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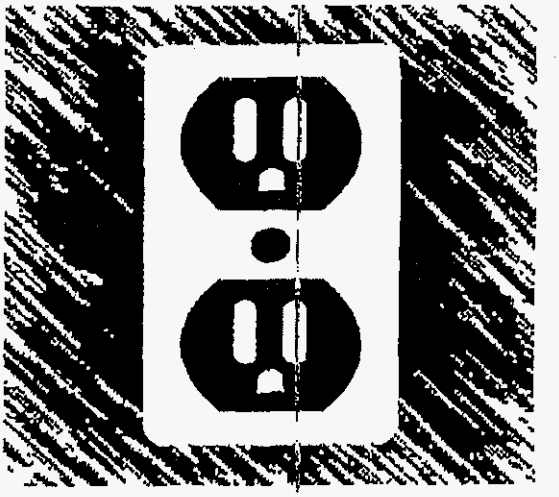

REVIEW OF COAL COMBUSTION RESIDUAL STORAGE AND DISPOSAL PROCESSES OF THE FLORIDA ELECTRIC INDUSTRY

NOVEMBER 2011

BY AUTHORITY OF

THE FLORIDA PUBLIC SERVICE COMMISSION
OFFICE OF AUDITING AND PERFORMANCE ANALYSIS

Review of Coal Combustion Residual Storage and Disposal Processes of the Florida Electric Industry

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November 2011

By Authority of
The State of Florida
Public Service Commission
Office of Auditing and Performance Analysis

PA-10-10-004

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1.0 Executive Summary

1.1 Scope And Objectives

This review examines how the four major investor-owned electric utilities (IOUs) in Florida are handling coal combustion residual (CCR) storage and disposal. It also addresses how each company is reassessing its practices based on proposed regulations by the U.S. Environmental Protection Agency (EPA). This review was conducted on behalf of the Florida Public Service Commission (FPSC) by the Performance Analysis Section of the Office of Auditing and Performance Analysis. The companies audited included: Tampa Electric Company (TECO), Progress Energy Florida, Inc. (PEF), Gulf Power Company (Gulf), and Florida Power & Light Company (FPL). Specifically, FPSC audit staff focused on the following areas:

- CCR Management
- Risk Assessment
- Performance Self-Evaluation

1.2 Background And Perspective

Nearly half of the nation's electricity comes from coal-fired generation plants.[1] Future reliance on coal generation may decline sharply as fewer coal plants are being built due to environmental concerns. In Florida, approximately 36 percent of the electricity was generated from coal in 2000. In 2010, 25 percent of Florida's electric generation was from coal and it is forecasted to remain near 25 percent by 2020.[2]

Coal combustion for electric generation produces four main types of large volume CCRs:

- Fly ash – Fine particles of silica glass that are removed from the plant exhaust gases by air emission control devices.
- Bottom ash – Ash particles that are too large to be carried in the flue gases and collect on the furnace walls or fall through open grates to an ash hopper.
- Boiler slag – Molten bottom ash collected at the base of slag tap and cyclone type furnaces that is quenched with water. It is made up of hard, black, angular particles that have a smooth, glassy appearance.
- Flue gas desulfurization materials (e.g., gypsum) – Sludge or powdered sulfate and sulfite produced through a process used to reduce sulfur dioxide (SO_2) emissions from the exhaust gas system of a coal-fired boiler.

Of the 136 million tons of CCRs generated nationwide in 2008 by roughly 495 coal-fired power plants, approximately 34 percent were disposed in landfills, 22 percent in surface

[1] U.S. Energy Information Administration (p.1) at http://www.eia.gov/cneaf/electricity/epa/figes1.html.
[2] FRCC's 2011 Load & Resource Plan, pp. S-17 to S-19, at http://www.psc.state.fl.us/utilities/electricgas/docs/FRCC_2011_Load_Resource_Plan.pdf.

impoundments,[3] and 8 percent in mines. The remaining 37 percent were recycled as in concrete, gypsum wallboard, or other beneficial uses.

The Florida power plants subject to this review generated approximately 3 million tons of CCRs in 2010, with about 20 percent stored or disposed in landfills, 3 percent in surface impoundments, 5 percent in other storage facilities, and 71 percent beneficially used. In 2010, the combined Florida cost for disposal totaled about $1.3 million. Sales revenue for the residual was over $3.4 million. In Florida, CCR storage and disposal and beneficial recycling are regulated by the Florida Department of Environmental Protection (FDEP). The FPSC also has regulatory authority pursuant to Chapter 366, Florida Statutes, over electric utility operations, safety, and rates which could be impacted by the increased regulatory costs associated with the EPA's proposed rules. As required by existing rules and statutes, power plants in Florida are permitted or licensed, and are required to monitor groundwater impacts from ash storage areas or settling ponds by one of the following ways:

- National Pollutant Discharge Elimination System permit and groundwater permit
- Separate groundwater permit
- Solid waste permit
- Conditions of certification under the Florida Power Plant Siting Act

2008 TVA Kingston Spill

Due in large part to the environmental impact of the CCR spill at the Tennessee Valley Authority's (TVA's) Kingston facility in 2008, the EPA has proposed rules to regulate CCRs as hazardous wastes. Future regulation of CCRs could restrict disposal in liquid form and require additional liners or capping of existing CCR ponds.

Following the TVA ash spill in 2008, the EPA requested detailed information from coal-fired electric utility plants to identify and assess the structural integrity of their CCR surface impoundments, dams, or other management units. Staff reviewed the responses to the EPA's requests and notes that none of Florida's coal-fired electric utility plants are on the "high hazard potential" ratings list. Hazard potential ratings are generally assigned by state dam safety officials.

EPA's April 2010 regulatory impact analysis contains a list identifying the electric utility plants that have reported historical contamination release events, involving CCR surface impoundments, within the years 1999 to 2008. None of Florida's coal-fired electric utility plants are on this list.

The EPA's risk assessment analysis concluded that absent proper disposal contaminants from CCRs leak into groundwater. On June 21, 2010, the EPA proposed rules that would regulate CCR disposal by electric utilities. The EPA also requested and reviewed comments on whether certain forms of beneficial uses should be regulated, such as the use of CCRs in embankment fill and some agricultural applications. At this time, the EPA is not proposing to regulate beneficial uses of CCRs on a federal level.

EPA Proposed Regulations

The EPA has proposed two regulatory schemes to regulate CCRs. In the Resource Conservation and Recovery Act under Subtitle C, CCRs are classified as *"special waste"*, and

[3]Surface impoundments are natural topographic depressions, man-made excavations, or diked areas formed primarily of earthen materials (although may be lined with man-made materials), which are designed to hold an accumulation of liquid wastes or wastes containing free liquids, and which are not injection wells. Examples of surface impoundments are holding, storage, settling, and aeration pits, ponds, and lagoons.

classified as *"non-hazardous waste"* under Subtitle D. Both schemes require liners and groundwater monitoring on new landfills receiving CCRs. The primary differences in the two plans involve the interim management of CCRs prior to disposal, treatment of existing disposal facilities, as well as implementation and enforcement.

Subtitle C regulates CCRs as hazardous waste. It includes measures intended to result in a phase out of existing surface impoundment facilities for the wet storage of CCRs. This approach also creates a comprehensive program of requirements for waste disposal that would be directly enforceable by the federal government through state or federal permit programs. Due to Florida's statutory prohibition of hazardous waste landfills, the disposal and beneficial use of CCRs in Florida would be prohibited. Absent legislative amendment, CCRs will have to be transported out-of-state for disposal or for beneficial use. States would be required to adopt the rule before it would become effective. The EPA expects that rule adoption by the states could take several years.

Under Subtitle D, the EPA would set performance standards for CCR disposal and would require liners on existing impoundments where CCRs are stored in wet form. The EPA expects this would induce utilities to close existing impoundments and increase the disposal of CCRs in dry form. This approach would go into effect perhaps as early as six months after promulgation of the rules because it would not require state or federal permit programs. The rules would not be federally enforceable, but would be primarily enforced through citizen litigation.

The EPA prepared a Regulatory Impact Analysis to estimate the costs and benefits of the two regulatory approaches under various scenarios. The EPA estimates nationwide annualized costs of $1.5 billion for the first approach and $0.6 billion under the second approach. The EPA's cost estimates include industry compliance costs, as well as state and federal monitoring and enforcement costs. The EPA contends that the rules will have "widespread environmental and economic benefits," including: benefits associated with groundwater protection, prevention of future ash spills, and encouragement of recycling into beneficial uses. There has been disagreement whether the EPA's proposed rules will increase or decrease beneficial uses for CCRs.

The EPA's annualized benefit estimate under Subtitle C is $7.4 billion based on induced future annual increases in beneficial use. However, potential decreases in beneficial use could reduce potential benefits by $0.1 billion to $3.0 billion per year nationwide.[4]

Gulf, for example, states that its costs necessary to comply with the Subtitle C and D regulations might result in an estimated annual revenue requirement between $186 million to $286 million and $102 million to $172 million to Gulf's retail customers, respectively. The company emphasizes that the costs and resulting revenue requirements to Gulf's retail customers are high-level estimates and include a significant amount of uncertainty.

The EPA released its proposed rules on June 21, 2010. The public comment period ended on November 19, 2010. The final rules are anticipated in 2012. The timing of compliance would depend on the rule option adopted, with full compliance expected by 2018. Both rules provide a five-year window for utilities to install required liners on existing CCR surface impoundments. **Appendix A** contains a summary of the EPA's proposed rules and **Appendix B** lists the key differences between the rule options.

[4] EPA's August 20, 2010 Proposed Rule Update at http://www.regulations.gov/#!documentDetail;D=EPA-HQ-RCRA-2009-0640-2661).

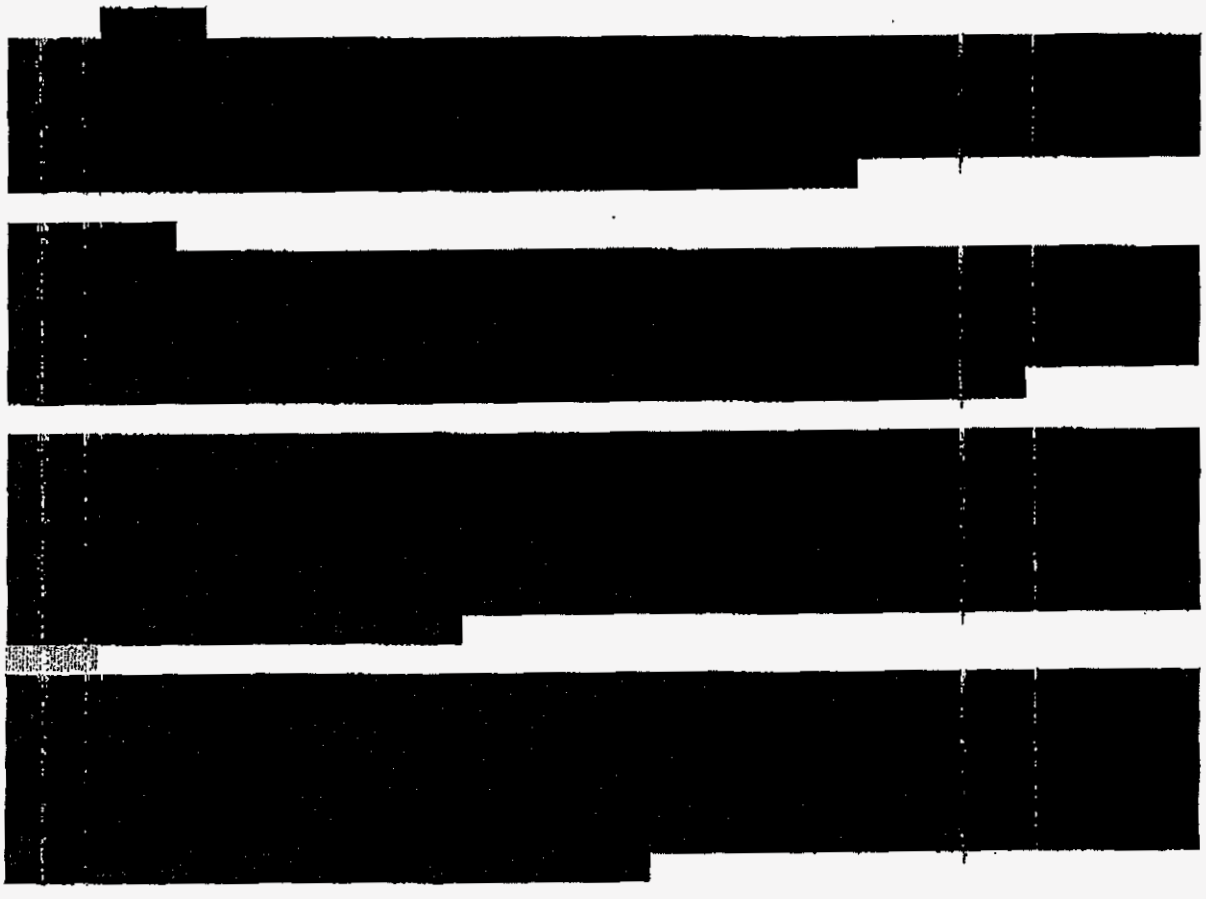
1.3 FINDINGS AND CONCLUSIONS

WHAT ARE AUDIT STAFF'S FINDINGS AND CONCLUSIONS?

Each of the four IOUs are proactively managing CCR storage and disposal activities. All four IOUs are taking steps to market CCRs for beneficial use with varying degrees of success, and each employ management oversight of storage and disposal operations. The company self-assessment information reflected in **Exhibits 2 and 3** appears to indicate general compliance with applicable federal, state and local regulations pertaining to CCR storage and disposal.

In addition, audit staff believes each company is assessing the potential operational changes and impacts of the proposed EPA regulations. The companies state that they continue to monitor the proceeding and will conduct a more thorough cost analysis once the EPA issues its final rules.

Audit staff's findings specific to each of the company's CCR management processes are as follows:



[redacted]

GULF

Audit staff raised some concerns regarding Gulf's procedures in place to handle potential emergency events at its CCR management facilities. To alleviate such concerns, the company states that it has implemented issuing cards with emergency contact information and posting the information in control rooms and other locations around the plants as designated by the plant managers. Audit staff also recognizes Gulf's initiation of stockpiling gravel, riprap (broken stones or concrete), and soil at its CCR surface impoundments for emergency dike repair purposes.

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Audit staff found that in 2010 Gulf marketed 41 percent of its CCR production. Net revenues from marketing the CCRs were [redacted] This total is comprised of [redacted] in revenue from Plant Daniel in Mississippi but with a marketing cost at Plant Crist of [redacted] Audit staff encourages Gulf to become more proactive in marketing the CCRs produced by its three plants in Florida. At some point, Gulf may want to consider the use of a competitive bidding process.

Additionally, audit staff notes that Gulf's inspectors at Plant Crist should complete each page of the inspection form, as formatted, including the inspection date and time. This process would not only satisfy the company's own procedures but also facilitate post-inspection data analysis, inspection performance reviews, and accurate recordkeeping of all the data contained in the eight-page inspection form.

[redacted]

CONCLUSIONS

Approximately three million tons of CCRs are generated per year by the Florida IOUs subject to this review. In 2010, the combined cost of CCR storage and disposal totaled about $1.3 million, while CCR sales revenue was over $3.4 million. The percent of CCRs marketed for beneficial use varied among the IOUs, from a low of 41 percent to a high of 86 percent.

Audit staff notes that the IOUs each have their own unique CCR production, storage and disposal issues. The utilities should continue to review their operations, identify areas for improvement, and make changes to their CCR storage and disposal processes that may be necessary. All companies are encouraged to either continue or increase their marketing of CCRs for beneficial use.

A B C D E

2.0 Overview of Operational Compliance

2.1 Observations

How much of the coal combustion residuals are produced, marketed, stored or disposed by the Florida IOUs, and what are the associated costs and revenues?

Combined, the Florida utilities produced approximately three million tons of CCRs in 2010. Over 71 percent of the residuals produced were marketed for beneficial use with the remainder stored or disposed. In 2010, the combined Florida cost for storage and disposal totaled about $1.3 million. Sales revenue for the residuals was over $3.4 million. **Exhibit 1** shows a summary of the amounts of CCRs produced, marketed, stored or disposed, and the associated costs and revenues in 2010 for each company.

CCR Production/Storage/Disposal/Sales
December 2010

IOU	Produced[2] (tons)	Marketed (tons)	Stored or Disposed (tons)	Storage or Disposal Cost	Sales Revenue
[redacted]					
GULF[1]					
[redacted]					
Total	2,650,142	1,888,249	752,491	$1,284,437	$3,426,892

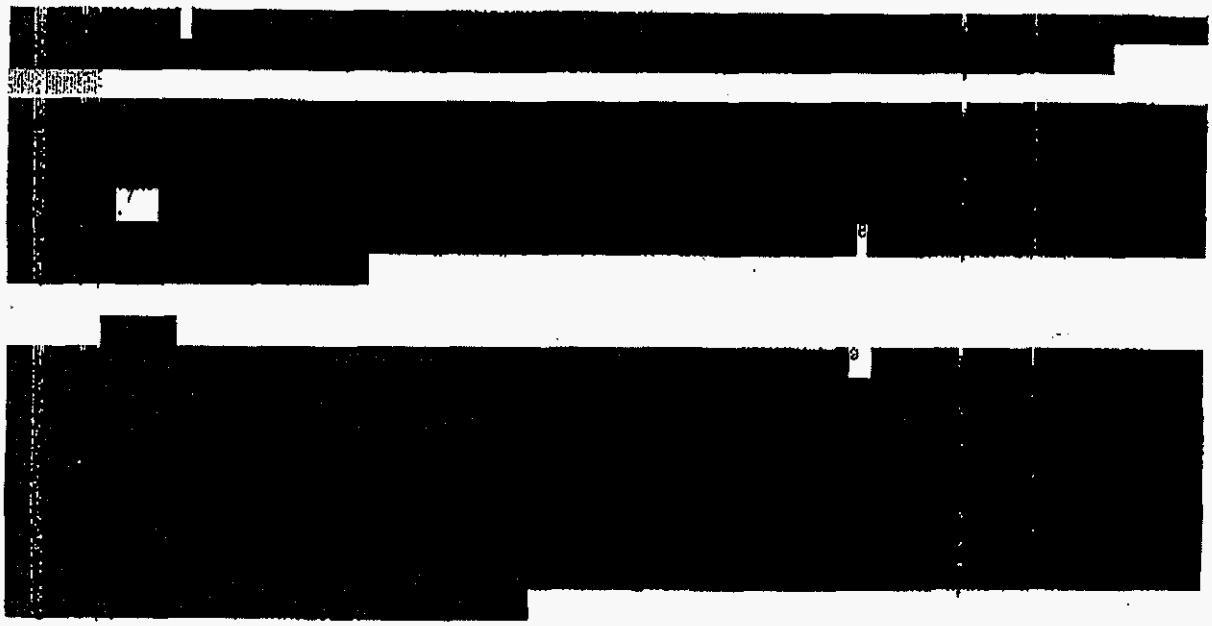
EXHIBIT 1 *Source: Supplemental Document Request 2.7(a),(b)*
[1]Includes Gulf's ownership portion of Plant Daniel (in Mississippi).
[2]Gulf states CCRs produced do not equal the sum of marketed, stored and disposed due to inherent imprecision in estimating ash content of varying coals.
[redacted]

What is the status of the utility's compliance with the current coal combustion residual storage and disposal requirements?

Exhibits 2 and 3 below reflect each IOU's self-assessment of the status of compliance with the current requirements for the disposal of CCRs in Florida.[5] **Exhibit 2** identifies the self-assessments for surface impoundments, and **Exhibit 3** identifies the self-assessments for landfills.

[redacted]

[5]EPA's April 2010 RIA at http://rffilibrary.files.wordpress.com/2010/05/epa-hq-rcra-2009-0640-0003.pdf; provides a summary of baseline state government requirements for both landfills and surface impoundments. See http://www.regulations.gov/#!documentDetail;D=EPA-HQ-RCRA-2009-0640-0003;oldLink=false.
[redacted]



GULF

Gulf has four CCR surface impoundments in Florida. Two of which are at Plant Crist, one at Plant Smith, and one at Plant Sholtz. Gulf states that all four are in compliance with all relevant and applicable federal and state laws and rules pertaining to CCR management. It also states that the liner, leachate collection system, financial assurance, and daily cover requirements are determined on a case-by-case basis pursuant to the FDEP Rule 62-701.220, F.A.C.

Exhibit 2 shows that Gulf passed groundwater monitoring at three of the four surface impoundments. The fourth impoundment is at Plant Crist and began operations in 1959. According to Gulf groundwater monitoring is not applicable for this impoundment. Gulf stated that due to the location of that surface impoundment, and topography, groundwater monitoring would not be possible and would not provide representative data due to the influence of the adjacent surface water. Gulf discussed the site factors with FDEP and it was decided that surface water monitoring for this surface impoundment would be adequate. This sampling method was agreed to and then required in Gulf's NPDES permit.

Gulf indicates in **Exhibit 2** that it does not have liners, leachate collection systems, caps, financial assurances, daily covers, dust controls, run-on/run-off controls, and post-closure monitoring controls for the three older surface impoundments. The company states these controls are not required for these impoundments. The 2009 surface impoundment at Plant Crist, however, does require some of these controls. Specifically, the liner, leachate, and run-on/run-off controls are required. The company states it complies with each of these requirements for the 2009 surface impoundment at Plant Crist. Gulf states that the cap,

financial assurance, daily cover, dust controls, and post-closure monitoring controls are not applicable to the 2009 surface impoundment.

CCR Engineering Control Requirements
Surface Impoundments in Florida*

Coal-Fired Power Plant	Year of Initial Operation	Groundwater Monitoring Compliance (Pass or Fail)	Liner (Yes or No)	Liner (Pass or Fail)	Leachate Collection System (Pass or Fail)	Cap (Yes or No)	Cap (Pass or Fail)	Financial Assurance (Pass or Fail)	Daily Cover (Pass or Fail)	Dust Controls (Pass or Fail)	Run-on/Run-off (Pass or Fail)	Post-Closure Monitoring (Pass or Fail)
[redacted]												
GULF												
Crist	1959	N/A[6]	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A
	2009	Pass	Yes	Pass	Pass	No	N/A	N/A	N/A	N/A	Pass	N/A
Smith	1965	Pass	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A
Scholz	1953	Pass	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A

*The inputs in the "Pass or Fail" columns refer to the issue of compliance with the minimum requirements reflected in the EPA's Appendix E at <http://www.regulations.gov/#!documentDetail;D=EPA-HQ-RCRA-2009-0640-0003;oldLink=false>.

[redacted]

[6]Gulf states that it conducts FDEP approved surface water monitoring in lieu of groundwater monitoring for the CCR surface impoundment at this facility.

EXHIBIT 2

Source: Company Responses to Supplemental DR2

CCR Engineering Control Requirements
Landfills in Florida*

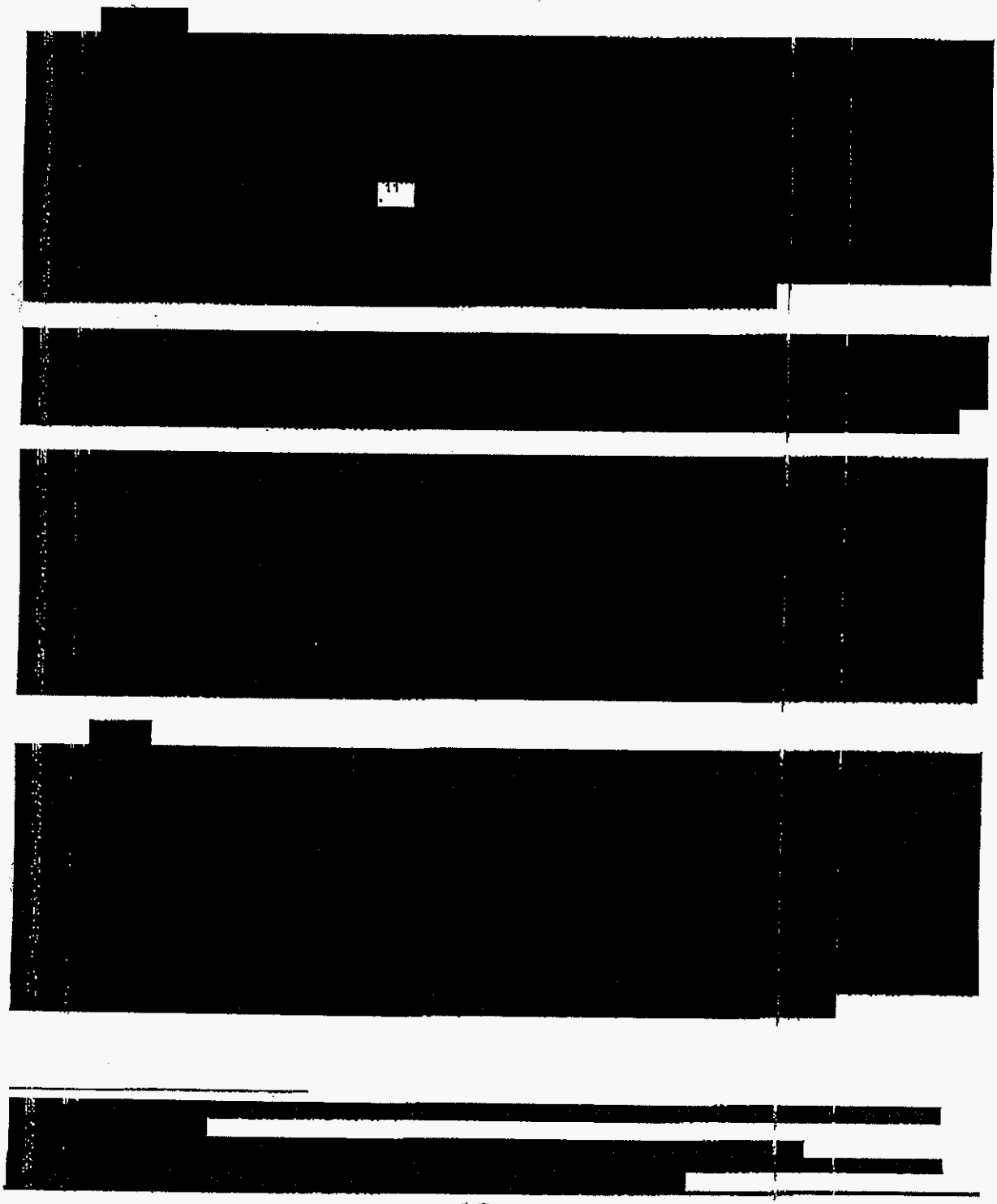
Coal Fired Power Plant	Year of Initial Operation	Groundwater Monitoring Compliance (Pass or Fail)	Liner (Yes or No)	Liner (Pass or Fail)	Leachate Collection System Pass or Fail	Cap (Yes or No)	Cap (Pass or Fail)	Financial Assurance (Pass or Fail)	Daily Cover (Pass or Fail)	Dust Controls (Pass or Fail)	Run-on/ Run-off (Pass or Fail)	Post-Closure Monitoring (Pass or Fail)
[redacted]												
GULF												
Crist	1980	Pass	No	N/A	N/A	Yes	Pass	N/A	N/A	Pass	Pass	N/A
Smith	1985	Pass	Yes	N/A	N/A	Yes	Pass	N/A	N/A	Pass	Pass	N/A
[redacted]												

*The inputs in the "Pass or Fail" columns refer to the issue of compliance with the minimum requirements reflected in the EPA's Appendix E at <http://www.regulations.gov/#!documentDetail;D=EPA-HQ-RCRA-2009-0640-0003;oldLink=false>.

EXHIBIT 3

Source: Company Responses to Supplemental DR2

WHAT PREVENTATIVE MEASURES HAVE BEEN TAKEN BY FLORIDA UTILITIES TO MITIGATE RISK OF HARM TO THE PUBLIC HEALTH AND ENVIRONMENT?



GULF

Gulf states that none of its CCR management facilities are closed-cycle, zero-discharge systems. Gulf Power notes that it is unaware of any federal law, state law or rule that requires implementation of closed-cycle, zero discharge systems.

Plant Crist operates a flue gas desulfurization (FGD) system. The operating areas of the FGD system at Plant Crist have concrete or geosysthetic liners in place to prevent stormwater from coming into contact with the gypsum and potentially impacting groundwater. The stormwater from these areas is conveyed to the existing FGD gypsum pond and storage area and then routed to another pond to be reused in the scrubber system. The only discharge from the FGD system is to a permitted Underground Injection Control (UIC) well that was approved by FDEP on February 12, 2009. Approximately 85 to 95 percent of the FGD system wastewater is recycled for reuse in the system itself. The remaining wastewater discharges from the FGD system (scrubber blow down and vacuum extraction water from the processing system) are conveyed into the lined pond system where gypsum settles and the remaining water is further conveyed to the return water pond. From that point, the water is routed for reuse in the FGD system. Only a small portion of the FGD system wastewater is removed and injected into the FDEP permitted UIC well for control of chloride concentrations to facilitate FGD system the wastewater reuse.

A B C D E

5.0 Gulf Power Company

5.1 Coal Combustion Residual Management

How much and what types of coal combustion residuals are produced, marketed, stored or disposed by the utility, and what are the associated costs and revenues?

Gulf has eight coal-fired electric power generation units in Florida with a combined capacity of 1,355 MW: Plant Crist Units 4 through 7 (906 MW), Plant Smith Units 1 and 2 (357 MW), and Plant Scholz Units 1 and 2 (92 MW). The amounts, by type, of CCRs produced, marketed, stored or disposed for 2008 through 2010 are shown in **Exhibit 10**, including the associated storage or disposal costs and sales revenues. In 2010, Gulf marketed 41 percent of CCR production, with the majority of the sales revenue derived from Gulf's ownership portion of Plant Daniel in Mississippi.

Gulf Power Company
CCR Production/Sales/Storage/Disposal

	Plant	Year	Produced (tons)[1]	Marketed (tons)[2]	Stored or Disposed (tons)[3]	Storage or Disposal Facility	Storage or disposal Costs	Sales Revenue
1	Crist	2008	[redacted]	[redacted]	[redacted]	Landfill	[redacted]	[redacted]
2		2009				Landfill		
3		2010[a]				Landfill		
4		2010				Landfill		
5	Smith	2008				Surface Impoundment		
6		2009				Surface Impoundment		
7		2010				Surface Impoundment		
8	Scholz	2008				Surface Impoundment		
9		2009				Surface Impoundment		
10		2010				Surface Impoundment		
11	Daniel[c]	2008[a]				Landfill		
12		2009[a]				Landfill		
13		2010[a]				Landfill		

[1] Coal ash figures represent both fly ash and bottom ash produced. Plant Crist is the only Gulf facility that generates FGD gypsum.
[2] Gulf states that it does not dispose CCRs but stores them in its surface impoundments and landfills until sold for beneficial use.
[3] Gulf states CCRs produced do not equal the sum of marketed, stored and disposed due to inherent imprecision in estimating ash content of varying coals.
[a] Gypsum; all other entries in this column represent both fly ash and bottom ash.
[b] Figures presented for Plant Daniel (in Mississippi) only represent Gulf Power's ownership portion.
[c] CCR landfill cap operation and maintenance costs.
[d] CCR surface impoundment operation and maintenance costs.
[e] The cost to develop markets with vendors for off-site beneficial use of gypsum in 2010 exceeded the revenue on gypsum sold. The primary cost was transportation, along with providing some gypsum at no cost to prospective vendors could test gypsum for use in their processes.

EXHIBIT 10 *Source: Supplemental Document Request 2.7(a)(b)*

WHAT ARE THE UTILITY'S COAL COMBUSTION RESIDUAL STORAGE AND DISPOSAL ACTIVITIES AND PROGRAMS?

All of Gulf's CCR storage areas are subject to permits issued by state agencies such as FDEP. Some of those permits require certifications on specific plant ash storage facilities on an annual basis. Gulf personnel conducts weekly inspections of the ash storage facilities. Additionally, Southern Company Services conducts an annual safety inspection and provides an assessment of Gulf's ash storage facilities. Gulf believes the inspections and assessments comply with best practices within the industry to ensure ash storage facilities meet all applicable local, state, federal regulations and industry standards. Specific plant activities and programs are described below.

PLANT CRIST

Fly ash is transported dry via a vacuum and pressure system to two silos. Once in the silos, the ash is either loaded into enclosed trucks for off-site beneficial use by concrete or cement companies or loaded into trucks and taken to the on-site ash landfill for storage. The bottom ash is transported via water to a hydrobin which is designed to remove the water from solid materials in slurry form. The hydrobin is drained each week and the bottom ash is transported by truck to the on-site ash landfill. The ash landfill is divided into cells. Once a cell is full, it is capped with topsoil and grass.

PLANT SMITH

CCRs at Plant Smith are transported by a wet sluicing system to the ash pond where the ash is stored. Periodically, ash is removed from the pond to meet appropriate water detention volume levels. The excavated ash is transported and placed into the on-site ash landfill for storage. As at Plant Crist, the ash landfill is divided into cells which are capped with topsoil and grass when full.

PLANT SCHOLZ

CCRs are transported by a wet sluicing system to the ash pond for storage. Periodically, CCRs are removed and stacked on internal dikes within the ash pond to maintain appropriate and safe volume levels.

PLANT DANIEL (IN MISSISSIPPI)

Fly ash is collected by a dry ash handling system and transferred to silos. The ash is then hauled to the on-site landfill or sold for beneficial use by concrete or cement companies. Similar to the operations at Plant Scholz, the bottom ash is transferred by a wet sluicing system to the ash pond for storage. The bottom ash is periodically removed from the pond to maintain appropriate and safe volume levels and hauled to the on-site landfill where it is either sold for off-site beneficial use by concrete or cement companies or stored.

WHAT DOES THE UTILITY DO TO MARKET COAL COMBUSTION RESIDUALS FOR BENEFICIAL USE?

According to Gulf's reported data as reflected in **Exhibit 10**, approximately 41 percent of its CCRs were marketed for beneficial use in 2010. Net revenues from marketing the CCR were [redacted]. This total is comprised of [redacted] in revenue from Plant Daniel in Mississippi but a marketing cost at Plant Crist of [redacted]. Audit staff encourages Gulf to become more proactive in marketing the CCRs

produced by its three plants in Florida. At some point, Gulf may want to consider the use of a competitive bidding process.
The company has existing contracts with end users that beneficially use CCRs for various purposes including wallboard, cement manufacturing, and agricultural uses. New CCR beneficial use markets are continually being explored by Gulf Power and the CCR marketers with which it contracts.

5.2 Risk Management

Does the utility employ adequate management oversight and appropriate controls for its coal combustion residual storage and disposal operations?

Gulf uses Southern Company Services technical staff to monitor the existing CCR storage processes by physical inspection of the facilities. Specifically, the company states that Gulf personnel conducts weekly inspections and Southern Company Services technical staff conducts an annual safety inspection and assessments of each ash impoundment at Gulf's coal-fired power plants.

According to the company, personnel at all of Gulf's plants, are to adhere to the Dam and Dike Inspection Guidelines for the water retaining structures on the property. The guidelines include specific plant responsibilities, such as weekly and monthly visual inspections by the Chemical and Results personnel and Compliance personnel, respectively. Any areas of concern are to be immediately reported to SCG Hydro Services. Also, all completed inspection checklists are to be promptly forwarded to the compliance group for review, routing, and filing. Additional inspections are to be conducted by either plant personnel or a dam safety engineer any time an unusual circumstance occurs: severe rain event, post-storm (hurricane, tornado, etc.), high river or stream flow, unusually high tide, or an earthquake. The results of such inspections are to be immediately reported to SCG Hydro Services for further review and corrective action.

Gulf also operates under various permits, such as the National Pollutant Discharge Elimination System permit, that contain specific inspection requirements concerning wastewater discharge and annual certification of impoundment integrity. Several of the permits require Gulf to certify annually that the ash ponds provide the necessary minimum wet weather detention volume to contain the combined volume for rainfall from a 10-year, 24-hour rainfall event and the maximum industrial wastewater flows which could occur during a 24-hour period.

Has the utility participated in the EPA's rulemaking or any other related proceeding concerning coal combustion residual storage and disposal?

Gulf provided comments on EPA's proposed CCR rulemaking during EPA's public comment period that ended on November 19, 2010. Gulf submitted comments as an operating company of Southern Company and as a member of the Florida Electric Power Coordinating Group, Inc.

Southern Company, as Gulf's parent corporation, also submitted comments to the EPA and stated that adoption of either the Subtitle C or D options could require closure of, or

significant change to, existing storage units. Construction of lined landfills, as well as additional waste management and groundwater monitoring may be necessary. Southern Company also stated that under both options, the EPA proposes to exempt the beneficial use of coal combustion byproducts from regulation; however, a hazardous or other designation indicative of heightened risk could limit or eliminate beneficial reuse options. Although its analysis is preliminary, Southern Company believes the EPA has significantly underestimated compliance costs in the proposed rule.

Southern Company stated in its comments that federal oversight is not necessary because its facilities are designed, constructed, and operated according to the best industry practices to ensure CCR management and disposal are safe and effective. However, should the EPA promulgate final regulations, Southern Company urged the EPA to take an approach that recognizes the operational realities of the existing energy delivery structure.

Southern Company further stated that any federal standards or regulations should recognize that CCRs are non-hazardous "solid waste" for purposes of the Resource Conservation and Recovery Act. Gulf believes existing CCR management facilities should be allowed to continue operating and that primary responsibility for CCR regulation should reside with the states, pursuant to the direction provided by Congress under Resource Conservation and Recovery Act Subtitle D. Among the options proposed or discussed by the EPA, Gulf states that Subtitle D-prime is the best approach, subject to the number of additional suggestions proposed by Gulf.

Southern Company stated that the impact of these proposed regulations will depend on their final form and the outcome of any legal challenges. The changes could result in significant additional compliance, operational costs that could affect future unit retirement, replacement decisions, results of operations, cash flows, and financial condition. Also, it noted that higher costs recovered through regulated rates would result in higher rates for customers and could contribute to reduced demand for electricity which could negatively impact results of operations, cash flows, and financial condition.

5.3 | PERFORMANCE SELF-EVALUATION

HAS THE UTILITY CONDUCTED ANY STUDIES OR ANALYSES ON ITS COAL COMBUSTION RESIDUAL STORAGE AND DISPOSAL MANAGEMENT PROCESSES?

Annual CCR storage and disposal management reports from Southern Company Services' inspectors conveyed the following over the period 2009 through 2010:

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PLANT CRIST

The dam safety inspection reports, dated April 9 and December 10, 2010 [redacted]

PLANT SMITH

A dam safety inspection report, dated February 10, 2010, [redacted]

In regard to an ash pond evaluation on April 23, 2010, [redacted]

A report, dated June 29, 2010, [redacted]

PLANT SCHOLZ

A dam safety inspection report by Southern Company Services, dated February 11, 2010, [redacted]

A report by Southern Company Services, dated October 11, 2010, [redacted]

Another internal report, dated November 18, 2010, [redacted]

PLANT DANIEL

A dam safety inspection report, dated April 14, 2009, [redacted]

1 2 3 4 5 6 7

[redacted]

Another internal dam safety inspection report, dated May 19, 2010, [redacted]

DOES THE UTILITY HAVE PROCESS IMPROVEMENT ACTIVITIES IN PLACE FOR ITS COAL COMBUSTION RESIDUAL STORAGE AND DISPOSAL MANAGEMENT PROCESSES (LESSONS LEARNED, PEER REVIEWS, ETC.)?

Gulf states its weekly inspections, annual safety inspections and assessments of its ash ponds by qualified personnel provide the necessary assurance that the facilities will safely retain the CCRs. Gulf has implemented the following procedures and practices to ensure continued safe CCR operations:

- Emergency response numbers and personnel available twenty-four hours a day, seven days a week if necessary;
- Plant personnel who conduct ash pond inspections are trained by dam safety engineers annually;
- Vegetation on dikes/berms of ash ponds is controlled;
- Any new structures, modifications to existing structures, or changes in maintained sluiced CCR levels must be reviewed and approved by professional engineers at Southern Company Services prior to and during design and construction.

Additionally, Gulf has initiated the stockpiling of gravel and soil at all ash pond locations in the event that corrective actions might be required. Gulf further notes that it strives to improve its best management practices through continual employee education on new industry standards and process improvements.

Gulf Power Company Responses to Florida Public Service Commission
Office of Auditing and Performance Analysis
Review of Coal Ash Storage and Disposal Processes

DOCUMENT REQUEST 1

1. *Please identify personnel primarily responsible for dealing with issues associated with the company's coal ash storage and disposal.*

   RESPONSE: James O. Vick, Director of Environmental Affairs, Gulf Power Company ("Gulf Power").

2. *Please provide copies of all company policies and procedures in place to facilitate proper coal ash storage and disposal.*

   RESPONSE: The Southern Company Safety Procedure for Dams and Dikes is provided as Attachment A. The Crist Electric Generating Plant National Pollutant Discharge Elimination System ("NPDES") permit, the Lansing Smith Electric Generating Plant NPDES permit, the Scholz Electric Generating Plant NPDES permit, and the Daniel Electric Generating Plant Solid Waste Management permit are provided in Attachment B and include specific permit conditions addressing coal ash management.

   Gulf Power's coal ash storage and disposal management policies and procedures are found in the documents listed below which are included in Attachment C.

   Plant Crist - Fly Ash Disposal and Technical Specifications (2010)
   Dam and Dike Inspection Guidelines (2009)
   Certificate of Completion of Construction and Operational Plan (1981)

   Plant Smith - Ash Pond Maintenance Plan (2010)
   Landfill Construction Permit (1988)
   Dry Fly Ash Disposal Area Revised Scope and Plan (1985)

   Plant Daniel - Technical Specification for Ash Stacking at the North Ash Management Unit- Cell 1 at Plant Daniel Mississippi Power Company (1-13-10)

3. *Please describe the company's goals and objectives relevant to its coal ash storage and disposal programs, and explain how the company works to achieve them.*

RESPONSE: Gulf Power's goals and objectives include properly managing coal ash generated from its electric generating units such that the coal ash stored in ash ponds and landfills remains in designated areas so as to protect human health, safety, and the environment. To maintain appropriate and safe volume levels, some of the ash in the ash ponds at Plants Smith, and Daniel is periodically removed and placed into the on-site ash

landfills. At Plant Scholz, excavated ash from the ash pond is stacked on internal dikes within the ash pond to maintain appropriate and safe volume levels.

At Plant Crist and Plant Daniel, the goals and objectives include reducing the amount of coal ash in the on-site landfills by maximizing the potential beneficial use of coal ash when beneficial use markets are available. To achieve these goals and objectives, Gulf Power continually markets coal ash to concrete and cement companies for their use as raw feed material. This coal ash needs to meet certain parameters to be beneficially used by the concrete and cement companies. Ash that cannot be beneficially used is stored in the on-site coal ash landfills at these plants.

4. *Please describe the company's type of disposal facilities and the capacity of each.*

RESPONSE: Coal ash is stored at each of the Gulf Power facilities described below.

1 Plant Crist Ash Pond – Area: 16 acres
Estimated remaining capacity [redacted] cy as of 2009

2 Plant Crist Ash Landfill – Area: 68 acres
Estimated remaining capacity [redacted] cy as of 2009

3 Plant Smith Ash Pond – Area: 172.2 acres
Estimated remaining capacity [redacted] cy as of 2009

4 Plant Smith Ash Landfill- Area: 72 acres
Estimated remaining capacity [redacted] cy as of 2009

5 Plant Scholz Ash Pond – Area: 31.8 acres
Estimated remaining capacity [redacted] cy as of 2009

6 Plant Daniel Ash Pond – Area: 18.7 acres
Estimated remaining capacity [redacted] cy as of 2009

7 Plant Daniel Ash Landfill – Area: 30 acres
Estimated remaining capacity [redacted] cy as of 2009

5. *Please describe the company's current coal ash storage and disposal programs.*

RESPONSE: At Plant Crist, fly ash is transported dry via a vacuum/pressure system to two silos. Once in the silos, the ash is either loaded into enclosed trucks for off-site beneficial use by concrete or cement companies or loaded into trucks and taken to the on-site ash landfill for storage/disposal. The bottom ash is transported via water to a hydrobin. The hydrobin is drained each week and the bottom ash is transported by truck to the on-site ash landfill. The ash landfill is divided into cells. Once a cell is full it is capped with top soil and grass.

Coal ash at Plant Smith is transported by a wet sluicing system to the ash pond where the ash is stored. Periodically, it becomes necessary to remove some of the ash from the pond to meet appropriate water detention volume levels. The excavated ash is

transported and placed into the on-site ash landfill for storage/disposal. The ash landfill is divided into cells. Once a cell is full, it is capped with top soil and grass.

At Plant Scholz, coal ash is transported by a wet sluicing system to the ash pond for storage/disposal. Periodically, coal ash is removed from the pond and stacked on internal dikes within the ash pond to maintain appropriate and safe volume levels.

At Plant Daniel, fly ash is collected by a dry ash handling system and transferred to silos. The ash is then hauled to the landfill or sold for off-site beneficial use by concrete or cement companies. Bottom ash is transferred by a wet sluicing system to the ash pond for storage/disposal. The bottom ash is periodically removed from the pond to maintain appropriate and safe volume levels and hauled to the on-site landfill, where it is either sold for off-site beneficial use by concrete or cement companies or stored permanently.

6. *Please explain the company's risk assessment of coal ash storage and disposal.*

RESPONSE: Gulf Power utilizes the expertise of a technical group within Southern Company called Southern Company Services to conduct an annual safety inspection/assessment of each ash impoundment at Gulf Power's coal-fired power plants. In addition to the annual inspections, plant personnel conduct weekly inspections of the ash ponds.

Some of the permits provided in Attachment B include annual impoundment integrity inspection requirements. Several of the permits require Gulf Power to annually certify that the ash ponds provide the necessary minimum wet weather detention volume to contain the combined volume for rainfall from the 10-year, 24-hour rainfall event and the maximum industrial wastewater flows which could occur during a 24-hour period.

7. *a. Please describe how the company monitors its existing coal ash storage and disposal program processes and practices.*

RESPONSE: Gulf Power monitors the existing coal ash storage and disposal processes by physical inspection of the facilities. Physical inspections/assessments are conducted annually by Southern Company Services technical staff. Plant personnel also conduct weekly inspections of the ash ponds and complete an inspection form which is kept on-site at each facility. Any problems noted are reported to the plant's compliance group and investigated, corrected, and monitored to completion.

b. Please describe any information collected or report produced during the monitoring process.

RESPONSE: Weekly and annual written reports of the physical inspections/assessments conducted on ash ponds at Gulf Power facilities are kept on-site at each respective facility.

8. *a. Please describe whether and how the company ensures that it gets early detection of coal ash storage and disposal problems.*

RESPONSE: The weekly and annual inspections/assessments discussed in response to question 6 are intended to provide for early detection of potential issues.

b. Please describe how the company defines "early detection" in its context.

RESPONSE: Gulf Power defines "early detection" as physical survey signs such as an increase in seepage from a cell and possible movement of soils. Preventative steps are taken to ensure that erosion and other unsafe conditions do not occur at the ash pond and landfill facilities.

c. Please describe the steps the company takes to ensure that it properly corrects and documents all early-detection coal ash storage and disposal problems or potential situations.

RESPONSE: As stated above, Gulf Power conducts inspections of its ash ponds on a weekly basis utilizing qualified plant personnel. In addition, an annual safety inspection/assessment of Gulf Power ash ponds is conducted by qualified Southern Company Services personnel. All inspection/assessment recommendations are appropriately addressed by plant management in a timely manner.

9. *Please describe how the company monitors, evaluates, and certifies that the company is complying with all applicable local, state, and federal regulations, including company and industry standards for proper coal ash storage disposal.*

RESPONSE: All of Gulf Power's ash storage areas are subject to permits issued by state agencies. Some of those permits require certifications on specific plant ash storage facilities on an annual basis. The use of specialized personnel within Southern Company Services to conduct annual safety inspections/assessments of Gulf Power ash ponds described in the response to question 6 provides Gulf Power with access to the best practices within the industry for ash storage facilities and enables Gulf Power's management to ensure that its ash storage facilities fully meet or exceed all applicable local, state, and federal regulations as well as company and industry standards for proper coal ash storage and disposal.

10. *Please provide a copy of the company's emergency management, disaster recovery, and contingency plans which outline all of the responsibilities and actions to be taken by the company to properly address coal ash storage and disposal problems.*

RESPONSE: The Southern Company Safety Procedure for Dams and Dikes is provided as Attachment A.

11. *Please provide copies of any studies, audits, or analyses prepared by the company, or a consultant, on the company's coal ash storage and disposal management process.*

RESPONSE: A summary of Gulf Power's coal ash storage and disposal management reports is listed below and the reports are included in Attachment D.

Plant Crist – Dam Safety Inspection Report (2009)
Dam Safety Inspection Report (2010)

Plant Smith – Dam Safety Inspection, Ash Pond Dike Report (2009)
Dam Safety Inspection, Ash Pond Dike Report (2010)
Ash Pond Evaluation (4-23-10)
Hydrologic and Hydraulic Analysis Report of the Ash Pond and Outlet Structure (6-29-10)

Plant Scholz – Dam Safety Inspection, Ash Pond Dike Report (2009)
Dam Safety Inspection, Ash Pond Dike Report (2010)
Field Observations –Scholz Ash Pond Cell 1 Seepage Event (10-11-10)
Plant Scholz Ash Pond Cell 1 Seepage Modeling (11-18-10)

Plant Daniel – Dam Safety Inspection Report (2009)
Dam Safety Inspection Report (2010)

12. *Please describe all process improvement activities associated with the company's coal ash storage and disposal management (lessons learned, peer reviews, etc.).*

RESPONSE: Gulf Power has always safely managed and maintained its ash storage facilities. As mentioned previously, Gulf Power's weekly inspections and annual safety inspections/assessments of its ash ponds by qualified personnel provide the necessary assurance that the facilities are structurally sound and will safely retain coal ash stored on-site. Gulf Power has implemented the following procedures and practices to ensure safe on-site storage of coal ash:

a. Emergency response numbers and personnel available twenty-four hours a day, seven days a week if necessary;
b. Plant personnel who conduct ash pond inspections are trained by dam safety engineers annually;
c. Vegetation on dikes/berms of ash ponds is controlled; and
d. Any new structures, modifications to existing structures, or changes in maintained sluiced coal ash levels must be reviewed and approved by professional engineers at Southern Company Services prior to and during design and construction.

In addition, Gulf Power has initiated the stockpiling of gravel and soil at all ash pond locations in the event that corrective actions might be required. Gulf Power strives to

improve its best management practices through continual employee education on new industry standards and process improvements.

13. Please provide the following information for 2008 through 2010:

a. Amount of coal ash produced;

2010 Plant Crist: [redacted] tons ash
2009 Plant Crist: [redacted] tons ash
2008 Plant Crist: [redacted] tons ash

2010 Plant Smith: [redacted] tons ash
2009 Plant Smith: [redacted] tons ash
2008 Plant Smith: [redacted] tons ash

2010 Plant Scholz: [redacted] tons ash
2009 Plant Scholz: [redacted] tons ash
2008 Plant Scholz: [redacted] tons ash

2010 Plant Daniel: [redacted] tons ash
2009 Plant Daniel: [redacted] tons ash
2008 Plant Daniel: [redacted] tons ash

b. Amount of coal ash disposed;

2010 Plant Crist: [redacted] tons ash
2009 Plant Crist: [redacted] ons ash
2008 Plant Crist: [redacted] tons ash

2010 Plant Smith: [redacted] tons ash
2009 Plant Smith: [redacted] tons ash
2008 Plant Smith: [redacted] tons ash

2010 Plant Scholz: [redacted] tons ash
2009 Plant Scholz: [redacted] ons ash
2008 Plant Scholz: [redacted] tons ash

2010 Plant Daniel: [redacted] tons ash
2009 Plant Daniel: [redacted] ons ash
2008 Plant Daniel: [redacted] ons ash

c. Amount of coal ash marketed;

2010 Plant Crist: [redacted] tons fly ash
2009 Plant Crist: [redacted] tons fly ash
2008 Plant Crist: [redacted] tons fly ash

Plant Smith: [redacted]

Plant Scholz: [redacted]

2010 Plant Daniel: [redacted] tons ash
2009 Plant Daniel: [redacted] tons ash
2008 Plant Daniel: [redacted] tons ash

d. Cost of coal ash disposal;

2010 Plant Crist Capital Expenditures: [redacted]
2009 Plant Crist Capital Expenditures:
2008 Plant Crist Capital Expenditures:

2010 Plant Crist O&M Expenses: [redacted]
2009 Plant Crist O&M Expenses:
2008 Plant Crist O&M Expenses:

2010 Plant Smith Capital Expenditures: [redacted]
2009 Plant Smith Capital Expenditures:
2008 Plant Smith Capital Expenditures:

2010 Plant Smith O&M Expenses: [redacted]
2009 Plant Smith O&M Expenses:
2008 Plant Smith O&M Expenses:

2010 Plant Scholz O&M Expenses: [redacted]
2009 Plant Scholz O&M Expenses:
2008 Plant Scholz O&M Expenses:

2010 Plant Daniel Capital Expenditures: [redacted]
2009 Plant Daniel Capital Expenditures:
2008 Plant Daniel Capital Expenditures:

2010 Plant Daniel O&M Expenses: [redacted]
2009 Plant Daniel O&M Expenses:
2008 Plant Daniel O&M Expenses:

* Costs presented for Plant Daniel represent Gulf Power's ownership portion

e. Revenue from coal ash sales.

Plant Crist: [redacted]
Plant Smith:
Plant Scholz:

1
2
3

2010 Plant Daniel: [redacted]*
2009 Plant Daniel: [redacted]*
2008 Plant Daniel: [redacted]*

* Costs presented for Plant Daniel represent Gulf Power's ownership portion

14. *Did the company participate in the EPA's proposed coal ash rulemaking proceeding on November 19, 2010? If so, please describe the results of such participation and provide any related documentation.*

RESPONSE: Gulf Power provided comments on EPA's proposed coal combustion byproduct rulemaking during EPA's public comment period that ended on November 19, 2010. Gulf Power submitted comments as an operating company of Southern Company and as a member of the Florida Electric Power Coordinating Group, Inc. ("FCG"). These comments are provided as Attachment E and Attachment F.

15. *Please describe the company's position on issues raised in any other federal, state, and/or local regulatory proceedings involving coal ash storage and disposal management processes.*

RESPONSE: Please refer to Attachment G which includes comments FCG provided on the Florida Department of Environmental Protection's ("FDEP") ongoing Industrial Solid Waste Disposal and Beneficial Use ("IWDR") rulemaking during 2003. Gulf Power is not aware of any other regulatory proceedings involving coal ash storage and disposal management processes.

16. *Please describe what the company is doing to prepare for, or participate in, other similar regulatory proceedings.*

RESPONSE: Gulf Power is not aware of any other regulatory proceedings involving coal ash storage and disposal processes other than EPA's proposed coal ash rulemaking and FDEP's ongoing IWDR rulemaking. If other regulatory proceedings are initiated or scheduled in the future, Gulf Power's participation may include filing comments and/or attending public hearings.

17. a. Please explain the company's position regarding whether coal ash should be classified as a "hazardous substance."

RESPONSE: See Attachment E, Section I. C. 2. (pg. 10) and Section III in its entirety (page 75) and FCG comments, Sections III, IV, and V (pages 8 through 35).

b. If it is ultimately classified as such, then how would this impact the company's coal ash disposal storage and disposal program management processes?

RESPONSE: On June 21, 2010, the EPA published a rulemaking proposal which requested comments on two potential regulatory options for management and disposal of coal combustion byproducts: regulation as a solid waste or regulation as if the materials technically constituted a hazardous waste. Adoption of either option could require closure of or significant change to existing storage units and construction of lined landfills, as well as additional waste management and groundwater monitoring requirements. Under both options, the EPA proposes to exempt the beneficial reuse of coal combustion byproducts from regulation; however, a hazardous or other designation indicative of heightened risk could limit or eliminate beneficial reuse options. Although its analysis is preliminary, Southern Company believes the EPA has significantly underestimated compliance costs in the proposed rule.

The outcome of these proposed regulations will depend on their final form and the outcome of any legal challenges, and cannot be determined at this time. However, additional regulation of coal combustion byproducts could have a significant impact on management, beneficial use, and disposal of such byproducts. These changes could result in significant additional compliance and operational costs that could affect future unit retirement and replacement decisions and results of operations, cash flows, and financial condition. Further, higher costs that are recovered through regulated rates would result in higher rates for our customers and could contribute to reduced demand for electricity, which could negatively impact results of operations, cash flows, and financial condition.

c. What specific changes would have to be made to the existing processes such as modifications to transporting or holding facility practices?

RESPONSE:
The outcome of these proposed regulations will depend on their final form and the outcome of any legal challenges, and cannot be determined at this time. However, additional regulation of coal combustion byproducts could have a significant impact on management, beneficial use, and disposal of such byproducts. These changes could result in significant additional compliance and operational costs that could affect future unit retirement and replacement decisions and results of operations, cash flows, and financial condition. Further, higher costs that are recovered through regulated rates would result in higher rates for our customers and could contribute to reduced demand for

electricity, which could negatively impact results of operations, cash flows, and financial condition.

18. *Please describe whether and how the company is addressing the proposed federal regulations and reassessing its coal ash storage and disposal practices consistent with the potential impact such regulations may have on its operations.*

RESPONSE: Gulf Power believes that its current coal ash storage and disposal practices are more than adequate to ensure the coal ash that is safely stored/disposed on-site does not adversely affect human health, safety, or the environment. Due to the uncertainty of the final form of the proposed EPA regulations, it is premature for Gulf Power to reassess its ash storage and disposal practices at this time. Gulf Power will continue to monitor EPA's rulemaking activities and will be able to better evaluate the impact to Gulf Power's coal ash management, beneficial use, and disposal after the proposed regulations are finalized.

Document Request 1 (Documents Produced)

Question 2

Document titled Safety Procedure for Dams and Dikes is confidential in its entirety.

Document Request 1 (Documents Produced)

Question 2

Document titled Technical Specification for Ash Stacking (Plant Daniel) is confidential in its entirety.

Document Request 1 (Documents Produced)

Question 2

Document titled Plant Crist Dam and Dike Inspection Guidelines is confidential in its entirety.

Document Request 1 (Documents Produced)

Question 2

Document titled Plant Smith Ash Pond Maintenance Plan 2010 is confidential in its entirety.

Document Request 1 (Documents Produced)

Question 2

Document titled Fly Ash Disposal and Technical Specifications 2010 (Plant Crist) is confidential in its entirety.

Document Request 1 (Documents Produced)

Question 11

Document titled 2009 Dam Safety Inspection (Scholz) is confidential in its entirety.

Document Request 1 (Documents Produced)

Question 11

Document titled 2009 Dam Safety Inspection (Crist) is confidential in its entirety.

Document Request 1 (Documents Produced)

Question 11

Document titled 2009 Dam Safety Inspection (Smith) is confidential in its entirety.

Document Request 1 (Documents Produced)

Question 11

Document titled 2009 Dam Safety Inspection (Daniel) is confidential in its entirety.

Document Request 1 (Documents Produced)

Question 11

Document titled 2010 Dam Safety Inspection (Smith) is confidential in its entirety.

Document Request 1 (Documents Produced)

Question 11

Document titled 2010 Dam Safety Inspection (Scholz) is confidential in its entirety.

Document Request 1 (Documents Produced)

Question 11

Document titled Ash Pond Evaluation (Smith) is confidential in its entirety.

Document Request 1 (Documents Produced)

Question 11

Document titled Hydrologic Analysis Report (Smith) is confidential in its entirety.

Document Request 1 (Documents Produced)

Question 11

Document titled 2010 Dam Safety Inspection (Daniel) is confidential in its entirety.

Document Request 1 (Documents Produced)

Question 11

Document titled October 11, 2010 Field Observation (Scholz) is confidential in its entirety.

Document Request 1 (Documents Produced)

Question 11

Document titled 2010 Dam Safety Inspection (Crist) is confidential in its entirety.

Document Request 1 (Documents Produced)

Question 11

Document titled November 18, 2010 Ash Pond Seepage Cell 1 Seepage Modeling (Scholz) is confidential in its entirety.

Gulf Power Company Responses to Florida Public Service Commission
Office of Auditing and Performance Analysis
Review of Coal Combustion Residual Storage and Disposal Processes

DOCUMENT REQUEST 2
July 29, 2011

1. *In regard to the company's risk assessment efforts concerning its coal combustion residual storage and disposal operations at all surface impoundments and landfills, please identify each impoundment and landfill and corresponding plant and provide:*

Response:

Plant Crist – coal combustion residual (CCR) surface impoundment and CCR landfill*
Plant Smith – CCR surface impoundment and CCR landfill
Plant Scholz – CCR surface impoundment
Plant Daniel – CCR surface impoundment and CCR landfill

* In a July 15, 2011 e-mail, the Florida Public Service Commission's (PSC) Vic Cordiano noted that the PSC's use of "coal ash" in Document Request 1 (DR-1) should be interpreted as including all types of CCR's. Therefore, to clarify Gulf Power Company's (Gulf Power) responses in DR-1, Questions 4 and 5, Plant Crist has a Flue Gas Desulfurization System (FGD system) which produces synthetic gypsum (FGD gypsum). This system was designed to produce high quality FGD gypsum so the material can be either directed to the drying system where it is subsequently stored in a covered storage area to be marketed for beneficial use or it is sent to the existing FGD gypsum pond/storage area where the water in the FGD gypsum is decanted and the decanted water is then conveyed to another pond to be reused in the FGD system. This results in FGD gypsum remaining in the existing FGD pond/storage area. This FGD gypsum remains in the storage area until a possible beneficial use is identified. The existing FGD gypsum pond/storage area is approximately 16 acres and currently has an estimated available capacity of [redacted] cubic yards. There is approximately [redacted] cubic yards of storage capacity in the covered storage area.

   a. *reports, recommendations, and resolutions (including dates) associated with the annual safety inspection and assessment for the past three years;*

Response: Each annual safety inspection report identified in Gulf Power's response to Question 11 in DR -1 contains recommendations for that respective year and the status of implementation of any recommendations made for the previous year. The annual safety inspection reports for calendar years 2009 and 2010 for each of Gulf Power's plants were previously provided in response to DR-1 (See Attachment D, Gulf Power Response to DR-1 (February 10, 2011)).

b. *documentation concerning status of compliance with the permits, i.e., including all records of compliance monitoring and completed permit certification sheets;*

Response: Groundwater monitoring reports for each of the plants and the annual surface impoundment certifications, to the extent required by the Florida Department of Environmental Protection (FDEP) or the Mississippi Department of Environmental Quality (MDEQ) are provided in Attachment A.

c. *number of weekly inspections performed in the past three years, including documentation (copies of completed inspection forms, checklists, related reports, memos, or other types of correspondence in regard to the results of such inspections);*

Response:

Plant Crist – 71 weekly inspections performed as of 12/29/10
Plant Smith – 49 weekly inspections performed as of 12/30/10
Plant Scholz – 30 weekly inspections performed as of 12/27/10
Plant Daniel – 51 weekly inspections performed as of 12/15/10

Weekly inspection documentation for each of the above-referenced plants is provided in Attachment B.

d. *descriptions of the problems that have been identified as a result of the weekly inspections and the corrective actions taken;*

Response: Please see Gulf Power's response to Question 1.c. and the documentation provided in Attachment B. The documentation provided identifies any issues observed as part of the weekly inspections and any corrective actions taken or recommended.

e. *an explanation of the specific preventative steps taken to ensure erosion and other unsafe conditions do not occur.*

Response: As set forth in Gulf Power's response to Question 12 in DR-1, Gulf Power has always safely managed and maintained its CCR surface impoundments and CCR landfills. That response outlines typical preventative steps that are taken to ensure erosion and other unsafe conditions do not occur. Also, Southern Company's Safety Procedure for Dams and Dikes (also provided by Gulf Power in response to DR-1) outlines a number of practices to minimize erosion of surface impoundment walls and other unsafe conditions. The Safety Procedure for Dams and Dikes was provided in response to DR-1(see Attachment A, Gulf Power Response to DR-1 (February 10, 2011)).

2. *Based on audit staff's review of Gulf's response to the EPA at http://www.epa.gov/epawaste/nonhaz/industrial/special/fossil/surveys/gulf-lansing.pdf, please provide a copy of the inspection report results from the FDEP in regard to its inspection conducted on February 5, 2009.*

Response: A copy of the requested FDEP inspection report is provided in Attachment C.

3. *Please provide follow-up actions concerning all inspection issues that remain open for:*

   a. *Plant Crist (April 9 and Dec 10, 2010 inspections);*

Response: Please see Gulf Power's response to Question 1.a.

   b. *Plant Scholz (February 11, 2010 inspection);*

Response: Please see Gulf Power's response to Question 1.a.

   c. *Plant Scholz (October 2 and October 6, 2010 inspections).*

Response: The seepage event observed in 2010 at the Plant Scholz CCR surface impoundment did not result in a discharge to waters of the state. [redacted] Discovery of the incident and the corrective actions taken by Gulf Power were documented and kept on file in accordance with specific permit conditions in the facility's NPDES permit relating to the CCR surface impoundment. These records (among many others) were available to FDEP representatives during the facility's last NPDES inspection which occurred in February, 2011. Documentation concerning the incident is provided in Attachment D as is the Gulf Power certification letter that mentions the seepage incident and Gulf Power's response thereto.

1 2 3

4. *Please complete Exhibits 6A/B for the Daniel and Smith plants.*

Response: It is Gulf Power's assumption that Exhibits 6A, 6B, 7A, and 7B attempt to outline/characterize certain of the U.S. Environmental Protection Agency (EPA) requirements proposed in that federal agency's June 21, 2010 rule co-proposals addressing CCRs. Those EPA rule co-proposals are not legally effective and it is unknown at this time when such rules will be finalized by EPA. Nor is it known whether EPA will finalize such rules under Subtitle C (Hazardous Waste) or Subtitle D (Non- Hazardous Waste) of Resource Conservation and Recovery Act (RCRA). Thus, Gulf Power does not believe it is appropriate to use the word "compliance" in any of the Exhibits. Along those lines, Gulf Power respectfully proposes a number of potential changes to those Exhibits. To assist the PSC in better understanding the current environmental regulations applicable to CCR management facilities, Gulf Power provides, in Attachment E, a general outline of the current regulatory framework for CCR landfills and surface impoundments in Florida. Finally, Gulf Power has completed modified Exhibits 6A and 6B for the Daniel and Smith plants as requested. Those modified Exhibits are also found in Attachment E along with modified Exhibits 7A and 7B.

5. *What would be the impact (in dollars/month) to ratepayers if the subtitle C, D, or "D-prime" regulations were to be adopted as proposed?*

Response: The cost impact of these proposed regulations will depend on their final form and the outcome of any legal challenges and cannot be determined with any certainty at this time.

Gulf Power has prepared an estimated range of costs associated with the potential capital additions necessary to comply with Subtitles C, D and D-prime. The ranges provided are high-level estimates and include a significant amount of uncertainty and should not be relied upon for purposes other than obtaining an order of magnitude with respect to the investment costs and resulting revenue requirements to Gulf's retail customers. Gulf readily admits that these estimates have significant shortcomings but nevertheless, in an effort to provide audit staff with a general estimate the potential impacts are summarized below.

Subtitle C: Gulf's assumption with respect to Subtitle C assumes no change in Florida law which currently prohibits siting of Class C hazardous waste landfills in the state of Florida. Under this assumption, Gulf could be required to: a) close and replace all of its existing coal-fired generating facilities located in the state of Florida and b) excavate, transport and dispose of existing coal combustion residuals to an interstate hazardous waste site around the 2017 time period. Closure of Crist units 4-7, Smith units 1-2, and Scholz units 1-2 would result in the retirement and replacement of 1,355 MW of capacity. The cost to replace 1,355 MW of existing capacity with 1,300 MW of natural gas capacity would range between $1.3 billion and $2.0 billion in 2011 dollars depending upon the technologies selected to replace the existing units. In addition to the estimates above, various other costs would be incurred but are not contemplated in the cost estimates provided. Other costs would include transmission costs (new & existing), gas pipeline costs, stranded investment costs, disposal costs of existing CCR's, etc. Just the replacement capacity cost of $1.3 billion to $2.0 billion would result in an estimated annual revenue requirement between $186 million and $286 million to Gulf's retail customers.

Subtitle D: Adoption of Subtitle D could require closure of, or significant change to, existing CCR storage units and construction of lined landfills, as well as additional waste management and groundwater monitoring requirements. The estimated cost to comply with Subtitle D ranges between $715 million and $1.2 billion in capital investments and excludes any estimate of O & M expenditures. The estimated range of $715 million to $1.2 billion would result in an estimated annual revenue requirement between $102 million and $172 million to Gulf's retail customers.

Subtitle D-prime: Adoption of Subtitle D-prime could require significant change to existing groundwater monitoring requirements. The estimated cost to comply with Subtitle D-prime ranges between $0.6 million and $1.5 million in capital investments and excludes any estimate of O & M expenditures. The estimated range of $0.6 million to $1.5 million in capital investment would result in an estimated annual revenue requirement between $86,000 and $229,000 to Gulf's retail customers.

Gulf Power has not developed cost impact estimates in dollars per month for the Subtitle C, D, or D-prime EPA rule co-proposals due to the number of, and degree of variation relating to all the unknown variables. Attachment F includes the calculation of annual revenue requirements referenced in this response.

6. *In regard to the EPA's rulemaking (details at http://water.epa.gov/scitech/wastetech/guide/steam_factsheet.cfm), please provide all related documentation such as comments filed, responses to the information collection request submitted, meetings or workshops attended, etc. If the company has not been involved with such rulemaking, please explain the reason(s) for no involvement.*

Response: Gulf Power provided its response to EPA's information collection request (ICR) in the above-referenced EPA rulemaking on steam effluent guidelines. A copy of the EPA ICR and Gulf Power's responses are provided in Attachment G.

a. *Please identify all plants and their respective coal combustion residual surface impoundments and landfills and provide a detailed description of whether or not each one is a closed-cycle, zero-discharge (CCZD) system.*

Response: Please refer to Gulf Power's response to Question 1.a. which identifies all plants and their respective CCR surface impoundments and landfills. The CCR management facilities listed are not closed-cycle, zero-discharge (CCZD) systems. Gulf Power is unaware of any federal or state law or rule that requires implementation of CCZD systems.

b. *Please identify each coal combustion residual surface impoundment or landfill that is not a CCZD system and explain the actions taken, or will be taken, by the company to implement a CCZD system.*

Response: The CCR surface impoundments and landfills listed in Gulf Power's response to Question 1.a. are not CCZD systems. Gulf Power is unaware of any federal or state law or rule that requires implementation of CCZD systems. As a result, Gulf Power is not undertaking any action to implement CCZD systems at any of the identified CCR management facilities at its plants.

7. *For each plant, please provide:*

a. *the annual quantity of coal combustion residuals beneficially used and the total amount generated at year-end 2008, 2009, and 2010.*

Response: Previously, Gulf Power provided information responsive to this request in its response to Question 13.a. and 13.c. in DR-1. In preparing its response to this question, Gulf Power discovered errors in the information previously provided in its responses to DR-1. Therefore, Gulf Power is providing the corrected information below and requests that this information also serve as a supplemental response to DR-1, Questions 13.a. and 13.c.

CCR's generated annually*:

1 2008 Plant Crist: [redacted] tons ash – FGD Gypsum: [redacted]
2 2009 Plant Crist: [redacted] tons ash – FGD Gypsum: [redacted]
3 2010 Plant Crist: [redacted] tons ash – FGD Gypsum: [redacted] tons

2008 Plant Smith: [redacted] tons ash
2009 Plant Smith: [redacted] tons ash
2010 Plant Smith: [redacted] tons ash

2008 Plant Scholz: [redacted] tons ash
2009 Plant Scholz: [redacted] tons ash
2010 Plant Scholz: [redacted] tons ash

2008 Plant Daniel: [redacted] tons ash **
2009 Plant Daniel: [redacted] tons ash
2010 Plant Daniel: [redacted] tons ash

* Coal ash figures represent both fly ash and bottom ash generated. Plant Crist is the only Gulf Power facility that generates FGD gypsum.

** Figures presented for Plant Daniel represent Gulf Power's ownership portion.

Annual CCR beneficial use volumes*:

2008 Plant Crist: [redacted] tons ash – FGD Gypsum: [redacted]
2009 Plant Crist: [redacted] tons ash – FGD Gypsum: [redacted]
2010 Plant Crist: [redacted] tons ash – FGD Gypsum: [redacted] tons

2008 Plant Smith: [redacted] tons ash
2009 Plant Smith: [redacted] tons ash
2010 Plant Smith: [redacted] tons ash

2008 Plant Scholz: [redacted] tons ash
2009 Plant Scholz: [redacted] tons ash
2010 Plant Scholz: [redacted] tons ash

2008 Plant Daniel: [redacted] tons ash **
2009 Plant Daniel: [redacted] tons ash
2010 Plant Daniel: [redacted] tons ash

* Coal ash figures represent both fly ash and bottom ash beneficially used. Plant Crist is the only Gulf Power facility that generates FGD gypsum.

** Figures presented for Plant Daniel represent Gulf Power's ownership portion.

b. *how much and what type of coal combustion residuals (fly ash, bottom ash, boiler slag, and flue gas desulfurization (FGD) solids such as gypsum and calcium sulfite) were produced and where stored or disposed (identify location, e.g., surface impoundment or landfill) at year-end 2008, 2009, and 2010.*

Response: Previously, Gulf Power provided information responsive to this request in its response to Question 13.b. in DR-1. In preparing its response to this question, Gulf Power discovered errors in the information previously provided in its response to DR-1. Therefore, Gulf Power is providing the corrected information below and it requests that this information also serve as a supplemental response to DR-1, Questions 13.b.

CCR's stored or disposed annually*:

2008 Plant Crist: [redacted] tons ash, CCR Landfill– FGD Gypsum: [redacted]
2009 Plant Crist: [redacted] tons ash, CCR Landfill – FGD Gypsum: [redacted]
2010 Plant Crist: [redacted] tons ash, CCR Landfill – FGD Gypsum: [redacted] tons, CCR Landfill

2008 Plant Smith: [redacted] tons ash, CCR Surface Impoundment
2009 Plant Smith: [redacted] tons ash, CCR Surface Impoundment
2010 Plant Smith: [redacted] tons ash, CCR Surface Impoundment

2008 Plant Scholz: [redacted] tons ash, CCR Surface Impoundment
2009 Plant Scholz: [redacted] tons ash, CCR Surface Impoundment
2010 Plant Scholz: [redacted] tons ash, CCR Surface Impoundment

2008 Plant Daniel: [redacted] tons ash, CCR Landfill **
2009 Plant Daniel: [redacted] tons ash, CCR Landfill
2010 Plant Daniel: [redacted] tons ash, CCR Landfill

* Coal ash figures represent both fly ash and bottom ash disposed. Plant Crist is the only Gulf Power facility that generates FGD gypsum.

** Figures presented for Plant Daniel represent Gulf Power's ownership portion.

8. *For each plant with FGD systems, please identify the plant and explain the design and operating practices to prevent the discharge of FGD wastewater (i.e., scrubber purge) as contaminated runoff or leachate.*

Response: The operating areas of the FGD system at Plant Crist have concrete or geosysthetic liners in place to prevent stormwater from coming into contact with the FGD gypsum and potentially impacting groundwater. The stormwater from these areas is conveyed to the existing FGD gypsum pond/storage area and then routed to another pond to be reused in the FGD scrubber system. The only discharge from the FGD system is to a permitted Underground

Injection Control (UIC) well that was approved by the FDEP on February 12, 2009. A copy of the FDEP UIC well permit is provided in Attachment H.

a. *Is a certain percentage of the wastewater recycled? If so, please provide the percentage of the wastewater recycled by each plant and describe the recycling process.*

Response: Approximately 85 – 95 percent of the FGD system wastewater is recycled for reuse in the FGD system itself. The remaining wastewater discharges from the FGD system (scrubber blowdown and vacuum extraction water from the processing system) are conveyed into the lined FGD pond system where FGD gypsum settles and the remaining water is further conveyed to the return water pond. From that point, the water is routed for reuse in the FGD system. Only a small portion of the FGD system wastewater is removed and injected into the FDEP-permitted UIC well for control of chloride concentrations to facilitate FGD system wastewater reuse.

9. *What specific marketing efforts are employed by the company for sale of coal combustion residuals for beneficial use?*

Response: Gulf Power has existing contracts with end users of CCRs that beneficially use CCRs for various purposes including wallboard and cement manufacturing, and agricultural uses. Contracts also exist with CCR beneficial use marketers who market the CCRs to end users of CCRs. New CCR beneficial use markets are continually being explored by Gulf Power and the CCR marketers with which it contracts.

10. *For each applicable plant shown in the attached Exhibits 6A-B and 7A-B, please explain and provide supporting documentation for:*

a. *reason(s) for non-compliance;*

Response: As provided in Gulf Power's response to Question 4, it is Gulf Power's assumption that Exhibits 6A, 6B, 7A, and 7B attempt to outline/characterize certain of the EPA requirements proposed in that federal agency's June 21, 2010 rule co-proposals addressing CCRs. Those EPA rule co-proposals are not legally effective and it is unknown at this time when such rules will be finalized by EPA. Nor is it known whether EPA will finalize such rules under Subtitle C (Hazardous Waste) or Subtitle D (Non-Hazardous Waste) of RCRA. Thus, Gulf Power does not believe it is appropriate to use the word "compliance" in any of the Exhibits. Simply put, the reason that Gulf Power's plants do not meet the various proposed EPA requirements is that such requirements are not legally effective. Gulf Power's Plants Crist, Smith, Scholz and Daniel are in compliance with all relevant and applicable federal and state laws and rules pertaining to CCR management. Please refer to Attachment E for a general outline of the applicable environmental regulatory requirements for CCR management units in Florida and Gulf Power modified Exhibits 6A, 6B, 7A and 7B.

b. *action plan(s) in place to achieve compliance, including date(s) upon which compliance has been, or will be, achieved.*

Response: See Gulf Power's response to Question 10.a. As provided in that response, Gulf Power's Plants Crist, Smith, Scholz and Daniel are in compliance with all relevant and applicable federal and state laws and rules pertaining to CCR management. Thus, there are no action plans necessary to achieve compliance. Due to the uncertainty of the timing and final form of EPA CCR regulations, it is premature for Gulf Power to reassess its CCR storage and disposal practices at this time. Gulf Power will continue to monitor EPA's rulemaking activities and will be able to better evaluate the impact to Gulf Power's CCR management, beneficial use, and disposal after the proposed EPA regulations are finalized.

11. *Please supplement your original response to DR-1.10 so that it includes more details concerning the emergency plans in place that specifically address coal combustion residual storage and disposal problems that could occur. Also, please indicate if such plans are in accordance with OSHA or other applicable industry standards.*

Response: The plant-specific CCR-related safety plans are provided in Attachment J. Gulf Power is not aware of any OSHA regulation specifically relating to CCR storage and disposal operations. Gulf Power does require, however, compliance with all worker safety standards under OSHA that are applicable to CCR storage and disposal operations at its plants. Nor is Gulf Power aware of any other similar applicable industry standards relating to worker safety in the context of CCR storage and disposal operations. Please refer to Gulf Power's response to Question 4 which references Attachment E. Attachment E includes a general overview of the current environmental regulatory framework for CCR management units in Florida.

INQUIRY No.

PROPOSAL

FORM
Attachment I

Bidder's name and address Siemens

EQUIPMENT ONLY WASTEWATER TREATMENT SYSTEM

FOR SOUTHERN COMPANY

PLANT CRIST SCRUBBER PROJECT
of GULF POWER COMPANY

Southern Company
42 Inverness Center Parkway
Bin # B414
Birmingham, AL 35242

1.0 SCOPE

In accordance with your Inquiry No. inviting proposals for Wastewater Treatment system for the referenced generating plant and subject to all conditions and requirements of your Specification, all related attachments and accompanying documents in connection therewith, we propose to design, fabricate, deliver, and commission the equipment for the prices quoted herein. Pricing does not include state sales/use tax.
"Option" is understood to be Purchaser's option.

2.0 PRICING

Note: All pricing F.O.B. plant site; State sales/use tax is excluded

~~2.1 Proposal 1 – River water as makeup, discharge to river~~

~~For scope of supply as described in the Specifications and Vendor Proposal~~

~~2.1.1 Price for providing equipment~~ $_____

~~2.1.2 Price for start up assistance~~ $_____

~~2.1.3 Price per day for additional field technical support~~ $_____

~~2.1.4 Maximum freight to plant site (All freight to be included here)~~ $_____

~~2.1.5 Price for erection of clarifiers (Option)~~ $_____

~~2.1.6 Price for low local shear agitators (Option) (where beneficial for process chemistry)~~ $_____

~~2.1.7 Price for acid/caustic neutralization equipment (Option)~~ $_____

2.2 Proposal 21 – Reclaim water as makeup, discharge to deep wells

For scope of supply as described in the Specifications and Vendor Proposal

1 2.2.1 Price for providing equipment $ [redacted]

2 2.2.2 Price for start up assistance $ [redacted]

3 2.2.3 Price per day for additional field technical support $ [redacted]

4 2.2.4 Maximum freight to plant site (All freight to be included here) $ [redacted]

5 2.2.5 Price for erection of clarifiers (Option) $ [redacted]

6 2.2.6 Price for low local shear agitators (Option) (where beneficial for process chemistry) $ [redacted]

7 2.2.7 Price for acid/caustic neutralization equipment (Option) $ [redacted]

8 2.2.8 Price for items which increase filter press automation, minimize maintenance, or alert DCS operators there is trouble with the presses (Option) $ [redacted]

9 2.2.9 Price for filter press cloth wash system (Option) $ [redacted]

ITEMS BELOW INSERTED BY SIEMENS WATER TECHNOLOGIES

10 2.2.10 Price for containment during site sand blasting operation (Option) $ [redacted]

11 2.2.11 Price for filter press acid wash (Option) $ [redacted]

12 2.2.12 Price for coagulant storage tank (Option) $ [redacted]

13 2.2.13 Price for hydrochloric acid storage tank & fume scrubber (Option) $ [redacted]

ESCALATION

3.1 Material prices quoted are: 0 % firm

100 % escalated

3.2 For escalated prices, the following shall apply:

3.2.1 Indices to be used (include percentages applicable to materials, labor, etc.)

3.2.2 Starting date of escalation 10/17/2007

3.2.3 Base Index Value(s) and base month

3.2.4 Ending date of escalation

3.2.5 Limits of escalation

3.2.6 Method of calculating escalation

4.0 ACCEPTANCE

Prices quoted shall be valid for ~~ninety (90)~~ sixty (60) days after proposal date.

5.0 QUALITY ASSURANCE

In addition to the Quality Assurance Documentation required by Paragraph 8.0 of the General Specification, we will furnish the following additional documentation which is generated as a result of our Quality Assurance Program.

6.0 DESCRIPTIVE DATA AND ENGINEERING INFORMATION

The following descriptive information and design data are furnished in connection with the equipment and materials offered with this Proposal.

6.1 Utility Consumption Data - Plant Criat

Proposal 1

Instrument air (also use for service air)	327/100	peak scfm @ psi		average scfm @ psi
Potable water	42/60	peak gpm @ psi		average gpm @ psi
Service water	210/30	peak gpm @ psi		average gpm @ psi
Electricity	1835	peak kW-hrs/day		average kW/day

~~Proposal 2~~

~~Instrument air (also use for service air)~~		~~peak scfm @ psi~~		~~average scfm @ psi~~
~~Potable water~~		~~peak gpm @ psi~~		~~average gpm @ psi~~
~~Service water~~		~~peak gpm @ psi~~		~~average gpm @ psi~~
~~Electricity~~		~~peak kW~~		~~average kW/day~~

6.2 Chemical Consumption Data - Plant Criat

6.2.1 *Chemical Description and Estimated Cost*

Proposal 1

Coagulant (as 40% ferric chloride)	245 lbs/day @ 97%	
Polymer	15 lbs/day @ 100%	
Dewatering Polymer (if needed)	None	
~~Sulfuric Acid (93%)~~ Hydrochloric Acid	128 lbs/day @ 100%	
Sulfide	34 lbs/day @ 100%	
Lime (hydrated)	7,200 lbs/day @ 93%	
Others		

6.2.2 *Chemical Dosing Rate*

Proposal 1

Coagulant (as 40% ferric chloride)	50	mg/L, 100%	10.2	lb/hr, 97%		gal/hr
Polymer	3	mg/L, 100%	0.625	lb/hr,100%		gal/hr
Dewatering Polymer (if needed)	N/A	mg/L		lb/hr		gal/hr
~~Sulfuric Acid (93%)~~ Hydrochloric Acid	52	mg/L, 100%	5.3	lb/hr,100%		gal/hr
Sulfide	15	mg/L, 100%	1.4	lb/hr,100%		gal/hr
Lime (hydrated)	3,094	mg/L, 100%	300	lb/hr, 93%		gal/hr
Others						
		mg/L		lb/hr		gal/hr
		mg/L		lb/hr		gal/hr
		mg/L		lb/hr		gal/hr

6.2.3 *Chemical Description and Estimated Cost*

~~Proposal 2~~		
~~Coagulant (as 40% ferric chloride)~~		
~~Polymer~~		
~~Dewatering Polymer (if needed)~~		
~~Sulfuric Acid (93%)~~		
~~Sulfide~~		
~~Lime (hydrated)~~		
~~Others~~		

6.2.4 *Chemical Dosing Rate*

~~Proposal 2~~						
~~Coagulant (as 40% ferric chloride)~~		~~mg/L~~		~~lb/hr~~		~~gal/hr~~
~~Polymer~~		~~mg/L~~		~~lb/hr~~		~~gal/hr~~
~~Dewatering Polymer (if needed)~~		~~mg/L~~		~~lb/hr~~		~~gal/hr~~
~~Sulfuric Acid (93%)~~		~~mg/L~~		~~lb/hr~~		~~gal/hr~~
~~Sulfide~~		~~mg/L~~		~~lb/hr~~		~~gal/hr~~
~~Lime (hydrated)~~		~~mg/L~~		~~lb/hr~~		~~gal/hr~~
~~Others~~						
		~~mg/L~~		~~lb/hr~~		~~gal/hr~~
		~~mg/L~~		~~lb/hr~~		~~gal/hr~~
		~~mg/L~~		~~lb/hr~~		~~gal/hr~~

6.3 Wastewater Treatment System Process Description - Plant Crist

Pleas see proposal Section III

6.4 Equipment Fill In Data

6.4.1 *Lime Storage & Feed Equipment*

	Proposal 1	~~Proposal 2~~	
System Manufacturer			
Storage Silo			
Quantity	One (1)		
Effective storage volume	2,667		ft^3
Inside diameter	12		ft. and in.
Straight side length	40 (overall)		ft. and in.
Cone angle			degrees
Cone height			ft. and in.
Material of construction	CS		
Interior coating manufacturer/system	None		
Exterior coating manufacturer/system	Sand blast + 2 mils polyamide epoxy + 2 mils acrylic enamel		
Operating weight			tons
Storage Silo Fill Line			
Material of construction	CS		
Fill connection type / manufacturer	Quick disconnect		
Compression seal coupling manufacturer			

Bin Activator			
Manufacturer	Kinergy or equal		
Materials of construction	CS		
Model No.	KBA-6-HD		
Inlet flange size			
Outlet flange size	12"		
Utility requirements, compressed air or electric and capacity	1.5		hp
Lime Feeder			
Manufacturer	Enpro or equal		
Materials of construction			
Model No.	Series 43		
Capacity Range, _ to _	136-1,356		lbs/hr
Power requirements	1		hp
Storage Silo Pulse Air Bag			
Quantity			
Manufacturer			
Materials of construction			
Model No.			
Air filtration capacity			ft^3/min
Filter surface area			ft^2
Utility requirements, compressed air capacity			scfm
Storage Silo Exhaust Fan			
Quantity	One (1)		
Manufacturer			
Materials of construction			
Model No.			
Air capacity			ft^3/min
Utility requirements, electric			hp
Lime Silo Level Switches			
Quantity	One (1)		
Manufacturer	Bindicator or equal		
Model No.			
Type	Rotary		
Lime Silo Continuous Level Instrumentation			
Quantity	One (1)		
Manufacturer	E & H or equal		
Model No.			
Type	Ultrasonic		
Slurry Tank Continuous Level Instrumentation			
Quantity	1		
Manufacturer	E & H or equal		
Model No.			
Type	Ultrasonic		
Slurry Tank			
Quantity	One (1)		
Capacity	700		gal
Operating weight			lbs
Shell material of construction	CS		
Lining material of construction	Unlined		
Mixer manufacturer	Lightnin or equal		
Model No.			
Slurry feed piping material	CS		
Equipment Area			
Insulation thickness	Not included		in.
Insulation R-value			
Quantity of lights			
Type of lights			
Light wattage, each			
Interior coating manufacturer/system			
Heater size	10		kW
Access door opening size, W x H			ft. and in.
Exhaust fan air capacity			ft^3/min
Power requirements	1/3		hp
Lime Slurry Feed Pump(s)			
General Data			
Pump manufacturer	Warman or equal		
Model			
Type			
Connections			
Size			

Suction			nom. inches
Discharge			nom. inches
Flange Class			
Suction			
Discharge			
Net weight			
Pump (less motor)			lb
Baseplate			lb
Performance Data, each pump			
Rotative speed			rpm
Flow rate at which maximum power requirement occurs			gpm
Recommended minimum continuous flow (recirculation)			gpm
Seal water flow/pressure required			gpm and psi
Guaranteed performance, each pump			
Capacity at design conditions	75		gpm
Total head at design conditions	90'		ft H_2O
center line			ft H_2O
Pump efficiency at design conditions			%
Maximum shutoff head			ft H_2O
Power requirements			
At design conditions			hp
At shutoff			hp
Maximum			hp
Pump Construction			
Impeller diameters			
Design			in.
Maximum available			in.
Minimum available			in.
Materials			
Casing			
Shaft			
Impeller			
Shaft sleeves			
Impeller wearing rings			
Casing wearing rings			
Type of bearings			
Radial			
Thrust			
Mechanical shaft seal			
Manufacturer			
Model No.			
Shaft diameter			
At bearing location(s)			in.
At seal packing location(s)			in.
Sleeve, outer diameter			in.
Coupling			
Manufacturer			
Model No.			
Rated power/service factor			hp
List of special tools which will be furnished	None		
Field assembly work required			
Shipping weight			lbs
Mixer	**See Page 6**		
Manufacturer			
Materials of construction			
Connection Type (baseplate or flanged)			
Model No.			
Local Control Panels			
Panel size (L x W x H)			ft and in
Panel approximate weight			lbs
Manufacturer			
Model			
Programmable Logic Control Systems	**No separate PLC**		
Manufacturer			
Model No.			
Low Voltage Induction Motors			
Motor manufacturer			
Model number			
Driven Equipment			
Design standards (e.g., NEMA/IEEE, IEC)			
Driven equipment maximum brake horsepower			hp

Motor nameplate			hp
Service factor (NEMA/IEEE motors only)			
Motor bearing type			
Motor efficiency at nameplate, hp, percent			
Bearing lubrication system			
Space heater rating (watts / voltage / phase)			

6.4.2 *Solids Contact Equipment*

	Proposal 1	~~Proposal 2~~	
Clarifier	**Wastewater Clarifier A & B**		
Quantity	Two (2)		
Materials of construction	Coated CS; Coatings by Purchaser		
Minimum system capacity	23 (FGD purge flow)		gpm
Maximum system capacity	180 (FGD purge flow)		gpm
Average effluent turbidity	N/A		NTU
Average effluent suspended solids	30		mg/L
Maximum rate of flow increase without effluent quality	19.75		gpm/hr
Influent water temperature rise limitation	2		°F/hr
Underflow solids concentration	6		% weight
Diameter	23		ft
Height	30		ft
Reaction well dimensions			ft
Recirculation rate (as % of inlet flow)	1,100		
Scraper Drive Unit			
Manufacturer	DBS		
Materials of construction	CS		
Model number			
Type			
Motor Data			
Manufacturer			
Enclosure	TEFC		
Horsepower at design conditions	0.75		hp
Service factor	1.15		
Voltage/Phase/RPM	460/3/1750		
Variable frequency drive	No		
Manufacturer			
Model number			
Type			
Motor Data			
Manufacturer			
Enclosure			
Horsepower at design conditions			hp
Service factor			
Voltage/Phase/RPM			
Variable frequency drive			
Voltage/Phase/RPM			
Variable frequency drive			
Guaranteed Clarifier Effluent Quality			
Turbidity	No guarantee		NTU
Suspended solids	30 (expected; not guaranteed)		mg/L

6.4.3 *Agitator*

	Proposal 1	~~Proposal 2~~	
Agitator	**Desaturation Tank Agitator A & B**		
Manufacturer	Lightnin or equal		
Connection Type (baseplate or flanged)			
Model No.	74Q5		
Weight			lb
Impeller diameter	40		in.
Impeller(s) height from floor			in.
Minimum submergence required from tank bottom			ft. and in.
Shaft length	258"		ft. and in.
Blade angle			degrees
Number of blades	Two (2)		
Number of baffles required in basin	Three (3)		
Degrees between baffles	120		
Baffle dimensions, L x W x H	10" wide x 251" high		ft. and in.
Impeller and shaft material	CS		
Impeller and shaft covering material	Rubber lined		
Impeller and shaft covering thickness			in.

Tank Bridge Loadings			
Bending moment			lbf-ft
Torque			lbf-ft
Axial Load			lbf
Gear reducer			
Manufacturer			
Model No.			
Reduction ratio (:)			
Number of reductions			
Service factor			
Performance data			
Operating speed	84		rpm
Critical shaft speed			rpm
Tip speed			ft/s
Low Voltage Induction Motor			
Motor manufacturer			
Model number			
Driven Equipment			
Design standards (e.g., NEMA/IEEE, IEC)			
Driven equipment maximum brake horsepower			hp
Motor nameplate, hp (kW)	5		
Service factor (NEMA/IEEE motors only)	1.15		
Motor bearing type			
Motor efficiency at nameplate			hp, %
Bearing lubrication system			
Space heater rating (watts / voltage / phase)			

	Proposal 1	~~Proposal 2~~	
Agitator	**Coagulation Mix Tank Agitator A & B**		
Manufacturer	Lightnin or equal		
Connection Type (baseplate or flanged)			
Model No.	73Q5		
Weight			lb
Impeller diameter	28		in.
Impeller(s) height from floor			in.
Minimum submergence required from tank bottom			ft. and in.
Shaft length	163"		ft. and in.
Blade angle			degrees
Number of blades	Two (2)		
Number of baffles required in basin	Three (3)		
Degrees between baffles	120		
Baffle dimensions, L x W x H	7" wide x 168" high		ft. and in.
Impeller and shaft material	CS		
Impeller and shaft covering material	Rubber lined		
Impeller and shaft covering thickness			in.
Tank Bridge Loadings			
Bending moment			lbf-ft
Torque			lbf-ft
Axial Load			lbf
Gear reducer			
Manufacturer			
Model No.			
Reduction ratio (:)			
Number of reductions			
Service factor			
Performance data			
Operating speed	126		rpm
Critical shaft speed			rpm
Tip speed			ft/s
Low Voltage Induction Motor			
Motor manufacturer			
Model number			
Driven Equipment			
Design standards (e.g., NEMA/IEEE, IEC)			
Driven equipment maximum brake horsepower			hp
Motor nameplate, hp (kW)	3		
Service factor (NEMA/IEEE motors only)	1.15		
Motor bearing type			
Motor efficiency at nameplate			hp, %
Bearing lubrication system			
Space heater rating (watts / voltage / phase)			

	Proposal 1	~~Proposal 2~~	
Agitator	**Sulfide Mix Tank Agitator A & B**		

Manufacturer	N/A		
Connection Type (baseplate or flanged)			
Model No.			
Weight			lb
Impeller diameter			in.
Impeller(s) height from floor			in.
Minimum submergence required from tank bottom			ft. and in.
Shaft length			ft. and in.
Blade angle			degrees
Number of blades			
Number of baffles required in basin			
Degrees between baffles			
Baffle dimensions, L x W x H			ft. and in.
Impeller and shaft material			
Impeller and shaft covering material			
Impeller and shaft covering thickness			in.
Tank Bridge Loadings			
Bending moment			lbf-ft
Torque			lbf-ft
Axial Load			lbf
Gear reducer			
Manufacturer			
Model No.			
Reduction ratio (__:__)			
Number of reductions			
Service factor			
Performance data			
Operating speed			rpm
Critical shaft speed			rpm
Tip speed			ft/s
Low Voltage Induction Motor			
Motor manufacturer			
Model number			
Driven Equipment			
Design standards (e.g., NEMA/IEEE, IEC)			
Driven equipment maximum brake horsepower			hp
Motor nameplate, hp (kW)			
Service factor (NEMA/IEEE motors only)			
Motor bearing type			
Motor efficiency at nameplate			hp, %
Bearing lubrication system			
Space heater rating (watts / voltage / phase)			

	Proposal 1	~~Proposal 2~~	
Agitator	**Flash Mix Tank Agitator A & B**		
Manufacturer	N/A		
Connection Type (baseplate or flanged)			
Model No.			
Weight			lb
Impeller diameter			in.
Impeller(s) height from floor			in.
Minimum submergence required from tank bottom			ft. and in.
Shaft length			ft. and in.
Blade angle			degrees
Number of blades			
Number of baffles required in basin			
Degrees between baffles			
Baffle dimensions, L x W x H			ft. and in.
Impeller and shaft material			
Impeller and shaft covering material			
Impeller and shaft covering thickness			in.
Tank Bridge Loadings			
Bending moment			lbf-ft
Torque			lbf-ft
Axial Load			lbf
Gear reducer			
Manufacturer			
Model No.			
Reduction ratio (__:__)			
Number of reductions			
Service factor			
Performance data			
Operating speed			rpm

Critical shaft speed			rpm
Tip speed			ft/s
Low Voltage Induction Motor			
Motor manufacturer			
Model number			
Driven Equipment			
Design standards (e.g., NEMA/IEEE, IEC)			
Driven equipment maximum brake horsepower			hp
Motor nameplate, hp (kW)			
Service factor (NEMA/IEEE motors only)			
Motor bearing type.			
Motor efficiency at nameplate			hp, %
Bearing lubrication system			
Space heater rating (watts / voltage / phase)			

	Proposal 1	~~Proposal 2~~	
Agitator	**Wastewater Clarifier Turbine A & B**		
Manufacturer	DBS		
Connection Type (baseplate or flanged)			
Model No.			
Weight			lb
Impeller diameter			in.
Impeller(s) height from floor			in.
Minimum submergence required from tank bottom			ft. and in.
Shaft length			ft. and in.
Blade angle			degrees
Number of blades			
Number of baffles required in basin			
Degrees between baffles			
Baffle dimensions, L x W x H			ft. and in.
Impeller and shaft material	CS		
Impeller and shaft covering material	Cellcote (by Purchaser)		
Impeller and shaft covering thickness			in.
Tank Bridge Loadings			
Bending moment			lbf-ft
Torque			lbf-ft
Axial Load			lbf
Gear reducer			
Manufacturer			
Model No.			
Reduction ratio (__:__)			
Number of reductions			
Service factor			
Performance data			
Operating speed			rpm
Critical shaft speed			rpm
Tip speed			ft/s
Low Voltage Induction Motor			
Motor manufacturer			
Model number			
Driven Equipment			
Design standards (e.g., NEMA/IEEE, IEC)			
Driven equipment maximum brake horsepower			hp
Motor nameplate, hp (kW)	2		
Service factor (NEMA/IEEE motors only)	1.15		
Motor bearing type			
Motor efficiency at nameplate			hp, %
Bearing lubrication system			
Space heater rating (watts / voltage / phase)			

	Proposal 1	~~Proposal 2~~	
Agitator	**Sludge Holding Tank Agitator**		
Manufacturer	Lightnin or equal		
Connection Type (baseplate or flanged)			
Model No.	74Q7.5		
Weight			lb
Impeller diameter	48"		in.
Impeller(s) height from floor			in.
Minimum submergence required from tank bottom			ft. and in.
Shaft length	228"		ft. and in.
Blade angle			degrees
Number of blades	One (1)		
Number of baffles required in basin	Three (3)		
Degrees between baffles	120°		

Baffle dimensions, L x W x H	12" wide x 215" high		ft. and in.
Impeller and shaft material	CS		
Impeller and shaft covering material	Rubber lined		
Impeller and shaft covering thickness			in.
Tank Bridge Loadings			
Bending moment			lbf-ft
Torque			lbf-ft
Axial Load			lbf
Gear reducer			
Manufacturer			
Model No.			
Reduction ratio (:)			
Number of reductions			
Service factor			
Performance data			
Operating speed	84		rpm
Critical shaft speed			rpm
Tip speed			ft/s
Low Voltage Induction Motor			
Motor manufacturer			
Model number			
Driven Equipment			
Design standards (e.g., NEMA/IEEE, IEC)			
Driven equipment maximum brake horsepower			hp
Motor nameplate, hp (kW)	7.5		
Service factor (NEMA/IEEE motors only)	1.15		
Motor bearing type			
Motor efficiency at nameplate			hp, %
Bearing lubrication system			
Space heater rating (watts / voltage / phase)			

	Proposal 1	Proposal 2	
Agitator	~~Clarifier Blowdown~~ Sump Agitator	Filtrate Sump Agitator	
Manufacturer	N/A	Lightnin or equal	
Connection Type (baseplate or flanged)			
Model No.		72Q3	
Weight			lb
Impeller diameter		45	in.
Impeller(s) height from floor			in.
Minimum submergence required from tank bottom			ft. and in.
Shaft length		120	ft. and in.
Blade angle			degrees
Number of blades		1	
Number of baffles required in basin		N/A	
Degrees between baffles		N/A	
Baffle dimensions, L x W x H		N/A	ft. and in.
Impeller and shaft material		CS	
Impeller and shaft covering material		Rubber lined	
Impeller and shaft covering thickness			in.
Tank Bridge Loadings			
Bending moment			lbf-ft
Torque			lbf-ft
Axial Load			lbf
Gear reducer			
Manufacturer			
Model No.			
Reduction ratio (:)			
Number of reductions			
Service factor			
Performance data			
Operating speed		84	rpm
Critical shaft speed			rpm
Tip speed			ft/s
Low Voltage Induction Motor			
Motor manufacturer			
Model number			
Driven Equipment			
Design standards (e.g., NEMA/IEEE, IEC)			
Driven equipment maximum brake horsepower			hp
Motor nameplate, hp (kW)		3	
Service factor (NEMA/IEEE motors only)		1.15	
Motor bearing type			

Motor efficiency at nameplate			hp, %
Bearing lubrication system			
Space heater rating (watts / voltage / phase)			

6.4.4 Inlet Flow Instrumentation

	Proposal 1	~~Proposal 2~~	
Raw FGD waste water flow transmitter			
Manufacturer	Rosemount		
Model number	8732CR12N0M4		
Primary elements type	Magnetic		
Primary elements manufacturer	Rosemount		
Differential pressure loss at design flow rate	<0.1		psi
Raw FGD waste water flow control valve			
Manufacturer	ITT		
Model number	2516		
Size	3"		
Differential pressure loss at design flow rate	10		psi

6.4.5 Liquid Chemical Feed Equipment

	Proposal 1	~~Proposal 2~~	
Chemical Feed System	**Coagulant**		
Pump Information			
Quantity	Three (3)		
Manufacturer	Milton Roy or equal		
Type	Diaphragm		
Model No.			
Maximum capacity	1.5		gph
Discharge pressure	100		psig
Hydraulic relief valve setting			psig
Materials of construction	PVC liquid end		
Calibration Columns			
Quantity	One (1)		
Manufacturer			
Model No.			
Volume, gal	250 mL		
Materials of construction	Plastic		
Chemical Injection Quill or Static Mixer			
Quantity	None		
Manufacturer			
Materials of construction			
Strainers			
Quantity	One (1)		
Manufacturer			
Model No.			
Materials of construction	CPVC		
Back-Pressure Valves			
Quantity	Two (2)		
Manufacturer			
Model No.			
Relief valve setting			psig
Materials of construction	CPVC		
Valves			
Type	Ball		
Manufacturer	GF or equal		
Model No.			
Materials of construction	CPVC		
Power consumption for this system/subsystem	1/2		hp

	Proposal 1	~~Proposal 2~~	
Chemical Feed System	**~~Sulfuric~~ Hydrochloric Acid**		
Pump Information			
Quantity	Two (2)		
Manufacturer	Milton Roy or equal		
Type	Diaphragm		
Model No.			
Maximum capacity	2.5		gph
Discharge pressure	100		psig
Hydraulic relief valve setting			psig
Materials of construction	PVC liquid end		
Calibration Columns			
Quantity	One (1)		
Manufacturer			

Model No.			
Volume, gal	250 mL		
Materials of construction	Plastic		
Chemical Injection Quill ~~or Static Mixer~~			
Quantity	One (1)		
Manufacturer	LMI or equal		
Materials of construction	CPVC		
Strainers			
Quantity	One (1)		
Manufacturer			
Model No.			
Materials of construction	CPVC		
Back-Pressure Valves			
Quantity	One (1)		
Manufacturer			
Model No.			
Relief valve setting			psig
Materials of construction	CPVC		
Valves			
Type	Ball		
Manufacturer	GF or equal		
Model No.			
Materials of construction	CPVC		
Power consumption for this system/subsystem	1/2		hp

Proposal 1 ~~Proposal 2~~

Chemical Feed System	Sulfide		
Pump Information			
Quantity	Three (3)		
Manufacturer	Milton Roy or equal		
Type	Diaphragm		
Model No.			
Maximum capacity	0.7		gph
Discharge pressure	100		psig
Hydraulic relief valve setting			psig
Materials of construction	PVC liquid end		
Calibration Columns			
Quantity	One (1)		
Manufacturer			
Model No.			
Volume, gal	250 mL		
Materials of construction	Plastic		
Chemical Injection Quill or Static Mixer			
Quantity	None		
Manufacturer			
Materials of construction			
Strainers			
Quantity	One (1)		
Manufacturer			
Model No.			
Materials of construction	CPVC		
Back-Pressure Valves			
Quantity	Two (2)		
Manufacturer			
Model No.			
Relief valve setting			psig
Materials of construction	CPVC		
Valves			
Type	Ball		
Manufacturer	GF or equal		
Model No.			
Materials of construction	CPVC		
Power consumption for this system/subsystem	1/2		hp

Proposal 1 ~~Proposal 2~~

Chemical Feed System	Polymer		
Pump Information			
Quantity	Three (3)		
Manufacturer	LMI or equal		
Type	SOV drive		
Model No.			
Maximum capacity	0.04		gph
Discharge pressure	100		psig
Hydraulic relief valve setting			psig

Materials of construction	PPL		
Calibration Columns			
Quantity	None		
Manufacturer			
Model No.			
Volume, gal			
Materials of construction			
Chemical Injection Quill or Static Mixer			
Quantity	None		
Manufacturer			
Materials of construction			
Strainers			
Quantity	None		
Manufacturer			
Model No.			
Materials of construction			
Back-Pressure Valves			
Quantity	None		
Manufacturer			
Model No.			
Relief valve setting			psig
Materials of construction			
Valves			
Type	Ball		
Manufacturer	GF or equal		
Model No.			
Materials of construction	CPVC		
Power consumption for this system/subsystem			hp

6.4.6 *Filter Press Equipment*

	Proposal 1	~~Proposal 2~~	
Manufacturer	Siemens Water Technologies		
Type (Belt verse Plate and Frame)	Plate and Frame		
Quantity	Two (2)		
Model number	1200N32-39-50SYHC		
Frame Type (sidebar / overhead)	Sidebar		
Automatic Plate Shifter, yes/no	Yes		
Light Curtains, yes/no	Yes		
Total volume	50 cu ft		ft^3/press
Number of plates	40		
Design operating pressure	225		psi
Plate size	1200 x 1200		mm
Cake thickness	1.25		mm
Overall Height	120.4		ft
Overall Width	93		ft
Overall Length	240		ft
Weight Empty	20,000		lbs
Weight Operating	24,500		lbs
Influent sludge concentration	8		%
Dry solids load	7,320 lbs/day		lb/hr
Belt press sludge throughput rate	N/A		ft3/min
Moisture in sludge cake	70%		%
Density of sludge cake	80		lb/ft3
Filter press filtrate solids	98%		ppm
Floor Discharge Opening Required			
Length	159		ft
Width	58		ft
Optional cake discharge devices			
Manifold Pipe Materials	Polypropylene lined DI/FRP		
Manifold Valves			
Manual - Manufacturer			
Manual - Type			
Manual - Material of Construction			
Automatic - Manufacturer	Xomax, Bray		
Automatic - Type	Plug, butterfly		
Automatic - Material of Construction	Lined/lined		
Automatic - Operator Type	Spring return rack and pinion		
Automatic - Operator Manufacturer			
Drip Pan / Bombay Door - Material of Construction	Carbon steel /painted		
Frame - Material of Construction	Carbon steel /painted		
Plate feed style	Center		
Total Cycle time	3 hours		hrs

Fast Fill			min
Slow Fill			min
Core Blow	5		min
Air Blow			min
Press Dump			min
Filter Cloth Material	Polypropylene		
Filter cloth weight	9-12 oz		oz./yd
Filter cloth fiber type	Mono/multi or mono		
Filter cloth weave type	Sateen		
Filter cloth porosity			scfm/ft^2
Total filtration area	990		ft^2
Hand held pendant, yes/no	Yes		
Filter cloth weave type	Sateen		
Manufacture's service trips	0		days
Coatings type / dry film thickness			mils
Core Blow Air Demand	10 scfm @ 40 psi		cfm/psi
Air Blow Air Demand	100 scfm @ 40 psi		cfm/psi
Belt width	N/A		in
Belt material	N/A		
High Pressure Cloth Wash, yes/no	Yes - option		
Skid Mounted, yes/no	Yes		
Skid dimensions, L/W/H	106" x 90" x 44"		ft
Total Skid Weight	2,500		lbs
Total Press Wash Time	1 hour		min
Volume of Service Water consumed per wash			gal
Volume of Water Tank	N/A		gal
Wash System Piping Material of Construction	Steel/SS		
Cloth Wash Operating Pressure	1450		psi
Skid Mounted Junction Box, yes/no	No		
Junction Box NEMA Rating			
Junction Box Material of Construction			
Cloth Wash Valves			
Manual - Manufacturer			
Manual - Type			
Manual - Material of Construction			
Automatic - Manufacturer	Flo-Tek		
Automatic - Type	Ball		
Automatic - Material of Construction	SS		
Automatic - Operator Type	Spring return rack and pinion		
Automatic - Operator Manufacturer	Bray		
High Pressure Cloth Wash Pump			
Quantity of Pumps	One (1)		
Pump Manufacturer	Abel		
Pump Model Number	HP-K-25		
Pump Type	Triplex piston pump		
Flow	85		gpm
Head	1450		psi
Casing Material of Construction	Iron		
Impeller Material of Construction	N/A		
RPM			
Mechanical Seal Type			
Mechanical Seal Manufacturer			
Flush/seal water demand per pump, gpm	None		
Horsepower	60		hp
Motor Manufacturer / Model	Siemens RG series		
Volts / phase / freq	460/3/60		
Design standards (e.g., NEMA/IEEE, IEC)	NEMA premium efficiency		
Driven equipment maximum brake hp			hp
Motor nameplate			hp
Service factor (NEMA/IEEE motors only)	1.15		
Motor bearing type			
Motor efficiency at nameplate	95		hp, %
Bearing lubrication system			
Space heater rating (watts / voltage / phase)			
Fast Fill Feed Pumps			
Quantity of Pumps	Two (2)		
Pump Manufacturer	Abel Pumps, L.P.		
Pump Model Number	HMD-G-21-0250-GU		
Pump Type	Piston membrane		
Flow	100		gpm
Head	240		psi

Casing Material of Construction	Cast iron		
Impeller Material of Construction	N/A		
RPM	75 strokes per minute		
Mechanical Seal Type	N/A		
Mechanical Seal Manufacturer	N/A		
Flush/seal water demand per pump, gpm	N/A		
Horsepower	20		hp
Motor Manufacturer / Model	Siemens RGZEESD		
Volts / phase / freq	460/3/60		
Design standards (e.g., NEMA/IEEE, IEC)	NEMA		
Driven equipment maximum brake hp	16.75		hp
Motor nameplate	20		hp
Service factor (NEMA/IEEE motors only)	1.15		
Motor bearing type	Regreasable single shielded		
Motor efficiency at nameplate	93.5 at full load		hp, %
Bearing lubrication system	Alemite fittings		
Space heater rating (watts / voltage / phase)	Not supplied		
Slow Fill Feed Pumps			
Quantity of Pumps	N/A		
Pump Manufacturer			
Pump Model Number			
Pump Type			
Flow			gpm
Head			psi
Casing Material of Construction			
Impeller Material of Construction			
RPM			
Mechanical Seal Type			
Mechanical Seal Manufacturer			
Flush/seal water demand per pump			gpm
Motor Manufacturer / Model			
Volts / phase / freq			
Design standards (e.g., NEMA/IEEE, IEC)			
Driven equipment maximum brake hp			hp
Motor nameplate			hp
Service factor (NEMA/IEEE motors only)			
Motor bearing type			
Motor efficiency at nameplate			hp, %
Bearing lubrication system			
Space heater rating (watts / voltage / phase)			
Press Fully Assembled on Shipment yes/no	Yes (except cloth washers)		
Quantity of Spatulas Provided	Two (2) per press		
Local Control Panels			
Panel size (L x W x H)	36 x 36 x 12		ft and in.
Panel approximate weight			lbs
Manufacturer	Siemens		
Programmable Logic Control System			
Manufacturer	AB		
Model No.	Control Logix		
Filter Press Platform			
Required (yes/no)	N/A		
Platform dimensions, L x W x H			ft and in.
Materials of construction			
Structural members not to exceed reaction on floor			lbs

8.4.7 *Slurry Pumps*

	Proposal 1	~~Proposal 2~~	
Slurry Pump	**Clarifier Blowdown ~~Sump~~ & Transfer Pumps A, & B & C**		
Pump manufacturer	Warman		
Model No.			
Type	Centrifugal		
Connections, size, in./flange class			
Suction			
Discharge			
Net weights			
Total pump assembly			lb
Pump (less motor)			lb
Baseplate			lb
Performance Data			
Rotative speed			rpm
Tip speed			ft/sec
Direction of rotation available as viewed from the input shaft			

Guaranteed performance			
Capacity at design conditions	105		gpm
Total head at design conditions	70		ft
NPSH required at design conditions, relative to pump shaft			ft
Pump efficiency at design conditions			%
Maximum solid size pump can pass			in
Maximum shutoff head			ft
Power requirements			
At design conditions			hp
At shutoff			hp
Maximum			hp
Flow rate at which maximum power requirement occurs			gpm
Recommended minimum continuous flow			gpm
Recommended maximum continuous flow			gpm
Seal water cooling water flow required & pressure required			gpm & psi
Seal injection water quality requirements			
Impeller diameters			
Design			in.
Maximum available			in.
Minimum available			in.
Materials			
Casing	DI		
Casing liner	Rubber		
Shaft			
Impeller	DI rubber lined		
Shaft sleeves			
Impeller wearing rings			
Casing wearing rings			
Mechanical shaft seal(s)			
Type of bearings			
Radial			
Thrust			
Description of bearing lubrication system and recommended			
Mechanical shaft seal			
Manufacturer			
Model No.			
Shaft diameter			
At bearing location(s)			in.
At seal location(s)			in.
Sleeve, outer diameter			in.
Coupling			
Manufacturer			
Model No.			
Rated power, hp/service factor			
Other Data			
List of special tools that will be furnished	None		
Field assembly work required	Skid mounted		
Direct Drive or V-belt Drive	V-belt		

	Proposal 1	~~Proposal 2~~	
Slurry Pump	**Wastewater Clarifier Sludge Pumps A, B, C, & D**		
Pump manufacturer	N/A		
Model No.			
Type			
Connections, size, in./flange class			
Suction			
Discharge			
Net weights			
Total pump assembly			lb
Pump (less motor)			lb
Baseplate			lb
Performance Data			
Rotative speed			rpm
Tip speed			ft/sec
Direction of rotation available as viewed from the input shaft end of the pump (Clockwise or Counterclockwise or Clockwise and counterclockwise)			
Guaranteed performance			
Capacity at design conditions			gpm
Total head at design conditions			ft
NPSH required at design conditions, relative to pump shaft center line			ft
Pump efficiency at design conditions			%

Maximum solid size pump can pass			in
Maximum shutoff head			ft
Power requirements			
At design conditions			hp
At shutoff			hp
Maximum			hp
Flow rate at which maximum power requirement occurs			gpm
Recommended minimum continuous flow			gpm
Recommended maximum continuous flow			gpm
Seal water cooling water flow required & pressure required			gpm & psi
Seal injection water quality requirements			
Impeller diameters			
Design			in.
Maximum available			in.
Minimum available			in.
Materials			
Casing			
Casing liner			
Shaft			
Impeller			
Shaft sleeves			
Impeller wearing rings			
Casing wearing rings			
Mechanical shaft seal(s)			
Type of bearings			
Radial			
Thrust			
Description of bearing lubrication system and recommended lubricant			
Mechanical shaft seal			
Manufacturer			
Model No.			
Shaft diameter			
At bearing location(s)			in.
At seal location(s)			in.
Sleeve, outer diameter			in.
Coupling			
Manufacturer			
Model No.			
Rated power, hp/service factor			
Other Data			
List of special tools that will be furnished			
Field assembly work required			
Direct Drive or V-belt Drive			

	Proposal 1	~~Proposal 2~~	
Slurry Pump	Filter Press Feed Pumps A & B		
Pump manufacturer	See 6.4.6		
Model No..			
Type			
Connections, size, in./flange class			
Suction			
Discharge			
Net weights			
Total pump assembly			lb
Pump (less motor)			lb
Baseplate			lb
Performance Data			
Rotative speed			rpm
Tip speed			ft/sec
Direction of rotation available as viewed from the input shaft and of the pump (Clockwise or Counterclockwise or Clockwise and counterclockwise)			
Guaranteed performance			
Capacity at design conditions			gpm
Total head at design conditions			ft
NPSH required at design conditions, relative to pump shaft center line			ft
Pump efficiency at design conditions			%
Maximum solid size pump can pass			in
Maximum shutoff head			ft
Power requirements			
At design conditions			hp

At shutoff			hp
Maximum			hp
Flow rate at which maximum power requirement occurs			gpm
Recommended minimum continuous flow			gpm
Recommended maximum continuous flow			gpm
Seal water cooling water flow required & pressure required			gpm & psi
Seal injection water quality requirements			
Impeller diameters			
Design			in.
Maximum available			in.
Minimum available			in.
Materials			
Casing			
Casing liner			
Shaft			
Impeller			
Shaft sleeves			
Impeller wearing rings			
Casing wearing rings			
Mechanical shaft seal(s)			
Type of bearings			
Radial			
Thrust			
Description of bearing lubrication system and recommended lubricant			
Mechanical shaft seal			
Manufacturer			
Model No.			
Shaft diameter			
At bearing location(s)			in.
At seal location(s)			in.
Sleeve, outer diameter			in.
Coupling			
Manufacturer			
Model No.			
Rated power, hp/service factor			
Other Data			
List of special tools that will be furnished			
Field assembly work required			
Direct Drive or V-belt Drive			

6.4.8 ***Vertical Pumps***

	Proposal 1	~~Proposal 2~~	
Pump	Filter Backwash Pumps A & B		
Manufacturer	N/A		
Model No.			
Type (turbine, sump, etc.)			
Number of stages, each pump			
Discharge connection size/flange class			in
Net weight, each			lb
Pump			lb
Motor			lb
Total, pump including motor, baseplate, and coupling			lb
Performance Data			
Rotative speed			rpm
Minimum distance required from bottom of suction bell to bottom of pit, ft			
Recommended minimum continuous flow (recirculation), each pump			gpm
Guaranteed performance (each pump)			gpm
Capacity at design conditions			gpm
Total head at design conditions, including head losses through the pump			ft. H_2O
Submergence required at design conditions (from water surface to bottom of suction bell)			in
Required NPSH, relative to pump inlet suction bell at design conditions			ft H_2O
Pump efficiency at design conditions			%
Motor efficiency at design conditions			%
Maximum shutoff head			ft H_2O
Power requirements			
At design conditions			hp

At shutoff			hp
Maximum			hp
Pump Construction			
Impeller diameters			
Design			in.
Maximum available			in.
Minimum available			in.
Materials			
Column			
Discharge head			
Bowls, volutes, and diffusers			
Shaft			
Impeller			
Impeller wearing ring			
Casing wearing ring			
Shaft sleeves			
Suction bell			
Suction strainer			
Shaft diameter			in.
Length of sections			in.
Length from baseplate to bottom of suction bell			in.
Line shaft bearings			
Type			
Number			
Length			
Material			
Bowl bearings			
Type			
Number			
Length			
Material			
Description of line shaft bearing lubrication system, including required quantity of externally supplied bearing lubrication water, if applicable			
Description of bowl bearing lubrication system, including required quantity of externally supplied bearing lubrication water, if applicable			
Description of shaft seals, including required quantity of externally supplied seal water, if applicable			
Motor Data			
Manufacturer			
Enclosure			
Horsepower at design conditions			hp
Service factor			
Voltage/Phase/RPM			
Miscellaneous Data			
Shipping weight (each pump assembly if more than one)			lb

	Proposal 1	~~Proposal 2~~	
Pump	**~~Effluent~~ Pumps C & D**		
Manufacturer	Fybroc		
Model No.	5500		
Type (turbine, sump, etc.)	Sump		
Number of stages, each pump	1		
Discharge connection size/flange class	3" / 150 lb		in
Net weight, each			lb
Pump			lb
Motor			lb
Total, pump including motor, baseplate, and coupling			lb
Performance Data			
Rotative speed			rpm
Minimum distance required from bottom of suction bell to bottom of pit, ft			
Recommended minimum continuous flow (recirculation), each pump			gpm
Guaranteed performance (each pump)			gpm
Capacity at design conditions	230		gpm
Total head at design conditions, including head losses through the pump			ft. H_2O
Submergence required at design conditions (from water surface to bottom of suction bell)			in
Required NPSH, relative to pump inlet suction bell at design conditions			ft H_2O

Pump efficiency at design conditions	57		%
Motor efficiency at design conditions			%
Maximum shutoff head	124.2		ft H_2O
Power requirements			
At design conditions			hp
At shutoff			hp
Maximum			hp
Pump Construction			
Impeller diameters			
Design			in.
Maximum available			in.
Minimum available			in.
Materials			
Column	FRP		
Discharge head	FRP		
Bowls, volutes, and diffusers			
Shaft			
Impeller	FRP		
Impeller wearing ring			
Casing wearing ring			
Shaft sleeves			
Suction bell			
Suction strainer			
Shaft diameter			in.
Length of sections			in.
Length from baseplate to bottom of suction bell			in.
Line shaft bearings			
Type			
Number			
Length			
Material			
Bowl bearings			
Type			
Number			
Length			
Material			
Description of line shaft bearing lubrication system, including required quantity of externally supplied bearing lubrication water, if applicable			
Description of bowl bearing lubrication system, including required quantity of externally supplied bearing lubrication water, if applicable			
Description of shaft seals, including required quantity of externally supplied seal water, if applicable			
Motor Data			
Manufacturer			
Enclosure	TEFC		
Horsepower at design conditions	15		hp
Service factor	1.15		
Voltage/Phase/RPM	460/3/1800		
Miscellaneous Data			
Shipping weight (each pump assembly if more than one)			lb

	Proposal 1	~~Proposal 2~~	
Pump	Dirty Backwash Sump Pumps A & B		
Manufacturer	Fybroc		
Model No.	5500		
Type (turbine, sump, etc.)	Sump		
Number of stages, each pump	1		
Discharge connection size/flange class	1.5" / 150 lb		in
Net weight, each			lb
Pump			lb
Motor			lb
Total, pump including motor, baseplate, and coupling			lb
Performance Data			
Rotative speed			rpm
Minimum distance required from bottom of suction bell to bottom of pit, ft			
Recommended minimum continuous flow (recirculation),			gpm
Guaranteed performance (each pump)			gpm
Capacity at design conditions	100		gpm
Total head at design conditions, including head losses through the pump			ft. H_2O

Submergence required at design conditions (from water surface to bottom of suction bell)			in
Required NPSH, relative to pump inlet suction bell at design conditions			ft H_2O
Pump efficiency at design conditions	42.7		%
Motor efficiency at design conditions			%
Maximum shutoff head			ft H_2O
Power requirements			
At design conditions			hp
At shutoff			hp
Maximum			hp
Pump Construction			
Impeller diameters			
Design			in.
Maximum available			in.
Minimum available			in.
Materials			
Column	FRP		
Discharge head	FRP		
Bowls, volutes, and diffusers			
Shaft			
Impeller	FRP		
Impeller wearing ring			
Casing wearing ring			
Shaft sleeves			
Suction bell			
Suction strainer			
Shaft diameter			in.
Length of sections			in.
Length from baseplate to bottom of suction bell			in.
Line shaft bearings			
Type			
Number			
Length			
Material			
Bowl bearings			
Type			
Number			
Length			
Material			
Description of line shaft bearing lubrication system, including required quantity of externally supplied bearing lubrication water, if applicable			
Description of bowl bearing lubrication system, including required quantity of externally supplied bearing lubrication water, if applicable			
Description of shaft seals, including required quantity of externally supplied seal water, if applicable			
Motor Data			
Manufacturer			
Enclosure	TEFC		
Horsepower at design conditions	7.5		hp
Service factor	1.15		
Voltage/Phase/RPM	460/3/1800		
Miscellaneous Data			
Shipping weight (each pump assembly if more than one)			lb

	Proposal 1	~~Proposal 2~~	
Pump	**Filtrate Sump Pumps A & B**		
Manufacturer	See 6.4.8, Dirty Backwash		
Model No.	Sump Pumps		
Type (turbine, sump, etc.)			
Number of stages, each pump			
Discharge connection size/flange class			in
Net weight, each			lb
Pump			lb
Motor			lb
Total, pump including motor, baseplate, and coupling			lb
Performance Data			
Rotative speed			rpm
Minimum distance required from bottom of suction bell to bottom of pit, ft			

Recommended minimum continuous flow (recirculation), each pump			gpm
Guaranteed performance (each pump)			gpm
Capacity at design conditions			gpm
Total head at design conditions, including head losses through the pump			ft. H_2O
Submergence required at design conditions (from water surface to bottom of suction bell)			in
Required NPSH, relative to pump inlet suction bell at design conditions			ft H_2O
Pump efficiency at design conditions			%
Motor efficiency at design conditions			%
Maximum shutoff head			ft H_2O
Power requirements			
At design conditions			hp
At shutoff			hp
Maximum			hp
Pump Construction			
Impeller diameters			
Design			in.
Maximum available			in.
Minimum available			in.
Materials			
Column			
Discharge head			
Bowls, volutes, and diffusers			
Shaft			
Impeller			
Impeller wearing ring			
Casing wearing ring			
Shaft sleeves			
Suction bell			
Suction strainer			
Shaft diameter			in.
Length of sections			in.
Length from baseplate to bottom of suction bell			in.
Line shaft bearings			
Type			
Number			
Length			
Material			
Bowl bearings			
Type			
Number			
Length			
Material			
Description of line shaft bearing lubrication system, including required quantity of externally supplied bearing lubrication water, if applicable			
Description of bowl bearing lubrication system, including required quantity of externally supplied bearing lubrication water, if applicable			
Description of shaft seals, including required quantity of externally supplied seal water, if applicable			
Motor Data			
Manufacturer			
Enclosure			
Horsepower at design conditions			hp
Service factor			
Voltage/Phase/RPM			
Miscellaneous Data			
Shipping weight (each pump assembly if more than one)			lb

6.4.9 ***Local Control Panels***

	Proposal 1	~~Proposal 2~~	
Panel description			
Panel size (L by W by H)			ft
Panel approximate weight			lb
Manufacturer			

6.4.10 ***Master - Programmable Logic Control System***

	Proposal 1	~~Proposal 2~~	
Manufacturer			
Model No.			
Dimensions (overall, L x W x H)			ft
Weight			lb

6.4.11 ***Shop Fabricated Tanks***

	Proposal 1	~~Proposal 2~~	
Tank name	**Sulfuric Acid Storage Tank**		
Shell material	N/A		
Plate thickness			
Shell			in.
Head or bottom			in.
Head or top			in.
Dry weight, each			lb
Gasket material			
Describe the amount of field erection work required			
Vent Dryer			
Manufacturer			
Model Number			
Overflow Check Valve			
Manufacturer			
Model Number			

6.4.12 ***Fiberglass Reinforced Plastic Tanks***

	Proposal 1	~~Proposal 2~~	
Tank	**Desaturation Tanks A & B**		
Manufacturer	Augusta, Ershigs or equal		
Tank type (open vs. closed top)	Open		
Tank residence time (if applicable)	64		min
Tank materials			
Resin			
Glass			
Surfacing mat			
Chopped strand mat			
Continuous roving			
Veil			
Cure			
Post cure			
Material thickness			
Top head			
Wall at top			in.
Wall at bottom			in.
Tank bottom			in.
Insulation			
Inside diameter	10		ft. and in.
Straight side length	23		ft. and in.
Effective volume	12,331		gal
Weight			
Empty			lb
Flooded			lb
Shipping			lb
Seismic moment			lbf-ft
Seismic shear			lb
Wind moment			lbf-ft
Wind shear			lb
Anchor bolts			
Dia			in
Quantity			
Name of supplier to perform shop testing	Augusta, Ershigs or equal		

	Proposal 1	~~Proposal 2~~	
Tank	**Coagulation Mix Tanks A & B**		
Manufacturer	Augusta, Ershigs or equal		
Tank type (open vs. closed top)	Open		
Tank residence time (if applicable)	18		min
Tank materials			
Resin			
Glass			
Surfacing mat			
Chopped strand mat			
Continuous roving			

Veil			
Cure			
Post cure			
Material thickness			
Top head			
Wall at top			in.
Wall at bottom			in.
Tank bottom			in.
Insulation			
Inside diameter	7		ft. and in.
Straight side length	15		ft. and in.
Effective volume	3,453		gal
Weight			
Empty			lb
Flooded			lb
Shipping			lb
Seismic moment			lbf-ft
Seismic shear			lb
Wind moment			lbf-ft
Wind shear			lb
Anchor bolts			
Dia			in
Quantity			
Name of supplier to perform shop testing	Augusta, Ershigs or equal		

	Proposal 1	~~Proposal 2~~	
Tank	**Sulfide Mix Tanks A & B**		
Manufacturer	N/A		
Tank type (open vs. closed top)			
Tank residence time (if applicable)			min
Tank materials			
Resin			
Glass			
Surfacing mat			
Chopped strand mat			
Continuous roving			
Veil			
Cure			
Post cure			
Material thickness			
Top head			
Wall at top			in.
Wall at bottom			in.
Tank bottom			in.
Insulation			
Inside diameter			ft. and in.
Straight side length			ft. and in.
Effective volume			gal
Weight			
Empty			lb
Flooded			lb
Shipping			lb
Seismic moment			lbf-ft
Seismic shear			lb
Wind moment			lbf-ft
Wind shear			lb
Anchor bolts			
Dia			in
Quantity			
Name of supplier to perform shop testing			

	Proposal 1	~~Proposal 2~~	
Tank	**Flash Mix Tanks A & B**		
Manufacturer	N/A		
Tank type (open vs. closed top)			
Tank residence time (if applicable)			min
Tank materials			
Resin			
Glass			
Surfacing mat			
Chopped strand mat			
Continuous roving			
Veil			
Cure			

Post cure			
Material thickness			
Top head			
Wall at top			in.
Wall at bottom			in.
Tank bottom			in.
Insulation			
Inside diameter			ft. and in.
Straight side length			ft. and in.
Effective volume			gal
Weight			
Empty			lb
Flooded			lb
Shipping			lb
Seismic moment			lbf-ft
Seismic shear			lb
Wind moment			lbf-ft
Wind shear			lb
Anchor bolts			
Dia			in
Quantity			
Name of supplier to perform shop testing			

	Proposal 1	~~Proposal 2~~	
Tank	Coagulant Storage Tank - Option	HCl Tank - Option	
Manufacturer	Augusta, Ershigs or equal	Augusta, Ershigs or equal	
Tank type (open vs. closed top)	Closed	Closed	
Tank residence time (if applicable)			min
Tank materials			
Resin			
Glass			
Surfacing mat			
Chopped strand mat			
Continuous roving			
Veil			
Cure			
Post cure			
Material thickness			
Top head			
Wall at top			in.
Wall at bottom			in.
Tank bottom			in.
Insulation			
Inside diameter	10	10	ft. and in.
Straight side length	14	14	ft. and in.
Effective volume	6,000	6,000	gal
Weight			
Empty			lb
Flooded			lb
Shipping			lb
Seismic moment			lbf-ft
Seismic shear			lb
Wind moment			lbf-ft
Wind shear			lb
Anchor bolts			
Dia			in
Quantity			
Name of supplier to perform shop testing	Augusta, Ershigs or equal	Augusta, Ershigs or equal	

	Proposal 1	~~Proposal 2~~	
Tank	Sludge Holding Tank		
Manufacturer	Augusta, Ershigs or equal		
Tank type (open vs. closed top)	Open		
Tank residence time (if applicable)	1,440		min
Tank materials			
Resin			
Glass			
Surfacing mat			
Chopped strand mat			
Continuous roving			
Veil			
Cure			
Post cure			

Material thickness			
Top head			
Wall at top			in.
Wall at bottom			in.
Tank bottom			in.
Insulation			
Inside diameter	12		ft. and in.
Straight side length	21		ft. and in.
Effective volume	15,220		gal
Weight			
Empty			lb
Flooded			lb
Shipping			lb
Seismic moment			lbf-ft
Seismic shear			lb
Wind moment			lbf-ft
Wind shear			lb
Anchor bolts			
Dia			in
Quantity			
Name of supplier to perform shop testing	Augusta, Ershigs or equal		

6.4.13 ***Gravity Filters***

	Proposal 1	~~Proposal 2~~	
Manufacturer	Siemens Water Technologies		
Materials of construction	FRP tank		
Backwash requirement	Approx 10 gpm continuous		gpm/sf
Service flow rate	2.4 normal		gpm/sf
Tank materials	FRP		
Average effluent turbidity	N/A		NTU
Average effluent TSS	10		ppm
Maximum rate of flow increase without effluent quality			gpm/hr
Backwash solids concentration			ppm

6.4.14 ***Large Bore General Service Valves (Furnished with Equipment)***

	Proposal 1	~~Proposal 2~~	
Valve identification description	Diaphragm		
Valve manufacturer	ITT		
Type	Straightway and weir		
Size	See P&IDs		
Wetted materials	CI body, rubber lined		
Valve identification description	Butterfly		
Valve manufacturer	Bray		
Type	Lug		
Size	See P&IDs		
Wetted materials	CI body, EPDM seat, nylon coated disc		
Valve identification description	Plug		
Valve manufacturer	Tufline		
Type	Plug		
Size	See P&IDs		
Wetted materials	DI body, TFE lined		

6.4.15 ***Small Bore General Service Valves (Furnished with Equipment)***

	Proposal 1	~~Proposal 2~~	
Valve identification description			
Valve manufacturer			
Type			
Size			
Wetted materials			
Valve identification description			
Valve manufacturer			
Type			
Size			
Wetted materials			

6.4.16 ***Control Valves (Furnished with Equipment)***

	Proposal 1	~~Proposal 2~~	
Valve identification description	Inlet control valve		
Valve manufacturer	ITT		
Type	Weir diaphragm		

Size	3"		
Wetted materials	CI body, rubber lined		
Valve identification description	Sludge recycle and transfer control valve		
Valve manufacturer	ITT		
Type	Weir diaphragm		
Size	2		
Wetted materials	CI body, rubber lined		

8.0 ALTERNATES AND PRICING

The Vendor is requested to address alternate proposals by including either of the following statements: "Having complied with the bidding requirements of your Specifications and attachments, we request due consideration to the attached alternate proposals, complete with prices and descriptive date for comparison to the base proposal" or Having complied with the bidding requirements of your Specifications and attachments, we do not offer an alternate proposal.

The Bidder's base bid shall meet the equipment requirements and match the treatment process as dictated by the attached flow diagrams and specifications contained herein. Alternate treatment methods or proprietary technologies not covered in these specifications should not be included in the Bidder's base proposal. In addition to the base bid, the Bidder may propose alternate bids which include alternate treatment technologies and/or changes to the specified process. The alternate bids must meet the effluent performance guarantees and specifically indicate where the Bidder has deviated from the specification requirements. Justification for these deviations shall also be provided, whether technical or economical in nature. Evaporative treatment methods will not be acceptable to the Purchaser.

9.0 EXCEPTIONS

9.1 Exceptions shall be noted in accordance with Paragraphs 14.3 of the General Specifications.

We have reviewed your Specifications and all related attachments. Unless specific exceptions are listed below (or attached to our proposals and referenced below), it is understood that all of the provisions contained therein are acceptable to us:

[ ] without exception

[X] with exceptions as outlined below:

Please see proposal Section X							

10.0 SUBCONTRACTORS

During the course of accomplishing work required by this inquiry, we will subcontract certain portions of the work to the firms listed below:

Name and Address of Subcontractor	Work to be Performed
Bowen	Clarifier installation

We understand that any changes in the above designated subcontractors after award of the contract must be pre-approved in writing by the Purchaser.

11.0 SIGNATURE

The undersigned hereby attests and affirms that: the inquiry documents have been read in detail by officers, employees, agents, or representatives of the company named below; that the company named below is fully qualified and able to perform in accordance with the terms and conditions of these inquiry documents; that he/she is an officer or employee of the company named below; that he/she is authorized to submit this Proposal, and, should Purchaser accept this Proposal, or any part or portion thereof, bind the company to the terms of these inquiry documents.

SIGNATURE: John Toms

Title: Industrial Capital Sales

12.0 NAME OF COMPANY: Siemens Water Technologies Corp.

Telephone Number 770-664-9334

Fax Number 770-664-9430

13.0 DATE: August 17, 2007

Attachment J - Technical Documents Required with Proposal

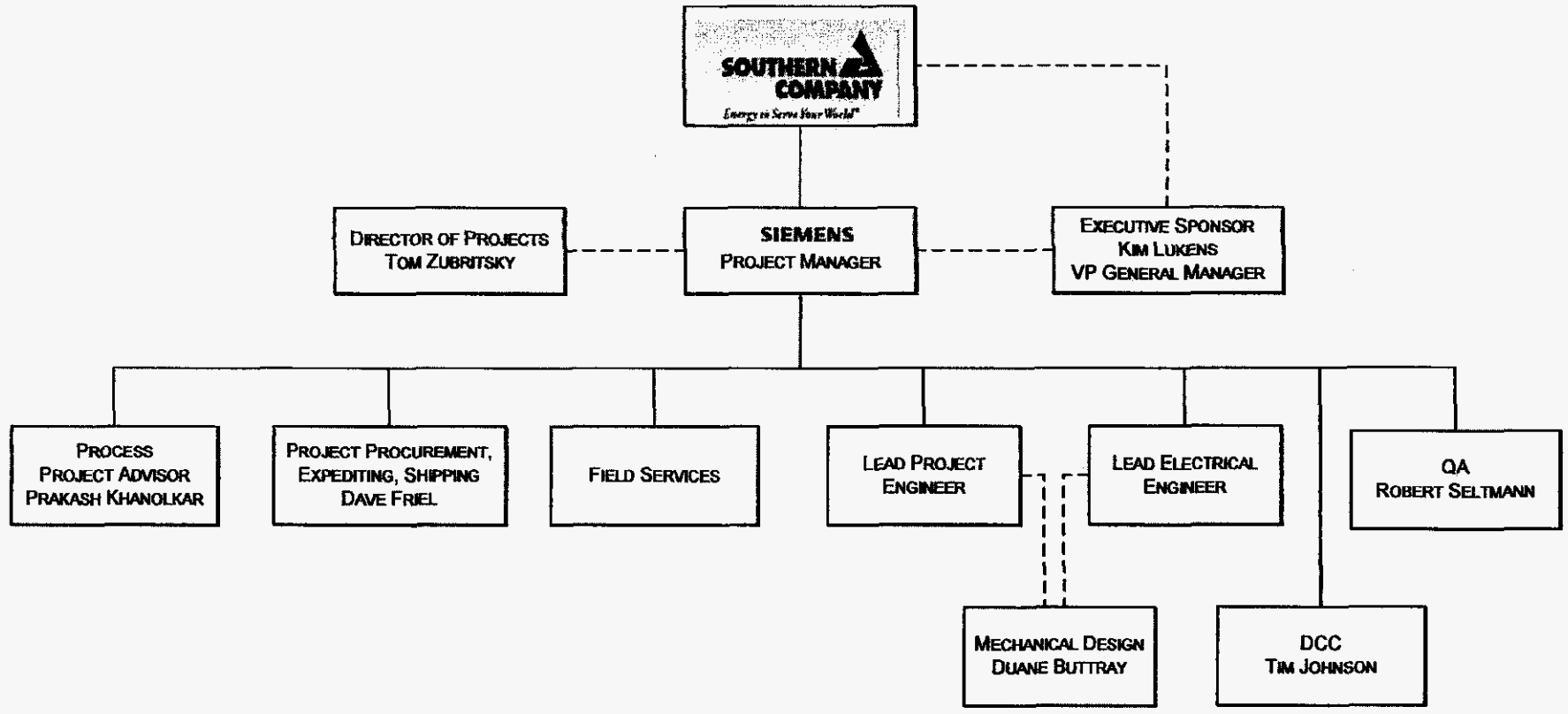
65.0700 - Wastewater Treatment System Required Proposal Submittals	Document Submitted with Proposal Package? Bidder Response Column
Submittal Description	**Yes/No**
Overall equipment flow diagrams	Yes
Dimensional drawings and weights of proposed components, including arrangement and areas needed for maintenance access.	Yes
Complete description of proposed equipment.	Yes
Summary description of codes and standards used, if different than specified, including a review of major differences.	Per specification
List of recommended spare parts, both critical and routine maintenance. Replacement Parts Information. Recommended spare parts list complete with description, prices, estimated lead time, and drawing showing locations.	No
List of special and maintenance tools to be furnished.	None required
Supplier's experience record with proposed equipment.	Yes
Complete descripiton of the extent of field assembly of components.	Yes
Detailed tank and reactor outline drawings for each tank/reactor, including nozzle locations.	No
Catalog cutsheets for major accessory equipment.	No
A description of bidder's recommended installation sequence.	No
Drawing showing arrangement of tank/silo appurtenances, including walkways and maintenance access locations.	No
Ladder and manway details	No
Description of shop fabrication and coating methods.	No
Electrical Load List - estimated hp or kw, voltage, and phases for all electrical loads including power consumption on average and maximum basis	Yes
Characteristic curves for each pump.	No
Major dimensions of each pump, complete with drive motor and baseplate.	No
Pump materials of construction.	Yes
Foundation and anchorage requirements.	No
Description of materials used and suitability for the specified application	Yes
Weights and operating loads of mixers.	Yes
Details of coatings, thicknesses, surface preparation including product data sheets of proposed coating/lining materials.	No
List of valve manufacturers to be used.	Yes
Panel dimensions.	Yes
Proposed Master PLC panel layout.	No
Description of proposed PLC equipment, including manufacturer, model, memory type and capacity, types and quantities of I/O modules provided, and preliminary PLC system architecture and layout.	Yes
Description of proposed optional programming unit, if required, including manufacturer, model, memory and disk capacities, and any accessories supplied. Also, describe the proposed programming software, including manufacturer, model, features, and capabilities.	Yes
Description of proposed interface to plant DCS, including communication standard, protocol, and media.	Yes

Description of proposed optional CRT-based graphical operator interface, including manufacturer, model, memory and disk capacities, MMI software type, MMI features and capabilities, and proposed operator displays.	Yes
Equipment storage requirements, including inside or outside requirements, requirements for controlled temperature or humidity, etc.	No
Preliminary I/O list	No
Maximum and average system power consumption.	Yes
Maximum and average system service water consumption.	Yes
Maximum and average system chemical requirements.	Yes
Maximum and average system service air requirements.	Yes
Manufacturer and model of all proposed electric actuators.	No
Completed proposal fill-in data sheets	Yes
Major dimensions of each pump, complete with drive motor and baseplate.	No
Equipment storage requirements, including inside or outside requirements, requirements for controlled temperature or humidity, etc.	No
Estimated project schedule including site erection schedule and proposed delivery schedule that meets delivery window outlined in the specification.	
Number of truckloads needed to deliver all equipment to the project site.	
Insurance certificate	
Comment on ability to meet waiver of subrogation and additional insurance status for Gulf Power and its affiliates as outlined in commercial Section 16.	

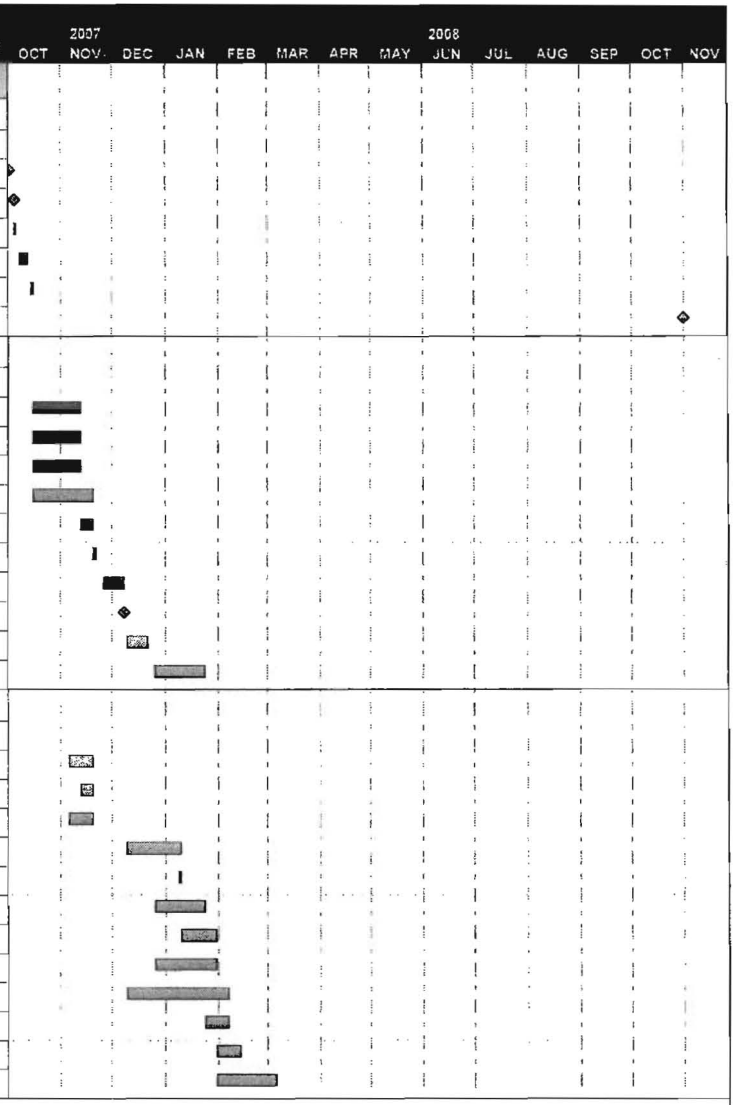
SIEMENS WATER TECHNOLOGIES CORP., INTEGRATED SOLUTIONS

ORGANIZATION CHART

SOUTHERN COMPANY WASTEWATER TREATMENT SYSTEM



Act ID	Description	Dur	Sch / Act Start	Sch / Act Finish	% Comp
Wastewater Treatment System					
General					
1005	Receive / Review Full Contract	0		01OCT07 *	0
1006	Contract Acceptance	0		04OCT07	0
1010	Turn-Over Meeting	1	05OCT07	05OCT07	0
1020	Develop Project Execution Plan	5	08OCT07	12OCT07	0
1030	Internal Project Kick-Off Meeting	1	15OCT07	15OCT07	0
1040	All Equipment On-Site	0		31OCT08	0
Process Engineering					
1068	Preliminary P&IDs (FA)	20	16OCT07	12NOV07	0
1070	Preliminary PFDs / Mass Balance (FA)	20	16OCT07	12NOV07	0
1075	Process Description (FI)	20	16OCT07	12NOV07	0
1072	Facility General Arrangement (FRC)	25	16OCT07	19NOV07	0
1133	Internal Review of Preliminary Engr Package	5	13NOV07	19NOV07	0
1134	Submit Preliminary Engr Package to Client	2	20NOV07	21NOV07	0
1135	Client Review / Approve Preliminary Engr Package	10	26NOV07	07DEC07	0
1152	Design Frozen	0		07DEC07	0
1153	Resubmit PFD's/P&IDs/Facility GA (Excl Tagging)	10	10DEC07	21DEC07	0
1174	Submit PFD's/P&IDs/Facility GA (with Tagging)	20	26DEC07	23JAN08	0
Equipment Engineering					
1076	Structural Loading Data & Operating Weights (FRC	10	06NOV07	19NOV07	0
1087	Embedded Anchor Bolt Plan (FI)	5	13NOV07	19NOV07	0
1290	Hydraulic Profile	10	06NOV07	19NOV07	0
1164	Philosophy of Operation (FA)	20	10DEC07	09JAN08	0
1165	Submit Philosophy of Operation to Client	1	09JAN08	09JAN08	0
1610	One Line Diagrams	20	26DEC07	23JAN08	0
1166	Client Review / Approve Philosophy of Operation	15	10JAN08	30JAN08	0
1670	Panel Layouts (FI)	25	26DEC07	30JAN08	0
1280	Pump Skid Layout Dwgs	40	10DEC07	06FEB08	0
1696	Motor & Instrument Location Plan Drawing (FI)	10	24JAN08	06FEB08	0
1790	Instrument Data Sheets (FRC)	10	31JAN08	13FEB08	0
1672	Panel Schematics (FI)	25	31JAN08	05MAR08	0

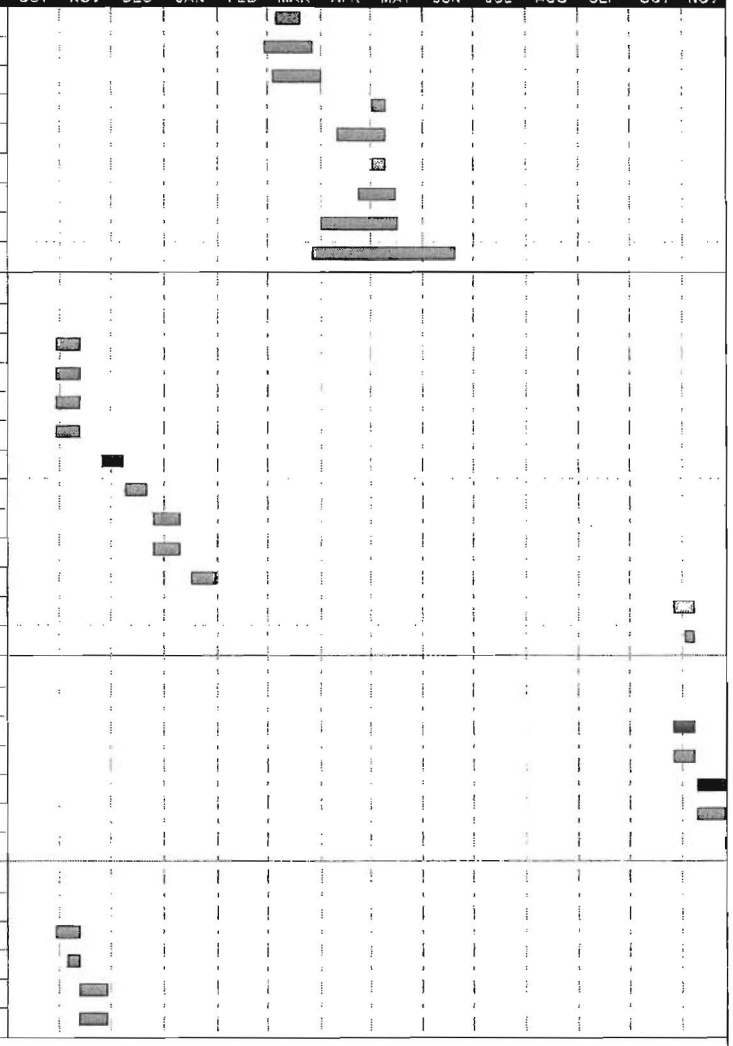


Finish date	09DEC08
Data date	01OCT07
Run date	17AUG07
Page number	1A
Project name	SC00

Siemens Water Technologies
Southern Company - Crist Power Station
WWTS Preliminary Schedule

Date	Revision	Checked	Approved
08AUG07			

Act ID	Description	Dur	Sch / Act Start	Sch / Act Finish	% Comp
1706	Field Wiring Schedule (FRC)	10	06MAR08	19MAR08	0
1167	Sequence of Operations	20	28FEB08	26MAR08	0
1077	Equipment Arangement (Outline) Drawings (FRC)	20	04MAR08	31MAR08	0
1085	Pump Curves (FI)	5	02MAY08	09MAY08	0
1086	Piping Isometrics / Layout Drawings (FRC)	20	11APR08	09MAY08	0
1097	Motor Data Sheets (FI)	5	02MAY08	09MAY08	0
1685	PLC Graphic Layout Drawings (FRC)	15	24APR08	15MAY08	0
1078	Equip Det Dwgs (Exc Walkways, Plat) (FRC)	33	01APR08	16MAY08	0
1686	PLC Control Program (FI)	60	27MAR08	19JUN08	0
Lists					
1073	Preliminary Equipment List (FRC)	10	30OCT07	12NOV07	0
1074	Preliminary Electrical Load List (FRC)	10	30OCT07	12NOV07	0
1750	Utility List (FRC)	10	30OCT07	12NOV07	0
1760	Chemical Usage (FRC)	10	30OCT07	12NOV07	0
1770	Equipment List (FRC)	10	26NOV07	07DEC07	0
1154	I/O List (FRC)	10	10DEC07	21DEC07	0
1675	Control Valve List (FRC)	10	26DEC07	09JAN08	0
1676	Manual Valve / Minor Equipment List (FRC)	10	26DEC07	09JAN08	0
1730	Instrument List (FRC)	10	17JAN08	30JAN08	0
1800	Recommended Spare Parts List (FI)	10	27OCT08	07NOV08	0
1810	Special Tools List (FI)	5	03NOV08	07NOV08	0
Manuals					
2830	O&M Manuals (FI)	10	27OCT08	07NOV08	0
2850	Installation Manual / Instructions (FI)	10	27OCT08	07NOV08	0
2840	Training Manual (FI)	10	10NOV08	25NOV08	0
2860	Commissioning / Startup Plan (FI)	10	10NOV08	25NOV08	0
2870	Performance Test Plan (FI)	10	26NOV08	09DEC08	0
QA					
1069	Project Specific Inspection & Test Plan (FI)	10	30OCT07	12NOV07	0
1079	QA / QC Program	5	06NOV07	12NOV07	0
1099	Welding Procedures (FI)	10	13NOV07	28NOV07	0
1109	Coating & Surface Preparation Specs (FRC)	10	13NOV07	28NOV07	0



Finish date	09DEC08
Data date	01OCT07
Run date	17AUG07
Page number	2A
Project name	SC00
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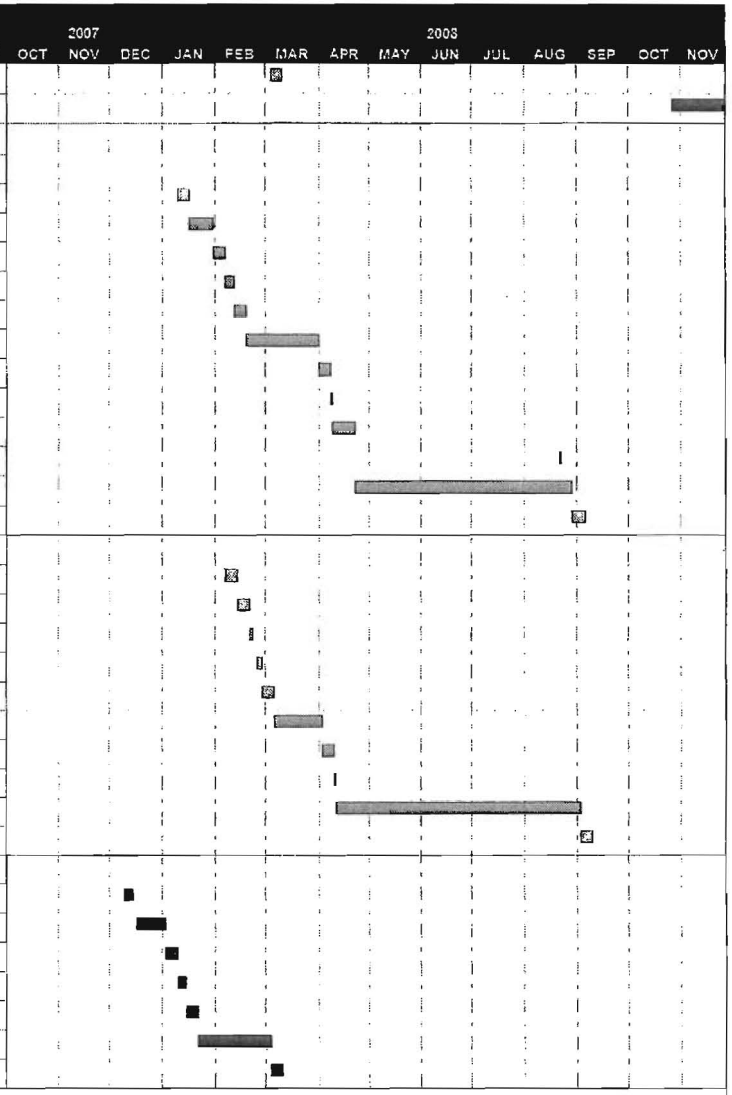
Siemens Water Technologies
Southern Company - Crist Power Station
WWTS Preliminary Schedule

Date	Revision	Checked	Approved
08AUG07			

Act ID	Description	Dur	Sch / Act Start	Sch / Act Finish	% Comp
1119	Coating Manufacturer Product Data Sheets (FRC)	5	04MAR08	10MAR08	0
1089	Manufacturer Data Books	30	27OCT08	09DEC08	0
Procurement / Delivery					
Chemical Feed Skids					
2988	Develop RFQ / Release to Purchasing	5	10JAN08	16JAN08	0
2990	Issue RFQ's to Suppliers	10	17JAN08	30JAN08	0
2995	Review of Quotations Technical & Commercial	5	31JAN08	06FEB08	0
3000	Requisition Released to Purchasing	3	07FEB08	11FEB08	0
3010	Purchase Order Placed with Supplier	5	12FEB08	18FEB08	0
3020	Vendor Engineering Process	30	19FEB08	31MAR08	0
3030	IS Review of Vendor Engineering	5	01APR08	07APR08	0
3040	IS Return Drawings to Supplier with Comments	1	08APR08	08APR08	0
3045	Component / Fabrication Receipt	10	09APR08	22APR08	0
3065	Ready for Inspection	1	22AUG08	22AUG08	0
3060	Manufacturing Process	90	23APR08	28AUG08	0
3070	Ready to Package & Ship to Site	5	29AUG08	05SEP08	0
Agitators					
5560	Develop RFQ / Release to Purchasing	5	07FEB08	13FEB08	0
5570	Issue RFQ's to Suppliers	5	14FEB08	20FEB08	0
5580	Review of Quotations Technical & Commercial	2	21FEB08	22FEB08	0
5590	Requisition Released to Purchasing	3	25FEB08	27FEB08	0
5600	Purchase Order Placed with Supplier	5	28FEB08	05MAR08	0
5602	Vendor Engineering Process	20	06MAR08	02APR08	0
5603	IS Review of Vendor Engineering	5	03APR08	09APR08	0
5604	IS Return Drawings to Supplier with Comments	1	10APR08	10APR08	0
5610	Manufacturing Process	100	11APR08	02SEP08	0
5630	Ready to Package & Ship to Site	5	03SEP08	09SEP08	0
Filter Presses					
5960	Develop RFQ / Release to Purchasing	5	10DEC07	14DEC07	0
5970	Issue RFQ's to Suppliers	10	17DEC07	02JAN08	0
5980	Review of Quotations Technical & Commercial	5	03JAN08	09JAN08	0
5990	Requisition Released to Purchasing	3	10JAN08	14JAN08	0
6000	Purchase Order Placed with Supplier	5	15JAN08	21JAN08	0
6010	Vendor Engineering Process	30	22JAN08	03MAR08	0
6020	IS Review of Vendor Engineering	5	04MAR08	10MAR08	0



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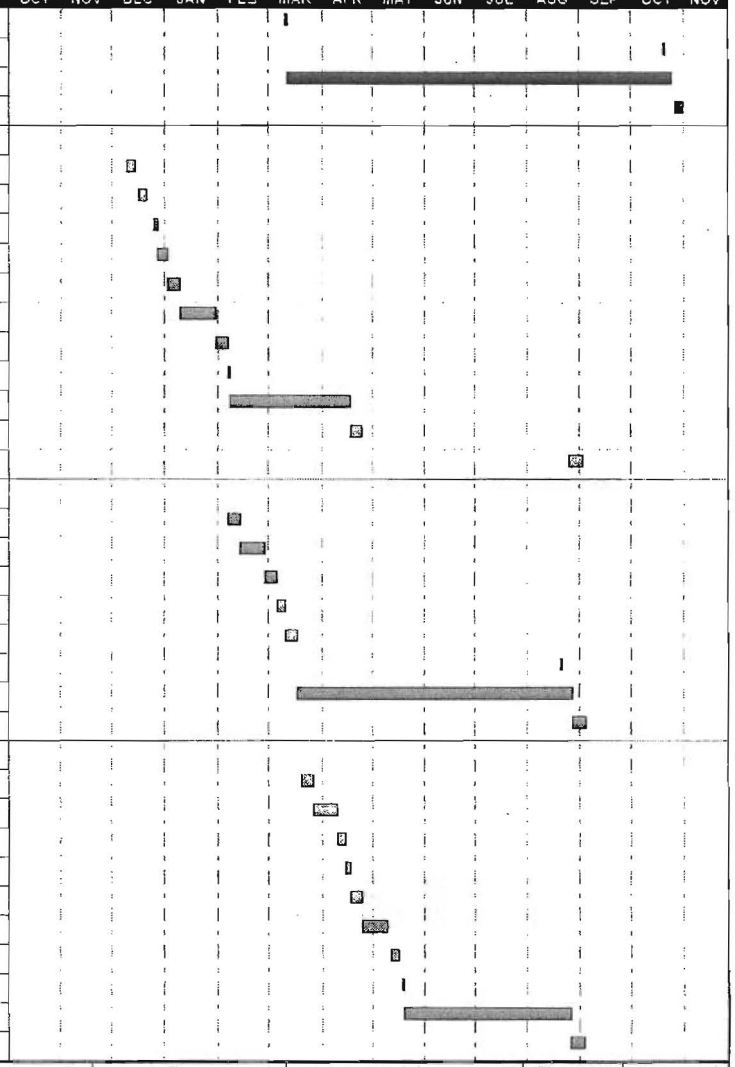
Act ID	Description	Dur	Sch / Act Start	Sch / Act Finish	% Comp
6030	IS Return Drawings to Supplier with Comments	1	11MAR08	11MAR08	0
6060	Ready for Inspection	1	20OCT08	20OCT08	0
6050	Manufacturing Process	160	12MAR08	24OCT08	0
6070	Ready to Package & Ship to Site	5	27OCT08	31OCT08	0
Centrifugal Pumps					
5480	Develop RFQ / Release to Purchasing	5	10DEC07	14DEC07	0
5490	Issue RFQ's to Suppliers	5	17DEC07	21DEC07	0
5500	Review of Quotations Technical & Commercial	2	26DEC07	27DEC07	0
5510	Requisition Released to Purchasing	3	28DEC07	02JAN08	0
5520	Purchase Order Placed with Supplier	5	03JAN08	09JAN08	0
5620	Vendor Engineering Process	15	10JAN08	30JAN08	0
6250	IS Review of Vendor Engineering	5	31JAN08	06FEB08	0
6260	IS Return Drawings to Supplier with Comments	1	07FEB08	07FEB08	0
5530	Manufacturing Process	50	08FEB08	17APR08	0
5540	Ready to Package & Ship to Skid Manufacturer	5	18APR08	24APR08	0
5550	Ready to Package & Ship to Site	5	26AUG08	02SEP08	0
Pump Skids					
6200	Develop RFQ / Release to Purchasing	5	07FEB08	13FEB08	0
6210	Issue RFQ's to Suppliers	10	14FEB08	27FEB08	0
6220	Review of Quotations Technical & Commercial	5	28FEB08	05MAR08	0
6230	Requisition Released to Purchasing	3	06MAR08	10MAR08	0
6240	Purchase Order Placed with Supplier	5	11MAR08	17MAR08	0
6300	Ready for Inspection	1	21AUG08	21AUG08	0
6290	Manufacturing Process	115	18MAR08	27AUG08	0
6310	Ready to Package & Ship to Site	5	28AUG08	04SEP08	0
Sump Pumps					
7500	Develop RFQ / Release to Purchasing	5	20MAR08	26MAR08	0
7510	Issue RFQ's to Suppliers	10	27MAR08	09APR08	0
7520	Review of Quotations Technical & Commercial	3	10APR08	14APR08	0
7530	Requisition Released to Purchasing	3	15APR08	17APR08	0
7540	Purchase Order Placed with Supplier	5	18APR08	24APR08	0
7550	Vendor Engineering Process	10	25APR08	09MAY08	0
7560	IS Review of Vendor Engineering	5	12MAY08	16MAY08	0
7570	IS Return Drawings to Supplier with Comments	1	19MAY08	19MAY08	0
7580	Manufacturing Process	70	20MAY08	26AUG08	0
7600	Ready to Package & Ship to Site	5	27AUG08	03SEP08	0



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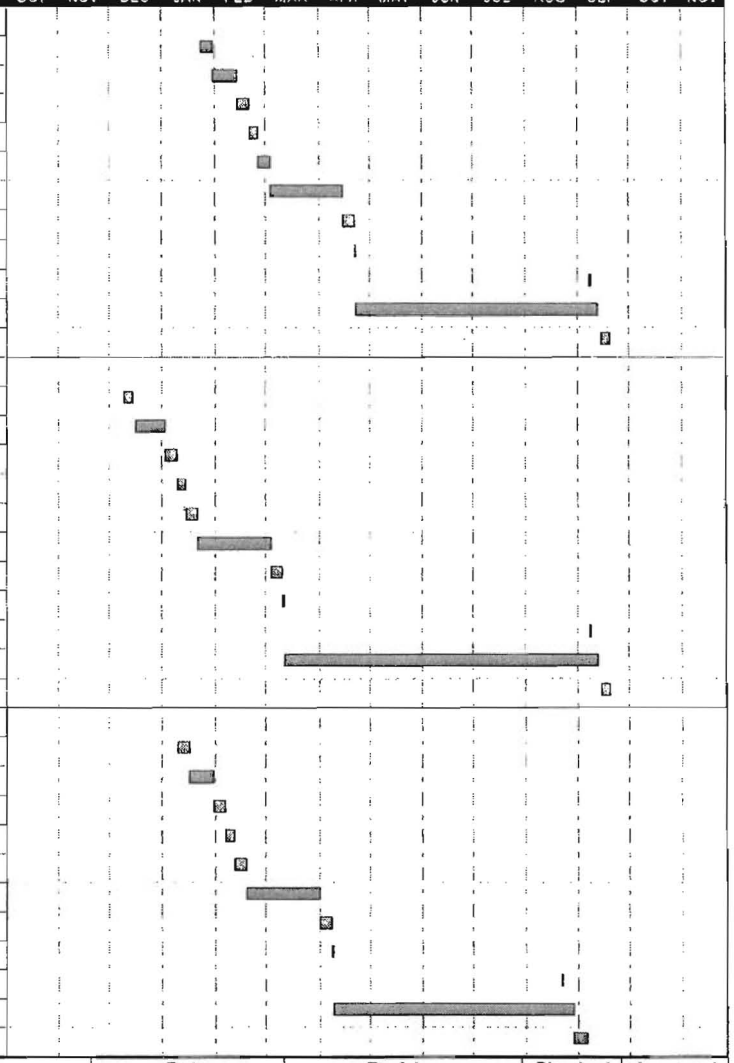
Act ID	Description	Dur	Sch / Act Start	Sch / Act Finish	% Comp
Polymer Blending Units					
7300	Develop RFQ / Release to Purchasing	5	24JAN08	30JAN08	0
7310	Issue RFQ's to Suppliers	10	31JAN08	13FEB08	0
7320	Review of Quotations Technical & Commercial	5	14FEB08	20FEB08	0
7330	Requisition Released to Purchasing	3	21FEB08	25FEB08	0
7340	Purchase Order Placed with Supplier	5	26FEB08	03MAR08	0
7350	Vendor Engineering Process	30	04MAR08	14APR08	0
7360	IS Review of Vendor Engineering	5	15APR08	21APR08	0
7370	IS Return Drawings to Supplier with Comments	1	22APR08	22APR08	0
7390	Ready for Inspection	1	08SEP08	08SEP08	0
7380	Manufacturing Process	100	23APR08	12SEP08	0
7400	Ready to Package & Ship to Site	5	15SEP08	19SEP08	0
Clarifiers / Internals					
5720	Develop RFQ / Release to Purchasing	5	10DEC07	14DEC07	0
5730	Issue RFQ's to Suppliers	10	17DEC07	02JAN08	0
5740	Review of Quotations Technical & Commercial	5	03JAN08	09JAN08	0
5750	Requisition Released to Purchasing	3	10JAN08	14JAN08	0
5760	Purchase Order Placed with Supplier	5	15JAN08	21JAN08	0
5770	Vendor Engineering Process	30	22JAN08	03MAR08	0
5780	IS Review of Vendor Engineering	5	04MAR08	10MAR08	0
5790	IS Return Drawings to Supplier with Comments	1	11MAR08	11MAR08	0
5820	Ready for Inspection	1	08SEP08	08SEP08	0
5810	Manufacturing Process	130	12MAR08	12SEP08	0
5830	Ready to Package & Ship to Site	5	15SEP08	19SEP08	0
Gravity Filters					
5840	Develop RFQ / Release to Purchasing	5	10JAN08	16JAN08	0
5850	Issue RFQ's to Suppliers	10	17JAN08	30JAN08	0
5860	Review of Quotations Technical & Commercial	5	31JAN08	06FEB08	0
5870	Requisition Released to Purchasing	3	07FEB08	11FEB08	0
5880	Purchase Order Placed with Supplier	5	12FEB08	18FEB08	0
5890	Vendor Engineering Process	30	19FEB08	31MAR08	0
5900	IS Review of Vendor Engineering	5	01APR08	07APR08	0
5910	IS Return Drawings to Supplier with Comments	1	08APR08	08APR08	0
5940	Ready for Inspection	1	22AUG08	22AUG08	0
5930	Manufacturing Process	100	09APR08	28AUG08	0
5950	Ready to Package & Ship to Site	5	29AUG08	05SEP08	0



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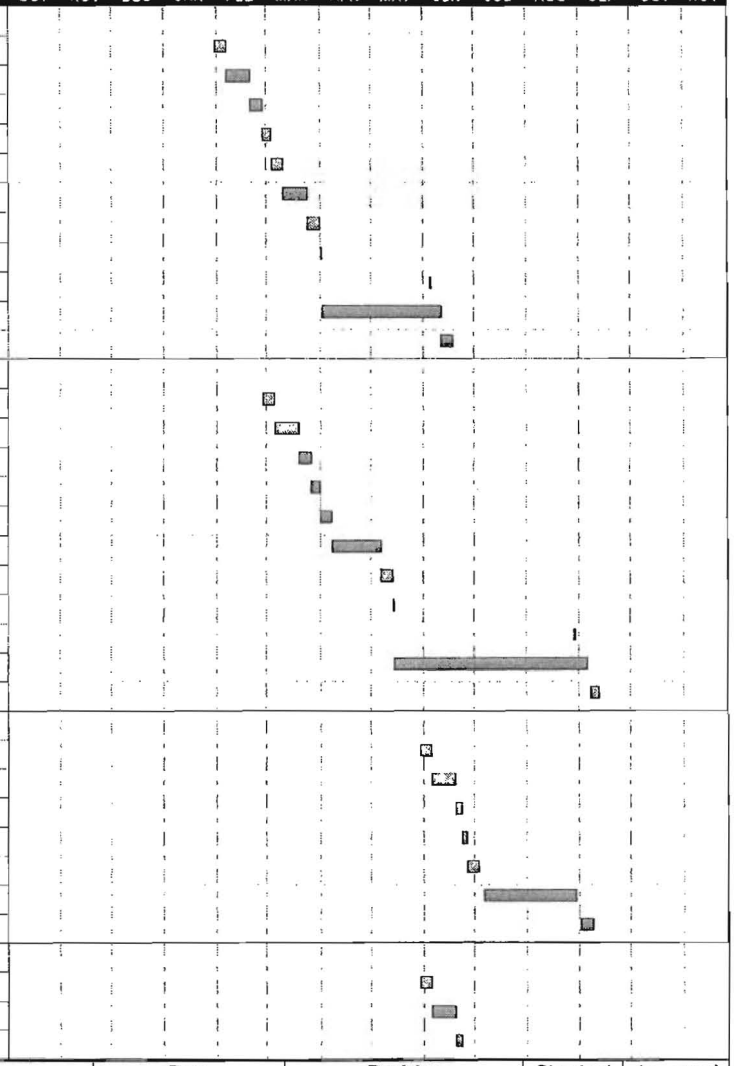
Act ID	Description	Dur	Sch / Act Start	Sch / Act Finish	% Comp
Electrical Control Panels					
6640	Develop RFQ / Release to Purchasing	5	31JAN08	06FEB08	0
6650	Issue RFQ's to Suppliers	10	07FEB08	20FEB08	0
6660	Review of Quotations Technical & Commercial	5	21FEB08	27FEB08	0
6670	Requisition Released to Purchasing	3	28FEB08	03MAR08	0
6680	Purchase Order Placed with Supplier	5	04MAR08	10MAR08	0
6690	Vendor Engineering Process	10	11MAR08	24MAR08	0
6700	IS Review of Vendor Engineering	5	25MAR08	31MAR08	0
6710	IS Return Drawings to Supplier with Comments	1	01APR08	01APR08	0
6740	Ready for Inspection	1	05JUN08	05JUN08	0
6730	Manufacturing Process	50	02APR08	11JUN08	0
6750	Ready to Package & Ship to Skid Manufacturer	5	12JUN08	18JUN08	0
PLC					
6520	Develop RFQ / Release to Purchasing	5	28FEB08	05MAR08	0
6530	Issue RFQ's to Suppliers	10	06MAR08	19MAR08	0
6540	Review of Quotations Technical & Commercial	5	20MAR08	26MAR08	0
6550	Requisition Released to Purchasing	3	27MAR08	31MAR08	0
6560	Purchase Order Placed with Supplier	5	01APR08	07APR08	0
6570	Vendor Engineering Process	20	08APR08	06MAY08	0
6580	IS Review of Vendor Engineering	5	07MAY08	13MAY08	0
6590	IS Return Drawings to Supplier with Comments	1	14MAY08	14MAY08	0
6620	Ready for Inspection	1	29AUG08	29AUG08	0
6610	Manufacturing Process	80	15MAY08	05SEP08	0
6630	Ready to Package & Ship to Site	5	08SEP08	12SEP08	0
Eyewash Stations / Safety Showers					
7610	Develop RFQ / Release to Purchasing	5	30MAY08	05JUN08	0
7620	Issue RFQ's to Suppliers	10	06JUN08	19JUN08	0
7630	Review of Quotations Technical & Commercial	2	20JUN08	23JUN08	0
7640	Requisition Released to Purchasing	3	24JUN08	26JUN08	0
7650	Purchase Order Placed with Supplier	5	27JUN08	03JUL08	0
7690	Manufacturing Process	40	07JUL08	29AUG08	0
7700	Ready to Package & Ship to Site	5	02SEP08	08SEP08	0
Sample Sinks					
7710	Develop RFQ / Release to Purchasing	5	30MAY08	05JUN08	0
7720	Issue RFQ's to Suppliers	10	06JUN08	19JUN08	0
7730	Review of Quotations Technical & Commercial	2	20JUN08	23JUN08	0



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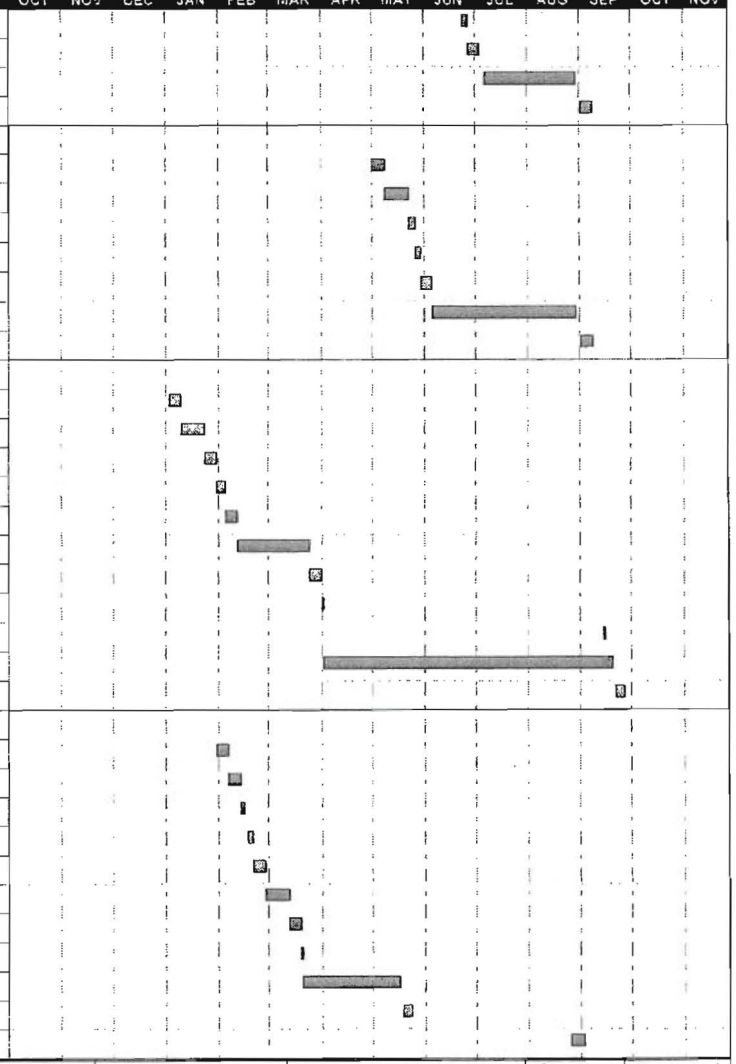
7740	Requisition Released to Purchasing	3	24JUN08	26JUN08	0
7750	Purchase Order Placed with Supplier	5	27JUN08	03JUL08	0
7790	Manufacturing Process	40	07JUL08	29AUG08	0
7800	Ready to Package & Ship to Site	5	02SEP08	08SEP08	0
Injection Quills					
7810	Develop RFQ / Release to Purchasing	5	01MAY08	08MAY08	0
7820	Issue RFQ's to Suppliers	10	09MAY08	22MAY08	0
7830	Review of Quotations Technical & Commercial	2	23MAY08	26MAY08	0
7840	Requisition Released to Purchasing	3	27MAY08	29MAY08	0
7850	Purchase Order Placed with Supplier	5	30MAY08	05JUN08	0
7890	Manufacturing Process	60	06JUN08	29AUG08	0
7900	Ready to Package & Ship to Site	5	02SEP08	08SEP08	0
FRP Tanks					
7000	Develop RFQ / Release to Purchasing	5	03JAN08	09JAN08	0
7010	Issue RFQ's to Suppliers	10	10JAN08	23JAN08	0
7020	Review of Quotations Technical & Commercial	5	24JAN08	30JAN08	0
7030	Requisition Released to Purchasing	3	31JAN08	04FEB08	0
7040	Purchase Order Placed with Supplier	5	05FEB08	11FEB08	0
7050	Vendor Engineering Process	30	12FEB08	24MAR08	0
7060	IS Review of Vendor Engineering	5	25MAR08	31MAR08	0
7070	IS Return Drawings to Supplier with Comments	1	01APR08	01APR08	0
7100	Ready for Inspection	1	15SEP08	15SEP08	0
7090	Manufacturing Process	120	02APR08	19SEP08	0
7110	Ready to Package & Ship to Site	5	22SEP08	26SEP08	0
Instrumentation					
5640	Develop RFQ / Release to Purchasing	5	31JAN08	06FEB08	0
5650	Issue RFQ's to Suppliers	5	07FEB08	13FEB08	0
5660	Review of Quotations Technical & Commercial	2	14FEB08	15FEB08	0
5670	Requisition Released to Purchasing	3	18FEB08	20FEB08	0
5680	Purchase Order Placed with Supplier	5	21FEB08	27FEB08	0
6270	Vendor Engineering Process	10	28FEB08	12MAR08	0
6320	IS Review of Vendor Engineering	5	13MAR08	19MAR08	0
6330	IS Return Engr Package to Supplier with Comments	1	20MAR08	20MAR08	0
5690	Manufacturing Process	40	21MAR08	16MAY08	0
5700	Ready to Package & Ship to Skid Manufacturer	5	19MAY08	23MAY08	0
5710	Ready to Package & Ship to Site	5	26AUG08	02SEP08	0



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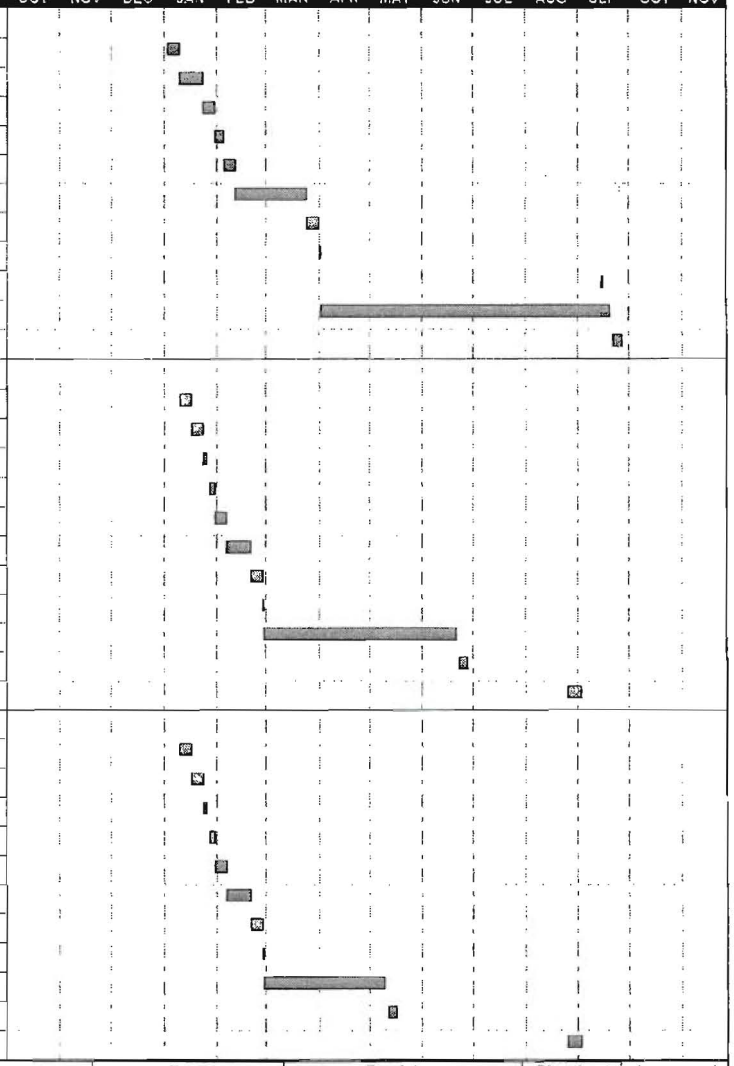
Act ID	Description	Dur	Sch / Act Start	Sch / Act Finish	% Comp
Lime Silo					
6080	Develop RFQ / Release to Purchasing	5	03JAN08	09JAN08	0
6090	Issue RFQ's to Suppliers	10	10JAN08	23JAN08	0
6100	Review of Quotations Technical & Commercial	5	24JAN08	30JAN08	0
6110	Requisition Released to Purchasing	3	31JAN08	04FEB08	0
6120	Purchase Order Placed with Supplier	5	05FEB08	11FEB08	0
6130	Vendor Engineering Process	30	12FEB08	24MAR08	0
6140	IS Review of Vendor Engineering	5	25MAR08	31MAR08	0
6150	IS Return Drawings to Supplier with Comments	1	01APR08	01APR08	0
6180	Ready for Inspection	1	15SEP08	15SEP08	0
6170	Manufacturing Process	120	02APR08	19SEP08	0
6190	Ready to Package & Ship to Site	5	22SEP08	26SEP08	0
Butterfly Valves					
4498	Develop RFQ / Release to Purchasing	5	10JAN08	16JAN08	0
4500	Issue RFQ's to Suppliers	5	17JAN08	23JAN08	0
4510	Review of Quotations Technical & Commercial	2	24JAN08	25JAN08	0
4515	Requisition Released to Purchasing	3	28JAN08	30JAN08	0
4520	Purchase Order Placed with Supplier	5	31JAN08	06FEB08	0
4508	Vendor Engineering Process	10	07FEB08	20FEB08	0
4518	IS Review of Vendor Engineering	5	21FEB08	27FEB08	0
4528	IS Return Engr Package to Supplier with Comments	1	28FEB08	28FEB08	0
4570	Manufacturing Process	80	29FEB08	20JUN08	0
4580	Ready to Package & Ship to Skid Manufacturer	5	23JUN08	27JUN08	0
4582	Ready to Package & Ship to Site	5	26AUG08	02SEP08	0
Check Valves					
5000	Develop RFQ / Release to Purchasing	5	10JAN08	16JAN08	0
5010	Issue RFQ's to Suppliers	5	17JAN08	23JAN08	0
5020	Review of Quotations Technical & Commercial	2	24JAN08	25JAN08	0
5030	Requisition Released to Purchasing	3	28JAN08	30JAN08	0
5040	Purchase Order Placed with Supplier	5	31JAN08	06FEB08	0
6340	Vendor Engineering Process	10	07FEB08	20FEB08	0
6350	IS Review of Vendor Engineering	5	21FEB08	27FEB08	0
6360	IS Return Engr Package to Supplier with Comments	1	28FEB08	28FEB08	0
5050	Manufacturing Process	50	29FEB08	09MAY08	0
5060	Ready to Package & Ship to Skid Manufacturer	5	12MAY08	16MAY08	0
5070	Ready to Package & Ship to Site	5	26AUG08	02SEP08	0



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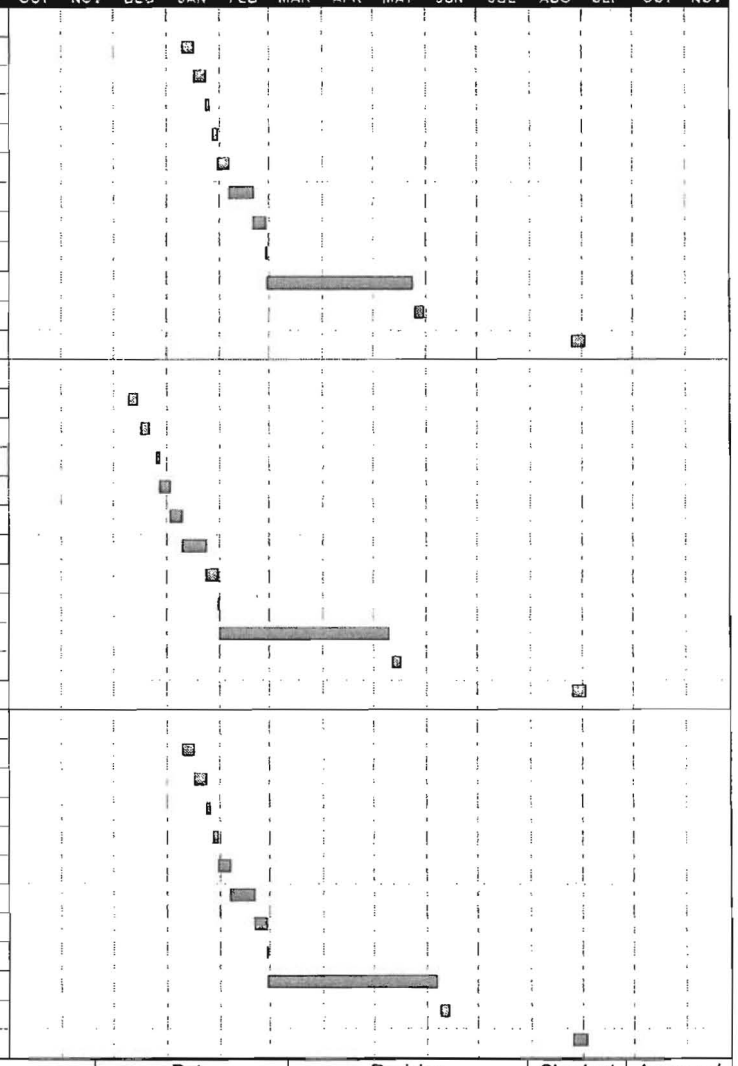
Act ID	Description	Dur	Sch / Act Start	Sch / Act Finish	% Comp
Diaphragm Valves					
5080	Develop RFQ / Release to Purchasing	5	10JAN08	16JAN08	0
5090	Issue RFQ's to Suppliers	5	17JAN08	23JAN08	0
5100	Review of Quotations Technical & Commercial	2	24JAN08	25JAN08	0
5110	Requisition Released to Purchasing	3	28JAN08	30JAN08	0
5120	Purchase Order Placed with Supplier	5	31JAN08	06FEB08	0
6370	Vendor Engineering Process	10	07FEB08	20FEB08	0
6380	IS Review of Vendor Engineering	5	21FEB08	27FEB08	0
6390	IS Return Engr Package to Supplier with Comments	1	28FEB08	28FEB08	0
5130	Manufacturing Process	60	29FEB08	23MAY08	0
5140	Ready to Package & Ship to Skid Manufacturer	5	26MAY08	30MAY08	0
5150	Ready to Package & Ship to Site	5	26AUG08	02SEP08	0
Knifegate Valves					
5160	Develop RFQ / Release to Purchasing	5	10DEC07	14DEC07	0
5170	Issue RFQ's to Suppliers	5	17DEC07	21DEC07	0
5180	Review of Quotations Technical & Commercial	2	26DEC07	27DEC07	0
5190	Requisition Released to Purchasing	3	28DEC07	02JAN08	0
5200	Purchase Order Placed with Supplier	5	03JAN08	09JAN08	0
6760	Vendor Engineering Process	10	10JAN08	23JAN08	0
6770	IS Review of Vendor Engineering	5	24JAN08	30JAN08	0
6780	IS Return Engr Package to Supplier with Comments	1	31JAN08	31JAN08	0
5210	Manufacturing Process	70	01FEB08	09MAY08	0
5220	Ready to Package & Ship to Skid Manufacturer	5	12MAY08	16MAY08	0
5230	Ready to Package & Ship to Site	5	26AUG08	02SEP08	0
Flow Control Valves					
5240	Develop RFQ / Release to Purchasing	5	10JAN08	16JAN08	0
5250	Issue RFQ's to Suppliers	5	17JAN08	23JAN08	0
5260	Review of Quotations Technical & Commercial	2	24JAN08	25JAN08	0
5270	Requisition Released to Purchasing	3	28JAN08	30JAN08	0
5280	Purchase Order Placed with Supplier	5	31JAN08	06FEB08	0
6790	Vendor Engineering Process	10	07FEB08	20FEB08	0
6800	IS Review of Vendor Engineering	5	21FEB08	27FEB08	0
6810	IS Return Engr Package to Supplier with Comments	1	28FEB08	28FEB08	0
5290	Manufacturing Process	70	29FEB08	06JUN08	0
5300	Ready to Package & Ship to Skid Manufacturer	5	09JUN08	13JUN08	0
5310	Ready to Package & Ship to Site	5	26AUG08	02SEP08	0



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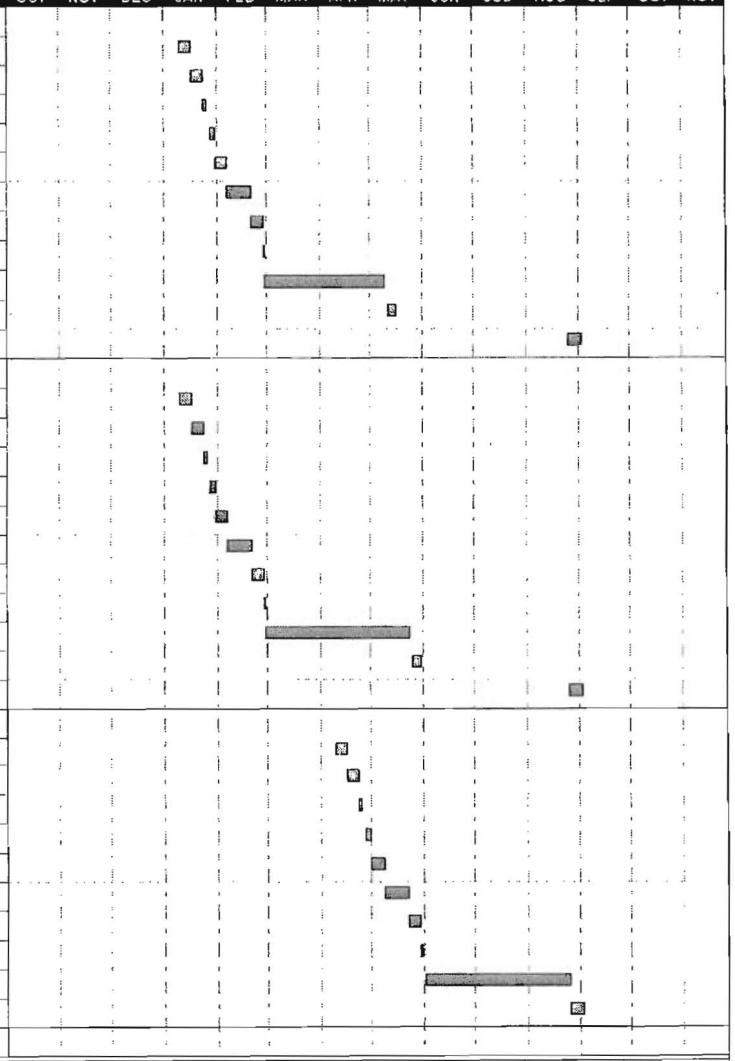
Act ID	Description	Dur	Sch / Act Start	Sch / Act Finish	% Comp
Pinch Valves					
5320	Develop RFQ / Release to Purchasing	5	10JAN08	16JAN08	0
5330	Issue RFQ's to Suppliers	5	17JAN08	23JAN08	0
5340	Review of Quotations Technical & Commercial	2	24JAN08	25JAN08	0
5350	Requisition Released to Purchasing	3	28JAN08	30JAN08	0
5360	Purchase Order Placed with Supplier	5	31JAN08	06FEB08	0
6820	Vendor Engineering Process	10	07FEB08	20FEB08	0
6830	IS Review of Vendor Engineering	5	21FEB08	27FEB08	0
6840	IS Return Engr Package to Supplier with Comments	1	28FEB08	28FEB08	0
5370	Manufacturing Process	50	29FEB08	09MAY08	0
5380	Ready to Package & Ship to Skid Manufacturer	5	12MAY08	16MAY08	0
5390	Ready to Package & Ship to Site	5	26AUG08	02SEP08	0
Pressure Relief Valves					
5400	Develop RFQ / Release to Purchasing	5	10JAN08	16JAN08	0
5410	Issue RFQ's to Suppliers	5	17JAN08	23JAN08	0
5420	Review of Quotations Technical & Commercial	2	24JAN08	25JAN08	0
5430	Requisition Released to Purchasing	3	28JAN08	30JAN08	0
5440	Purchase Order Placed with Supplier	5	31JAN08	06FEB08	0
6850	Vendor Engineering Process	10	07FEB08	20FEB08	0
6860	IS Review of Vendor Engineering	5	21FEB08	27FEB08	0
6870	IS Return Engr Package to Supplier with Comments	1	28FEB08	28FEB08	0
5450	Manufacturing Process	60	29FEB08	23MAY08	0
5460	Ready to Package & Ship to Skid Manufacturer	5	26MAY08	30MAY08	0
5470	Ready to Package & Ship to Site	5	26AUG08	02SEP08	0
Variable Frequency Drives					
7910	Develop RFQ / Release to Purchasing	5	10APR08	16APR08	0
7920	Issue RFQ's to Suppliers	5	17APR08	23APR08	0
7930	Review of Quotations Technical & Commercial	2	24APR08	25APR08	0
7940	Requisition Released to Purchasing	3	28APR08	30APR08	0
7950	Purchase Order Placed with Supplier	5	01MAY08	08MAY08	0
7960	Vendor Engineering Process	10	09MAY08	22MAY08	0
7970	IS Review of Vendor Engineering	5	23MAY08	29MAY08	0
7980	IS Return Engr Package to Supplier with Comments	1	30MAY08	30MAY08	0
7990	Manufacturing Process	60	02JUN08	25AUG08	0
8000	Ready to Package & Ship to Site	5	26AUG08	02SEP08	0
Access Walkways, Bridges & Stairs					



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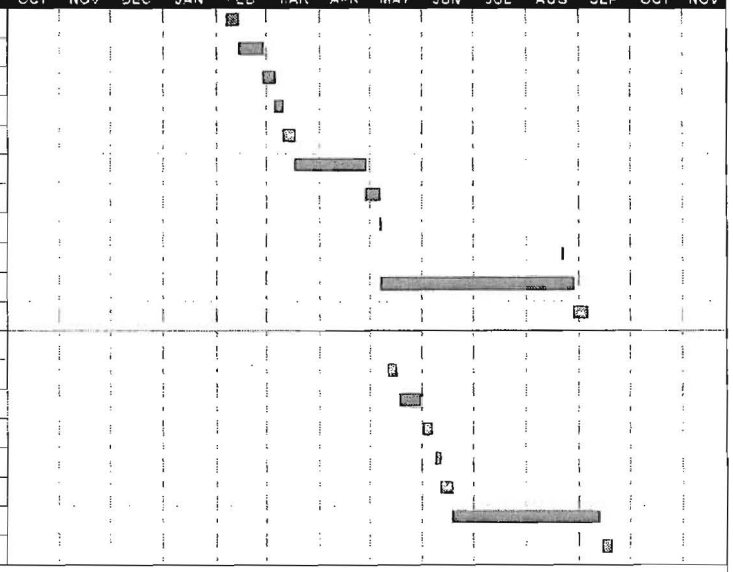
Project name	SC00

Siemens Water Technologies
Southern Company - Crist Power Station
WWTS Preliminary Schedule

Date	Revision	Checked	Approved
08AUG07			

Act ID	Description	Dur	Sch / Act Start	Sch / Act Finish	% Comp
6400	Develop RFQ / Release to Purchasing	5	07FEB08	13FEB08	0
6410	Issue RFQ's to Suppliers	10	14FEB08	27FEB08	0
6420	Review of Quotations Technical & Commercial	5	28FEB08	05MAR08	0
6430	Requisition Released to Purchasing	3	06MAR08	10MAR08	0
6440	Purchase Order Placed with Supplier	5	11MAR08	17MAR08	0
6450	Vendor Engineering Process	30	18MAR08	28APR08	0
6460	IS Review of Vendor Engineering	5	29APR08	06MAY08	0
6470	IS Return Drawings to Supplier with Comments	1	07MAY08	07MAY08	0
6500	Ready for Inspection	1	22AUG08	22AUG08	0
6490	Manufacturing Process	80	08MAY08	28AUG08	0
6510	Ready to Package & Ship to Site	5	29AUG08	05SEP08	0
Interconnecting Piping					
9000	Develop RFQ / Release to Purchasing	5	12MAY08	16MAY08	0
9010	Issue RFQ's to Suppliers	10	19MAY08	30MAY08	0
9020	Review of Quotations Technical & Commercial	5	02JUN08	06JUN08	0
9030	Requisition Released to Purchasing	3	09JUN08	11JUN08	0
9040	Purchase Order Placed with Supplier	5	12JUN08	18JUN08	0
9050	Manufacturing Process	60	19JUN08	12SEP08	0
9070	Ready to Package & Ship to Site	5	15SEP08	19SEP08	0



Finish date	09DEC08
Data date	01OCT07
Run date	17AUG07
Page number	11A
Project name	SC00

Siemens Water Technologies
Southern Company - Crist Power Station
WWTS Preliminary Schedule

Date	Revision	Checked	Approved
08AUG07			

Scope of Supply Matrix: Proposal Issue **Date of Issue: August 9, 2007**

Client:	Southern Company
Client Contract No:	TBD
Project:	FGD WWTS
Location:	Crist Power Station - Pensapola, Florida
Project No.:	TBD
Project Manager:	John Zuemie
Project Engineer:	Prakash Khanolkar

NOTES:

SIEMENS

SOUTHERN COMPANY

1. Responsibility designations are to be interpreted as follows:
S - Siemens Water Technologies

O - Owner or Others retained by Owner to execute a portion of the overall scope of work.

ALL - Each party is responsible for a given line item for his own scope to the extent applicable.

2. Following the responsibility designation above, a "1" or "2" may be shown. A "1" means the party identified has lead responsibility for that item. A "2" means the party has secondary or review responsibility. No number after the responsibility designation means the named party is solely responsible for the given line item.

TABLE OF CONTENTS:

	ACTIVITY	CONTRACT AND GENERAL CONDITIONS		ENGINEERING AND DELIVERABLES					EQUIPMENT AND INSTALLED WORKS			SUPERVISION or TECHNICAL ASSISTANCE		REMARKS
		Included	Excluded	Technical Data	Basic Design	Detailed Design	Deliverable Item	Excluded	Supply	Installation	Excluded	Installation	Commissioning	
A	CONTRACT EXECUTION/ADMINISTRATION/GENERAL CONDITIONS													
A.1	**Administrative**													
A.1.1	Overall administration and coordination of the project for own scope	S, O												
A.1.2	Develop, Update, and Maintain Overall Detailed Project Schedule, Including Manpower Loading (input for own scope)	S, O												
A.1.3	Co-ordination with Other Contractors	O												
A.1.4	Project Execution Plan (for own scope)	S, O												
A.1.5	Daily Construction Reports	O												
A.1.6	Report of Manpower	O												
A.1.7	Monthly Progress Report (input for own scope)	S, O												
A.1.8	Bonds and Special Insurances	O												
A.2	**Health and Safety**													
A.2.1	Safety Program	O												
A.2.2	Site Specific Safety Plan	O												
A.2.3	Site Safety Rep. and Weekly Safety Report	O												
A.2.4	Maintain equipped first-aid stations	O												
A.2.5	Make arrangement with nearby hospital for emergencies	O												
A.2.6	Statutory notices, registers, inspections, etc.	O												
A.2.7	Safety equipment and protective clothing for own employees	O												
A.2.8	Safety equipment for work near water	O												
A.2.9	Fire extinguishers, etc. (temporary) for site offices	O												
A.2.10	Provide permanent safety/maintenance equipment, systems, materials, or placarding within battery limits	O												
A.2.11	Ventilation to working areas (temporary and permanent)	O												
A.3	**QA/QC**													
A.3.1	QA/QC Program (for own scope)	S, O												
A.3.2	Inspection and Test Plan (for own scope)	S, O												
A.3.3	Onsite QA/QC Representative	O												
A.3.4	Shop and field fabrication procedures and qualifications (for own scope)	S, O												
A.3.5	Material and components certifications (for own scope)		S											
A.3.6	Inspection, control and witness tests (for own scope of supply and Quality Plan)	S, O												

	ACTIVITY	CONTRACT AND GENERAL CONDITIONS		ENGINEERING AND DELIVERABLES					EQUIPMENT AND INSTALLED WORKS			SUPERVISION or TECHNICAL ASSISTANCE		REMARKS
		Included	Excluded	Technical Data	Basic Design	Detailed Design	Deliverable Item	Excluded	Supply	Installation	Excluded	Installation	Commissioning	
A.3.7	Compile Manufacturer's Data Books (submit for review only). Covers entire EPC scope. Each party responsible for own scope items (for own scope)	S												
A.3.8	Manufacturer's Certificate of Origin (for own scope)		S											
A.3.9	Construction Turnover Package (including all testing records, QA/QC records, as-built drawings, etc.). Depending on scope split, can be submitted separately or in conjunction with Manufacturer's Data Books.	O												
A.4	**Permits and Environmental Compliance**													
A.4.1	Environmental Impact Assessment	O												
A.4.2	Permits (Environmental)	O												
A.4.3	Permit Engineering	O												
A.4.4	Soil Erosion, Sedimentation, and Environmental Compliance Plan (after site turnover)	O												
A.4.5	Payment of all permit fees by party responsible for obtaining that permit	O												
A.4.6	Obtain all Planning Approval from relevant authorities	O												
A.4.7	Obtain all Construction Licenses from relevant authorities	O												
A.4.8	Obtain Certificate of Fitness for use from relevant authorities	O												
A.4.9	Obtain all utility authority approvals and permanent connections	O												
A.4.10	Obtain certificates for lifting equipment	O												
A.4.11	Compliance with all Environmental laws such as air pollution, water pollution, waste disposal, etc.	O												
A.4.12	Any other permits, licenses, approvals, certificates, not mentioned above	O												
A.5	**Site Establishment and Access**													
A.5.1	Mobilization	O												
A.5.2	Construction Parking within 250 ft of the work site	O												
A.5.3	Temp office facilities to be located within 250 ft or less of the battery limits	O												
A.5.4	Provide access roads to battery limits.	O												
A.5.5	Maintain continuous free and clear access to battery limits	O												
A.5.6	Provide and maintain a secure material and equipment laydown area within 250 ft of the treatment plant battery limits	O												
A.6	**Site Security**													
A.6.1	Full-time gatekeeper at main site entrance	O												
A.6.2	Main Contractor's Signboards	O												
A.6.3	Clearances/badging	O												
A.7	**Temporary Electricity and Utilities**													
A.7.1	Electrical Power Supply and Power Distribution as required (to battery limits for construction)	O												
A.7.1	Electrical Power Distribution as required (within battery limits for construction)	O												
A.7.1	Temporary measures to maintain flows and other services at the works during construction	O												
A.7.1	Temporary potable water installation to site offices	O												
A.7.1	Temporary sewage drainage (Porta Johns)	O												
A.7.1	Removal at end of site works	O												
A.7.1	Costs for temporary power consumed on-site	O												
A.8	**Temporary Telephone Lines, Etc.**													
A.8.1	Incoming lines, for phone and fax	O												
A.8.2	Telephone extensions	O												
A.8.3	Fax machines	O												
A.8.4	Call charges for phone services	O												
A.9	**Other Services for Site Establishment or Construction**													
A.9.1	Supervision of installation of supplied equipment	O1, S2												Siemens to provide periodic technical assistance.
A.9.2	Temporary installation to facilitate installation or requirements	O												
A.9.3	Provide all necessary temporary facilities, manpower and materials for installation	O												
A.9.4	Hand tools, power tools, lifting equipment, etc.	O												
A.9.5	Lifting lugs (for own scope)	O												
A.9.6	Lifting beam(s) for construction	O												

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A.10	**Materials Handling, Receipt, Protection and Touch-Up**													
A.10.1	Receipt and unloading of equipment and materials	O												
A.10.2	Inspection of equipment/materials upon arrival on-site	O												
A.10.3	Store, inventory and protect equipment/materials in storage	O												
A.10.4	Protect installed equipment	O												
A.10.5	Protect building, fitting and finishes	O												
A.10.6	Protection and/or restoration of existing installations and services to the extent required by the scope of work	O												
A.10.7	Touch-up of shop or field-applied protective coatings	O												
A.11	**Temporary Site Accommodation**													
A.11.1	Offices/Break Room/Lunch Room/Change Room	O												
A.12	**Scaffold and Access**													
A.12.1	Temporary hole covers	O												
A.12.2	Provide temporary and permanent safety barriers and maintain	O												
A.12.3	Scaffolding required for installation, testing and commissioning	O												
A.12.4	Other scaffolding requirements	O												
A.13	**Cleaning and Clearance Demobilization of Site**													
A.13.1	Cleaning up general areas	O												
A.13.2	Carting rubbish to central point	O												
A.13.3	Cleaning offices, toilets, canteen, etc.	O												
A.13.4	Rubbish skips	O												
A.13.5	Clear Site - Accommodation	O												
A.13.6	Clear Site - Temporary works	O												
A.13.7	Clear Site - Plant and equipment	O												
A.13.8	Clean Structures for turnover	O												
A.14	**Site Data**													
A.14.1	Locate existing buried services	O												
A.14.2	Initial Site Survey Data	O												
A.14.3	Project Specific Site Survey	O												
A.14.4	Initial Site Investigation/Soil Borings	O												
A.14.5	Additional Site Investigation/Soil Borings	O												
A.15	**General System Deliverables**													
A.15.1	Installation manuals/instructions (for own scope)						S							
A.15.2	Operating and maintenance manuals (for own scope)						S							
B	**PROCESS DESIGN SCOPE**													
B.1	PE-Stamped Drawings							S						
B.2	Design relating to areas outside of the battery limits			O	O	O								
B.3	Identification of the tie-in points at battery limits			O										
B.4	Process Flow Diagram (PFD)			S	S	S	S							
B.5	Identify and Qualify Influent Waste Streams			O										
B.6	Mass balance			S	S	S	S							
B.7	P&IDs for the new installations within the battery limits			S	S	S	S							
B.8	Location Drawing/Site Plan			O	O	O	O							
B.9	Preliminary system general arrangement drawings (within battery limits)			S	S	S	S							
B.10	Process control philosophy document (for own scope)			S	S	S	S							
B.11	Hydraulic profile within battery limits (for own scope)			S	S	S	S							
B.12	Define utility (air, water, electric, and chemicals) requirements within the battery limits (for own scope)			S			S							
B.13	Hazop Review of the Treatment Plant P&IDs within battery limits (for own scope)			O1, S2			O1, S2							
C	**CIVIL/BUILDING/FACILITY WORKS**													
C.1	PE-Stamped Drawings						O							
C.2	Site clearing and grubbing								O	O		O		
C.3	Site preparation								O	O		O		
C.4	Site grading/site preparation plan						O							
C.5	Excavations and earthworks								O	O		O		
C.6	On-site area for disposal of soil								O					

	ACTIVITY	CONTRACT AND GENERAL CONDITIONS		ENGINEERING AND DELIVERABLES					EQUIPMENT AND INSTALLED WORKS			SUPERVISION or TECHNICAL ASSISTANCE		REMARKS
		Included	Excluded	Technical Data	Basic Design	Detailed Design	Deliverable Item	Excluded	Supply	Installation	Excluded	Installation	Commissioning	
C.7	Soil or site remediation								O					
C.8	Storm water drainage (to nearest site drainage structure)								O	O		O		
C.9	Site/battery limits dewatering								O	O		O		
C.10	Underground piping and services			S, O	O	O			O	O		O		
C.11	Underground cable systems, duct systems, trenches, draw pits, etc.			S, O	O	O			O	O		O		
C.12	Grounding grid			O	O	O			O	O		O		
C.13	Foundations, slabs, sumps, walls and other concrete structures			O	O	O			O	O		O		
C.14	Hold-down bolt schedule			S, O	O	O			O	O		O		
C.15	Equipment dimensions and operating weights (for own scope)			S, O										
C.16	Piling and Pile Cap Design and Supply (if necessary)			O	O	O			O	O		O		
C.17	Building supply and erection (including all lighting, insulation, HVAC, and other required amenities.) Also includes any required electrical panels for building services and amenities.			O	O	O			O	O		O		
C.18	Building insulation			O	O	O			O	O		O		
C.19	Building fireproofing			O	O	O			O	O		O		
C.20	Building fire detection system and alarm			O	O	O			O	O		O		
C.21	Building fire suppression (i.e. sprinkler) system			O	O	O			O	O		O		
C.22	Firewall at electrical control room			O	O	O			O	O		O		
C.23	Compliance with ADA within the treatment plant battery limits			O	O	O			O	O		O		
C.24	Domestic fittings, plumbing, sanitary installations, etc.			O	O	O			O	O		O		
C.25	Office furniture								O					
C.26	Control room desk and chair								O					
C.27	Lab Furniture								O					
C.28	Lab Equipment and Reagents								O	O		O		
C.29	Laboratory instruments								O	O		O		
C.30	Any required structural steel items not covered elsewhere in this document (including required protective coatings)			O	O	O			O	O		O		
C.31	Grouting and Sealants			O					O	O		O		
C.32	Protective Coatings (Non Process Applications)			O					O	O		O		
C.33	Protective Coatings (Process Applications)			O					O	O		O		
C.34	Roads inside the battery limits (temporary)			O	O	O			O	O		O		
C.35	Roads inside the battery limits (permanent)			O	O	O			O	O		O		
C.36	Car parking (permanent)			O	O	O			O	O		O		
C.37	Finish grading			O	O	O			O	O		O		
C.38	Seeding of non-paved/gravel areas within battery limits								O	O		O		
C.39	Landscaping								O	O		O		
C.40	Fencing (permanent)								O	O		O		
C.41	Access gates (permanent)								O	O		O		
D	**MECHANICAL WORKS AND EQUIPMENT SUPPLY**													
D.1	**General**													
D.1.1	PE-Stamped Drawings							S						
D.1.2	Line list/schedule within battery limits (for own scope)						S1, O2							Siemens will supply this documentation to the extent it can. The final line list will have to be generated by the installing contractor who will determine the quantity of spool pieces to fabricate for any given piping run. Limited to pipe 1" diameter and above.
D.1.3	Valve schedule (including minor in-line equipment items) within the battery limits (for own scope)						S							

	ACTIVITY	CONTRACT AND GENERAL CONDITIONS		ENGINEERING AND DELIVERABLES					EQUIPMENT AND INSTALLED WORKS			SUPERVISION or TECHNICAL ASSISTANCE		REMARKS
		Included	Excluded	Technical Data	Basic Design	Detailed Design	Deliverable item	Excluded	Supply	Installation	Excluded	Installation	Commissioning	
D.1.4	Detailed system general arrangement drawings (within battery limits)			S, O	S	S	S							Siemens will issue the detailed system general arrangement drawings. Siemens will locate the equipment on the drawings and will layout the I/C piping. Southern Company will be responsible for providing the detailed building structure layout for integration with the equipment layout. Southern Company will also be responsible for all pipe racks and supports to be located and designed in accordance with the Siemens pipe routing.
D.1.5	Interconnect Piping (Process) (within battery limits)			S1, O2	S1, O2	S1, O2			S, O	O		O		Siemens will provide routing of all piping 1" diameter and greater and will supply the same in loose bulk quantities. Others (not Siemens) will be responsible for the design, fabrication, and installation of all piping spools 1" diameter and greater from the materials supplied by Siemens and the supply, design, and installation of piping/tubing less than 1" diameter which shall be field routed.
D.1.6	Interconnect Piping (Chemical Feeds) (within battery limits)			S1, O2	S1, O2	S1, O2			S, O	O		O		Siemens will provide routing of all piping 1" diameter and greater and will supply the same in loose bulk quantities. Others (not Siemens) will be responsible for the design, fabrication, and installation of all piping spools 1" diameter and greater from the materials supplied by Siemens and the supply, design, and installation of piping/tubing less than 1" diameter which shall be field routed.
D.1.7	Utilities Piping (service air, water, natural gas, electric, and sampling, etc.) (outside of battery limits to tie-in points)			O	O	O			O	O		O		
D.1.8	Utilities Piping (service air, water, natural gas, electric, and sampling, etc.) (within battery limits to tie-in points)			S1, O2	S1, O2	S1, O2			S, O	O		O		Siemens will provide routing of all piping 1" diameter and greater and will supply the same in loose bulk quantities. Others (not Siemens) will be responsible for the design, fabrication, and installation of all piping spools 1" diameter and greater from the materials supplied by Siemens and the supply, design, and installation of piping/tubing less than 1" diameter which shall be field routed.
D.1.9	Piping/electrical outside battery limits			O	O	O			O	O		O		
D.1.10	Stress analysis of piping (if required)			O	O	O								
D.1.11	3D Microstation drawings for above ground process pipe work			S	S	S	S							
D.1.12	Pipe support structures			O	O	O			O	O		O		
D.1.13	Tank and Pipe Insulation (freeze protection)			O	O	O			O	O		O		
D.1.14	Tank and Pipe insulation (personal protection)			O	O	O			O	O		O		
D.1.15	Above-ground pipe painting/coatings (including pipe support structures)			O					O	O		O		
D.1.16	Line markings/labeling			O					O	O		O		
D.1.17	Application of Siemens Codes and Standards (for standard packaged equipment)			S										
D.1.18	Specifications for inquiry and selection of equipment (for own scope of supply)			S1, O2										
D.1.19	Manufacturing drawings (for own scope of supply)							S						
D.1.20	ALL Off-Skid Manual Valves (except Manual Valves with Limit Switches)			S					S, O	O		O		Siemens will supply for all piping sizes 1" diameter and greater; Others will supply for all piping sizes less than 1" diameter.
D.1.21	ALL On-Skid Manual Valves			S					S	S1, O2		O		Manual valves on skidded equipment will be pre-installed.

	ACTIVITY	CONTRACT AND GENERAL CONDITIONS		ENGINEERING AND DELIVERABLES					EQUIPMENT AND INSTALLED WORKS			SUPERVISION or TECHNICAL ASSISTANCE		REMARKS
		Included	Excluded	Technical Data	Basic Design	Detailed Design	Deliverable Item	Excluded	Supply	Installation	Excluded	Installation	Commissioning	
D.1.22	ALL Off-Skid Automatic Valves and Manual Valves with Limit Switches			S					S	O		O		Off-skid automatic valves and manual valves with limit switches will be shipped loose for complete installation by Others (not Siemens).
D.1.23	ALL On-Skid Automatic Valves			S					S	S1, O2		O		Automatic valves on skidded equipment will be pre-installed.
D.1.24	ALL Off-Skid Instruments			S					S	O		O		Off-skid instruments will be shipped loose for complete installation by Others (not Siemens).
D.1.25	ALL On-Skid Instruments			S					S	S1, O2		O		Instruments on skidded equipment will be pre-installed.
D.1.26	ALL Steel Tank Coatings (except as noted below)			S, O					O	O		O		
D.1.27	Nameplates and Tagging (for own scope)								S, O					
D.1.28	Miscellaneous installation materials for equipment including but not limited to: insulation, cladding, bolts, nuts, washers, gaskets, clamps, shims								O	O		O		
D.1.29	Termination flanges (at tie-in points)								S, O	O		O		Included to the extent required to install Siemens-supplied interconnecting piping.
D.1.30	Piping special items including: strainers/filters (temporary and permanent), sight glasses, flexible hoses and connections								O	O		O		
D.1.31	Instrument air manifold and termination flanges								O	O		O		
D.1.32	Utilities Stations								O	O		O		
D.1.33	Eyewash Stations/Safety Showers			S					S	O		O		
D.1.34	Cathodic Protection			O	O	O			O	O		O		
D.1.35	Preparation, preservation and packing of deliverables for shipment to site (for own scope)								S, O					
D.1.36	Delivery to Site (for own scope)								S, O					
D.1.37	Final pump alignments at site (skidded and non-skidded pumps)								O	O		O		
D.2	**Detailed Supply of Equipment (Per P&ID Sheets)**													
D.2.1	(Items not specifically delineated within this section are covered by the general line items above)													
D.2.2	**P&ID D-603, Sheet 1**													
D.2.2.1	Reaction Tank 1A (FRP)			S	S	S			S	O		O		
D.2.2.2	Reaction Tank 1A Mixer			S	S	S			S	O		O		
D.2.2.3	Reaction Tank 1A Mixer Support/Access Bridge			S, O	O	O			O	O		O		
D.2.2.4	Reaction Tank 1A Elevated Stand			S, O	O	O			O	O		O		
D.2.3	**(Left Intentionally Blank)**													
D.2.4	**P&ID D-603, Sheet 2**													
D.2.4.1	Reaction Tank 1B (FRP)			S	S	S			S	O		O		
D.2.4.2	Reaction Tank 1B Mixer			S	S	S			S	O		O		
D.2.4.3	Reaction Tank 1B Mixer Support/Access Bridge			S, O	O	O			O	O		O		
D.2.4.4	Reaction Tank 1B Elevated Stand			S, O	O	O			O	O		O		
D.2.5	**P&ID D-603, Sheet 3**													
D.2.5.1	Reaction Tank 2A (FRP)			S	S	S			S	O		O		
D.2.5.2	Reaction Tank 2A Mixer			S	S	S			S	O		O		
D.2.5.3	Reaction Tank 2A Mixer Support/Access Bridge			S, O	O	O			O	O		O		
D.2.5.4	Reaction Tank 2A Elevated Stand			S, O	O	O			O	O		O		
D.2.6	**P&ID D-603, Sheet 4**													
D.2.6.1	Reaction Tank 2B (FRP)			S	S	S			S	O		O		
D.2.6.2	Reaction Tank 2B Mixer			S	S	S			S	O		O		
D.2.6.3	Reaction Tank 2B Mixer Support/Access Bridge			S, O	O	O			O	O		O		
D.2.6.4	Reaction Tank 2B Elevated Stand			S, O	O	O			O	O		O		
D.2.7	**P&ID D-603, Sheet 6**													
D.2.7.1	Solids Contact Clarifier Tank A (Qty. 1) - Includes Sludge Sump - Steel			S	S	S			S	O		O		Siemens will provide tank steel in knocked-down condition with the exterior surfaces primed only. The interior surfaces cannot be shop-primed as the kinds of linings recommended require field surface preparation and application of primer coatings. Tank to be field-erected and coated by installing contractor.

	ACTIVITY	CONTRACT AND GENERAL CONDITIONS		ENGINEERING AND DELIVERABLES					EQUIPMENT AND INSTALLED WORKS			SUPERVISION or TECHNICAL ASSISTANCE		REMARKS
		Included	Excluded	Technical Data	Basic Design	Detailed Design	Deliverable Item	Excluded	Supply	Installation	Excluded	Installation	Commissioning	
D.2.7.2	Solids Contact Clarifier - Bridge, Internals (draft tube, reaction well, torque cage, rake arms.). Bridge supplied fully finished coated. Internals supplied unprimed and uncoated (field applied preparation and coatings required).			S	S	S			S	O		O		
D.2.7.3	Radial effluent launders with adjustable weirs (nylon or FRP fasteners)			S	S	S			S	O		O		
D.2.7.4	Effluent nozzle, influent piping, sludge suction piping, internal concrete fill/grout, wire mesh, 360 degree sludge sump to concrete seal, 360 degree tank to concrete seal, etc.)			S, O	O	O			O	O		O		
D.2.7.5	Recirculation Drive/VFD			S	S	S			S	O		O		
D.2.7.6	Rake Arm Drive			S	S	S			S	O		O		
D.2.7.7	Rake Arm Lift Drive			S	S	S			S	O		O		
D.2.7.8	Sample Sink			S					S	O		O		
D.2.7.9	Polymer Injection Quill			S	S	S			S	O		O		
D.2.8	**P&ID D-603, Sheet 6**													
D.2.8.1	Solids Contact Clarifier Tank B (Qty. 1) - Includes Sludge Sump - Steel			S, O	O	O			O	O		O		Siemens will provide tank steel in knocked-down condition with the exterior surfaces primed only. The interior surfaces cannot be shop-primed as the kinds of linings recommended require field surface preparation and application of primer coatings. Tank to be field-erected and coated by installing contractor.
D.2.8.2	Solids Contact Clarifier - Bridge, Internals (draft tube, reaction well, torque cage, rake arms.). Bridge supplied fully finished coated. Internals supplied unprimed and uncoated (field applied preparation and coatings required).			S	S	S			S	O		O		
D.2.8.3	Radial effluent launders with adjustable weirs (nylon or FRP fasteners)			S	S	S			S	O		O		
D.2.8.4	Effluent nozzle, influent piping, sludge suction piping, internal concrete fill/grout, wire mesh, 360 degree sludge sump to concrete seal, 360 degree tank to concrete seal, etc.)			S, O	O	O			O	O		O		
D.2.8.5	Recirculation Drive/VFD			S	S	S			S	O		O		
D.2.8.6	Rake Arm Drive			S	S	S			S	O		O		
D.2.8.7	Rake Arm Lift Drive			S	S	S			S	O		O		
D.2.8.8	Sample Sink			S					S	O		O		
D.2.8.9	Polymer Injection Quill			S	S	S			S	O		O		
D.2.9	**P&ID D-603, Sheet 7**													
D.2.9.1	Continuous Backwash Filters A/B/C			S	S	S			S	O		O		
D.2.9.2	Continuous Backwash Filters A/B/C Solenoid Panels (Qty. 3)			S	S	S			S	O		O		Shipped loose for field installation.
D.2.9.3	Hydrochloric Acid Injection Quill			S	S	S			S	O		O		
D.2.10	**P&ID D-603, Sheet 8**													
D.2.10.1	Treated Wastewater Sump (Concrete)			S, O	O	O			O	O		O		
D.2.10.2	Treated Wastewater Sump Pumps A/B			S	S	S			S	O		O		
D.2.11	**P&ID D-603, Sheet 9**													
D.2.11.1	Sludge Recycle/Sludge Transfer Pumps A/B/C Skid			S	S	S			S	O		O		
D.2.12	**P&ID D-603, Sheet 10**													
D.2.12.1	Sludge Holding Tank (FRP)			S	S	S			S	O		O		
D.2.12.2	Sludge Holding Tank Mixer			S	S	S			S	O		O		
D.2.12.3	Sludge Holding Tank Mixer Support/Access Bridge			S, O	O	O			O	O		O		
D.2.13	**P&ID D-603, Sheet 11**													
D.2.13.1	Filter Press Feed Pumps A/B Skid			S	S	S			S	O		O		
D.2.14	**P&ID D-603, Sheet 12**													
D.2.14.1	Filter Presses A/B			S	S	S			S	O		O		
D.2.15	**P&ID D-603, Sheet 13**													
D.2.15.1	Filtrate Sump (Concrete)			S, O	S	S			S	O		O		
D.2.15.2	Filtrate Sump Mixer			S	S	S			S	O		O		
D.2.15.3	Filtrate Sump Pumps A/B			S	S	S			S	O		O		
D.2.16	**P&ID D-603, Sheet 14**													
D.2.16.1	Lime Silo Feed System (Silo, Slurry Tank, Slurry Mixer, Feed Pump, Feeder, Bin Activator, Piping, Valves, Instruments)			S	S	S			S	O		O		Partially Shop Assembled/Partially Field Assembled
D.2.17	**(Left Intentionally Blank)**													

	ACTIVITY	CONTRACT AND GENERAL CONDITIONS		ENGINEERING AND DELIVERABLES					EQUIPMENT AND INSTALLED WORKS			SUPERVISION or TECHNICAL ASSISTANCE		REMARKS
		Included	Excluded	Technical Data	Basic Design	Detailed Design	Deliverable Item	Excluded	Supply	Installation	Excluded	Installation	Commissioning	
D.2.18	**P&ID D-603, Sheet 15**													
D.2.18.1	Sulfide Feed Pumps A/B/C Skid			S	S	S			S	O		O		
D.2.18.2	Sulfide Totes								O	O		O		
D.2.19	**P&ID D-603, Sheet 16**													
D.2.19.1	Ferric Chloride Feed Pumps A/B/C Skid			S	S	S			S	O		O		
D.2.19.2	Ferric Chloride Totes								O	O		O		
D.2.20	**P&ID D-603, Sheet 17**													
D.2.20.1	Polymer Blending Units/Feed Pumps A/B/C Skid			S	S	S			S	O		O		
D.2.20.2	Polymer Totes								O	O		O		
D.2.20.3	Backflow Preventor			O	O	O			O	O		O		
D.2.21	**P&ID D-603, Sheet 18**													
D.2.21.1	Hydrochloric Acid Feed Pumps A/B Skid			S	S	S			S	O		O		
D.2.21.2	Hydrochloric Acid Totes								O	O		O		
D.3	**Supply of Structural Walkways, Stairways, Platforms, etc. not identified above**													
D.3.1	Interconnecting Walkways and Stairs (including protective coatings for these items)			O	O	O			S, O	O		O		Siemens supply is limited to furnishing an access bridge across the three (3) gravity filters and one (1) ladder for its access.
D.3.2	Access Stairway and Access Ladders to Provide Access to All Equipment (including protective coatings for these items)			O	O	O			S, O	O		O		Siemens supply is limited to furnishing one (1) stairway for access to the clarifiers.
E	**ELECTRICAL WORKS AND EQUIPMENT SUPPLY**													
E.1	PE-Stamped Drawings							S						
E.2	Motor list (for own scope)						S							
E.3	Instrument List (for own scope)						S							
E.4	Instrument Data Sheets (for own scope)						S							
E.5	Motor and Instrument Location Drawings			S	S	S	S							
E.6	Off-skid instrument wiring (including tray/supports) between equipment items			O	O	O			O	O		O		
E.7	Instrument wiring between local panel(s) and PLC/DCS Panel including termination			O	O	O			O	O		O		
E.8	Instrument air supply tubing and fittings including supports (as required)			O	O	O			O	O		O		
E.9	Instrument mountings, stands and supports (for field connections)			O	O	O			O	O		O		
E.10	Instrument process hook-ups			O	O	O								
E.11	Single line diagrams/construction single lines (for own scope)			S, O	O	O	O							
E.12	Field Wiring Schedule (for own scope)			S	S	S	S							
E.13	Interconnecting cables, cable trays, cable tray supports, conduit, and junction boxes (within battery limits)			O	O	O			O	O		O		
E.14	Cable schedules and bulk material take offs			O	O	O			O	O		O		
E.15	Local disconnects.			O	O	O		S	O	O		O		
E.16	Application of codes and standards (for own scope)			S, O										
E.17	Motor Control Centers			S, O	O	O			O	O		O		
E.18	Secondary Unit Substation Transformers			O	O	O			O	O		O		
E.19	480V Load Centers/Switchgear			O	O	O			O	O		O		
E.20	Distribution and Breaker Panels and Transformers			O	O	O			O	O		O		
E.21	Detailed Control philosophy (SOO)						S							
E.22	Compilation of overall I/O list (for own scope)						S							
E.23	Operator Interface Workstation (for own scope of work)			S	S	S			S	O		O		
E.24	UPS / Battery Chargers (For workstations only)			O	O	O			O	O		O		
E.25	Operator Interface Software Development (for own scope of supply)			S	S	S	S		S	S		S		
E.26	PLC software development (for own scope of supply)			S	S	S	S		S	S		S		
E.27	Sufficient information to permit DCS configuration (Owner's interface)			S										
E.28	Software and Licenses							S						
E.29	Hardware (media converters) between equipment PLC and the Owner's network			O	O	O			O	O		O		
E.30	Tank and Pipe Heat Tracing (Including Panels and Transformers)			O	O	O			O	O		O		
E.31	Lightning protection			O	O	O			O	O		O		
E.32	Intruder alarm			O	O	O			O	O		O		
E.33	Telephone System			O	O	O			O	O		O		

	ACTIVITY	CONTRACT AND GENERAL CONDITIONS		ENGINEERING AND DELIVERABLES					EQUIPMENT AND INSTALLED WORKS			SUPERVISION or TECHNICAL ASSISTANCE		REMARKS
		Included	Excluded	Technical Data	Basic Design	Detailed Design	Deliverable Item	Excluded	Supply	Installation	Excluded	Installation	Commissioning	
E.34	Bldg. Telephone Panel/Hardware			O	O	O			O	O		O		
E.35	Paging System			O	O	O			O	O		O		
E.36	Plant Paging System Panel/Hardware			O	O	O			O	O		O		
E.37	CCTV systems			O	O	O			O	O		O		
E.38	Security access systems			O	O	O			O	O		O		
E.39	Plant area lighting			O	O	O			O	O		O		
E.40	Lighting Panels and Transformers			O	O	O			O	O		O		
E.41	VFDs			S, O	O	O			O	O		O		
E.42	Control Panels (for own scope)			S	S	S			S	O		O		
E.43	Local gauge boards							S						
E.44	Grounding (for own scope) (i.e.) Siemens equipment to have grounding lugs; all other grounding components/installation by Contractor)								S, O	O		O		
E.45	Analyzer shelters							S						
E.46	Nameplates and Tagging (for own scope)								S, O					
F	**OTHER SUPPLY ITEMS**													
F.1	**Spare Parts**													
F.1.1	Spare Parts List						S							
F.1.2	Capital spare parts (unless noted otherwise in the bid request documents)										S			
F.1.3	Commissioning spare parts (for own scope)								S					
F.1.4	Spare parts for normal operation										S			
F.2	**Chemicals, Lubricants, Other**													
F.2.1	**Initial Supply**													
F.2.1.1	Bulk chemicals								O	O		O		
F.2.1.2	Chemical totes								O	O		O		
F.2.1.3	Lubricants and greases								O	O		O		
F.2.1.4	Biomass			(NOT APPLICABLE TO THIS SYSTEM)							S, O			
F.2.1.5	Consumables								O	O		O		
F.2.2	**Follow-On Supply (including during testing and commissioning)**													
F.2.2.1	Bulk chemicals								O	O		O		
F.2.2.2	Chemical totes								O	O		O		
F.2.2.3	Lubricants and greases								O	O		O		
F.2.2.4	Biomass			(NOT APPLICABLE TO THIS SYSTEM)							S, O			
F.2.2.5	Consumables								O	O		O		
G	**TESTING, COMMISSIONING, AND START-UP**													
G.1.1	Design of any temporary pipe work, connections, or other facilities as may be required in order to successfully test and commissioning the equipment supplied (for own scope of supply)				O	O			O	O		O		
G.1.2	Site laboratory for water quality if applicable to own scope								O					
G.1.3	Supply Qualified Operators								O					
G.1.4	Training Manual (Training Power Point Presentation)						S							
G.1.5	Classroom Training						S							
G.1.6	Hands-On Training						S							
G.2	**Pre-Commissioning Hydraulic Testing**													
G.2.1	Static hydraulic testing of all water retaining structures								O				O	
G.2.2	Hydraulic pressure testing of all pipe work (including preparation of test packages)								O				O	
G.2.3	Hydraulic pressure testing of storage tanks and other vessels (including preparation of test packages)								O				O	
G.2.4	Supply of water for testing								O					
G.2.5	Supply of power for testing								O					
G.2.6	Making a point of disposal for testing water available								O					
G.2.7	Transfer of test waters to battery limits and from battery limits to disposal point								O					
G.2.8	Transfer of test waters within battery limits as necessary								O					
G.2.9	Documentation of all test results						O							
G.3	**Pre-Commissioning Dry Testing - M&E Equipment**													
G.3.1	Supply of power for testing								O					

	ACTIVITY	CONTRACT AND GENERAL CONDITIONS		ENGINEERING AND DELIVERABLES					EQUIPMENT AND INSTALLED WORKS			SUPERVISION or TECHNICAL ASSISTANCE		REMARKS
		Included	Excluded	Technical Data	Basic Design	Detailed Design	Deliverable Item	Excluded	Supply	Installation	Excluded	Installation	Commissioning	
G.3.2	Dry testing procedures for equipment						S, O							
G.3.3	Labor for the dry testing of equipment								O				O1, S2	
G.3.4	Production of dry testing records						S, O							
G.3.5	Any other dry testing requirement						S, O							
G.4	**Commissioning Wet Testing - M&E Equipment**													
G.4.1	Supply of water for testing								O					
G.4.2	Supply of power for testing								O					
G.4.3	Making a point of disposal for testing water available								O					
G.4.4	Transfer of test waters to battery limits and from battery limits to disposal point								O				O	
G.4.5	Transfer of test waters within battery limits as necessary								O				S1, O2	
G.4.6	Wet testing procedures for equipment (for own scope)						S							
G.4.7	Labor for wet testing of equipment (for own scope)						S							
G.4.8	Production of wet testing records for equipment (for own scope)													
G.5	**PLANT START-UP AND PERFORMANCE TESTING**													
G.5.1	Supply of process wastewater for start-up and testing								O					
G.5.2	Supply of power for start-up and testing								O					
G.5.3	Making a point of disposal for final in-spec. effluent available								O					
G.5.4	Making a point of disposal for out of spec. effluent available								O					
G.5.5	Transfer of test waters to battery limits								O				O	
G.5.6	Transfer of test waters within battery limits as necessary								O				S1, O2	
G.5.7	Transfer of in-spec. effluent to disposal point								O				O	
G.5.8	Transfer of out-of-spec. effluent to disposal point								O				O	
G.5.9	Start-up procedures (for own scope)						S							
G.5.10	Labor and operation of the treatment plant during start-up								O				S1, O2	
G.5.11	Labor and operation of the treatment plant during any biological acclimation period(s)										S, O			
G.5.12	Compilation of the process start-up records (for own scope)						S							
G.5.13	Performance testing procedures (for own scope)						S							
G.5.14	Labor and operation of the treatment plant during performance testing								O				S1, O2	
G.5.15	Sampling and analysis required to validate the treated water quality at the inlet and outlet battery limits								S, O					
H	**OPERATIONS**													
H.1.1	Commences Upon Completion of Installation								O				O	

SIEMENS

SUGGESTED COATINGS - FGD APPLICATIONS
TANKS, SUMPS, TRENCHES AND CHEMICAL AREA COATINGS

Tank Name	% TSS	pH	Type Construction	Agitation	Ceilcote Lining/Coating
Field Erect Carbon Steel Tanks	3-6	5.5	Steel	Yes	▪ Primer: 680 Primer Field Applied ▪ Basecoat: 505 Coroline Lining (with Fiberglass Mat Reinforcement) ▪ Topcoat: 505AR Coroline (minimum total system DFT 125 mils, excluding wearpad) ▪ Wearpad: 505AR Coroline (additional 125 mils DFT)
Clarifier and Sludge Holding Tanks	10-18	8.5	Steel Tank and Internals Grouted Concrete Floor	Rake Arms	**Lining on Floor and Wall to 12 ft above Concrete Floor High Point:** ▪ Primer: 680 Primer ▪ Basecoat: 68AR Lining (with Fiberglass Mat Reinforcement) ▪ Topcoat: 505AR Coroline (minimum total system DFT 125 mils) ▪ Concrete to Steel Joints: Ceilcote Hinge Joint **Lining on Wall from 12 ft above Concrete Floor High Point and Higher and All Submerged Clarifier Internals:** ▪ Primer: 680 Primer ▪ Basecoat: 662 Flakeline ▪ Intermediate coat: 662AR Flakeline ▪ Topcoat: 662AR Flakeline (minimum total system DFT 55 mils)
Filtrate Sump	15	8.5	Concrete	Yes	▪ Primer: 680 Primer/610 Ceilpatch Scratch Coat ▪ Basecoat: 68AR Lining (with Fiberglass Mat Reinforcement) ▪ Topcoat: 505AR Coroline (minimum total system DFT 125 mils, excluding wearpad) ▪ Wearpad: 505AR Coroline (additional 125 mils DFT)
Building Process Water Trenches	Varies	Varies	Concrete	No	▪ Primer: 680 Primer/610 Ceilpatch Scratch Coat ▪ Basecoat: 68AR Lining (with Fiberglass Mat Reinforcement) ▪ Topcoat: 662AR Flakeline (minimum total system DFT 90 mils)
HCl and Caustic Tank Secondary Containment (HCl ~30%) (Caustic ~50%)	N/A	2-10	Concrete	No	▪ Primer: 380 Primer/310 Ceilpatch Scratch Coat ▪ Basecoat: 242 Flakeline ▪ Topcoat: 242 Flakeline (minimum total system DFT 32 mils) ▪ Concrete Floor to Wall Juncture: Ceilcote Hinge Joint
Ferric Chloride Tank Secondary Containment (Ferric Chloride 37%)	N/A	~7	Concrete	No	▪ Primer: 380 Primer/310 Ceilpatch Scratch Coat ▪ Basecoat: 242 Flakeline ▪ Topcoat: 242 Flakeline (minimum total system DFT 32 mils) ▪ Concrete Floor to Wall Juncture: Ceilcote Hinge Joint

SIEMENS

Tank Name	% TSS	pH	Type Construction	Agitation	Ceilcote Lining/Coating
HCl Pump Skid Curbed Area (HCl ~30%)	N/A	2-10	Concrete	No	▪ Primer: 380 Primer/310 Ceilpatch Scratch Coat ▪ Basecoat: 242 Flakeline ▪ Topcoat: 242 Flakeline (minimum total system DFT 32 mils) ▪ Concrete Floor to Wall Juncture: Ceilcote EJ-3
Ferric Chloride Pump Skid Curbed Area (Ferric Chloride 37%)	N/A	~7	Concrete	No	▪ Primer: 380 Primer/310 Ceilpatch Scratch Coat ▪ Basecoat: 242 Flakeline ▪ Topcoat: 242 Flakeline (minimum total system DFT 32 mils) ▪ Concrete Floor to Wall Juncture: Ceilcote EJ-3
Polymer and Sulfide Curbed Area (Both relatively non-aggressive)	N/A	~7	Concrete	No	▪ Primer: 380 Primer/310 Ceilpatch Scratch Coat ▪ Basecoat: 242 Flakeline ▪ Topcoat: 242 Flakeline (minimum total system DFT 32 mils) ▪ Concrete Floor to Wall Juncture: Ceilcote EJ-3
Lime Slurry Curbed Area (Lime Slurry ~10%)	N/A	~10	Concrete	No	▪ Primer: 380 Primer/310 Ceilpatch Scratch Coat ▪ Basecoat: 242 Flakeline ▪ Topcoat: 242 Flakeline (minimum total system DFT 32 mils) ▪ Concrete Floor to Wall Juncture: Ceilcote EJ-3
Truck Unloading Pad	N/A	2-10	Concrete	No	▪ Primer: 380 Primer/310 Ceilpatch Scratch Coat ▪ Basecoat: 6640AR Ceilcrete Lining (with Fiberglass Mat Reinforcement) ▪ Topcoat: 6640AR Ceilcrete (minimum total system DFT 125 mils) ▪ Concrete Floor to Wall Juncture: Ceilcote EJ-3
Truck Unloading Pad Containment Sump	N/A	2-10	Concrete	No	▪ Primer: 380 Primer/310 Ceilpatch Scratch Coat ▪ Basecoat: 242MR Flakeline Lining (with Fiberglass Mat Reinforcement) ▪ Topcoat: 242 Flakeline (minimum total system DFT 80 mils) ▪ Concrete Floor to Wall Juncture: Ceilcote Hinge Joint

Ceilcote Contact Information:

Frank Bova - Regional Manager
Ceilcote USA
Office: 877-234-5546
Cell: 330-289-7379
e-mail: frank.bova@ceilcotecc.com
website: www.ceilcotecc.com

INQUIRY No.

PROPOSAL

FORM
Attachment I

Aquatech International Corporation, One Four Coins Drive Canonsburg PA 15317

EQUIPMENT ONLY WASTEWATER TREATMENT SYSTEM

FOR SOUTHERN COMPANY

PLANT CRIST SCRUBBER PROJECT
of GULF POWER COMPANY

Southern Company
42 Inverness Center Parkway
Bin # B414
Birmingham, AL 35242

1.0 SCOPE

In accordance with your Inquiry No. inviting proposals for Wastewater Treatment system for the referenced generating plant and subject to all conditions and requirements of your Specification, all related attachments and accompanying documents in connection therewith, we propose to design, fabricate, deliver, and commission the equipment for the prices quoted herein. Pricing does not include state sales/use tax. "Option" is understood to be Purchaser's option.

2.0 PRICING

Note: All pricing F.O.B. plant site; State sales/use tax is excluded

~~2.1 Proposal 1 – River water as makeup, discharge to river~~

~~For scope of supply as described in the Specifications and Vendor Proposal~~

~~2.1.1 Price for providing equipment~~ $_____

~~2.1.2 Price for start up assistance~~ $_____

~~2.1.3 Price per day for additional field technical support~~ $_____

~~2.1.4 Maximum freight to plant site (All freight to be included here)~~ $_____

~~2.1.5 Price for erection of clarifiers (Option)~~ $_____

~~2.1.6 Price for low local shear agitators (Option) (where beneficial for process chemistry)~~ $_____

~~2.1.7 Price for acid/caustic neutralization equipment (Option)~~ $_____

2.2 Proposal 21 – Reclaim water as makeup, discharge to deep wells

For scope of supply as described in the Specifications and Vendor Proposal

1 2.2.1 Price for providing equipment $ [redacted]

2 2.2.2 Price for start up assistance $ [redacted]

3 2.2.3 Price per day for additional field technical support $ [redacted]

4 2.2.4 Maximum freight to plant site (All freight to be included here) $ [redacted]

5 2.2.5 Price for erection of clarifiers (Option) $ [redacted]

6 2.2.6 Price for low local shear agitators (Option) (where beneficial for process chemistry) $ [redacted]

7 2.2.7 Price for acid/caustic neutralization equipment (Option) $ [redacted]

8 2.2.8 Price for items which increase filter press automation, minimize maintenance, or alert DCS operators there is trouble with the presses (Option) $ [redacted]

9 2.2.9 Price for filter press cloth wash system (Option) $ [redacted]

3.0 ESCALATION

3.1 Material prices quoted are: Discuss % firm

Discuss % escalated

3.2 For escalated prices, the following shall apply:

3.2.1 Indices to be used (include percentages applicable to materials, labor, etc.)

In previous contracts we have used published indicies for material per pound included in our scope, labor escalation per contract negotiated and difference in bought out items above $50,000 value. We are open to discussion of this point.

3.2.2 Starting date of escalation 9/1/2007

3.2.3 Base Index Value(s) and base month 9/1/2007

3.2.4 Ending date of escalation 9/1/2008

3.2.5 Limits of escalation Discuss

3.2.6 Method of calculating escalation Discuss

4.0 ACCEPTANCE

Prices quoted shall be valid for ninety (90) days after proposal date.

5.0 QUALITY ASSURANCE

In addition to the Quality Assurance Documentation required by Paragraph 8.0 of the General Specification, we will furnish the following additional documentation which is generated as a result of our Quality Assurance Program.

Please reference Section IV of our proposal for our Quality Plan.

6.0 DESCRIPTIVE DATA AND ENGINEERING INFORMATION

The following descriptive information and design data are furnished in connection with the equipment and materials offered with this Proposal.

6.1 Utility Consumption Data - Plant Crist

Proposal 1

Instrument air (also use for service air)		peak scfm @ psi	40	average scfm @ psi
Potable water	72	peak gpm @ psi	Infrequent Intermittent as needed	average gpm @ psi
Service water	82	peak gpm @ psi	25	average gpm @ psi
Electricity	5671	peak kW*	3637	average kW/day

*does not include water heater

~~Proposal 2~~

~~Instrument air (also use for service air)~~		~~peak scfm @ psi~~		~~average scfm @ psi~~
~~Potable water~~		~~peak gpm @ psi~~		~~average gpm @ psi~~
~~Service water~~		~~peak gpm @ psi~~		~~average gpm @ psi~~
~~Electricity~~		~~peak kW~~		~~average kW/day~~

6.2 Chemical Consumption Data - Plant Crist

6.2.1 *Chemical Description and Estimated Cost*

Proposal 1	Technical Grade	
Coagulant (as 40% ferric chloride)	40% FeCl3 solution	
Polymer	Anionic Polymer	
Dewatering Polymer (if needed)		
Sulfuric Acid (93%)	Technical Grade 93% Sulfuric Acid	
Sulfide	Nalmet 8702 or Degussa TMT-15	
Lime (hydrated)	93% Ca(OH)2	
Others		

6.2.2 *Chemical Dosing Rate*

See Mass balance for data

Proposal 1

Coagulant (as 40% ferric chloride)	30 to 50	mg/L as Fe		lb/hr		gal/hr
Polymer	1 to 3	mg/L		lb/hr		gal/hr
Dewatering Polymer (if needed)	TBD	mg/L		lb/hr		gal/hr
Sulfuric Acid (93%)	50 to 100	mg/L		lb/hr		gal/hr
Sulfide	5 to 10	mg/L as S		lb/hr		gal/hr
Lime (hydrated)	upto 5300	mg/L as $Ca(OH)_2$		lb/hr		gal/hr
Others						
		mg/L		lb/hr		gal/hr
		mg/L		lb/hr		gal/hr
		mg/L		lb/hr		gal/hr

6.2.3 *Chemical Description and Estimated Cost*

Proposal 2

Coagulant (as 40% ferric chloride)		
Polymer		
Dewatering Polymer (if needed)		
Sulfuric Acid (93%)		
Sulfide		
Lime (hydrated)		
Others		

6.2.4 *Chemical Dosing Rate*

Proposal 2

Coagulant (as 40% ferric chloride)		mg/L		lb/hr		gal/hr
Polymer		mg/L		lb/hr		gal/hr
Dewatering Polymer (if needed)		mg/L		lb/hr		gal/hr
Sulfuric Acid (93%)		mg/L		lb/hr		gal/hr
Sulfide		mg/L		lb/hr		gal/hr
Lime (hydrated)		mg/L		lb/hr		gal/hr
Others						
		mg/L		lb/hr		gal/hr
		mg/L		lb/hr		gal/hr
		mg/L		lb/hr		gal/hr

6.3 Wastewater Treatment System Process Description - Plant Crist

Desaturation Tank, Sulfide Mix Tank, Coagulation Mix Tank, and Solids Contact Clarifier with integral flocculation zone. These unit operations are followed by Three (3) x 50% Gravity Filters. A common Sludge Dewatering System and chemical feed skids are also included.

The chemical processes are described below:

-Lime addition shall be employed as the first step to raise the pH of the FGD wastewater to a range of ~ 8.5 to 9.5. In this pH range, heavy metals react with the lime to form insoluble metal hydroxides. Additionally, the desaturation of the gypsum laden wastestream will be enhanced by the addition of lime, as well as routinely recycling a portion of the clarifier underflow to the front to the process. The lime source for addition shall be hydrated lime, which will be routinely fed through a lime slurry makeup system.

-Organo Sulfide will then be added to further reduce the solubility of heavy metals by forming metal sulfides. For this application, either Nalmet 8702 or TMT-15 organo sulfide reagents shall be used as the source of sulfide chemical.

-Coagulation of the metal hydroxide and metal sulfides mixture will then be reacted with a 40% ferric chloride solution to aid in the formation of larger precipitated solids for subsequent flocculation and settling. Filter Press filtrate and gravity filter spent backwash waters will continuously be returned at a controlled range to this process reactor to enhance solids formation. The pH will be controlled to a specific end point to optimize performance. (Expected ~8.0 to 9.5 range, to be determined under field conditions.)

-Flocculation using an anionic polymer is provided for addition under controlled stirred conditions. The polymer shall be added after dilution through an automatic mixing blending system to the flocculation zone of the clarifier.

-Clarification for the separation of precipitated metals and inert solids using gravity separation is expected to result in a clarifier effluent containing on average 20 ppm TSS or less. The clarifier underflow is estimated at 4% TSS for the metal hydroxide/metal sulfides mixture.

-Gravity Filtration for removal of suspended solids to <1 ppm prior to discharge will incorporate conventional gravity sand filter technology.

-Dewatering of the clarifier underflow will first be directed to a sludge holding tank, and then to recessed plate and frame filter pressing operations. Solids dewatering to at least 30% dryness is expected.

6.4 Equipment Fill In Data

6.4.1 *Lime Storage & Feed Equipment*

	Proposal 1	Proposal 2	
System Manufacturer			
Storage Silo			
Quantity	One (1)		
Effective storage volume	3000		ft^3
Inside diameter	12'		ft. and in.
Straight side length	45'		ft. and in.
Cone angle	60°		degrees

Cone height	5'-3"		ft. and in.
Material of construction	Carbon Steel		
Interior coating manufacturer/system			
Exterior coating manufacturer/system	See Paint Spec		
Operating weight	60		tons
Storage Silo Fill Line			
Material of construction	CS		
Fill connection type / manufacturer	Camlock		
Compression seal coupling manufacturer	Morris		
Bin Activator			
Manufacturer	Metal Fab		
Materials of construction	CS		
Model No.	4' Model		
Inlet flange size	60"		
Outlet flange size	12"		
Utility requirements, compressed air or electric	1/2		hp
Lime Feeder			
Manufacturer	Wallace Tieman		
Materials of construction	SS		
Model No.	32-055		
Capacity Range, to			lbs/hr
Power requirements	1/2 HP		hp
Storage Silo Pulse Air Bag			
Quantity	1		
Manufacturer	DCE or Flex Kleen		
Materials of construction	CS		
Model No.	VS15K53		
Air filtration capacity	1000		ft^3/min
Filter surface area	161		ft^2
Utility requirements, compressed air capacity	6		scfm
Storage Silo Exhaust Fan			
Quantity	1		
Manufacturer	Dayton		
Materials of construction	CS and Aluminum		
Model No.	4C359		
Air capacity			ft^3/min
Utility requirements, electric	1/3		hp
Lime Silo Level Switches			
Quantity	3		
Manufacturer	Bindicator		
Model No.			
Type			
Lime Silo Continuous Level Instrumentation			
Quantity	1		
Manufacturer	Magnetrol		
Model No.	704-501 A-130		
Type	Radar		
Slurry Tank Continuous Level Instrumentation			
Quantity	1		
Manufacturer	Magnetrol		
Model No.	704-501 A-130		
Type	Radar		
Slurry Tank			
Quantity	1		
Capacity	1000		gal
Operating weight	12000		lbs
Shell material of construction	CS		
Lining material of construction	None		
Mixer manufacturer	Lightnin		
Model No.			
Slurry feed piping material	CS		
Equipment Area			
Insulation thickness	1"		in.
Insulation R-value	12		
Quantity of lights	4		
Type of lights	Incandescent		
Light wattage, each	100		
Interior coating manufacturer/system	See Paint Spec		
Heater size	5 kW		kW
Access door opening size, W x H	16" x 14"		ft. and in.
Exhaust fan air capacity			ft^3/min

Power requirements	5 kW		hp
Lime Slurry Feed Pump(s)	**Pump selection to be discussed.**		
General Data			
Pump manufacturer	Weir or Equal		
Model			
Type	Horizontal Centrifugal		
Connections			
Size			
Suction			nom. inches
Discharge			nom. inches
Flange Class			
Suction			
Discharge			
Net weight			
Pump (less motor)			lb
Baseplate			lb
Performance Data, each pump			
Rotative speed			rpm
Flow rate at which maximum power requirement			gpm
Recommended minimum continuous flow			gpm
Seal water flow/pressure required			gpm and psi
Guaranteed performance, each pump			
Capacity at design conditions			gpm
Total head at design conditions			ft H_2O
pump shaft center line			ft H_2O
Pump efficiency at design conditions			%
Maximum shutoff head			ft H_2O
Power requirements			
At design conditions			hp
At shutoff			hp
Maximum			hp
Pump Construction			
Impeller diameters			
Design			in.
Maximum available			in.
Minimum available			in.
Materials			
Casing			
Shaft			
Impeller			
Shaft sleeves			
Impeller wearing rings			
Casing wearing rings			
Type of bearings			
Radial			
Thrust			
Mechanical shaft seal			
Manufacturer			
Model No.			
Shaft diameter			
At bearing location(s)			in.
At seal packing location(s)			in.
Sleeve, outer diameter			in.
Coupling			
Manufacturer			
Model No.			
Rated power/service factor			hp
List of special tools which will be furnished			
Field assembly work required			
Shipping weight			lbs
Mixer			
Manufacturer	Lightnin		
Materials of construction	316SS		
Connection Type (baseplate or flanged)	Clamp		
Model No.			
Local Control Panels			
Panel size (L x W x H)			ft and in
Panel approximate weight			lbs
Manufacturer			
Model			
Programmable Logic Control Systems			

Manufacturer			
Model No.			
Low Voltage Induction Motors			
Motor manufacturer			
Model number			
Driven Equipment			
Design standards (e.g., NEMA/IEEE, IEC)			
Driven equipment maximum brake horsepower			hp
Motor nameplate			hp
Service factor (NEMA/IEEE motors only)			
Motor bearing type			
Motor efficiency at nameplate, hp, percent			
Bearing lubrication system			
Space heater rating (watts / voltage / phase)			

6.4.2 ***Solids Contact Equipment***

	Proposal 1	~~Proposal 2~~	
Clarifier	**Wastewater Clarifier A & B**		
Quantity	Two (2) x 100%		
Materials of construction	Carbon Steel Sidewalls with rubberlining, Concrete bottom		
Minimum system capacity	0		gpm
Maximum system capacity	180		gpm
Average effluent turbidity	≤3 (expected)		NTU
Average effluent suspended solids	20		mg/L
Maximum rate of flow increase without effluent	60		gpm/hr
Influent water temperature rise limitation	1		°F/hr
Underflow solids concentration	4%		% weight
Diameter	14 ft		ft
Height	15 ft		ft
Reaction well dimensions	3' diameter x 14' high		ft
Recirculation rate (as % of inlet flow)	100% - 600%		
Scraper Drive Unit (Sludge Rake)			
Manufacturer	DBS Manufacturing		
Materials of construction	Chlorobutyl RL Carbon Steel		
Model number	S25		
Type	Truss		
Motor Data			
Manufacturer	Baldor/Reliance or Equal		
Enclosure	TEFC		
Horsepower at design conditions	1/2		hp
Service factor	1.15		
Voltage/Phase/RPM	460/3/60		
Variable frequency drive	N/A		
Manufacturer	N/A		
Model number	N/A		
Type			
Motor Data			
Manufacturer			
Enclosure			
Horsepower at design conditions			hp
Service factor			
Voltage/Phase/RPM			
Variable frequency drive			
Voltage/Phase/RPM			
Variable frequency drive			
Guaranteed Clarifier Effluent Quality			
Turbidity	≤3		NTU
Suspended solids	≤30		mg/L

6.4.3 ***Agitator***

	Proposal 1	~~Proposal 2~~	
Agitator	**Desaturation Tank Agitator A & B**		
Manufacturer	Lightnin		
Connection Type (baseplate or flanged)	Baseplate Center Mounted 12" above tank on customer supplied support beam		
Model No.	73Q7.5		
Weight	1136.74 (excludes rubberlining)		lb
Impeller diameter	49		in.
Impeller(s) height from floor	32		in.

Minimum submergence required from tank	4 ft - 3 in		ft. and in.
Shaft length	174		ft. and in.
Blade angle	90		degrees
Number of blades	3/3 (Total 6)		
Number of baffles required in basin	3		
Degrees between baffles	120		
Baffle dimensions, L x W x H	14'-8" L x 0'-9" W		ft. and in.
Impeller and shaft material	Carbon Steel		
Impeller and shaft covering material	Rubberlining		
Impeller and shaft covering thickness	0.1875		in.
Tank Bridge Loadings			
Bending moment	61400		lbf-ft
Torque	13746		lbf-ft
Axial Load	≥840		lbf
Gear reducer			
Manufacturer	Lightnin		
Model No.			
Reduction ratio (:)	31.4:1		
Number of reductions	2		
Service factor			
Performance data			
Operating speed			rpm
Critical shaft speed			rpm
Tip speed	1077		ft/s
Low Voltage Induction Motor			
Motor manufacturer	TECO Westinghouse		
Model number	Max E2		
Driven Equipment			
Design standards (e.g., NEMA/IEEE, IEC)	NEMA		
Driven equipment maximum brake horsepower	Later		hp
Motor nameplate, hp (kW)	2		
Service factor (NEMA/IEEE motors only)	Later		
Motor bearing type	Radial		
Motor efficiency at nameplate	Later		hp, %
Bearing lubrication system	Splash Oil/Grease On Outer Shaft		
Space heater rating (watts / voltage / phase)	TBD		

	Proposal 1	~~Proposal 2~~	
Agitator	Coagulation Mix Tank Agitator A & B		
Manufacturer	Lightnin		
Connection Type (baseplate or flanged)	Baseplate Center Mounted 12" above tank on customer supplied support beam		
Model No.	73Q3		
Weight	880.03 (excludes rubberlining)		lb
Impeller diameter	30		in.
Impeller(s) height from floor	30		in.
Minimum submergence required from tank	3'-6"		ft. and in.
Shaft length	14'-6"		ft. and in.
Blade angle	90		degrees
Number of blades	3/3 (Total 6)		
Number of baffles required in basin	3		
Degrees between baffles	120		
Baffle dimensions, L x W x H	12'-0" L x 0'-7" W		ft. and in.
Impeller and shaft material	Carbon Steel		
Impeller and shaft covering material	Rubberlining		
Impeller and shaft covering thickness	0.1875		in.
Tank Bridge Loadings			
Bending moment	61400		lbf-ft
Torque	13746		lbf-ft
Axial Load	2840		lbf
Gear reducer			
Manufacturer	Lightnin		
Model No.	73Q3		
Reduction ratio (:)	16.7:1		
Number of reductions	2		
Service factor			
Performance data			
Operating speed			rpm
Critical shaft speed			rpm

Tip speed	785		ft/s
Low Voltage Induction Motor			
Motor manufacturer	TECO Westinghouse		
Model number	Later		
Driven Equipment	Coagulation Tank Agitator		
Design standards (e.g., NEMA/IEEE, IEC)	NEMA		
Driven equipment maximum brake horsepower	Later		hp
Motor nameplate, hp (kW)	3		
Service factor (NEMA/IEEE motors only)	Later		
Motor bearing type	Radial		
Motor efficiency at nameplate	Later		hp, %
Bearing lubrication system	Oil Splash/Grease On Outer Shaft		
Space heater rating (watts / voltage / phase)	TBD		

	Proposal 1	Proposal 2	
Agitator	**Sulfide Mix Tank Agitator A & B**		
Manufacturer	Lightnin		
Connection Type (baseplate or flanged)	Baseplate Center Mounted 12" above tank on customer supplied support beam		
Model No.	73Q3		
Weight	891.38		lb
Impeller diameter	36		in.
Impeller(s) height from floor	25		in.
Minimum submergence required from tank	3'-9"		ft. and in.
Shaft length	13'-9"		ft. and in.
Blade angle	90		degrees
Number of blades	3/3 (Total 6)		
Number of baffles required in basin	3		
Degrees between baffles	120		
Baffle dimensions, L x W x H	11'-7"L x 0'-8" W		ft. and in.
Impeller and shaft material	Carbon Steel		
Impeller and shaft covering material	Rubberlining		
Impeller and shaft covering thickness	0.1875		in.
Tank Bridge Loadings			
Bending moment	10600		lbf-ft
Torque	3387		lbf-ft
Axial Load	1864		lbf
Gear reducer			
Manufacturer	Lightnin		
Model No.	73Q3		
Reduction ratio (:)	20.9:1		
Number of reductions	2		
Service factor			
Performance data			
Operating speed			rpm
Critical shaft speed			rpm
Tip speed	791		ft/s
Low Voltage Induction Motor			
Motor manufacturer	TECO Westinghouse		
Model number	Later		
Driven Equipment			
Design standards (e.g., NEMA/IEEE, IEC)	NEMA		
Driven equipment maximum brake horsepower			hp
Motor nameplate, hp (kW)	3		hp
Service factor (NEMA/IEEE motors only)	Later		
Motor bearing type	Radial		
Motor efficiency at nameplate	Later		hp, %
Bearing lubrication system	Splash Oil/Grease on Outer Shaft		
Space heater rating (watts / voltage / phase)	TBD		

	Proposal 1	Proposal 2	
Agitator	**Flash Mix Tank Agitator A & B**		
Manufacturer	N/A		
Connection Type (baseplate or flanged)			
Model No.			

Weight				lb
Impeller diameter				in.
Impeller(s) height from floor				in.
Minimum submergence required from tank				ft. and in.
Shaft length				ft. and in.
Blade angle				degrees
Number of blades				
Number of baffles required in basin				
Degrees between baffles				
Baffle dimensions, L x W x H				ft. and in.
Impeller and shaft material				
Impeller and shaft covering material				
Impeller and shaft covering thickness				in.
Tank Bridge Loadings				
Bending moment				lbf-ft
Torque				lbf-ft
Axial Load				lbf
Gear reducer				
Manufacturer				
Model No.				
Reduction ratio (:)				
Number of reductions				
Service factor				
Performance data				
Operating speed				rpm
Critical shaft speed				rpm
Tip speed				rpm
Low Voltage Induction Motor				
Motor manufacturer				
Model number				
Driven Equipment				
Design standards (e.g., NEMA/IEEE, IEC)				
Driven equipment maximum brake horsepower				hp
Motor nameplate, hp (kW)				hp
Service factor (NEMA/IEEE motors only)				
Motor bearing type				
Motor efficiency at nameplate				hp, %
Bearing lubrication system				
Space heater rating (watts / voltage / phase)				

	Proposal 1	~~Proposal 2~~	
Agitator	**Wastewater Clarifier Turbine A & B**		
Manufacturer	DBS Manufacturing		
Connection Type (baseplate or flanged)	Part of Dual Turntable Drive		
Model No.	825		
Weight	4600		lb
Impeller diameter	34"		in.
Impeller(s) height from floor	72		in.
Minimum submergence required from tank	N/A in Overflow Tank		ft. and in.
Shaft length	11'-5"		ft. and in.
Blade angle	45 degrees		degrees
Number of blades	4		
Number of baffles required in basin	4		
Degrees between baffles	90		
Baffle dimensions, L x W x H	8" x 11'-8"		ft. and in.
Impeller and shaft material	Duplex SS		
Impeller and shaft covering material	N/A		
Impeller and shaft covering thickness	N/A		in.
Tank Bridge Loadings			
Bending moment	8,000 ft-lbs		lbf-ft
Torque	8,000 ft-lbs		lbf-ft
Axial Load	10,000		lbf
Gear reducer			
Manufacturer	Later		
Model No.	Later		
Reduction ratio (:)	Later		
Number of reductions	Later		
Service factor	Later		
Performance data			
Operating speed	4-24		rpm

Critical shaft speed	Later		rpm
Tip speed	3.8		ft/s
Low Voltage Induction Motor			
Motor manufacturer	Baldor/Reliance/Equal		
Model number	Later		
Driven Equipment	Later		
Design standards (e.g., NEMA/IEEE, IEC)	NEMA		
Driven equipment maximum brake horsepower	1.0		hp
Motor nameplate, hp (kW)	3.0		
Service factor (NEMA/IEEE motors only)	1.15		
Motor bearing type	Later		
Motor efficiency at nameplate	Later		hp, %
Bearing lubrication system	Later		
Space heater rating (watts / voltage / phase)	Later		

	Proposal 1	~~Proposal 2~~	
Agitator	**Sludge Holding Tank Agitator**		
Manufacturer	Lightnin		
Connection Type (baseplate or flanged)	Baseplate Center Mounted 12" above tank on customer supplied support beam		
Model No.	74Q7.5		
Weight	1611.53		lb
Impeller diameter	54		in.
Impeller(s) height from floor	30		in.
Minimum submergence required from tank	6'-0"		ft. and in.
Shaft length	17'-6"		ft. and in.
Blade angle	90		degrees
Number of blades	3		
Number of baffles required in basin	3		
Degrees between baffles	120		
Baffle dimensions, L x W x H	17'-6" L x 1'-0" W		ft. and in.
Impeller and shaft material	Carbon Steel		
Impeller and shaft covering material	Rubberlining		
Impeller and shaft covering thickness	0.1875		in.
Tank Bridge Loadings			
Bending moment	34921		lbf-ft
Torque	10372		lbf-ft
Axial Load	3302		lbf
Gear reducer			
Manufacturer	Lightnin		
Model No.	74Q7.5		
Reduction ratio (__:__)	25.6:1		
Number of reductions	2		
Service factor			
Performance data			
Operating speed			rpm
Critical shaft speed			rpm
Tip speed	89		ft/s
Low Voltage Induction Motor			
Motor manufacturer	TECO Westinghouse		
Model number	Later		
Driven Equipment			
Design standards (e.g., NEMA/IEEE, IEC)	NEMA		
Driven equipment maximum brake horsepower	Later		hp
Motor nameplate, hp (kW)	7.5		hp
Service factor (NEMA/IEEE motors only)			
Motor bearing type	Radial		
Motor efficiency at nameplate	Later		hp, %
Bearing lubrication system	Splash Oil/Grease On Outer Shaft		
Space heater rating (watts / voltage / phase)			

	Proposal 1	~~Proposal 2~~	
Agitator	**Clarifier Blowdown Sump Agitator**		
Manufacturer	Lightnin		
Connection Type (baseplate or flanged)	Flanged		
Model No.	71Q1		
Weight	367.18		lb

Impeller diameter	26		in.
Impeller(s) height from floor	12		in.
Minimum submergence required from tank	36		ft. and in.
Shaft length	84		ft. and in.
Blade angle	90		degrees
Number of blades	3		
Number of baffles required in basin	3		
Degrees between baffles	120		
Baffle dimensions, L x W x H	NA		ft. and in.
Impeller and shaft material	Carbon Steel		
Impeller and shaft covering material	Rubberlining		
Impeller and shaft covering thickness	0.1875		in.
Tank Bridge Loadings			
Bending moment	4391		lbf-ft
Torque	788		lbf-ft
Axial Load	803		lbf
Gear reducer			
Manufacturer	Lightnin		
Model No.	71Q1		
Reduction ratio (:)	14.5:1		
Number of reductions	2		
Service factor			
Performance data			
Operating speed			rpm
Critical shaft speed			rpm
Tip speed	850		ft/s
Low Voltage Induction Motor			
Motor manufacturer	TECO Westinghouse		
Model number	71Q1		
Driven Equipment			
Design standards (e.g., NEMA/IEEE, IEC)	NEMA		
Driven equipment maximum brake horsepower	Later		hp
Motor nameplate, hp (kW)	7.5		hp
Service factor (NEMA/IEEE motors only)			
Motor bearing type	Radial		
Motor efficiency at nameplate			hp, %
Bearing lubrication system	Splash Oil/Grease On Outer Shaft		
Space heater rating (watts / voltage / phase)			

6.4.4 *Inlet Flow Instrumentation*

	Proposal 1	~~Proposal 2~~	
Raw water flow transmitter			
Manufacturer	Rosemount		
Model number	8732E/8705		
Primary elements type	Magnetic Flowmeter/Flow Tube		
Primary elements manufacturer	Rosemount		
Differential pressure loss at design flow rate	TBD		psi
Raw water flow control valve			
Manufacturer	Fisher		
Model number	V200		
Size	4"		
Differential pressure loss at design flow rate	≤10		psi

6.4.5 *Liquid Chemical Feed Equipment*

	Proposal 1	~~Proposal 2~~	
Chemical Feed System	**Coagulant**		
Pump information			
Quantity	3		
Manufacturer	Pulsafeeder		
Type	Positive Displacement Hydraulically Actuated Diaphragm		
Model No.	Pulsa Series 25HJ		
Maximum capacity	1.2		gph
Discharge pressure	305 rated 87 operating		psig
Hydraulic relief valve setting	80		psig
Materials of construction	PVDF/PTFE		
Calibration Columns			

Quantity	3		
Manufacturer	Pulsafeeder		
Model No.	W777033-PVC		
Volume, gal	0.027		
Materials of construction	PVC		
Chemical Injection Quill or Static Mixer			
Quantity	NA		
Manufacturer			
Materials of construction			
Strainers			
Quantity	3		
Manufacturer	Pulsafeeder		
Model No.	Later		
Materials of construction	PVC		
Back-Pressure Valves			
Quantity	3		
Manufacturer	Pulsafeeder		
Model No.	W777375-PVC		
Relief valve setting	60		psig
Materials of construction	PVC		
Valves			
Type	CHECK		
Manufacturer	Pulsafeeder		
Model No.	Later		
Materials of construction	Alloy C/PVDF		
Power consumption for this system/subsystem	1.0 with 2 pumps operating		hp

	Proposal 1	~~Proposal 2~~	
Chemical Feed System	**Sulfuric Acid**		
Pump Information			
Quantity	3		
Manufacturer	Pulsafeeder		
Type	Positive Displacement, Hydraulically Actuated Diaphragm		
Model No.	680		
Maximum capacity	3		gph
Discharge pressure	600 (rated)		psig
Hydraulic relief valve setting	80		psig
Materials of construction	Alloy 20, PTFE		
Calibration Columns			
Quantity	3		
Manufacturer	Pulsafeeder		
Model No.	W777042-000		
Volume, gal	0.053		
Materials of construction	Boro Silicated Glass		
Chemical Injection Quill or Static Mixer			
Quantity			
Manufacturer			
Materials of construction			
Strainers			
Quantity	3		
Manufacturer	Pulsafeeder		
Model No.			
Materials of construction	Alloy		
Back-Pressure Valves			
Quantity	3		
Manufacturer	Pulsafeeder		
Model No.	WW777303-020		
Relief valve setting	100		psig
Materials of construction	Carpenter 20		
Valves			
Type	Check		
Manufacturer	Pulsafeeder		
Model No.	Later		
Materials of construction	Alloy C/Alloy 20		
Power consumption for this system/subsystem	1.0 with 2 pumps operating		hp

	Proposal 1	~~Proposal 2~~	
Chemical Feed System	**Sulfide**		
Pump Information			
Quantity	3		

Manufacturer	Pulsafeeder		
Type	Positive Displacement Hydraulically Actuated Diaphragm		
Model No.	Pulsa Series 680		
Maximum capacity	5.2		gph
Discharge pressure	185 (rated), 30 (operating)		psig
Hydraulic relief valve setting	Later		psig
Materials of construction	PVC Head; PTFE Diaphragm		
Calibration Columns			
Quantity	3		
Manufacturer	Pulsafeeder		
Model No.	W777035-PVC		
Volume, gal	0.133		
Materials of construction	PVC Head; PTFE Diaphragm		
Chemical Injection Quill or Static Mixer			
Quantity	N/A		
Manufacturer	↓		
Materials of construction	↓		
Strainers			
Quantity	3		
Manufacturer	Pulsafeeder		
Model No.	Later		
Materials of construction	PVC		
Back-Pressure Valves			
Quantity	3		
Manufacturer	Pulsafeeder		
Model No.	W777376-PVC		
Relief valve setting	60		psig
Materials of construction	PVC		
Valves			
Type	Check		
Manufacturer	Pulsafeeder		
Model No.	Later		
Materials of construction	Ceramic/PVC		
Power consumption for this system/subsystem	1.0 with 2 pumps operating		hp

Proposal 1 ~~Proposal 2~~

Chemical Feed System	Polymer		
Pump Information			
Quantity	3		
Manufacturer	Pulsafeeder		
Type	Progessive Cavity, Diaphragm		
Model No.	680		
Maximum capacity	2		gph
Discharge pressure	590 (rated), 87 (operating)		psig
Hydraulic relief valve setting	100		psig
Materials of construction	PVC/PTFE		
Calibration Columns			
Quantity	3		
Manufacturer	Pulsafeeder		
Model No.	W777034-PVC		
Volume, gal	0.053		
Materials of construction	PVC		
Chemical Injection Quill or Static Mixer			
Quantity	N/A		
Manufacturer	↓		
Materials of construction	↓		
Strainers			
Quantity	3		
Manufacturer	Pulsafeeder		
Model No.			
Materials of construction	PVC		
Back-Pressure Valves			
Quantity	3		
Manufacturer	Pulsafeeder		
Model No.	W777375-PVC		
Relief valve setting	60		psig
Materials of construction	PVC		
Valves			
Type	Check		
Manufacturer	Pulsafeeder		

Model No.	Later		
Materials of construction	PVC/PVC		
Power consumption for this system/subsystem	1.0 + (mixing chamber) with 2 pumps operating		hp

6.4.6 *Filter Press Equipment*

	Proposal 1	~~Proposal 2~~	
Manufacturer	Andritz Separation		
Type (Belt verse Plate and Frame)	Plate & Frame		
Quantity	2		
Model number	1000 mm filter pres		
Frame Type (sidebar / overhead)	Side bar		
Automatic Plate Shifter, yes/no	yes		
Light Curtains, yes/no	yes (both sides)		
Total volume	50		ft^3/press
Number of plates	57		
Design operating pressure	225		psi
Plate size	1000 x1000		mm
Cake thickness	32mm		mm
Overall Height	7		ft
Overall Width	7		ft
Overall Length	26		ft
Weight Empty	17500		lbs
Weight Operating	23000		lbs
Influent sludge concentration	4		%
Dry solids load	30		lb/hr
Belt press sludge throughput rate	N/A		ft3/min
Moisture in sludge cake	70		%
Density of sludge cake	75		lb/ft3
Filter press filtrate solids	100		ppm
Floor Discharge Opening Required	225 x 46		
Length	18.75		ft
Width	3.83		ft
Optional cake discharge devices	Gravity/Shaker		
Manifold Pipe Materials	FRP		
Manifold Valves	FRP		
Manual - Manufacturer	Max Air		
Manual - Type	Max Air		
Manual - Material of Construction			
Automatic - Manufacturer	Max Air		
Automatic - Type	Ball		
Automatic - Material of Construction	FRP		
Automatic - Operator Type	Air actuated		
Automatic - Operator Manufacturer	Max Air		
Drip Pan / Bombay Door - Material of Construction	Painted steel covered with polypropylene		
Frame - Material of Construction	Carbon Steel		
Plate feed style	Center		
Total Cycle time	3		hrs
Fast Fill	N/A		min
Slow Fill	180		min
Core Blow	2		min
Air Blow	2		min
Press Dump	3		min
Filter Cloth Material	Polypropylene		
Filter cloth weight	5		oz./yd
Filter cloth fiber type	Mono Multi		
Filter cloth weave type	Sateen		
Filter cloth porosity	3-5		scfm/ft^2
Total filtration area	970		ft^2
Hand held pendant, yes/no	light curtain		
Filter cloth weave type	Sateen		
Manufacture's service trips	5		days
Coatings type / dry film thickness	5		mils
Core Blow Air Demand	30		cfm/psi
Air Blow Air Demand	30		cfm/psi
Belt width	N/A		in
Belt material	N/A		
High Pressure Cloth Wash, yes/no	yes		
Skid Mounted, yes/no	yes		
Skid dimensions, L/W/H	6.8 x 7.6 x 3.2		ft
Total Skid Weight	2500		lbs

Total Press Wash Time	180		min
Volume of Service Water consumed per wash	3000		gal
Volume of Water Tank			gal
Wash System Piping Material of Construction	FRP		
Cloth Wash Operating Pressure	1450		psi
Skid Mounted Junction Box, yes/no			
Junction Box NEMA Rating			
Junction Box Material of Construction			
Cloth Wash Valves			
Manual - Manufacturer			
Manual - Type	Ball		
Manual - Material of Construction			
Automatic - Manufacturer			
Automatic - Type			
Automatic - Material of Construction			
Automatic - Operator Type			
Automatic - Operator Manufacturer			
High Pressure Cloth Wash Pump			
Quantity of Pumps	1		
Pump Manufacturer	ABEL		
Pump Model Number	HP-k-25		
Pump Type	single-acting triplex, reciprocating		
Flow	58		gpm
Head	1450		psi
Casing Material of Construction	C.Steel		
Impeller Material of Construction	N/A		
RPM	1800		
Mechanical Seal Type	N/A		
Mechanical Seal Manufacturer	N/A		
Flush/seal water demand per pump, gpm	N/A		
Horsepower	60		hp
Motor Manufacturer / Model			
Volts / phase / freq	460/3/60		
Design standards (e.g., NEMA/IEEE, IEC)			
Driven equipment maximum brake hp			hp
Motor nameplate			hp
Service factor (NEMA/IEEE motors only)	1.15		
Motor bearing type			
Motor efficiency at nameplate			hp, %
Bearing lubrication system			
Space heater rating (watts / voltage / phase)	NA (indoor use)		
Fast Fill Feed Pumps			
Quantity of Pumps	2		
Pump Manufacturer	Fybroc		
Pump Model Number	1530 series 2 x 3 x 8		
Pump Type	Horizontal Centrifugal		
Flow	90		gpm
Head	200 max		psi
Casing Material of Construction	FRP		
Impeller Material of Construction	FRP - VR- 1A		
RPM	1750		
Mechanical Seal Type	8B2 (silicar/silicar/316/viton)		
Mechanical Seal Manufacturer	John Crane		
Flush/seal water demand per pump, gpm	TBD		
Horsepower	5		hp
Motor Manufacturer / Model	Approved Supplier		
Volts / phase / freq	460/3/60		
Design standards (e.g., NEMA/IEEE, IEC)	ANSI		
Driven equipment maximum brake hp			hp
Motor nameplate			hp
Service factor (NEMA/IEEE motors only)	1.15		
Motor bearing type			
Motor efficiency at nameplate			hp, %
Bearing lubrication system			
Space heater rating (watts / voltage /	N/A		

Slow Fill Feed Pumps			
Quantity of Pumps	2		
Pump Manufacturer	ABLE		
Pump Model Number	HMD-G-32-0250-GU		
Pump Type	Double Acting Simplex		
Flow	90		gpm
Head	Not specified		psi
Casing Material of Construction	Cast iron with rubber lining		
Impeller Material of Construction			
RPM	1750		
Mechanical Seal Type			
Mechanical Seal Manufacturer			
Flush/seal water demand per pump			gpm
Motor Manufacturer / Model			
Volts / phase / freq	460/3/60		
Design standards (e.g., NEMA/IEEE, IEC)			
Driven equipment maximum brake hp			hp
Motor nameplate			hp
Service factor (NEMA/IEEE motors only)			
Motor bearing type			
Motor efficiency at nameplate			hp, %
Bearing lubrication system			
Space heater rating (watts / voltage /	N/A (Indoors)		
Press Fully Assembled on Shipment yes/no	yes		
Quantity of Spatulas Provided	2		
Local Control Panels	Press mounted		
Panel size (L x W x H)			ft and in.
Panel approximate weight			lbs
Manufacturer			
Programmable Logic Control System	yes		
Manufacturer	A/B		
Model No.			
Filter Press Platform			
Required (yes/no)			
Platform dimensions, L x W x H			ft and in.
Materials of construction			
Structural members not to exceed reaction on			lbs

6.4.7 *Slurry Pumps*

	Proposal 1	~~Proposal 2~~	
Slurry Pump	Clarifier Blowdown Sump Pumps A & B		
Pump manufacturer	Metpro - Pybroc		
Model No.	5500 sump		
Type	Vertical Sump		
Connections, size, in./flange class			
Suction	2		
Discharge	1		
Net weights			
Total pump assembly	Later		lb
Pump (less motor)	Later		lb
Baseplate	Later		lb
Performance Data			
Rotative speed	1750		rpm
Tip speed			ft/sec
Direction of rotation available as viewed from the			
Guaranteed performance			
Capacity at design conditions	30		gpm
Total head at design conditions	77.9		ft
NPSH required at design conditions, relative to	3.26		ft
Pump efficiency at design conditions	30		%
Maximum solid size pump can pass			in
Maximum shutoff head	94.5		ft
Power requirements			
At design conditions	1.95		hp
At shutoff			hp
Maximum	3.39		hp
Flow rate at which maximum power requirement	51.8		gpm
Recommended minimum continuous flow	7.36		gpm
Recommended maximum continuous flow	Later		gpm
Seal water cooling water flow required & pressure	Later		gpm & psi

Seal injection water quality requirements	Later		
Impeller diameters			
Design	9.125		in.
Maximum available			in.
Minimum available			in.
Materials			
Casing	FRP		
Casing liner	FRP		
Shaft	FRP		
Impeller	FRP VR-1A		
Shaft sleeves			
Impeller wearing rings			
Casing wearing rings			
Mechanical shaft seal(s)			
Type of bearings			
Radial			
Thrust			
Description of bearing lubrication system and			
Mechanical shaft seal			
Manufacturer			
Model No.			
Shaft diameter			
At bearing location(s)			in.
At seal location(s)			in.
Sleeve, outer diameter			in.
Coupling			
Manufacturer	Fybroc		
Model No.			
Rated power, hp/service factor			
Other Data			
List of special tools that will be furnished			
Field assembly work required			
Direct Drive or V-belt Drive	Direct Drive		

	Proposal 1	~~Proposal 2~~	
Slurry Pump	Wastewater Clarifier Sludge Pumps A, B, C, & D		
Pump manufacturer	N/A		
Model No.			
Type			
Connections, size, in./flange class			
Suction			
Discharge			
Net weights			
Total pump assembly			lb
Pump (less motor)			lb
Baseplate			lb
Performance Data			
Rotative speed			rpm
Tip speed			ft/sec
input shaft end of the pump (Clockwise or Counterclockwise or Clockwise and counterclockwise)			
Guaranteed performance			
Capacity at design conditions			gpm
Total head at design conditions			ft
NPSH required at design conditions, relative to pump shaft center line			ft
Pump efficiency at design conditions			%
Maximum solid size pump can pass			in
Maximum shutoff head			ft
Power requirements			
At design conditions			hp
At shutoff			hp
Maximum			hp
Flow rate at which maximum power requirement			gpm
Recommended minimum continuous flow			gpm
Recommended maximum continuous flow			gpm
Seal water cooling water flow required & pressure			gpm & psi
Seal injection water quality requirements			
Impeller diameters			
Design			in.
Maximum available			in.
Minimum available			in.

Materials				
Casing				
Casing liner				
Shaft				
Impeller				
Shaft sleeves				
Impeller wearing rings				
Casing wearing rings				
Mechanical shaft seal(s)				
Type of bearings				
Radial				
Thrust				
Description of bearing lubrication system and				
Mechanical shaft seal				
Manufacturer				
Model No.				
Shaft diameter				
At bearing location(s)				In.
At seal location(s)				In.
Sleeve, outer diameter				In.
Coupling				
Manufacturer				
Model No.				
Rated power, hp/service factor				
Other Data				
List of special tools that will be furnished				
Field assembly work required				
Direct Drive or V-belt Drive				

	Proposal 1	~~Proposal 2~~	
Slurry Pump	**Filter Press Feed Pumps A & B**		
Pump manufacturer	Metpro Fybroc		
Model No.	1500 Series Group 2		
Type	Horizontal Centrifugal		
Connections, size, In./flange class			
Suction	3		
Discharge	2		
Net weights			
Total pump assembly	Later		lb
Pump (less motor)	Later		lb
Baseplate	Later		lb
Performance Data			
Rotative speed	1750		rpm
Tip speed			ft/sec
Input shaft end of the pump (Clockwise or Counterclockwise or Clockwise and counterclockwise)	Counterclockwise facing suction flange		
Guaranteed performance			
Capacity at design conditions	90		gpm
Total head at design conditions	200		ft
NPSH required at design conditions, relative to pump shaft center line	1.77		ft
Pump efficiency at design conditions	52.9		%
Maximum solid size pump can pass			In
Maximum shutoff head			ft
Power requirements			
At design conditions	2.53		hp
At shutoff			hp
Maximum	5.11		hp
Flow rate at which maximum power requirement	221		gpm
Recommended minimum continuous flow	25.9		gpm
Recommended maximum continuous flow	108		gpm
Seal water cooling water flow required & pressure			gpm & psi
Seal injection water quality requirements			
Impeller diameters			
Design	7.25		In.
Maximum available			In.
Minimum available			In.
Materials			
Casing	FRP VR-1A		
Casing liner	FRP VR-1A		
Shaft	FRP VR-1A		
Impeller	FRP VR-1A		

Shaft sleeves			
Impeller wearing rings			
Casing wearing rings			
Mechanical shaft seal(s)			
Type of bearings			
Radial			
Thrust			
Description of bearing lubrication system and			
Mechanical shaft seal			
Manufacturer			
Model No.			
Shaft diameter			
At bearing location(s)			in.
At seal location(s)			in.
Sleeve, outer diameter			in.
Coupling			
Manufacturer			
Model No.			
Rated power, hp/service factor			
Other Data			
List of special tools that will be furnished			
Field assembly work required	Yes		
Direct Drive or V-belt Drive	Direct		

6.4.8 ***Vertical Pumps***

	Proposal 1	~~Proposal 2~~	
Pump	**Filter Backwash Pumps A & B**		
Manufacturer	Metpro Pybroc		
Model No.	5500 Series - 3600		
Type (turbine, sump, etc.)	Vertical Sump		
Number of stages, each pump	1		
Discharge connection size/flange class	3		in
Net weight, each			lb
Pump			lb
Motor			lb
Total, pump including motor, baseplate, and coupl	Later		lb
Performance Data			
Rotative speed	3500		rpm
Minimum distance required from bottom of suction bell to bottom of pit, ft			
Recommended minimum continuous flow	94.3		gpm
Guaranteed performance (each pump)	450		gpm
Capacity at design conditions	450		gpm
head losses through the pump			ft H_2O
Submergence required at design conditions (from water surface to bottom of suction bell)	22.5		in
bell at design conditions	Later		ft H_2O
Pump efficiency at design conditions	70.2		%
Motor efficiency at design conditions			%
Maximum shutoff head	243		ft H_2O
Power requirements			
At design conditions	32.4		hp
At shutoff			hp
Maximum	47.1		hp
Pump Construction	FRP		
Impeller diameters			
Design	7.625		in.
Maximum available			in.
Minimum available			in.
Materials			
Column	FRP		
Discharge head	FRP		
Bowls, volutes, and diffusers	FRP		
Shaft	Hastelloy C		
Impeller	FRP		
Impeller wearing ring			
Casing wearing ring			
Shaft sleeves			
Suction bell			
Suction strainer			
Shaft diameter			in.

Length of sections			in.
Length from baseplate to bottom of suction	98		in.
Line shaft bearings			
Type	Thrust		
Number			
Length			
Material			
Bowl bearings			
Type			
Number			
Length			
Material			
Description of line shaft bearing lubrication system, including required quantity of externally supplied bearing lubrication water, if applicable			
Description of bowl bearing lubrication system, including required quantity of externally supplied bearing lubrication water, if applicable			
quantity of externally supplied seal water, if applicable			
Motor Data			
Manufacturer	Later		
Enclosure			
Horsepower at design conditions			hp
Service factor			
Voltage/Phase/RPM			
Miscellaneous Data			
Shipping weight (each pump assembly if more			lb

	Proposal 1	~~Proposal 2~~	
Pump	**Effluent Pumps C & D**		
Manufacturer	MetPro-Fybroc		
Model No.	5500 2x3x13		
Type (turbine, sump, etc.)	Vertical Sump		
Number of stages, each pump	1		
Discharge connection size/flange class	2/150#		in
Net weight, each			lb
Pump	Later		lb
Motor	Later		lb
Total, pump including motor, baseplate, and coupl	Later		lb
Performance Data			
Rotative speed	1750		rpm
Minimum distance required from bottom of suction bell to bottom of pit, ft	48		
Recommended minimum continuous flow	59.6		gpm
Guaranteed performance (each pump)	200		gpm
Capacity at design conditions	200		gpm
head losses through the pump			ft. H_2O
Submergence required at design conditions (from water surface to bottom of suction bell)	22.5		in
bell at design conditions			ft H_2O
Pump efficiency at design conditions	55.4		%
Motor efficiency at design conditions			%
Maximum shutoff head	121		ft H_2O
Power requirements			
At design conditions	10.5		hp
At shutoff			hp
Maximum	11.6		hp
Pump Construction	FRP VR-1A		
Impeller diameters			
Design	Later		in.
Maximum available			in.
Minimum available			in.
Materials			
Column	FRP		
Discharge head	FRP		
Bowls, volutes, and diffusers			
Shaft			
Impeller			
Impeller wearing ring			
Casing wearing ring			

Shaft sleeves			
Suction bell			
Suction strainer			
Shaft diameter			in.
Length of sections			in.
Length from baseplate to bottom of suction			in.
Line shaft bearings			
Type	Thrust		
Number			
Length			
Material			
Bowl bearings			
Type			
Number			
Length			
Material			
Description of line shaft bearing lubrication system, including required quantity of externally supplied bearing lubrication water, if applicable			
Description of bowl bearing lubrication system, including required quantity of externally supplied bearing lubrication water, if applicable			
quantity of externally supplied seal water, if applicable			
Motor Data			
Manufacturer	Later		
Enclosure	NEMA TEFC		
Horsepower at design conditions	20		hp
Service factor	1.15		
Voltage/Phase/Frequency	460/3/60		
Miscellaneous Data			
Shipping weight (each pump assembly if more	Later		lb

	Proposal 1	~~Proposal 2~~	
Pump	**Dirty Backwash Sump Pumps A & B**		
Manufacturer	Fybroc		
Model No.	5500 1 x 2 x 10		
Type (turbine, sump, etc.)	Vertical Sump		
Number of stages, each pump	1		
Discharge connection size/flange class	1		in
Net weight, each	Later		lb
Pump	Later		lb
Motor	Later		lb
Total, pump including motor, baseplate, and coupl	Later		lb
Performance Data			
Rotative speed	1750		rpm
Minimum distance required from bottom of suction bell to bottom of pit, ft	6		
Recommended minimum continuous flow	6.98		gpm
Guaranteed performance (each pump)	20		gpm
Capacity at design conditions	20		gpm
head losses through the pump			ft. H_2O
Submergence required at design conditions (from water surface to bottom of suction bell)	22.5		in
bell at design conditions			ft H_2O
Pump efficiency at design conditions			%
Motor efficiency at design conditions			%
Maximum shutoff head	73.5		ft H_2O
Power requirements			
At design conditions	1.38		hp
At shutoff			hp
Maximum			hp
Pump Construction	FRP		
Impeller diameters			
Design	6.125		in.
Maximum available			in.
Minimum available			in.
Materials			
Column	FRP		
Discharge head	FRP		
Bowls, volutes, and diffusers			
Shaft			

Impeller			
Impeller wearing ring			
Casing wearing ring			
Shaft sleeves			
Suction bell			
Suction strainer			
Shaft diameter			in.
Length of sections			in.
Length from baseplate to bottom of suction			in.
Line shaft bearings			
Type	Thrust		
Number			
Length			
Material			
Bowl bearings			
Type			
Number			
Length			
Material			
Description of line shaft bearing lubrication system, including required quantity of externally supplied bearing lubrication water, if applicable			
Description of bowl bearing lubrication system, including required quantity of externally supplied bearing lubrication water, if applicable			
quantity of externally supplied seal water, if applicable			
Motor Data	Later		
Manufacturer			
Enclosure	NEMA		
Horsepower at design conditions	3		hp
Service factor	1.15		
Voltage/Phase/RPM	460/3/60		
Miscellaneous Data	Later		
Shipping weight (each pump assembly if more	Later		lb

	Proposal 1		Proposal 2	
Pump	Filtrate Sump Pumps A & B			
Manufacturer	N/A			
Model No.				
Type (turbine, sump, etc.)				
Number of stages, each pump				
Discharge connection size/flange class				in
Net weight, each				lb
Pump				lb
Motor				lb
Total, pump including motor, baseplate, and coupl				lb
Performance Data				
Rotative speed				rpm
Minimum distance required from bottom of suction bell to bottom of pit, ft				
Recommended minimum continuous flow				gpm
Guaranteed performance (each pump)				gpm
Capacity at design conditions				gpm
head losses through the pump				ft. H_2O
Submergence required at design conditions (from water surface to bottom of suction bell)				in
bell at design conditions				ft H_2O
Pump efficiency at design conditions				%
Motor efficiency at design conditions				%
Maximum shutoff head				ft H_2O
Power requirements				
At design conditions				hp
At shutoff				hp
Maximum				hp
Pump Construction				
Impeller diameters				
Design				in.
Maximum available				in.
Minimum available				in.
Materials				
Column				

Discharge head				
Bowls, volutes, and diffusers				
Shaft				
Impeller				
Impeller wearing ring				
Casing wearing ring				
Shaft sleeves				
Suction bell				
Suction strainer				
Shaft diameter				in.
Length of sections				in.
Length from baseplate to bottom of suction				in.
Line shaft bearings				
Type				
Number				
Length				
Material				
Bowl bearings				
Type				
Number				
Length				
Material				
Description of line shaft bearing lubrication system, including required quantity of externally supplied bearing lubrication water, if applicable				
Description of bowl bearing lubrication system, including required quantity of externally supplied bearing lubrication water, if applicable				
quantity of externally supplied seal water, if applicable				
Motor Data				
Manufacturer				
Enclosure				
Horsepower at design conditions				hp
Service factor				
Voltage/Phase/RPM				
Miscellaneous Data				
Shipping weight (each pump assembly if more				lb

6.4.9 ***Main Control (PLC) Panel***

	Proposal 1	~~Proposal 2~~	
Panel description	NEMA-12, painted CS (See proposal Section I)		
Panel size (L by W by H)	87"(H) x 156"(W) x 32"(D) Preliminary Estimate		ft
Panel approximate weight	4000 lbs Preliminary Estimate		lb
Manufacturer	Control Design Inc. / Machine Control Systems		

6.4.10 ***Master - Programmable Logic Control System***

	Proposal 1	~~Proposal 2~~	
Manufacturer	Allen Bradley		
Model No.	Control Logix		
Dimensions (overall, L x W x H)	Later		ft
Weight	Later		lb

6.4.11 ***Shop Fabricated Tanks***

	Proposal 1	~~Proposal 2~~	
Tank name	Sulfuric Acid Storage Tank		
Shell material	Carbon Steel		
Plate thickness			
Shell	12 mm		in.
Head or bottom	Later		in.
Head or top	Later		in.
Dry weight, each	Later		lb
Gasket material	Later		
Describe the amount of field erection work	Later		
Vent Dryer			
Manufacturer	Later		
Model Number	Later		
Overflow Check Valve			

Manufacturer	Later		
Model Number	Later		

6.4.12 ***Fiberglass Reinforced Plastic Tanks***

	Proposal 1	~~Proposal 2~~	
Tank	Desaturation Tanks A & B		
Manufacturer	Customer approved (Augusta,		
Tank type (open vs closed top)	Open Tank		
Tank residence time (if applicable)	68		min
Tank materials			
Resin	Derakane 411		
Glass			
Surfacing mat	Inner surface - 1 layer, C-veil/nexus veil with 20% silicone carbide		
Chopped strand mat	3 plies ECR		
Continuous roving	Unidirectional 2402/yd^2 woven roving		
Veil	C-Veil		
Cure	Co/Nap MEKP		
Postcure	Protective Gel Surface Coat with UV inhibitors		
Material thickness			
Top head	NA		
Wall at top	0.335		in.
Wall at bottom	0.405		in.
Tank bottom	0.405		in.
Insulation	NA		
Inside diameter	8'-6"		ft. and in.
Straight side length	16'-2"		ft. and in.
Effective volume	6000		gal
Weight			
Empty	4000		lb
Flooded	~57000		lb
Shipping	4000		lb
Seismic moment			lbf-ft
Seismic shear			lb
Wind moment			lbf-ft
Wind shear			lb
Anchor bolts			
Dia			in
Quantity			
Name of supplier to perform shop testing			

	Proposal 1	~~Proposal 2~~	
Tank	Coagulation Mix Tanks A & B		
Manufacturer	Customer approved (Augusta, Ershigs, An-Cor or Tankinetics		
Tank type (open vs closed top)	Open Tank		
Tank residence time (if applicable)			min
Tank materials			
Resin			
Glass			
Surfacing mat	Inner surface - 1 layer, C-veil/nexus veil with 20% silicone carbide		
Chopped strand mat	3 plies ECR		
Continuous roving	Unidirectional 2402/yd^2 woven roving		
Veil	C-Veil		
Cure	Co/Nap MEKP		
Postcure	Protective Gel Surface Coat with UV inhibitors		
Material thickness			
Top head	NA		
Wall at top	0.285		in.
Wall at bottom	0.345		in.
Tank bottom	0.345		in.
Insulation	NA		
Inside diameter	7'-0"		ft. and in.
Straight side length	13'-6"		ft. and in.

Effective volume	3300		gal
Weight			
Empty	2700		lb
Flooded	31600		lb
Shipping	2700		lb
Seismic moment			lbf-ft
Seismic shear			lb
Wind moment			lbf-ft
Wind shear			lb
Anchor bolts			
Dia			in
Quantity			
Name of supplier to perform shop testing			

	Proposal 1	~~Proposal 2~~	
Tank	Sulfide Mix Tanks A & B		
Manufacturer	Customer approved (Augusta, Ershigs, An-Cor or Tankinetics		
Tank type (open vs closed top)	Open		
Tank residence time (if applicable)			min
Tank materials			
Resin			
Glass			
Surfacing mat	inner surface - 1 layer, C-veil/nexus veil with 20% silicone carbide		
Chopped strand mat	3 plies ECR		
Continuous roving	Unidirectional 2402/yd^2 woven roving		
Veil	C-Veil		
Cure	Co/Nap MEKP		
Postcure	Protective Gel Surface Coat with UV inhibitors		
Material thickness			
Top head	NA		
Wall at top	0.265		in.
Wall at bottom	0.345		in.
Tank bottom	0.345		in.
Insulation	NA		
Inside diameter	7'-8"		ft. and in.
Straight side length	14'-2"		ft. and in.
Effective volume	4000		gal
Weight	3000		
Empty	3000		lb
Flooded	~38100		lb
Shipping	3000		lb
Seismic moment			lbf-ft
Seismic shear			lb
Wind moment			lbf-ft
Wind shear			lb
Anchor bolts			
Dia			in
Quantity			
Name of supplier to perform shop testing	Later		

	Proposal 1	~~Proposal 2~~	
Tank	Flash Mix Tanks A & B		
Manufacturer	Customer approved (Augusta, Ershigs, An-Cor or Tankinetics		
Tank type (open vs closed top)	Open Top		
Tank residence time (if applicable)	29		min
Tank materials			
Resin			
Glass			
Surfacing mat	inner surface - 1 layer, C-veil/nexus veil with 20% silicone carbide		
Chopped strand mat	3 plies ECR		
Continuous roving	Unidirectional 2402/yd^2 woven roving		
Veil	C-Veil		
Cure	Co/Nap MEKP		

Postcure	Protective Gel Surface Coat with UV Inhibitors		
Material thickness			
Top head	NA		
Wall at top	0.315		in.
Wall at bottom	0.335		in.
Tank bottom	0.335		in.
Insulation			
Inside diameter			ft. and in.
Straight side length			ft. and in.
Effective volume			gal
Weight			
Empty	3800		lb
Flooded	25700		lb
Shipping	3800		lb
Seismic moment			lbf-ft
Seismic shear			lb
Wind moment			lbf-ft
Wind shear			lb
Anchor bolts			
Dia			in
Quantity			
Name of supplier to perform shop testing			

	Proposal 1	~~Proposal 2~~	
Tank	Coagulant Storage Tank		
Manufacturer	Customer approved (Augusta, Ershigs, An-Cor or Tankinetics		
Tank type (open vs closed top)	Open Top		
Tank residence time (if applicable)			min
Tank materials			
Resin			
Glass			
Surfacing mat	Inner surface - 1 layer, C-veil/nexus veil with 20% silicone carbide		
Chopped strand mat	3 plies ECR		
Continuous roving	Unidirectional 2402/yd² woven roving		
Veil	C-Veil		
Cure	Co/Nap MEKP		
Postcure	Protective Gel Surface Coat with UV Inhibitors		
Material thickness			
Top head	NA		
Wall at top	0.335		in.
Wall at bottom	0.425		in.
Tank bottom	0.425		in.
Insulation	NA		
Inside diameter	10		ft. and in.
Straight side length	14		ft. and in.
Effective volume	6000		gal
Weight			
Empty	3800		lb
Flooded	75500		lb
Shipping	3800		lb
Seismic moment			lbf-ft
Seismic shear			lb
Wind moment			lbf-ft
Wind shear			lb
Anchor bolts			
Dia			in
Quantity			
Name of supplier to perform shop testing			

	Proposal 1	~~Proposal 2~~	
Tank	Sludge Holding Tank		
Manufacturer	Customer approved (Augusta, Ershigs, An-Cor or Tankinetics		
Tank type (open vs closed top)	Open		
Tank residence time (if applicable)	~480		min
Tank materials			
Resin			
Glass			

Surfacing mat	Inner surface - 1 layer, C-		
Chopped strand mat	3 plies ECR		
Continuous roving	Unidirectional 2402/yd^2		
Veil	C-Veil		
Cure	Co/Nap MEKP		
Postcure	Protective Gel Surface Coat with		
Material thickness			
Top head	NA		
Wall at top	0.335		in.
Wall at bottom	0.545		in.
Tank bottom	0.545		in.
Insulation	NA		
Inside diameter			ft. and in.
Straight side length			ft. and in.
Effective volume	9350		gal
Weight			
Empty	6900		lb
Flooded	66100		lb
Shipping	6900		lb
Seismic moment			lbf-ft
Seismic shear			lb
Wind moment			lbf-ft
Wind shear			lb
Anchor bolts			
Dia			in
Quantity			
Name of supplier to perform shop testing			

6.4.13 *Gravity Filters*

	Proposal 1	~~Proposal 2~~	
Manufacturer	Aquatech		
Materials of construction	FRP		
Backwash requirement	12-15 (Designed for 15 max)		gpm/sf
Service flow rate	30		gpm/sf
Tank materials	FRP		
Average effluent turbidity	≤3		NTU
Average effluent TSS	≤1		ppm
Maximum rate of flow increase without effluent quality degradation			gpm/hr
Backwash solids concentration	500-600		ppm

6.4.14 *Large Bore General Service Valves (Furnished with Equipment)*

	Proposal 1	~~Proposal 2~~	
Valve identification description			
Valve manufacturer			
Type			
Size			
Wetted materials			
Valve identification description			
Valve manufacturer			
Type			
Size			
Wetted materials			

6.4.15 *Small Bore General Service Valves (Furnished with Equipment)*

	Proposal 1	~~Proposal 2~~	
Valve identification description			
Valve manufacturer			
Type			
Size			
Wetted materials			
Valve identification description			
Valve manufacturer			
Type			
Size			
Wetted materials			

6.4.16 *Control Valves (Furnished with Equipment)*

	Proposal 1	~~Proposal 2~~	
Valve identification description			
Valve manufacturer	Fisher		

Type	Ceramic V-Ball		
Size	1", 3", 4", 6"		
Wetted materials			
Valve identification description			
Valve manufacturer			
Type			
Size			
Wetted materials			

8.0 ALTERNATES AND PRICING

The Vendor is requested to address alternate proposals by including either of the following statements: "Having complied with the bidding requirements of your Specifications and attachments, we request due consideration to the attached alternate proposals, complete with prices and descriptive date for comparison to the base proposal" or Having complied with the bidding requirements of your Specifications and attachments, we do not offer an alternate proposal.

The Bidder's base bid shall meet the equipment requirements and match the treatment process as dictated by the attached flow diagrams and specifications contained herein. Alternate treatment methods or proprietary technologies not covered in these specifications should not be included in the Bidder's base proposal. In addition to the base bid, the Bidder may propose alternate bids which include alternate treatment technologies and/or changes to the specified process. The alternate bids must meet the effluent performance guarantees and specifically indicate where the Bidder has deviated from the specification requirements. Justification for these deviations shall also be provided, whether technical or economical in nature. Evaporative treatment methods will not be acceptable to the Purchaser.

9.0 EXCEPTIONS

9.1 Exceptions shall be noted in accordance with Paragraphs 14.3 of the General Specifications.

We have reviewed your Specifications and all related attachments. Unless specific exceptions are listed below (or attached to our proposals and referenced below), it is understood that all of the provisions contained therein are acceptable to us:

[ ] without exception

[X] with exceptions as outlined below:

AIC Bid Issue Clarification Exception Document.xls

See attachments, documents presented in our proposal

10.0 SUBCONTRACTORS

During the course of accomplishing work required by this inquiry, we will subcontract certain portions of the work to the firms listed below:

Name and Address of Subcontractor	Work to be Performed

We understand that any changes in the above designated subcontractors after award of the contract must be pre-approved in writing by the Purchaser.

11.0 SIGNATURE

The undersigned hereby attests and affirms that: the Inquiry documents have been read in detail by officers, employees, agents, or representatives of the company named below; that the company named below is fully qualified and able to perform in accordance with the terms and conditions of these Inquiry documents; that he/she is an officer or employee of the company named below; that he/she is authorized to submit this Proposal, and, should Purchaser accept this Proposal, or any part or portion thereof, bind the company to the terms of these Inquiry documents.

SIGNATURE:

Title:

12.0 NAME OF COMPANY: Aquatech International Corporation

Telephone Number 724-746-5300

Fax Number 724-746-5359

13.0 DATE: 8/17/2007

INQUIRY No.

PROPOSAL

FORM
Attachment I

Bidder's name and address Infilco Degremont

EQUIPMENT ONLY WASTEWATER TREATMENT SYSTEM

FOR SOUTHERN COMPANY

PLANT CRIST SCRUBBER PROJECT
of GULF POWER COMPANY

Southern Company
42 Inverness Center Parkway
Bin # B414
Birmingham, AL 35242

1.0 SCOPE

In accordance with your Inquiry No. inviting proposals for Wastewater Treatment system for the referenced generating plant and subject to all conditions and requirements of your Specification, all related attachments and accompanying documents in connection therewith, we propose to design, fabricate, deliver, and commission the equipment for the prices quoted herein. Pricing does not include state sales/use tax.
"Option" is understood to be Purchaser's option.

2.0 PRICING

Note: All pricing F.O.B. plant site; State sales/use tax is excluded

2.1 Proposal 1 – River water as makeup, discharge to river (Alternate Design)

For scope of supply as described in the Specifications and Vendor Proposal

1 2.1.1 Price for providing equipment $ [redacted]

2 2.1.2 Price for start up assistance $ [redacted]

3 2.1.3 Price per day for additional field technical support $ [redacted]

4 2.1.4 Maximum freight to plant site (All freight to be included here) $ [redacted]

5 2.1.5 Price for erection of clarifiers (Option) $ [redacted]

6 2.1.6 Price for low local shear agitators (Option) (where beneficial for process chemistry) $ [redacted]

7 2.1.7 Price for acid/caustic neutralization equipment (Option) $ [redacted]

2.2 Proposal 21 – Reclaim water as makeup, discharge to deep wells (BASE Design)

For scope of supply as described in the Specifications and Vendor Proposal

8 2.2.1 Price for providing equipment $ [redacted]

9 2.2.2 Price for start up assistance $ [redacted]

10 2.2.3 Price per day for additional field technical support $ [redacted]

11 2.2.4 Maximum freight to plant site (All freight to be included here) $ [redacted]

12 2.2.5 Price for erection of clarifiers (Option) $ [redacted]

13 2.2.6 Price for low local shear agitators (Option) (where beneficial for process chemistry) $ [redacted]

14 2.2.7 Price for acid/caustic neutralization equipment (Option) $ [redacted]

15 2.2.8 Price for items which increase filter press automation, minimize maintenance, or alert DCS operators there is trouble with the presses (Option) $ [redacted]

16 2.2.9 Price for filter press cloth wash system (Option) $ [redacted]

3.0 ESCALATION

3.1 Material prices quoted are: 100 % firm

N/A % escalated

3.2 For escalated prices, the following shall apply:

3.2.1 Indices to be used (include percentages applicable to materials, labor, etc.)

N/A

3.2.2 Starting date of escalation: N/A

3.2.3 Base Index Value(s) and base month: N/A

3.2.4 Ending date of escalation: N/A

3.2.5 Limits of escalation: N/A

3.2.6 Method of calculating escalation: N/A

4.0 ACCEPTANCE

Prices quoted shall be valid for ninety (90) days after proposal date.

5.0 QUALITY ASSURANCE

In addition to the Quality Assurance Documentation required by Paragraph 8.0 of the General Specification, we will furnish the following additional documentation which is generated as a result of our Quality Assurance Program.

IDI Standard QA/QC Documentation Sale be provided, as well, as those required by Southern Company's QA/QC Program. IDI can provide upon request a copy of IDI's QA/QC Manual

6.0 DESCRIPTIVE DATA AND ENGINEERING INFORMATION

The following descriptive information and design data are furnished in connection with the equipment and materials offered with this Proposal.

6.1 Utility Consumption Data - Plant Crist

Proposal 1

Instrument air (also use for service air)		peak scfm @ psi		average scfm @ psi
Potable water	0	peak gpm @ psi	0	average gpm @ psi
Service water		peak gpm @ psi		average gpm @ psi
Electricity		peak kW		average kW/day

Proposal 2

~~Instrument air (also use for service air)~~		~~peak scfm @ psi~~		~~average scfm @ psi~~
~~Potable water~~		~~peak gpm @ psi~~		~~average gpm @ psi~~
~~Service water~~		~~peak gpm @ psi~~		~~average gpm @ psi~~
~~Electricity~~		~~peak kW~~		~~average kW/day~~

6.2 Chemical Consumption Data - Plant Crist

6.2.1 *Chemical Description and Estimated Cost*

Proposal 1

Coagulant (as 40% ferric chloride)	[redacted]		
Polymer			
Dewatering Polymer (if needed)			
Hydrochloric Acid (37%)			
TMT			
Lime (hydrated)			

6.2.2 *Chemical Dosing Rate (Estimated)*

Proposal 1

Coagulant (as 40% ferric chloride)	75	mg/L		lb/hr	1.35	gal/hr
Polymer (Neat Solution 30 % Active)	10	mg/L		lb/hr	0.25	gal/hr
Dewatering Polymer (if needed)	N/A	mg/L	N/A	lb/hr	N/A	gal/hr
Hydrochloric Acid (37%)	20	mg/L		lb/hr	0.5	gal/hr
TMT	4	mg/L		lb/hr	0.26	gal/hr
Lime (hydrated)	480	mg/L	47.95	lb/hr		gal/hr
		mg/L		lb/hr		gal/hr
		mg/L		lb/hr		gal/hr
		mg/L		lb/hr		gal/hr

6.2.3 ~~*Chemical Description and Estimated Cost*~~

~~Proposal 2~~

~~Coagulant (as 40% ferric chloride)~~		
~~Polymer~~		
~~Dewatering Polymer (if needed)~~		
~~Sulfuric Acid (93%)~~		
~~Sulfide~~		
~~Lime (hydrated)~~		
~~Others~~		

6.2.4 ~~*Chemical Dosing Rate*~~

~~Proposal 2~~

~~Coagulant (as 40% ferric chloride)~~		~~mg/L~~		~~lb/hr~~		~~gal/hr~~
~~Polymer~~		~~mg/L~~		~~lb/hr~~		~~gal/hr~~
~~Dewatering Polymer (if needed)~~		~~mg/L~~		~~lb/hr~~		~~gal/hr~~
~~Sulfuric Acid (93%)~~		~~mg/L~~		~~lb/hr~~		~~gal/hr~~
~~Sulfide~~		~~mg/L~~		~~lb/hr~~		~~gal/hr~~
~~Lime (hydrated)~~		~~mg/L~~		~~lb/hr~~		~~gal/hr~~
~~Others~~						
		~~mg/L~~		~~lb/hr~~		~~gal/hr~~
		~~mg/L~~		~~lb/hr~~		~~gal/hr~~
		~~mg/L~~		~~lb/hr~~		~~gal/hr~~

6.3 Wastewater Treatment System Process Description - Plant Crist

See Proposals

6.4 Equipment Fill In Data

6.4.1 *Lime Storage & Feed Equipment*

	Proposal 1	~~Proposal 2~~	
System Manufacturer			
Storage Silo			
Quantity	1		
Effective storage volume	2,666		ft^3
Inside diameter	12'-0"		ft. and in.
Straight side length	40'-0"		ft. and in.
Cone angle	60		degrees
Cone height	8" (Approx)		ft. and in.
Material of construction	Carbon Steel		
Interior coating manufacturer/system	None		
Exterior coating manufacturer/system	Primer 2.0 Mils, Finish 1.5 Mils Two Part Acrylic Polyurethane		
Operating weight (Estimated)	44, When Completely Filled		tons
Storage Silo Fill Line			
Material of construction	Carbon Steel		
Fill connection type / manufacturer	4", Quick Connect, Kamlock		
Compression seal coupling manufacturer	N/A		
Bin Activator			
Manufacturer	Kinergy		
Materials of construction	Carbon Steel		
Model No.	Contract Submittal		
Inlet flange size	5 ft		

Outlet flange size	12 inches		
Utility requirements, compressed air or electric	Electric		hp
Lime Feeder			
Manufacturer	Enpro		
Materials of construction	304 Stainless Steel		
Model No.	Series 43		
Capacity Range, _ to _	360		lbs/hr
Power requirements	0.5 0 90V DC Drive		hp
Storage Silo ~~Pulse Air Bag~~	**Shaker Type**		
Quantity	1		
Manufacturer	Enpro		
Materials of construction	Carbon Steel		
Model No.	Series 1704		
Air filtration capacity	1,500		ft^3/min
Filter surface area	300		ft^2
Utility requirements, compressed air capacity	N/A - Electric		scfm
Storage Silo Exhaust Fan			
Quantity	1		
Manufacturer	Dayton		
Materials of construction	Carbon Steel		
Model No.	Contract Submittal		
Air capacity	Contract Submittal		ft^3/min
Utility requirements, electric	0.05		hp
Lime Silo Level Switches			
Quantity	N/A		
Manufacturer	N/A		
Model No.	N/A		
Type	N/A		
Lime Silo Continuous Level Instrumentation			
Quantity	1		
Manufacturer	ENH		
Model No.	Contract Submittal		
Type	Guided Wave Radar		
Slurry Tank Continuous Level Instrumentation			
Quantity	1		
Manufacturer	ENH		
Model No.	Contract Submittal		
Type	Guided Wave Radar		
Slurry Tank			
Quantity	1		
Capacity	750		gal
Operating weight (Estimated)	7,500		lbs
Shell material of construction	316 Stainless Steel		
Lining material of construction	316 Stainless Steel		
Mixer manufacturer	Wingert		
Model No.	Contract Submittal		
Slurry feed piping material	Schedule 80 Galivanized		
Equipment Area			
Insulation thickness	None		in.
Insulation R-value	N/A		
Quantity of lights	2		
Type of lights	Fluorescent		
Light wattage, each	60 Watts		
Interior coating manufacturer/system	Primer 2.0 Mils, Finish 1.5 Mils Two Part Acrylic Polyurethane		
Heater size	10		kW
Access door opening size, W x H	6' x 6'-8"		ft. and in.
Exhaust fan air capacity	Contract Submittal		ft^3/min
Power requirements	0.05		hp
Lime Slurry Feed Pump(s)			
General Data	50 gpm @ 50 psig		
Pump manufacturer	Wilfey		
Model	Contract Submittal		
Type	Centrifugal		
Connections	Flanged		
Size			
Suction	2.5"		nom. inches
Discharge	2"		nom. inches
Flange Class			
Suction	ANSI 150 Lbs		
Discharge	ANSI 150 Lbs		
Net weight	1,000 (Approx)		
Pump (less motor)	900 (Approx)		lb
Baseplate	100 (Approx)		lb
Performance Data, each pump			
Rotative speed	Contract Submittal		rpm
Flow rate at which maximum power requirement	Contract Submittal		gpm

Recommended minimum continuous flow	50		gpm
Seal water flow/pressure required	50		gpm and psi
Guaranteed performance, each pump	Contract Submittal		
Capacity at design conditions	50		gpm
Total head at design conditions	115		ft H_2O
pump shaft center line	Contract Submittal		ft H_2O
Pump efficiency at design conditions	80 (Approx)		%
Maximum shutoff head	Contract Submittal		ft H_2O
Power requirements	Contract Submittal		
At design conditions	Contract Submittal		hp
At shutoff	Contract Submittal		hp
Maximum	Contract Submittal		hp
Pump Construction	Cast Iron		
Impeller diameters	Contract Submittal		
Design	Contract Submittal		in.
Maximum available	Contract Submittal		in.
Minimum available	Contract Submittal		in.
Materials	Contract Submittal		
Casing	Contract Submittal		
Shaft	Contract Submittal		
Impeller	Contract Submittal		
Shaft sleeves	Contract Submittal		
Impeller wearing rings	Contract Submittal		
Casing wearing rings	Contract Submittal		
Type of bearings	Contract Submittal		
Radial	Contract Submittal		
Thrust	Contract Submittal		
Mechanical shaft seal	Contract Submittal		
Manufacturer	Contract Submittal		
Model No.	Contract Submittal		
Shaft diameter	Contract Submittal		
At bearing location(s)	Contract Submittal		in.
At seal packing location(s)	Contract Submittal		in.
Sleeve, outer diameter	Contract Submittal		in.
Coupling	Contract Submittal		
Manufacturer	Contract Submittal		
Model No.	Contract Submittal		
Rated power/service factor	5		hp
List of special tools which will be furnished	N/A		
Field assembly work required	Mimimum		
Shipping weight	1,000 Approx		lbs
Mixer			
Manufacturer	Wingert		
Materials of construction	316 Stainless Steel		
Connection Type (baseplate or flanged)	Flanged		
Model No.	Contract Submittal		
Local Control Panels			
Panel size (L x W x H)	Contract Submittal		ft and in
Panel approximate weight	500		lbs
Manufacturer	Enpro		
Model	N/A		
Progammable Logic Control Systems			
Manufacturer	Allen-Bradley		
Model No.	ControlLogix		
Low Voltage Induction Motors			
Motor manufacturer	Contract Submittal		
Model number	Contract Submittal		
Driven Equipment	See P & ID		
Design standards (e.g., NEMA/IEEE, IEC)	NEMA		
Driven equipment maximum brake horsepower	Contract Submittal		hp
Motor nameplate	Contract Submittal		hp
Service factor (NEMA/IEEE motors only)	1.15		
Motor bearing type	Contract Submittal		
Motor efficiency at nameplate, hp, percent	Contract Submittal		
Bearing lubrication system	Contract Submittal		
Space heater rating (watts / voltage / phase)	Contract Submittal		

6.4.2 *Solids Contact Equipment*

	Proposal 1	~~Proposal 2~~	
Clarifier	**Wastewater Clarifier A & B**		
Quantity	2		
Materials of construction	Carbon Steel		
Minimum system capacity	0		gpm
Maximum system capacity	120		gpm
Average effluent turbidity	10		NTU
Average effluent suspended solids	20		mg/L

Maximum rate of flow increase without effluent	10		gpm/hr
Influent water temperature rise limitation	3		°F/hr
Underflow solids concentration	5	Estimated	% weight
Diameter	14		ft
Height	16		ft
Reaction well dimensions	3		ft
Recirculation rate (as % of inlet flow)	5		
Scraper Drive Unit			
Manufacturer	SPS		
Materials of construction	Carbon Steel		
Model number	DDSL-903004Z		
Type	Dual Drive with Lift		
Motor Data	0.5		
Manufacturer	NORD		
Enclosure	TEFC		
Horsepower at design conditions	0.5		hp
Service factor	1.15 (Drive 7)		
Voltage/Phase/RPM	480/3/0.5		
Variable frequency drive	N/A		
Manufacturer			
Model number			
Type			
Motor Data			
Manufacturer			
Enclosure			
Horsepower at design conditions			hp
Service factor			
Voltage/Phase/RPM			
Variable frequency drive			
Voltage/Phase/RPM			
Variable frequency drive			
Guaranteed Clarifier Effluent Quality			
Turbidity	10		NTU
Suspended solids	25		mg/L

6.4.3 *Agitator*

	Proposal 1	~~Proposal 2~~	
Agitator	**Desaturation Tank Agitator A & B**		
Manufacturer	Lightin or Philadephia		
Connection Type (baseplate or flanged)	Flanged		
Model No.	73Q5		
Weight	(Approx)		lb
Impeller diameter	42		in.
Impeller(s) height from floor	75		in.
Minimum submergence required from tank	75		ft. and in.
Shaft length	15' - 1"		ft. and in.
Blade angle	Contract Submittal		degrees
Number of blades	2		
Number of baffles required in basin	2		
Degrees between baffles	4		
Baffle dimensions, L x W x H	45		ft. and in.
Impeller and shaft material	Carbon Steel		
Impeller and shaft covering material	Rubber Lined		
Impeller and shaft covering thickness	1/4"		in.
Tank Bridge Loadings			
Bending moment	13,000 (Approx)		lbf-ft
Torque	5,600 (Approx)		lbf-ft
Axial Load	Contract Submittal		lbf
Gear reducer			
Manufacturer	Lightin or Philadephia		
Model No.	73 Lightin		
Reduction ratio (__:__)	Contract Submittal		
Number of reductions	Contract Submittal		
Service factor			
Performance data			
Operating speed	68.3		rpm
Critical shaft speed	Contract Submittal		rpm
Tip speed	Contract Submittal		ft/s
Low Voltage Induction Motor			
Motor manufacturer	Teco		
Model number	Max-E2 (Type AEHH)		
Driven Equipment	Mixer		
Design standards (e.g., NEMA/IEEE, IEC)	NEMA		
Driven equipment maximum brake horsepower	4.5 (Estimated)		hp
Motor nameplate, hp (kW)	5		

Service factor (NEMA/IEEE motors only)	1.15		
Motor bearing type	De-gassed Regreasable Ball Bearing		
Motor efficiency at nameplate	89.5		hp, %
Bearing lubrication system	External Grease		
Space heater rating (watts / voltage / phase)	Contract Submittal		

	Proposal 1	~~Proposal 2~~	
Agitator	**Coagulation Mix Tank Agitator A & B**		
Manufacturer	Lightin or Philadephia		
Connection Type (baseplate or flanged)	Flanged		
Model No.	73Q2		
Weight	1,500 (Approx)		lb
Impeller diameter	38		in.
Impeller(s) height from floor	75		in.
Minimum submergence required from tank	75		ft. and in.
Shaft length	15'-1"		ft. and in.
Blade angle	Contract Submittal		degrees
Number of blades	2		
Number of baffles required in basin	4		
Degrees between baffles	45		
Baffle dimensions, L x W x H	10" W x 14'H		ft. and in.
Impeller and shaft material	Carbon Steel		
Impeller and shaft covering material	Rubber Lined		
Impeller and shaft covering thickness	1/4"		in.
Tank Bridge Loadings			
Bending moment	13,000 (Approx)		lbf-ft
Torque	6,500 (Approx)		lbf-ft
Axial Load			lbf
Gear reducer			
Manufacturer	Lightin or Philadephia		
Model No.	73 Lightin		
Reduction ratio (__:__)	Contract Submittal		
Number of reductions	Contract Submittal		
Service factor	Contract Submittal		
Performance data			
Operating speed	68.3		rpm
Critical shaft speed	Contract Submittal		rpm
Tip speed	Contract Submittal		ft/s
Low Voltage Induction Motor			
Motor manufacturer	Teco		
Model number	Max-E2 (Type AEHH)		
Driven Equipment	Mixer		
Design standards (e.g., NEMA/IEEE, IEC)	NEMA		
Driven equipment maximum brake horsepower	1.8 (Est)		hp
Motor nameplate, hp (kW)	2		
Service factor (NEMA/IEEE motors only)	1.15		
Motor bearing type	De-gassed Regreasable Ball Bearing		
Motor efficiency at nameplate	89		hp, %
Bearing lubrication system	External Grease		
Space heater rating (watts / voltage / phase)	Contract Submittal		

	Proposal 1	~~Proposal 2~~	
Agitator	**Sulfide Mix Tank Agitator A & B**		
Manufacturer	Lightin or Philadephia		
Connection Type (baseplate or flanged)	Flanged		
Model No.	73Q2		
Weight	1,500 (Approx)		lb
Impeller diameter	38		in.
Impeller(s) height from floor	75		in.
Minimum submergence required from tank	75		ft. and in.
Shaft length	15'-1"		ft. and in.
Blade angle	Contract Submittal		degrees
Number of blades	2		
Number of baffles required in basin	4		
Degrees between baffles	45		
Baffle dimensions, L x W x H	10" W x 14'H		ft. and in.
Impeller and shaft material	Carbon Steel		
Impeller and shaft covering material	Rubber Lined		
Impeller and shaft covering thickness	1/4"		in.
Tank Bridge Loadings			
Bending moment	13,000 (Approx)		lbf-ft
Torque	6,500 (Approx)		lbf-ft
Axial Load			lbf
Gear reducer			
Manufacturer	Lightin or Philadephia		

Model No.	73 Lightin		
Reduction ratio (__:__)	Contract Submittal		
Number of reductions	Contract Submittal		
Service factor			
Performance data			
Operating speed	68.3		rpm
Critical shaft speed	Contract Submittal		rpm
Tip speed	Contract Submittal		ft/s
Low Voltage Induction Motor			
Motor manufacturer	Teco		
Model number	Max-E2 (Type AEHH)		
Driven Equipment	Mixer		
Design standards (e.g., NEMA/IEEE, IEC)	NEMA		
Driven equipment maximum brake horsepower	1.8 (Est)		hp
Motor nameplate, hp (kW)	2		
Service factor (NEMA/IEEE motors only)	1.15		
Motor bearing type	De-gassed Regreasable Ball Bearing		
Motor efficiency at nameplate	89		hp, %
Bearing lubrication system	External Grease		
Space heater rating (watts / voltage / phase)	Contract Submittal		

Proposal 1 ~~Proposal 2~~

Agitator	Flash Mix Tank Agitator A & B		
Manufacturer	Lightin or Philadephia		
Connection Type (baseplate or flanged)	Flanged		
Model No.	73Q2		
Weight	1,500 (Approx)		lb
Impeller diameter	38		in.
Impeller(s) height from floor	75		in.
Minimum submergence required from tank	75		ft. and in.
Shaft length	15'-1"		ft. and in.
Blade angle	Contract Submittal		degrees
Number of blades	2		
Number of baffles required in basin	4		
Degrees between baffles	45		
Baffle dimensions, L x W x H	10" W x 14'H		ft. and in.
Impeller and shaft material	Carbon Steel		
Impeller and shaft covering material	Rubber Lined		
Impeller and shaft covering thickness	1/4"		in.
Tank Bridge Loadings			
Bending moment	13,000 (Approx)		lbf-ft
Torque	6,500 (Approx)		lbf-ft
Axial Load	Contract Submittal		lbf
Gear reducer			
Manufacturer	Lightin or Philadephia		
Model No.	73 Lightin		
Reduction ratio (__:__)	Contract Submittal		
Number of reductions	Contract Submittal		
Service factor	Contract Submittal		
Performance data			
Operating speed	68.3		rpm
Critical shaft speed	Contract Submittal		rpm
Tip speed	Contract Submittal		ft/s
Low Voltage Induction Motor			
Motor manufacturer	Teco		
Model number	Max-E2 (Type AEHH)		
Driven Equipment	Mixer		
Design standards (e.g., NEMA/IEEE, IEC)	NEMA		
Driven equipment maximum brake horsepower	1.8 (Est)		hp
Motor nameplate, hp (kW)	2		
Service factor (NEMA/IEEE motors only)	1.15		
Motor bearing type	De-gassed Regreasable Ball Bearing		
Motor efficiency at nameplate	89		hp, %
Bearing lubrication system	External Grease		
Space heater rating (watts / voltage / phase)	Contract Submittal		

Proposal 1 ~~Proposal 2~~

Agitator	Wastewater Clarifier Turbine A & B		
Manufacturer	SPS		
Connection Type (baseplate or flanged)	Flanged		
Model No.	DDSL-903004Z		
Weight	2,800		lb
Impeller diameter	2'-8"		in.
Impeller(s) height from floor	Contract Submittal		in.

Minimum submergence required from tank	Contract Submittal		ft. and in.
Shaft length	Contract Submittal		ft. and in.
Blade angle	18 (Curved Blade)		degrees
Number of blades	5		
Number of baffles required in basin	4		
Degrees between baffles	90		
Baffle dimensions, L x W x H	6" W x 4'H		ft. and in.
Impeller and shaft material	Carbon Steel		
Impeller and shaft covering material	Rubber Lined		
Impeller and shaft covering thickness	1/4"		in.
Tank Bridge Loadings			
Bending moment	Contract Submittal		lbf-ft
Torque	Contract Submittal		lbf-ft
Axial Load	Contract Submittal		lbf
Gear reducer			
Manufacturer	NORD (Helical)		
Model No.			
Reduction ratio (__:__)	4.7 x 90 x 55		
Number of reductions	3		
Service factor	2.5		
Performance data			
Operating speed	16		rpm
Critical shaft speed	40		rpm
Tip speed	< 5		ft/s
Low Voltage Induction Motor			
Motor manufacturer	NORD		
Model number			
Driven Equipment	Turbine Drive		
Design standards (e.g., NEMA/IEEE, IEC)	NEMA		
Driven equipment maximum brake horsepower	2.5		hp
Motor nameplate, hp (kW)	3		
Service factor (NEMA/IEEE motors only)	1.15		
Motor bearing type	Ball		
Motor efficiency at nameplate			hp, %
Bearing lubrication system	Sealed Greased for Life		
Space heater rating (watts / voltage / phase)	N/A		

	Proposal 1	~~Proposal 2~~	
Agitator	**Sludge Holding Tank Agitator**		
Manufacturer	Lightin or Philadephia		
Connection Type (baseplate or flanged)	Flanged		
Model No.	73Q5		
Weight	(Approx)		lb
Impeller diameter	42		in.
Impeller(s) height from floor	75		in.
Minimum submergence required from tank	75		ft. and in.
Shaft length	15' - 1"		ft. and in.
Blade angle	Contract Submittal		degrees
Number of blades	2		
Number of baffles required in basin	2		
Degrees between baffles	4		
Baffle dimensions, L x W x H	45		ft. and in.
Impeller and shaft material	Carbon Steel		
Impeller and shaft covering material	Rubber Lined		
Impeller and shaft covering thickness	1/4"		in.
Tank Bridge Loadings			
Bending moment	13,000 (Approx)		lbf-ft
Torque	5,600 (Approx)		lbf-ft
Axial Load	Contract Submittal		lbf
Gear reducer			
Manufacturer	Lightin or Philadephia		
Model No.	73 Lightin		
Reduction ratio (__:__)	Contract Submittal		
Number of reductions	Contract Submittal		
Service factor	Contract Submittal		
Performance data			
Operating speed	68.3		rpm
Critical shaft speed	Contract Submittal		rpm
Tip speed	Contract Submittal		ft/s
Low Voltage Induction Motor			
Motor manufacturer	Teco		
Model number	Max-E2 (Type AEHH)		
Driven Equipment	Mixer		
Design standards (e.g., NEMA/IEEE, IEC)	NEMA		

Driven equipment maximum brake horsepower	4.5 (Estimated)		hp
Motor nameplate, hp (kW)	5		
Service factor (NEMA/IEEE motors only)	1.15		
Motor bearing type	De-gassed Regreasable Ball Bearing		
Motor efficiency at nameplate	89.5		hp, %
Bearing lubrication system	External Grease		
Space heater rating (watts / voltage / phase)	Contract Submittal		

	Proposal 1	~~Proposal 2~~	
Agitator - N/A	**Clarifier Blowdown Sump Agitator - Not Required**		
Manufacturer			
Connection Type (baseplate or flanged)			
Model No.			
Weight			lb
Impeller diameter			in.
Impeller(s) height from floor			in.
Minimum submergence required from tank			ft. and in.
Shaft length			ft. and in.
Blade angle			degrees
Number of blades			
Number of baffles required in basin			
Degrees between baffles			
Baffle dimensions, L x W x H			ft. and in.
Impeller and shaft material			
Impeller and shaft covering material			
Impeller and shaft covering thickness			in.
Tank Bridge Loadings			
Bending moment			lbf-ft
Torque			lbf-ft
Axial Load			lbf
Gear reducer			
Manufacturer			
Model No.			
Reduction ratio (__:__)			
Number of reductions			
Service factor			
Performance data			
Operating speed			rpm
Critical shaft speed			rpm
Tip speed			ft/s
Low Voltage Induction Motor			
Motor manufacturer			
Model number			
Driven Equipment			
Design standards (e.g., NEMA/IEEE, IEC)			
Driven equipment maximum brake horsepower			hp
Motor nameplate, hp (kW)			
Service factor (NEMA/IEEE motors only)			
Motor bearing type			
Motor efficiency at nameplate			hp, %
Bearing lubrication system			
Space heater rating (watts / voltage / phase)			

6.4.4 *Inlet Flow Instrumentation*

	Proposal 1	~~Proposal 2~~	
Raw water flow transmitter			
Manufacturer	ABB		
Model number	Magmaster MFE-4-ER-14031.1		
Primary elements type	Hastelloy		
Primary elements manufacturer	ABB		
Differential pressure loss at design flow rate	< 2 psig		psi
Raw water flow control valve			
Manufacturer	Xomox		
Model number	Fig 008		
Size	2"		
Differential pressure loss at design flow rate	< 2 psig		psi

6.4.5 *Liquid Chemical Feed Equipment*

	Proposal 1	~~Proposal 2~~	
Chemical Feed System	**Coagulant**		
Pump Information			
Quantity	3		
Manufacturer	Pulsafeeder		

Type	Hydraulic Actuated Diaphagm		
Model No.	Pulsa Series 680		
Maximum capacity	1		gph
Discharge pressure	150		psig
Hydraulic relief valve setting	100		psig
Materials of construction	Pump - Carbon Steel		
Calibration Columns			
Quantity	1		
Manufacturer	Kofio		
Model No.	Contract Submittal		
Volume, gal	Contract Submittal		
Materials of construction	PVC		
Chemical Injection Quill or Static Mixer			
Quantity	N/A		
Manufacturer	N/A		
Materials of construction	N/A		
Strainers			
Quantity	1		
Manufacturer	Later		
Model No.	Later		
Materials of construction	CPVC		
Back-Pressure Valves			
Quantity	2		
Manufacturer	Contract Submittal		
Model No.	Contract Submittal		
Relief valve setting	100		psig
Materials of construction	CPVC		
Valves			
Type	Ball		
Manufacturer	Contract Submittal		
Model No.	Contract Submittal		
Materials of construction	CPVC		
Power consumption for this system/subsystem	0.5		hp
	Proposal 1	~~Proposal 2~~	

Chemical Feed System	**Hydrochloric Acid**		
Pump Information			
Quantity	3		
Manufacturer	Pulsafeeder		
Type	Hydraulic Actuated Diaphagm		
Model No.	Pulsa Series 680		
Maximum capacity	3		gph
Discharge pressure	150		psig
Hydraulic relief valve setting	100		psig
Materials of construction	Pump - Carbon Steel		
Calibration Columns			
Quantity	1		
Manufacturer	Kofio		
Model No.	Later		
Volume, gal	Later		
Materials of construction	PVC		
Chemical Injection Quill or Static Mixer			
Quantity	N/A		
Manufacturer			
Materials of construction			
Strainers			
Quantity	1		
Manufacturer	Later		
Model No.	Later		
Materials of construction	CPVC		
Back-Pressure Valves			
Quantity	2		
Manufacturer	Contract Submittal		
Model No.	Contract Submittal		
Relief valve setting	100		psig
Materials of construction	CPVC		
Valves			
Type	Ball		
Manufacturer	Contract Submittal		
Model No.	Contract Submittal		
Materials of construction	CPVC		
Power consumption for this system/subsystem	0.5		hp
	Proposal 1	~~Proposal 2~~	

Chemical Feed System	**Sulfide (TMT)**		
Pump Information			

Quantity	3		
Manufacturer	Pulsafeeder		
Type	Hydraulic Actuated Diaphagm		
Model No.	Pulsa Series 680		
Maximum capacity	0.3		gph
Discharge pressure	150		psig
Hydraulic relief valve setting	100		psig
Materials of construction	Pump - Carbon Steel		
Calibration Columns			
Quantity	1		
Manufacturer	Kofio		
Model No.	Contract Submittal		
Volume, gal	Contract Submittal		
Materials of construction	PVC		
Chemical Injection Quill or Static Mixer			
Quantity	N/A		
Manufacturer	N/A		
Materials of construction	N/A		
Strainers			
Quantity	1		
Manufacturer	Contract Submittal		
Model No.	Contract Submittal		
Materials of construction	CPVC		
Back-Pressure Valves			
Quantity	2		
Manufacturer	Contract Submittal		
Model No.	Contract Submittal		
Relief valve setting	100		psig
Materials of construction	CPVC		
Valves			
Type	Ball		
Manufacturer	Contract Submittal		
Model No.	Contract Submittal		
Materials of construction	CPVC		
Power consumption for this system/subsystem	0.5		hp

	Proposal 1	~~Proposal 2~~	
Chemical Feed System	**Polymer**		
Pump Information			
Quantity	2 Units (2 Solenoid Pumps per Unit)		
Manufacturer	Fluid Dynamics		
Type	Liquid		
Model No.	Dynablend L4-D		
Maximum capacity	0.4 Neat Polymer		gph
Discharge pressure	35 - 50		psig
Hydraulic relief valve setting	100 (Solenoid Neat Polymer Feed Pumps)		psig
Materials of construction	Carbon Steel Frame - Polypropylene Feed Pumps		
Calibration Columns			
Quantity	1		
Manufacturer	Fluid Dynamics		
Model No.			
Volume, gal	200 ml		
Materials of construction	PVC		
Chemical Injection Quill or Static Mixer			
Quantity	N/A		
Manufacturer	N/A		
Materials of construction	N/A		
Strainers			
Quantity	1		
Manufacturer	Contract Submittal		
Model No.	Contract Submittal		
Materials of construction	CPVC		
Back-Pressure Valves			
Quantity	1		
Manufacturer	Contract Submittal		
Model No.	Contract Submittal		
Relief valve setting	Contract Submittal		psig
Materials of construction	CPVC		
Valves			
Type	Ball		
Manufacturer	Hayward		
Model No.			
Materials of construction	CPVC		
Power consumption for this system/subsystem	115 V		hp

6.4.6 *Filter Press Equipment*

	Proposal 1	~~Proposal 2~~	
Manufacturer	Andritz		
Type (Belt verse Plate and Frame)	Recess Chamber		
Quantity	2		
Model number	1000/LP/80/72-32		
Frame Type (sidebar / overhead)	Sidebar		
Automatic Plate Shifter, yes/no	Yes		
Light Curtains, yes/no	Yes Both Sides		
Total volume	50		ft^3/press
Number of plates	57		
Design operating pressure	100		psi
Plate size	1000 x 1000		mm
Cake thickness	32		mm
Overall Height	7		ft
Overall Width	7		ft
Overall Length	26		ft
Weight Empty	17,500		lbs
Weight Operating	23,000		lbs
Influent sludge concentration	3 to 5		%
Dry solids load	30		lb/hr
Belt press sludge throughput rate	N/A		ft3/min
Moisture in sludge cake	40 to 50		%
Density of sludge cake	70 to 80		lb/ft3
Filter press filtrate solids	50 to 150		ppm
Floor Discharge Opening Required			
Length	225 x 48		ft
Width	18.75		ft
Optional cake discharge devices	Gravity/Shaker		
Manifold Pipe Materials	FRP		
Manifold Valves			
Manual - Manufacturer	Max Air		
Manual - Type	Ball		
Manual - Material of Construction	FRP		
Automatic - Manufacturer	Max Air		
Automatic - Type	Ball		
Automatic - Material of Construction	FRP		
Automatic - Operator Type	Air Actuated		
Automatic - Operator Manufacturer	Max Air		
Drip Pan / Bombay Door - Material of Construction	Carbon Steel - Painted		
Frame - Material of Construction	Carbon Steel - Painted		
Plate feed style	Center		
Total Cycle time	1 to 1.5		hrs
Fast Fill	5		min
Slow Fill	N/A		min
Core Blow	1 to 2		min
Air Blow	2		min
Press Dump	30 to 45		min
Filter Cloth Material	Polypropelene		
Filter cloth weight	5		oz./yd
Filter cloth fiber type	Mono Muilt		
Filter cloth weave type	Sateen		
Filter cloth porosity	3 to 5		$scfm/ft^2$
Total filtration area	970		ft^2
Hand held pendant, yes/no	Light Curtain		
Filter cloth weave type	Sateen		
Manufacture's service trips	5		days
Coatings type / dry film thickness	5		mils
Core Blow Air Demand	30		cfm/psi
Air Blow Air Demand	30		cfm/psi
Belt width	N/A		in
Belt material	N/A		
High Pressure Cloth Wash, yes/no	Yes	Optional	
Skid Mounted, yes/no	Yes		
Skid dimensions, L/W/H	6.8x 7.6 x 3.2		ft
Total Skid Weight	2500		lbs
Total Press Wash Time	180		min
Volume of Service Water consumed per wash	3,000		gal
Volume of Water Tank			gal
Wash System Piping Material of Construction	FRP		
Cloth Wash Operating Pressure	1,450		psi
Skid Mounted Junction Box, yes/no	Yes		
Junction Box NEMA Rating	4X		

Junction Box Material of Construction	Stainless Steel		
Cloth Wash Valves			
Manual - Manufacturer	Contract Submittal		
Manual - Type	Ball		
Manual - Material of Construction	Contract Submittal		
Automatic - Manufacturer	Contract Submittal		
Automatic - Type	Contract Submittal		
Automatic - Material of Construction	Contract Submittal		
Automatic - Operator Type	Contract Submittal		
Automatic - Operator Manufacturer	Contract Submittal		
High Pressure Cloth Wash Pump	Contract Submittal		
Quantity of Pumps	Contract Submittal		
Pump Manufacturer	Contract Submittal		
Pump Model Number	Contract Submittal		
Pump Type	Contract Submittal		
Flow	Contract Submittal		gpm
Head	Contract Submittal		psi
Casing Material of Construction	Contract Submittal		
Impeller Material of Construction	Contract Submittal		
RPM	Contract Submittal		
Mechanical Seal Type	Contract Submittal		
Mechanical Seal Manufacturer	Contract Submittal		
Flush/seal water demand per pump, gpm	Contract Submittal		
Horsepower	Contract Submittal		hp
Motor Manufacturer / Model	Contract Submittal		
Volts / phase / freq	Contract Submittal		
Design standards (e.g., NEMA/IEEE, IEC)	NEMA		
Driven equipment maximum brake hp	Contract Submittal		hp
Motor nameplate	Contract Submittal		hp
Service factor (NEMA/IEEE motors only)	Contract Submittal		
Motor bearing type	Contract Submittal		
Motor efficiency at nameplate	Contract Submittal		hp, %
Bearing lubrication system	Contract Submittal		
Space heater rating (watts / voltage / phase)			
Fast Fill Feed Pumps	N/A		
Quantity of Pumps			
Pump Manufacturer			
Pump Model Number			
Pump Type			
Flow			gpm
Head			psi
Casing Material of Construction			
Impeller Material of Construction			
RPM			
Mechanical Seal Type			
Mechanical Seal Manufacturer			
Flush/seal water demand per pump, gpm			
Horsepower			hp
Motor Manufacturer / Model			
Volts / phase / freq			
Design standards (e.g., NEMA/IEEE, IEC)			
Driven equipment maximum brake hp			hp
Motor nameplate			hp
Service factor (NEMA/IEEE motors only)			
Motor bearing type			
Motor efficiency at nameplate			hp, %
Bearing lubrication system			
Space heater rating (watts / voltage /			
Slow Fill Feed Pumps			
Quantity of Pumps	2		
Pump Manufacturer	Seepex		
Pump Model Number	17-12		
Pump Type	Progressive Cavity		
Flow	75		gpm
Head	100		psi
Casing Material of Construction	Carbon Steel - Rubber Lined		
Impeller Material of Construction	Duplex Stainless Steel	Stator	
RPM	248		
Mechanical Seal Type	Contract Submittal		
Mechanical Seal Manufacturer	Contract Submittal		
Flush/seal water demand per pump	Contract Submittal		gpm
Motor Manufacturer / Model	Contract Submittal		

Volts / phase / freq	480/3/60		
Design standards (e.g., NEMA/IEEE, IEC)	NEMA		
Driven equipment maximum brake hp	Contract Submittal		hp
Motor nameplate	Contract Submittal		hp
Service factor (NEMA/IEEE motors only)	1.15		
Motor bearing type	Contract Submittal		
Motor efficiency at nameplate	Contract Submittal		hp, %
Bearing lubrication system	Contract Submittal		
Space heater rating (watts / voltage /	Contract Submittal		
Press Fully Assembled on Shipment yes/no	Yes		
Quantity of Spatulas Provided	0		
Local Control Panels			
Panel size (L x W x H)	Contract Submittal		ft and in.
Panel approximate weight	Contract Submittal		lbs
Manufacturer	Hoffman		
Programmable Logic Control System			
Manufacturer	Allen-Bradley		
Model No.	ControlLogix		
Filter Press Platform			
Required (yes/no)	Yes		
Platform dimensions, L x W x H	Contract Submittal		ft and in.
Materials of construction	Galvanized Steel		
Structural members not to exceed reaction on	Contract Submittal		lbs

6.4.7 *Slurry Pumps - Not Required*

	Proposal 1	~~Proposal 2~~	
Slurry Pump	**Clarifier Blowdown Sump Pumps A & B - Not Required**		
Pump manufacturer			
Model No.			
Type			
Connections, size, in./flange class			
Suction			
Discharge			
Net weights			
Total pump assembly			lb
Pump (less motor)			lb
Baseplate			lb
Performance Data			
Rotative speed			rpm
Tip speed			ft/sec
Direction of rotation available as viewed from the			
Guaranteed performance			
Capacity at design conditions			gpm
Total head at design conditions			ft
NPSH required at design conditions, relative to			ft
Pump efficiency at design conditions			%
Maximum solid size pump can pass			in
Maximum shutoff head			ft
Power requirements			
At design conditions			hp
At shutoff			hp
Maximum			hp
Flow rate at which maximum power requirement			gpm
Recommended minimum continuous flow			gpm
Recommended maximum continuous flow			gpm
Seal water cooling water flow required & pressure			gpm & psi
Seal injection water quality requirements			
Impeller diameters			
Design			in.
Maximum available			in.
Minimum available			in.
Materials			
Casing			
Casing liner			
Shaft			
Impeller			
Shaft sleeves			
Impeller wearing rings			
Casing wearing rings			
Mechanical shaft seal(s)			
Type of bearings			
Radial			
Thrust			
Description of bearing lubrication system and			
Mechanical shaft seal			
Manufacturer			

Model No.			
Shaft diameter			
At bearing location(s)			in.
At seal location(s)			in.
Sleeve, outer diameter			in.
Coupling			
Manufacturer			
Model No.			
Rated power, hp/service factor			
Other Data			
List of special tools that will be furnished			
Field assembly work required			
Direct Drive or V-belt Drive			

	Proposal 1	~~Proposal 2~~	
Slurry Pump	**Wastewater Clarifier Sludge Pumps A, B, C, & D**		
Pump manufacturer	Seepex		
Model No.	17-6L		
Type	Progressive Cavity		
Connections, size, in./flange class			
Suction	4"		
Discharge	3"		
Net weights			
Total pump assembly	500		lb
Pump (less motor)	450		lb
Baseplate			lb
Performance Data			
Rotative speed	41		rpm
Tip speed	N/A		ft/sec
Input shaft end of the pump (Clockwise or Counterclockwise or Clockwise and counterclockwise)	Clockwise		
Guaranteed performance			
Capacity at design conditions	50		gpm
Total head at design conditions	66		ft
NPSH required at design conditions, relative to pump shaft center line			ft
Pump efficiency at design conditions			%
Maximum solid size pump can pass			in
Maximum shutoff head			ft
Power requirements			
At design conditions	5HP		hp
At shutoff			hp
Maximum			hp
Flow rate at which maximum power requirement	65		gpm
Recommended minimum continuous flow	0		gpm
Recommended maximum continuous flow	65		gpm
Seal water cooling water flow required & pressure	N/A		gpm & psi
Seal injection water quality requirements	N/A		
Rotor diameters			
Design	1.44		in.
Maximum available	Contract Submittal		in.
Minimum available	Contract Submittal		in.
Materials			
Casing	Carbon Steel		
Casing Liner	Carbon Steel - Rubber Lined		
Rotor	Duplex Stainless Steel		
Impeller	N/A		
Shaft sleeves	N/A		
Impeller wearing rings	N/A		
Casing wearing rings	N/A		
Mechanical shaft seal(s)	Yes		
Type of bearings			
Radial	Contract Submittal		
Thrust	Contract Submittal		
Description of bearing lubrication system and	Contract Submittal		
Mechanical shaft seal			
Manufacturer	Burgmann		
Model No.	MG-1-g60-055-Q1Q1 (Hastelloy)		
Shaft diameter			
At bearing location(s)	Contract Submittal		in.
At seal location(s)	Contract Submittal		in.
Sleeve, outer diameter	Contract Submittal		in.
Coupling			
Manufacturer	Seepex		
Model No.	Contract Submittal		
Rated power, hp/service factor	Contract Submittal		

Other Data			
List of special tools that will be furnished	N/A		
Field assembly work required	All Pumps are Totally Assembly on a Skid		
Direct Drive or V-belt Drive	Direct Drive		

	Proposal 1	~~Proposal 2~~	
	Filter Press Feed Pumps A & B		
Pump manufacturer	Seepex		
Model No.	17-6L		
Type	Progressive Cavity		
Connections, size, in./flange class			
Suction	4"		
Discharge	3"		
Net weights			
Total pump assembly	500		lb
Pump (less motor)	450		lb
Baseplate			lb
Performance Data			
Rotative speed	71		rpm
Tip speed	N/A		ft/sec
Input shaft end of the pump (Clockwise or Counterclockwise or Clockwise and counterclockwise)	Clockwise		
Guaranteed performance			
Capacity at design conditions	50		gpm
Total head at design conditions	66		ft
NPSH required at design conditions, relative to pump shaft center line			ft
Pump efficiency at design conditions			%
Maximum solid size pump can pass			in
Maximum shutoff head			ft
Power requirements			
At design conditions	10		hp
At shutoff			hp
Maximum			hp
Flow rate at which maximum power requirement	65		gpm
Recommended minimum continuous flow	0		gpm
Recommended maximum continuous flow	65		gpm
Seal water cooling water flow required & pressure	N/A		gpm & psi
Seal injection water quality requirements	N/A		
Impeller diameters			
Design	1.44		in.
Maximum available			in.
Minimum available			in.
Materials			
Casing	Carbon Steel		
Casing liner	Carbon Steel - Rubber Lined		
Rotor	Duplex Stainless Steel		
Impeller	N/A		
Shaft sleeves	N/A		
Impeller wearing rings	N/A		
Casing wearing rings	N/A		
Mechanical shaft seal(s)			
Type of bearings			
Radial			
Thrust			
Description of bearing lubrication system and			
Mechanical shaft seal			
Manufacturer	Burgmann		
Model No.	MG-1-g60-055-Q1Q1 (Hastelloy)		
Shaft diameter			
At bearing location(s)			in.
At seal location(s)			in.
Sleeve, outer diameter			in.
Coupling			
Manufacturer	Seepex		
Model No.			
Rated power, hp/service factor			
Other Data			
List of special tools that will be furnished	N/A		
Field assembly work required	All Pumps are Totally Assembly on a Skid		
Direct Drive or V-belt Drive	Direct Drive		

6.4.6 Vertical Pumps

	Proposal 1	~~Proposal 2~~	
Pump	**Effluent/Filter Backwash Pumps A & B**		
Manufacturer	Gallgher		
Model No.	Series 2100		
Type (turbine, sump, etc.)	Cantilever		
Number of stages, each pump	One		
Discharge connection size/flange class	3.5		in
Net weight, each			lb
Pump	1,400		lb
Motor	730		lb
Total, pump including motor, baseplate, and coupl	2,130		lb
Performance Data			
Rotative speed	1375		rpm
Minimum distance required from bottom of suction bell to bottom of pit, ft	12"		
Recommended minimum continuous flow	90		gpm
Guaranteed performance (each pump)	180 gpm (115 TDH) Effluent, 300 gpm (66 TDH) Backwash		gpm
Capacity at design conditions	Contract Submittal		gpm
head losses through the pump	Contract Submittal		ft. H_2O
Submergence required at design conditions (from water surface to bottom of suction bell)	Contract Submittal		in
bell at design conditions	Contract Submittal		ft H_2O
Pump efficiency at design conditions	23		%
Motor efficiency at design conditions	Contract Submittal		%
Maximum shutoff head	Contract Submittal		ft H_2O
Power requirements			
At design conditions	23.41		hp
At shutoff	Contract Submittal		hp
Maximum	Contract Submittal		hp
Pump Construction	High Chrome 340		
Impeller diameters			
Design	13.5		in.
Maximum available	Contract Submittal		in.
Minimum available	Contract Submittal		in.
Materials			
Column	High Chrome 340		
Discharge head	High Chrome 340		
Bowls, volutes, and diffusers	High Chrome 340		
Shaft	High Chrome 340		
Impeller	High Chrome (A05) 354		
Impeller wearing ring	Contract Submittal		
Casing wearing ring	Contract Submittal		
Shaft sleeves	Contract Submittal		
Suction bell	Contract Submittal		
Suction strainer	Contract Submittal		
Shaft diameter	Contract Submittal		in.
Length of sections	Contract Submittal		in.
Length from baseplate to bottom of suction	Contract Submittal		in.
Line shaft bearings			
Type	Contract Submittal		
Number	Contract Submittal		
Length	Contract Submittal		
Material	Contract Submittal		
Bowl bearings			
Type	Contract Submittal		
Number	Contract Submittal		
Length	Contract Submittal		
Material	Contract Submittal		
Description of line shaft bearing lubrication system, including required quantity of externally supplied bearing lubrication water, if applicable	Contract Submittal		
Description of bowl bearing lubrication system, including required quantity of externally supplied bearing lubrication water, if applicable	Contract Submittal		
Description of shaft seals, including required quantity of externally supplied seal water, if	Contract Submittal		
Motor Data			
Manufacturer			
Enclosure	TEFC		
Horsepower at design conditions	40		hp
Service factor	1.15		
Voltage/Phase/RPM	480/3/1800		
Miscellaneous Data	Contract Submittal		
Shipping weight (each pump assembly if more	Contract Submittal		lb
	Proposal 1	~~Proposal 2~~	

Pump	Effluent Pumps C & D (Not Required)		
Manufacturer			
Model No.			
Type (turbine, sump, etc.)			
Number of stages, each pump			
Discharge connection size/flange class			in
Net weight, each			lb
Pump			lb
Motor			lb
Total, pump including motor, baseplate, and coupl			lb
Performance Data			
Rotative speed			rpm
Minimum distance required from bottom of suction bell to bottom of pit, ft			
Recommended minimum continuous flow			gpm
Guaranteed performance (each pump)			gpm
Capacity at design conditions			gpm
head losses through the pump			ft H_2O
Submergence required at design conditions (from water surface to bottom of suction bell)			in
bell at design conditions			ft H_2O
Pump efficiency at design conditions			%
Motor efficiency at design conditions			%
Maximum shutoff head			ft H_2O
Power requirements			
At design conditions			hp
At shutoff			hp
Maximum			hp
Pump Construction			
Impeller diameters			
Design			in.
Maximum available			in.
Minimum available			in.
Materials			
Column			
Discharge head			
Bowls, volutes, and diffusers			
Shaft			
Impeller			
Impeller wearing ring			
Casing wearing ring			
Shaft sleeves			
Suction bell			
Suction strainer			
Shaft diameter			in.
Length of sections			in.
Length from baseplate to bottom of suction			in.
Line shaft bearings			
Type			
Number			
Length			
Material			
Bowl bearings			
Type			
Number			
Length			
Material			
Description of line shaft bearing lubrication system, including required quantity of externally supplied bearing lubrication water, if applicable			
Description of bowl bearing lubrication system, including required quantity of externally supplied bearing lubrication water, if applicable			
Description of shaft seals, including required quantity of externally supplied seal water, if			
Motor Data			
Manufacturer			
Enclosure			
Horsepower at design conditions			hp
Service factor			
Voltage/Phase/RPM			
Miscellaneous Data			
Shipping weight (each pump assembly if more			lb

	Proposal 1	~~Proposal 2~~	
Pump	Dirty Backwash Sump Pumps A & B - Not Required)		

Manufacturer			
Model No.			
Type (turbine, sump, etc.)			
Number of stages, each pump			
Discharge connection size/flange class			in
Net weight, each			lb
Pump			lb
Motor			lb
Total, pump including motor, baseplate, and coup			lb
Performance Data			
Rotative speed			rpm
Minimum distance required from bottom of suction bell to bottom of pit, ft			
Recommended minimum continuous flow			gpm
Guaranteed performance (each pump)			gpm
Capacity at design conditions			gpm
head losses through the pump			ft. H_2O
Submergence required at design conditions (from water surface to bottom of suction bell)			in
bell at design conditions			ft H_2O
Pump efficiency at design conditions			%
Motor efficiency at design conditions			%
Maximum shutoff head			ft H_2O
Power requirements			
At design conditions			hp
At shutoff			hp
Maximum			hp
Pump Construction			
Impeller diameters			
Design			in.
Maximum available			in.
Minimum available			in.
Materials			
Column			
Discharge head			
Bowls, volutes, and diffusers			
Shaft			
Impeller			
Impeller wearing ring			
Casing wearing ring			
Shaft sleeves			
Suction bell			
Suction strainer			
Shaft diameter			in.
Length of sections			in.
Length from baseplate to bottom of suction			in.
Line shaft bearings			
Type			
Number			
Length			
Material			
Bowl bearings			
Type			
Number			
Length			
Material			
Description of line shaft bearing lubrication system, including required quantity of externally supplied bearing lubrication water, if applicable			
Description of bowl bearing lubrication system, including required quantity of externally supplied bearing lubrication water, if applicable			
Description of shaft seals, including required quantity of externally supplied seal water, if			
Motor Data			
Manufacturer			
Enclosure			
Horsepower at design conditions			hp
Service factor			
Voltage/Phase/RPM			
Miscellaneous Data			
Shipping weight (each pump assembly if more			lb

	Proposal 1	~~Proposal 2~~	
Pump	**Filtrate Sump Pumps A & B**		
Manufacturer	Gallgher		

Model No.	Series 100		
Type (turbine, sump, etc.)	Cantilever		
Number of stages, each pump	One		
Discharge connection size/flange class	2.5		in
Net weight, each			lb
Pump	900		lb
Motor	416		lb
Total, pump including motor, baseplate, and coup	1,320		lb
Performance Data			
Rotative speed	1,672		rpm
Minimum distance required from bottom of suction bell to bottom of pit, ft	12"		
Recommended minimum continuous flow	100		gpm
Guaranteed performance (each pump)	100 gpm @ 66 TDH		gpm
Capacity at design conditions			gpm
head losses through the pump			ft. H_2O
Submergence required at design conditions (from water surface to bottom of suction bell)	Contract Submittal		in
bell at design conditions			ft H_2O
Pump efficiency at design conditions	23		%
Motor efficiency at design conditions			%
Maximum shutoff head			ft H_2O
Power requirements			
At design conditions	9.33		hp
At shutoff	Contract Submittal		hp
Maximum	Contract Submittal		hp
Pump Construction	High Chrome 340		
Impeller diameters			
Design	10		in.
Maximum available			in.
Minimum available			in.
Materials			
Column	High Chrome 340		
Discharge head	High Chrome 340		
Bowls, volutes, and diffusers	High Chrome 340		
Shaft	High Chrome 340		
Impeller	High Chrome (A05) 354		
Impeller wearing ring	Contract Submittal		
Casing wearing ring	Contract Submittal		
Shaft sleeves	Contract Submittal		
Suction bell	Contract Submittal		
Suction strainer	Contract Submittal		
Shaft diameter	Contract Submittal		in.
Length of sections	Contract Submittal		in.
Length from baseplate to bottom of suction	Contract Submittal		in.
Line shaft bearings			
Type	Contract Submittal		
Number	Contract Submittal		
Length	Contract Submittal		
Material	Contract Submittal		
Bowl bearings			
Type	Contract Submittal		
Number	Contract Submittal		
Length	Contract Submittal		
Material	Contract Submittal		
Description of line shaft bearing lubrication system, including required quantity of externally supplied bearing lubrication water, if applicable	Contract Submittal		
Description of bowl bearing lubrication system, including required quantity of externally supplied bearing lubrication water, if applicable	Contract Submittal		
Description of shaft seals, including required quantity of externally supplied seal water, if	Contract Submittal		
Motor Data			
Manufacturer			
Enclosure	TEFC		
Horsepower at design conditions	10		hp
Service factor	1.15		
Voltage/Phase/RPM	480/3/1800		
Miscellaneous Data			
Shipping weight (each pump assembly if more			lb

6.4.9 *Local Control Panels*

	Proposal 1	~~Proposal 2~~	
Panel description	PLC		

Panel size (L by W by H)	(72"X118"X18"), (84.12"X78.5"X18.12") - 2 Enclosures		ft
Panel approximate weight	Later		lb
Manufacturer	Hoffman		

6.4.10 *Master - Programmable Logic Control System*

	Proposal 1	~~Proposal 2~~	
Manufacturer	Allen-Bradley		
Model No.	ControlLogix		
Dimensions (overall, L x W x H)	(72"X118"X18"), (84.12"X78.5"X18.12") - 2 Enclosures		ft
Weight	Later		lb

6.4.11 *Shop Fabricated Tanks*

	Proposal 1	~~Proposal 2~~	
Tank name	**Hydrochloric Storage Tank**		
Shell material	**Tote by Owner**		
Plate thickness			
Shell			in.
Head or bottom			in.
Head or top			in.
Dry weight, each			lb
Gasket material	Natural Rubber		
Describe the amount of field erection work	None		
Vent Dryer			
Manufactuer			
Model Number			
Overflow Check Valve			
Manufactuer	N/A		
Model Number	N/A		

6.4.12 *Fiberglass Reinforced Plastic Tanks*

	Proposal 1	~~Proposal 2~~	
Tank	**Desaturation Tanks A & B**		
Manufacturer	Augusta Fiberglass		
Tank type (open vs closed top)	Open		
Tank residence time (if applicable)	120 (Approx)		min
Tank materials			
Resin	Dion 9102 VinylEster		
Glass			
Surfacing mat			
Chopped strand mat	Yes		
Continuous roving			
Veil	10 - 20 Mil "C" Glass		
Cure	Later		
Postcure	Later		
Material thickness			
Top head	N/A		
Wall at top	0.3		in.
Wall at bottom	0.3		in.
Tank bottom	3/8"		in.
Insulation	N/A		
Inside diameter	8		ft. and in.
Straight side length	16		ft. and in.
Effective volume	8,800 (Approx)		gal
Weight			
Empty	2,300 (Approx) Tank Only		lb
Flooded	74,000 (Approx)		lb
Shipping	2,300 (Approx) Tank Only		lb
Seismic moment	Contract Submittal		lbf-ft
Seismic shear	Contract Submittal		lb
Wind moment	Contract Submittal		lbf-ft
Wind shear	Contract Submittal		lb
Anchor bolts			
Dia	3/4"		in
Quantity	8		
Name of supplier to perform shop testing	Augusta Fiberglass		

	Proposal 1	~~Proposal 2~~	
Tank	**Coagulation Mix Tanks A & B**		
Manufacturer	Augusta Fiberglass		
Tank type (open vs closed top)	Open		
Tank residence time (if applicable)	30 (Approx)		min
Tank materials			
Resin	Dion 9102 VinylEster		
Glass			
Surfacing mat			
Chopped strand mat	Yes		
Continuous roving			

Veil	10 - 20 Mil "C" Glass		
Cure	Later		
Postcure	Later		
Material thickness			
Top head	N/A		
Wall at top	0.3		in.
Wall at bottom	0.3		in.
Tank bottom	5/16"		in.
Insulation	N/A		
Inside diameter	6		ft. and in.
Straight side length	16		ft. and in.
Effective volume	3,100 (Approx)		gal
Weight			
Empty	2,100 (Approx) Tank Only		lb
Flooded	27,000 (Approx)		lb
Shipping	2,100 (Approx) Tank Only		lb
Seismic moment	Contract Submittal		lbf-ft
Seismic shear	Contract Submittal		lb
Wind moment	Contract Submittal		lbf-ft
Wind shear	Contract Submittal		lb
Anchor bolts			
Dia	3/4"		in
Quantity	8		
Name of supplier to perform shop testing	Augusta Fiberglass		

	Proposal 1	~~Proposal 2~~	
Tank	**Sulfide Mix Tanks A & B**		
Manufacturer	Augusta Fiberglass		
Tank type (open vs closed top)	Open		
Tank residence time (if applicable)	30 (Approx)		min
Tank materials			
Resin	Dion 9102 VinylEster		
Glass			
Surfacing mat			
Chopped strand mat	Yes		
Continuous roving			
Veil	10 - 20 Mil "C" Glass		
Cure	Later		
Postcure	Later		
Material thickness			
Top head	N/A		
Wall at top	0.3		in.
Wall at bottom	0.3		in.
Tank bottom	5/16"		in.
Insulation	N/A		
Inside diameter	6		ft. and in.
Straight side length	16		ft. and in.
Effective volume	3,100 (Approx)		gal
Weight			
Empty	2,100 (Approx) Tank Only		lb
Flooded	27,000 (Approx)		lb
Shipping	2,100 (Approx) Tank Only		lb
Seismic moment	Contract Submittal		lbf-ft
Seismic shear	Contract Submittal		lb
Wind moment	Contract Submittal		lbf-ft
Wind shear	Contract Submittal		lb
Anchor bolts			
Dia	3/4"		in
Quantity	8		
Name of supplier to perform shop testing	Augusta Fiberglass		

	Proposal 1	~~Proposal 2~~	
Tank	**Flash Mix Tanks A & B**		
Manufacturer	Augusta Fiberglass		
Tank type (open vs closed top)	Open		
Tank residence time (if applicable)	30 (Approx)		min
Tank materials			
Resin	Dion 9102 VinylEster		
Glass			
Surfacing mat			
Chopped strand mat	Yes		
Continuous roving			
Veil	10 - 20 Mil "C" Glass		
Cure	Later		
Postcure	Later		

Material thickness			
Top head	N/A		
Wall at top	0.3		in.
Wall at bottom	0.3		in.
Tank bottom	5/16"		in.
Insulation	N/A		
Inside diameter	6		ft. and in.
Straight side length	16		ft. and in.
Effective volume	3,100 (Approx)		gal
Weight			
Empty	2,100 (Approx) Tank Only		lb
Flooded	27,000 (Approx)		lb
Shipping	2,100 (Approx) Tank Only		lb
Seismic moment	Contract Submittal		lbf-ft
Seismic shear	Contract Submittal		lb
Wind moment	Contract Submittal		lbf-ft
Wind shear	Contract Submittal		lb
Anchor bolts			
Dia	3/4"		in
Quantity	8		
Name of supplier to perform shop testing	Augusta Fiberglass		

Proposal 1 ~~Proposal 2~~

Tank	Coagulant Storage Tank		
Manufacturer	Augusta Fiberglass		
Tank type (open vs closed top)	Closed Top		
Tank residence time (if applicable)	One (1) Truck Load		min
Tank materials			
Resin	Dion 9102 VinylEster		
Glass			
Surfacing mat			
Chopped strand mat	Yes		
Continuous roving			
Veil	10 - 20 Mil "C" Glass		
Cure	Later		
Postcure	Later		
Material thickness			
Top head	5/16"		
Wall at top	0.3		in.
Wall at bottom	0.3		in.
Tank bottom	5/16"		in.
Insulation	N/A		
Inside diameter	10		ft. and in.
Straight side length	14		ft. and in.
Effective volume	6,000 (Approx)		gal
Weight			
Empty	3,000 (Approx) Tank Only		lb
Flooded	75,000 (Approx)		lb
Shipping	3,000 (Approx) Tank Only		lb
Seismic moment	Contract Submittal		lbf-ft
Seismic shear	Contract Submittal		lb
Wind moment	Contract Submittal		lbf-ft
Wind shear	Contract Submittal		lb
Anchor bolts			
Dia	3/4"		in
Quantity	8		
Name of supplier to perform shop testing	Augusta Fiberglass		

Proposal 1 ~~Proposal 2~~

Tank	Sludge Holding Tank		
Manufacturer	Augusta Fiberglass		
Tank type (open vs closed top)	Open		
Tank residence time (if applicable)	480		min
Tank materials			
Resin	Dion 9102 VinylEster		
Glass			
Surfacing mat			
Chopped strand mat	Yes		
Continuous roving			
Veil	10 - 20 Mil "C" Glass		
Cure	Later		
Postcure	Later		
Material thickness			
Top head	N/A		
Wall at top	0.3		in.

Wall at bottom	0.3		in.
Tank bottom	3/8"		in.
Insulation	N/A		
Inside diameter	8		ft. and in.
Straight side length	16		ft. and in.
Effective volume	5,600		gal
Weight			
Empty	2,400 (Approx) Tank Only		lb
Flooded	56,000 (Approx)		lb
Shipping	2,400 (Approx) Tank Only		lb
Seismic moment	Contract Submittal		lbf-ft
Seismic shear	Contract Submittal		lb
Wind moment	Contract Submittal		lbf-ft
Wind shear	Contract Submittal		lb
Anchor bolts			
Dia	3/4"		in
Quantity	8		
Name of supplier to perform shop testing	Augusta Fiberglass		

6.4.13 *Gravity Filters*

	Proposal 1	~~Proposal 2~~	
Manufacturer	Infilco Degremont		
Materials of construction	Carbon Steel - Rubber Lined		
Backwash requirement	12		gpm/sf
Service flow rate	3.75 (With Two (2) Filter Bays In Service)		gpm/sf
Tank materials	Carbon Steel		
Average effluent turbidity	< 1		NTU
Average effluent TSS	< 2		ppm
Maximum rate of flow increase without effluent quality degradation	144 (With all Filters Bay Running)		gpm/hr
Backwash solids concentration	300 - 400		ppm

6.4.14 *Large Bore General Service Valves (Furnished with Equipment)*

	Proposal 1	~~Proposal 2~~	
Valve identification description	N/A		
Valve manufacturer	N/A		
Type	N/A		
Size	N/A		
Wetted materials	N/A		
Valve identification description	N/A		
Valve manufacturer	N/A		
Type	N/A		
Size	N/A		
Wetted materials	N/A		

6.4.15 *Small Bore General Service Valves (Furnished with Equipment)*

	Proposal 1	~~Proposal 2~~	
Valve identification description	Process		
Valve manufacturer	Xomox		
Type	Plug or Butterfly		
Size	4" or less		
Wetted materials	Teflon		
Valve identification description	Chemical		
Valve manufacturer	Hayward		
Type	Ball		
Size	3/4" of less		
Wetted materials	CPVC		

6.4.16 *Control Valves (Furnished with Equipment) - Automatic Isolation Valves*

	Proposal 1	~~Proposal 2~~	
Valve identification description	Process		
Valve manufacturer	Xomox		
Type	Plug		
Size	4" or less		
Wetted materials	Teflon		
Valve identification description	Process		
Valve manufacturer	Xomox		
Type	Butterfly		
Size	4" or less		
Wetted materials	Teflon		

8.0 ALTERNATES AND PRICING

The Vendor is requested to address alternate proposals by including either of the following statements: "Having complied with the bidding requirements of your Specifications and attachments, we request due consideration to the attached alternate proposals, complete with prices and descriptive date for comparison to the base proposal" or Having complied with the bidding requirements of your Specifications and attachments, we do not offer an alternate proposal.

The Bidder's base bid shall meet the equipment requirements and match the treatment process as dictated by the attached flow diagrams and specifications contained herein. Alternate treatment methods or proprietary technologies not covered in these specifications should not be included in the Bidder's base proposal. In addition to the base bid, the Bidder may propose alternate bids which include alternate treatment technologies and/or changes to the specified process. The alternate bids must meet the effluent performance guarantees and specifically indicate where the Bidder has deviated from the specification requirements. Justification for these deviations shall also be provided, whether technical or economical in nature. Evaporative treatment methods will not be acceptable to the Purchaser.

9.0 EXCEPTIONS

9.1 Exceptions shall be noted in accordance with Paragraphs 14.3 of the General Specifications.

We have reviewed your Specifications and all related attachments. Unless specific exceptions are listed below (or attached to our proposals and referenced below), it is understood that all of the provisions contained therein are acceptable to us:

[ ] without exception

[Yes, Please Proposal] with exceptions as outlined below:

10.0 SUBCONTRACTORS

During the course of accomplishing work required by this inquiry, we will subcontract certain portions of the work to the firms listed below:

Name and Address of Subcontractor	Work to be Performed
EnPro Technologies, Lee Summit, MO	Lime Silo
SPS Engineering, North Salt Lake, UT	Reactor Clarifiers

We understand that any changes in the above designated subcontractors after award of the contract must be pre-approved in writing by the Purchaser.

11.0 SIGNATURE

The undersigned hereby attests and affirms that: the Inquiry documents have been read in detail by officers, employees, agents, or representatives of the company named below; that the company named below is fully qualified and able to perform in accordance with the terms and conditions of these inquiry documents; that he/she is an officer or employee of the company named below; that he/she is authorized to submit this Proposal, and, should Purchaser accept this Proposal, or any part or portion thereof, bind the company to the terms of these Inquiry documents.

SIGNATURE: Rich Ubaldi

Title: Vice President - Industrial

12.0 NAME OF COMPANY: Infilco Degremont Inc.

Telephone Number 804-756-7600

Fax Number 804-756-7643

13.0 DATE: 8/16/2007

Equipment only wastewater treatment system proposal rev 0
2/15/2007

Document Request 2 (Documents Produced)

Question 6

Document titled Functional Design Specification (Infilco Degremont, Inc.) is confidential in its entirety.

Document Request 2 (Documents Produced)

Question 6

Documents titled 2008 & 2009 Pilot Test Plant Reports from Chiyoda Corporation are confidential in their entirety.