4. These reports shall be submitted to the Department on a quarterly basis.

e. TEC shall maintain a daily log of the amounts and types of fuels used and copies of fuel analyses containing information on sulfur content, ash content and heating values.

11. Tampa Electric Company is allowed to divert and integrate all of the flue gas from Unit No. 3 for purposes of treating that flue gas in the existing Unit No. 4 flue gas desulfurization (FGD) system.

12. Unit No. 4 is allowed to operate continuously, i.e., 8760 hours/year.

13. Gravimetric instrument data verifying that the 20.0 percent maximum petroleum coke by weight basis has not been exceeded shall be maintained and submitted to the Department's Southwest District Office and the Environmental Protection Commission of Hillsborough County (EPCHC) with each annual operating report.

14. Pursuant to Rule 52-212.200(2)(d), F.A.C., the actual emissions of the No. 4 Unit shall equal the representative actual emissions as defined in 40 CFR 52.21(b)(33). The Permitted shall maintain and submit to the Department and EPCHC on an annual basis for a period of five years from the date the unit begins firing petroleum coke, data demonstrating that the operational change did not result in an emissions increase.

15. During emergency conditions in the principal company, an affected

facility with a malfunctioning flue gas desulfurization system may be operated if sulfur dioxide emissions are minimized by:

a. Operating all operable flue gas desulfurization system modules, and bringing back into operation any malfunctioned module as soon as repairs are completed,

b. Bypassing flue gases around only those flue gas desulfurization system modules that have been taken out of operation because they were incapable of any sulfur dioxide emission reduction or which would have suffered significant physical damage if they had remained in operation, and

c. Operating a spare flue gas desulfurization system module. The Department or EPCHC may at their discretion require TEC within 60 days of notification to demonstrate spare module capability. To demonstrate this capability, the owner or operator must demonstrate compliance with the appropriate requirements of specific conditions I.A.1.a. and I.A.1.c. for any period of operation lasting from 24 hours to 30 days when:

(1) Any one flue gas desulfurization module is not operated,

(2) The affected facility is operating at the maximum heat input rate,

(3) The fuel fired during the 24-hour to 30-day period is representative of the type and average sulfur content of fuel used over a typical 30-day period, and

(4) TEC has given the Department or EPCHC at least 30 days notice of the date and period of time over which the demonstration will be performed.

16. The licensee shall install a selective catalytic reduction (SCR) system for nitrogen oxides (NOx) control on the facility's Unit No. 4 solid fuel-fired boiler.

B. Air Monitoring Program

1. The licensee

a. When Units 3 and 4 are operating in the integrated mode (Unit 3 flue gasses routed through the Unit 4 FGD system), the continuous monitoring system will measure sulfur dioxide emissions at the inlet and outlet of the Unit 4 FGD system and from the Unit 3 stack, while emissions of nitrogen dioxides, oxygen and/or carbon dioxide, and opacity shall be measured in the Unit 4 duct prior to the FGD

system.

b. When Units 3 and 4 are not operating in the integrated mode, the continuous monitoring system will measure only Unit 4's inlet duct and stack for SO_2 emissions. The emissions of nitrogen oxides, oxygen and/or carbon dioxide, and opacity shall be measured in the Unit 4 duct prior to the FGD system.

2. The licensee shall maintain a daily log of the amounts and types of fuels used and copies of fuel analyses containing information on sulfur content, ash content and heating values.

3. The licensee shall provide sampling ports into the stack and shall provide access to the sampling ports, in accordance with DEP publication, Standard Sampling Techniques and Methods of Analysis for the Determination of Air Pollutants from Point Sources, July, 1975.

4. The ambient monitoring program may be reviewed by the Department and the licensee annually beginning two years after start-up of Unit 4.

5. Prior to operation of the source, the licensee shall submit to the Department a standardized plan or procedure that will allow the licensee to monitor emission control equipment efficiency and enable the licensee to return malfunctioning equipment to proper operation as expeditiously as possible.

6. TEC shall calibrate, maintain, and operate a continuous monitoring system, and record the output of the system, for measuring the opacity of emissions discharged to the atmosphere. If opacity interference due to water droplets exists in the stack (for example, from the use of an FGD system), the opacity is monitored upstream of the interference (at the inlet to the FGD system). If opacity interference is experienced at all locations (both at the inlet and outlet of the sulfur dioxide control system), alternate parameters indicative of the particulate matter control system's performance are monitored (subject to the approval of the Department and the Environmental Protection Commission of Hillsborough County [EPCHC]).

7. TEC shall calibrate, maintain, and operate a continuous monitoring system, and record the output of the system, for measuring sulfur dioxide emissions as follows:

a. Sulfur dioxide emissions are monitored at both the inlet and outlet of the sulfur dioxide control device.

b. An "as fired" fuel monitoring system (upstream of coal pulverizers) meeting the requirements of Method 19, Determination of Sulfur Dioxide Removal Efficiency and Particulate Matter, Sulfur Dioxide, and Nitrogen Oxides Emission Rates, may be used to determine potential sulfur dioxide emissions in place of a continuous sulfur dioxide emission monitor at the inlet to the sulfur dioxide control

device as required in the preceding specific condition I.B.7.a.

8. TEC shall calibrate, maintain, and operate a continuous monitoring system, and record the output of the system, for measuring nitrogen oxides emissions discharged to the atmosphere.

9. TEC shall calibrate, maintain, and operate a continuous monitoring system, and record the output of the system, for measuring the oxygen and/or carbon dioxide content of the flue gases at each location where sulfur dioxide or nitrogen oxides emissions are monitored. The sulfur dioxide, nitrogen dioxide, oxygen and/or carbon dioxide, and opacity monitoring devices shall meet the applicable requirements of Section 62-214, F.A.C., 40 CFR 60.47a., and 40 CFR 75.). The opacity monitor shall be placed in the duct work between the electrostatic precipitator and the FGD scrubber. When Units 3 and 4 are operating in the integrated mode (Unit 3 flue gases routed through the Unit 4 FGD system), the continuous monitoring system will measure sulfur dioxide emissions at the inlet and outlet of the Unit 4 FGD system and from the Unit 3 stack (CS002), while emissions of nitrogen oxides, oxygen and/or carbon dioxide, and opacity shall be measured in the Unit 4 duct prior to the FGD system. When Units 3 and 4 are not operating in the integrated mode, the continuous monitoring system will measure only Unit 4's inlet duct and stack for SO_2 emissions. The emissions of nitrogen oxides, oxygen and/or carbon dioxide, and opacity shall be measured in the Unit 4 duct prior to the FGD system.

10. The continuous monitoring systems required in specific conditions B.7., B.8., and B.9., shall be operated and record data during all periods of operation of Unit No. 4 including periods of startup, shutdown, malfunction or emergency conditions, except for continuous monitoring system breakdowns, repairs, calibration checks, and zero and span adjustments.

11. TEC shall obtain emission data for at least 18 hours in at least 22 out of 30 successive boiler operating days. If this minimum data requirement cannot be met with a continuous monitoring system, TEC shall supplement emission data with other monitoring systems approved by the Department or the EPCHC, or the reference methods and procedures as described in Specific Condition B.13.

12. The 1-hour averages required under 40 CFR 60.13(h), *Monitoring Requirements*, are expressed in lbs/million Btu heat input and used to calculate the average emission rates required in specific conditions B.13. and B.14. The 1-hour averages are calculated using the data points required under 40 CFR 60.13(b), *Monitoring Requirements*. At least two data points must be used to calculate the 1-hour averages.

13. When it becomes necessary to supplement continuous monitoring system data to meet the minimum data requirements in specific condition B.21., TEC shall use the following reference methods and procedures. Acceptable alternative methods and procedures are given in specific condition B.25.

a. Method 6 shall be used to determine the SO_2 concentration at the same location as the SO_2 monitor. Samples shall be taken at 60-minute intervals. The sampling time and sample volume for each sample shall be at least 20 minutes and 0.020 dscm (0.71 dscf). Each sample represents a 1-hour average.

b. Method 7 shall be used to determine the NO_x concentration at the same location as the NO_x monitor. Samples shall be taken at 30-minute intervals. The arithmetic average of two consecutive samples represents a 1-hour average.

c. The emission rate correction factor, integrated bag sampling and analysis procedure of Method 3B shall be used to determine the O_2 or CO_2 concentration at the same location as the O_2 or CO_2 monitor. Samples shall be taken for at least 30 minutes in each hour. Each sample represents a 1-hour average.

d. The procedures in Method 19 shall be used to compute each 1-hour average concentration in 1b/million Btu heat input.

14. TEC shall use the following methods and procedures to conduct the monitoring system performance evaluations required under 40 CFR 60.13(c), *Monitoring Requirements,* and the calibration checks required under 40 CFR 60.13(d), *Monitoring Requirements*. Acceptable alternative methods and procedures are given in specific condition B.25.

a. Methods 6, 7, and 3B, as applicable, shall be used to determine O_2, SO_2, and NO_x concentrations.

b. SO_2 or NO_x (NO), as applicable, shall be used for preparing the calibration gas mixtures (in N_2, as applicable) under 40 CFR 60 Appendix B, Performance Specification 2.

c. The span value for a continuous monitoring system for measuring opacity is between 60 and 80 percent and for a continuous monitoring system measuring nitrogen oxides is determined as follows.

Fossil Fuel	Span value for nitrogen oxides (ppm)
Solid	1,000

d. Reserved

e. For affected facilities burning fossil fuel alone or in combination with non-fossil fuel, the span value of the sulfur dioxide continuous monitoring system at the inlet to the sulfur dioxide control device is 125 percent of the maximum estimated hourly potential emissions of the fuel fired, and the outlet of the sulfur dioxide control device is 50 percent of maximum estimated hourly potential emissions oil fuel, alone or in combination with non-fossil fuel, the span value of the fuel

fired. [Rule 62-204.800(7)(b)2., F.A.C.; 40 CFR 60.47a(i); 40 CFR 60.13; 40 CFR 60 Appendix A, Methods 3B, 6, and 7; 40 CFR 60 Appendix B, Performance Specification 2.]

15. TEC may use the following as alternatives to the reference methods and procedures specified in conditions B.23. and B.24.

a. For Method 6, Method 6A or 6B (whenever Methods 6 and 3 or 3B data are used) or 6C may be used. Each Method 6B sample obtained over 24 hours represents 24 1-hour averages. If Method 6A or 6B is used under Condition I.B.24., the conditions under 40 CFR 60.46(d)(1) apply; these conditions do not apply under condition I.B.23.

b. For Method 7, Method 7A, 7C, 7D or 7E may be used. If Method 7C, 7D, or 7E is used, the sampling time for each run shall be 1 hour.

c. For Method 3, Method 3A or 3B may be used if the sampling time is 1 hour.

d. For Method 3B, Method 3A may be used.

[Rule 62-204.800(7)(b)2., F.A.C.; 40 CFR 60.47a(j); 40 CFR 60.46(d)(1), 40 CFR 60 Appendix A, Methods 3, 3A, 3B, 6, 6A, 6B, 6C, 7, 7A, 7C, 7D, and 7E]

16. In conducting the performance tests required in 40 CFR 60.8, the owner or operator shall use as reference methods and procedures the methods in appendix A of 40 CFR 60 or the methods and procedures as specified in conditions B.17. through B.20., except as provided in 40 CFR 60.8(b). 40 CFR 60.8(f) does not apply to specific conditions B.18 and B.19. for SO_2 and NOx. Acceptable alternative methods are given in specific condition B.20.
[Rule 62-204.800(7)(b)2., F.A.C.; 40 CFR 60.48a(a); 40 CFR 60.8]

17. TEC shall determine compliance with the particulate matter standards in specific condition B.5. as follows:

a. The dry basis F factor (O_2) procedures in Method 19 shall be used to compute the emission rate of particulate matter.

b. For the particular matter concentration, Method 5B shall be used after wet FGD systems.

(1) The sampling time and sample volume for each run shall be at least 120 minutes and 1.70 dscm (60 dscf). The probe and filter holder heating system in the sampling train may be set to provide an average gas temperature of no greater than 160±14 °C (320±25 °F).

(2) For each particulate run, the emission rate correction factor, integrated or grab sampling and analysis procedures of Method 3B shall be used to determine the O_2 concentration. The O_2 sample shall be obtained simultaneously with, and at the same traverse points as, the particulate run. If the particulate run has more than 12 traverse points, the O_2 traverse points may be reduced to 12 provided that Method 1 is used to locate the 12 O_2 traverse points. If the grab sampling procedure is used, the O_2 concentration for the run shall be the arithmetic mean of all the individual O_2 concentrations at each traverse point.

c. Method 9 and the procedures in 40 CFR 60.11 shall be used to determine opacity.
[Rule 62-204.800(7)(b)2., F.A.C.; 40 CFR 60.48a(b); 40 CFR 60.11, 40 CFR 60 Appendix A, Methods 1, 3B, 5B, 9, and 19]

18. TEC shall determine compliance with the SO_2 standards in specific condition I.A.1.a. as follows:

a. The percent of potential SO_2 emissions (%Ps) to the atmosphere shall be computed using the following equation:

$\%P_s = [(100 - \%R_f)\ (100 - \%R_g)]/100$
where:
$\%P_s$ = percent of potential SO_2 emissions, percent.
$\%R_f$ = percent reduction from fuel pretreatment, percent.
$\%R_g$ = percent reduction by SO_2 control system, percent.

b. The procedures in Method 19 may be used to determine percent reduction ($\%R_f$) of sulfur by such processes as fuel pretreatment (physical coal cleaning, hydrodesulfurization of fuel oil, etc.), coal pulverizers, and bottom and flyash interactions. This determination is optional.

c. The procedures in Method 19 shall be used to determine the percent SO_2 reduction ($\%R_g$ of any SO_2 control system. Alternatively, a combination of an "as fired" fuel monitor and emission rates measured after the control system, following the procedures in Method 19, may be used if the percent reduction is calculated using the average emission rate from the SO_2 control device and the average SO_2 input rate from the "as fired" fuel analysis for 30 successive boiler operating days.

d. The appropriate procedures in Method 19 shall be used to determine the emission rate.

e. The continuous monitoring systems specified in conditions B.17. and B.19. shall be used to determine the concentrations of SO_2 and CO_2 or O_2.
[Rule 62-204.800(7)(b)2., F.A.C.; 40 CFR 60.48a (c); 40 CFR 60 43a; 40 CFR 60.47a(b) and (d); 40 CFR 60 Appendix A, Method 19]

19. TEC shall determine compliance with the NOx standards in specific condition I.A.1.b. as follows:

a. The appropriate procedures in Method 19 shall be used to determine the emission rate of NOx.

b. The continuous monitoring systems specified in specific conditions B.18. and B.19. shall be used to determine the concentrations of NOx and CO_2 or O_2. [Rule 62-204.800(7)(b)2., F.A.C.; 40 CFR 60.48a(d); 40 CFR 60.44a; 40 CFR 60.47a(c); 40 CFR 60.47a(d)]

20. TEC may use the following as alternatives to the reference methods and procedures specified in condition B.17:

a. For Method 5 or 5B, Method 17 may be used at Unit No. 4 if the stack temperature at the sampling location does not exceed an average temperature of 160 °C (320 °F). The procedures of sections 2.1 and 2.3 of Method 5B may be used in Method 17 only if it is used after wet FGD systems. Method 17 shall not be used after wet FGD systems if the effluent is saturated or laden with water droplets.

b. The F_c factor (CO_2) procedures in Method 19 may be used to compute the emission rate of particulate matter under the stipulations of 40 CFR 60.46(d)(1*)*. The CO_2 shall be determined in the same manner as the O_2 concentration. [Rule 62-204.800(7)(b)2., F.A.C.; 40 CFR 60.48a(e); 40 CFR 60.46(d)(1); 40 CFR 60 Appendix A, Methods 5, 5B, 17, and 19]

21. For sulfur dioxide, nitrogen oxides, and particulate matter emissions, the performance test data from the initial performance test and from the performance evaluation of the continuous monitors (including the transmissometer) shall be submitted to the Department and the EPCHC. [Rule 62-204.800(7)(b)2., F.A.C.; 40 CFR 60.49a(a)]

22. For sulfur dioxide and nitrogen oxides the following information shall be reported to the Department and the EPCHC for each 24-hour period.

a. Calendar date.

b. The average SO_2 and NOx emission rates (lb/ million Btu heat input) for each 30 successive boiler operating days, ending with the last 30-day period in the quarter; reasons for non-compliance with the standard; and, description of corrective actions taken.

c. Percent reduction of the potential combustion concentration of sulfur dioxide for each 30 successive boiler operating days, ending with the last 30-day period in the quarter; reasons for non-compliance with the standard; and, description of corrective actions taken.

d. Identification of the boiler operating days for which pollutant or dilutent data have not been obtained by an approved method for at least 18 hours of operation of the facility; justification or not obtaining sufficient data; and description of corrective actions taken.

e. Identification of the times when emissions data have been excluded from the calculation of average emission rates because of startup, shutdown, malfunction (NO_x only), emergency conditions (SO_2 only), or other reasons, and justification for excluding data for reasons other than startup, shutdown, malfunction, or emergency conditions.

f. Identification of "F" factor used for calculations, method of determination, and type of fuel combusted.

g. Identification of times when hourly averages have been obtained based on manual sampling methods.

h. Identification of the times when the pollutant concentration exceeded full span of the continuous monitoring system.

i. Description of any modifications to the continuous monitoring system which could affect the ability of the continuous monitoring system to comply with 40 CFR 60 Appendix B, Performance Specifications 2 or 3.

[Rule 62-204.800(7)(b)2., F.A.C.; 40 CFR 60.49a(b); 40 CFR 60 Appendix B]

23. If the minimum quantity of emission data, as required by the emission monitoring specific conditions B.6. through B.15., is not obtained for any 30 successive boiler operating days, the following information obtained under the requirements of specific condition B.5. shall be reported to the DEP for that 30-day period:

a. The number of hourly averages available for outlet emission rates (n_o) and inlet emission rates (n_i) as applicable.

b. The standard deviation of hourly averages for outlet emission rates (s_o) and inlet emission rates (s_i) as applicable.

c. The lower confidence limit for the mean outlet emission rate (E_o*) and the upper confidence limit for the mean inlet emission rate (E_i*) as applicable.

d. The applicable potential combustion concentration.

e. The ratio of the upper confidence limit for the mean outlet emission rate (E_o*) and the allowable emission rate (E_{std}) as applicable.

[Rule 62-204.800(7)(b)2., F.A.C.; 40 CFR 60.49a(c); 40 CFR 60 Appendix A, Method 19]

24. If any sulfur dioxide standards under specific condition I.A.1.a. is exceeded during emergency conditions because of control system malfunction, the owner or operator of the affected facility shall submit a signed statement:

a. Indicating if emergency conditions existed and requirements under specific condition B.14. were met during each period, and

b. Listing the following information:

(1) Time periods the emergency condition existed;

(2) Electrical output and demand on the owner or operator's electric utility system and the affected facility;

(3) Amount of power purchased from interconnected neighboring utility companies during the emergency period;

(4) Percent reduction in emissions achieved;

(5) Atmospheric emission rate (ng/J or lb/MMBtu) of the pollutant discharged; and

(6) Actions taken to correct control system malfunction.
[Rule 62-204.800(7)(b)2., F.A.C.; 40 CFR 60.49a(d); 40 CFR 60.43a; 40 CFR 60.46a(d)]

25. If fuel pretreatment credit is claimed toward the sulfur dioxide emission standards in specific condition B.7. TEC shall submit a signed statement:

a. Indicating what percentage cleaning credit was taken for the calendar quarter, and whether the credit was determined in accordance with the provisions of specific condition B.28. and Method 19 (Appendix A of 40 CFR 60); and

b. Listing the quantity, heat content, and date each pretreated fuel shipment was received during the previous quarter; the name and location of the fuel pretreatment facility; and the total quantity and total heat content of all fuels received at the affected facility during the previous quarter.

[Rule 62-204.800(7)(b)2., F.A.C.; 40 CFR 60.49a(e), 40 CFR 60.48a(c)]

26. For any periods for which opacity, sulfur dioxide or nitrogen oxides emissions data are not available, the owner or operator of the affected facility shall

submit a signed statement indicating if any changes were made in operation of the emission control system during the period of data unavailability. Operations of the control system and affected facility during periods of data unavailability are to be compared with operation of the control system and affected facility before and following the period of data unavailability.
[Rule 62-204.800(7)(b)2., F.A.C.; 40 CFR 60.49a(f)]

27. The owner or operator of the affected facility shall submit a signed statement indicating whether:

a. The required continuous monitoring system calibration, span, and drift checks or other periodic audits have or have not been performed as specified.

b. The data used to show compliance was or was not obtained in accordance with approved methods and procedures of these conditions and is representative of plant performance.

c. The minimum data requirements have o have not been met; or, the minimum data requirements have not been met for errors that were unavoidable.

d. Compliance with the standards has or has not been achieved during the reporting period.

[Rule 62-204.800(7)(b)2., F.A.C.; 40 CFR 60.49a(g)]

28. For the purposes of the reports required under 40 CFR 60.7, periods of excess emissions are defined as all 6-minute periods during which the average opacity exceeds the applicable opacity standards under specific condition B.6. Opacity levels in excess of the applicable opacity standard and the date of such excesses are to be submitted to the Administrator each calendar quarter.

[Rule 62-204.800(7)(b)2., F.A.C.; 40 CFR 60.49a(h)]

29. The owner or operator of an affected facility shall submit the written reports required under this section and subpart A to the Department and the EPCHC for every calendar quarter. All quarterly reports shall be postmarked by the 30th day following the end of each calendar quarter.
[Rule 62-204.800(7)(b)2., F.A.C.; 40 CFR 60.49a(i)]

30. Gravimetric instrument data verifying that the 20.0% maximum petroleum coke content by weight has not been exceeded shall be maintained for five years and submitted to the Department and the EPCHC with each annual operating report. Also to be maintained and available for inspection shall be a daily record of operation showing the date, fuel used, mode of operation (integrated/non-integrated), and the duration of all startups, shutdowns and malfunctions. TEC shall maintain

copies of fuel analyses containing information on sulfur content, ash content, and heating values.
[PSD-FL-040; Rules 62-4.070(3), 62-213.440(1)(b)2.b., F.A.C., and Power Plant Siting Certification PA 79-12]

31. Pursuant to Rule 62-212.200(2)(d), F.A.C., the actual emissions of the No. 4 Unit shall equal the representative actual emissions as defined in 40 CFR 52.21(b)(33). TEC shall maintain and submit to the Department and the EPCHC on an annual basis for a period of 5 years from the date the unit begins firing petroleum coke, data demonstrating that the operational change did not result in an emissions increase.

C. Stack Testing:

1. Within 60 calendar days after achieving the maximum capacity at which each unit will be operated, but no later than 180 operating days after initial start-up, the licensee shall conduct performance tests for particulates, SO2, NOx, and visible emissions during normal operations near 4,330 MMBtu/hr heat input and furnish the Department a written report of the results of such performance tests within 30 days. The performance tests will be conducted in accordance with the provisions of 40 CFR 60.46a, 48a, and 49a.

2. Performance tests shall be conducted and data reduced in accordance with methods and procedures in accordance with DEP's Standard Sampling Techniques and Methods of Analysis for Determination on Air Pollutants from Point Sources,-July, 1975.

3. Performance tests shall be conducted under such conditions as the Department shall specify based on representative performance of the facility. The licensee shall make available to the Department such records as may be necessary to determine the conditions of the performance tests.

4. The licensee shall provide 30 days prior notice of the performance tests to afford the Department the opportunity to have an observer present.

5. Stack tests for particulates and SO2 shall be performed annually in accordance with conditions C.2, 3, and 4 above.

D. Reporting

1. For Unit 4, stack monitoring, fuel usage and fuel analysis data shall be reported to the Department's Southwest District Office on a quarterly basis commencing with the start of commercial operation in accordance with 40 CFR, Part 60, Section 60.7., and in accordance with Section 62-296.405, FAC.

2. Utilizing the SAROAD or other format approved in writing by the Department, ambient air monitoring data shall be reported to the Bureau of Air Quality

Management of the Department quarterly. Commencing on the date of certification, such reports shall be due by the last day of the month following the quarterly reporting period.

3. Beginning one month after certification, the licensee shall submit to the Department a quarterly status report briefly outlining progress made on engineering design and purchase of major pieces of equipment (including control equipment). All reports and information required to be submitted under this condition shall be submitted to the Department's Southwest District Office.

II. Water Discharges

Any discharges into any waters of the State during construction and operation of Big Bend Unit 4 shall be in accordance with all applicable provisions of the NPDES Permit FL0000817 (hereto attached as Appendix A), Chapter 62-301, Florida Administrative Code, and 40 CFR, 423, Effluent Guidelines and Standards for Steam Electric Power Generating Point Source Category except as provided herein. Also, the licensee shall comply with the following conditions of certification:

A. Plant Effluents and Receiving Body of Water

For discharges made from the power plant the following conditions shall apply:

1. Receiving Body of Water (RBW)

The receiving body of water has been determined by the Department to be those waters of the Tampa Bay and any other waters affected which are considered to be waters of the State within the definition of Chapter 403, Florida Statutes.

2. Point of Discharge (P.O.D.)

The point of discharge will be determined by the Department to be where the effluent physically enters the waters of the State.

3. Thermal Mixing Zone

The instantaneous zone of thermal mixing for the cooling system shall not exceed an area of 4980 acres. The temperature at the point of discharge into the Tampa Bay shall not be greater than 109 degrees F. The temperature of the water at the edge of the mixing zone shall not exceed the limitations of Paragraph 17-3.05(l)(d). The licensee shall validate the size of this mixing zone by submission of a verified or calibrated thermal dispersion model at least six months prior to

commencement of operation. The Department and TECO shall agree to a program for selecting, verifying and utilizing an appropriate model.

4. Chemical Wastes

All discharges of low volume wastes (demineralizer regeneration, floor drainage, lab drains and similar wastes) shall comply with Chapter 62-302. If violations of Chapter 17-3 occur, corrective action shall be taken. These wastewaters shall be discharged to an adequately sized and constructed treatment facility. Preoperational and operational metal cleaning wastes, low volume wastes, boiler fireside wash, air preheater wash, and stack wash shall be disposed of in an adequately sized percolation pond and spray irrigation facility. The low volume liquid waste stream from the flue gas desulfurization system (FGD) may be discharged from internal outfall IO130 to outfalls DO011, DO012, or DO014 in accordance with the provisions of Permit No. FL0000817 REV A.

5. Coal Pile

Coal pile runoff shall be disposed of in the wastewater treatment/spray irrigation system and shall not be directly discharged to surface waters.

6. Chlorine

The concentration of total residual chlorine discharged from Unit 4 shall not exceed 0.2 mg/l at the POD nor 0.01 mg/l beyond an instantaneous mixing zone of 6.1 acres. The condensers for Unit 4 shall not be chlorinated more than two hours per day and shall not be chlorinated simultaneously with any other unit.

7. pH

The pH of the combined discharges shall be such that the pH be within the range of 6.0 to 8.5.

8. Polychlorinated Biphenyl Compounds

There shall be no net discharge of polychlorinated biphenyl compounds.

9. FGD Chloride Bleedstream

The bleedstream from the FGD system shall be treated, discharged and monitored in accordance with the provisions of Permit No. FL0000817 REV A.

a. Such discharge shall be limited and monitored by the licensee as specified below:

	DISCHARGE LIMITATIONS	MONITORING REQUIREMENTS		
EFFLUENT CHARACTERISTIC	Maximum Instantaneous	Measurement Frequency	Sample Type	Sample Point
Flow, MGD	See Item c. below	Continuous	Recorder	NA
Total Suspended Solids, mg/l	30.0	Quarter	Grab	EFF-3
Oil & Grease, mg/l	15.0	Quarter	Grab	EFF-3
Total Recoverable Arsenic (total), µ/l	Report[1]	Quarter	Grab	EFF-3
Total Recoverable Chromium, µ/l	Report[1]	Quarter	Grab	EFF-3
Total Recoverable Copper, µ/l	Report[1]	Quarter	Grab	EFF-3
Total Recoverable Lead, µ/l	Report[1]	Quarter	Grab	EFF-3
Total Recoverable Mercury, µ/l	Report[1]	Quarter	Grab	EFF-3
Total Recoverable Nickel, µ/l	Report[1]	Quarter	Grab	EFF-3
Total Recoverable Selenium, µ/l	Report[1]	Quarter	Grab	EFF-3
Gross Alpha, pCi/l	Report[1]	Quarter	Grab	EFF-3
Radium (226 & 228), pCi/l	Report[1]	Quarter	Grab	EFF-3
pH, standard units (range)	See Item d, below	Quarter	Grab	EFF-3

1. After four quarters of reporting the licensee may request by minor permit revision a reduction or discontinuance of monitoring for these parameters.

b. The facility shall at all times ensure that treated effluent from Outfall IO130 is being discharged to one of four once-through cooling water (OTWC) outfall discharge pipes that is discharging at a flow rate of approximately 250,000 gpm. This shall be achieved by rerouting the flow from IO130 to another OTWC outfall pipe if flow in the first outfall pipe is being discontinued or reduced.

c. The maximum daily average and monthly average shall be reported.

d. The pH shall not be less than 6.0, nor greater than 9.0 standard units.

e. The Department reserves the right to require toxicity testing during the first year after start-up of the new FGD treatment system if monitoring results required above indicate a potential for toxicity violations at the point of discharge to

State waters.

f. Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s):

EFF-3 - at a location after final treatment but prior to discharge to Outfalls DO011, DO012, DO013, or DO014.

10. Boiler Blowdown

Blowdown from the boiler shall be treated as appropriate prior to discharge to the cooling water system. The following effluent limitations shall apply:

Effluent	Daily Maximum	Maximum 30-Day Daily Average
TSS	100 mg/l	30 mg/l
Oil and Grease	20 mg/l	15 mg/l
pH	6-9	6-9

11. Gypsum Storage Area

There shall be no direct discharge of stormwater runoff to surface waters from the gypsum storage area.

12. Storm Water Runoff

During plant operation, necessary measures shall be used to settle, filter, treat, or absorb silt-containing or pollutant-laden stormwater runoff to limit the suspended solids to 50 mg/l or less at the POD during rainfall periods less than the 10-year, 24-hour rainfall, and to prevent an increase in turbidity of more than 50 Jackson Turbidity Units above background in waters of the State beyond 150 meters from the POD at Station E 4500 and N 3712.

Control measures shall consist at the minimum of filters, sediment traps, barriers, berms or vegetative planting. Exposed or disturbed soil shall be protected as soon as possible to minimize silt- and sediment-laden runoff. The pH shall be kept within the range of 6.0 to 8.5 at the POD.

13. Percolation Pond Overflow

There shall be no discharge from the wastewater treatment system percolation pond except during emergency conditions caused by severe weather. Any discharge from the existing overflow pipe shall be reported to the Department and the Environmental Protection Agency. All discharges from this overflow system shall be monitored for pH, TSS, oil and grease, and the metals listed in condition II, B. l.; the flow and duration of flow shall be estimated.

B. Water Monitoring Programs

The licensee shall monitor and report to the Department the listed parameters on the basis specified herein. The methods and procedures utilized shall receive written approval by the Department. The monitoring program may be reviewed annually by the Department, and a determination may be made as to the necessity and extent of continuation, and may be modified in accordance with Condition No. XXV.

1. Chemical Monitoring

The following parameters shall be monitored during discharge as shown, discharge commencing with the start of commercial operation of Unit 4, and reported monthly to the Department's Southwest District Office:

Parameter	Location	Sample Type	Frequency
Flow, Cooling	Intake	Pump Log	Continuous
Flow, Boiler Blowdown	Prior to CWS	Daily Log	Daily
Flow, FGD Bleed	Prior to CWS	Recorder	Continuous
pH	CWS and prior to CWS on FGD Bleed and Boiler Blowdown	Grab	Two per Week
Temperature	CWS Outfall	Recorder	Continuous
TSS	FGD Bleed and Boiler Blowdown	Grab	Two per Week
Chlorine, Total Residual	Outfall of CWS	Multiple Grab	Weekly
Oil and Grease	Boiler Blowdown and FGD bleed	Grab	Two per Month
Metals	FGD Bleed Stream prior to discharge to CWS	Two-Grab composite, not less than two hours between samples	One per Month
Arsenic	"	"	"
Cadmium	"	"	"
Iron	"	"	"
Lead	"	"	"
Mercury	"	"	"
Selenium	"	"	"
Zinc	"	"	"
Copper	"	"	"
Chromium	"	"	"

Parameter	Location	Sample Type	Frequency
Nickel	"	"	"

*CWS - Cooling Water System

2. Biological Monitoring

a. Thermal Studies

Sampling shall be done on a bimonthly basis commencing one month after certification and shall continue for a period of one year after Unit 4 is on line. Such sampling shall consist of a baseline survey and an intensive survey. Sampling methodology shall be the same as that in the 1979 aquatic biology studies. Deviations from that methodology shall be approved by the DEP.

All raw data shall be available upon request by DEP. At the end of the first year of post-operational study, the Department shall review all of the data in the form of an annual report and shall determine if mitigative action must be taken by TECO and shall determine if the impacts of the thermal discharge are in compliance with the requirements of Section 62-302.520, F.A.C., and if the thermal mixing zone granted by Condition II.A.3 is appropriate. If the data are sufficient to convince the Department that severe thermal effects have been confined to an acceptably limited area, the monitoring studies shall be terminated. If not, the studies shall be continued until such time as the thermal impact can be thoroughly evaluated.

(1) Baseline Survey

In order to put the 1979 benthic study in proper ecological perspective regarding the regular cyclical biotic fluctuations which are known to occur in Tampa Bay, the following program shall be implemented:

(a) Benthic macroinvertebrate sampling shall be carried out on a bimonthly basis one month after the time of enactment of certification until a period of 12 months prior to commencement of operation of Unit 4. Five stations corresponding to stations 5, 6, 8, 11, and 12 of the 1979 Benthic Ecology Study* shall be sampled according to the methods outlined in the TECO benthic report. Deviations from that methodology shall be approved by the DEP.

(b) Water quality parameters shall be monitored during the benthic sampling program on a bimonthly basis at each of the above stations. Parameters to be examined shall include salinity, dissolved oxygen, turbidity, and water temperature (top and bottom).

(c) A sediment analysis shall be carried out at each of these stations on a bimonthly basis corresponding to the benthic sampling

according to the methods outlined in the 1979 Benthic Study. If sediment samples show little bimonthly variability, TECO may request a less rigorous sampling frequency.

*"A Study of Thermal Effects on Benthic Communities of Big Bend, Tampa Bay (Florida)", July 1980. TECO

(2) Intensive Survey

In order to adequately assess the thermal impact of Big Bend Unit 4 in conjunction with the combined plume discharge from Units 1, 2, and 3, the following biological monitoring program shall be implemented one year before and shall continue for one year after commencement of operation of Unit 4. A proposal for these intensive studies shall be prepared by the applicant and shall be submitted to DEP for approval at least 18 months prior to commercial operation of Unit 4. Such a proposal shall reflect the methodologies employed during the 1979 study so that both data sets can be compared for evaluation of thermal impact from Unit 4.

(a) The applicant shall collect bimonthly benthic, samples. The stations to be chosen for the Benthic sampling program shall be taken from the 1979 Benthic Ecology Study plus three additional stations. These three stations shall be located on a transect running into the bay from station 8, paralleling stations 5, 6, and 7 of the 1979 study. Water quality parameters and sediment samples shall be collected and analyzed as in the baseline survey.

(b) Stations 1 and 2 shall be deleted from the proposed studies.

(c) Trammel (or gill net) and trawl samples shall be taken each month during the day and at night in the vicinity of the embayment-Apollo Beach pass. If possible, night sampling shall be during a flood tide. Additionally, monthly seine samples shall be collected in the area during the day.

b. Entrainment

(1) In order to evaluate the entrainment mortality at the Big Bend Station, TECO shall conduct a Fine Mesh Screen Survivability Study (similar to the 1980 Prototype FMS study) for one full spawning period (March through September). Sampling for the study will be conducted at three locations pertaining to Unit 4:

Station 1: Front of screen after organisms are impinged and washed to the screen return system.

Station 2: Behind the screen.

Station 3: At the discharge point in the Organism Return Canal (ORC).

Stations 1 and 2 will be sampled simultaneously to estimate the total number of organisms entrained at the plant. Initial and latent mortality tests will be conducted on organisms collected at stations 1 and 3 only. A detailed scope of study shall be submitted by TECO at least twelve months prior to the commencement of commercial operation of Unit 4.

The applicant shall implement the fine mesh screens inspection and maintenance program submitted to the Department on July 21, 1987, to assure that the screens are properly maintained and operated. The applicant shall maintain logs of inspections, maintenance, and repairs. The logs shall include the date of inspection, items inspected, repairs needed, and date maintenance job request submitted.

III. Water Use

A. Use of Water

TECO shall use the lowest quality water which it has the ability to use. To the extent that a dependable supply of non-potable water can be provided, TECO shall use the non- potable water in lieu of the potable water from the public water supply system of Hillsborough County. However, if TECO can demonstrate that non-potable water is not available due to technical or environmental reasons, then the use of potable water may be authorized by the Secretary upon the concurrence of the Southwest Florida Water Management District (SWFWMD).

B. Consumptive Use of Groundwater

1. In the event that fresh groundwater in excess of quantities permitted by SWFWMD should be required for the operation of Big Bend Unit 4, TECO shall demonstrate to the satisfaction of the SWFWMD that such a consumptive use of groundwater will be in compliance with the regulations and policies of the District and will have no significant adverse effect on regional water supplies.

2. In the event that use of brackish groundwater should become necessary, an intensive investigation and aquifer testing program shall be performed by TECO. The aquifer testing program shall be submitted to the Department and the Director, Regulatory Division of SWFWMD, and approved prior to commencement of the investigation. The investigation should include but need not be limited to the following:

a. The geology encountered while drilling the well, with emphasis placed on the depth, thickness and hydraulic characteristics of formations

encountered.

b. The aquifer systems that are encountered, along with the discussion on water quality and availability.

c. Performance of a pump test, description of aquifer characteristics and evaluation procedure.

d. Interpretations of geophysical logs.

e. Discussion of aquifer recharge and ultimate source.

Upon completion of the investigations, TECO shall submit a report on the feasibility of utilizing brackish groundwater for cooling tower make-up, and at that time the SWFWMD may authorize withdrawals. If SWFWMD should authorize withdrawals of brackish water, TECO shall submit monthly pumpage reports and chlorides, sulfate and TDS analysis on the production well to the SWFWMD.

C. Emergency Shortages

In the event an emergency water shortage should be declared pursuant to Section 373.175 or 373.246, F.S., by Southwest Florida Water Management District for an area including Hillsborough County, the Department pursuant to Section 403.516, F.S., may alter, modify, or declare to be inactive all or parts of Condition III.A.-E. An authorized SWFWMD representative at any reasonable time may enter the property to inspect the facilities.

D. Monitoring and Reporting

Tampa Electric Company shall monitor the groundwater at Big Bend Station in accordance with the approved groundwater monitoring program:

IV. Control Measures During Construction

A. Stormwater Runoff

During construction, necessary measures shall be used to settle, filter, treat or absorb silt-containing or pollutant-laden stormwater runoff to limit the suspended solids to 50 mg/l or less at the POD during rainfall periods less than the 10-year, 24-hour rainfall, and to prevent an increase in turbidity of more than 50 Jackson Turbidity Units above background in waters of the State beyond 150 meters from the POD.

Control measures shall consist at the minimum of filters, sediment traps, barriers, berms or vegetative planting. Exposed or disturbed soil shall be protected as soon as possible to minimize silt- and sediment-laden runoff. The pH shall be kept within the range of 6.0 to 8.5 at the POD.

B. Sanitary Wastes

Disposal of sanitary wastes from construction toilet facilities shall be in accordance with applicable regulations of the Department and appropriate local health agency. The sewage treatment plant shall be operated in accordance with Chapters 62-302, 62-600, and 62-601, F.A.C., section 403.867, F.S. and the rules promulgated thereunder.

C. Environmental Control Program

An environmental control program shall be established under the supervision of a qualified person to assure that all construction activities conform to good environmental practices and the applicable conditions of certification.

The licensee shall notify the Department by telephone if unexpected harmful effects or evidence of irreversible environmental damage are detected during construction, shall immediately report in writing to the Department and shall within two weeks provide an analyses of the problem and a plan to eliminate or significantly reduce the harmful effects or damage and a plan to prevent reoccurrence.

D. Discharge of Construction Dewatering Effluent

Construction dewatering effluent shall be treated as appropriate to limit suspended solids to no more than 50 mg/l. The discharge of construction dewatering liquids shall not cause turbidity in excess of 50 Jackson Turbidity Units above ambient beyond a 20 meter radius from the point of discharge. Weekly grab samples will be collected and analyzed for suspended solids.

V. Solid Wastes

Solid wastes resulting from construction or operation shall be disposed of in accordance with the applicable regulations of Chapter 62-701 and 62-702, F.A.C. The licensee shall submit a program for approval outlining the methods to be used in handling and disposal of solid wastes. Such program shall indicate at the least methods for erosion control, covering, vegetation and quality control.

Open burning in connection with land clearing shall be in accordance with

Chapter 62-256, F.A.C. No additional permits shall be required, but the Division of Forestry shall be notified prior to burning. Open burning shall not occur if the Division of Forestry has issued a ban on burning due to fire hazard conditions.

VI. Operation Safeguards

The overall design, layout, and operation of the facilities shall be such as to minimize hazards to humans and the environment. Security control measures shall be utilized to prevent exposure of the public to hazardous conditions. The Federal Occupational Safety and Health Standards will be complied with during construction and operation. The Safety Standards specified under Section 440.56, F.S., by the Industrial Safety Section of the Florida Department of Commerce will also be complied with.

VII. Screening

The licensee shall provide screening of the site through the use of aesthetically acceptable structures, vegetated earthen walls and/or existing or planted vegetation in accordance with Hillsborough County ordinances.

VIII. Potable Water Supply System

The potable water supply system shall be designed and operated in conformance with Chapter 62-555, F.A.C. Information as required in 62-555, F.A.C., shall be submitted to the Department prior to construction and operation. The operator of the potable water supply system shall be certified in accordance with section 403.067, F.S., and rules promulgated thereunder.

IX. Transformer and Electric Switching Gear

The foundations for transformers, capacitors, and switching gear necessary to connect Big Bend Unit 4 to the existing distribution system shall be constructed of an impervious material and shall be constructed in such a manner as to allow complete collection and recovery of any spills or leakage of oily, toxic, or hazardous substances. Should a spill occur, the following steps shall be taken:

A. The spill will be assessed and cleanup activities will be initiated;

B. Equipment will be isolated, if necessary, and the source of the spill will be stopped;

C. Gravel and mineral oil will be removed and clean gravel will be replaced; and

D. Measures will be implemented as necessary in accordance with the Oil Spill Prevention Control and Countermeasure Plan for Big Bend Station.

X. Toxic, Deleterious, or Hazardous Materials

The spill of any toxic, deleterious, or hazardous materials shall be reported in the manner specified by Condition XV.

XI. Construction in Waters of the State

A. Intake and Discharge

1. No construction on sovereignty submerged lands shall commence without obtaining lease or title from the Department of Environmental Protection.

2. Construction of intake and discharge structures should be done in a manner to minimize turbidity. Turbidity screens should be used to prevent turbidity in excess of 50 JTUs above background beyond 150 meters from the dredging, pile driving, or construction site.

3. The construction methodology for the intake structure and screens shall be provided to the Department's Southwest District Office for review prior to construction.

4. All spoil shall be piped hydraulically or trucked to an upland disposal site of sufficient capacity to retain all material.

5. Effective stabilization of submerged bottom sediments at the Cooling Water System discharge should be achieved and maintained during the period of operation by the placement of concrete, riprap or other suitable material.

B. Relocation of Jackson Branch

1. An equivalent square footage of mangroves will be replanted in the new creek cut.

2. The new creek will have 6:1 side slopes from +1' MSL to -1 ' MSL.

3. Juncus sp. are to be planted at three foot intervals for the entire length of the relocated segment of the branch according to sound management practices.

4. The 90O turn in the creek should be stabilized by riprap as well as the planting of a higher concentration of Juncus sp. on the outside of the turn.

5. The relocated cut is to be excavated and stabilized behind an upstream plug before being connected to the existing creek; conversely, the existing branch shall not be taken off line until the new cut is stabilized and JTUs are less than 25 in the new channel.

6. Licensee should submit to the Southwest District Office a replanting proposal at least 60 days prior to commencement of construction, including species, methods and placement details.

7. Licensee will monitor the outfall of Jackson Branch twice daily during construction for turbidity in JTUs and report these results weekly to the Southwest District Office.

C. Newman Branch

1. In the construction of the FGD/gypsum disposal areas, TECO shall not alter the ditch along the east side of Beach Road, as that ditch is tidally connected to Newman Branch.

2. To mitigate against the loss of the grass pond in the area designated as Phase I of the FGD/gypsum disposal area, TECO shall reconstruct the northernmost east-west drainage canal. The side slopes of this drainage canal from Beach Road to the eastern side of the Phase I area shall be reduced to at least 6:1 (horizontal to vertical) and planted with Juncus sp. The remaining portion of the reconstructed ditch-from the Phase I area east to U.S. Highway 41 shall have side slopes of at least 3:1 (horizontal to vertical). Such reconstruction shall be done in a manner to prevent violation of Section 62-302, F.A.C., Water Quality Criteria, and in accordance with the plans approved by the Department.

XII. FGD/Gypsum Landfill

The proposed FGD/gypsum landfill area shall be monitored and studied pursuant to a detailed groundwater testing and monitoring program as defined in Condition III D.

The results of the program will be used by the Department in determining whether TECO has affirmatively demonstrated that Florida Water Quality Criteria (Chapter 62-302, F.A.C) will not be violated.

If the Department determines that TECO has failed to affirmatively demonstrate that Florida Water Quality Criteria (Chapter 62-302, F.A.C) will not be violated, TECO

shall within 90 days of such determination present to the Department a plan of correction (which may include, if appropriate, an impermeable liner) for review and approval by the Department and for timely implementation by TECO.

Construction of perimeter berms shall be in conformance with the provisions of Chapter 62-672, F.A.C., regarding earthen dams.

XIII. Transmission Lines

Directly associated transmission lines shall be constructed and maintained in order to minimize environmental impacts in accordance with Chapter 403, F.S.

XIV. Change in Discharge

All discharges or emission authorized herein shall be consistent with the terms and conditions of this certification. The discharge of any pollutant not identified in the application or any discharge more frequent than, or at a level in excess of, that authorized herein shall constitute a violation of the certification. Any anticipated facility expansions, production increases, or process modification which will result in new, different or increased discharges or expansion in steam generating capacity will require a submission of a new or supplemental application pursuant to Chapter 403, Florida Statutes.

XV. Noncompliance Notification

If, for any reason, the licensee does not comply with or will be unable to comply with any limitation specified in this certification, the licensee shall notify the Director of DEP's Southwest District Office by telephone during the working day in which licensee becomes aware of said noncompliance and shall confirm this situation in writing within seventy-two (72) hours supplying the following information:

A. A description and cause of noncompliance; and

B. The period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate and prevent recurrence of the noncomplying event.

XVI. Facilities Operation

The licensee shall at all times maintain in good working order and operate as efficiently as possible all treatment or control facilities or systems installed or used by the licensee to achieve compliance with the terms and conditions of this certification.

Such systems are not to be bypassed without prior Department approval. The one exception is that during periods when light oil is used for ignition, the FGD system may be bypassed.

XVII. Adverse Impact

The licensee shall take all reasonable steps to minimize any adverse impact resulting from noncompliance with any limitation specified in this certification, including, but not limited to, such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying event.

XVIII. Right of Entry

The licensee shall allow the Secretary of the Florida Department of Environmental Protection and/or authorized representatives, upon the presentation of credentials:

A. To enter upon the licensee's premises where an effluent source is located or in which records are required to be kept under the terms and conditions of this permit; and

B. To have access to and copy all records required to be kept under the conditions of this certification; and

C. To inspect and test any monitoring equipment or monitoring method required in this certification and to sample any discharge or pollutants; and

D. To assess any damage to the environment or violation of ambient standards.

XIX. Revocation or Suspension

This certification may be suspended or revoked pursuant to Section 403.512, Florida Statutes, or for violations of any Condition of Certification.

XX. Civil and Criminal Liability

This certification does not relieve the licensee from civil or criminal liability for noncompliance with any conditions of this certification, applicable rules or regulations of the Department, or Chapter 403, Florida Statutes, or regulations thereunder.

Subject to Section 403.511, Florida Statutes, this certification shall not preclude

the institution of any legal action or relieve the licensee from any responsibilities or penalties established pursuant to any other applicable State Statutes or regulations.

XXI. Property Rights

The issuance of this certification does not convey any property rights in either real or personal property, tangible or intangible, nor any exclusive privileges, nor does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of Federal, State, or local laws or regulations. The applicant will obtain title, lease or right of use to any sovereign submerged lands occupied by the plant, transmission line structures, or appurtenant facilities from the State of Florida.

XXII. Severability

The provisions of this certification are severable, and, if any provision of this certification or the application of any provision of this certification is held invalid, the application of such provision to other circumstances and the remainder of the certification shall not be affected thereby.

XXVIII. Definitions

The meaning of terms used herein shall be governed by the definitions contained in Chapter 403, Florida Statutes, and any regulation adopted pursuant thereto. In the event of any dispute over the meaning of a term used in these general or special conditions which is not defined in such statutes or regulations, such dispute shall be resolved by reference to the most relevant definitions contained in any other state or federal statute or regulation or, in the alternative, by the use of the commonly accepted meaning as determined by the Department.

XXIV. Review of Site Certification

The certification shall be final unless revised, revoked or suspended pursuant to law. At least every five years from the date of issuance of this certification or any National Pollutant Discharge Elimination System Permit issued pursuant to the Federal Water Pollution Control Act Amendments of 1972 for the plant units, the Department shall review all monitoring data that has been submitted to it during the preceding five-year period for the purpose of determining the extent of the licensee's compliance with the conditions of this certification of the environmental impact of this facility. The Department shall submit the results of its review and recommendations to the licensee. Such review will be repeated at least every five years thereafter.

XXV. Modification of Conditions

The conditions of this certification may be modified in the following manner:

A. The Board hereby delegates to the Secretary the authority to modify, after notice and opportunity for hearing, any conditions pertaining to consumptive use of water, monitoring, sampling, groundwater, mixing zones, zones of discharge or variances to water quality standards.

B. All other modifications shall be made in accordance with Section 403.516, Florida Statutes.

XXVI. Flood Control Protection

The plant and associated facilities shall be constructed in such a manner as to comply with the Hillsborough County flood protection requirements.

XXVII. Effect of Certification

Certification and conditions of certification are predicated upon design and performance criteria indicated in the application. Thus, conformance to those criteria, unless specifically amended, modified, or as the Department and parties are otherwise notified, is binding upon the applicant in the preparation, construction and maintenance of the certified project. In those instances where a conflict occurs between the application's design criteria and the conditions of certification, the conditions shall prevail.

XXVIII. Fine Mesh Screens

Fine mesh screens, similar to those tested and described by TECO in the 316 Demonstration, shall be installed on the intakes of Units 3 and 4 with the appropriate sprays and screen wash sluice return system to minimize entrainment. The screen wash sluice return system shall discharge to the east end of the canal north of the intake canal or to a location acceptable to the Department and EPA. The applicant shall operate the fine mesh screens for Units 3 and 4 intake structures and the organism return mechanism from March 15 through October 15 of each year.

XXIX. Noise

To mitigate the effects of noise produced by the steam blowout of steam boiler tubes and by construction of the Phase IV FGD byproduct disposal area, TECO shall conduct public awareness campaigns prior to such activities to forewarn the public of

the estimated time and duration of the noise.

XXX. Variances

TECO is granted variances for discharges of FGD system blowdown pursuant to Sections 403.201 and 403.511(2) F.S., for a period of two years from October 1, 1989 for the following parameters:

A. Arsenic - 62-302.530(5), F.A.C.
B. Cadmium - 62-302.530(16), F.A.C.
C. Chromium - 62-302.530(20), F.A.C.
D. Copper - 62-302.530(24), F.A.C.
E. Iron - 62-302.530(39), F.A.C.
F. Mercury - 62-302/530(42), F.A.C.
G. Nickel - 62-302.530(45), F.A.C.
H. Selenium - 62-302.530(59), F.A.C.

During the period that the variance is in effect, TECO shall (1) determine the concentrations of the above metals as well as lead in the two discharge streams; (2) operate the FGD blowdown treatment system so as to minimize the metal content of the discharge from the system; and (3) submit reports of the above studies by October 31, 1990, and June 30, 1991.

Upon receipt of the aforementioned reports, the Secretary shall determine whether the variances should be renewed and may impose appropriate conditions to minimize the discharges and their impacts.

XXXI. History

Certification issued 08/17/81; signed by Governor Graham
Modified 09/17/81; signed by Secretary Tschinkel
Modified 11/18/82; signed by Governor Graham
Modified 03/19/84; signed by Governor Graham
Modified 03/16/87; signed by Secretary Twachtmann
Modified 10/12/87; signed by Governor Martinez
Modified 06/06/90; signed by Secretary Twachtmann
Modified 04/06/94; signed by Secretary Wetherell
Modified 06/19/95; signed by Secretary Wetherell
Modified 09/18/95; signed by Secretary Wetherell
Modified 02/07/00, signed by Secretary Struhs
Modified 05/17/01; signed by Deputy Secretary Green
Modified 07/29/03, signed by Program Administrator Oven
Modified 09/13/05, signed by Program Administrator Oven

APPENDIX A NPDES PERMIT FL0000817

STATE OF FLORIDA
INDUSTRIAL WASTEWATER FACILITY PERMIT

PERMITTEE:

Tampa Electric Company (TEC)
Post Office Box 111
Tampa, FL 33601-0111

PERMIT NUMBER: FL0000817
PA FILE NUMBER: FL0000817-007-IW1S
ISSUANCE DATE: March 17, 2005
EXPIRATION DATE: March 16, 2010

RESPONSIBLE AUTHORITY:

Mr. David M. Lukcic
Manager of Land and Water
Programs, Environmental, Health and
Safety Department

FACILITY CORRESPONDENCE:

Big Bend Power Station
Post Office Box 111
Tampa, Florida 33601-0111

FACILITY LOCATION:

13031 Wyandotte Road
Apollo Beach, FL 33572
Hillsborough County

Latitude: 27° 47’ 36” N Longitude: 82° 24’ 16” W

This permit is issued under the provisions of Chapter 403, Florida Statutes, and applicable rules of the Florida Administrative Code and constitutes authorization to discharge to waters of the state under the National Pollutant Discharge Elimination System. The above named permittee is hereby authorized to operate the facilities shown on the application and other documents attached hereto or on file with the Department and made a part hereof and specifically described as follows:

The plant consists of four coal-fired steam electric units with a total nameplate rating of 1823 MW and three oil-fired combustion turbines with a combined capacity of 175 MW.

Once-through Cooling Water (OTCW) from Units 1, 2, 3, and 4 is discharged through individual conduits to the facility's discharge canal. Treated Flue Gas Desulfurization (FGD) blowdown is

discharged to one or more of the four OTCW discharge conduits prior to entering the discharge canal. In addition, the combined effluent from the on-site Tampa Bay Water Desalination Facility, including reverse osmosis concentrate, filter backwash/rinse water, and sludge filtrate, is discharged to one or more of the four OTCW discharge conduits prior to entering the discharge canal. The discharge from the Tampa Bay Water Desalination Facility is authorized under a separate permit (FL0186813).

All other industrial wastewater streams from this facility are collected and processed by the on-site recycled water system, authorized under a separate permit (FLA017047) issued by the Department's Southwest District. The recycled water system consists of two percolation/evaporation ponds. The effluent from the percolation pond is recycled back to the facility.

WASTEWATER TREATMENT:

Treatment of Flue Gas Desulfurization (FGD) purge water is achieved by an on-site wastewater treatment facility consisting of neutralization, chemical oxidation, precipitation, clarification, and filtration.

EFFLUENT DISPOSAL:

Surface Water Discharge:

An existing discharge to the discharge canal (Class III Marine waters), D-011. This once-through cooling water outfall from Unit 1 is located approximately at latitude 27° 47' 36" N, longitude 82° 24' 16" W.

An existing discharge to the discharge canal (Class III Marine waters), D-012. This once-through cooling water outfall from Unit 2 is located approximately at latitude 27° 47' 36" N, longitude 82° 24' 12" W.

An existing discharge to the discharge canal (Class III Marine waters), D-013. This once-through cooling water outfall from Unit 3 is located approximately at latitude 27° 47' 36" N, longitude 82° 24' 10" W.

An existing discharge to the discharge canal (Class III Marine waters), D-014. This once-through cooling water outfall from Unit 4 is located approximately at latitude 27° 47' 36" N, longitude 82° 24' 05" W.

An existing discharge to Hillsborough Bay (Class III Marine waters), D-001. This combined plant discharge at the end of the discharge canal is located approximately at latitude 27° 47' 36" N, longitude 82° 24' 45" W.

Internal Outfalls:

This permit authorizes the discharge from an existing internal Outfall I-130 to Outfalls D-011, D-012, D-013, or D-014.

IN ACCORDANCE WITH: The limitations, monitoring requirements and other conditions as set forth in Part I through Part VIII on pages 3 through 21 of this permit.

I. Effluent Limitations and Monitoring Requirements

A. Surface Water Discharges

1. During the period beginning on the issuance date and lasting through the expiration date of this permit, the permittee is authorized to discharge the **Combined Plant Discharge** (consisting of Outfalls D-011, D-012, D-013, D-014, and I-130) from **Outfall D-001**. Such discharge shall be limited and monitored by the permittee as specified below:

	Discharge Limitations			Monitoring Requirements		
Parameters (units)	**Monthly Average**	**Maximum Weekly Average**	**Instantaneous Maximum**	**Monitoring Frequency**	**Sample Type**	**Sample Point**
Flow (MGD)	Report	NA	Report	Continuous	Pump logs	FLW-1
Temperature Water (ºF),	Report1	NA	109[1]	Continuous	Recorder	EFF-1
Temp. Diff. Between Intake and Discharge (ºF),	NA	16.8	NA	6/day	Calculated	INT-1 EFF-1
Oxygen, Dissolved (DO) (MG/L)	See Item 3 below.			Weekly (See Item 4 below)	Grab (See Item 4 below)	INT-2 EFF-2
pH (SU) range	See Item 5 below.			Weekly	Grab	EFF-2

2. Effluent samples shall be taken at the monitoring site locations listed in permit condition I.A.1 and as described below:

Sample Point	Description of Monitoring Location
FLW-1	Flow shall be calculated from the operation of the once-through cooling water pumps located at the intake canal.
EFF-1	Discharge temperature shall be taken from the averaged value of the temperature array located in the discharge canal adjacent to the dilution pump house dock at Outfall D-001.
INT-1	Intake temperature, used for calculating temperature rise, shall be taken at the intake side of each unit condenser.
INT-2	Center of the Eastern Catwalk between the intake structures of Units 2 and 3. Samples shall be taken at the centerline depth and 8 feet above the centerline depth of the intake pipes at the same location on the catwalk.
EFF-2	In the discharge canal next to the dilution pump house dock at Outfall D-001. Dissolved Oxygen readings shall be taken within 3 feet of the water surface.

1 Discharge from Outfall D-001 is also subject to the thermal limitations established by Rule 62-302.520(1), F.A.C.

3. The DO limitations at Sample Point EFF-2 shall be as follows:

For instantaneous values:

a) Shall not be depressed below the intake DO when the intake DO is at or below 4.0 mg/L.

b) Shall be greater than or equal to 4.0 mg/l when the intake DO is greater than 4.0 mg/L

Instantaneous DO values are defined as the average of all individual DO samples taken at a sample point over a four-hour period. The permittee shall maintain four-hour DO averages (to be considered instantaneous values) for both the intake and discharge. The four-hour averaging periods for the discharge shall begin and end two hours after the four-hour averaging periods at the intake sample point. For purposes of determining compliance with the instantaneous DO limitation in Item a) above, the four-hour average discharge DO shall be compared with the corresponding consecutive four-hour average intake DO.

For purposes of determining compliance with the instantaneous DO limitation in Item b) above, the lowest four-hour average discharge DO shall be used.

For 24-hour average values:

a) Shall not be depressed below the 24-hour average intake DO when the 24-hour average intake DO is at or below 5.0 mg/L.

b) Shall be greater than or equal to 5.0 mg/L when the 24-hour average intake DO is greater than 5.0 mg/L.

24-hour average DO values are defined as the average of all individual DO samples taken at a sample point over a 24-hour period. If there are sample periods in excess of twenty-four hours, a separate average DO shall be calculated for each additional twenty-four hour period.

For purposes of determining compliance with the 24-hour DO limitation in Items a) above, the 24-average discharge DO shall be compared with the 24-hour intake DO over the same time period. For purposes of determining compliance with the 24-hour DO limitation in Items b) above, the lowest 24-hour average discharge DO shall be used.

4. Grab samples for both the intake and discharge shall be taken every 10 minutes, for 24 hours, once a week.

5. The pH shall not be less than 6.5 nor greater than 8.5 standard units. If natural background is less than 6.5 units or greater than 8.5 units see (Rule 62-302.530(52)(c) FAC).

6. During the period beginning on the issuance date and lasting through the expiration date of this permit, the permittee is authorized to discharge treated **Flue Gas Desulfurization (FGD) wastewater** from Internal **Outfall I-130** to Outfalls D-011, D-012, D-013, or D-014. Such discharge shall be limited and monitored by the permittee as specified below:

	Discharge Limitations			**Monitoring Requirements**		
Parameters (units)	**Instantaneous Maximum**	**Maximum Daily Average**	**Monthly Average**	**Monitoring Frequency**	**Sample Type**	**Sample Point**
Flow (MGD)	NA	Report	Report	Continuous	Recorder	FLW-2
Solids, Total Suspended (MG/L)	30.0	NA	NA	Quarterly	Grab	EFF-3

	Discharge Limitations			Monitoring Requirements		
Parameters (units)	**Instantaneous Maximum**	**Maximum Daily Average**	**Monthly Average**	**Monitoring Frequency**	**Sample Type**	**Sample Point**
Oil and Grease (MG/L)	15.0	NA	NA	Quarterly	Grab	EFF-3
Arsenic, Total Recoverable (UG/L)	Report2	NA	NA	Quarterly	Grab	EFF-3
Chromium, Total Recoverable (UG/L)	Report[2]	NA	NA	Quarterly	Grab	EFF-3
Copper, Total Recoverable (UG/L)	Report[2]	NA	NA	Quarterly	Grab	EFF-3
Lead, Total Recoverable (UG/L)	Report[2]	NA	NA	Quarterly	Grab	EFF-3
Mercury, Total Recoverable (UG/L)	Report[2]	NA	NA	Quarterly	Grab	EFF-3
Nickel, Total Recoverable (UG/L)	Report[2]	NA	NA	Quarterly	Grab	EFF-3
Selenium, Total Recoverable (UG/L)	Report[2]	NA	NA	Quarterly	Grab	EFF-3
Alpha, Gross Particle Activity (PCI/L)	Report[2]	NA	NA	Quarterly	Grab	EFF-3
Radium 226 + Radium 228, Total (PCI/L)	Report[2]	NA	NA	Quarterly	Grab	EFF-3
pH (SU) range	6.0 to 9.0			Quarterly	Grab	EFF-3

7. Effluent samples shall be taken at the monitoring site locations listed in permit condition I.A.6 and as described below:

Sample Point	Description of Monitoring Location
FLW-2	The flow monitoring location for the treated FGD wastewater.
EFF-3	After final treatment but prior to discharge to Outfalls D-011, D-012, D-013, or D-014.

8. The facility shall at all times ensure that treated effluent from Outfall I-130 is being discharged to one of four once-through cooling water (OTCW) outfall discharge pipes that is discharging at a flow rate of approximately 250,000 gpm. This shall be achieved by rerouting the flow from Outfall I-130 to another OTCW outfall pipe if flow in the first outfall pipe is being discontinued or reduced.

B. Underground Injection Control Systems

1. This section is not applicable to this facility.

C. Land Application Systems

1. This section is not applicable to this facility..

2 After four quarters of reporting the permittee may request by minor permit revision a reduction or discontinuation of monitoring for these parameters.

D. Other Methods of Disposal or Recycling

1. This section is not applicable to this facility.

E. Other Limitations and Monitoring and Reporting Requirements

1. The sample collection, analytical test methods and method detection limits (MDLs) applicable to this permit shall be in accordance with Rule 62-4.246, Chapters 62-160 and 62-601, F.A.C., and 40 CFR 136, as appropriate. The list of Department established analytical methods, and corresponding MDLs (method detection limits) and PQLs (practical quantification limits), which is titled "Florida Department of Environmental Protection Table as Required By Rule 62-4.246(4) Testing Methods for Discharges to Surface Water" dated June 21, 1996, is available from the Department on request. The MDLs and PQLs as described in this list shall constitute the minimum acceptable MDL/PQL values and the Department shall not accept results for which the laboratory's MDLs or PQLs are greater than those described above unless alternate MDLs and/or PQLs have been specifically approved by the Department for this permit. Any method included in the list may be used for reporting as long as it meets the following requirements:

   a. The laboratory's reported MDL and PQL values for the particular method must be equal or less than the corresponding method values specified in the Department's approved MDL and PQL list;

   b. The laboratory reported PQL for the specific parameter is less than or equal to the permit limit or the applicable water quality criteria, if any, stated in Chapter 62-302, F.A.C. Parameters that are listed as "report only" in the permit shall use methods that provide a PQL, which is equal to or less than the applicable water quality criteria stated in 62-302 FAC; and

   c. If the PQLs for all methods available in the approved list are above the stated permit limit or applicable water quality criteria for that parameter, then the method with the lowest stated PQL shall be used.

   Where the analytical results are below method detection or practical quantification limits, the permittee shall report the actual laboratory MDL and/or PQL values for the analyses that were performed following the instructions on the applicable discharge monitoring report. Approval of alternate laboratory MDLs or PQLs are not necessary if the laboratory reported MDLs and PQLs are less than or equal to the permit limit or the applicable water quality criteria, if any, stated in Chapter 62-302, F.A.C. However, where necessary, the permittee may request approval for alternative methods or for alternative MDLs and PQLs for any approved analytical method, in accordance with the criteria of Rules 62-160.520 and 62-160.530, F.A.C.

2. The Department is continuing the previously approved alternative MDL/PQL values for Mercury as follows:

Parameter	EPA Method	MDL	PQL
Mercury	245.1/245.2	10.0 µg/L	25.0 µg/L

   In accordance with Item VI.7 of the Schedules section of this permit, the permittee shall provide information to the Department that re-affirms the need for alternate MDL/PQL values for Mercury based on analytical interferences associated with the solids in the effluent matrix due the FGD blowdown discharge. The Department reserves the right to revise the above MDL/PQL and/or methods as appropriate based on information provided and other laboratory analytical information available to the Department.

3. Monitoring requirements under this permit are effective on the first day of the second month following permit issuance. Until such time, the permittee shall continue to monitor and report in accordance with previously effective permit requirements, if any. During the period of operation authorized by this permit, the permittee shall complete and submit to the Department, at the address listed below, the Discharge Monitoring Reports (DMRs) in accordance with the frequencies specified by the REPORT type (i.e., monthly, toxicity, quarterly,

semiannual, annual, etc.) indicated on the DMR forms attached to this permit. Monitoring results for each monitoring period shall be submitted in accordance with the associated DMR due dates below.

REPORT Type on DMR	Monitoring Period	DMR Due Date
Monthly or Toxicity	first day of month – last day of month	28th day of following month
Quarterly	January 1 - March 31 April 1 – June 30 July 1 – September 30 October 1 – December 31	April 28 July 28 October 28 January 28
Semiannual	January 1 – June 30 July 1 – December 31	July 28 January 28
Annual	January 1 – December 31	January 28

DMRs shall be submitted for each required monitoring period including months of no discharge.

The permittee shall make copies of the attached DMR form(s) and shall submit the completed DMR form(s) to the Department at the address specified below:

Florida Department of Environmental Protection
Wastewater Compliance Evaluation Section, Mail Station 3551
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

4. Unless specified otherwise in this permit, all reports and notifications required by this permit, including twenty-four hour notifications, shall be submitted to or reported to the Southwest District Office at the address specified below:

   Florida Department of Environmental Protection
   Southwest District
   3804 Coconut Palm Drive
   Tampa, Florida 33618-8318
   Phone Number (813) 744-6100

5. All reports and other information shall be signed in accordance with requirements of Rule 62-620.305, F.A.C. *[62-620.305]*.

6. Parameters which must be monitored as a result of a surface water discharge shall be analyzed using a sufficiently sensitive method in accordance with 40 CFR Part 136.

7. The permittee shall provide safe access points for obtaining representative samples which are required by this permit.

8. If there is no discharge from the facility on a day scheduled for sampling, the sample shall be collected on the day of the next discharge.

9. Any bypass of the treatment facility which is not included in the monitoring specified in sections I.A, I.B, I.C, or I.D, is to be monitored for flow and all other required parameters. For parameters other than flow, at least

one grab sample per day shall be monitored. Daily flow shall be monitored or estimated, as appropriate, to obtain reportable data. All monitoring results shall be reported on the appropriate DMR.

10. The permittee is authorized to discharge from Outfalls D-011, D-012, D-013, and D-014 without limitations or monitoring requirements.

11. The permittee is authorized to discharge intake screen backwash water from Units 1, 2, 3, and 4 to the intake canal without limitations or monitoring requirements, except as noted in Section I.E.12 below.

12. Intake screen wash water from Units 3 and 4 shall be discharged to the Apollo Beach embayment, south of the discharge canal during the period from March 15 through October 15, and may be discharged without limitations or monitoring requirements. Any bypasses of the fine mesh screens during this period shall be reported to the Department.

13. There shall be no discharge of floating solids or visible foam in such amounts that form a nuisance and no discharge of a visible oil sheen at any time in accordance with Rules 62-302.500(1)(b) and 62-302.530(50)(b), F.A.C. Any such discharges shall be reported to the Department when submitting DMR's.

14. Discharge of any product registered under the Federal Insecticide, Fungicide, and Rodenticide Act to any waste stream which ultimately may be released to waters of the State is prohibited unless specifically authorized elsewhere in this permit. This requirement is not applicable to products used for lawn and agricultural purposes or to the use of herbicides if used in accordance with labeled instructions and any applicable State permit.

A permit revision from the Department shall be required prior to the use of any biocide or chemical additive used in the cooling system or any other portion of the treatment system which may be toxic to aquatic life. The permit revision request shall include:

a. Name and general composition of biocide or chemical
b. Frequencies of use
c. Quantities to be used
d. Proposed effluent concentrations
e. Acute and/or chronic toxicity data (laboratory reports shall be prepared according to EPA document No. EPA-821-R-02-012 entitled, "Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, 5th ed."
f. Product data sheet
g. Product label

The Department shall review the above information to determine if a major or minor permit revision is necessary. Discharge associated with the use of such biocide or chemical is not authorized without a permit revision by the Department. Permit revisions shall be processed in accordance with the requirements of Chapter 62-620, F.A.C.

15. The Permittee shall continue compliance with the facility's Manatee Protection Plan approved by the Department on August 6, 2003.

16. The Permittee shall develop a Plan of Study (POS) pursuant to the schedule in Item VI.4, including a proposed implementation schedule, designed to monitor any potential effects on biological communities from the discharge. Background sampling stations shall be established as needed as part of the POS. The biological community monitoring program shall include, at a minimum, submerged grasses, benthic macroinvertebrates, and fish. Data gathered from other existing Tampa Bay monitoring programs may be used by the permittee if applicable. The Plan of Study shall identify data provided by other existing programs as well as additional monitoring to be conducted by the permittee. The POS shall be submitted to the Department for review and approval.

    Quarterly summary reports shall be submitted to the Department, summarizing and interpreting the data collected. A final report of all data shall be prepared and submitted to the Department with the permit renewal application.

II. Industrial Sludge Management Requirements

A. Basic Management Requirements

1. Sludge or other solids generated from watewater treatment systems shall be recycled or otherwise disposed of in a permitted solid waste management facility in accordance with the requirements of Chapter 62-701, F.A.C.

2. The filter cake sludge from the Flue Gas Desulfurization (FGD) purge treatment system shall be managed in a manner that prevents contact with stormwater or the discharge of wastewater to waters of the State.

3. Storage, transportation, and disposal of sludge/solids characterized as hazardous waste shall be in compliance with Department rules.

4. The permittee shall keep records of the amount of sludge transported for recycling or disposal. If a person other than the permittee is responsible for sludge transportation and disposal the permittee shall also keep the following records:

    a. name, address and telephone number of any transporter, and any manifests or bill of lading used;
    b. name and location of the site of treatment and disposal;
    c. name, address, and telephone number of the entity responsible for the treatment and disposal.

III. Ground Water Monitoring Requirements

1. The ground water monitoring requirements for this facility are regulated under separate Department permit Number FLA017047.

IV. Other Land Application Requirements

1. This section is not applicable to this facility.

V. Operation and Maintenance Requirements

A. Operation of Treatment and Disposal Facilities

1. The permittee shall ensure that the operation of this facility is as described in the application and supporting documents.

2. The operation of the pollution control facilities described in this permit shall be under the supervision of a person who is qualified by formal training and/or practical experience in the field of water pollution control.

B. Record keeping Requirements:

1. The permittee shall maintain the following records on the site of the permitted facility and make them available for inspection:

   a. Records of all compliance monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, including, if applicable, a copy of the laboratory certification showing the certification number of the laboratory, for at least three years from the date the sample or measurement was taken;

   b. Copies of all reports, other than those required in items a. and f. of this section, required by the permit for at least three years from the date the report was prepared, unless otherwise specified by Department rule;

   c. Records of all data, including reports and documents used to complete the application for the permit for at least three years from the date the application was filed, unless otherwise specified by Department rule;

   d. A copy of the current permit;

   e. A copy of any required record drawings;

   f. Copies of the logs and schedules showing plant operations and equipment maintenance for three years from the date on the logs or schedule.

   g. Records shall be maintained on-site and available to the Department, which demonstrate that the combined total withdrawal from the Hillsborough Bay does not exceed 1.40 billion gallons per day during times of operation of the auxiliary supply water system that provides water for the Tampa Bay Desalination Facility.

VI. Schedules

1. A Best Management Practices Pollution Prevention (BMP3) Plan shall be prepared and implemented in accordance with Part VII of this permit and the following schedule:

   Continue Implementing Existing BMP3 Plan ……. Issuance Date of Permit

2. The permittee shall achieve compliance with the other conditions of this permit as follows:

   Operational level attained …… Issuance Date of permit

3. No later than 14 calendar days following a date identified in the above schedule(s) of compliance, the permittee shall submit either a report of progress or, in the case of specific actions being required by an identified date, a written notice of compliance or noncompliance. In the latter case, the notice shall include the cause of noncompliance, any remedial actions taken, and the probability of meeting the next scheduled requirement.

4. Biological Monitoring Program

   Within three (3) months of the issuance date of this permit, the Permittee shall submit a Plan of Study in accordance with the requirements of Item I.E.16.

5. On-site Storm Water Improvements

The permittee shall initiate and complete on-site storm water improvements in accordance with the time schedule provided below. The time schedule below shall be from the issuance date of this permit. Detailed engineering design shall begin upon Department's approval of the conceptual engineering drawings.

Preliminary Engineering Plans (Plans)...……..……..... 3 months.
Department Review and Approval of the Plans *
Detailed Engineering . …….....……..……. 9 months
Start Construction ……..…… 18 months
Completion of Construction …… 44 months

* The Department shall approve or request additional information within 30 days from the date of receipt of the Plans. If the Department requests additional information, the Department shall complete its review and advise TEC whether the Plans are approved or additional information is required within 30 days from the date of receipt of that additional information.

6. The permittee shall comply with the requirements of 40CFR part 125.95(a)(1) and (2) no later than upon submittal of a timely application for permit renewal, submitted pursuant to the requirements of Condition VII.C. of this permit.

7. Within 60 days of the permit issuance date of this permit, the permittee shall provide information to the Department that reaffirms the need for alternate MDL/PQL values for laboratory Mercury analysis in accordance with the Condition I.E.2 of this permit.

VII. Other Specific Conditions

A. Specific Conditions Applicable to All Permits

1. Drawings, plans, documents or specifications submitted by the permittee, not attached hereto, but retained on file at the Southwest District Office, are made a part hereof.

2. Where required by Chapter 471 (P.E.) or Chapter 492 (P.G.) Florida Statutes, applicable portions of reports to be submitted under this permit, shall be signed and sealed by the professional(s) who prepared them.

3. This permit satisfies Industrial Wastewater program permitting requirements only and does not authorize operation of this facility prior to obtaining any other permits required by local, state or federal agencies.

B. Specific Conditions Related to Construction

1. This section is not applicable to this facility.

C. Duty to Reapply

1. The permittee shall submit an application to renew this permit at least 180 days before the expiration date of this permit.

2. The permittee shall apply for renewal of this permit on the appropriate form listed in Rule 62-620.910, F.A.C., and in the manner established in Chapter 62-620, F.A.C., and the Department of Environmental Protection Guide to Wastewater Permitting including submittal of the appropriate processing fee set forth in Rule 62-4.050, F.A.C.

3. An application filed in accordance with subsections 1. and 2. of this part shall be considered timely and sufficient. When an application for renewal of a permit is timely and sufficient, the existing permit shall not expire until the Department has taken final action on the application for renewal or until the last day for seeking judicial review of the agency order or a later date fixed by order of the reviewing court.

4. The late submittal of a renewal application shall be considered timely and sufficient for the purpose of extending the effectiveness of the expiring permit only if it is submitted and made complete before the expiration date.

D. Specific Conditions Related to Best Management Practices/Pollution Prevention Conditions

1. General Conditions

In accordance with Section 304(e) and 402(a)(2) of the Clean Water Act (CWA) as amended, 33 U.S.C. §§ 1251 et seq., and the Pollution Prevention Act of 1990, 42 U.S.C. §§ 13101-13109, the permittee must develop and implement a plan for utilizing practices incorporating pollution prevention measures. References to be considered in developing the plan are "Criteria and Standards for Best Management Practices Authorized Under Section 304(e) of the Act," found at 40 CFR 122.44 Subpart K and the Waste Minimization Opportunity Assessment Manual, EPA/625/7-88/003.

a. Definitions

(1) The term "pollutants" refers to conventional, non-conventional and toxic pollutants.

(2) Conventional pollutants are: biochemical oxygen demand (BOD), suspended solids, pH, fecal coliform bacteria and oil & grease.

(3) Non-conventional pollutants are those which are not defined as conventional or toxic.

(4) Toxic pollutants include, but are not limited to: (a) any toxic substance listed in Section 307(a)(1) of the CWA, any hazardous substance listed in Section 311 of the CWA, or chemical listed in Section 313(c) of the Superfund Amendments and Reauthorization Act of 1986; and (b) any substance (that is not also a conventional or non-conventional pollutant except ammonia) for which EPA has published an acute or chronic toxicity criterion.

(5) "Pollution prevention" and "waste minimization" refer to the first two categories of EPA's preferred hazardous waste management strategy: first, source reduction and

then, recycling.

(6) "Recycle/Reuse" is defined as the minimization of waste generation by recovering and reprocessing usable products that might otherwise become waste; or the reuse or reprocessing of usable waste products in place of the original stock, or for other purposes such as material recovery, material regeneration or energy production.

(7) "Source reduction" means any practice which: (a) reduces the amount of any pollutant entering a waste stream or otherwise released into the environment (including fugitive emissions) prior to recycling, treatment or disposal; and (b) reduces the hazards to public health and the environment associated with the release of such pollutant. The term includes equipment or technology modifications, process or procedure modifications, reformulation or redesign of products, substitution of raw materials, and improvements in housekeeping, maintenance, training, or inventory control. It does not include any practice which alters the physical, chemical, or biological characteristics or the volume of a pollutant through a process or activity which itself is not integral to, or previously considered necessary for, the production of a product or the providing of a service.

(8) "BMP3" means a Best Management Plan incorporating the requirements of 40 CFR § 122.44, Subpart K, plus pollution prevention techniques associated with a Waste Minimization Assessment.

(9) "Waste Minimization Assessment" means a systematic planned procedure with the objective of identifying ways to reduce or eliminate waste.

2. **Best Management Practices/Pollution Prevention Plan**

The permittee shall develop and implement a BMP3 plan for the facility which is the source of wastewater and storm water discharges covered by this permit. The plan shall be directed toward reducing those pollutants of concern which discharge to surface waters and shall be prepared in accordance with good engineering and good housekeeping practices. For the purposes of this permit, pollutants of concern shall be limited to toxic pollutants, as defined above, known to the discharger. The plan shall address all activities which could or do contribute these pollutants to the surface water discharge, including process, treatment, and ancillary activities. The BMP3 plan shall contain the following components:

a. Signatory Authority & Management Responsibilities

The BMP3 plan shall be signed by the permittee or their duly authorized representative in accordance with rule 62-620.305(2)(a) and (b). The BMP3 plan shall be reviewed by the plant environmental/engineering staff and plant manager. Where required by Chapter 471 (P.E.) or Chapter 492 (P.G.) Florida Statutes, applicable portions of the BMP3 plan shall be signed and sealed by the professional(s) who prepared them.

A copy of the plan shall be retained at the facility and shall be made available to the Department upon request.

The BMP3 plan shall contain a written statement from corporate or plant management indicating management's commitment to the goals of the BMP3 program. Such statements shall be publicized or made known to all facility employees. Management shall also provide training for the individuals responsible for implementing the BMP3 plan.

b. BMP3 Plan Requirements

(1) Name & description of facility, a map illustrating the location of the facility & adjacent receiving waters, and other maps, plot plans or drawings, as necessary;

(2) Overall objectives (both short-term and long-term) and scope of the plan, specific reduction goals for pollutants, anticipated dates of achievement of reduction, and a description of means for achieving each reduction goal;

(3) A description of procedures relative to spill prevention, control & countermeasures and a description of measures employed to prevent storm water contamination;

(4) A description of practices involving preventive maintenance, housekeeping, recordkeeping, inspections, and plant security; and

c. Waste Minimization Assessment

The permittee is encouraged but not required to conduct a waste minimization assessment (WMA) for this facility to determine actions that could be taken to reduce waste loadings and chemical losses to all wastewater and/or storm water streams.

If the Permittee elects to develop and implement a WMA, information on plan components can be obtained from the Department's Industrial Wastewater website, or from:

Florida Department of Environmental Protection
Industrial Wastewater Section, Mail Station 3545
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

(850) 245-8589
(850) 245-8669 -- Fax

d. Best Management Practices & Pollution Prevention Committee Recommended:

A Best Management Practices Committee (Committee) should be established to direct or assist in the implementation of the BMP3 plan. The Committee should be comprised of individuals within the plant organization who are responsible for developing the BMP3 plan and assisting the plant manager in its implementation, monitoring of success, and revision. The activities and responsibilities of the Committee should address all aspects

of the facility's BMP3 plan. The scope of responsibilities of the Committee should be described in the plan.

e. Employee Training

Employee training programs shall inform personnel at all levels of responsibility of the components & goals of the BMP3 plan and shall describe employee responsibilities for implementing the plan. Training shall address topics such as good housekeeping, materials management, record keeping & reporting, spill prevention & response, as well as specific waste reduction practices to be employed. Training shall also disclose how individual employees may contribute suggestions concerning the BMP3 plan or suggestions regarding Pollution Prevention. The plan shall identify periodic dates for such training.

f. Plan Development & Implementation

The BMP3 plan shall be implemented upon the effective date of this permit, unless any later dates are specified in this permit. If a WMA is ongoing at the time of development or implementation it may be described in the plan. Any waste reduction practice which is recommended for implementation over a period of time may also be identified in the plan, including a schedule for its implementation.

g. Submission of Plan Summary & Progress/Update Reports

(1) Plan Summary: Not later than 2 years after the effective date of the permit, a summary of the BMP3 plan shall be developed and maintained at the facility and made available to the Department upon request. The summary shall include the following: a brief description of the plan, its implementation process, schedules for implementing identified waste reduction practices, and a list of all waste reduction practices being employed at the facility. The results of WMA studies, as well as scheduled WMA activities may be discussed.

(2) Progress/Update Reports: Annually thereafter for the duration of the permit progress/update reports documenting implementation of the plan shall be maintained at the facility and made available to the Department upon request. The reports shall discuss whether or not implementation schedules were met and revise any schedules, as necessary. The plan shall also be updated as necessary and the attainment or progress made toward specific pollutant reduction targets documented. Results of any ongoing WMA studies as well as any additional schedules for implementation of waste reduction practices may be included.

(3) A recommended timetable for the various plan requirements follows:

Timetable for BMP3 Plan:

ELEMENT	TIME FROM EFFECTIVE DATE OF THIS PERMIT
Complete WMA (if	6 months

ELEMENT	TIME FROM EFFECTIVE DATE OF THIS PERMIT
appropriate)	
Progress/Update Reports	3 years, and then annually thereafter

The permittee shall maintain the plan and subsequent reports at the facility and shall make the plan available to the Department upon request.

h. Plan Review & Modification

If following review by the Department, the BMP3 plan is determined insufficient, the permittee will be notified that the BMP3 plan does not meet one or more of the minimum requirements of this Part. Upon such notification from the Department, the permittee shall amend the plan and shall submit to the Department a written certification that the requested changes have been made. Unless otherwise provided by the Department, the permittee shall have 30 days after such notification to make the changes necessary.

The permittee shall modify the BMP3 plan whenever there is a change in design, construction, operation, or maintenance, which has a significant effect on the potential for the discharge of pollutants to waters of the State or if the plan proves to be ineffective in achieving the general objectives of reducing pollutants in wastewater or storm water discharges. Modifications to the plan may be reviewed by the Department in the same manner as described above.

E. Specific Conditions Related to Existing Manufacturing, Commercial, Mining, and Silviculture Wastewater Facilities or Activities

1. Existing manufacturing, commercial, mining, and silvicultural wastewater facilities or activities that discharge into surface waters shall notify the Department as soon as they know or have reason to believe:

   a. That any activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following levels
      (1) One hundred micrograms per liter,
      (2) Two hundred micrograms per liter for acrolein and acrylonitrile; five hundred micrograms per liter for 2,4-dinitrophenol and for 2-methyl-4,6-dinitrophenol; and one milligram per liter for antimony, or
      (3) Five times the maximum concentration value reported for that pollutant in the permit application.

   b. That any activity has occurred or will occur which would result in any discharge, on a non-routine or infrequent basis, of a toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following levels
      (1) Five hundred micrograms per liter,
      (2) One milligram per liter for antimony, or
      (3) Ten times the maximum concentration value reported for that pollutant in the permit application.

F. Reopener Clause

1. The permit shall be revised, or alternatively, revoked and reissued in accordance with the provisions contained in Rules 62-620.325 and 62-620.345 F.A.C., if applicable, or to comply with any applicable effluent standard or limitation issued or approved under Sections 301(b)(2)(C) and (D), 304(b)(2) and 307(a)(2) of the Clean Water Act (the Act), as amended, if the effluent standards, limitations, or water quality standards so issued or approved:

   a. Contains different conditions or is otherwise more stringent than any condition in the permit/or;

   b. Controls any pollutant not addressed in the permit.

   The permit as revised or reissued under this paragraph shall contain any other requirements then applicable.

2. The permit may be reopened to adjust effluent limitations or monitoring requirements should future Water Quality Based Effluent Limitation determinations, water quality studies, DEP approved changes in water quality standards, or other information show a need for a different limitation or monitoring requirement, in accordance with the provisions contained in Rule 62-620.325 F.A.C.

3. The Department may develop a Total Maximum Daily Load (TMDL) during the life of the permit. Once a TMDL has been established and adopted by rule, the Department shall revise this permit to incorporate the final findings of the TMDL, in accordance with the provisions contained in Rule 62-620.325 F.A.C.

VIII. General Conditions

1. The terms, conditions, requirements, limitations and restrictions set forth in this permit are binding and enforceable pursuant to Chapter 403, Florida Statutes. Any permit noncompliance constitutes a violation of Chapter 403, Florida Statutes, and is grounds for enforcement action, permit termination, permit revocation and reissuance, or permit revision. *[62-620.610(1), F.A.C]*

2. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviations from the approved drawings, exhibits, specifications or conditions of this permit constitute grounds for revocation and enforcement action by the Department. *[62-620.610(2), F.A.C.]*

3. As provided in Subsection 403.087(6), F.S., the issuance of this permit does not convey any vested rights or any exclusive privileges. Neither does it authorize any injury to public or private property or any invasion of personal rights, nor authorize any infringements of federal, state, or local laws or regulations. This permit is not a waiver of or approval of any other Department permit or authorization that may be required for other aspects of the total project which are not addressed in this permit. *[62-620.610(3), F.A.C.]*

4. This permit conveys no title to land or water, does not constitute state recognition or acknowledgment of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the State. Only the Trustees of the Internal Improvement Trust Fund may express State opinion as to title. *[62-620.610(4), F.A.C.]*

5. This permit does not relieve the permittee from liability and penalties for harm or injury

to human health or welfare, animal or plant life, or property caused by the construction or operation of this permitted source; nor does it allow the permittee to cause pollution in contravention of Florida Statutes and Department rules, unless specifically authorized by an order from the Department. The permittee shall take all reasonable steps to minimize or prevent any discharge, reuse of reclaimed water, or residuals use or disposal in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit. *[62-620.610(5), F.A.C.]*

6. If the permittee wishes to continue an activity regulated by this permit after its expiration date, the permittee shall apply for and obtain a new permit. *[62-620.610(6), F.A.C.]*

7. The permittee shall at all times properly operate and maintain the facility and systems of treatment and control, and related appurtenances, that are installed and used by the permittee to achieve compliance with the conditions of this permit. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to maintain or achieve compliance with the conditions of the permit. *[62-620.610(7), F.A.C.]*

8. This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit revision, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition. *[62-620.610(8), F.A.C.]*

9. The permittee, by accepting this permit, specifically agrees to allow authorized Department personnel, including an authorized representative of the Department and authorized EPA personnel, when applicable, upon presentation of credentials or other documents as may be required by law, and at reasonable times, depending upon the nature of the concern being investigated, to

   a. Enter upon the permittee's premises where a regulated facility, system, or activity is located or conducted, or where records shall be kept under the conditions of this permit;

   b. Have access to and copy any records that shall be kept under the conditions of this permit;

   c. Inspect the facilities, equipment, practices, or operations regulated or required under this permit; and

   d. Sample or monitor any substances or parameters at any location necessary to assure compliance with this permit or Department rules.

   [62-620.610(9), F.A.C.]

10. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data, and other information relating to the construction or operation of this permitted source which are submitted to the Department may be used by the Department as

evidence in any enforcement case involving the permitted source arising under the Florida Statutes or Department rules, except as such use is proscribed by Section 403.111, Florida Statutes, or Rule 62-620.302, F.A.C. Such evidence shall only be used to the extent that it is consistent with the Florida Rules of Civil Procedure and applicable evidentiary rules. [62-*620.610(10), F.A.C.]*

11. When requested by the Department, the permittee shall within a reasonable time provide any information required by law which is needed to determine whether there is cause for revising, revoking and reissuing, or terminating this permit, or to determine compliance with the permit. The permittee shall also provide to the Department upon request copies of records required by this permit to be kept. If the permittee becomes aware of relevant facts that were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be promptly submitted or corrections promptly reported to the Department. *[62-620.610(11), F.A.C.]*

12. Unless specifically stated otherwise in Department rules, the permittee, in accepting this permit, agrees to comply with changes in Department rules and Florida Statutes after a reasonable time for compliance; provided however, the permittee does not waive any other rights granted by Florida Statutes or Department rules. A reasonable time for compliance with a new or amended surface water quality standard, other than those standards addressed in Rule 62-302.500, F.A.C., shall include a reasonable time to obtain or be denied a mixing zone for the new or amended standard. *[62-620.610(12), F.A.C.]*

13. The permittee, in accepting this permit, agrees to pay the applicable regulatory program and surveillance fee in accordance with Rule 62-4.052, F.A.C. *[62-620.610(13), F.A.C.]*

14. This permit is transferable only upon Department approval in accordance with Rule 62-620.340, F.A.C. The permittee shall be liable for any noncompliance of the permitted activity until the transfer is approved by the Department. *[62-620.610(14), F.A.C.]*

15. The permittee shall give the Department written notice at least 60 days before inactivation or abandonment of a wastewater facility and shall specify what steps will be taken to safeguard public health and safety during and following inactivation or abandonment. *[62-620.610(15), F.A.C.]*

16. The permittee shall apply for a revision to the Department permit in accordance with Rules 62-620.300 and the Department of Environmental Protection Guide to Wastewater Permitting at least 90 days before construction of any planned substantial modifications to the permitted facility is to commence or with Rule 62-620.325(2) for minor modifications to the permitted facility. A revised permit shall be obtained before construction begins except as provided in Rule 62-620.300, F.A.C. *[62-620.610(16), F.A.C.]*

17. The permittee shall give advance notice to the Department of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements. The permittee shall be responsible for any and all damages which may result from the changes and may be subject to enforcement action by the Department for penalties or revocation of this permit. The notice shall include the following information:

a. A description of the anticipated noncompliance;

b. The period of the anticipated noncompliance, including dates and times; and

c. Steps being taken to prevent future occurrence of the noncompliance.

[62-620.610(17), F.A.C.]

18. Sampling and monitoring data shall be collected and analyzed in accordance with Rule 62-4.246, Chapter 62-160 and 62-601, F.A.C. and 40CFR 136, as appropriate.

a. Monitoring results shall be reported at the intervals specified elsewhere in this permit and shall be reported on a Discharge Monitoring Report (DMR), DEP Form 62-620.910(10).

b. If the permittee monitors any contaminant more frequently than required by the permit, using Department approved test procedures, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR.

c. Calculations for all limitations, which require averaging of measurements shall use an arithmetic mean unless otherwise specified in this permit.

d. Any laboratory test required by this permit shall be performed by a laboratory that has been certified by the Department of Health (DOH) under Chapter 64E-1, F.A.C., where such certification is required by Rule 62-160.300, F.A.C. The laboratory must be certified for any specific method and analyte combination that is used to comply with this permit. For domestic wastewater facilities, the on-site test procedures specified in Rule 62-160.300(4), F.A.C., shall be performed by a laboratory certified test for those parameters or under the direction of an operator certified under Chapter 62-602, F.A.C.

e. Field activities including on-site tests and sample collection, whether performed by a laboratory or a certified operator, must follow the applicable procedures described in DEP-SOP-001/01 (January 2002). Alternate field procedures and laboratory methods may be used where they have been approved according to the requirements of Rules 62-160.220, 62-160.330, and 62-160.600, F.A.C.

19. Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule detailed elsewhere in this permit shall be submitted no later than 14 days following each schedule date. *[62-620.610(19), F.A.C.]*

20. The permittee shall report to the Department's Southwest District Office any noncompliance which may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the permittee becomes aware of the circumstances. A written submission shall also be provided within five days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance including exact dates and time, and if the noncompliance has not been corrected, the anticipated time it is

expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.

a. The following shall be included as information which must be reported within 24 hours under this condition:

1. Any unanticipated bypass which causes any reclaimed water or effluent to exceed any permit limitation or results in an unpermitted discharge,

2. Any upset which causes any reclaimed water or the effluent to exceed any limitation in the permit,

3. Violation of a maximum daily discharge limitation for any of the pollutants specifically listed in the permit for such notice, and

4. Any unauthorized discharge to surface or ground waters.

b. Oral reports as required by this subsection shall be provided as follows:

1. For unauthorized releases or spills of untreated or treated wastewater reported pursuant to subparagraph a.4 that are in excess of 1,000 gallons per incident, or where information indicates that public health or the environment will be endangered, oral reports shall be provided to the Department by calling the STATE WARNING POINT TOLL FREE NUMBER (800) 320-0519, as soon as practical, but no later than 24 hours from the time the permittee becomes aware of the discharge. The permittee, to the extent known, shall provide the following information to the State Warning Point:

(a) Name, address, and telephone number of person reporting;

(b) Name, address, and telephone number of permittee or responsible person for the discharge;

(c) Date and time of the discharge and status of discharge (ongoing or ceased);

(d) Characteristics of the wastewater spilled or released (untreated or treated, industrial or domestic wastewater);

(e) Estimated amount of the discharge;

(f) Location or address of the discharge;

(g) Source and cause of the discharge;

(h) Whether the discharge was contained on-site, and cleanup actions taken to date;

(i) Description of area affected by the discharge, including name of water body affected, if any; and

(j) Other persons or agencies contacted.

2. Oral reports, not otherwise required to be provided pursuant to subparagraph b.1 above, shall be provided to Department's Southwest District Office within 24 hours from the time the permittee becomes aware of the circumstances.

c. If the oral report has been received within 24 hours, the noncompliance has been corrected, and the noncompliance did not endanger health or the environment, the Department's Southwest District Office shall waive the written report. *[62-620.610(20), F.A.C.]*

21. The permittee shall report all instances of noncompliance not reported under Conditions VIII.17 and 19 of this permit at the time monitoring reports are submitted. This report shall contain the same information required by Condition VIII.20 of this permit. *[62-620.610(21), F.A.C.]*

22. Bypass Provisions:

a. Bypass is prohibited, and the Department may take enforcement action against a permittee for bypass, unless the permittee affirmatively demonstrates that:

1. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage; and

2. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventative maintenance; and

3. The permittee submitted notices as required under Condition VIII.22.b of this permit.

b. If the permittee knows in advance of the need for a bypass, it shall submit prior notice to the Department, if possible at least 10 days before the date of the bypass. The permittee shall submit notice of an unanticipated bypass within 24 hours of learning about the bypass as required in Condition VIII.20 of this permit. A notice shall include a description of the bypass and its cause; the period of the bypass, including exact dates and times; if the bypass has not been corrected, the anticipated time it is expected to continue; and the steps taken or planned to reduce, eliminate, and prevent recurrence of the bypass.

c. The Department shall approve an anticipated bypass, after considering its adverse effect, if the permittee demonstrates that it will meet the three conditions listed in Condition VIII.22 a.(1) through (3) of this permit.

d. A permittee may allow any bypass to occur which does not cause reclaimed water or effluent limitations to be exceeded if it is for essential maintenance to assure efficient

operation. These bypasses are not subject to the provision of Condition VIII.22.a through c. of this permit. *[62-620.610(22), F.A.C.]*

23. Upset Provisions:

a. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed contemporaneous operating logs, or other relevant evidence that:

1. An upset occurred and that the permittee can identify the cause(s) of the upset;

2. The permitted facility was at the time being properly operated;

3. The permittee submitted notice of the upset as required in Condition VIII.20 of this permit; and

4. The permittee complied with any remedial measures required under Condition VIII.5 of this permit.

b. In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.

c. Before an enforcement proceeding is instituted, no representation made during the Department review of a claim that noncompliance was caused by an upset is final agency action subject to judicial review.*[62-620.610(23), F.A.C.]*

Executed in Tallahassee, Florida

STATE OF FLORIDA DEPARTMENT OF
ENVIRONMENTAL PROTECTION

_____

Mimi Drew
Director
Division of Water Resource Management

2600 Blair Stone Road
Tallahassee, FL 32399-2400
(850) 245-8336

APPENDIX A

Document 3

Dike Stability Calculations

Doc 03
Dike Stability Calcs

STONE & WEBSTER ENGINEERING CORPORATION

CALCULATION TITLE PAGE

*SEE INSTRUCTIONS ON REVERSE SIDE

A-5010.84 (FRONT)

CLIENT & PROJECT	PAGE 1 OF 19
TECO / 824	

CALCULATION TITLE (Indicative of the Objective):	QA CATEGORY (✓)
ASH POND DIKE STABILITY ANALYSIS	☐ I – NUCLEAR SAFETY RELATED ☐ II ☐ III ☐ N/A OTHER

CALCULATION IDENTIFICATION NUMBER

J. O. OR W.O. NO	DIVISION & GROUP	CURRENT CALC. NO.	OPTIONAL TASK CODE	OPTIONAL WORK PACKAGE NO.
12408	GEOTECHNICAL	G-22	N/A	N/A

*APPROVALS – SIGNATURE & DATE

PREPARER(S)/DATE(S)	REVIEWER(S)/DATE(S)	INDEPENDENT REVIEWER(S)/DATE(S)	REV. NO. OR NEW CALC NO.	SUPERSEDES *CALC. NO. OR REV. NO.	CONFIRMATION *REQUIRED (✓) YES	NO
J W Hwang 4/13/81	R Squire 12/3/82	N/A	N/A	N/A		

DISTRIBUTION*

GROUP	NAME & LOCATION	COPY SENT (✓)	GROUP	NAME & LOCATION	COPY SENT (✓)
RECORDS MGT. FILES (OR FIRE FILE IF NONE)					

001318

CALCULATION SHEET

STONE & WEBSTER ENGINEERING CORPORATION

J.O./W.O./CALCULATION NO.	REVISION	PAGE
12408/TECO/C-22		2/19

PREPARER/DATE	REVIEWER/CHECKER/DATE	INDEPENDENT REVIEWER/DATE
J.W. Hwang/2/13/91		

SUBJECT/TITLE: ASH POND DIKE STABILITY ANALYSIS

QA CATEGORY/CODE CLASS:

Purpose

The purpose of this calculation are 1) to determine the side slopes of the ash pond dikes by slope stability analyses with and without vehicle loadings on the crest of dikes, and 2). to determine the suitability of Tampa Bay mud as fill material for dikes

Material Properties

The foundation material at the site is mostly fine sand with trace% silt. Potential fill materials are fine sand similar to the foundation soil and the bay mud dredged from Tampa Bay. The shear strength parameters are as follows:

	Soil Type	c'	φ'
Foundation soil	fine sand	0	32°
Fine sand fill	fine sand	0	32°
Bay mud fill	silt or clay	0	20°

Method of Analysis

1. Case 1, without crest loading
   To determine the design embankment side slopes, the factors of safety for sand fill section and mud fill sections are analyzed under free slopes, full reservoir and drawdown conditions

2. Case 2, with crest loading
   Factors of safety are evaluated with various track pressures, clearance from the edge of the crest and widths of crawler tracks are evaluated.

3. LEASE II program with Sarad scheme is used to compute the factors of safety and locate the critical failure surfaces.

Results and Conclusions

1 Results of analyses are summarized on page 3.

2 For compacted fine sand embankment, side slopes of 2.5(H) on 1.0(V) are required to have a factor of safety above 1.5

3. Dredged bay mud is not suitable for dike filling

4 For most crawler tractors, the maximum track contact pressure is below 1300 psf. If the clearance is 3' from the edge of crest, the factor of safety will be about 1.5 (e.g. Caterpillar D-8).

5 If the width of crawler track is less than 2', bearing capacity may become the controlling stability factor.

001319

CALCULATION SHEET

STONE & WEBSTER ENGINEERING CORPORATION

J.O./W.O./CALCULATION NO.	REVISION	PAGE
12408/TECo/G-22		3/19

PREPARER/DATE	REVIEWER/CHECKER/DATE	INDEPENDENT REVIEWER/DATE
J W Huang / 4/13/81		

SUBJECT/TITLE: ASH POND DIKE STABILITY ANALYSIS

QA CATEGORY/CODE CLASS:

Summary of Results

The results of stability analyses are shown on the next two pages

Case 1 Without loading on crest

a. To have a minimum factor of safety of 1.50, the slopes should be 2.5(H) on 1.0(V) or flatter for both inside and outside slopes. The drawdown rate of pond level will be at a very slow rate. Therefore, the rapid drawdown case is ignored.

b. Dikes with fill material of $c=0$ $\phi'=20°$ will have factors of safety below 1.0. Therefore, the dredged bay mud is not acceptable as fill material.

c. The crest of the sections analyzed are at El.+220 instead of El.+230. Since the critical surfaces for all cases are shallow ones, and the fill materials are cohesionless, the results are also applicable to sections with crest at El.+230

Case 2. With loadings on Crest

a. The factors of safety for various loading conditions are plotted on page 6.

b. As shown on page 19, all critical failure surfaces are shallow circles starting from inside the first track and come out of slopes at about mid-height of the dike

c. With $\phi'=32°$, $N_\gamma=30.2$, $\gamma=120$ pcf

For $B=1.0'$, $q_u=\frac{1}{2}\gamma B N_\gamma=\frac{1}{2}\times120\times30=1800$ psf

For $B=2.0$ $q_u=3600$ psf

Thus, if the track width is less than 2', bearing capacity may become the controlling factor.

d. Most crawler tractors have track widths from 16" to 22" and ground contact pressure ranging from 800 psf to 1320 psf. (Ref: page 69, General Excavation, by A.B. Carson)

For Caterpillar D-8, width = 22", max. pressure = 1320 psf

With 3' clearance,

Stability F.S $\doteq$ 1.50 (page 6) O.K.

Bearing capacity F.S $\doteq 3600\times\frac{22}{24}/1320 = 2.50$. Say, O.K.

001320

CALCULATION SHEET

STONE & WEBSTER ENGINEERING CORPORATION

A5010.01

J.O./W.O./CALCULATION NO.	REVISION	PAGE
12408/TECO/G-22		4/19

PREPARER/DATE	REVIEWER/CHECKER/DATE	INDEPENDENT REVIEWER/DATE
T. W. Hwang/01/23/81		

SUBJECT/TITLE	QA CATEGORY/CODE CLASS
ASH POND DIKE STABILITY ANALYSIS	

Summary of Stability Analysis

Case 1 — Without loading on crest

	Factor of Safety		
	Inside Slope		Outside slope
	2.5 : 1.0	2.0 : 1.0	2.5 : 1.0
$\phi'_{fill} = 32°$, $c = 0$			
Full Reservoir	1.59	1.33	1.62
Before Reservoir Filling	1.63	1.32	"
Rapid Drawdown	0.72	0.57	
$\phi'_{fill} = 26°$, $c = 0$			
Full Reservoir	0.93	0.76	0.95
Before Reservoir Filling	0.95	0.77	"

Notes:

1. Foundation material: $c = 0$ $\phi' = 32°$ $\gamma = 120$ pcf assumed
2. All critical failure surfaces are shallow surfaces, approaching infinite slope type of failure.
3. Details of these analyses are shown on pages 7 to 18

CALCULATION SHEET

STONE & WEBSTER ENGINEERING CORPORATION

45010.01

J.O./W.O./CALCULATION NO.	REVISION	PAGE
TECO/12408/G-22		5/19

PREPARER/DATE	REVIEWER/CHECKER/DATE	INDEPENDENT REVIEWER/DATE
J.W. Huang / 2/21/01		

SUBJECT/TITLE: ASH POND DIKE STABILITY ANALYSIS

QA CATEGORY/CODE CLASS:

Summary of Stability Analysis

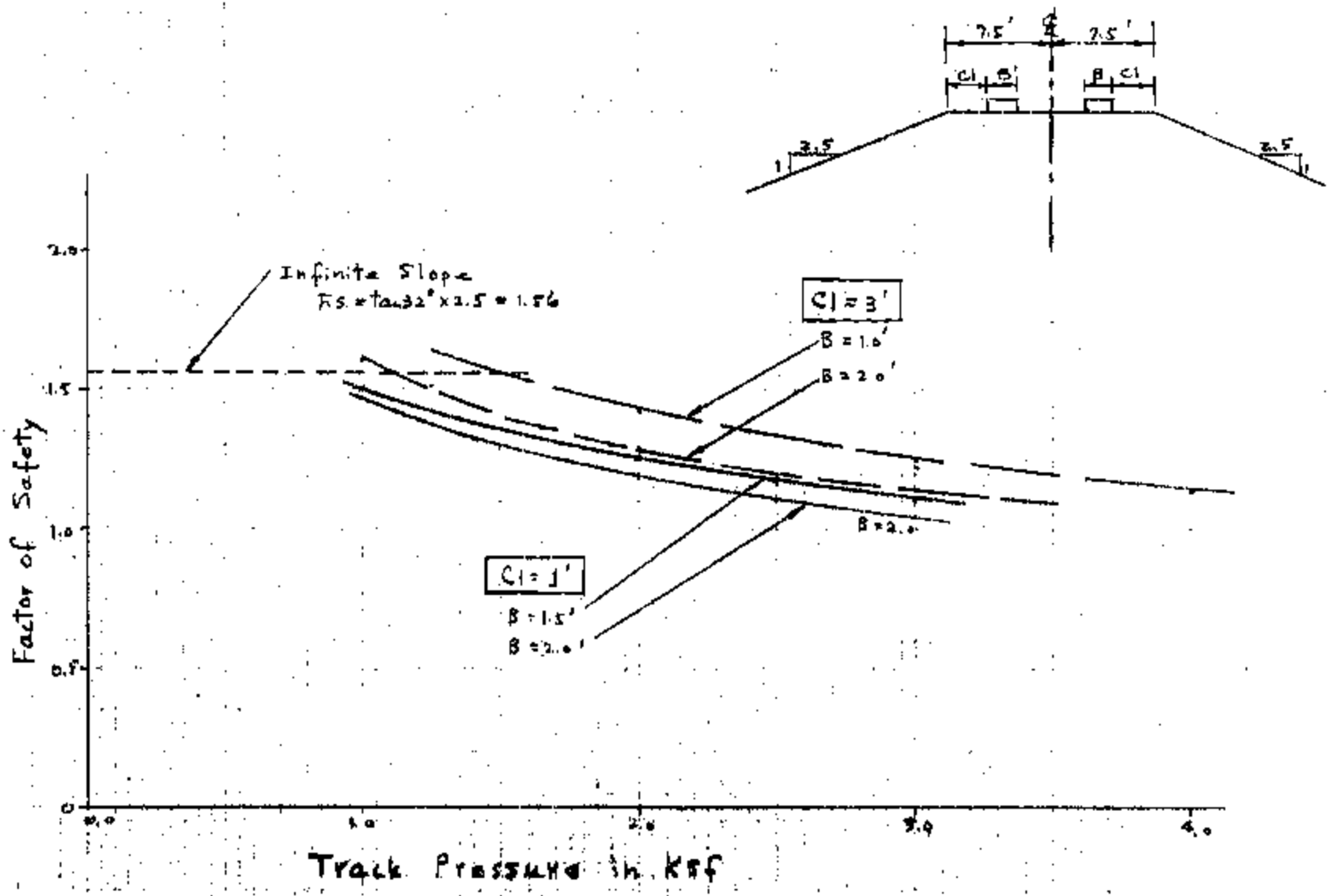
Case 2 — Wind loading on crest

B	CI	Pressure in KSF 0.25	0.50	1.0	1.5	2.0	2.5	3.0/4.0	Run No.
1.5	1'			1.500		1.253	1.176	1.115	024
2.0	1'			1.493		1.194	1.108	1.048	025
2.5	1'	1.692*	1.607	1.463	1.296				027
1.5	3.0'			1.762		1.445		1.248/1.133	028
2.0	3.0'		1.714*	1.604		1.292		1.135	032

Notes:

1. The factors of safety are plotted on the next page
2. The critical surfaces are shown on page 19. All critical failure surfaces are shallow circle. (slope failure)

* Infinite slope failure


7.5'
7.5'
C1
B
B
C1
3.5
1
2.5
1
Infinite Slope
F.S. = tan 32° x 2.5 = 1.56
C1 = 3'
B = 1.0'
B = 2.0'
B = 2.0'
C1 = 1'
B = 1.5'
B = 2.0'
Factor of Safety
2.0
1.5
1.0
0.5
0
0.0
1.0
2.0
3.0
4.0
Track Pressure in KSF

001323

6/19

CALCULATION SHEET

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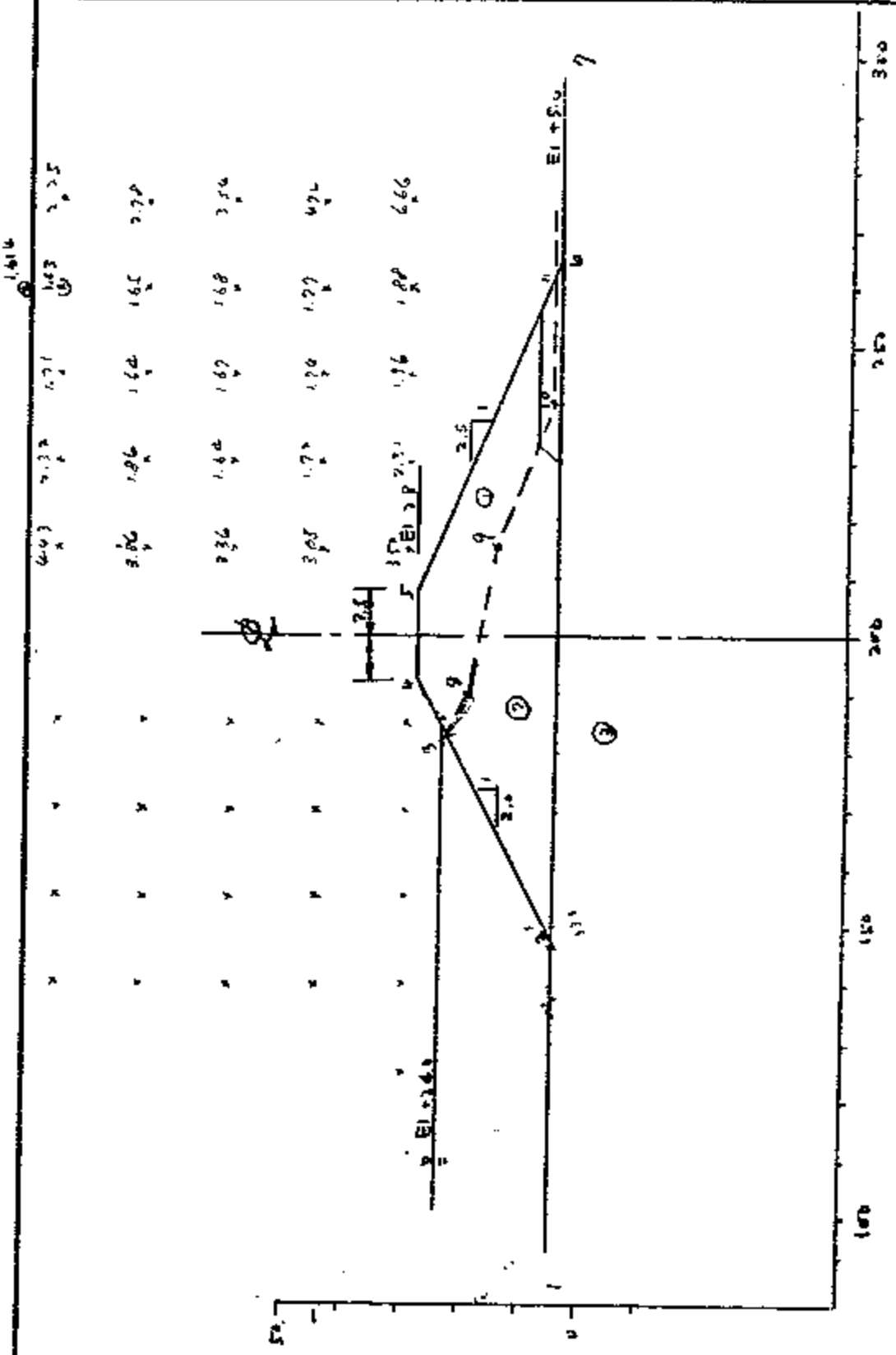
J.O./W.O./CALCULATION NO.	REVISION	PAGE
12408/TECO/G-22		7/19

PREPARER/DATE	REVIEWER/CHECKER/DATE	INDEPENDENT REVIEWER/DATE
J.W. Hwang / 01/21/84		

SUBJECT/TITLE: ASH POND DIKE STABILITY ANALYSIS

QA CATEGORY/CODE CLASS



001324

CALCULATION SHEET

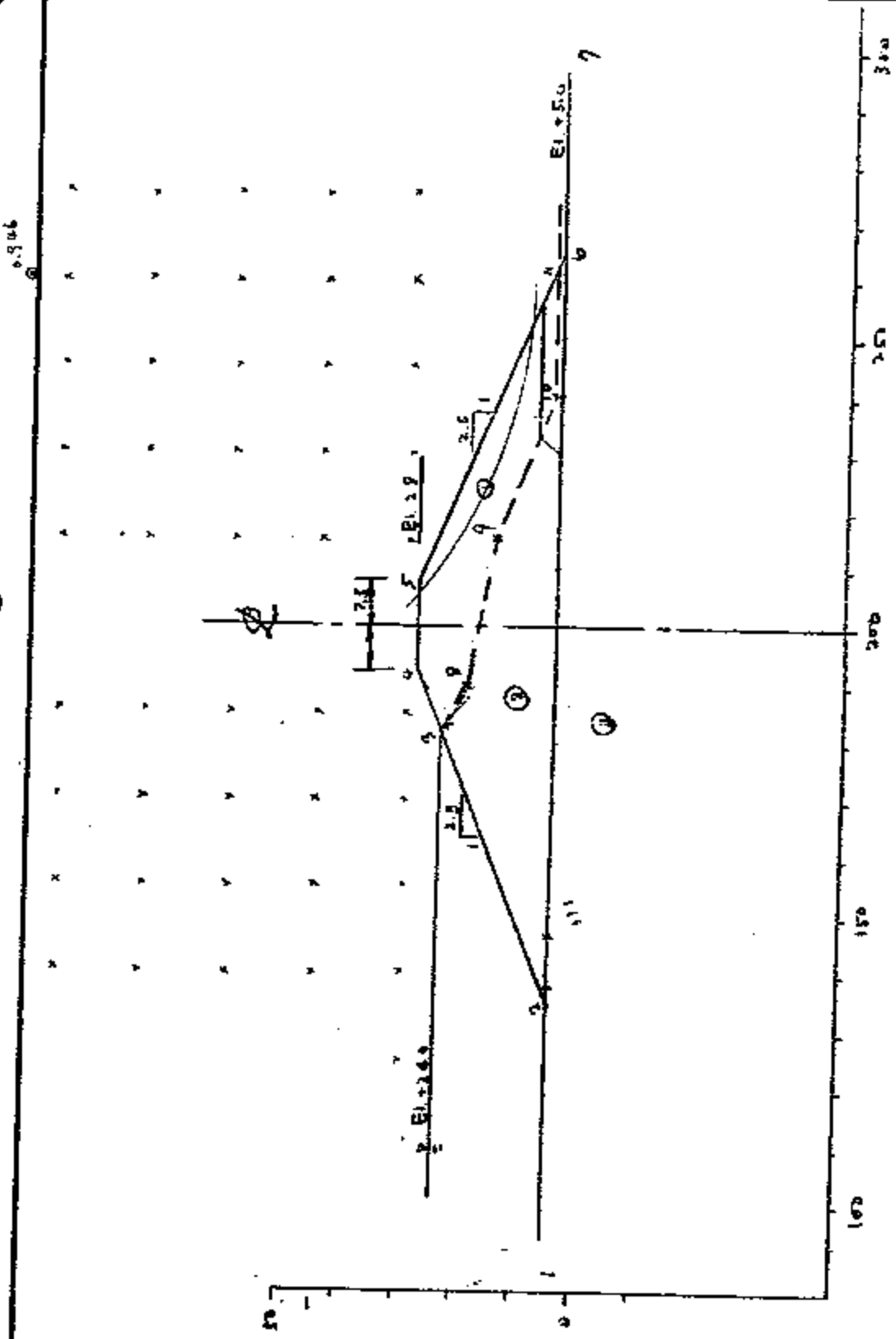
STONE & WEBSTER ENGINEERING CORPORATION

J.O./W.O./CALCULATION NO.	REVISION	PAGE
12408/TECO/G-22		8/19

PREPARER/DATE	REVIEWER/CHECKER/DATE	INDEPENDENT REVIEWER/DATE
J.W. Hwang/01/21/84		

SUBJECT/TITLE: ASH POND DIKE STABILITY ANALYSIS

QA CATEGORY/CODE CLASS:



Outside slope
2.5 on 1.0 slope

$x_c = 126.0$ $y_c = 75.3$ $R_c = 85.6'$

FS = 0.946

Run No. 004

Material Properties

Zone	γ	c	φ
1	115	0	20°
2	130	0	26°
3	120	0	34°

001325

CALCULATION SHEET

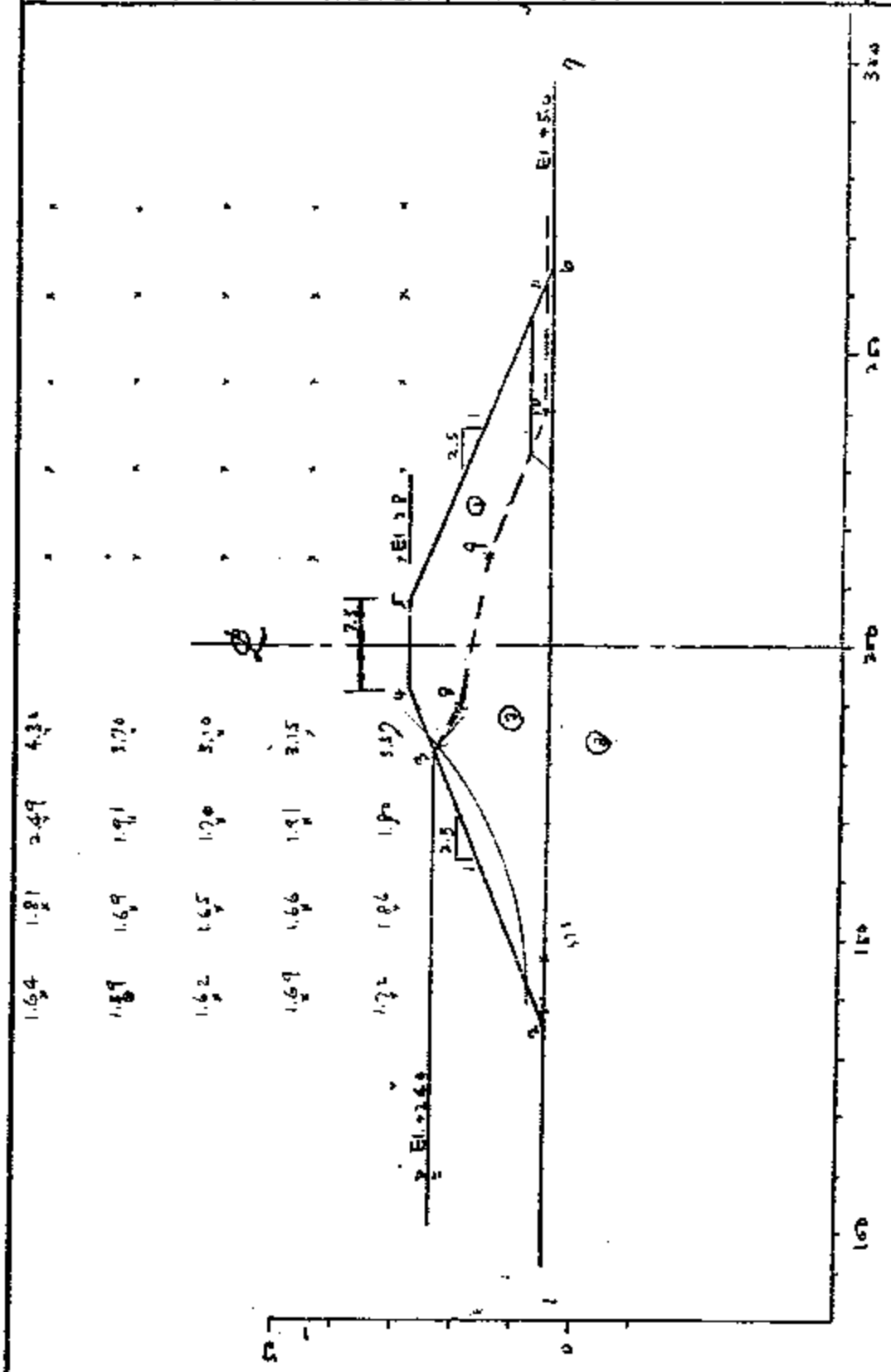
STONE & WEBSTER ENGINEERING CORPORATION

J.O./W.O./CALCULATION NO.	REVISION	PAGE
12408/TECO/G-22		9/19

PREPARER/DATE	REVIEWER/CHECKER/DATE	INDEPENDENT REVIEWER/DATE
J.W. Huang/01/21/84		

SUBJECT/TITLE: ASH POND DIKE STABILITY ANALYSIS

2A CATEGORY/CODE CLASS:



CALCULATION SHEET

STONE & WEBSTER ENGINEERING CORPORATION

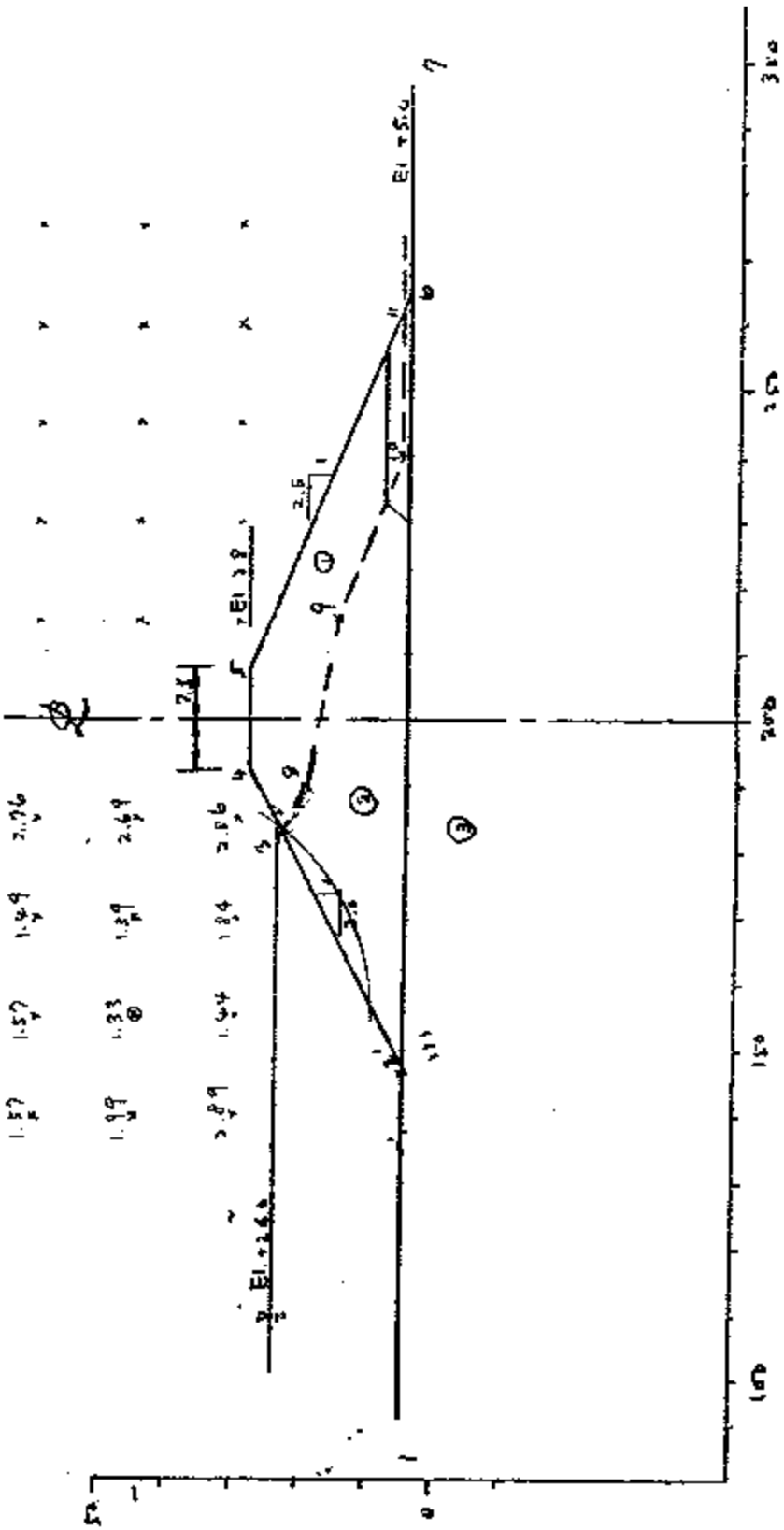
A501G61

A.O./W.O./CALCULATION NO.	REVISION	PAGE
12408/TECO/G-22		10/19

PREPARER/DATE	REVIEWER/CHECKER/DATE	INDEPENDENT REVIEWER/DATE
J.W. Hwang / 01/21/84		

SUBJECT/TITLE: ASH POND DIKE STABILITY ANALYSIS

QA CATEGORY/CODE CLASS:



Inside slope
2.5 on 1.0 slope
Full reservoir, steady seepage
Xc = 155.0 Yc = 45.0 Rc = 35.6
FS = 1.23 (by grid)
Run No. 110

Material Properties

Zone	γ	c	φ'
1	115	0	30°
2	130	0	32°
3	120	0	34°

001327

CALCULATION SHEET

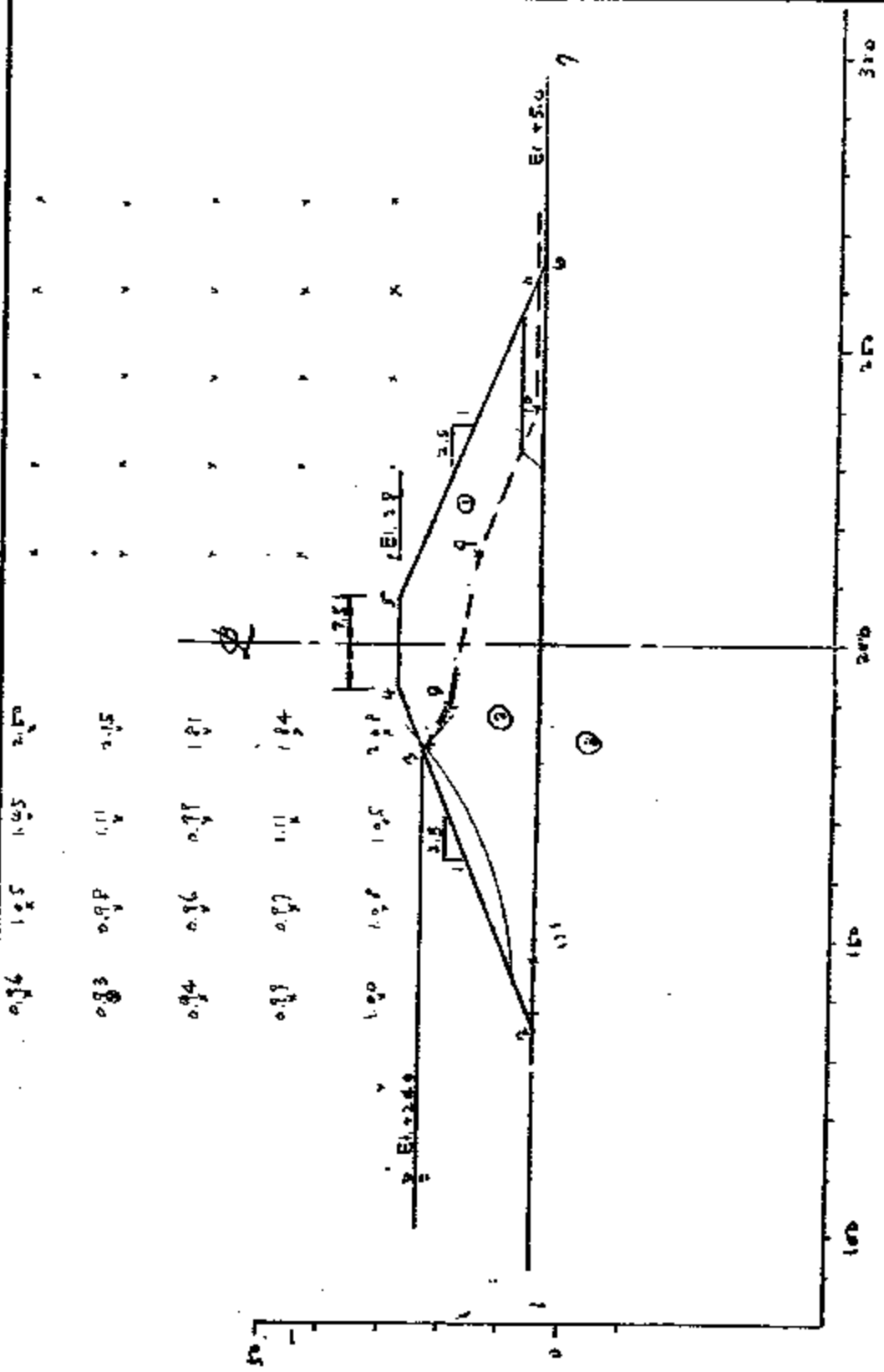
STONE & WEBSTER ENGINEERING CORPORATION

J.O./W.O./CALCULATION NO.	REVISION	PAGE
12408/TECO/G-22		11/19

PREPARER/DATE	REVIEWER/CHECKER/DATE	INDEPENDENT REVIEWER/DATE
J W Hwang / 01/21/86		

SUBJECT/TITLE: ASH POND DIKE STABILITY ANALYSIS

QA CATEGORY/CODE CLASS:



Inside slope
2.5 : 1.0 slope
Full reservoir, steady seepage
$q_{fill} = 20'$
$x_c = 140.0$ $y_c = 75.0$ $R_c = 67.0$
F.S. = 0.73 (by grid)
Run No. 109

001329

Material Properties

Zone	γ	c'	φ'
1	115	0	24°
2	130	0	40°
3	120	0	32°

CALCULATION SHEET

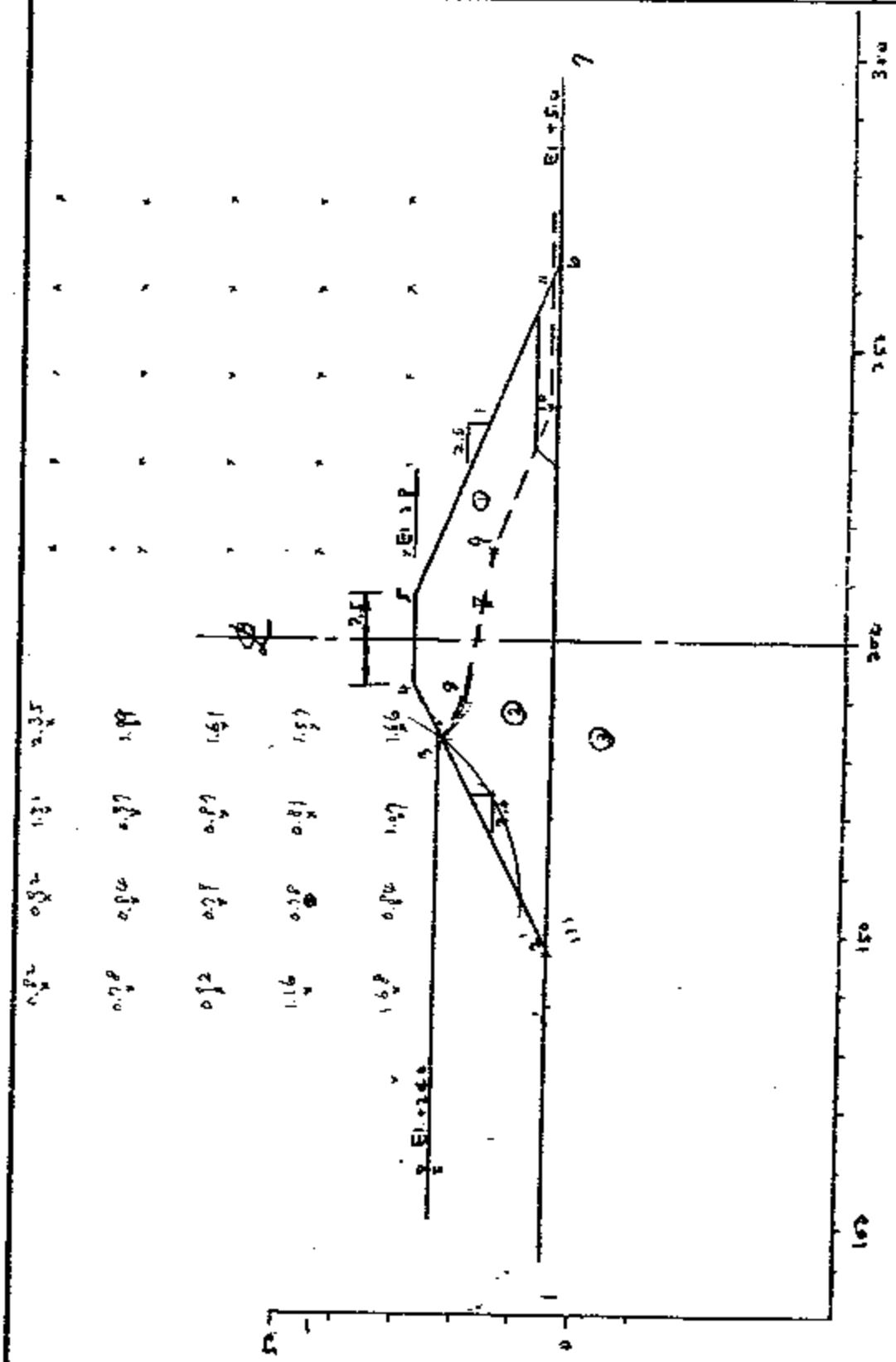
STONE & WEBSTER ENGINEERING CORPORATION

J.O./W.O./CALCULATION NO.	REVISION	PAGE
12408/TECO/G-22		12/19

PREPARER/DATE	REVIEWER/CHECKER/DATE	INDEPENDENT REVIEWER/DATE
J.W. Huang / 01/21/81		

SUBJECT/TITLE: ASH POND DIKE STABILITY ANALYSIS

QA CATEGORY/CODE CLASS:


El +50.0
El +36.0
2.5
1
2.5
1
1.66
1.57
1.61
1.98
2.35
1.31
0.92
1.07
0.81
0.89
0.87
0.78
0.92
1.16
1.68
0.70
0.80
0.72
0.80
0.70
0.80
0.70
0.80
0.70

CALCULATION SHEET

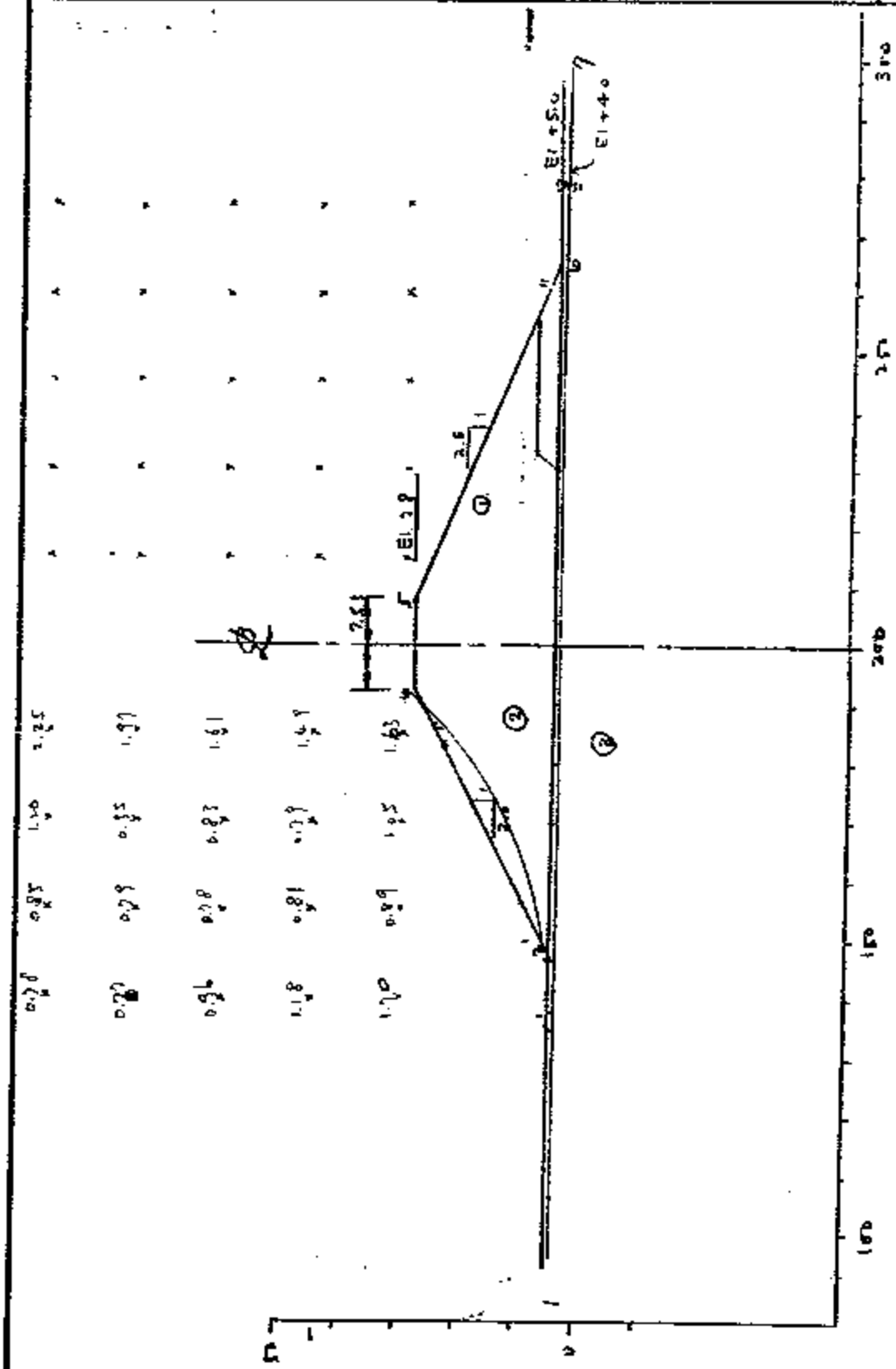
STONE & WEBSTER ENGINEERING CORPORATION

J.O./W.O./CALCULATION NO.	REVISION	PAGE
12408/TECO/G-22		13/19

PREPARER/DATE	REVIEWER/CHECKER/DATE	INDEPENDENT REVIEWER/DATE
JW Hujane / 01/21/84		

SUBJECT/TITLE: ASH POND DIKE STABILITY ANALYSIS

QA CATEGORY/CODE CLASS:



001329

CALCULATION SHEET

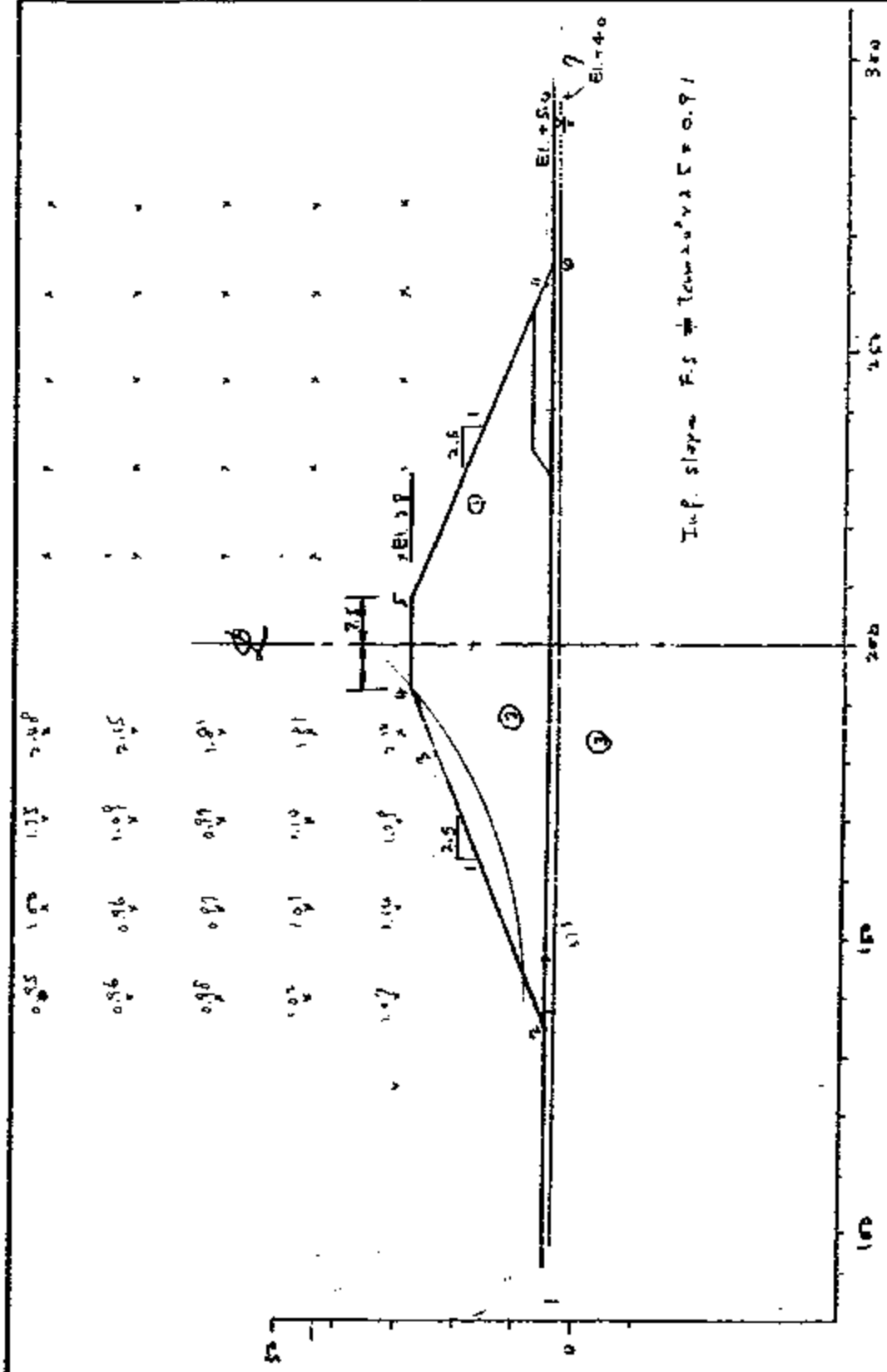
STONE & WEBSTER ENGINEERING CORPORATION

J.O./W.O./CALCULATION NO.	REVISION	PAGE
12408/TECO/G-22		14/19

PREPARER/DATE	REVIEWER/CHECKER/DATE	INDEPENDENT REVIEWER/DATE
J.W. Huang / 01/21/84		

SUBJECT/TITLE: ASH POND DIKE STABILITY ANALYSIS

QA CATEGORY/CODE CLASS:



001330

CALCULATION SHEET

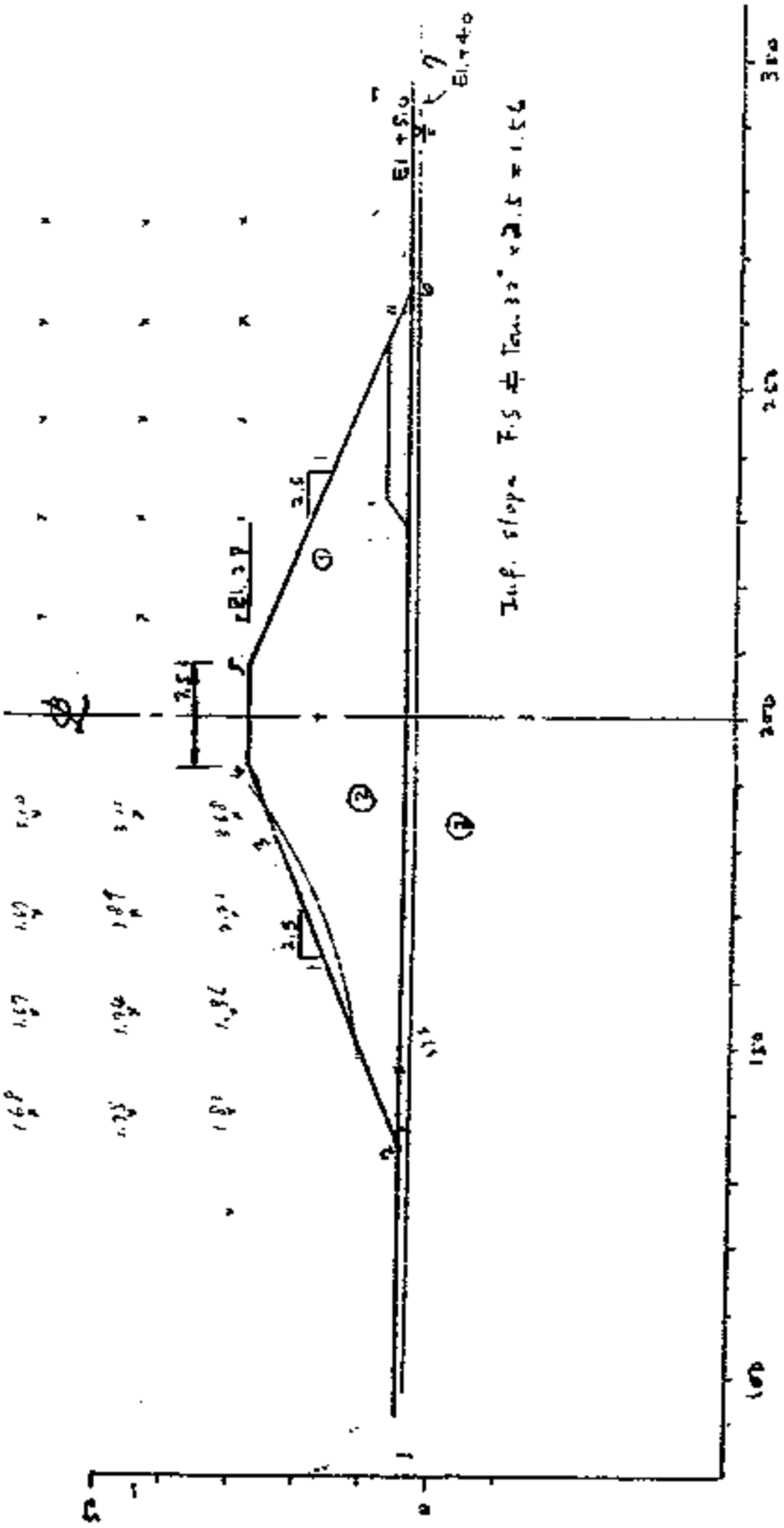
STONE & WEBSTER ENGINEERING CORPORATION

J.O./W.O./CALCULATION NO.	REVISION	PAGE
12408/TECO/G-22		15/19

PREPARER/DATE	REVIEWER/CHECKER/DATE	INDEPENDENT REVIEWER/DATE
J.W. Hwang / 01/21/81		

SUBJECT/TITLE: ASH POND DIKE STABILITY ANALYSIS

QA CATEGORY/CODE CLASS:



Inside slope
2.5 on 1.0 slope
Before piling

X_c = 140, Y_c = 92.2, R_c = 88.6
F.S. = 1.625 by search
Run No.: 105.107

001331

Material Properties

Zone	γ	c	φ
1	115	0	32
2	115	0	32
3	120	0	32

CALCULATION SHEET

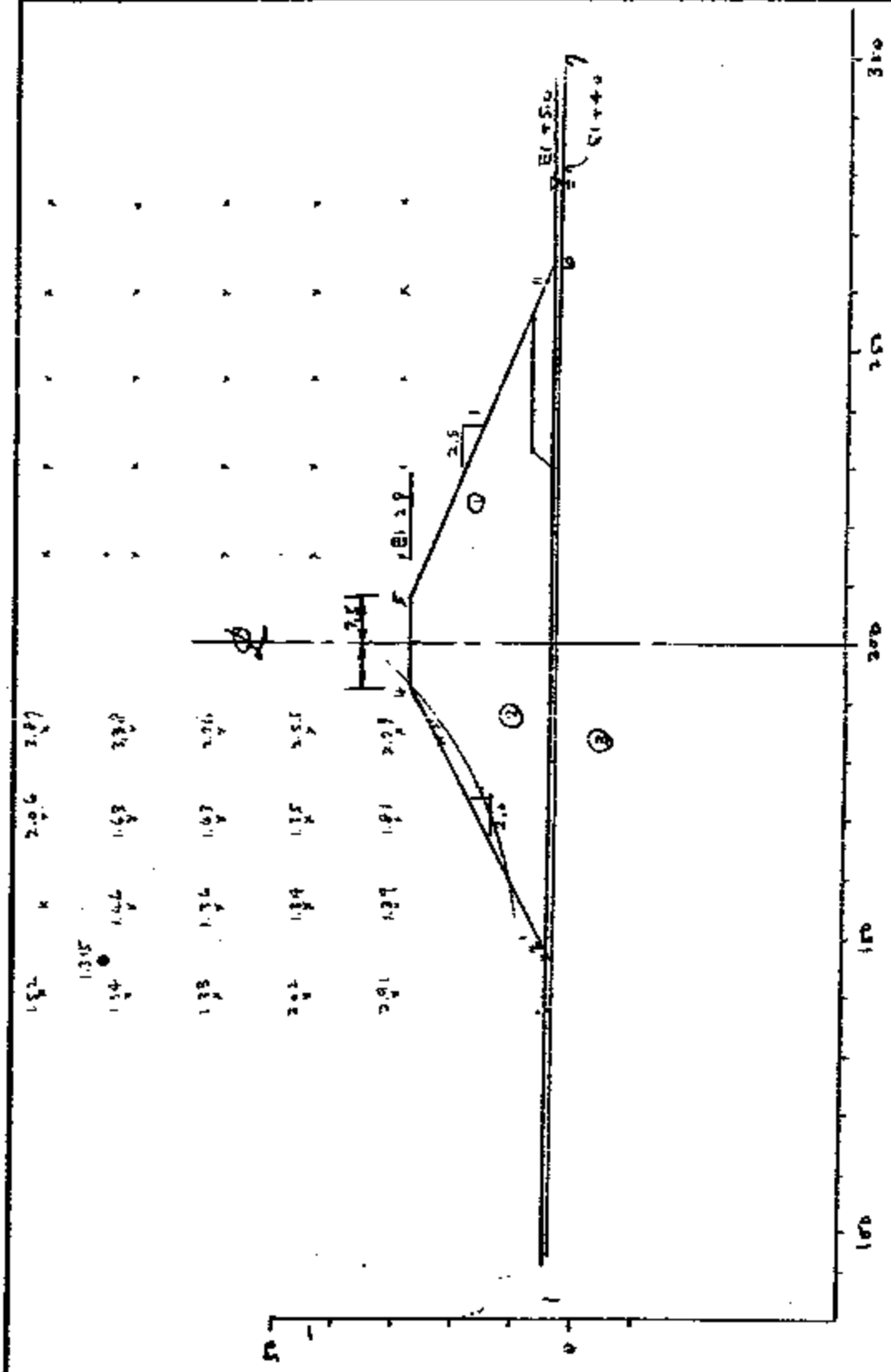
STONE & WEBSTER ENGINEERING CORPORATION

J.O./W.O./CALCULATION NO.	REVISION	PAGE
12408/TECO/G-22		16/19

PREPARER/DATE	REVIEWER/CHECKER/DATE	INDEPENDENT REVIEWER/DATE
J.W. Huang/01/21/84		

SUBJECT/TITLE: ASH POND DIKE STABILITY ANALYSIS

QA CATEGORY/CODE CLASS:



Inside Slope
2.0 on 1.0 slope
Before filling

$X_c = 146.0$ $Y_c = 78.8$, $R_c = 69.5$
F.S. = 1.115
Run Nos: 108, 107

Material Properties

Zone	γ	c	φ
1	115	0	27°
2	115	0	32°
3	120	0	32°

001332

CALCULATION SHEET

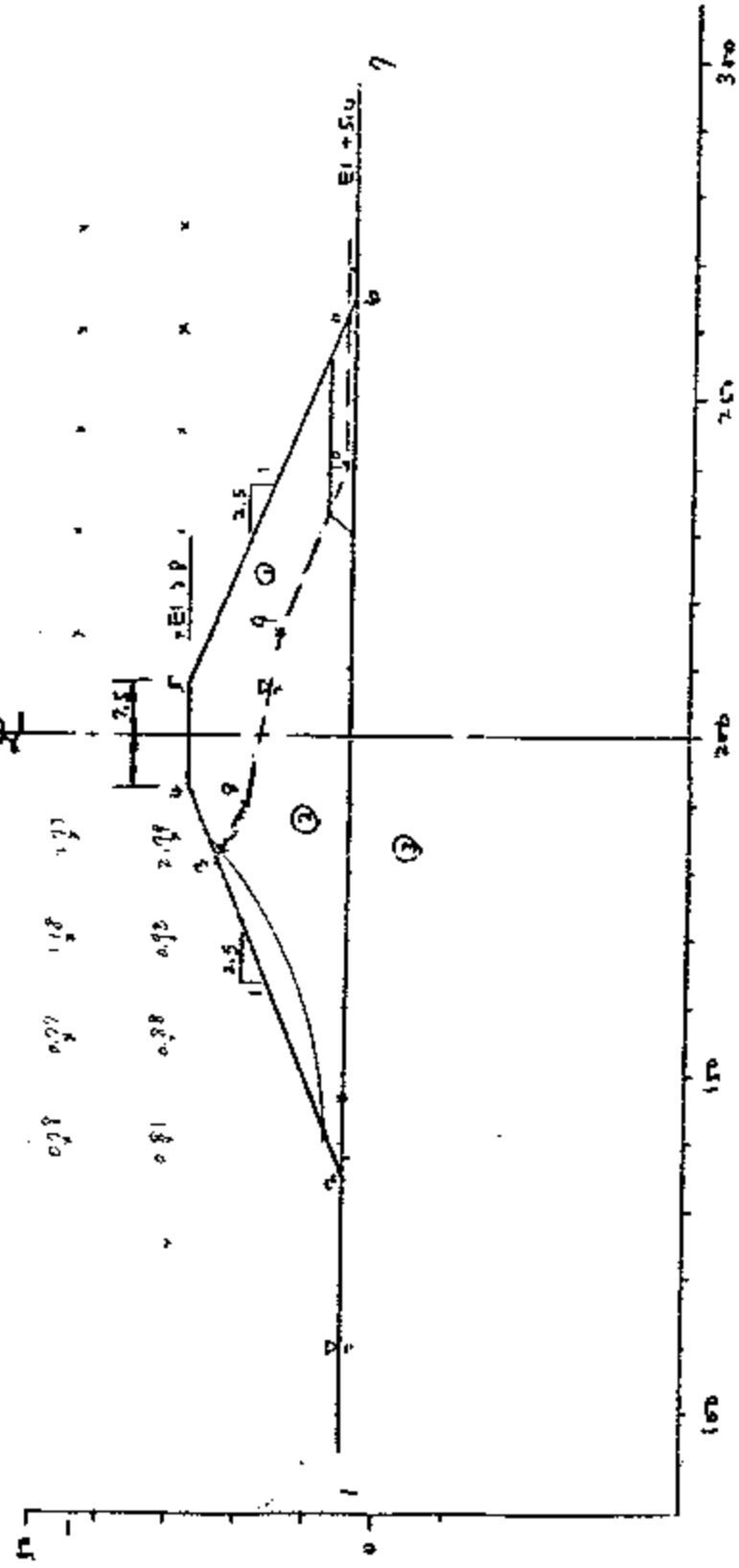
STONE & WEBSTER ENGINEERING CORPORATION

J.O./W.O./CALCULATION NO.	REVISION	PAGE
12408/TECO/G-22		17/19

PREPARER/DATE	REVIEWER/CHECKER/DATE	INDEPENDENT REVIEWER/DATE
J W Hwang / 01/21/81		

SUBJECT/TITLE: ASH POND DIKE STABILITY ANALYSIS

QA CATEGORY/CODE CLASS:


El +5.4
2.5
1
2.5
1
2.5
1
2.5
1
El 2.0
1.96
1.48
1.30
1.18
0.92
0.96
0.80
0.77
0.88
0.81
0.94
0.78
0.81
0.51
0.72
0.94

CALCULATION SHEET

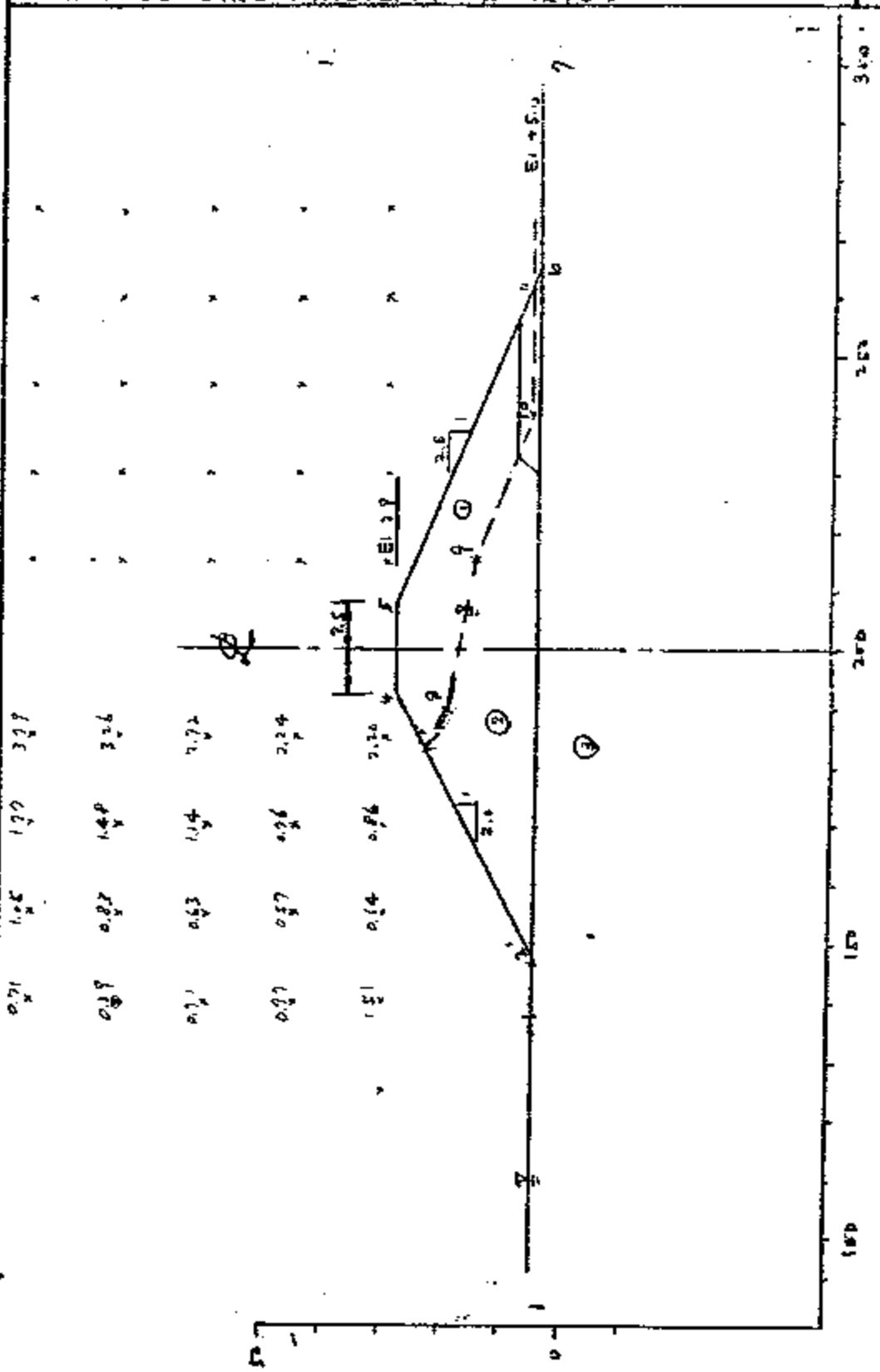
STONE & WEBSTER ENGINEERING CORPORATION

J.O./W.O./CALCULATION NO.	REVISION	PAGE
12468/TECO/G-22		18/19

PREPARER/DATE	REVIEWER/CHECKER/DATE	INDEPENDENT REVIEWER/DATE
JW Hwang/01/21/84		

SUBJECT/TITLE: ASH POND DIKE STABILITY ANALYSIS

QA CATEGORY/CODE CLASS:



Inside slope
2.0 : 1.0 slope
After rapid drawdown
Xc = 160.0 Yc = 2.5 Rc = 35.6 (?)
FS = 0.87
Run No. 106

001334

Material Properties

Zone	γ	c	φ
1	115	0	32
2	130	0	32
3	120	0	32

CALCULATION SHEET

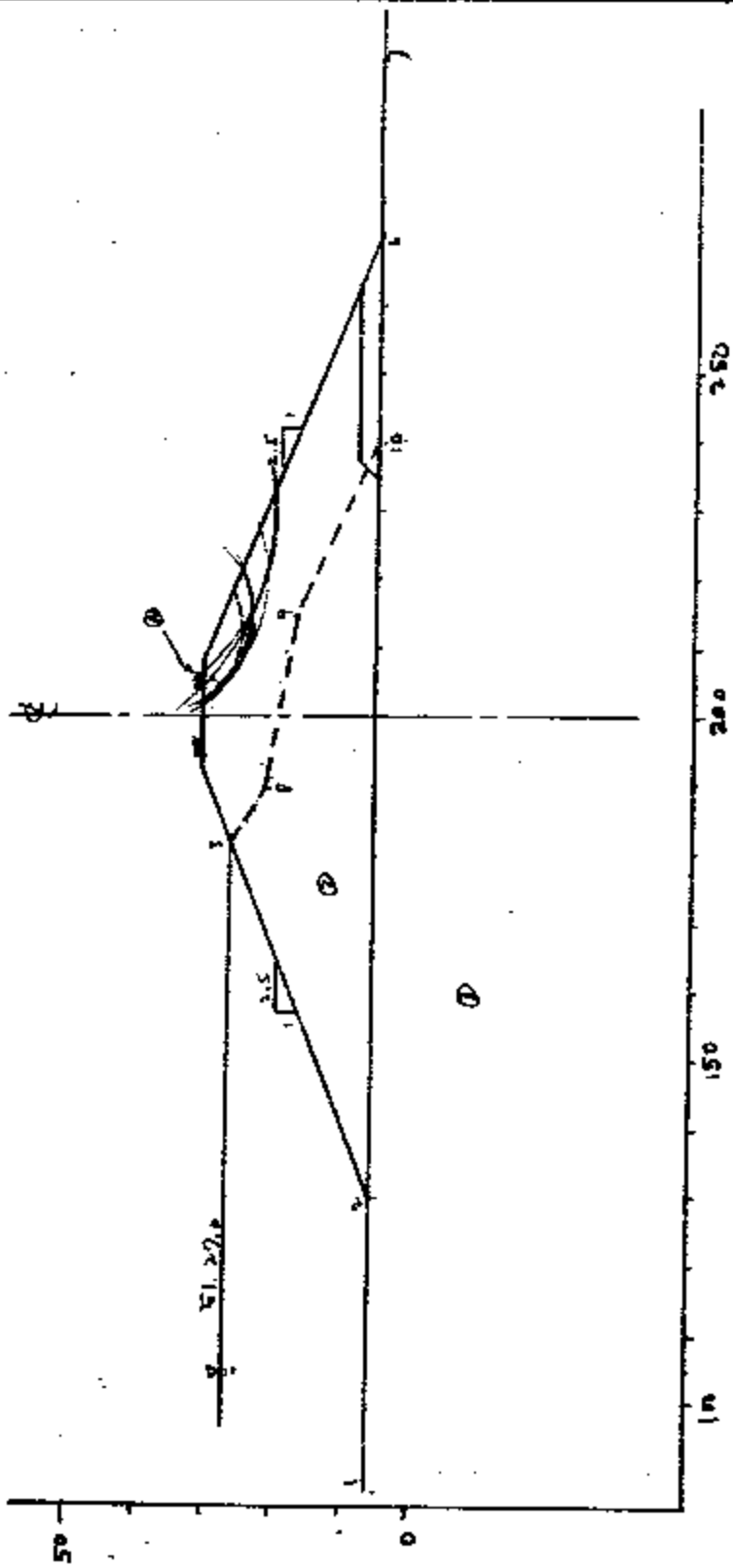
STONE & WEBSTER ENGINEERING CORPORATION

J.O./W.O./CALCULATION NO.	REVISION	PAGE
TECA-884/12448/G-22	1	19/19

PREPARER/DATE	REVIEWER/CHECKER/DATE	INDEPENDENT REVIEWER/DATE
J.G. Hwang / 2/19/81		

SUBJECT/TITLE: ASH POND DIKE STABILITY ANALYSIS

QA CATEGORY/CODE CLASS:



APPENDIX A

Document 4

Ash Pond Level Summary

Doc 04
Ash Pond Level Summary

Big Bend Ash Pond Levels

Ponds	***Normal Operating Elevation (ft)***	***Elevation (ft) @ Design Freeboard***	***Pond Elevationon 3/1/11***	***Approx. Top of Berm Elevation (ft)***
Economizer Ash [1]	27.3	27.3	27.3	31.0
Bottom Ash [2]	22-26.2	26.2	25.9	31.0

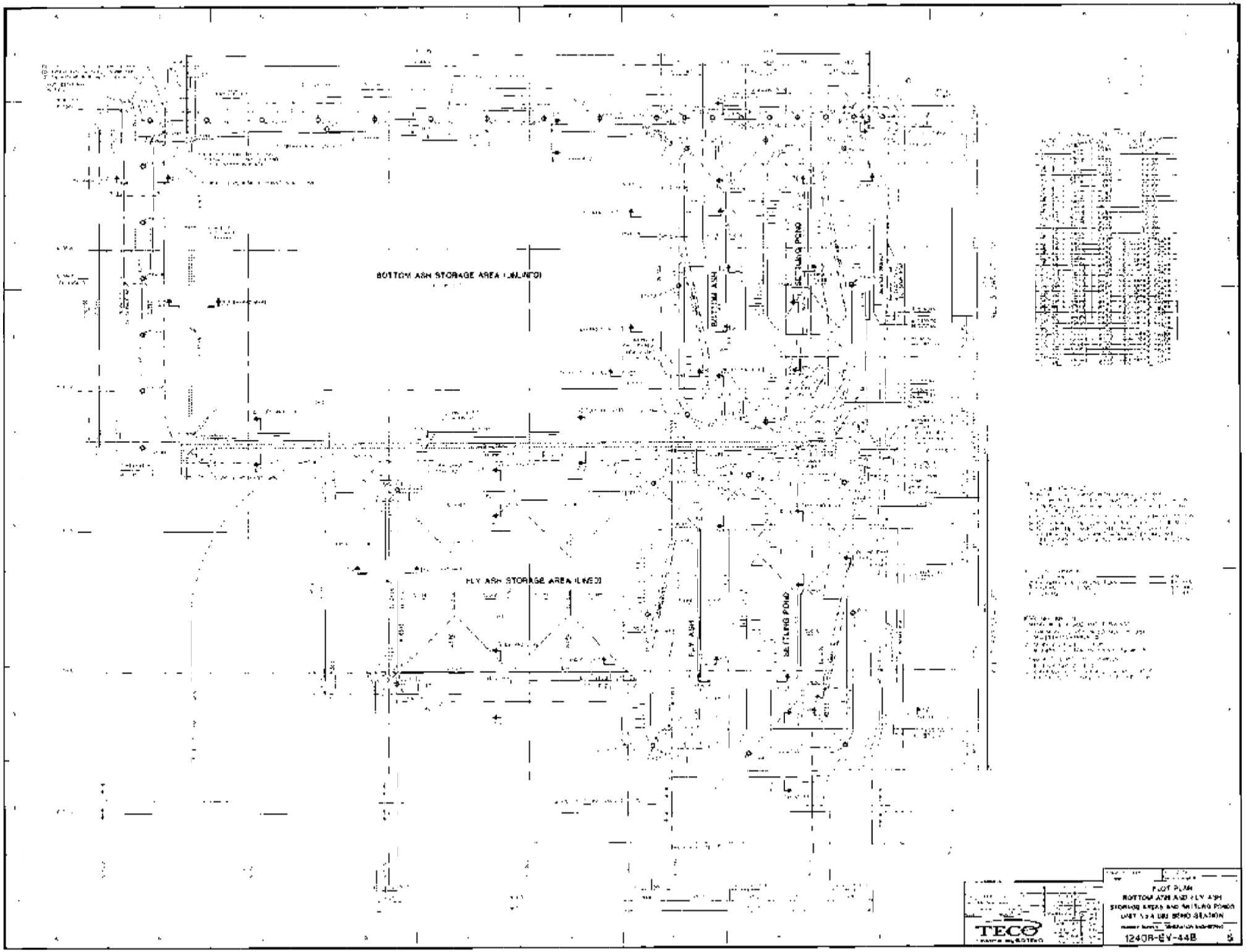
[1] Elevation/freeboard controlled by overflow pipe to Reclaimed Water Pond.

APPENDIX A

Document 5

Ash Pond Drawings

Doc 05
Ash Pond Drawings


BOTTOM ASH STORAGE AREA (UNLINED)
BOTTOM ASH
SETTLING POND
FLY ASH STORAGE AREA (LINED)
FLY ASH
SETTLING POND
TECO
PLOT PLAN
BOTTOM ASH AND FLY ASH
STORAGE AREAS AND SETTLING PONDS
1240R-EV-44B

ISSUED FOR CONSTRUCTION

UNIT NO. 4 DIGESTER STATION
TAMPA ELECTRIC COMPANY

ISSUED FOR CONSTRUCTION

UNIT NO. 4 BIG BEND STATION
TAMPA ELECTRIC COMPANY

ISSUED FOR CONSTRUCTION

UNIT 10 & 11 DEMOLITION
TAMPA ELECTRIC COMPANY

ISSUED FOR CONSTRUCTION

INTERMEDIA - BIG BEND STATION
TAMPA ELECTRIC COMPANY

APPENDIX A

Document 6

TECO Site Layout

Doc 06
TECO Site Layout

NORTH
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
LEGEND
1 DISPOSAL AREA (DA-1)
2 DISPOSAL AREA (DA-2A)
3 DISPOSAL AREA (DA-2B)
4 DISPOSAL AREA (DA-2C)
5 COAL FIELD
6 SLAG SETTLING BINS
7 STI FLYASH TREATMENT
8 SETTLING POND
9 NORTH RECYCLE POND
10 SOUTH RECYCLE POND
11 SOLIDS SEPARATION UNITS
12 MANATEE VIEWING CENTER (MVC)
13 BOTTOM ASH PONDS
14 ECONOMIZER ASH PONDS
15 LONG TERM BOTTOM ASH
16 LONG TERM FLYASH
17 FGD GYPSUM (SOUTH FORTY)
18 DISPOSAL AREA (DA-5)

APPENDIX B

Document 7

EPA Checklist TECO Big Bend N Bottom Ash

Site Name:	**TECO Big Bend**	**Date:**	**3-1-11**
Unit Name:	**North Bottom Ash Pond**	**Operator's Name:**	**Randy Melton**
Unit I.D.:		**Hazard Potential Classification:**	**High** ☐ **Significant** ☐ **Low** X
	Inspector's Name:	Michael Hanson, John Alford - 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?	daily		18. Sloughing or bulging on slopes?		X
2. Pool elevation (operator records)?	25.29		19. Major erosion or slope deterioration?		X
3. Decant inlet elevation (operator records)?	N/A		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?		X	Is water entering inlet, but not exiting outlet?		X
5. Lowest dam crest elevation (operator records)?	31		Is water exiting outlet, but not entering inlet?		X
6. If instrumentation is present, are readings recorded (operator records)?	X		Is water exiting outlet flowing clear?		N/A
7. Is the embankment currently under construction?		X	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation, stumps, topsoil in area where embankment fill will be placed)?	X		From underdrain?		N/A
9. Trees growing on embankment? (If so, indicate largest diameter below)		X	At isolated points on embankment slopes?		X
10. Cracks or scarps on crest?		X	At natural hillside in the embankment area?		X
11. Is there significant settlement along the crest?		X	Over widespread areas?		X
12. Are decant trashracks clear and in place?		X	From downstream foundation area?		X
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		X	"Boils" beneath stream or ponded water?		X
14. Clogged spillways, groin or diversion ditches?		X	Around the outside of the decant pipe?		X
15. Are spillway or ditch linings deteriorated?		X	22. Surface movements in valley bottom or on hillside?		X
16. Are outlets of decant or underdrains blocked?		X	23. Water against downstream toe?		X
17. Cracks or scarps on slopes?		X	24. Were Photos taken during the dam inspection?	X	

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

Issue #	Comments
1	Dike inspections performed during reading of water levels, no specific SOP was provided and no third party inspections have been performed since initial construction.
3	Ponds are zero discharge - all discharge from pond returns via recycle system decant.
23	Jackson Branch is a channel that runs along the northern slope approx. 10 feet from the toe.

Coal Combustion Waste (CCW)

Impoundment Inspection

Impoundment NPDES Permit N/A **INSPECTOR** Dewberry

Date 3-1-11
Impoundment Name North Bottom Ash Pond

Impoundment Company TECO Big Bend
EPA Region IV

State Agency
(Field Office) Address
Name of Impoundment

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

New ☐ **Update** X

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

IMPOUNDMENT FUNCTION: Receives Bottom Ash and Slag – 100% recycled via mechanical removal

Nearest Downstream Town Name: Apollo Beach

Distance from the impoundment: 1.5 miles

Location:

Latitude	27	Degrees	47	Minutes	30	Seconds	**N**
Longitude	82	Degrees	23	Minutes	56	Seconds	**W**

State Florida **County** Hillsborough

	Yes	No
Does a state agency regulate this impoundment?	X	☐

If So Which State Agency? Department of Environmental Protection

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

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

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

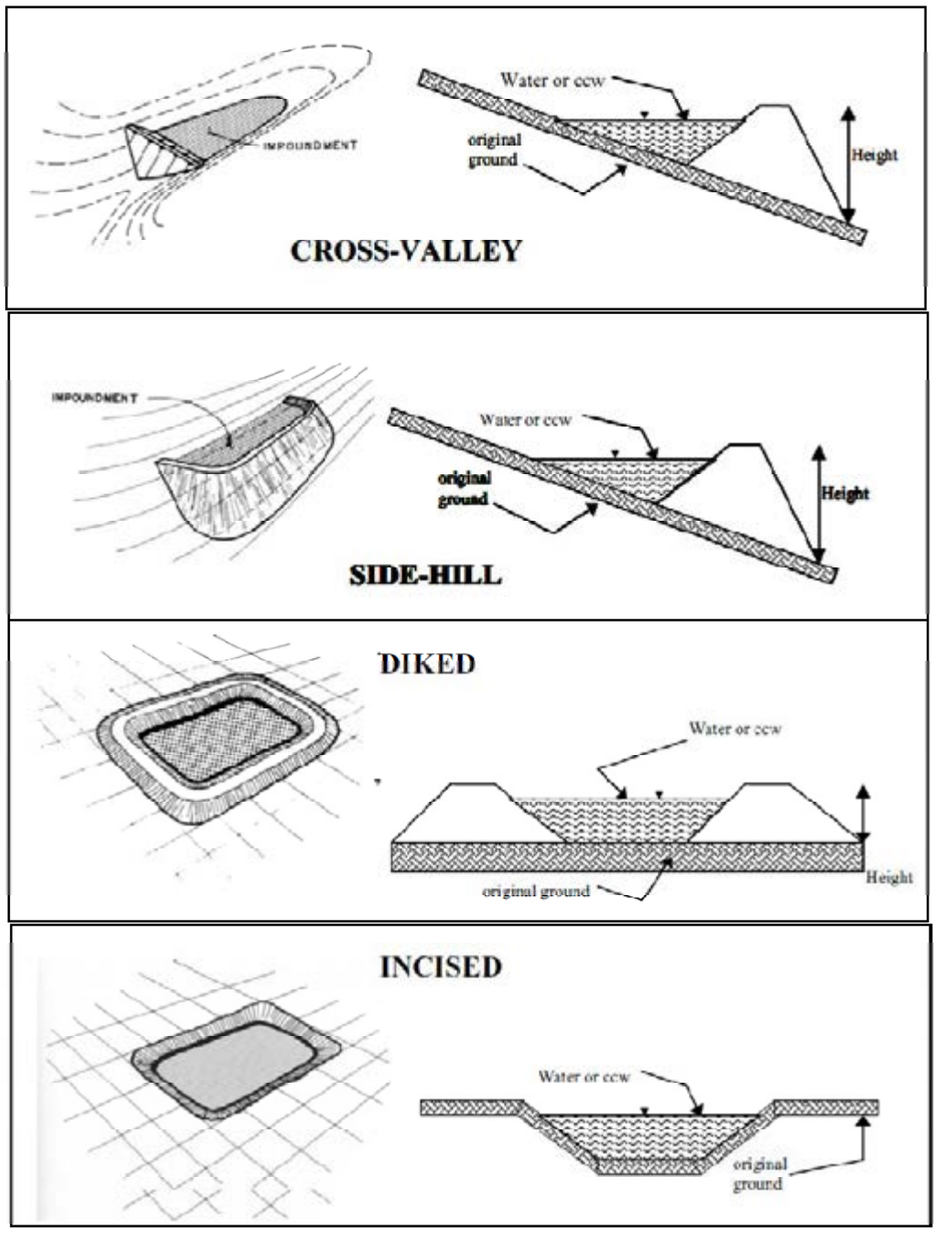
☐ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns.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

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

DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

No residential or commercial property in vicinity and limited potential for environmental impacts from accidental release.

CONFIGURATION:



☐ Cross-Valley ☐ Side-Hill X Diked

☐ Incised (form completion optional) ☐ Combination Incised/Diked

Embankment Height (ft)	25	**Embankment Material**	Native material
Pool Area (ac)	5.7	**Liner**	80 mil HDPE
Current Freeboard (ft)	5.71	**Liner Permeability**	N/A

TYPE OF OUTLET (Mark all that apply)

☐ **Open Channel Spillway**

☐ Trapezoidal

☐ Triangular

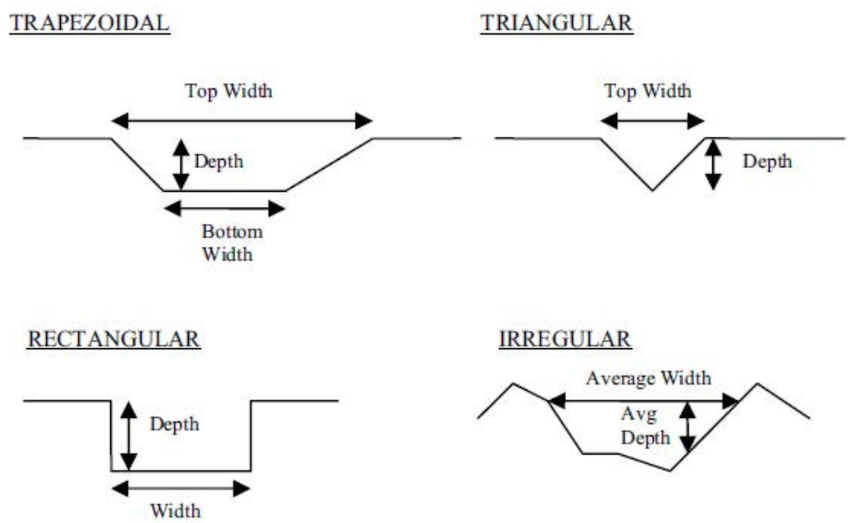
☐ Rectangular

☐ Irregular

depth (ft)

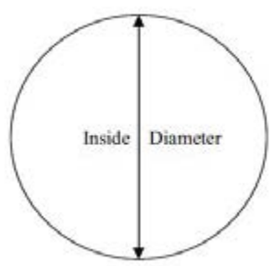
average bottom width (ft)

top width (ft)



x **Outlet**

18" inside diameter
(SDR 17 – smooth lined – 19.5" OD)



Material

☐ corrugated metal

☐ welded steel

☐ concrete

☐ plastic (hdpe, pvc, etc.)

☐ other (specify):

	Yes	No
Is water flowing through the outlet?	☐	☐

☐ **No Outlet**

☐ **Other Type of Outlet**
(specify):

The Impoundment was Designed By **Stone and Webster**

	Yes	No
Has there ever been a failure at this site?	☐	X

If So When?

If So Please Describe :

	Yes	No
Has there ever been significant seepages at this site?	☐	X
If So When?		

If So Please Describe :

	Yes	No
Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site?	☐	X
If so, which method (e.g., piezometers, gw pumping,...)?		

If So Please Describe :

ADDITIONAL INSPECTION QUESTIONS

Concerning the embankment foundation, was the embankment construction built over wet ash, slag, or other unsuitable materials? If there is no information just note that. **No**

Did the dam assessor meet with, or have documentation from, the design Engineer-of-Record concerning the foundation preparation? **Yes, See Stability Analysis from Stone & Webster**

From the site visit or from photographic documentation, was there evidence of prior releases, failures, or patchwork on the dikes? **No**

APPENDIX B

Document 8

EPA Checklist TECO Big Bend N Economizer Ash

Site Name:	**TECO Big Bend**	**Date:**	**3-1-11**
Unit Name:	**North Economizer Ash Pond**	**Operator's Name:**	**Randy Melton**
Unit I.D.:		**Hazard Potential Classification:**	**High** ☐ **Significant** ☐ **Low** X
	Inspector's Name:	Michael Hanson, John Alford - 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?	daily		18. Sloughing or bulging on slopes?		X
2. Pool elevation (operator records)?	27.3		19. Major erosion or slope deterioration?		X
3. Decant inlet elevation (operator records)?	27.3		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?		X	Is water entering inlet, but not exiting outlet?		X
5. Lowest dam crest elevation (operator records)?	31		Is water exiting outlet, but not entering inlet?		X
6. If instrumentation is present, are readings recorded (operator records)?	X		Is water exiting outlet flowing clear?		N/A
7. Is the embankment currently under construction?		X	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation, stumps, topsoil in area where embankment fill will be placed)?	X		From underdrain?		N/A
9. Trees growing on embankment? (If so, indicate largest diameter below)		X	At isolated points on embankment slopes?		X
10. Cracks or scarps on crest?		X	At natural hillside in the embankment area?		X
11. Is there significant settlement along the crest?		X	Over widespread areas?		X
12. Are decant trashracks clear and in place?		X	From downstream foundation area?		X
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		X	"Boils" beneath stream or ponded water?		X
14. Clogged spillways, groin or diversion ditches?		X	Around the outside of the decant pipe?		X
15. Are spillway or ditch linings deteriorated?		X	22. Surface movements in valley bottom or on hillside?		X
16. Are outlets of decant or underdrains blocked?		X	23. Water against downstream toe?		X
17. Cracks or scarps on slopes?		X	24. Were Photos taken during the dam inspection?	X	

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

Issue #	Comments
1	Dike inspections performed during reading of water levels, no specific SOP was provided and no third party inspections have been performed since initial construction.
3	Ponds are zero discharge - all discharge from pond returns via recycle system decant.
23	Jackson Branch is a channel that runs along the northern and eastern slope approx. 10 feet from the toe.

Coal Combustion Waste (CCW)

Impoundment Inspection

Impoundment NPDES Permit N/A **INSPECTOR** Dewberry

Date 3-1-11
Impoundment Name North Economizer Ash Pond

Impoundment Company TECO Big Bend
EPA Region IV

State Agency
(Field Office) Address
Name of Impoundment

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

New ☐ **Update** X

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

IMPOUNDMENT FUNCTION: Receives Economizer Ash as permanent disposal

Nearest Downstream Town Name: Apollo Beach

Distance from the impoundment: 1.5 miles

Location:

Latitude	27	Degrees	47	Minutes	30	Seconds	**N**
Longitude	82	Degrees	23	Minutes	42	Seconds	**W**

State Florida **County** Hillsborough

	Yes	No
Does a state agency regulate this impoundment?	X	☐

If So Which State Agency? Department of Environmental Protection

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

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

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

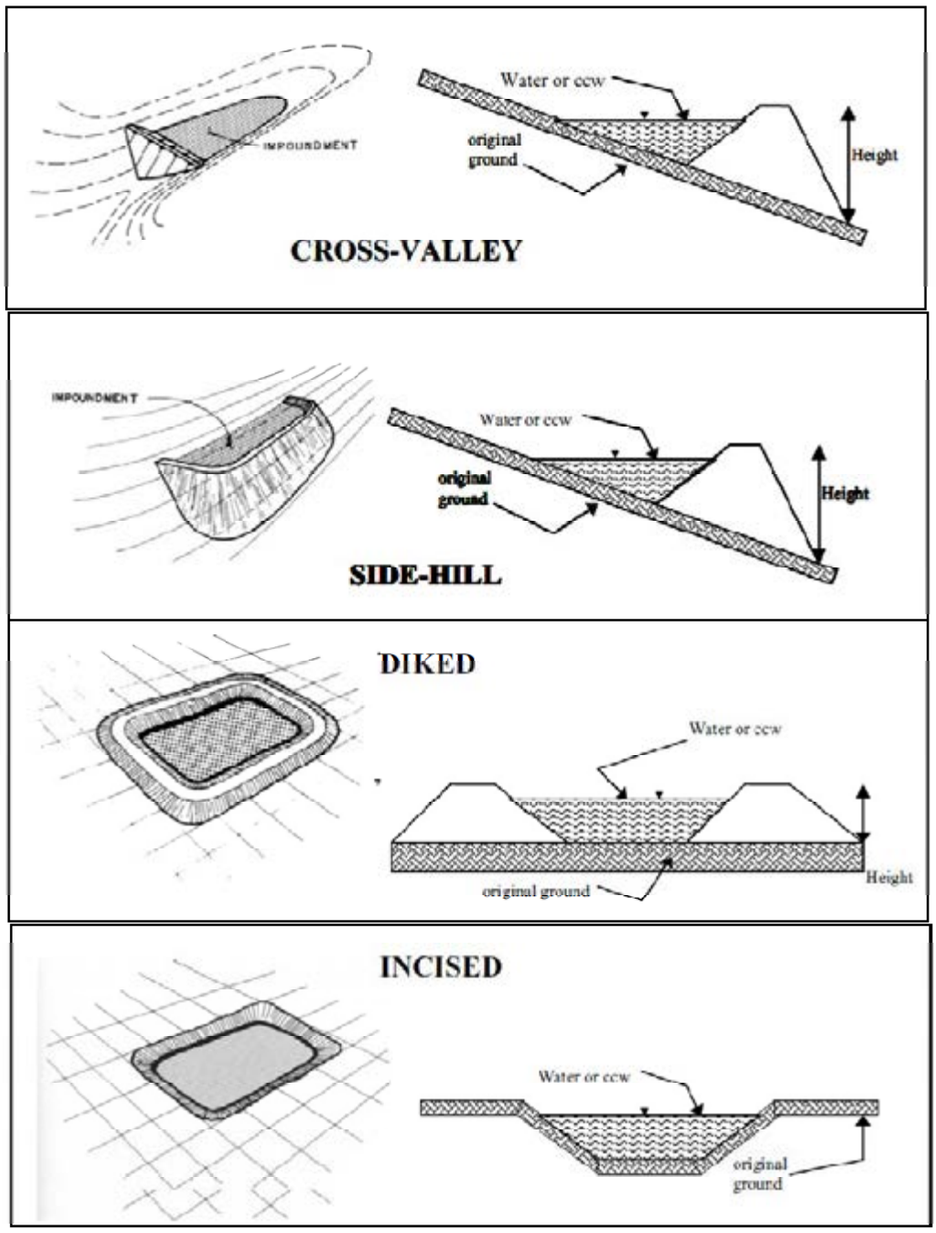
☐ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns.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

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

DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

No residential or commercial property in vicinity and limited potential for environmental impacts from accidental release.

CONFIGURATION:



☐ Cross-Valley ☐ Side-Hill X Diked

☐ Incised (form completion optional) ☐ Combination Incised/Diked

Embankment Height (ft)	25	**Embankment Material**	Native material
Pool Area (ac)	5.5	**Liner**	80 mil HDPE
Current Freeboard (ft)	5.71	**Liner Permeability**	N/A

TYPE OF OUTLET (Mark all that apply)

☐ **Open Channel Spillway**

☐ Trapezoidal

☐ Triangular

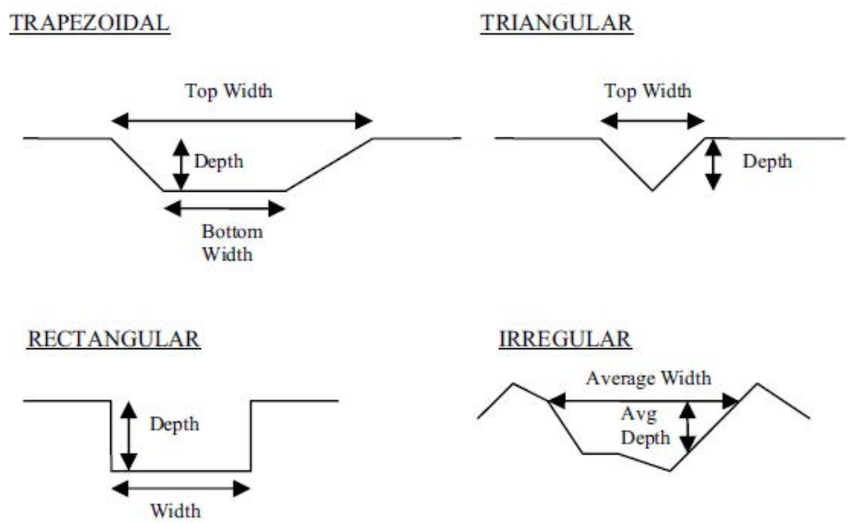
☐ Rectangular

☐ Irregular

depth (ft)

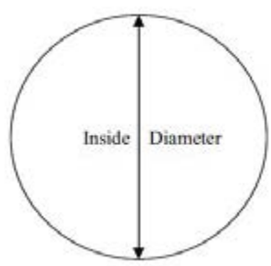
average bottom width (ft)

top width (ft)



x **Outlet**

18" inside diameter
(SDR 17 – smooth lined – 19.5" OD)



Material

☐ corrugated metal

☐ welded steel

☐ concrete

☐ plastic (hdpe, pvc, etc.)

☐ other (specify):

	Yes	No
Is water flowing through the outlet?	☐	☐

☐ **No Outlet**

☐ **Other Type of Outlet**
(specify):

The Impoundment was Designed By **Stone and Webster**

	Yes	No
Has there ever been a failure at this site?	☐	X

If So When?

If So Please Describe :

	Yes	No
Has there ever been significant seepages at this site?	☐	X
If So When?		

If So Please Describe :

	Yes	No
Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site?	☐	X
If so, which method (e.g., piezometers, gw pumping,...)?		

If So Please Describe :

ADDITIONAL INSPECTION QUESTIONS

Concerning the embankment foundation, was the embankment construction built over wet ash, slag, or other unsuitable materials? If there is no information just note that. **No**

Did the dam assessor meet with, or have documentation from, the design Engineer-of-Record concerning the foundation preparation? **Yes, See Stability Analysis from Stone & Webster**

From the site visit or from photographic documentation, was there evidence of prior releases, failures, or patchwork on the dikes? **No**

APPENDIX B

Document 9

EPA Checklist TECO Big Bend S Bottom Ash

Site Name:	**TECO Big Bend**	**Date:**	**3-1-11**
Unit Name:	**South Bottom Ash Pond**	**Operator's Name:**	**Randy Melton**
Unit I.D.:		**Hazard Potential Classification:**	**High** ☐ **Significant** ☐ **Low** X
	Inspector's Name:	Michael Hanson, John Alford - 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?	daily		18. Sloughing or bulging on slopes?		X
2. Pool elevation (operator records)?	N/A		19. Major erosion or slope deterioration?		X
3. Decant inlet elevation (operator records)?	N/A		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?		X	Is water entering inlet, but not exiting outlet?		X
5. Lowest dam crest elevation (operator records)?	31		Is water exiting outlet, but not entering inlet?		X
6. If instrumentation is present, are readings recorded (operator records)?	X		Is water exiting outlet flowing clear?		N/A
7. Is the embankment currently under construction?		X	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation, stumps, topsoil in area where embankment fill will be placed)?	X		From underdrain?		N/A
9. Trees growing on embankment? (If so, indicate largest diameter below)	X		At isolated points on embankment slopes?		X
10. Cracks or scarps on crest?		X	At natural hillside in the embankment area?		X
11. Is there significant settlement along the crest?		X	Over widespread areas?		X
12. Are decant trashracks clear and in place?		X	From downstream foundation area?		X
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		X	"Boils" beneath stream or ponded water?		X
14. Clogged spillways, groin or diversion ditches?		X	Around the outside of the decant pipe?		X
15. Are spillway or ditch linings deteriorated?		X	22. Surface movements in valley bottom or on hillside?		X
16. Are outlets of decant or underdrains blocked?		X	23. Water against downstream toe?		X
17. Cracks or scarps on slopes?		X	24. Were Photos taken during the dam inspection?	X	

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

Issue #	Comments
1	Dike inspections performed during reading of water levels, no specific SOP was provided and no third party inspections have been performed since initial construction.
2	Pond is currently drained and ash is being mechanically removed and transported via truck for recycle.
3	Ponds are zero discharge - all discharge from pond returns via recycle system decant.
9	2-4" dbh woody brush dense growth on bottom 10 feet of exterior south slope only. Removal would require extensive slope repair. Maintain and prevent further expansion onto slope.
13	2 minor depression areas on top of dike (2-4 inches deep). Provide backfill during normal maintenance.

Coal Combustion Waste (CCW)

Impoundment Inspection

Impoundment NPDES Permit N/A **INSPECTOR** Dewberry

Date 3-1-11
Impoundment Name **South Bottom Ash Pond**

Impoundment Company **TECO Big Bend**
EPA Region IV

State Agency
(Field Office) Address
Name of Impoundment

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

New ☐ **Update** **X**

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

IMPOUNDMENT FUNCTION: Receives Bottom Ash and Slag – 100% recycled via mechanical removal

Nearest Downstream Town Name: Apollo Beach

Distance from the impoundment: 1.5 miles

Location:

Latitude	27	Degrees	47	Minutes	28	Seconds	**N**
Longitude	82	Degrees	23	Minutes	56	Seconds	**W**

State Florida **County** Hillsborough

	Yes	No
Does a state agency regulate this impoundment?	X	☐

If So Which State Agency? Department of Environmental Protection

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

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

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

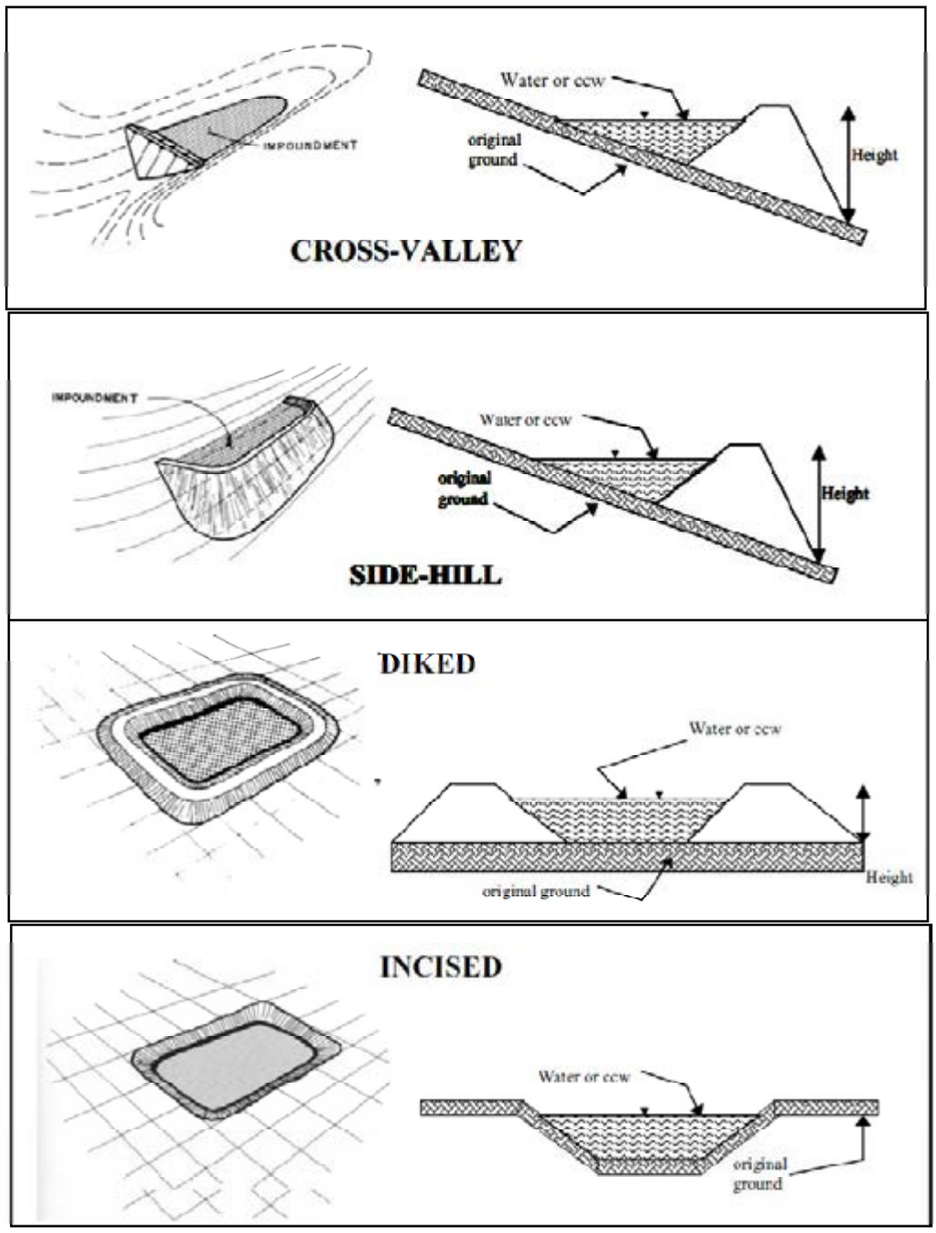
☐ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns.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

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

DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

No residential or commercial property in vicinity and limited potential for environmental impacts from accidental release.

CONFIGURATION:



☐ Cross-Valley ☐ Side-Hill X Diked

☐ Incised (form completion optional) ☐ Combination Incised/Diked

Embankment Height (ft)	25	**Embankment Material**	Native material
Pool Area (ac)	6.0	**Liner**	80 mil HDPE
Current Freeboard (ft)	N/A (dry)	**Liner Permeability**	N/A

TYPE OF OUTLET (Mark all that apply)

☐ **Open Channel Spillway**

☐ Trapezoidal

☐ Triangular

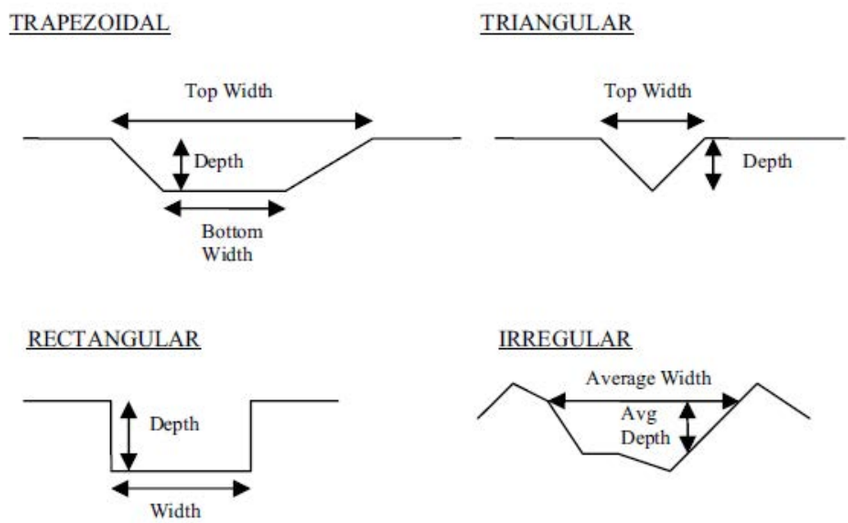
☐ Rectangular

☐ Irregular

depth (ft)

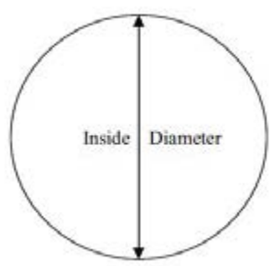
average bottom width (ft)

top width (ft)



x **Outlet**

18" inside diameter
(SDR 17 – smooth lined – 19.5" OD)



Material

☐ corrugated metal

☐ welded steel

☐ concrete

☐ plastic (hdpe, pvc, etc.)

☐ other (specify):

	Yes	No
Is water flowing through the outlet?	☐	☐

☐ **No Outlet**

☐ **Other Type of Outlet**
(specify):

The Impoundment was Designed By **Stone and Webster**

	Yes	No
Has there ever been a failure at this site?	☐	X

If So When?

If So Please Describe :

	Yes	No
Has there ever been significant seepages at this site?	☐	X
If So When?		

If So Please Describe :

	Yes	No
Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site?	☐	X
If so, which method (e.g., piezometers, gw pumping,...)?		

If So Please Describe :

ADDITIONAL INSPECTION QUESTIONS

Concerning the embankment foundation, was the embankment construction built over wet ash, slag, or other unsuitable materials? If there is no information just note that. **No**

Did the dam assessor meet with, or have documentation from, the design Engineer-of-Record concerning the foundation preparation? **Yes, See Stability Analysis from Stone & Webster**

From the site visit or from photographic documentation, was there evidence of prior releases, failures, or patchwork on the dikes? **No**

APPENDIX B

Document 10

EPA Checklist TECO Big Bend S Economizer Ash

Site Name:	**TECO Big Bend**	**Date:**	**3-1-11**
Unit Name:	**South Economizer Ash Pond**	**Operator's Name:**	**Randy Melton**
Unit I.D.:		**Hazard Potential Classification:**	**High** ☐ **Significant** ☐ **Low** X
	Inspector's Name:	Michael Hanson, John Alford - 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?	daily		18. Sloughing or bulging on slopes?		X
2. Pool elevation (operator records)?	N/A		19. Major erosion or slope deterioration?		X
3. Decant inlet elevation (operator records)?	N/A		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?		X	Is water entering inlet, but not exiting outlet?		X
5. Lowest dam crest elevation (operator records)?	31		Is water exiting outlet, but not entering inlet?		X
6. If instrumentation is present, are readings recorded (operator records)?	X		Is water exiting outlet flowing clear?		N/A
7. Is the embankment currently under construction?		X	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation, stumps, topsoil in area where embankment fill will be placed)?	X		From underdrain?		N/A
9. Trees growing on embankment? (If so, indicate largest diameter below)		X	At isolated points on embankment slopes?		X
10. Cracks or scarps on crest?		X	At natural hillside in the embankment area?		X
11. Is there significant settlement along the crest?		X	Over widespread areas?		X
12. Are decant trashracks clear and in place?		X	From downstream foundation area?		X
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		X	"Boils" beneath stream or ponded water?		X
14. Clogged spillways, groin or diversion ditches?		X	Around the outside of the decant pipe?		X
15. Are spillway or ditch linings deteriorated?		X	22. Surface movements in valley bottom or on hillside?		X
16. Are outlets of decant or underdrains blocked?		X	23. Water against downstream toe?		X
17. Cracks or scarps on slopes?	X		24. Were Photos taken during the dam inspection?	X	

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

Issue #	Comments
1	Dike inspections performed during reading of water levels, no specific SOP was provided and no third party inspections have been performed since initial construction.
2	Pond is full and recently seeded. Permanent closure process being permitted now. Perimeter stormwater drainage provided and discharged to reclaimed water storage for recycling.
17	Liner had approx. 6" long shear failure on interior slope 5 feet from top of slope. Potential for stormwater seepage into the dike material. Requires liner repair.
23	Jackson Branch is a channel that runs along the eastern slope approx. 10 feet from the toe.

Coal Combustion Waste (CCW)

Impoundment Inspection

Impoundment NPDES Permit N/A **INSPECTOR** Dewberry

Date 3-1-11
Impoundment Name **South Economizer Ash Pond**

Impoundment Company **TECO Big Bend**
EPA Region IV

State Agency
(Field Office) Address
Name of Impoundment

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

New ☐ **Update** **X**

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

IMPOUNDMENT FUNCTION: Receives Economizer Ash for permanent disposal

Nearest Downstream Town Name: Apollo Beach

Distance from the impoundment: 1.5 miles

Location:

Latitude	27	Degrees	47	Minutes	27	Seconds	**N**
Longitude	82	Degrees	23	Minutes	42	Seconds	**W**

State Florida **County** Hillsborough

	Yes	No
Does a state agency regulate this impoundment?	X	☐

If So Which State Agency? Department of Environmental Protection

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

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

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

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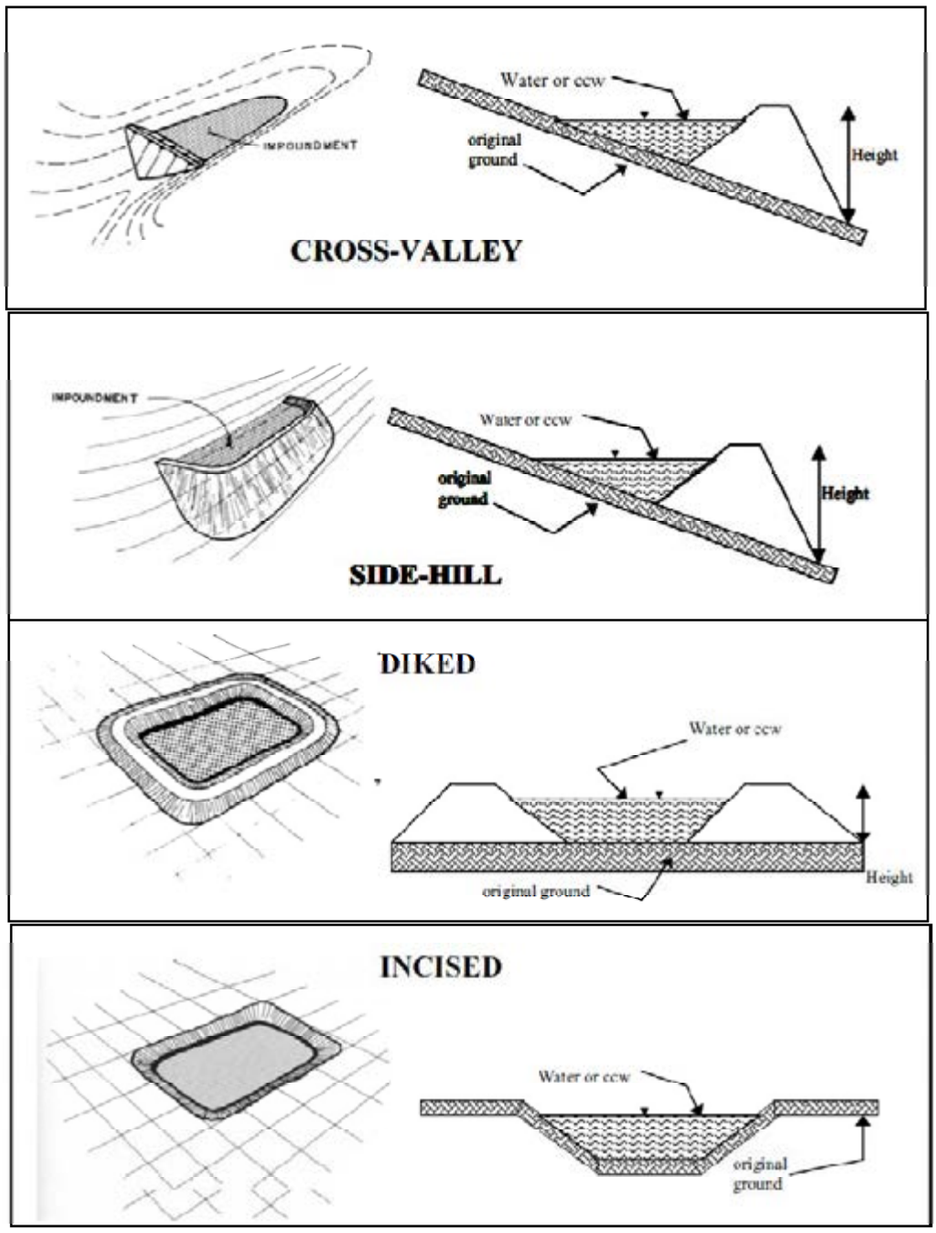
☐ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

No residential or commercial property in vicinity and limited potential for environmental impacts from accidental release.

CONFIGURATION:



☐ Cross-Valley ☐ Side-Hill X Diked

☐ Incised (form completion optional) ☐ Combination Incised/Diked

Embankment Height (ft)	25	**Embankment Material**	Native material
Pool Area (ac)	N/A	**Liner**	80 mil HDPE
Current Freeboard (ft)	N/A	**Liner Permeability**	N/A

TYPE OF OUTLET (Mark all that apply)

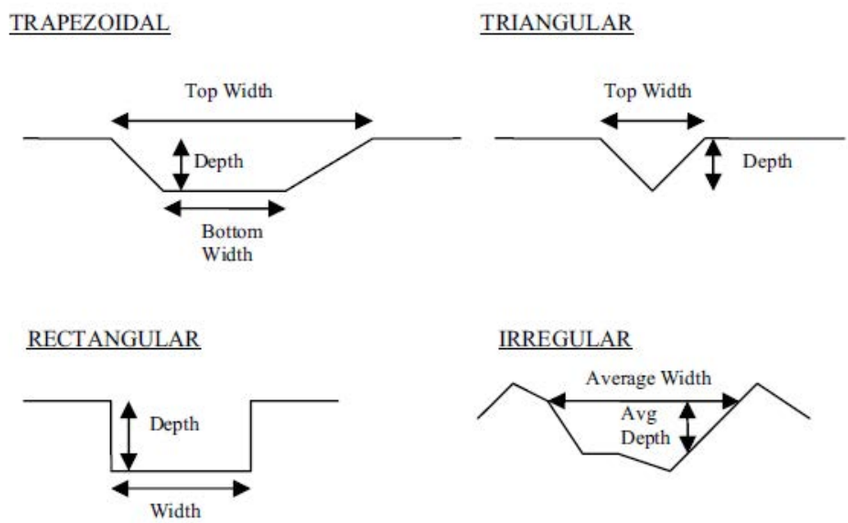
☐ **Open Channel Spillway**

- ☐ Trapezoidal
- ☐ Triangular
- ☐ Rectangular
- ☐ Irregular

depth (ft)

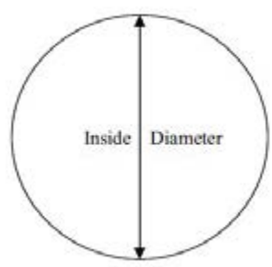
average bottom width (ft)

top width (ft)



N/A **Outlet**

inside diameter



Material

- ☐ corrugated metal
- ☐ welded steel
- ☐ concrete
- ☐ plastic (hdpe, pvc, etc.)
- ☐ other (specify):

	Yes	No
Is water flowing through the outlet?	☐	☐

☐ **No Outlet**

☐ **Other Type of Outlet** (specify):

The Impoundment was Designed By **Stone and Webster**

	Yes	No
Has there ever been a failure at this site?	☐	X

If So When?

If So Please Describe :

	Yes	No
Has there ever been significant seepages at this site?	☐	X
If So When?		

If So Please Describe :

	Yes	No
Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site?	☐	X
If so, which method (e.g., piezometers, gw pumping,...)?		

If So Please Describe :

ADDITIONAL INSPECTION QUESTIONS

Concerning the embankment foundation, was the embankment construction built over wet ash, slag, or other unsuitable materials? If there is no information just note that. **No**

Did the dam assessor meet with, or have documentation from, the design Engineer-of-Record concerning the foundation preparation? **Yes, See Stability Analysis from Stone & Webster**

From the site visit or from photographic documentation, was there evidence of prior releases, failures, or patchwork on the dikes? **No**