ORIGINAL

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In Re: Petition for Determination of Need for an Electrical Power Plant in Okeechobee County by Okeechobee Generating Company, L.L.C.	DOCKET NO. 991462-EU FILED: Oct. 25, 1999

DIRECT TESTIMONY

OF

WILLIAM F. SULLIVAN, JR., P.E.

ON BEHALF OF

OKEECHOBEE GENERATING COMPANY, L.L.C.

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

IN RE: PETITION FOR DETERMINATION OF NEED FOR THE OKEECHOBEE GENERATING PROJECT, FPSC DOCKET NO. 991462-EU

DIRECT TESTIMONY OF WILLIAM F. SULLIVAN, JR., P.E.

Q: Please state your name, title and business address.

A: My name is William F. Sullivan, Jr. My business address is 7500 Old Georgetown Road, Bethesda, Maryland.

Q: By whom are you employed and in what position?

A: I am employed by PG&E Generating Company as Vice President, Engineering.

Q: Please describe your duties with PG&E Generating.

A: My Department is responsible for the overall design and engineering of projects for PG&E Generating. These responsibilities entail site planning, facility layout, evaluation of cooling alternatives and equipment selection.

Q: Please summarize your educational background and your experience in power plant engineering, design, construction, operations and maintenance.

A: I have over 27 years of experience as a manager and engineer in power plant engineering, design, construction, operations and maintenance. Prior to joining PG&E Generating, I spent twelve years as Director of Generation Services and Project Manager for the Manchester Street Station Repowering Project for New England Power Service Company. Prior to that, I held Project Manager and Project Engineer positions with Stone and Webster Engineering Corporation in Boston. I received a B.S. in Mechanical Engineering and an M.S. in Mechanical Engineering from Northeastern University. A copy of my resumé, which summarizes my educational background and work experience, is attached to this testimony as Exhibit _____(WFS-1).

Q: Are you a licensed professional engineer?

A: Yes. I am a licensed professional engineer in the Commonwealth of Massachusetts and the State of Rhode Island.

Q: Have you previously testified before regulatory authorities or courts?

A: Yes. I testified before the Rhode Island Energy Facilities Siting Board.

Q: What is the purpose of your testimony?

A: The purposes of my testimony is to provide engineering and technical information regarding the design of the Okeechobee Generating Project to the Florida Public Service Commission.

Q: What are your responsibilities with respect to the Okeechobee Generating Project that is the subject of this proceeding?

A: My department is responsible for the engineering and technical design of the generating facility. I have supervisory responsibility for all aspects of the Okeechobee Generating Project's ("Project") design.

Q: Are you sponsoring any exhibits to your testimony?

A: Yes.

WFS-1. William F. Sullivan's resumé and work experience summary.

WFS-2. Okeechobee Generating Project Site Plan

WFS-3. Okeechobee Generating Project Plot Plan

WFS-4. Plant Performance Table

WFS-5. Design Basis

WFS-6. Process Flow Schematic

WFS-7. Plant Water Balance

WFS-8. One-line Electrical Diagram

WFS-9. Project Engineering, Procurement and Construction Schedule

WFS-10. Okeechobee Generating Project Site Location Relative to Local Landmarks and Zoning Designations

I am also sponsoring Figures 3- 8, 13, Tables 1 and 2 and the associated narrative text relating to my testimony at pages 1-4, 8, 15, 17, 21, 25, 35-36, 41, 43, 54 and 69 of those Exhibits.

Q: Please summarize the Okeechobee Generating Project.

A: The Okeechobee Generating Project is a natural gas-fired combined cycle generation facility. The plant consists of two combustion turbine generators (CTGs), two heat recovery steam generators (HRSGs) and two steam turbine generators (STGs). The system is configured so that each power train operates independently of the other, increasing reliability and dispatchability. The plant will have 550 MW (nominal) of net generating capacity at ISO temperature and relative humidity. The Project's rated winter capacity will be 561.3 MW and its rated summer capacity will be 514.3 MW. The Project will utilize state-of-the-art dry low-NO_x combustion technology to minimize emissions of oxides of nitrogen (NO_x). In addition, a Selective Catalytic Reduction ("SCR") system will be used to further reduce NO_x.

Q: Please describe the SCR system that will be used for NO_x reduction at the Project.

A: The SCR system for the Project will consist of a catalyst and an ammonia injection grid located within the heat recovery steam generator. Ammonia reacts with NO_x in the presence of the catalyst which reduces the NO_x to elemental nitrogen and oxygen.

Q: Please give a brief description of the site for the Okeechobee Generating Project.

A: The facility will be located north-northeast of Lake Okeechobee, in a rural area approximately 5 miles southeast of the City of Okeechobee, Okeechobee County, Florida. The facility will be located on approximately 40 acres of an approximately 771 acre site situated to the west of Nubbin Slough along the northern side of State Route 710. The site is cleared and located on level ground. An access road will be constructed to the site from State Route 710. Exhibit _____(WFS-10) shows the location of the facility in relation to the City of Okeechobee.

Q: Please describe the general arrangement and layout of the Project on the site.

A: The facility will use approximately 40 acres of the site approximately one-half mile north of State Route 710. The general arrangement for the site is shown on the site plan, Exhibit_____(WFS-2). The facility's "footprint" has been located and designed to minimize the disturbance of wetlands on the site while still providing close proximity to transportation and utility corridors.

Q: Please describe the generating technology of the Okeechobee Generating Project.

A: The facility will be a state-of-the-art combined cycle generating plant. The facility will use two advanced technology combustion turbine generators manufactured by ABB (or equivalent), two heat recovery steam generators and two steam turbine generators to produce 528.2 MW of generating capacity at annual average site conditions.

Q: Please summarize the performance characteristics of the Okeechobee Generating Project.

A: The performance characteristics of the generating facility are summarized in the Plant Performance Table, Exhibit _____ (WFS-4). Facility generating output and emissions data are provided at various expected site ambient conditions at full and part load operation.

Q: Please describe the process flow of the Project.

A: The process flow of the Project is depicted in the Process Flow Schematic, Exhibit _____ (WFS-6). That depiction is accurate and incorporated by reference into my answer.

Q: Please describe the design basis for the Project.

A: The design basis is attached as Exhibit_____ (WFS-5). That description is accurate and incorporated by reference into my answer.

Q: Please summarize the starting and emergency power supplies for the Project.

A: The facility will obtain station service and start-up power from the local utility serving Okeechobee County in order to maintain normal house loads during periods in which the facility is off-line and to accelerate the combustion turbine generators to a self sustaining operation speed during start-up. In the event of a loss of the transmission system, emergency power for the plant will be provided from a stationary battery system for one hour. After one hour, emergency power will be provided for by the plant's emergency diesel generators. The facility's emergency diesel generators will be capable of providing sufficient power for safe shutdown of each unit but will not be capable of restarting the units.

Q: Please give a brief description of the control systems for the Okeechobee Generating Project.

A: The plant is controlled by a Distributed Control System (DCS). The control system is designed to provide full automation of each unit. The gas turbine sequencer allows the operator to start and stop the gas turbine automatically. Operator stations are designed to allow a graphical, intuitive navigation through the plant processes from a central control room.

Q: Please summarize the environmental profile of the Okeechobee Generating Project.

A: The facility will be fueled by natural gas and use state-of-the-art combustion technology to limit emissions. Dry low-NOx combustors will be utilized in conjunction with SCR, as described earlier, to reduce NO_x emissions to 2.5 parts per million on a dry volume basis adjusted to 15% O_2. The Project's emission profile at various site ambient and load conditions is shown in the Plant Performance Table, Exhibit _____ (WFS-4).

Q: Please summarize the projected water requirements and water supply plan for the Okeechobee Generating Project.

A: The projected water requirements for the Project are summarized in the Plant Water Balance, Exhibit_____ (WFS-7). The facility's maximum water consumption will be approximately 5.4MGD. The Project's primary source of make-up water to the cooling towers will be surface water provided from the South Florida Water Management District's channelized Canal C-59 at the Taylor Creek/Nubbin Slough. On-site groundwater wells are expected to provide back-up water supply during extreme drought conditions, if needed. The Project will use wet cooling towers to condense steam back to water for reuse in the HRSGs and STGs.

Q: Please describe the engineering, procurement, and construction schedule for the Project.

A: The facility's projected schedule is provided in the Project Schedule, Exhibit_____ (WFS-9). That schedule is accurate and incorporated by reference into my answer. The facility is planned to commence commercial operation in April, 2003.

Q: What is the current status of the engineering design work for the Okeechobee Generating Project?

A: Conceptual engineering for the Project is under way. A site plan, water balance, and process flow diagram are complete. In addition, site wetlands have been delineated and topographic mapping of the site has been completed.

Q: Does this conclude your direct testimony?

A: Yes.

WILLIAM F. SULLIVAN, JR., P.E.

Vice President, Engineering
PG&E Generating

EXPERIENCE SUMMARY

Currently Vice President, Engineering, responsible for all Engineering and Design at PG&E Generating, including plant engineering for operating power plants, and project engineering for power plants in construction and power plants in development.

Prior to PG&E Generating's acquisition of New England Power Company generating stations, Mr. Sullivan was Director of Generation Services, responsible for providing Engineering and Construction Services to New England Power Company's thermal and hydro power stations and retail affiliates. His group also provided Energy Related Services to external company customers.

Also, while at New England Power Service Company, Mr. Sullivan was the Project Manager for the 500 MW Manchester Street Station Repowering Project. The project was completed two months ahead of schedule and significantly under budget.

Mr. Sullivan has 27 years of experience in the engineering and construction industry. His responsibilities have included engineering, design, construction and project management.

Before joining New England Power Service Company, Mr. Sullivan was a Project Manager/Project Engineer for Stone & Webster Engineering Corporation (SWEC). Mr. Sullivan was assigned as Project Manager/Project Engineer for the Detroit Public Lighting Department - Mistersky Station Continuing Services Contract; Project Engineer for Tampa Electric Company - Gannon Station Unit 4 Hot Reheat Line Replacement Project; and Project Engineer for New England Power Company - Salem Harbor Station and Brayton Point Oil Ash Removal Study.

Mr. Sullivan was also assigned to the Consolidated Edison Co. Life Extension Project as a Mechanical Engineer; to the SWEC Reference Fossil Power Plant as Lead Mechanical Engineer; to the North Omaha Station Life Extension Project as a Mechanical Engineer; to the Gannon Station Coal Conversion Project as a Power Engineer; to the SWEC Industrial Reference Power Plant Project as the Lead Power Engineer; to the New Boston and Mystic Station Coal Conversion Projects as the Principal Mechanical Engineer; to the Brayton Point Coal Conversion Project as the Lead Power Engineer; to the Malakoff Electric Generating Station Project as the Principal Piping Engineer; and as the ASME N-5 Engineering Site Administrator assigned to the Millstone Nuclear Power Station - Unit 3 Project.

Prior to rejoining SWEC, Mr. Sullivan was Chief Mechanical Engineer for Kaiser Engineers, where his responsibilities included the design and construction of all mechanical systems on the Southwest Corridor Rapid Transit Relocation Project.

During Mr. Sullivan's original employment with SWEC, he was assigned as a Mechanical Engineer in the Nuclear Engineering Group on the Millstone Nuclear Power Station - Units 2 and 3 Projects, and in the Facilities Engineering Group as an Engineer in the Mechanical Engineering Group of the Shoreham Nuclear Power Station Project, and in the Nuclear Engineering Group on the Preliminary Liquid Metal Fast Breeder Reactor Project.

While attending Northeastern University, Mr. Sullivan held co-op work assignments at Dynatech Research and Development Corporation and GTE Sylvania, Inc.

EDUCATION

NORTHEASTERN UNIVERSITY
Master of Science - Mechanical Engineering 1976

NORTHEASTERN UNIVERSITY
Bachelor of Science - Mechanical Engineering 1973

LICENSES AND REGISTRATIONS

- Professional Engineer - Massachusetts and Rhode Island

PROFESSIONAL AFFILIATIONS

- Tau Beta Pi, National Engineering Honor Fraternity - Member
- Pi Tau Sigma, National Mechanical Engineering Honor Fraternity - Member
- Member of North American Electric Reliability Council (NERC) Security Committee

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Exhibit _____ (WFS-4)
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TABLE 2

Okeechobee Generating Project
Estimated Plant Performance (Per Unit Values)
Combined Cycle Generating Facility
Two ABB GT24 Combustion Turbine Generators
Two Unfired Heat Recovery Steam Generators
Two Condensing Steam Turbine Generators

	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7	Case 8	Case 9	Case 10	Case 11	Case 12	Case 13
Conditions													
Load %	100	100	100	100	100	75	75	75	75	50	50	50	50
Amb. Temp. (°F)	40	59	73	95	95	40	59	73	95	40	59	73	95
W.B. Temp.(°F)	32	51.5	69	77	77	32	51.5	69	77	32	51.5	69	77
Relative Humidity (%)	38%	60%	82%	45%	45%	38%	60%	82%	45%	38%	60%	82%	0.447563
Steam Inj.	Off	Off	Off	Off	On	Off	Off	Off	Off	Off	Off	Off	Off
Evap. Cooler	Off	On	On	On	Off	Off	Off	Off	Off	Off	Off	Off	Off
Location Cond.													
CIT (°F)	40	52.625	69.6	79.7	95	40	59	73	95	40	59	73	95
Elevation (ft above sea level)	25	25	25	25	25	25	25	25	25	25	25	25	25
Pressure (psia)	14.67	14.67	14.67	14.67	14.67	14.67	14.67	14.67	14.67	14.67	14.67	14.67	14.67
Unit Performance													
Exhaust Flow (kip/hr)	3,216	3,154	3,052	2,984	3,036	2,634	2,554	2,479	2,346	2,160	2,095	2,031	1915.575
Steam Injection	0	0	0	0	1	0	0	0	0	0	0	0	0
Gross Output (kW)	285,667	280,000	269,076	262,163	267,386	223,894	214,088	204,564	186,972	162,255	153,842	145,997	133138.8
Heat Input (MMBtu/hr HHV)	1,907	1,865	1,789	1,739	1,777	1,487	1,430	1,376	1,279	1,145	1,098	1,052	969.1373
Gross Heat Rate (BTU/kWhr HHV)	6,676	6,668	6,649	6,635	6,645	6,644	6,678	6,725	6,842	7,059	7,138	7,207	7279.153
Auxiliary Load (kW)	5,000	5,000	5,000	5,000	5,000	4,500	4,500	4,500	4,500	3,900	3,900	3,900	3900
Net Output (kW)	280,667	275,000	264,076	257,163	262,386	219,394	209,588	200,064	182,472	158,355	149,942	142,097	129238.8
Net Heat Rate (Btu/kWhr HHV)	6,795	6,782	6,775	6,764	6,772	6,780	6,822	6,876	7,011	7,233	7,324	7,405	7498.813
Plant Output													
Net Plant Output (kW)	561334	550000	528152	514325	524773	438787	419175	400129	364944	316711	299884	284194	258477.5
Stack Emissions per Unit													
NOx, ppmvd @15% O2	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
NOx, lb/hr	18.9	18.5	17.8	17.4	17.7	14.9	14.4	13.9	13.1	11.3	12.3	11.9	10.15423
SO2, lb/hr	9.9	9.7	9.3	9.1	9.3	7.8	7.5	7.2	6.7	6.0	5.7	5.5	5.1

Natual gas sulfur 2 gr/100 SCF
Perfromance new and clean

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Exhibit _____ (WFS-2)
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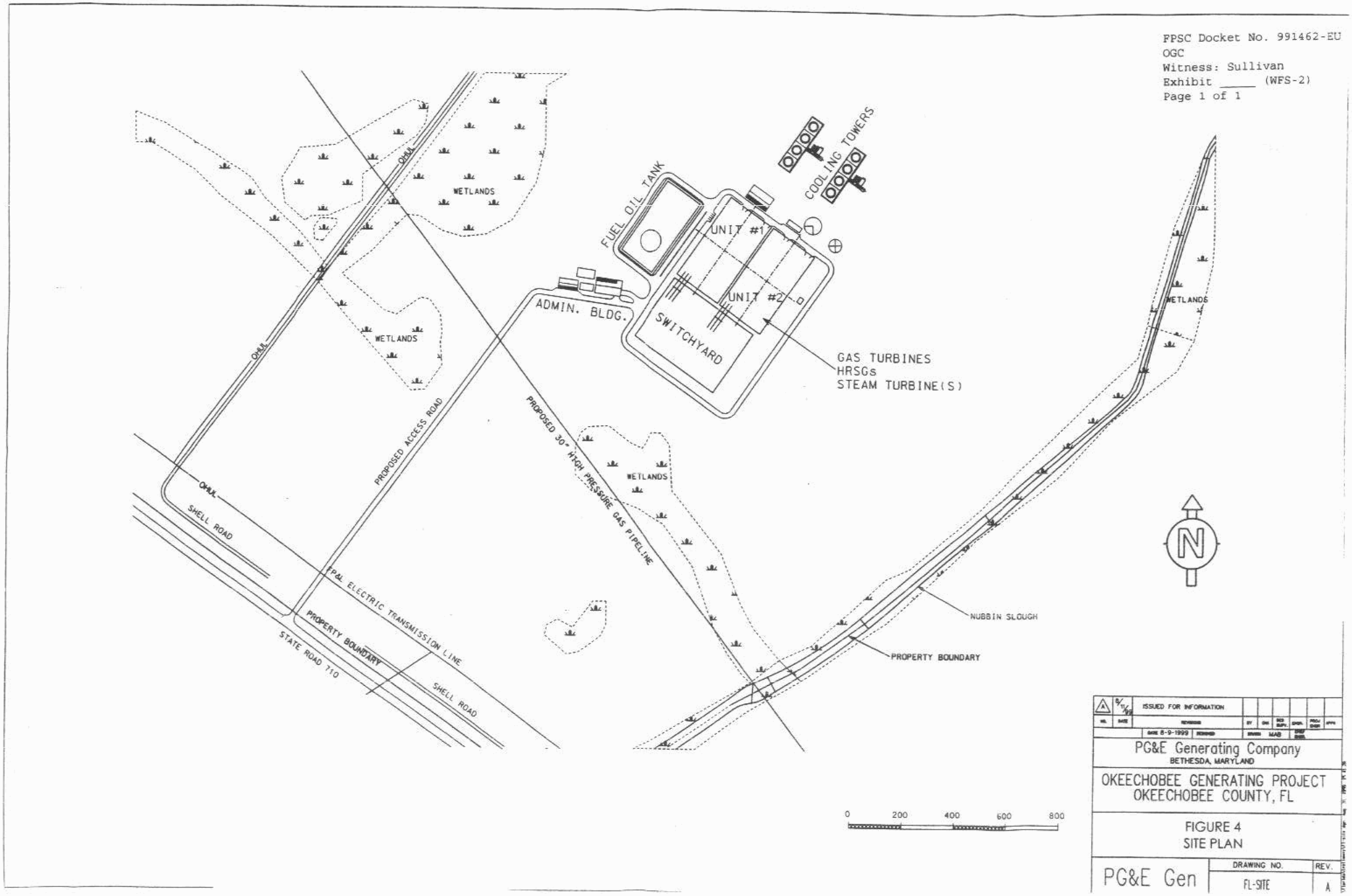

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Witness: Sullivan
Exhibit _____ (WFS-3)
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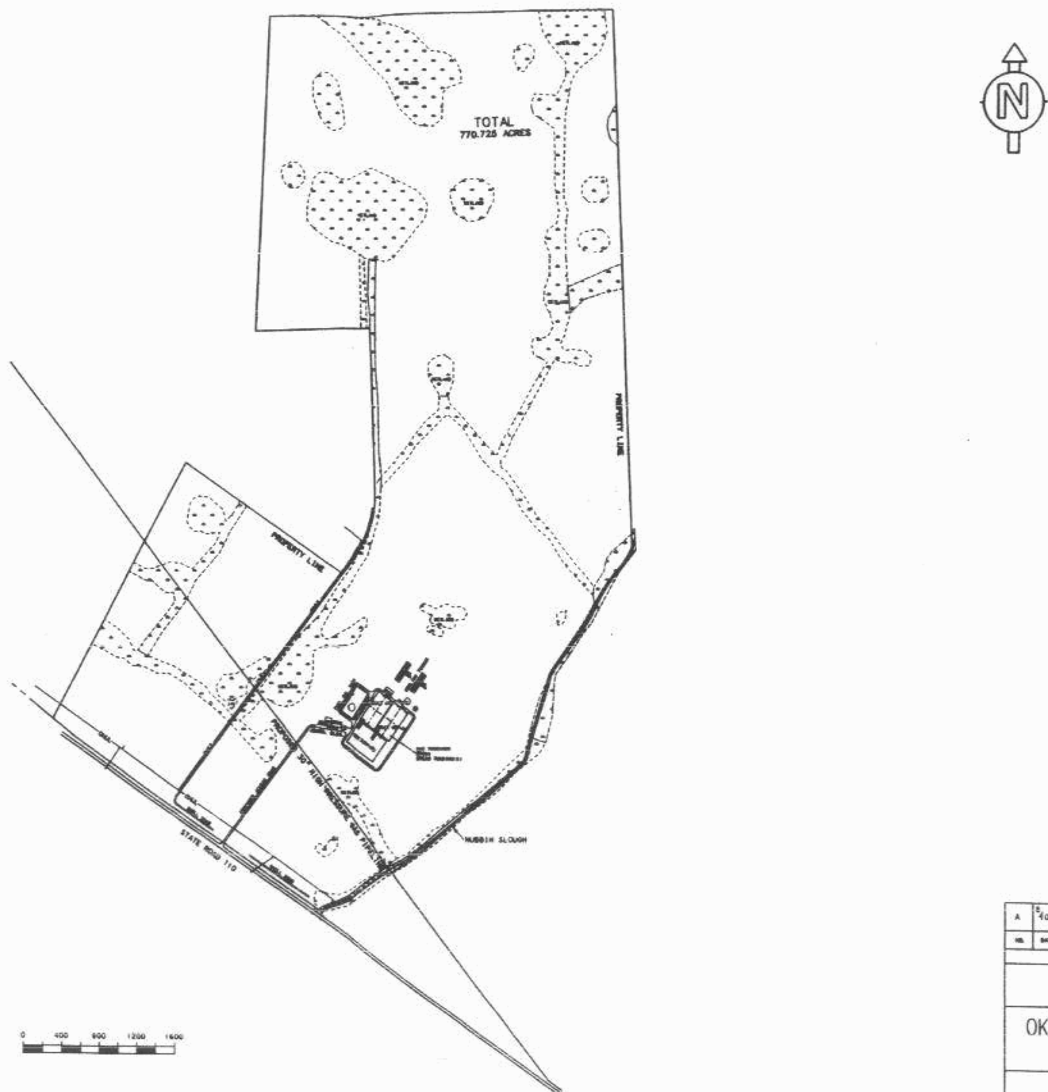


A	8/10/99	ISSUED FOR INFORMATION						
	DATE 8/10/1999		DRAWN MAB					

PG&E Generating Company
BETHESDA, MARYLAND

OKEECHOBEE GENERATING PROJECT
OKEECHOBEE COUNTY, FL

FIGURE 5
PLOT PLAN

PG&E Gen	DRAWING NO.	REV.
	FL-PLOT	A

DESIGN BASIS

INTRODUCTION

The Energy Facility is a highly efficient combined cycle electric power plant that will be fueled by natural gas. The Facility will be nominal rated to produce 550 MW at standard site conditions.

This section describes the Facility and its supporting systems. It also includes a general location map, a preliminary site plan and a map detailing the preliminary water, gas, and electrical interconnect routes.

PROJECT LOCATION

The Facility will be located just north of Lake Okeechobee, in a rural area approximately 5 miles southeast of the City of Okeechobee, Okeechobee County, Florida. The Facility will be located on approximately 40 acres of an approximately 771 acre site situated to the west of Nubbin Slough along the northern side of State Route 710. The site is cleared and located on fairly level ground. An access road will be constructed to the site from State Route 710. Exhibit 2 shows the location of the Facility.

The Gulfstream Natural Gas System (Gulfstream) natural gas pipeline is planned to cut across the southern portion of the site south of the proposed facility as illustrated in Exhibit 2. FP&L's Sherman substation is located approximately 3 miles to the northwest of the Facility. FP&L 230kV electric transmission lines between the Sherman and Martin substations transverse the site.

OVERVIEW

The proposed Energy Facility will consist of two combustion turbine generators, two heat recovery steam generators (HRSG) equipped with selective catalytic reduction (SCR) and steam turbine(s). The combustion turbines will generate approximately two thirds of the Facility's output. Energy will be recovered from the hot combustion gases exiting the combustion turbines and will be used to generate steam in the HRSGs. Steam from the HRSGs will be expanded through steam turbines which will produce the balance of the Facility's output. This process of utilizing both the power generated in the combustion turbines as well as that generated by the steam turbines is commonly referred to as "combined cycle" generation. Cooling water will be used in conjunction with cooling towers to condense steam back to water for reuse in the HRSGs. The Facility's primary water supply will be provided from the convergence of SFWMD channelized canals L-63N, L-63S nad L-59. A process diagram for the plant is included in Exhibit 6.

The Facility will emit NO_X (nitrogen oxides), CO (carbon monoxide), non-methane hydrocarbons, small quantities of particulate (PM10), and sulfur oxides (SO_X). The Facility will be designed to control NO_X using an advanced Dry Low-NO_X combustion system and a Selective Catalytic Reduction (SCR) system. This represents state-of-the-art emissions control technology, capable of achieving approximately 2.5 ppmvd NO_X levels. Only trace amounts of SO_2 will be emitted when burning natural gas. CO and non-methane hydrocarbon emissions will be minimized through the use of good combustion practice.

FACILITY DESCRIPTION

Facility Structures and Buildings

The Energy Facility will include the following structures and buildings:

- A common control room, warehouse and administration building which will contain a workshop, a maintenance area, and offices.
- Each HRSG will be located adjacent to its combustion turbine and will connect to an approximate 200 foot high emission stack. There will be one stack for each unit.
- Mechanical induced draft evaporative cooling towers.
- Water storage tanks.
- An electrical switchyard.

Combustion Turbine

The Facility will employ industrial frame advanced technology combustion turbines equipped with dry low-NO_X combustors. The CT will be housed in an enclosure which provides thermal insulation, acoustical attenuation, and fire extinguishing media containment. The enclosure will allow access for routine inspections and maintenance.

Heat Recovery Steam Generators ("HRSGs")

One of the significant features of a combined cycle plant is the utilization of the hot exhaust gas from the combustion turbine to produce steam which, in turn, is expanded in a steam turbine to drive an electric generator and produce electricity. The Heat Recovery Steam Generator (HRSG) is the key piece of equipment necessary to the production of this steam.

The HRSGs will be multiple-pressure, reheat units. The various pressure sections will each consist of economizer, evaporator and superheater sections. The HRSGs will also be equipped with a reheater to further improve cycle efficiency.

Steam Turbine ("ST")

The ST will be a multiple admission, reheat, condensing turbine designed for sliding pressure operation. The HP portion of the ST receives high pressure superheated steam from the HRSG and then exhausts steam into the reheat section of the HRSG. Reheated steam from the HRSG is supplied to the IP turbine, and the IP turbine exhausts into the low pressure LP turbine. The LP turbine receives low pressure superheated steam from the HRSG and exhausts steam into the condenser.

Stack

Combustion turbine combustion gases will discharge through an approximate 19 foot diameter, 200 foot high carbon steel stack. The stack will be designed to minimize the potential for aerodynamic down wash of stack emissions.

Cooling System

After the steam passes through the steam turbine it is condensed in a shell and tube heat exchanger (surface condenser) utilizing cooling water from the cooling tower. Each condenser will include a shell, tubes, a water box, and hot well. Condensed water in the hot well is pumped back to the the HRSG to begin the thermal cycle again.

DESIGN BASIS
(continued)

Cooling water for the condensers will be provided from evaporative (wet) induced draft cooling towers. Fans at the top of the cooling tower maintain a draft within the cooling tower. The water will be cooled by evaporation as it falls through baffles from the top of the cooling tower to a basin at the bottom of the tower where it is again pumped back through the condenser. Cooling tower components will include a basin, fans, fan decks, drift eliminators, fill material (baffles), and other necessary components. A preliminary water balance is shown in Exhibit 7. Maximum water usage will be aproximately 5.33 million gallons per day (3,700 gpm) when operating at 90° F, 60% relative humidity while operating both the evaporative cooler and steam injection systems.

Fuel Supply and Storage Systems

Natural gas will be the primary fuel for the Facility. The Facility's gaseous fuel system will interconnect to the Gulfstream gas metering station located at the site boundary. Gas scrubbers will be provided to remove particulate and moisture from the gas prior to use in the combustion turbines. The gaseous fuel system will also include fuel gas heaters, meters and isolation system in accordance with governing engineering codes.

Distillate fuel oil will be used as the back-up fuel source. Fuel oil will be stored on-site to support continuous operation for 24 hours in the event of interruption of natural gas service. The fuel oil tank capacity will be 650,000 gallons. Fuel oil will be delivered to the site via tanker trucks.

Condensate and Feedwater Systems

The condensate system will deliver deaerated water from the condenser hotwell to the HRSG. The condensate system will also provide water to other facility subsystems.

The feedwater system will provide feedwater to the economizer sections of the HRSG. The feedwater system will also supply water to interstage desuperheaters.

Demineralized Water System

The demineralizer plant will consist of either a permanantly installed or mobile demineralizer system to produce demineralized water for the Facility from the raw water source. The product water from the demineralizer system will be stored in a demineralized water storage tank for use as steam cycle makeup.

The demineralized water storage tank will provide both the demineralized water and condensate storage functions of the plant. The tank will be constructed of lined carbon steel.

Demineralizer system regeneration and treatment will be done at the Energy Facility or off-site depending on the selected system.

Boiler Feedwater Treatment

These systems will typically consist of hydrazine for oxygen scavenging (injected into condensate system); phosphate for boiler water solids control (utilized in the HRSG steam drums); and ammonium hydroxide for pH control (fed into condensate).

Waste Water Treatment System

The process waste streams will be combined, collected, and disposed of separately or in combination, depending on the type of treatment required and the ultimate discharge point. Plant wastewater that could potentially contain small quantities of oil (including the plant area washdown floor drains, equipment and sample drains) will be treated in an oil/water separator, where the clean effluent may be recycled for use as cooling tower makeup. Oil and sludge collected in the oil/water separator will be disposed of off-site. Wastewater grab sample points will be provided in accordance with the requirements of all applicable permits.

Sanitary waste will be routed to an on-site septic tank for disposal. 1,440 gallons of sanitary waste will be generated per day.

HRSG blowdown will be collected in a dedicated sump and either recycled to the cooling tower basin or discharged to Nubbin Slough. Cooling tower blowdown will be routed to Nubbin Slough.

Spill prevention and control measures will include dikes around fuel oil tanks, acid tanks, and hypochlorite tanks. The dikes will be sized to contain a volume larger than that of the enclosed tank. Curbed enclosures will be provided for boiler feedwater treatment chemicals and water pretreatment chemicals (including hypochlorite) which will be stored in their delivery containers.

Oil-filled transformers will be located in a rock-filled sump. Storm water that collects in the sumps will drain to a common corner sump.

Compressed Air System

The compressed air system will be designed to provide dry, oil-free, control air for plant instrumentation, controls and maintenance activities.

The primary source of plant compressed air will be from permanently installed air compressors. The instrument air supply will be oil-filtered and dried. The system will also include a compressed air receiver.

The system will be complete with piping, valves, locally mounted instrumentation, and controls.

Fire Protection System

An on-site fire protection system will be provided for the plant. The water supply for the fire protection system will be stored on-site in either the raw water tank or cooling tower basin. A main underground fire header will be provided to serve strategically placed yard hydrants and sprinkler/deluge systems for the facility.

The fire water distribution system will incorporate sectionalizing valves so that a failure in any part of the system can be isolated while allowing the remainder of the system to function properly.

The fire protection system will also include:

- An extinguishing system for the gas turbine/generator set
- Dry pipe, automatic sprinkler system to envelop, as required, oil piping and equipment associated with the steam turbine lube oil system.
- Wet pipe sprinkler systems for the turbine building and warehouse storage area

A protective signaling system with main panel in the control room

Control System

DESIGN BASIS
(continued)

Each unit will have a state-of-the-art, integrated microprocessor based control system for plant control, data acquisition, and data analysis. The plant control system will provide for startup, shutdown, and control of plant operation within limits and for protection of equipment.

Electric Power System

The electric output of each of the Facility's generators will be connected to a main step-up transformer. The output from the main step-up transformers will be connected to the Facility's on-site switchyard.

Emissions Monitoring

An emissions monitoring system for airborne pollutants will be installed to provide monitoring and alarming of NO_X and CO concentrations in the HRSG exhaust systems. This system will either be a continuous emissions monitoring system (CEMS) or a software based predictive emissions monitoring system (PEMS). The emissions monitoring system will provide input signals to the microprocessor based data acquisition system, previously described, and will meet all the requirements of the Florida Department of Environmental Protection (FDEP) for monitoring and reporting.

Stormwater Drainage

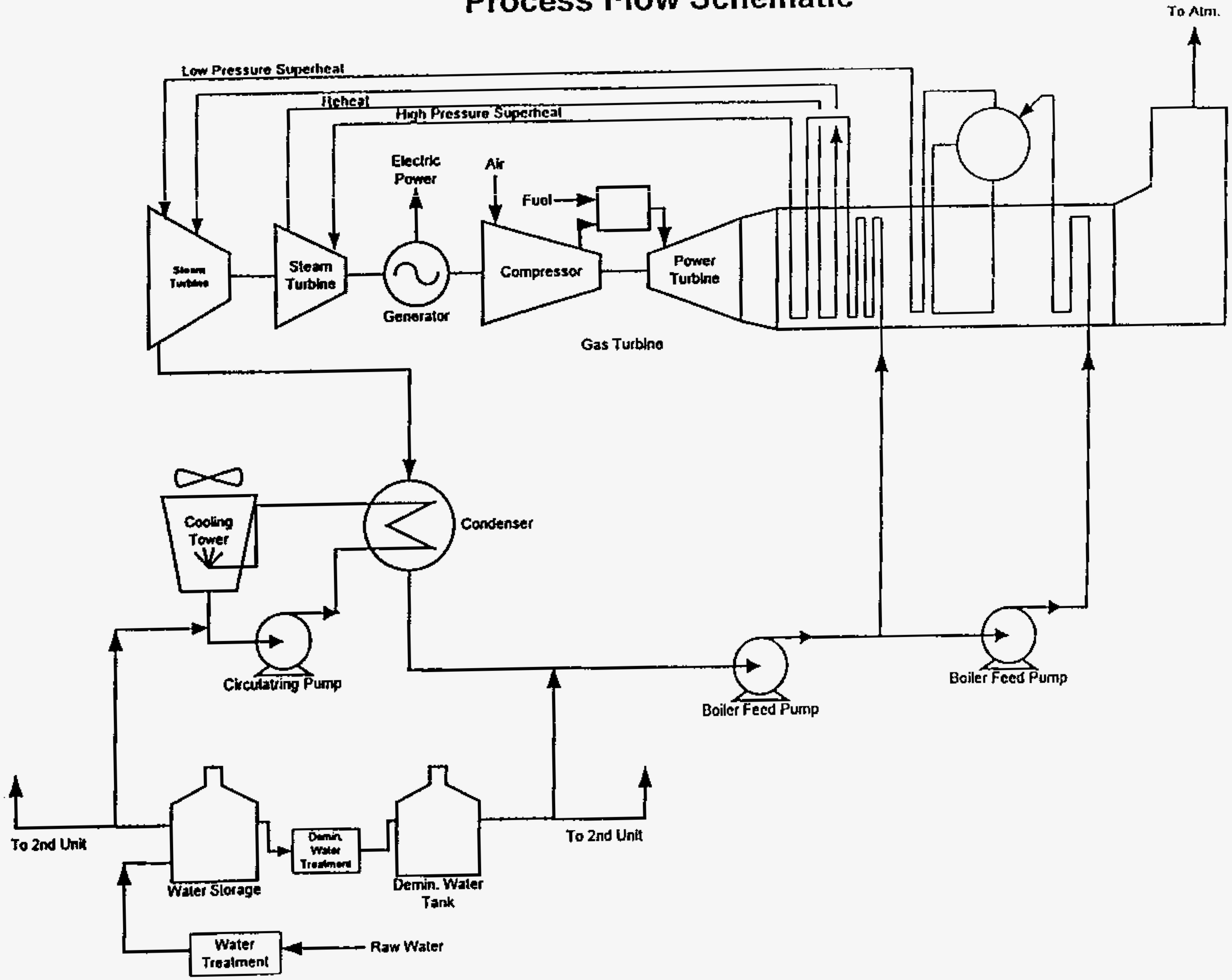
A permanent stormwater management basin will be provided to collect stormwater from the Facility. Stormwater will be collected by a system of drains and catch basins and which will connect to underground piping providing a gravity drain system. The basin will be sized to allow collected sediment to settle out before it is discharged, as well as to ensure that peak runoff rates are not increased.

Associated Facilities

Natural gas will be provided to the facility from a natural gas pipeline to be constructed by Gulfstream. The pipeline will traverse the property to the south of the plant and north of S.R. 710. Exhibit 2 depicts the pipeline route across the property. A gas metering station will also be provided for on the site.

Figure 8

Okeechobee Generating Project
Process Flow Schematic



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OGC
Witness: Sullivan
Exhibit ___ (WFS-6)
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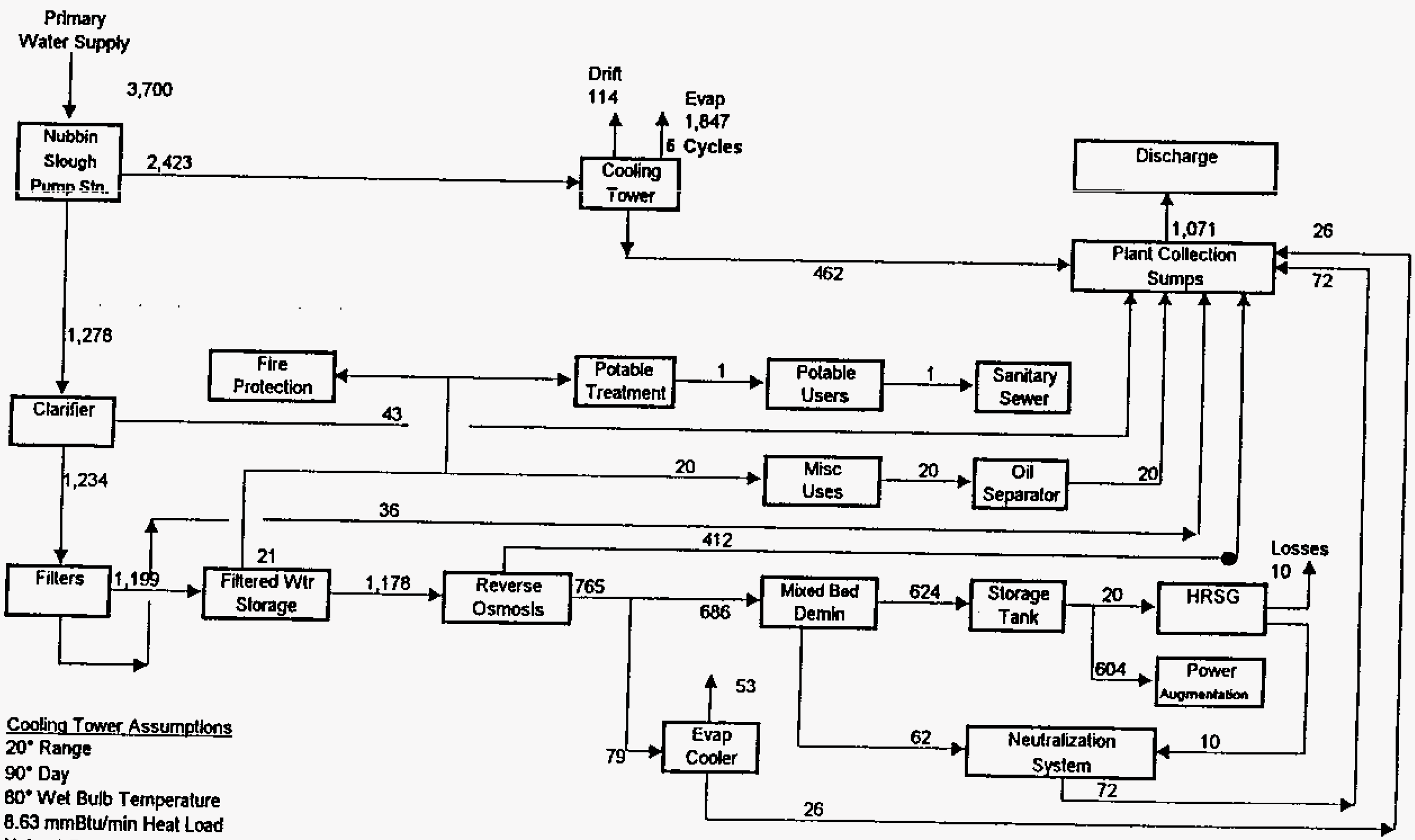
FIGURE 7
Okeechobee Generating Project
Preliminary Water Balance
(Peak Summer Day)



__Cooling Tower Assumptions__
20° Range
90° Day
80° Wet Bulb Temperature
8.63 mmBtu/min Heat Load
Natural Gas
Summer Peak Conditions

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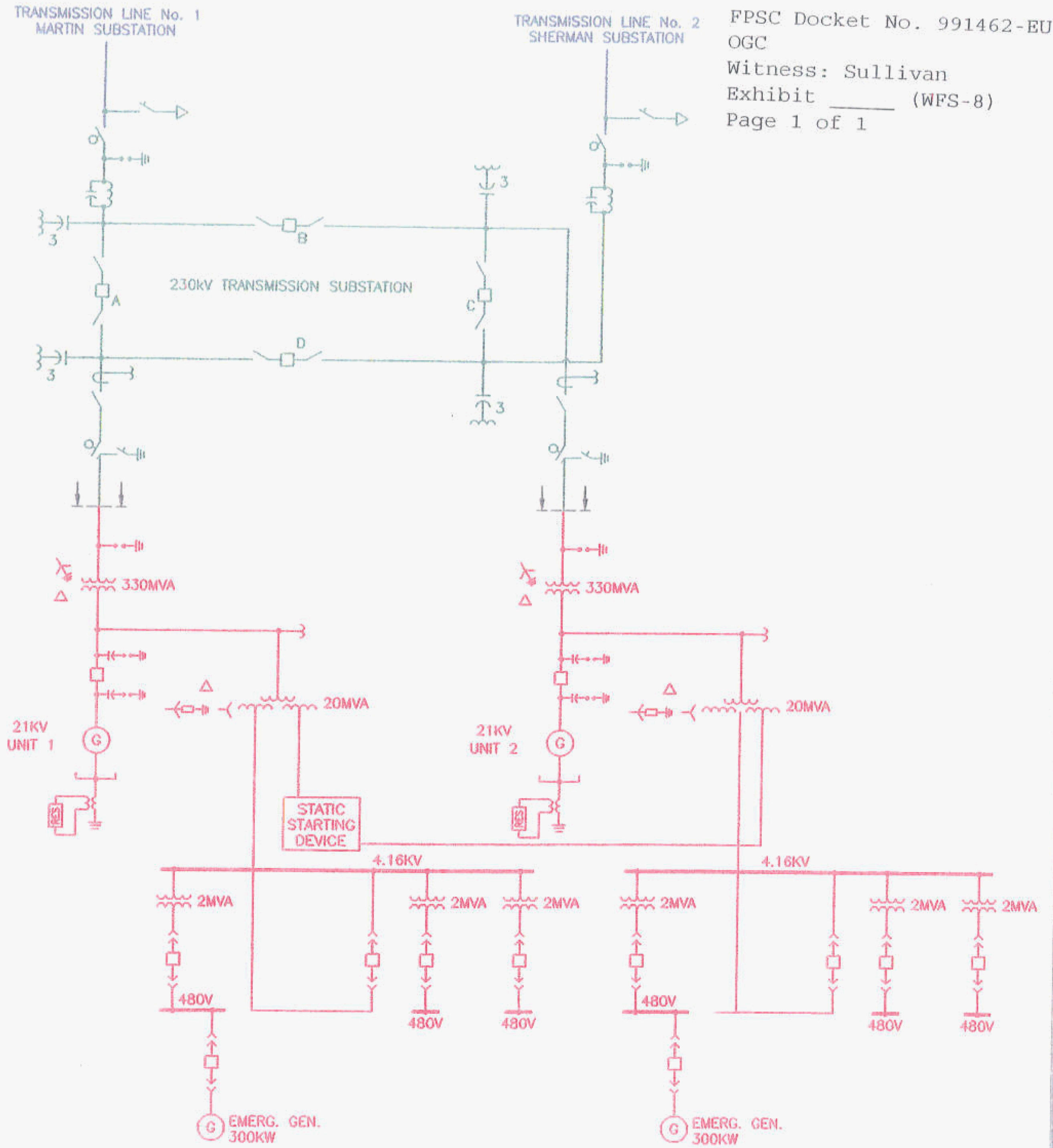


NOT FOR CONSTRUCTION

LEGEND

LIMIT OF REGIONAL SWITCHING AND TAGGING JURISDICTION

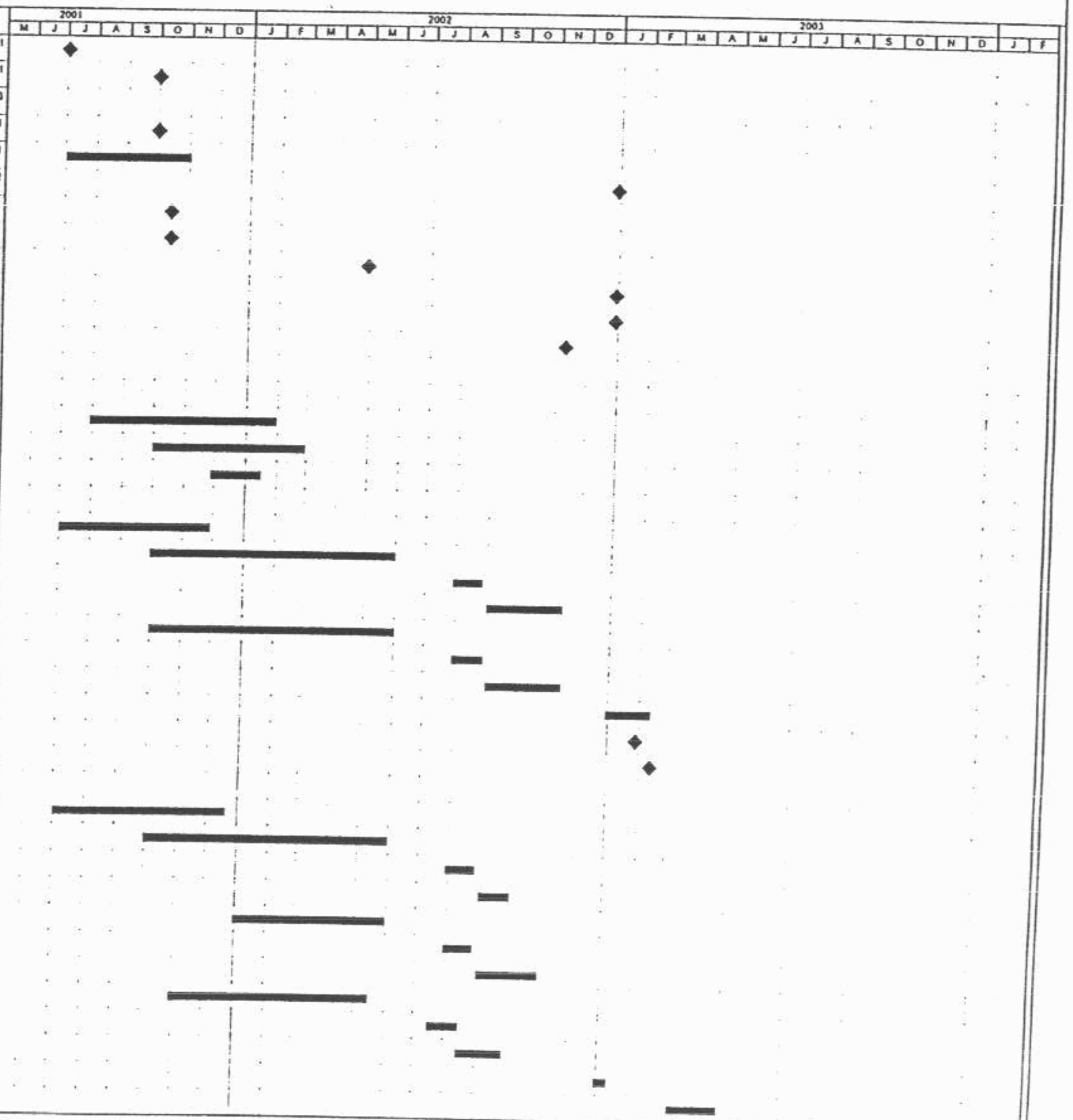
	Tech S Corp P.O. BOX 393 WESTBOROUGH, MA 01581 (508) 393-7085
PLM	ELECTRIC POWER ENGINEERING 35 MAIN STREET (508) 435-0200 HOPKINTON, MA 01748
DRAWN RAJ	PG&E GENERATING COMPANY BETHESDA, MARYLAND
CHD	NEW GENERATION PLANT
APPD	FIGURE 6 OKEECHOBEE GENERATING PROJECT ONE-LINE ELECTRICAL DIAGRAM
DATE 9/17/99	
SCALE NONE	NO. 9229-9-E01-0

FIGURE 13
OKEECHOBEE GENERATING PROJECT
PROJECT SCHEDULE

PG&E Generating

Okeechobee Generating Project

ID	Task Name	Start	Finish
1	**Notice to Commence Engineering**	Mon 7/2/01	Mon 7/2/01
2	**Notice to Proceed**	Mon 10/1/01	Mon 10/1/01
3	**Project Key Dates**	Mon 7/2/01	Wed 6/18/03
4	-Access to Site	Mon 10/1/01	Mon 10/1/01
5	-Site Preparation	Mon 7/2/01	Thu 11/1/01
6	-Water Supply for Commissioning and Operation	Mon 12/30/02	Mon 12/30/02
7	-Water Available for Construction	Mon 10/15/01	Mon 10/15/01
8	-Power Available for Construction	Mon 10/15/01	Mon 10/15/01
9	-Waste Water Connection Available	Mon 4/29/02	Mon 4/29/02
10	-Fuel Gas Available	Mon 12/30/02	Mon 12/30/02
11	-Fuel Oil Available	Mon 12/30/02	Mon 12/30/02
12	-HV Electrical Interconnect Available	Mon 11/11/02	Mon 11/11/02
13			
14	**Power Island Unit 1**	Mon 7/2/01	Wed 4/30/03
15	Arrangement Planning	Mon 7/30/01	Tue 1/29/02
16	Civil Engineering	Mon 10/1/01	Wed 2/27/02
17	Civil Construction	Wed 11/28/01	Tue 1/15/02
18			
19	Engineering GT System	Mon 7/2/01	Tue 11/27/01
20	Procurement GT & Auxiliaries	Mon 10/1/01	Fri 5/31/02
21	Transport GT & Auxiliaries	Tue 7/30/02	Mon 8/26/02
22	Installation GT & Auxiliaries	Mon 9/2/02	Wed 11/13/02
23	Procurement Generator & Auxiliaries	Mon 10/1/01	Fri 5/31/02
24	Transport Generator & Auxiliaries	Tue 7/30/02	Wed 8/28/02
25	Installation Generator & Accessories	Mon 9/2/02	Wed 11/13/02
26	Commissioning GT & Auxiliaries	Mon 12/30/02	Tue 2/11/03
27	First Ignition GT	Wed 1/29/03	Wed 1/29/03
28	First Synchronization GT	Thu 2/13/03	Thu 2/13/03
29			
30	Engineering W/S & ST	Mon 7/2/01	Wed 12/19/01
31	Procurement ST	Mon 10/1/01	Thu 5/30/02
32	Transport ST	Tue 7/30/02	Mon 8/26/02
33	Installation ST	Mon 9/2/02	Mon 9/30/02
34	Procurement Piping / Valves	Mon 12/31/01	Thu 5/30/02
35	Transport Piping / Valves	Tue 7/30/02	Mon 8/26/02
36	Installation Piping / Valves	Mon 9/2/02	Wed 10/30/02
37	Procurement Air cooled Condenser	Tue 10/30/01	Wed 5/15/02
38	Transport Air Cooled Condenser	Tue 7/16/02	Wed 8/14/02
39	Installation Air Cooled Condenser	Wed 8/14/02	Fri 9/27/02
40	Commissioning W/S & ST	Mon 12/30/02	Fri 1/10/03
41	Optimization Incl. Funct / Performance Test	Thu 3/13/03	Wed 4/30/03



Project: Schedule
Date: Tue 9/21/99

Task · Progress · Summary · Rolled Up Split · Rolled Up Progress · Project Summary
Split · Milestone · Rolled Up Task · Rolled Up Milestone · External Tasks

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FIGURE 13
(continued)

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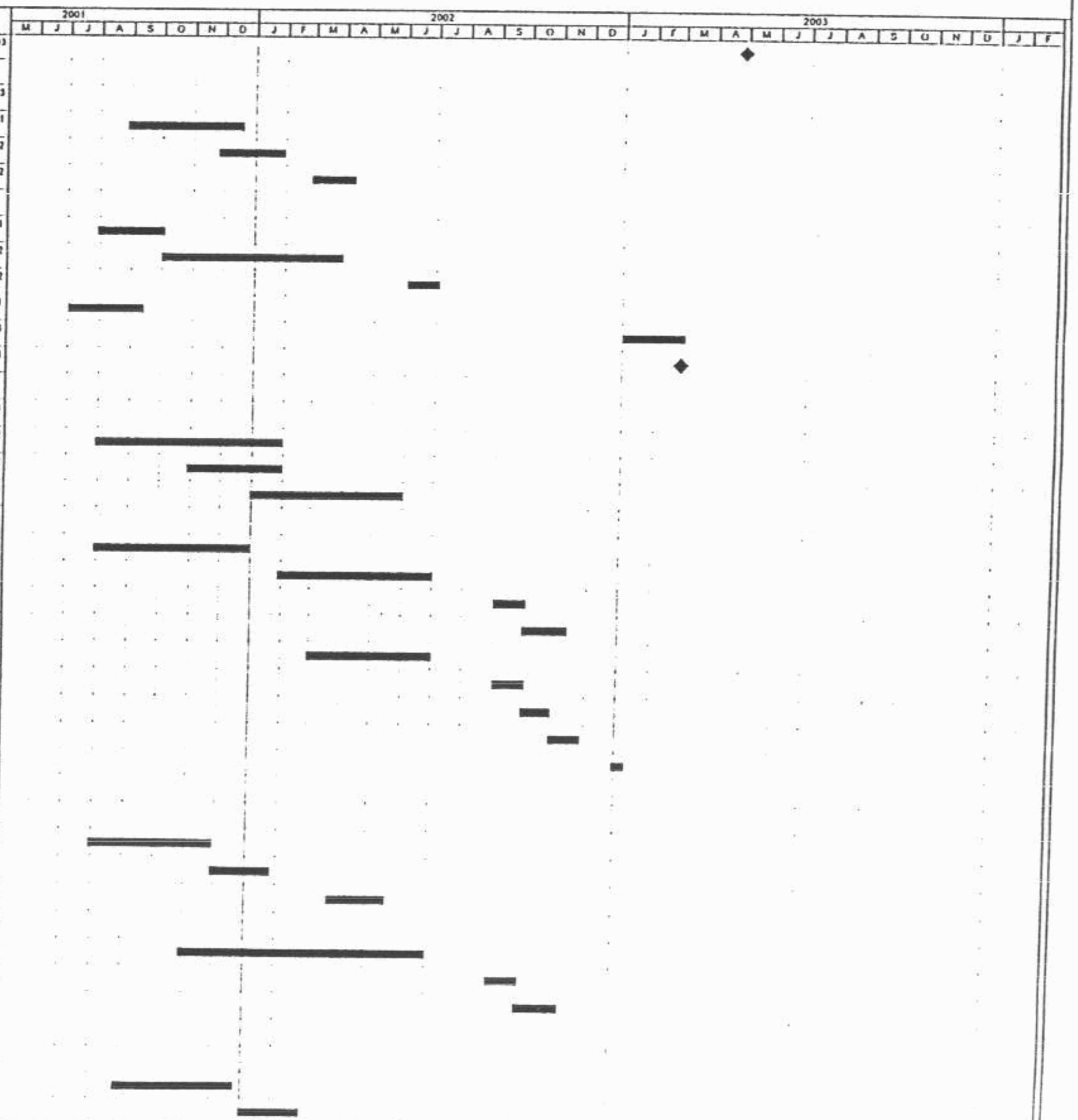
Okeechobee Generating Project

ID	Task Name	Start	Finish
42	Substantial Completion Unit 1	Mon 4/28/03	Mon 4/28/03
43			
44	**Heat Recovery Steam Generator Unit 1**	Mon 7/2/01	Mon 3/3/03
45	Arrangement Planning	Tue 8/28/01	Wed 12/19/01
46	Civil Engineering	Mon 11/26/01	Tue 1/29/02
47	Civil Construction	Wed 2/27/02	Wed 4/10/02
48			
49	Engineering HRSG	Mon 7/30/01	Tue 10/2/01
50	Procurement HRSG	Mon 10/1/01	Fri 3/29/02
51	Transport HRSG	Mon 6/3/02	Wed 7/3/02
52	Installation HRSG	Mon 7/2/01	Wed 9/12/01
53	Commissioning HRSG	Thu 1/2/03	Mon 3/3/03
54	First Steam to Turbine	Fri 2/28/03	Fri 2/28/03
55			
56	**Electrical & Control Building Unit 1**	Mon 7/30/01	Fri 1/10/03
57	Arrangement Planning	Mon 7/30/01	Wed 1/30/02
58	Civil Engineering	Mon 10/29/01	Wed 1/30/02
59	Civil Construction	Mon 12/31/01	Fri 5/31/02
60			
61	Engineering Electrical System	Mon 7/30/01	Mon 12/31/01
62	Procurement Electrical Equipment	Tue 1/29/02	Mon 7/1/02
63	Transport Electrical Equipment	Mon 9/2/02	Wed 10/2/02
64	Installation Electrical Euipment	Mon 9/30/02	Tue 11/12/02
65	Procurement Control Equipment	Thu 2/28/02	Mon 7/1/02
66	Transport Control Equipment	Mon 9/2/02	Wed 10/2/02
67	Installation Control Equipment	Mon 9/30/02	Mon 10/28/02
68	Cabling	Mon 10/28/02	Wed 11/27/02
69	Commissioning Elecincal System	Mon 12/30/02	Fri 1/10/03
70			
71	**Transformer Area Unit 1**	Mon 7/30/01	Mon 11/11/02
72	Arrangement Planning	Mon 7/30/01	Wed 11/28/01
73	Civil Engineering	Wed 11/28/01	Fri 1/25/02
74	Civil Construction	Mon 3/25/02	Tue 5/21/02
75			
76	Procurement Transformer	Mon 10/29/01	Mon 7/1/02
77	Transport Transformer	Mon 9/2/02	Wed 10/2/02
78	Installation Transformer	Mon 9/30/02	Mon 11/11/02
79			
80	**Fuel System**	Mon 7/30/01	Tue 3/11/03
81	Arrangement Planning	Mon 8/27/01	Mon 12/24/01
82	Civil Engineering	Mon 12/31/01	Thu 2/28/02



Project Schedule
Date: Tue 9/21/99

Task · Split · Progress · Milestone · Summary · Rolled Up Task · Rolled Up Split · Rolled Up Milestone · Rolled Up Progress · External Tasks · Project Summary

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FIGURE 13
(continued)

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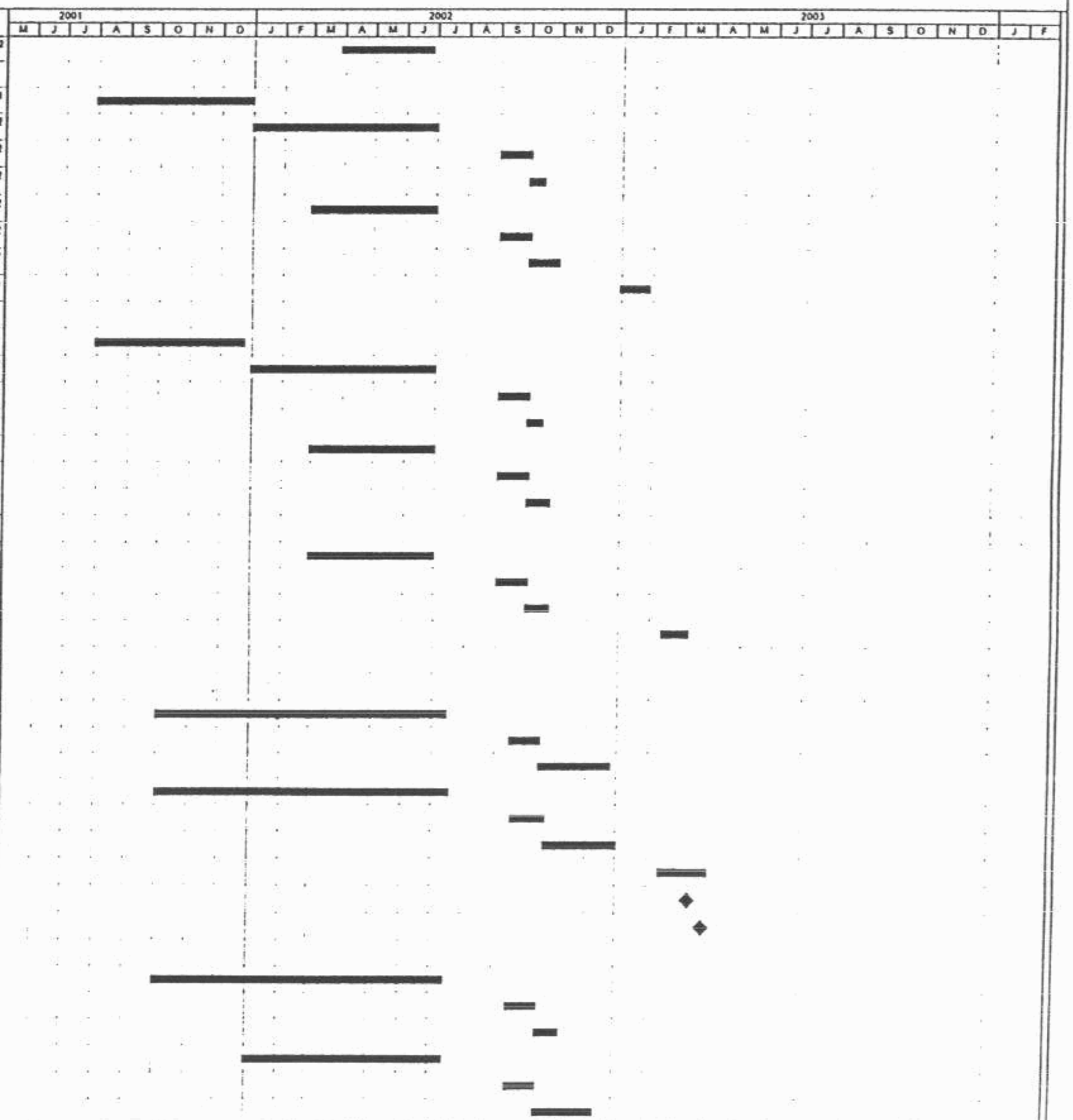
Okeechobee Generating Project

ID	Task Name	Start	Finish
83	Civil Construction	Thu 3/28/02	Wed 6/26/02
84			
85	Engineering Fuel Gas System	Mon 7/30/01	Mon 12/31/01
86	Procurement Fuel Gas Equipment	Mon 12/31/01	Mon 7/1/02
87	Transport Fuel Gas Equipment	Mon 9/2/02	Wed 10/2/02
88	Installation Fuel Gas Equipment	Mon 9/30/02	Tue 10/15/02
89	Procurement Fuel Gas Piping	Thu 2/28/02	Mon 7/1/02
90	Transport Guel Gas Piping	Mon 9/2/02	Wed 10/2/02
91	Installation Fuel Gas Piping	Mon 9/30/02	Wed 10/30/02
92	Commissioning Fuel Gas System	Mon 12/30/02	Tue 1/28/03
93			
94	Engineering Fuel Oil System	Mon 7/30/01	Mon 12/24/01
95	Procurement Fuel Oil Equipment	Mon 12/31/01	Mon 7/1/02
96	Transport Fuel Oil Equipment	Mon 9/2/02	Wed 10/2/02
97	Installation Fuel Oil Equipment	Mon 9/30/02	Tue 10/15/02
98	Procurement Fuel Oil Tank	Thu 2/28/02	Mon 7/1/02
99	Transport Fuel Oil Tank	Mon 9/2/02	Wed 10/2/02
100	Installation Fuel Oil Tank	Mon 9/30/02	Wed 10/23/02
101			
102	Procurement Fuel Oil Piping	Thu 2/28/02	Mon 7/1/02
103	Transport Fuel Oil Piping Installation Fuel Oil Piping	Mon 9/2/02	Wed 10/2/02
104	Installation Fuel Oil Piping	Mon 9/30/02	Wed 10/23/02
105	Commissioning Fuel Oil System	Thu 2/13/03	Tue 3/11/03
106			
107	Power Island Unit 2	Mon 10/1/01	Wed 6/18/03
108	Procurement GT & Auxilianes	Mon 10/1/01	Mon 7/15/02
109	Transport GT & Auxiliaries	Mon 9/16/02	Wed 10/16/02
110	Installation GT & Auxiliaries	Tue 10/15/02	Wed 12/25/02
111	Procurement Generator & Auxiliaries	Mon 10/1/01	Thu 7/18/02
112	Transport Generator & Auxiliaries	Wed 9/18/02	Mon 10/21/02
113	Installation Generator & Accessories	Mon 10/21/02	Wed 1/1/03
114	Commissioning GT & Auxiliaries	Thu 2/13/03	Tue 4/1/03
115	First Ignition GT	Fri 3/14/03	Fri 3/14/03
116	First Synchronization GT	Fri 3/28/03	Fri 3/28/03
117			
118	Procurement ST	Mon 10/1/01	Mon 7/15/02
119	Transport ST	Mon 9/16/02	Wed 10/16/02
120	Installation ST	Tue 10/15/02	Thu 11/7/02
121	Procurement Piping / Valves	Mon 12/31/01	Mon 7/15/02
122	Transport Piping / Valves	Mon 9/16/02	Wed 10/16/02
123	Installation Piping / Valves	Tue 10/15/02	Fri 12/13/02



Project: # schedul
Date: Tue 9/21/99

Task | Progress | Summary | Rolled Up Split | Rolled Up Progress | Project Summary
Split | Milestone | Rolled Up Task | Rolled Up Milestone | External Tasks

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FIGURE 13
(continued)

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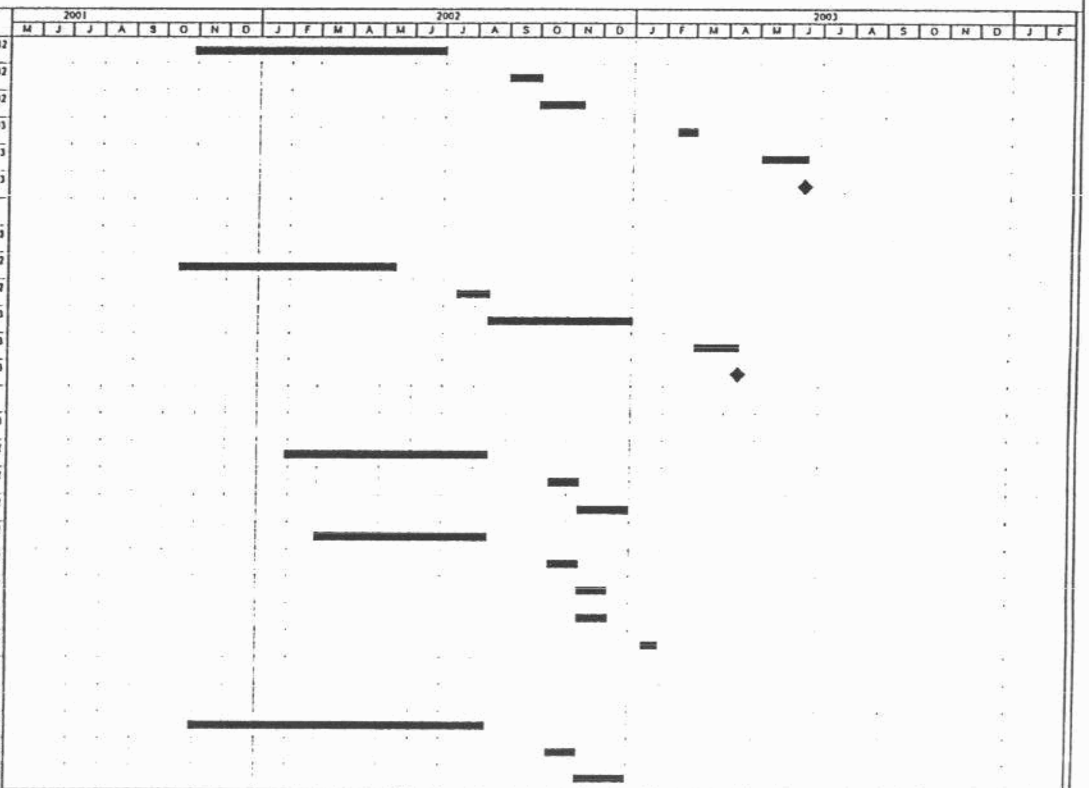
Okeechobee Generating Project

ID	Task Name	Start	Finish
124	Procurement Air cooled Condenser	Mon 10/29/01	Mon 7/1/02
125	Transport Air Cooled Condenser	Mon 9/2/02	Wed 10/2/02
126	Installation Air Cooled Condenser	Tue 10/1/02	Wed 11/13/02
127	Commissioning W/S & ST	Thu 2/13/03	Mon 3/3/03
128	Optimization Incl. Funct / Performance Test	Mon 5/5/03	Wed 6/18/03
129	Substantial Completion Unit 2	Mon 6/16/03	Mon 6/16/03
130			
131	**Heat Recovery Steam Generator Unit 2**	Mon 10/15/01	Mon 4/14/03
132	Procurement HRSG	Mon 10/15/01	Wed 5/15/02
133	Transport HRSG	Mon 7/15/02	Wed 8/14/02
134	Installation HRSG	Wed 8/14/02	Wed 1/1/03
135	Commissioning HRSG	Mon 3/3/03	Mon 4/14/03
136	First Steam to Turbine	Mon 4/14/03	Mon 4/14/03
137			
138	**Electrical & Control Building Unit 2**	Tue 1/29/02	Wed 1/29/03
139	Procurement Electrical Equipment	Tue 1/29/02	Wed 8/14/02
140	Transport Electrical Equipment	Mon 10/14/02	Tue 11/12/02
141	Installation Electrical Equipment	Tue 11/12/02	Mon 12/30/02
142	Procurement Control Equipment	Thu 2/28/02	Wed 8/14/02
143	Transport Control Equipment	Mon 10/14/02	Tue 11/12/02
144	Installation Control Equipment	Tue 11/12/02	Tue 12/10/02
145	Cabling	Tue 11/12/02	Wed 12/11/02
146	Commissioning Electrical System	Tue 1/14/03	Wed 1/29/03
147			
148	**Transformer Area Unit 2**	Mon 10/29/01	Mon 12/30/02
149	Procurement Transformer	Mon 10/29/01	Wed 8/14/02
150	Transport Transformer	Mon 10/14/02	Tue 11/12/02
151	Installation Transformer	Tue 11/12/02	Mon 12/30/02



Project: Schedule
Date: Tue 9/21/99

Task | Split | Progress | Milestone | Summary | Rolled Up Task | Rolled Up Split | Rolled Up Milestone | Rolled Up Progress | External Tasks | Project Summary

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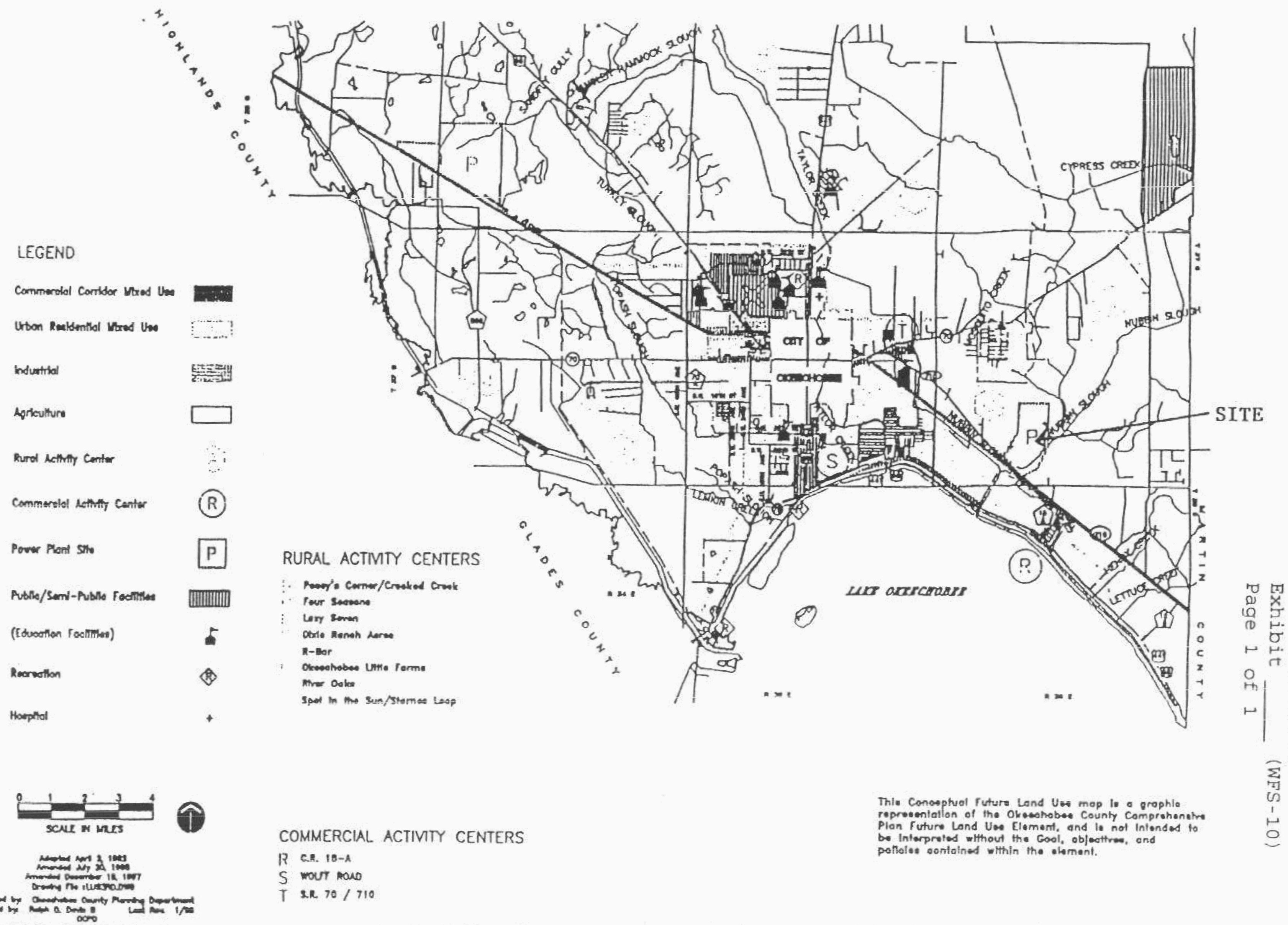
FIGURE 3
OKEECHOBEE GENERATING PROJECT SITE LOCATION RELATIVE TO LOCAL LANDMARKS AND ZONING DESIGNATIONS



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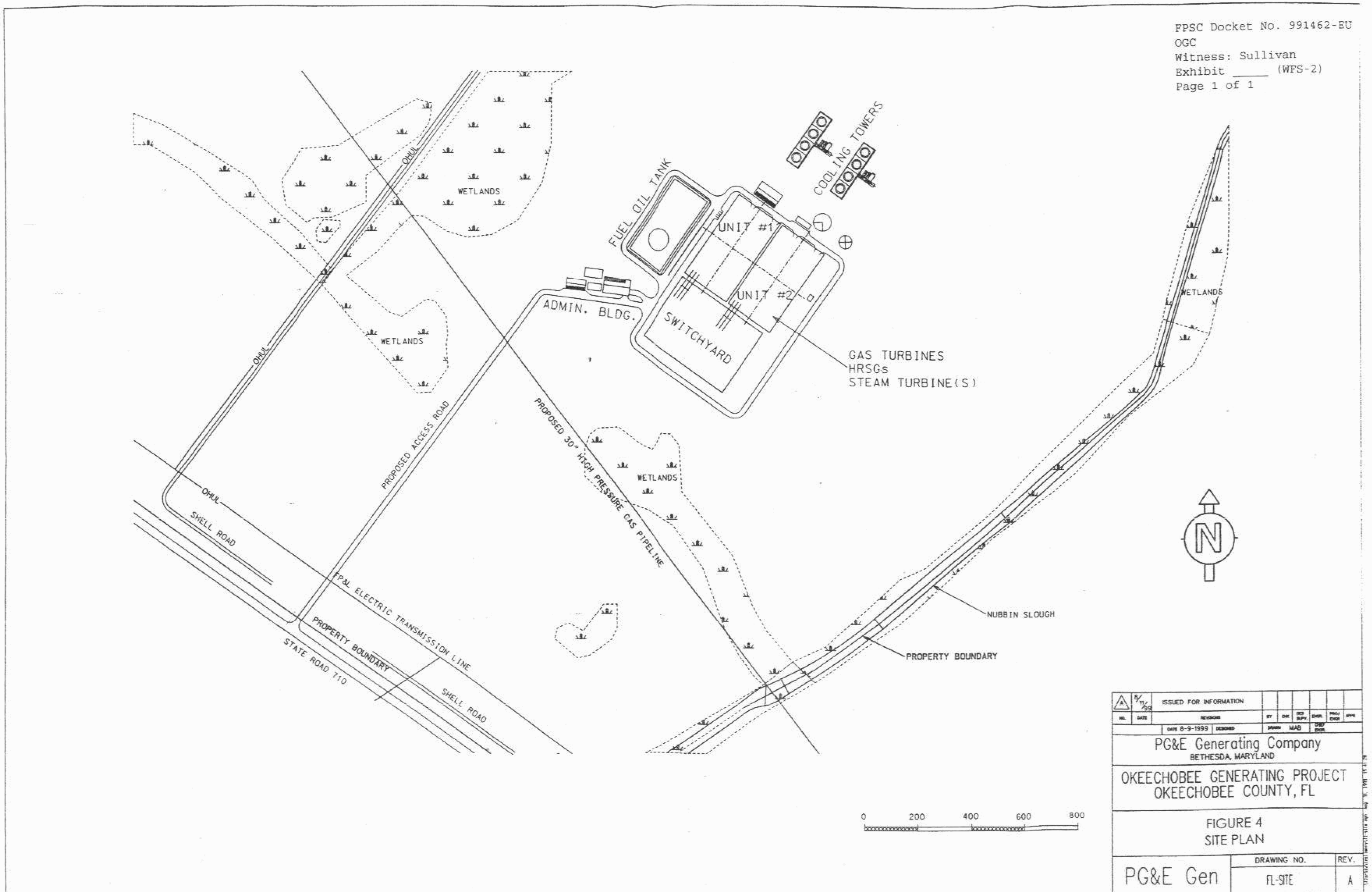

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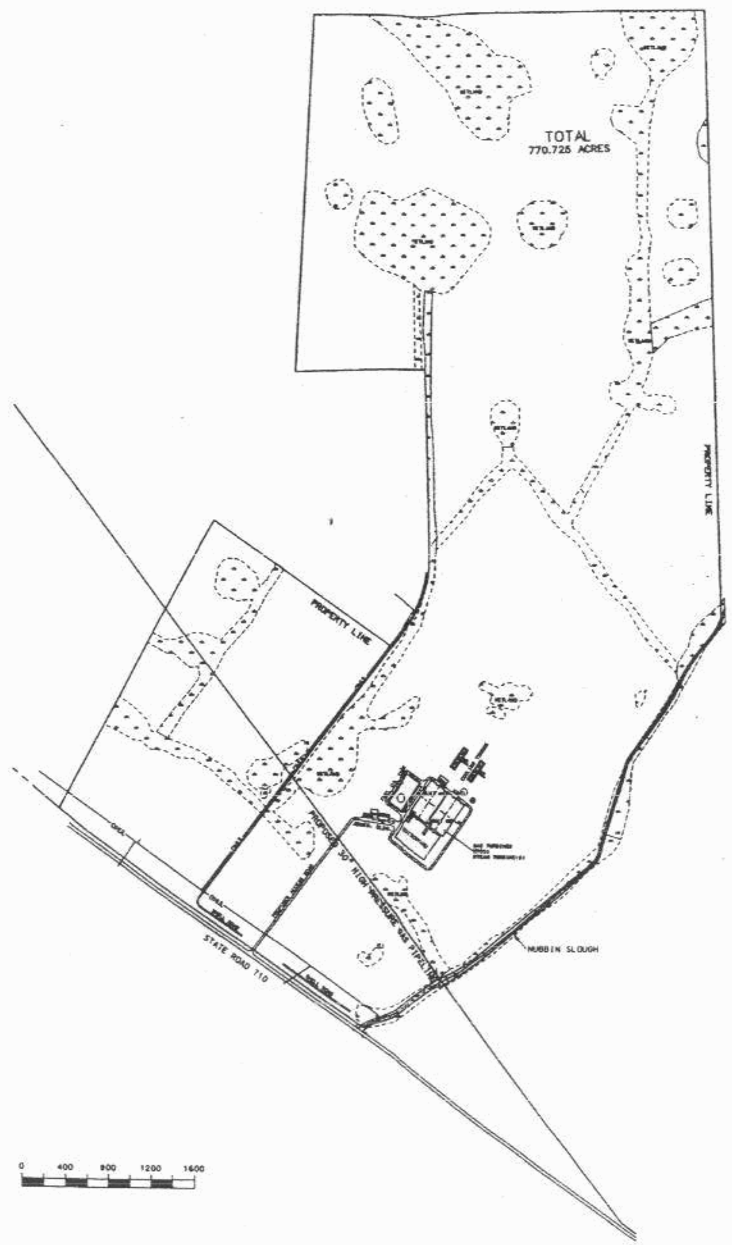

A	8/10/99	ISSUED FOR INFORMATION							
NO.	DATE	REVISIONS	BY	CHK	DES SUPV.	ENGR.	PROJ ENGR	APPR	
		DATE 8/10/1999 DESIGNED	DRAWN MAB	CHIEF ENGR.					

PG&E Generating Company
BETHESDA, MARYLAND

OKEECHOBEE GENERATING PROJECT
OKEECHOBEE COUNTY, FL

FIGURE 5
PLOT PLAN

PG&E Gen	DRAWING NO.	REV.
	FL-PLOT	A