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SITE CERTIFICATION APPLICATION AND ENVIRONMENTAL ANALYSIS

SEMINOLE PLANT UNITS NO. 1 & NO. 2

SEMINOLE ELECTRIC COOPERATIVE, INC.

VOLUME II

3.0
STATION FACILITIES

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CHAPTER 3.0

STATION FACILITIES

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3.0 STATION FACILITIES

Descriptions of facilities contained herein reflect the best available information at the time this document is written. It is expected that changes and refinements will be made as the engineering and design process proceeds. The information was furnished by Seminole Electric Cooperative, Inc. (SECI) and Burns and Roe, Inc., the project architect/engineer consultant.

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3.1 STATION LAYOUT AND APPEARANCE

The plan-view layout of major station facilities is shown in Figure 3.1-1. The environmental basis for the layout is described in Section 9.3.1. Table 3.1-1 gives a summary of pertinent data for Seminole Plant Units No. 1 and No. 2.

3.1.1 Structures

A profile of the station structures is shown in Figure 3.1-2 and an artist rendering is given as the frontispiece to Volume I. Table 3.1-2 gives pertinent data for the power block.

3.1.2 Site Drainage Plan

Landscaping Plan

The proposed site landscaping plan is shown in Figure 3.1-3. Site clearing will be minimized; only those areas will be cleared which are needed to accommodate plant facilities and allow reasonable access to those facilities. Landscaping, as required, will utilize indigenous grasses, shrubs, and trees to minimize maintenance requirements for energy and water; minimize disruption of vegetative communities; and fully use vegetative buffer around the site for aesthetic enhancement and noise control.

Areas to be cleared will be marked. Clearing will be accomplished under supervision. Care will be taken to assure that adequate control is maintained over all phases of the clearing operation. Debris from clearing will be disposed of in an approved manner.

Untreated Storm Drainage

The proposed site will be designed to handle storm runoff in excess of the infiltration capacity of site soils. While excessive runoff is not expected because of the very porous soils, a proposed drainage system design, Figure 3.1-4, will consist of properly sloped ground toward open ditches or swales to collect and channel runoff from the area. The excess runoff shall be directed towards existing swamps or lowlands onsite as shown on Figure 3.1-4. The lowlands will serve dual purpose of sedimentation ponds as well as holding ponds for water to accumulate prior to infiltration into the ground. The cross-sectional area of the ditches and culverts will be adequate for critical quantities of flow based on the 10-year rain occurrence as defined by the U.S. Dept. of Commerce (1961) allowing for inlet time considerations.

Culverts will be concrete or corrugated galvanized steel and will be designed for full capacity, covering the computed flow times a safety factor of not less than 1.25. The design will follow the "Rational Method" (American Society of Civil Engineers, 1970).

Treated Storm Drainage

Drainage and rainwater runoff from coal and limestone areas will be conveyed by unlined ditches to the ash pond for sedimentation and equalization before further treatment. Continuous low-volume coal pile seepage collected between rainfall events will be pumped to the bottom ash disposal area.

3.1.3 Transportation System

3.1.3.1 Fuel

Coal is expected to be delivered via the Louisville and Nashville Railroad and transferred to the Seaboard Coast Line Railroad on 70- to 90-car unit trains. Each car will hold 100 tons of coal. It is expected that one to two trains will arrive at the site per day. Train arrivals can be expected at any time of the day or night, seven days per week, depending on railroad scheduling at the time.

3.1.3.2 People

There will be vehicle entrances at the west side of the property to U.S. Route 17 and at the south end of the property to State Route S209. The service entrance will be on the west side of the site at U.S. Route 17, and the personnel entrance will be at the south end of the property at State Route S209.

Table 3.1-1

Seminole Plant Units No. 1 and No. 2
Summary of Pertinent Data

I. Electrical Generating System	
Number of Boilers	2
Type	Pulverized Coal
Rated Capacity of Generators with valves wide open (MW-net)	1200
Rated (Guaranteed) Capacity (MW-gross nominal)	1240
Max. Generation at valves wide open - 5% over pressure all heaters in service (MW-gross nominal)	1360
Max. Steam Flow (Lbs/Hr)	4,904,000
II. Flue Gas System	
Number of Stacks (dual-flue)	1
Height of Stack (ft)	675
Number of Liners	2
Diameter at Top (inside-ft, each flue)	36
SO_2 Removal System	Limestone Scrubbers
Avg. SO_2 Removal including coal washing at mine (%)	85[a]
Particulate Removal	Electrostatic Precipitators
Avg. Particulate Removal (%)	99.6[a]
Nitrogen Oxides Control	0.6 lbs/10^6Btu by boiler design
III. Cooling System	
Type	Closed Cycle
Cooling Tower Type (1 per unit)	Natural Draft
Cycles of Concentration	4

Table 3.1-1 (Continued)

Max. Heat Rejection Rate (Btu/Hr)	6.05×10^9
Avg. Heat Rejection Rate (Btu/Hr)	4.12×10^9
Approach (°F)	13
Temperature Range (°F)	21
Design Ambient Wetbulb (°F)	79
Design Relative Humidity	60%
Flow through Condensers (gpm)	520,000
Design Evaporation (gpm)	11,100
Avg. Evaporation (gpm)	8,250
Design Drift (gpm)	27
Avg. Drift (gpm)	27
Design Makeup (gpm)	14,800
Avg. Makeup (gpm)	11,000
Design Blowdown (gpm)	3,650
Avg. Blowdown (gpm)	2,700
Travel Time across Condensers (sec)	17.5
Type of Condenser Anti-fouling	Shock Chlorination

IV. Fuel

Type	Bituminous Coal (Illinois Basin)
Annual Coal Consumption at 0.7[b] Load Factor (Million tons per year)	3.262
Coal Consumption @ Rated cap. (TPH @ 11,700 Btu/lb)	460
Coal Consumption @ max. cap. (TPH)[c]	566
Fuel Heat Value (Btu/Lb)	11,000 to 12,500
Boiler Design Fuel Heat Value (Btu/lb)	11,700
Sulfur Content (%) (Range as fired)	1.5 to 3.0
Design Sulphur Content (%) (as fired)	3.0
Avg. Sulphur Content % - as fired estimated	2.5
Ash Content (%) (Range as fired)	6 to 10
Design Ash Content % - as fired	.10

Table 3.1-1 (Continued)

Avg. Ash Content % - as fired estimated	8%
Coal Preparation	Crushed & Washed
Method of Delivery	Rail
Ratio: Bottom Ash/Fly Ash	0.2/0.8
V. Stack Emissions	
Total Suspended Particulates, Avg. (Lbs/Hr)[b]	238
Total Suspended Particulates, Max. (Lbs/Hr)[c]	374
SO_2, Avg. (Lbs/Hr)[b]	9074
SO_2, Max. (Lbs/Hr)[c]	14260
NO_x, Avg. (Lbs/Hr)[b]	4754
NO_x, Max. (Lbs/Hr)[c]	7472
Avg. Exit Gas Velocity (fps)	19.2
Avg. Exit Gas Temperature (°F)	128
Avg. Exit Gas Volume (acfm)	2.35×10^6
Max. Exit Gas Volume (acfm)	3.69×10^6
VI. Water Use	
Source: St. Johns River	
Max. Withdrawal (gpm)	19,750
Avg. Withdrawal (gpm)	10,980
Source: Floridan Aquifer	
Max. Withdrawal (gpm)	2,700
Avg. withdrawal (gpm)	410
VII. Liquid Discharges	
(Individual system discharges are listed in Table VII of the NPDES Permit Application contained in Appendix C.)	
Discharges to St. Johns River	
Cooling Tower Blowdown	
Maximum (gpm)	3470
Average (gpm)	1200
Sanitary Wastewater	
Maximum (gpm)	10
Average (gpm)	6

144
1.2
288
144
172.8

3470

Table 3.1-1 (Continued)

	Central Wastewater Treatment	
	Maximum (gpm)	1200
	Average (gpm)	500
VIII.	Solid Waste Disposal	
	Sanitary Sludge (land spreading)	minor
	Fly Ash (acre-feet, total)	6,100
	Bottom Ash (acre-feet, total)	1,500
	Scrubber Sludge (acre-feet, total)	11,500
	Combined/Dewatered Ash/Sludge (acre-feet, total)	16,000
	Office and Miscellaneous hauled to suitable landfill	minor
IX.	Other	
	Construction Force at Station Site (peak)	1013
	Permanent Staff at Station	140
	Start Construction	Dec 1979
	Commercial Operation	
	Unit No. 1	Jun 1983
	Unit No. 2	Jun 1985
	Estimated Capital Costs ($ Million)	
	Unit No. 1 (1983)	460
	Unit No. 2 (1985)	465

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[a]Preferred alternative based on proposed New Source Performance Standards. Overall sulfur removal efficiency will be 85 percent including 6 percent credit for coal washing at mine.

[b]Average consumption and emissions are based on 1) 2.5% sulfur as fired; 2) 8% ash content; c) 11,700 Btu/lb fuel; 4) 70% L.F. and 5) 30% removal of sulfur at the mine by washing and 79% removal at the plant site by scrubbing.

[c]Maximum consumption and emissions are based on 1) 3.0% sulfur as fired; 2) 10% ash content; 3) 11,000 Btu/lb fuel; 4) 100% L.F. and; 5) 30% removal of sulfur at the mine by washing and 79% removal at the plant site by scrubbing.

Table 3.1-2

Power Block Description

Electrical Output (per unit)	Gross	Net
Maximum Turbine-Generator Output (5% overpressure, Valves Wide Open (VWO))	680,000 KW	635,000 KW
Normal Peak Turbine-Generator Output (Rated pressure, VWO)	652,000 KW	600,000 KW
Turbine-Generator Guaranteed Output	620,000 KW	579,000 KW
Average Output (based on 70% capacity factor)	457,000 KW	427,000 KW

Generator Output: Approx. 794,000 KVA @ 90% PF

Voltage Rating of Generators: Approx. 23,000 Volts

Maximum Steam Flow: 4,904,000 lbs/hr

Type of Firing: Main: Pulverized bituminous coal
Ignition and Warmup: No. 2 Fuel Oil

3.1.4 Other Associated Facilities

3.1.4.1 Spill Prevention Control and Countermeasure Plan

The following plan will be submitted to fulfill CFR requirements as presented in Chapter 40, Part 112.

1.0 INTRODUCTION

Chapter 40, Part 112 of the Code of Federal Regulations requires that nontransportation-related onshore and offshore facilities engaged in certain oil related activities and which could reasonably be expected to discharge oil into or upon the navigable waters of the United States or adjoining shorelines prepare a Spill Prevention Control and Countermeasure Plan (SPCC Plan).

The Seminole Plant Units 1 & 2 described on the following pages have been prepared in accordance with good engineering practices and have full approval of the management of Seminole Electric Cooperative, Inc.

As required by 40 CFR 112.7, this SPCC Plan follows the sequence outlined in Section 112.7 and discusses the conformance of the plant with the applicable guidelines. Since the plant is a proposed new source, not to be in operation until 1983, the prevention measures discussed will be included as a fundamental part of the site layout and plant design.

As required by Section 112.4 and 112.5, this SPCC Plan will be amended, as warranted.

2.0 DESCRIPTION OF OIL RELATED FACILITIES AND ACTIVITIES

A. Fuel oil supply for startup of the main boilers and diesel generator

B. Oil filled transformers

C. Main turbine and boiler feed pump turbine oil supply

D. Miscellaneous lube oil systems

3.0 EXPECTED EQUIPMENT FAILURE

A. Fuel oil supply for startup of the main boilers and diesel generators

   1. Type of Failure: Tank rupture
   2. Quantity: 150,000 gallons

3. Control: The tank will be surrounded by retaining walls capable of containing the entire contents of the tank should a leak develop, and will be of sufficient diameter and height to assure that a leak will not project outside the containment wall. A sump area will be provided from which the oil will be pumped into trucks and removed.

B. Oil filled transformers

1. Type of Failure: Tank rupture
2. Quantity: Largest transformer - approximately 10,000 gallons
3. Control: The transformers will be designed with an oil containment dike/pit under each transformer with a sump area from which the oil will be pumped into trucks and removed.

C. Main turbine and boiler feed pump turbine oil supply

1. Type of Failure: Tank rupture
2. Quantity: 30,000 gallons
3. Control: A containment room will be constructed around these storage tanks and will be designed to contain the entire capacity of the tanks. A pump and sump will be located within the room to remove all oil and/or water.

4.0 PROPOSED SPILL PREVENTION MEASURES

4.1 General Description of System

Discussed in Section 3.0.

4.2 Facility Drainage

In-plant effluent treatment systems are designed to treat drainage from contained areas that contain oil spills or excessive leaks. These contained areas will be drained by manually activated pumps and will pass through an oil interceptor prior to entering waste treatment. All plant drainage (except storm drains) flows through the waste treatment system.

4.3 Bulk Storage Tanks

Fuel oil tank is an above-ground steel tank. The retaining wall around the tank has sufficient freeboard to handle the contents of the tank. Rainwater drainage is through an oil interceptor to the waste treatment system. The tank is above-ground contruction. Visual inspection will be made on a routine basis. Visible oil leaks which result in a loss of oil from tank seams, gaskets, rivets, and bolts to cause the accumulation of oil in contained areas will be corrected promptly. Turbine oil storage tanks are located above ground in the Turbine Generator Building and will be inside a containment room. Large spillage of oil will be transferred to the waste oil storage tank by pump. Water washdown which contains oil will pass through an oil interceptor and then to the waste treatment system.

D. Miscellaneous lube oil systems

1. Type of Failure: Minor system leaks
2. Quantity: Less than 50 gallons
3. Control: Water washdown which contains oil will pass through an oil interceptor and then to the waste treatment system.

4.4 Facility Transfer Operations, Pumping, And Implant Process.

All underground piping will be either coated or have cathodic protection to reduce corrosion.

If corrosion damage to piping is found, additional examination and corrective action will be taken as indicated by the severity and magnitude of the damage.

When a pipeline is not in service or is on standby for an extended time, the terminal connection at the transfer point will be capped or blank flanged and marked as to origin.

Pipe supports will be properly designed to minimize abrasion and corrosion and to allow for expansion and contraction.

All above-ground valves and pipelines will be subjected to regular examinations by operating personnel in accordance with procedures to be established.

If vehicular traffic could endanger above-ground piping, signs will be posted to warn traffic of the potential danger.

4.5 Facility Tank Truck Loading/Unloading

Tank truck unloading procedures will comply with the requirements of the U.S. Department of Transportation.

Rack area drainage flows into the catchment basin. Warning signs will be used in unloading areas to prevent vehicular traffic departure before complete disconnect.

5.0 INSPECTION AND RECORDS

Procedures for inspection and recording will be formulated and will become an integral part of the SPCC plan. These procedures will be submitted to the appropriate agencies for their review prior to implementation.

6.0 SECURITY

The Seminole plant will be fully fenced, and entrance gates will be guarded at all times.

The master flow and drain valves and other valves that will permit outward flow of the tank capacity will be securely locked in the closed position when in non-operating or non-standby status.

The starter controls on all oil pumps will be located at a site accessible only to authorized personnel.

The loading connection of oil pipelines will be capped securely or blank flanged when not in service or standby service for an extended time.

The Seminole plant will be operated 24 hours a day and, therefore, will be well lighted at night.

7.0 PERSONNEL, TRAINING

The Plant Manager will be designated as being accountable for oil spill prevention. He will report to the Director of Power Production who in turn will report to the Vice President and General Manager.

The Plant Manager will schedule and conduct spill prevention briefings for the plant operations and maintenance personnel in order to assure adequate understanding of the SPCC plan as described.

3.1.4.2 Fuel Oil Storage

Diesel and fuel oil supply for startup of the boilers and diesel generation will be stored in tanks as described in Section 3.2. This area will be diked and closed off from the environment consistent with controls in the Spill Prevention Control and Countermeasure Plan. Any accumulated rainwater or oil will be pumped through an oil-water separator prior to further treatment in the Chemical Waste System.

3.1.4.3 Bulk Chemical Storage Facilities

Chemical bulk storage will include:

1. 66 ^{o}Be' Sulfuric Acid
2. 50% Liquid Sodium Hydroxide
3. 50% Liquid Alum
4. 30% Aqueous Ammonia
5. 35% Aqueous Hydrazine
6. Hydrated Lime, 93% dry
7. Chlorine
8. Carbon Dioxide
9. Hydrogen
10. Nitrogen
11. Acetylene (Bottles)
12. Oxygen (Bottles)
13. Argon/Helium (Bottles)

Liquid chemical bulk tanks and associated pumps will be installed directly over the neutralization sumps. Each sump will be equipped with a normally closed drain valve and connected to a neutralization sump. Any leakage will be neutralized before pumping to the Chemical Waste System.

3.1.4.4 Machine Shop and Vehicle Maintenance Facilities

Floor drainage in these areas will be collected, passed through an oil interceptor, and further treated in the Chemical Waste System.

3.1.4.5 Scrubber Drains

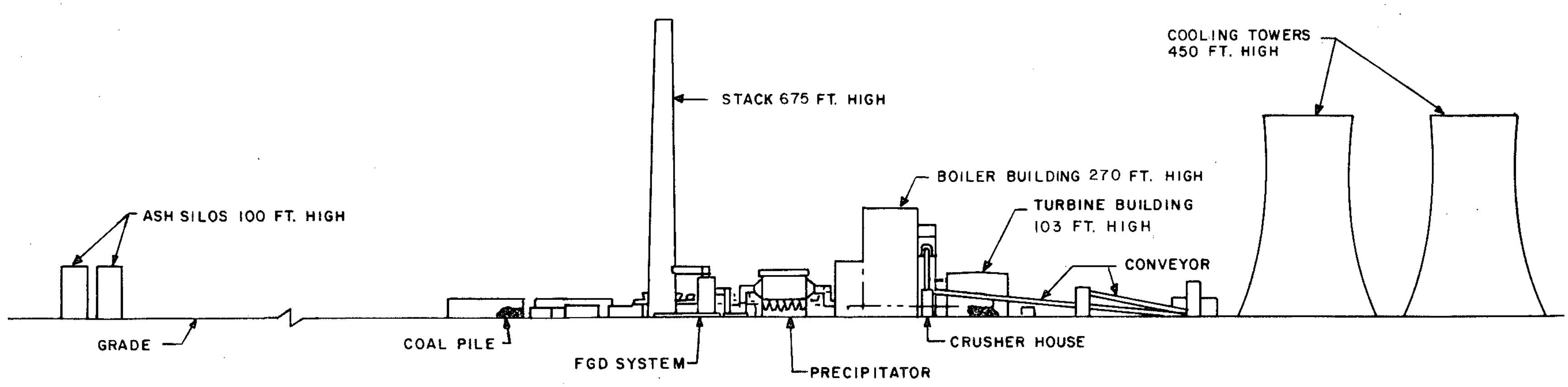
Scrubber drains can be classified by two (2) types: 1) oily; 2) reageant. Oily drains (for spred reducers, etc.) will be directed through an oil intercepter. Reageant drains will be recycled back into the reaction tank.

3.1.4.6 Oil Pumps and Tanks

The areas in the main plant island which have pumps or vessels which pump or house oils will be diked, and drains from these areas will be directed to an oil intercepter before further treatment.

3.1.4.7 Transformers

The transformers will be designed with an oil containment dike/pit under each transformer. These drains will pass through an oil interceptor.



1. ALL HEIGHTS ARE APPROXIMATE
2. GRADE ELEV. APPROX. 80 FT. ABOVE MSL

Figure 3.1-2. Station Profile.

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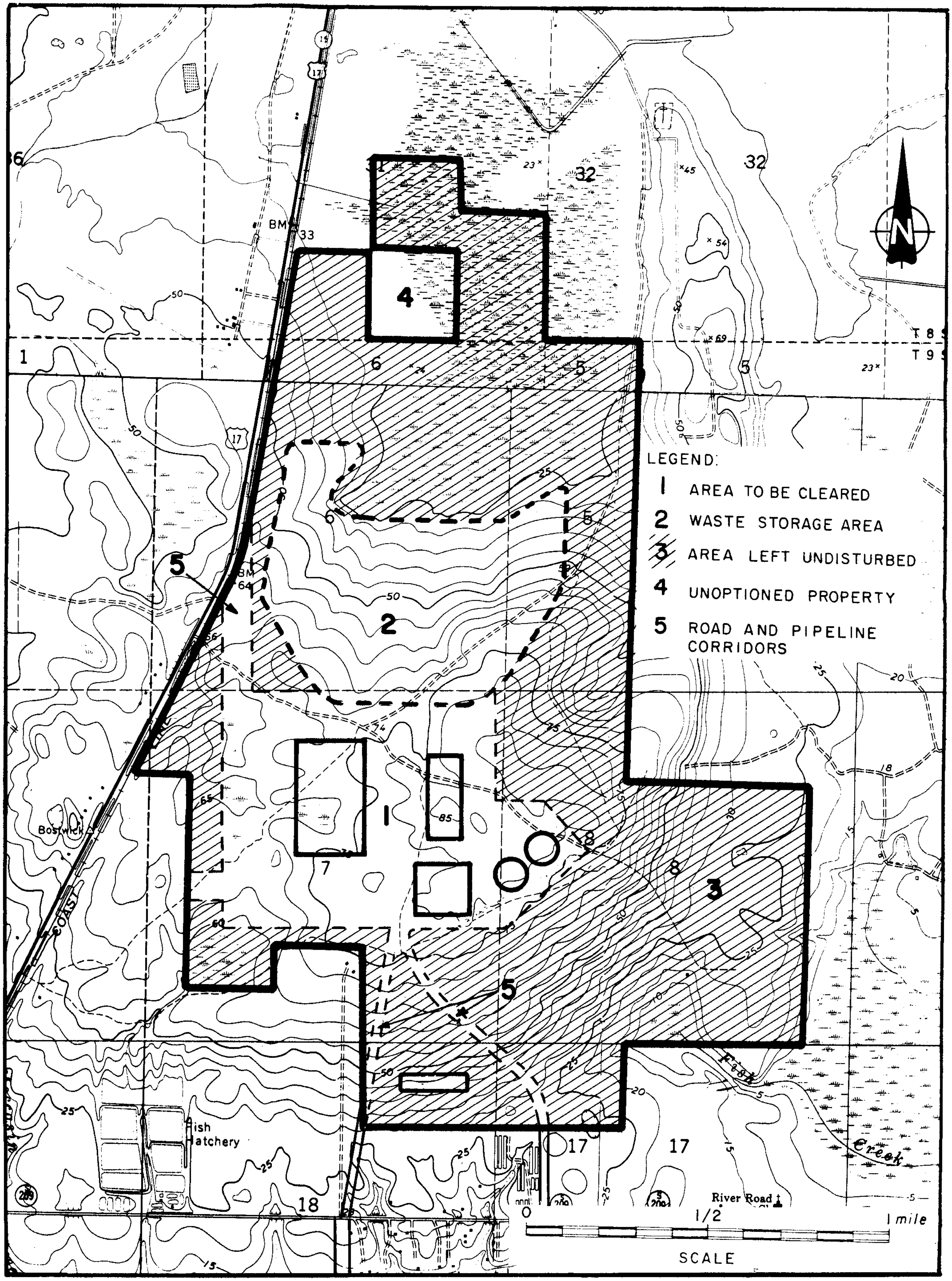

Figure 3.1-3. Generalized Site Landscape Plan.

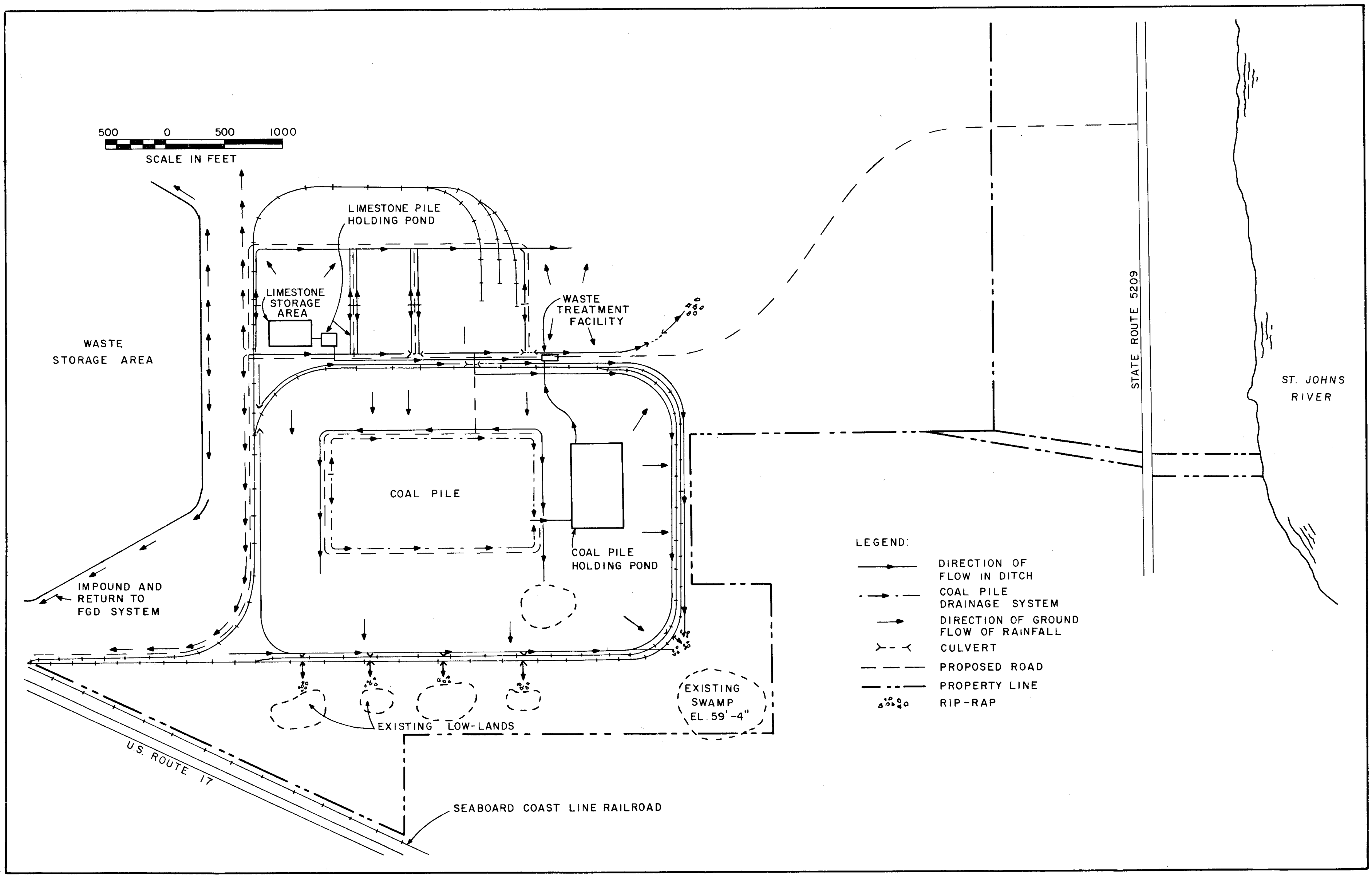

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Figure 3.1-4. Storm Drainage System.

3.2 FUEL DESCRIPTION

Seminole Plant Units No. 1 and No. 2 are being designed to burn a wide range of Eastern and Midwestern (Illinois Basin) bituminous coal conforming to the following range of characteristics, presented on an as-received basis:

Moisture (percent)	$\leq$ 15
Volatiles (percent)	$\geq$ 30
Fixed Carbon (percent)	$\geq$ 40
Ash (percent)	$\leq$ 10
Sulfur (percent)	1.5 to 3.0
Heat Content (Btu/lb)	$\geq$ 11,000
Softening Temperature (°F)	2,200 minimum
Grindability (Hardgrove)	50 to 60

Contractual negotiations have been completed with a supplier in West Kentucky and Illinois for bituminous coal.

Coal will be stored in an active pile equivalent to 72 hours of steam generator maximum continuous rating. Inactive storage will be in the form of an open pile about 34 acres in area by 40 feet high, equivalent to 90 days of 100-percent load factor operation. The silos within the station will hold 12 hours of coal at steam generator maximum continuous rating.

Coal will be removed from unit train cars into hoppers, from which feeders will move the coal onto conveyors. A redundant conveyor belt system will move the coal to a transfer tower for forwarding either to dead or active storage or to the plant. Reclaim will be either by a bucket reclaimer or hoppers under the active pile, with feeders moving the coal onto reclaim system conveyors. A conveyor belt system will move the coal to the silos. Coal will be removed by automatic feeders from the silos into ball tube mills for pulverizing before feeding the fuel into the steam generator furnace.

In addition to coal, No. 2 fuel oil will be used for initial lightoff, low load flame stabilization, and supply to the diesel equipment (emergency diesel generator, etc.) This oil will have approximately the following analysis:

Carbon (percent)	87.0
Hydrogen (percent)	12.4
Sulfur (percent)	0.5
Nitrogen (percent)	0.1
Heat Content (Btu/lb)	18,000

It is estimated that there will be approximately twenty startups during the first year of operation of each unit and six startups per year per unit thereafter. Based on 12,000 gallon consumption per startup, the first year consumption will be 240,000 gallons per unit and 72,000 gallons annually per unit after that.

Oil will be delivered to the station by tank truck and stored in one closed fuel oil tank. The tank will have a capacity of 150,000 gallons. The tank will be surrounded by retaining walls capable of containing the entire contents of the tank should a leak develop and will be of sufficient diameter and height to assure that a leak will not project outside the contaiment wall. Tank water and rainwater will be treated before discharge.

3.3 AIR EMISSIONS CONTROL SYSTEM

(Considerably more detailed information on emission controls is provided in Appendix F.)

3.3.1 Control of Boiler Emissions

3.3.1.1 Sulfur Dioxide

Many methods currently exist for the control of sulfur dioxide (SO_2) emissions in flue gases. Seminole's base design includes the installation of a Flue Gas Desulfurization (FGD) system to limit sulfur dioxide emissions to those required by Federal and State emission standards. Among the major criteria for the selection of the type of FGD processes to be considered were the ability to achieve desired removal efficiency, availability and reliability, operating costs, availability and cost of reagent, proper engineering design of system, and environmental impact potential.

The FGD system proposed to be installed and operated at the Seminole Station will be the limestone flue gas scrubbing process. Limestone scrubbing systems have demonstrated the ability to achieve desired removal efficiencies. The Seminole Station scrubbing system is being designed to achieve a 79 percent SO_2 removal efficiency. (This, in combination with coal washing at the mine, will result in an overall sulfur removal of 85 percent.) Burning fuel with a 1.5 to 3.0 percent sulfur content and 11,000 to 12,500 Btu/lb heating value, the FGD system should limit maximum SO_2 emissions to no more than 1.15 lb/10^6 Btu. This is in compliance with the proposed Federal Electric Utility Steam Generating Unit New Source Performance Standard (NSPS) and Florida new source emission standard of 1.2 lb/10^6 Btu.

3.3.1.2 Nitrogen Dioxide

The only proven method of limiting nitrogen oxides (NO_x) emission is in the combustion process. Methods used are flue gas recirculation, overfire air, and two (2) stage combustion. This furnace design will utilize the most proven methods which are two (2) stage combustion and overfire air to accomplish reduced NO_x emissions. The boilers planned for the Seminole Station are guaranteed by the manufacturer to limit NO_x emissions to meet required emission limitations.

NO_x emissions vary depending upon plant load conditions, being greatest at the unit highest load and least at its lowest load. Assuming all NO_x to be in the form of nitrogen dioxide (NO_2), the furnace design planned for the Seminole Station will limit NO_2 emissions to a maximum emission rate of 0.6 lb/10^6 Btu at peak capacity. This is in compliance with the current Florida emission standard of 0.7 lb/10^6 Btu and proposed Federal NSPS of 0.6 lb/10^6 Btu.

3.3.1.3 Total Suspended Particulates

There are several methods commonly used for the removal of particulates from flue gases. The Seminole Station is proposed to be equipped with electrostatic precipitators, which represent currently the most proven and reliable method of particulate control in the power industry for large central stations. Electrostatic precipitators will provide the necessary efficiency and availability needed to meet and maintain air quality standards. Precipitators will be installed between the air preheater outlet of the furnace and the inlet to the induced draft fans.

The precipitators to be installed at the Seminole Station will be designed to achieve a control efficiency of 99.6 percent. At this efficiency and assuming a combination of high ash/low Btu coal, the maximum particulate emission rate will be 0.03 lbs/10^6 Btu at peak operating capacity. This rate is in compliance with the current Florida emission standard of 0.1 lb/10^6 Btu and the proposed Federal NSPS of 0.03 lb/10^6 Btu.

3.3.2 Good Engineering Practice Stack Height

Good Engineering Practice (GEP) stack height is defined as the height necessary to insure that emissions do not result in excessive concentrations in the immediate vicinity of the stack as a result of atmospheric downwash and wake effects that may be created by the stack itself, nearby structures, or nearby terrain obstacles. In calculating ambient ground-level concentrations due to stack emissions, regulatory policy is to avoid giving credit for stack heights which exceed the GEP height.

According to a draft EPA document (EPA, 1977a) on GEP stack height design, GEP stack height is defined as the height of nearby structures which are close enough to exert a wake effect, plus 1.5 times the lesser dimension (height or width) of these nearby structures. This same document suggests that the area in which stack emissions would be influenced by the wake effect of a hyperbolic natural draft cooling tower extends approximately three tower heights from the upper edge of the tower. As will be noticed in Figure 3.1-1, both of Seminole's cooling towers have been located far enough away from the boiler stacks, using the three-times-height rule of thumb, that GEP stack height need not be defined in terms of cooling tower height. Instead, the dimensions of the power block structures determine GEP stack height for this project.

The highest point of the power block is the boiler building which is approximately 270 feet high. The lateral dimension of the power block, which consists of several contiguous structures (boiler building, electrostatic precipitator housing, turbine building, etc.), exceeds the vertical dimension. Therefore, defining GEP stack height as the height of nearby structures (which are close enough to exert a wake effect) plus 1.5 times the lesser dimension (height or width) of nearby structures, the resulting GEP height for Unit No. 1 and Unit No. 2 stacks is (270) + (270 x 1.5), or approximately 675 feet. This is the height on which modeling is based.

3.3.3 Fugitive Dust Control

Potential sources of fugitive dust emissions are coal storage and handling, limestone handling, fly ash disposal, and excavation and traffic during construction.

A complete wetting system and/or dust collection equipment for dust suppression will be utilized at the coal unloading site. The coal will be stacked in an open pile. The inactive coal pile will be compacted by bulldozers to minimize surface dust blowoff.

As the coal is reclaimed for use in the plant, it will be transfered from belt to belt; at these transfer points dusting can occur, therefore pnuematic collecting devices have been supplied. The enclosed coal crusher house and the coal tripper gallery at the boilers will be ventilated and equipped with dust collection devices.

The control of nuisance dust caused by excavation and traffic will be by application of water and/or chemicals to reduce dust concentrations.

3.4 STATION SERVICE WATER SYSTEM

The service water will originate from two deep wells located near the western border of the property and drawing from the Floridan Aquifer. Each well pump will have 1500 gpm capacity. Average daily withdrawal rate is expected to be about 590,000 gallons.

A generalized flow diagram of the station water use system is shown in Figure 3.4-1. Well water will require treatment prior to station uses except for fire water storage. The basic flow diagram for the well water pretreatment system is shown in Figure 3.4-2. Treatment will include aeration to oxidize iron and sulfides, and to remove dissolved carbon dioxide prior to lime softening and filtration. Treatment chemicals will include alum, lime [$Ca(OH)_2$], chlorine, and a potable water-grade polyelectrolyte. Treated water leaving the lime softening unit will contain 5 to 10 mg/liter of suspended matter. This water will be further treated in dual-media gravity type filters.

Filtered water from the pretreatment system will be further treated for potable water use and boiler makeup water. The basic flow diagram for this system is shown in Figure 3.4-3. The system will include activated carbon purifiers for the removal of resident traces of organics, chlorine, and suspended matter. Activated carbon treated water will be used in the potable water system and as the inlet to ion exchange demineralizing units. Demineralized water from these units will be used for the boiler makeup water and in the condensate polishing system described in Section 3.6.4.

Figure 3.4-1

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Generalized Flow Diagram of the Station Water Use System is Contained in Figure 3, NPDES Permit Application (Appendix C).

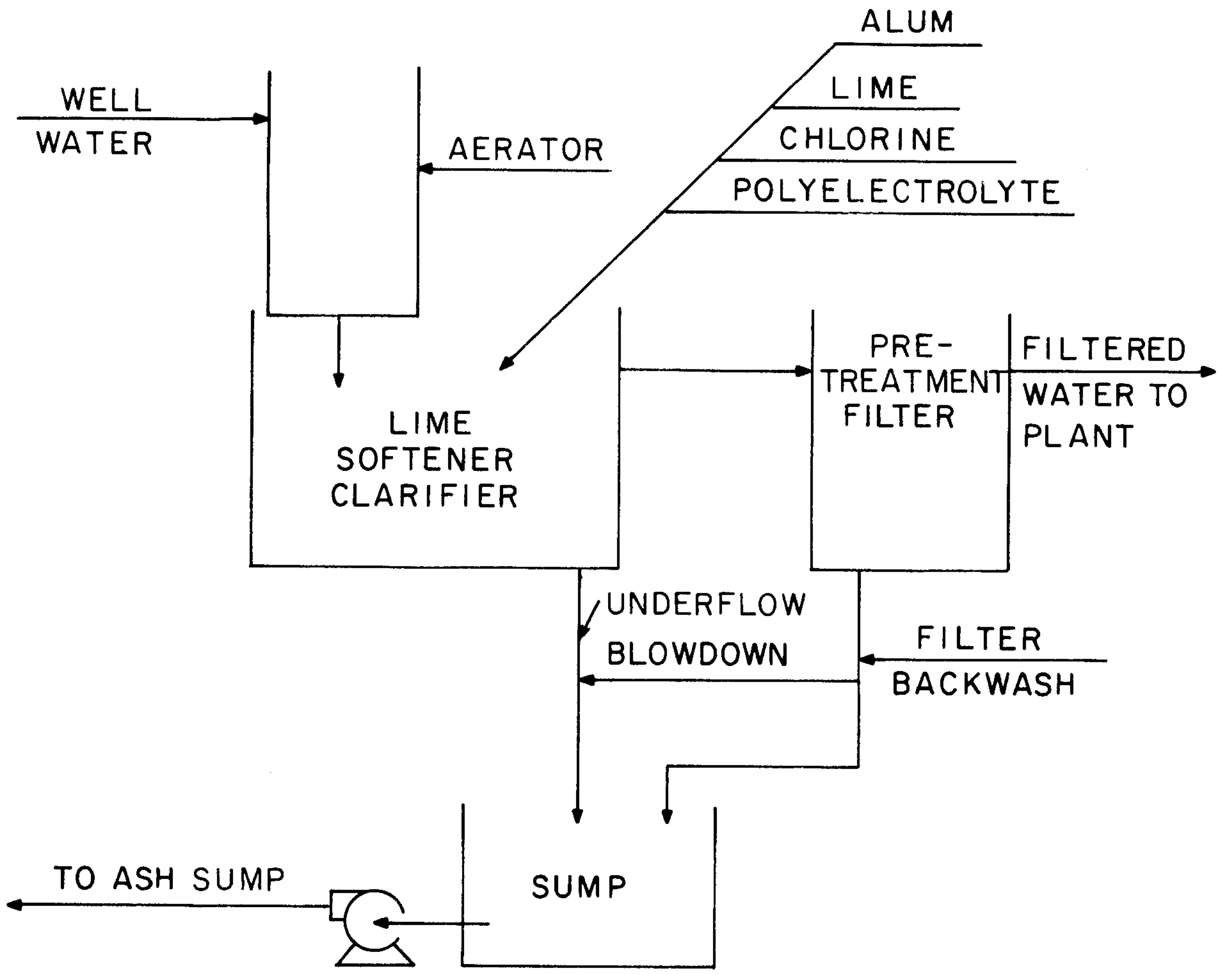


Figure 3.4-2. Well Water Pretreatment System Flow Diagram.

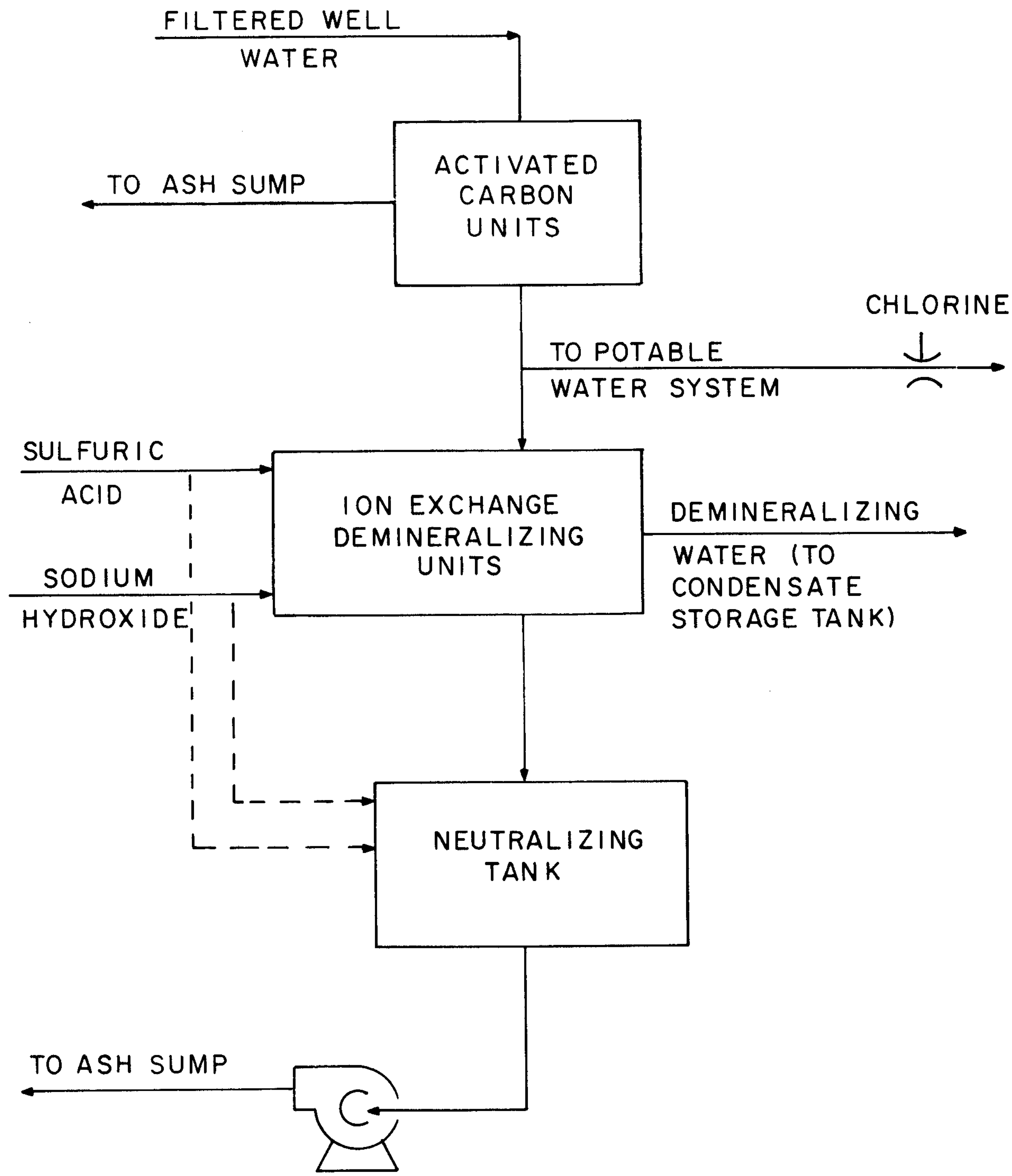


Figure 3.4-3. Makeup Demineralizing System Flow Diagram.

3.5 HEAT DISSIPATION SYSTEM

3.5.1 Cooling Towers

The station's rejected heat load will be expelled into the atmosphere through two natural-draft cooling towers. Most of the heat load will originate in the steam turbine cycle, with the balance coming from residual heat removal systems in the plant. Circulating water will be continuously circulated through the condensers where it will pick up rejected heat from the turbine and auxiliaries. This water, together with the water from other heat removal systems, will be pumped to the cooling towers where heat will be dissipated to the atmosphere by evaporate cooling.

The heat load for maximum power generation or design conditions is 6.05 x 10^9 Btu/hr. Under design conditions, the recirculating cooling water flow in Units 1 and 2 will be 270,000 gpm each. Recirculating water will be cooled in a closed loop. Evaporation rate at design is approximately 2.1 percent of flow or 11,100 gpm, and drift will be 0.005 percent of the flow or 27 gpm for two units. To control the formation of deposits and corrosion in the system, the towers will be operated at four cycles of concentration and pH adjustment by chemical addition, as required. This means the solids present in the raw river water will be re-concentrated by a factor of four due to the evaporation process. The design blowdown rate from both cooling towers will be about 3650 gpm. A portion of this blowdown, 1,200 gpm, may be recovered for the flue gas desulfurization (FGD) system. The maximum makeup water requirements will be 16,127 gpm for both units. The cooling tower characteristics are summarized in Table 3.5-1. 23.2 MGD

To control biological growth in the condenser, chlorine will be added intermittently. Only enough chlorine to provide a residual of 0.2 ppm chlorine at the discharge point when two (2) units are in operation. This will be accomplished by staggering chlorine injections to the two (2) units so that while one unit will have approximately 0.00 ppm the other unit will have a maximum free chlorine limit of 0.4 ppm (MAX CASE) thereby obtaining a composite efficient of 0.2 ppm or less.

It is expected that there will be four to six applications each day for a period of 15 to 30 minutes. Chlorine injection is expected to take place in the circulation water pump suction line.

Periodic applications of chlorine to the tower fill and distribution system may be required to control growths. During such periods, the blowdown valves will be manually closed to prevent any unauthorized release of chlorine bearing water. In normal operation, small quantities of sulfuric acid will be added to the recirculating water under pH control. This is necessary to prevent the formation of calcium carbonate scale on heat transfer surfaces. The pH of the circulating water will be maintained in the range of 7.0 to 7.5.

3.5.2 Intake Structure

The intake structure will be that described in Section 9.2.7.7 Scheme 6 - Wedgewise Screen Intake.

3.5.3 Discharge Structure

The type of discharge structure is shown in Figure 3.5-1. It will be a submerged outlet consisting of a single 16-inch diameter pipe. A nozzle will be situated at the end of the pipe.

The location of the nozzle will be such that (1) water of sufficient depth (estimated at 6 feet) will exist at normal low tide to achieve sufficient mixing, and (2) sufficient distance (estimated at 150 feet) will be maintained from an intake structure, or channel to a discharge structure, to prevent excessive recirculation of discharged water to the intake.

The nozzle will be designed to maintain an exit velocity of 10 to 15 feet per second (fps) under design conditions of hydraulic head and discharge. The design range of exit velocities is based on two considerations. First, the lower end of the range is based on maintaining at least a 10 to 1 discharge ratio with the upper limit of expected ambient current velocities. Second, the upper end of the range, 15 fps, is based on preventing the occurrence of a surface boil at the depth of 5 feet during periods of minimum tide elevation (total river depth will be 6 feet, but the nozzle will be submerged 5 feet). The discharge range of 10 to 15 fps should insure good mixing through the turbulent jet action in order to prevent stratification and concentration of effluent in the river.

The discharge nozzle will be designed to pass the maximum expected plant discharge at the before-mentioned velocity. A surge tank will be provided in the discharge system to maintain the design exit velocities. During periods of lower-than-maximum plant discharges, a valve arrangement will interupt flows to the river while the surge tank fills up. When the tank is full, the valve will be opened. Then, the wastewater will discharge to the river at the prescribed velocity until the level in the tank falls to a predetermined level, at which time the value will close, thus completing the cycle. In other words, discharges to the river will be intermittant during periods of low plant wastewater flow.

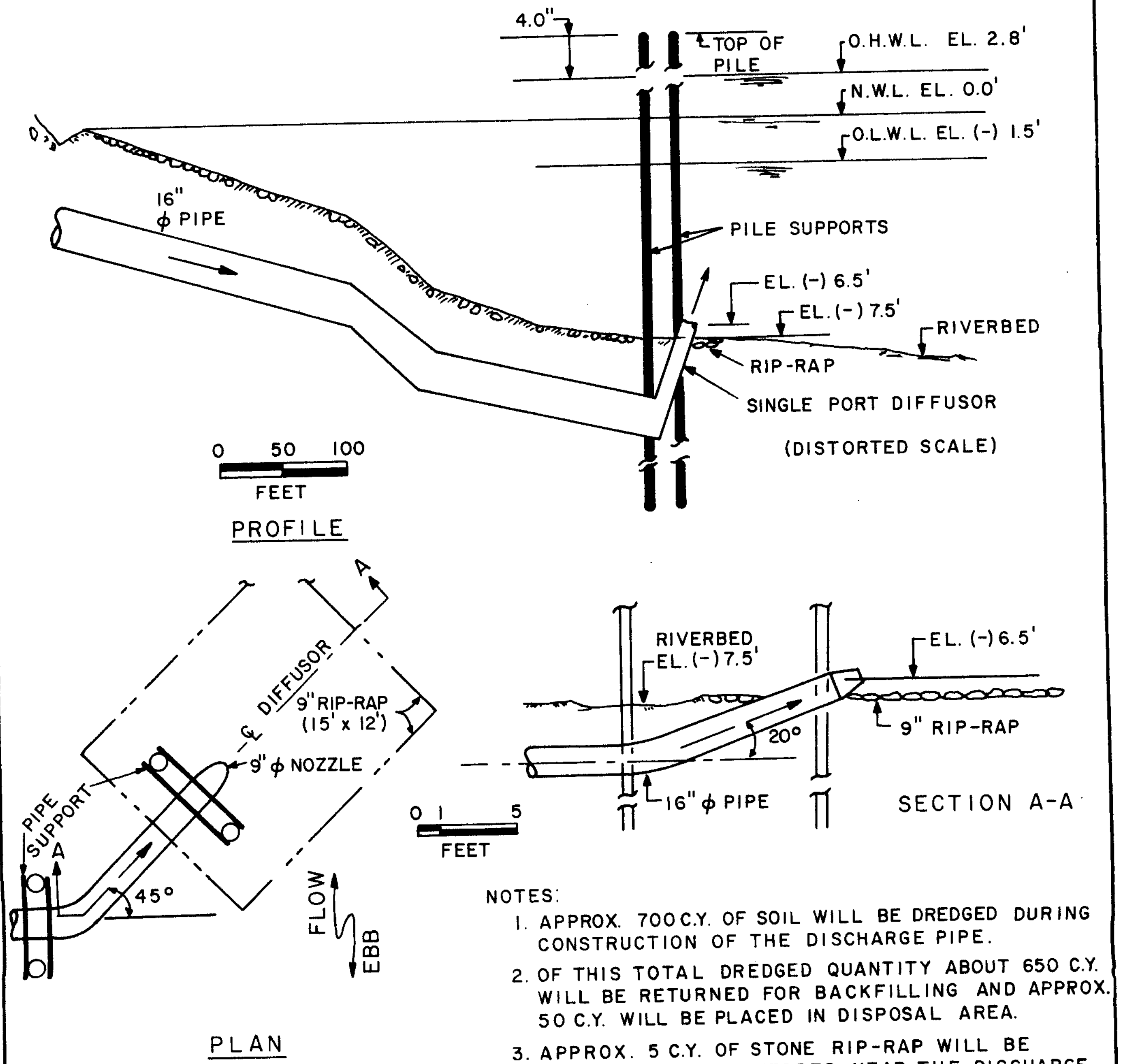
As shown in Figure 3.5-1, the nozzle will be directed away from the river bottom at an angle of approximately 20 degrees in order to prevent erosion of the bottom and resuspension of sediments. Near the discharge nozzle, riprap will be placed on the bottom to prevent scour caused by jet turbulence. The point of discharge will be elevated slightly from the bottom, about 1 foot above the riprap. The discharge jet will be directed toward the downriver flow direction at approximately 45 degrees to the ambient current direction.

A series of piles will be placed at the nozzle in order to prevent displacement of the pipes due to thrusts caused by change in flow direction and the discharge jet.

Table 3.5-1

Summary of Pertinent Data
for Heat Dissipation System

HEAT DISSIPATION RATES (Btu/Hr)	
Max. Power Generation	6.04×10^9
Average Power Operation	4.12×10^9
COOLING TOWERS	
Type	Natural Draft
Number	2
Height	450 ft.
Recirculating Flow Rate (each tower)	270,000 gpm
Diameter at Base	450 ft.
PRINCIPAL WATER USE (Maximum for two units, gpm)	
Surface Water Withdrawal	16,127
Evaporation	12,130
Drift	27
Blowdown	3,970



NOTES:

1. APPROX. 700 C.Y. OF SOIL WILL BE DREDGED DURING CONSTRUCTION OF THE DISCHARGE PIPE.
2. OF THIS TOTAL DREDGED QUANTITY ABOUT 650 C.Y. WILL BE RETURNED FOR BACKFILLING AND APPROX. 50 C.Y. WILL BE PLACED IN DISPOSAL AREA.
3. APPROX. 5 C.Y. OF STONE RIP-RAP WILL BE PLACED ON THE RIVERBED NEAR THE DISCHARGE PORT.

Figure 3.5-1. Proposed Discharge Structure.

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3.6 CHEMICAL WASTE SYSTEM

3.6.1 General

The Chemical Waste System is provided to collect and treat wastewater streams to meet the water discharge quality limitations given in 40 CFR 423 and Chapter 17-3 of the Florida Administrative Code. The basic philosophy of the system design is to neutralize strong wastes at the source, separate oil before pumping, collect and equalize the wastes in one of two ash pond areas, then adjust pH and reduce remaining oil, heavy metals, and suspended matter by coagulation and sedimentation before monitoring and release.

Flow, frequency, daily and annualized average production of the wastewater sources described below are summarized in Table VII of the NPDES Permit Application (Appendix C). The quantities shown are based on station operation at full rated capacity. A flow diagram of plant water systems is given in Figure 3.4-1.

3.6.2 Well Water Pretreatment System

Clarifier Blowdown

Waste produced by the well water lime softening unit discussed in Section 3.4 will be primarily a calcium carbonate slurry with small amounts of ferric, aluminum, and magnesium hydroxides. Sludge from the lime softening unit will be blown off intermittently every 30 minutes. Sludge will be collected in a sump and pumped to the equalization pond or ash sump for sedimentation and equalization before further treatment.

Pretreatment Filter Backwash

Under full load conditions, each of the three, two-compartment filters described in Section 3.4 will be backwashed at an average rate of approximately 850 gpm for a period of about 5 minutes per day. The composition of the suspended matter in the filter backwash water will be similar to that in the clarifier blowdown sludge. The filter backwash water will be discharged to the same sump receiving clarifier blow-down and pumped to the equalization pond or ash sump for sedimentation and equalization before further treatment.

3.6.3 Makeup Demineralizing System

Periodically, the activated carbon units described in Section 3.4 will require backwashing to remove traces of suspended matter that pass through the pretreatment system filters. At maximum plant demand, each of the three activated carbon purifiers will require backwash at a rate of approximately 400 gpm for 15 minutes, followed by a short rinse, once per week. This wastewater will be routed to the equalization pond or ash sump for sedimentation and equalization before further treatment.

The operating capacity of the ion exchange demineralizing resins is limited. When exhausted, cation-exchange resins are regenerated with a dilute solution of sulfuric acid, while anion resins are regenerated with a dilute solution of sodium hydroxide. Excess regenerant solutions and rinse water not recoverable by recycle are collected in a batch neutralization tank that is an integral part of the system. The collected wastes are mixed, and additional sulfuric acid or sodium hydroxide are automatically added to adjust the pH to a range of 6.5 to 8.5. The flow rates from regenerating ion exchange units is variable during the cycle. After verification of proper pH adjustment by the operator, neutralized demineralizer wastes will be pumped at a rate of about 250 gpm to one of the two ash ponds for equalization prior to further treatment. At maximum plant load, up to two makeup demineralizer regenerations could take place in one day.

3.6.4 Condensate Polishing System

A deep bed-mixed type condensate polishing system will be provided to treat hotwell condensate on Units 1 and 2. These ion exchange units will remove traces of corrosion and erosion products as well as any contaminants entering the feedwater cycle as a result of air or condenser in-leakage. When the ion exchange resins are exhausted, or when excessive pressure drop conditions occur, the resins will be hydraulically transferred to a regeneration facility near the makeup demineralizing system. Here the resins will be backwashed, separated, regenerated, rinsed, mixed, and prepared for hydraulic transport to a service unit when needed.

The basic flow diagram for the condensate polishing system is shown in Figure 3.6-1. Demineralized water is used for all transfer and regenerating operations. As in the makeup demineralizing system, the ion exchange resins of the condensate polishing system are regenerated with dilute solutions of sulfuric acid for cation exchange resins and sodium hydroxide for anion exchange resins. Excess transfer water, backwash water, spent acid and caustic regenerant solutions, and rinse waters are collected in a neutralizing tank. As part of the automatic cycle, the pH of the collected waste is adjusted to a range of 6.5 to 8.5 by the addition of sulfuric acid or sodium hydroxide as needed. After verification of proper pH adjustment by the operator, the neutralized waste will be pumped at a rate of about 250 gpm to the equalization pond or ash sump for equalization prior to further treatment. Under full load conditions, up to one condensate polishing system regeneration on each generating unit could be expected each day.

3.6.5 Boiler Blowdown

The high pressure boiler water chemistry at this station will be based on zero solids, or all volatile treatment. Up to 2 mg/liter of ammonia and 0.020 mg/liter of hydrazine will be present in the feedwater at the economizer inlet. Essentially, all the hydrazine will be decomposed into nitrogen and ammonia in the high temperature environment of the boiler. Chemistry management to provide high purity steam will limit total solids in the boiler water to about 2 mg/liter. This low level of total solids in the boiler water will be maintained by the condensate polishing system.

Blowdown will come directly from the boiler drums and from the water and steam sampling system analyzers that continuously monitor the system. All blowdown water will be continuously cooled before passing to the perculation fields for disposal. Each of the main boilers will continuously produce up to 20 gpm of blowdown.

3.6.6 Floor Drains

Under normal operating conditions, there is little flow in the floor drain system. However, periodic clean-up operation will result in some occasionally oily waste. Mechanical emulsification with subsequent difficulty in separation will be avoided by the use of local oil interceptors. After separation of oil, wastewater will be pumped to either the equalization basin or ash sump for equalization before further treatment. Oil trapped by the interceptors will be removed periodically, drummed, and incinerated or reused. Each of the floor drain systems in Units 1 and 2, the machine shop, and vehicle maintenance area, will have a capacity of about 50 gpm.

3.6.7 Turbine Oil Sumps

Turbine oil sumps associated with Units 1 and 2 do not normally contain any water. Oil is collected here and recovered or drummed for disposal. However, during periodic clean-up operations, washwater will enter the turbine oil sumps. After manual removal of oil, any water remaining will be pumped at a rate of up to 50 gpm to a floor drain sump for further oil separation prior to pumping to either the equalization basin or ash sump for equalization before further treatment.

3.6.8 Laboratory Drains

Power station laboratory wastewaters contain very small quantities of contaminants resulting from fuel and water testing. Up to about 5 gpm of laboratory wastewater will be pumped to either the equalization basin or ash sump for equalization before further treatment.

3.6.9 Bottom Ash Sluice Water

Bottom ash from Units 1 and 2 will be hydraulically sluiced intermittently at a rate of about 2000 gpm to a dewatering facility. Water decanted will be recycled and reused. About 5 percent of the sluice water flow (or 100 gpm) plus the process flow input (440 gpm) giving a gross flowrate of 540 gpm will be continuously withdrawn to avoid supersaturation of the system with sparingly soluble constituents such as calcium sulfate or calcium carbonate. Water withdrawn from the bottom ash system will be further treated in the Central Wastewater Treatment System.

3.6.10 Air Preheater Wash

Periodically, the air preheaters are washed at a high rate for a short period of time. Preheater washwater flows of up to 2500 gpm will be collected in a local sump for batch treatment if required, then pumped to the equalization basin or ash sump for equalization before further treatment.

3.6.11 Boiler Fireside Wash

As part of a scheduled maintenance outage, the internal or fireside of the boiler may require water washing. The wastewater from hose type washing at rates up to 200 gpm will be collected in a local sump for batch treatment, if required, then pumped to one of two ash ponds for equalization before further treatment.

3.6.12 Stack Wash

As in the case of boiler fireside wash, an occasional hose type washing of a portion of the stack liner may be required. This operation, during a unit outage, may produce up to 200 gpm of wastewater. The wastewater will be collected in a local sump for batch treatment, if required, then pumped to the percolation field for disposal.

3.6.13 Cooling Tower Basin Cleaning

During infrequent maintenance outages, it may be necessary to remove silt and debris from the cooling tower basins. This will be accomplished by draining the system under supervision to avoid disturbing accumulated sediments. When drained as much as possible without disturbing the sediments, the drain valves will be closed and the system cleaned by hosing. Accumulated sediments, debris, and washwater will be trucked to the sludge disposal area for addition to the combined effluent.

3.6.14 Boiler Chemical Cleaning

Prior to initial commercial operation, and about every 4 to 5 years afterwards, the boiler and preboiler system will require cleaning. The cleaning operation typically includes an alkaline flush or "boilout" with a solution of trisodium phosphate and detergent followed by a water wash. The boiler itself is then usually cleaned with a dilute solution of hydrochloric acid (5 percent) with a small amount of inhibitor added.

After the acid cleaning, the system is water flushed, then filled with a solution containing small amounts of ammonia and hydrazine to protect it against corrosion until startup.

Spent alkaline and acid cleaning solutions, and washwater will be pumped at a rate of about 500 gpm to the equalization basin. The wastewater will be batch treated using lime or caustic soda, or other chemicals found necessary in laboratory jar tests. After treatment, the wastewater will be pumped to the percolation field for disposal.

3.6.15 Central Wastewater Treatment System

The Central Wastewater Treatment System is provided to collect, equalize, store, treat, and monitor excess water before release. The basic flow diagram is shown in Figure 3.6-2. Strong wastes are batch treated at the source and oil is trapped locally before pumping wastes to the equalization basin. The large-volume detention and contact with various wastes provides equalization of chemical composition and temperature required for good operation of coagulation-sedimentation treatment systems. Any free oil not absorbed by ash or other sediments will be trapped by retaining baffles and removed by surface skimmers.

Wastewater will be pumped from one of two equalization basins to a pH adjustment tank at a rate controlled on the basis of pond level. Here, the pH will be adjusted to a narrow optimum range to assure minimum heavy metal concentration and good coagulation conditions. Any floating oil will be skimmed periodically and returned to the inlet end of one of the two ash ponds.

After pH adjustment, the water will flow to a conservatively rated solids-contact type clarifier. Alum and a potable-water-grade coagulant aid will be added to assure good clarity of the treated water. Coagulated constituents in the clarifier sludge will be intermittently blown down to the inlet side of the operating equalization basin for sedimentation and retention.

The clarified treated water will flow by gravity to a monitoring detention tank. Control parameters will be continuously monitored, and if acceptable, the treated water will be released. If control limits are exceeded, the system will provide automatic recycle back to the inlet end of the operating equalization basin, and the operators will be notified by automatic alarm.

Table 3.6-1 Deleted

Wastewater volumes may be found in

Table VII of the NPDES Permit Application

(Appendix C)

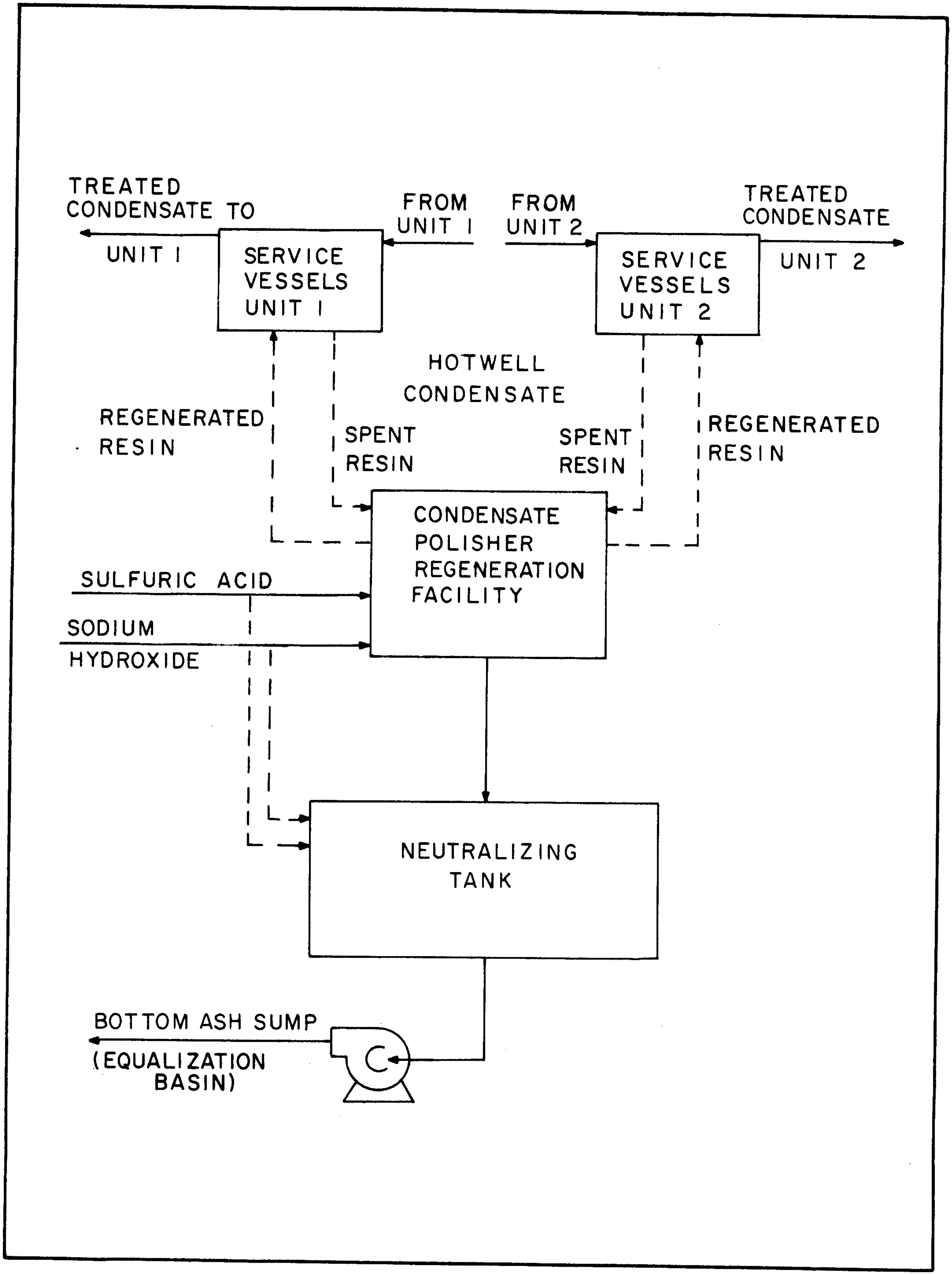

Figure 3.6-1. Condensate Polishing System Flow Diagram.

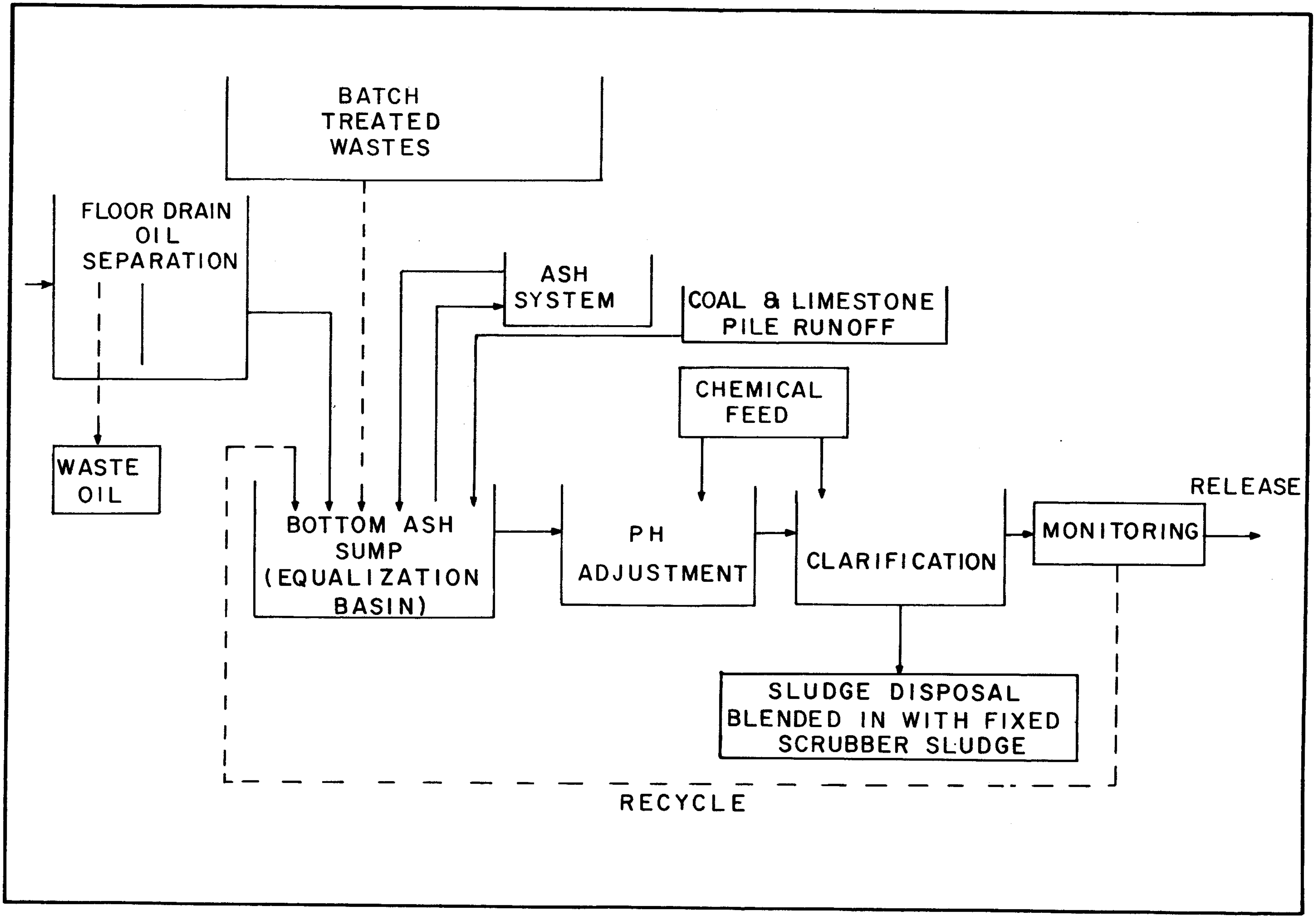

Figure 3.6-2. Central Wastewater Treatment System Flow Diagram

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3.7 SANITARY WASTEWATER TREATMENT SYSTEM

A sanitary wastewater treatment system will be provided consisting of a prefabricated, digestion-type sewage treatment plant capable of treating approximately 10,000 gallons per day of domestic-type sewage.

A flow diagram of the plant is shown in Figure 3.7-1. The plant will include a comminutor and clarifier in addition to an aeration chamber. Effluent water from the system will be chlorinated if needed and will meet all aspects of EPA, local and State of Florida requirements prior to disposal. Effluent will be discharged with excess cooling tower blowdown and with effluent from the Central Wastewater Treatment System. Resulting sludge will be land spreaded.

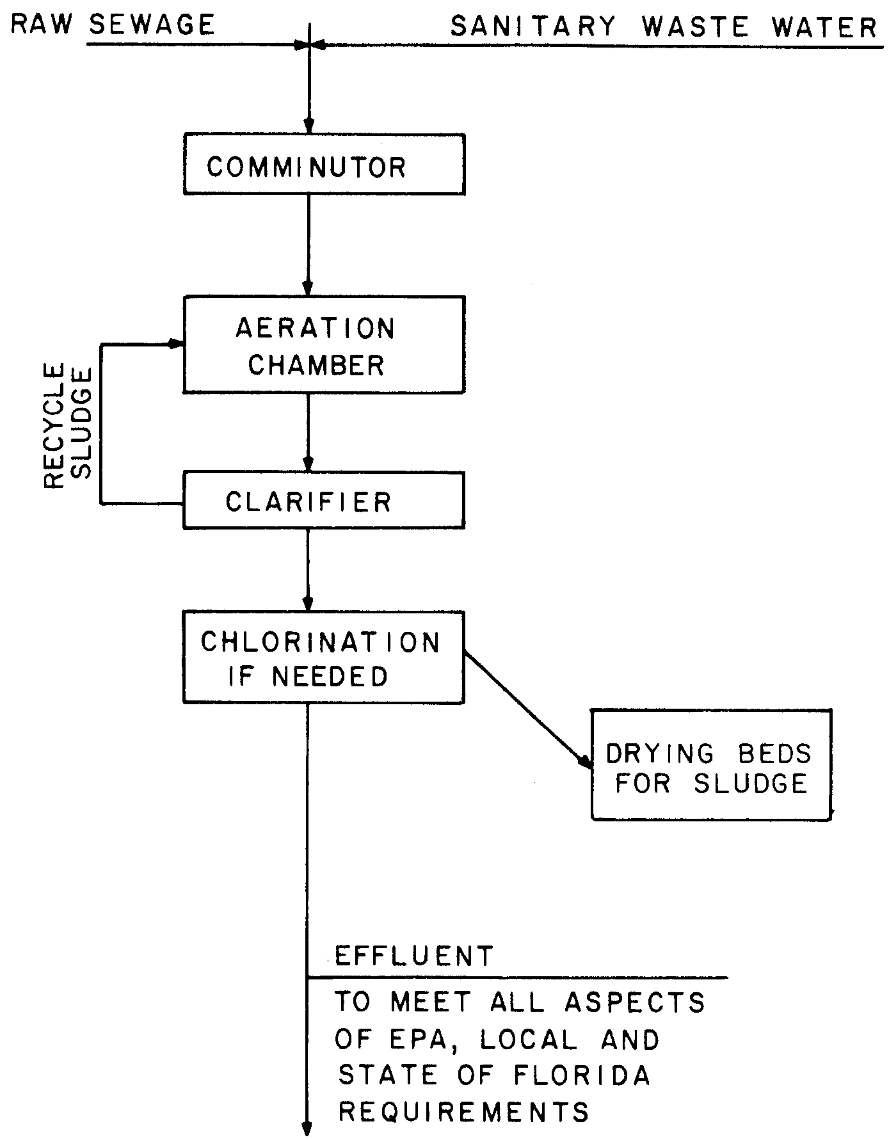

Figure 3.7-1. Sanitary Wastewater Treatment System Flow Diagram.

3.8 SOLID WASTE DISPOSAL SYSTEM

3.8.1 General

Listed below are the types and volumes of major solid waste expected to be generated by the proposed station over the life of the station:

Type of Solid Waste	Estimated Volume (acre-feet)
SO_2 Scrubber Sludge	11,500
Fly Ash	6,100
Bottom Ash	1,500
Combined fly ash, bottom ash & SO_2 Absorber Sludge	16,000 per

The combined fly ash, bottom ash and SO_2 absorber sludge volume of 16,000 acre-feet which is the combination of blending each of the above components with a cementatious product (lime, cement, etc.) to form a "fixed" effluent which will be used to build an impervious liner which will allow future storage of a product which has not been "fixed". The following subsections discuss the handling systems for these wastes as presently conceived.

3.8.2 Ash Handling System

3.8.2.1 Bottom Ash

Bottom ash will be collected in a wet hopper located beneath the boiler and removed directly to the dewatering tanks (bins) by sluicing. Ash sluice water will pass through jet eductors, removing the ash from the clinker grinder located under the hopper to the dewatering tanks located at the effluent process area. Overflow from the dewatering tanks will be recycled for ash sluicing.

3.8.2.2 Economizer Ash

Economizer ash will flow directly from hoppers under the economizer section of the boiler into economizer ash storage tanks. It will be removed by sluicing directly to the bottom ash hopper and will be sluiced with the bottom ash to the dewatering bin.

3.8.2.3 Fly Ash

Fly ash is proposed to be collected by electrostatic precipitators and deposited in hoppers under the precipitators. A dry pneumatic system will remove the ash to silos for ultimate disposal. From the silos, ash can either be removed dry to closed bulk storage trucks or freight cars for offsite sale, or blended with the SO_2 absorber sludge and transported to the combined storage area.

3.8.3 Ash Production

Each steam generator will produce approximately 22 tons per hour of ash at maximum output using performance coal. Seventeen tons per hour will be fly ash; 4 tons per hour will be bottom ash. For both units, average ash production will be 209,000 tons per year of fly ash and 52,000 tons per year of bottom ash. Economizer ash is negligible in volume and is included in the bottom ash quantities.

Ash sluice water will be used at a rate of approximately 2000 gpm to transport the bottom ash and economizer ash from each steam generator. This water, as previously noted, will be recycled from the bottom ash pond. Makeup to the sluice water will come from the cooling tower blowdown system.

3.8.4 Flue Gas Desulfurization Waste

Each steam generator will produce approximately 45 tons of sludge per hour at maximum output burning performance coal. Average sludge production for both units will be 546,000 tons per year. The sludge will contain 15 percent solids when pumped to the thickener and will consolidate to approximately 35 percent solids after allowing it to settle. The thickener underflow will then be transferred to vacuum filters or hydroclone for further reduction in water content ($\approx$ 75 to 85%). All the water which has been decanted will be recycled for scrubber reuse. The 75 percent effluent if oxidized can either be sold or processed with the fly ash, bottom ash and fixing agent in the mixing mill. The mixed product is then transported to the disposal site where it will be contoured and compacted.

533.33 Acre feet/yr
= 860444.44 cu yds/yr
= .63 Tons/cu yd.

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3.8.5 Composition of Ash and Scrubber Sludge

Typical compositions of ash and scrubber sludge are expected to be as follows:

Ash Constituents	Percent
Phosphorous pentoxide	0.15
Silica	50.00
Ferric oxide	19.20
Alumina	20.35
Titania	1.00
Lime	3.00
Sulfur trioxide	1.70
Potassium oxide	2.35
Sodium oxide	0.85
Undetermined	0.50

Scrubber Sludge Constituents	Unoxidized	Oxidized
$CaSO_4 \cdot 2H_2O$	48	83 to 88
$CaSO_3 \cdot 1/2\ H_2O$	44	4 to 9
$CaCO_3$ (assuming stoichiometry of 1.08)	5	5
$MgSO_4 \cdot 6H_2O$	3	3
Fly Ash	Trace	Trace

3.8.6 Sludge and Ash Fixation Process

The selected method of waste ash and sludge disposal is considered to be the best technology available for protection of ground water quality within the context of the hydro-geological setting of the Putnam Site.

The specific process that has tentatively been selected is a modification of the Poz-O-Tec^R System developed by IU Conversion Systems, Inc. The process receives both FGD sludge and dry fly ash from the flue gas cleaning system of the power plant. The sludge is partially dewatered by thickeners (if necessary) followed by vacuum filtration. The resulting filter cake is then blended with fly ash, bottom ash, and lime in a muller or pug mill type mixer to insure thorough mixing. The resulting material can be compacted. As the material cures, cementitious reactions occur which improves its physical properties. The following physical properties are expected after 14 to 28 days of curing (Duval and others, 1978):

Moisture Content:	30 to 40%
Bulk Density:	110 to 115 lbs/cu ft
Permeability:	10^{-7} cm/sec
Internal friction angle:	40^{o}
Cohesion:	1500 to 50,000 lbs/sq ft

The material can reportedly be placed on normal slopes of 2 horizontal to 1 vertical, and behaves much the same as a silty clay when initially produced and placed. The appearance and behavior is very similar to clayey soil. Upon curing, the material gains strength and develops the properties of a concrete-like material (Duval and others, 1978).

With respect to protection of ground water quality, the low permeability of the cured material (10^{-7} cm/sec)is comparible to practically impervious soils such as homogeneous, unweathered clays that have permeabilities of 10^{-7} to 10^{-9} cm/sec (Terzaghi and Peck, 1948). The fixated material will be used to construct dikes and lining in the disposal areas.

After an adequate lining is in place, the sludge preparation process will be modified by eliminating the lime and other additives from the mixture. The material, without lime, can be described as a "stabilized cake." The stabilized cake will then be placed in the lined disposal areas. The reason for eliminating lime for part of the material is to minimize the resource and energy expenditure associated with manufacture and transportation of lime.

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3.9 FIRE AND SECURITY MEASURES

3.9.1 Fire Prevention and Protection

Fire Fighting Facilities

The station well water supply system will be the main water source for fire protection. The system will be initially installed and used to supply clean water to the storage tank for both construction and permanent plant fire protection services. This tank will be used for potable water until the permanent plant pretreatment system is installed for potable and plant makeup services which will be supplied by a branch connection from the well pump discharge.

The water storage tanks for fire protection will be 300,000 gallon internally lined steel fabricated tanks. They will be located north of the stack and will supply about three hours of water for fire protection. The first tank will be installed during the initial construction period.

One diesel engine fire pump will be provided in a fire pump house located near the water storage tank. This pump will have its own fuel oil storage tank and battery powered electrical system for startup. This pump and pump house will be installed during the initial construction period. This pump house will also house a motor driven jockey pump and a motor driven fire pump. The jockey pump will be made operable along with the diesel pump.

A permanent underground yard fire loop will be installed from the fire pump house. This system will have several post indicator shutoff valves for isolation and system extensions as needed. This loop will be installed during the initial construction period in such a configuration that parts may be removed to accommodate construction needs later.

The fire-fighting facilities discussed above will be augmented with hand fire extinguishers located throughout the project to assure prompt extinguishment of incipient fires.

Management

Early contact will be made with the Palatka Fire Department. Communications will be established to provide a prompt response to assure equipment and personnel are available to fight major fires.

A fire brigade will be formed and trained in the use of equipment to promptly extinguish incipient fires. The guards on duty during non-working hours will be trained to extinguish fires, summon the Palatka Fire Department and management personnel.

Fire Prevention

Housekeeping to prevent significant accumulations of combustible debris will be maintained throughout the life of the project. Flammable liquids will be stored and dispensed in accordance with codes and regulations including control of smoking and other known ignition sources. Welding operations will be effectively controlled to assure sparks and slag do not fall on combustible material resulting in fires.

Other operations will be reviewed by the onsite Safety and Security Manager. Appropriate requirements will be incorporated into the safety program as these are made known.

3.9.2 Security

Security during construction and operation have many similarities. The construction security program will be developed in coordination with the Seminole Electric Cooperative, Inc., and will be turned over to SECI at completion of construction.

A guard force will be provided to assure security requirements are being met. The guard force shall be under the direction of a Safety and Security Manager.

Security fencing will be provided at appropriate locations early in the construction period. The main plant area will be well lighted. Gates will be guard controlled for access to the site by authorized personnel only.

Periodic search of vehicles and containers entering and leaving the project will be maintained. All suppliers' trucks and delivery vehicles will be inspected on leaving the project.

Guards will patrol the project site by inspecting gates, fences, and designated areas during nights and non-working days. Any unusual observation will be promptly recorded and necessary controls promptly implemented. Guards will be provided with radio communications to each other and the Safety and Security Manager to assure matters are effectively and promptly resolved. Telephone and/or radio communications will be provided to the Palatka Fire Department and Local Law Enforcement Officials.

If possible, a radio-telephone patch will be provided to assure communications. As the plant becomes operational, additional security measures may be installed as determined by SECI. Television monitoring and other electronic intervention/detection devices may be required as the project develops.

A Security Manual will be developed expanding on the above. As the Security Program develops, appropriate requirements will be incorporated into the Security Manual.

3.10 CONSTRUCTION SCHEDULE

Figure 3.10-1 is a general project schedule showing important milestones. Notable items include: (1) onsite construction activity is scheduled to begin in December 1979, (2) Units No. 1 and No. 2 commercial operation is scheduled for June 1983 and June 1985, respectively; and (3) construction of associated transmission lines is scheduled to coincide with station milestones.

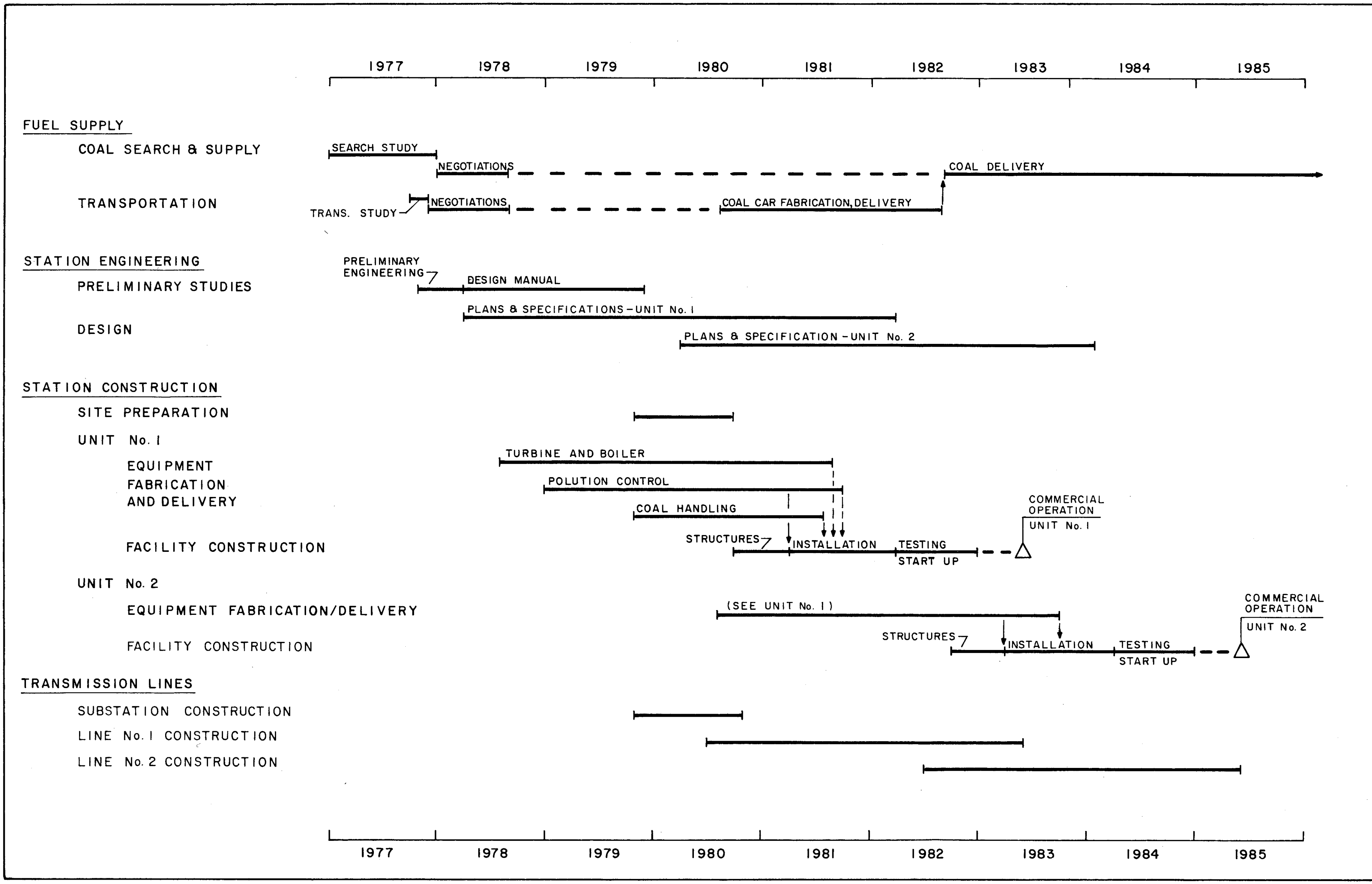

Figure 3.10-1. Project Schedule.

3.11 REFERENCES

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