Seminole Electric
COOPERATIVE, INC.
IN PARTNERSHIP WITH THOSE WE SERVE

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BUREAU OF AIR REGULATION

February 26, 2001

Mr. Al Linero
Florida Department of Environmental Protection
Bureau of Air Regulation
2600 Blair Stone Road
Tallahassee, FL 32399-2400

RE: Payne Creek Generating Station
PSD-FL-214A / PA-89-25SA

Dear Mr. Linero:

As required in the above referenced permit, Seminole Electric Cooperative, Inc. is submitting the equipment descriptions for the Turbines, SCR System, CO Catalyst System, and the CEMS. We are currently in the process of preparing the CEMS Protocol and will forward it to your office soon. If you have any questions or require any additional information please call me at (813) 963-0994, extension 1224.

Sincerely,

Mike Roddy
Senior Environmental Engineer

cc: Hamilton S. Oven

16313 North Dale Mabry Highway P.O. Box 272000 Tampa, Florida 33688-2000
Telephone 813.963.0994 Fax 813.264.7906 www.seminole-electric.com

W501FD II Combustion Turbine

The W501F combustion turbine consists of a 16-stage, high efficiency axial compressor, an integral combustion chamber equipped with 16 can-annular combustors, and a 4-stage reaction type turbine. The combustion turbine is directly coupled to the generator at the compressor end.

Ambient air is drawn through the inlet manifold and inlet casing into the compressor. It is pressurized to approximately 16 atmospheres and fed into the combustors, where it is mixed with fuel and ignited, raising the temperature of the mixture of air and combustion products. The compressed and heated mixture (gas) then expands through the turbine, dropping in pressure and temperature as the heat energy is converted into mechanical work. A portion of the power thus developed by the turbine is used for driving the compressor, with the balance of power used to drive the generator. The expanded gases are then exhausted into the heat recovery steam generator (HRSG).

Combustion System

The combustion system consists of 16 can-annular Dry Low NOx combustors configured to burn primarily natural gas with No. 2 distillate oil as a backup fuel.

The presence or absence of flame and the uniformity of the fuel distribution between combustors are monitored by thermocouples located downstream of the last stage turbine blades. These can also detect combustor malfunctions when at load.

CO CATALYST

The gas turbine exhaust passes through the carbon monoxide catalytic oxidation system where the carbon monoxide is oxidized. The oxidation reaction between oxygen and carbon monoxide, which is enhanced by the catalyst, occurs at 500°F and above to form carbon dioxide.

The CO converter unit assembly is composed of special stainless steel foil, corrugated and folded back and forth upon itself to make a honeycomb core. The core is encased in a stainless steel enclosure measuring approximately 4 square feet. This core and enclosure is called a "module."

These modules are fitted into an internal support frame made of carbon steel. Expansion seals on the outside of the internal support frame assures that the exhaust passes through the catalyst. The expansion seals also accommodate thermal expansion. The above mentioned components are installed in an external support structure which serves as a duct spool piece.

This catalyst structure is constructed of carbon steel with a stainless steel liner over the insulation, and has a manway on one side wall. The manway is for installation and removal of catalyst modules.

Test catalyst cores or "buttons" (cylinders about 3 inches dia.) are located in various catalyst modules. The test catalyst buttons are mounted for easy replacement from time to time for lab testing.

SELECTIVE CATALYTIC REDUCTION (SCR)

This section of the HRSG provides a system for aqueous ammonia injection into the gas path with a resulting ninety approximately (90) percent NOx removal efficiency. The SCR includes the reactor housing, transitions, internal support structure, catalyst and ammonia skid.

The plant will be equipped with a SINOx emission control system that will have a dedicated reactor housing with catalyst, ammonia injection grid, recycle gas skid, metering panel, and system control from the plant's existing DCS system.

Aqueous ammonia approximately (27 % wt) will be used as the reducing agent. The SINOx system is connected to the supply piping and the amount of ammonia that is injected is determined by a flow control and metering valve.

The metered amount of the ammonia solution is injected, in accordance with the actual emission source load, into the exhaust gas system upstream of the SINOx-catalyst (feed forward control system). The correlation curve/map (Predictive Emission Monitoring System, PEMS) of the NOx-mass flow, relative to the load, is finalized during start-up/commissioning in actual field operating conditions. Additionally, signals corresponding to the actual NOx and 02 concentration as measured by the plant CEMS (Continuous Emission Monitoring System) at the stack are transferred to the DCS system to monitor the control and optimize the PEMS map if required.

A two-phase (liquid-air) injection nozzle atomizes the reducing agent in the spray evaporator. Recycled exhaust gas is used for evaporating the- reducing agent. This carrier air/gas with the evaporated, premixed reducing agent is then injected into the exhaust gas via the ammonia injection grid piping assembly located upstream of the (SCR) catalyst in the HRSG duct. In the presence of the highly active homogeneous mixture, extruded SINOx (SCR) catalyst will convert the nitrogen oxides (NOX) by reacting with the ammonia (NH_3) to form harmless molecular nitrogen (N_2) and water.

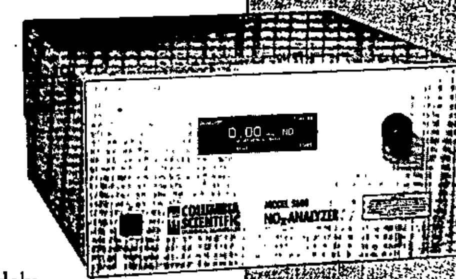
The SINOx system will be controlled by means of the plant Teleperm (TXP) DCS system. The display of system status/messages and operator controls will be made available on the existing TXP Operators Stations located within the plant control room.

FORNEY

MODEL 5600 CHEMILUMINESCENT NO_X ANALYZER

TECHNICAL BULLETIN

THE MODEL 5600 ANALYZER OFFERS SUPERIOR SENSITIVITY THROUGH PHOTON COUNTING. The 5600 microprocessor-controlled NO_X Analyzer performs specific, real-time and continuous dry analysis of ambient level nitric oxide and nitrogen dioxide in gas mixtures by detecting chemiluminescence resulting from the nitric oxide/ozone reaction.



The Model 5600 NO_X Analyzer derives its stability from maintaining the reaction chamber and the photomultiplier tube, each in thermally stable environments. This temperature stabilization ensures accurate readings over widely varying ambient temperatures without the need for moving parts such as a chopper. Furthermore, the 5600 Analyzer uses an exclusive photon-counting technique that filters photomultiplier noise far more effectively than conventional analog techniques. This results in improved sensitivity and long-term stability.

The logical menu-driven operation is extremely user-friendly and features a liquid crystal display and rotary encoder (knob) which does not require a keyboard. Ease of maintenance is enhanced by the interchangeability of many Model 5600 components with those of other 5000 - series analyzers.

- SENSITIVITY — Superior sensitivity through photon counting. No A/D conversions.
- ENVIROMENTAL MONITORING — EPA approved for ambient air monitoring.
- OUTPUTS — Wide autoranging from 0 to 50,000 ppb.
- EASE OF USE — Easily read backlit liquid crystal display. Graphic user interface using rotary encoder. No keyboard required.
- EASY MAINTENANCE — No mechanical choppers or moving parts.
- PREDICTIVE DIAGNOSTICS — Parameters are measured, checked continuously and alarmed with an output to printer or external computer.

COLUMBIA SCIENTIFIC
ENVIRONMENTAL INSTRUMENTATION

Columbia Scientific Model 5200-P Paramagnetic Oxygen Analyzer

The 5200-P Oxygen Analyzer (Ex-Situ) is a rugged and light-weight instrument which may be used for discontinuous or continuous measurement of the oxygen content in a clean and dry gas sample. The sampling system of the analyzer includes an internal fine filter in order to prevent foreign matter entering into the measuring cell. A flowmeter with needle valve introduces the sample gas into the measuring cell at the required flow rate.

Pragmagnetic measurement of oxygen prevents any inaccuracy of measurement due to the cross sensitivities of other gases because the paramagnetism of oxygen is significantly greater than that of other common gases and consequently the molecules of oxygen are attracted more strongly by a magnetic field. The magneto-dynamic cell consists of two nitrogen-filled quartz spheres arranged in the form of a dumb-bell. A single turn coil of platinum wire is placed around the dumb-bell which is suspended in a symmetrical non-uniform magnetic field. At the center of the dumb-bell is a small mirror. When the surrounding gas contains oxygen, the spheres are pushed out of the magnetic field caused by the relatively strong paramagnetism of oxygen. The force on the dumb-bell is corrected by a current through the coil which is controlled by a photo-detection system via a light beam and the mirror on the dumb-bell. The feedback current, required to compensate the torque acting on the dumb-bell will be proportional to the oxygen concentration in the gas sample through the cell.

Due to the extremely fast response time, and negligible cross sensitivity from other sample gas components, the 5200-P Analyzer is ideal for measuring oxygen concentrations in flue gases, inert gas installations, food packaging machines, ambient air and medical applications.

Technical Specifications of Model 5200-P Oxygen Analyzer

Measuring range:	0-100 volume % oxygen, linear.
Meter indication:	Digital meter; • 3½ digit 18mm high LCD-indicator for 0-100% oxygen reading.
Output signals:	0-10VDC, non-isolated, load > 100 KΩ, for each selected range. * Option: • 0-20mA or 4-20mA, isolated or non-isolated, max. load 300Ω, for the chosen measuring range. ** Option: • Oxygen alarm for minimum or maximum contact.
Response time for 90% FSD:	< 3 seconds at 60 l/h. air.
Accuracy after calibration:	± 1 volume % of span.
Reproducibility:	< 1 volume % of span.
Influence of ambient temperature:	Zero point ± 0.02 volume % oxygen per C°. Sensitivity ± 0.1 volume % oxygen per C°.
Influence of barometric pressure:	The oxygen reading will vary in direct proportion to changes of the barometric pressure which is continuously measured and compensated.
Influence of sample gas flow:	Variations in gas flow between 0 and 60 l/h. will show a difference of < 1% by volume oxygen.
Gas inlet pressure:	Minimum 0.01 barg. Maximum 1 barg.
Gas outlet pressure:	Outlet of analyzer must always discharge freely in the open atmosphere.
Flow rate of sample gas:	Adjustable between 7 and 70 l/h with needle valve on the flow-meter. Maximum flow 60 l/h.
Ambient temperature:	During operation between -10° C and +55° C.
Storage temperature:	Between -20° C and +60° C. Relative humidity 0-90% RH.
Power supply:	Internal power unit for 115/220 VAC, selectable, +/- 10%, 40-60 Hz., 3.5VA.
Materials in contact with sample gas:	Platinum, Glass, Polypropylene, Stainless Steel 316, Viton and Epoxy resin.
Sample gas connection:	Hose nipple for DN 11-4mm tube.
Dimensions:	Height = 120mm, Width = 120mm, Length = 80mm, (Designed for mounting on CEMS auxiliary panel. Readout mounted on CEMS front panel)
Weight:	1 Kg.

REMARKS:

* Optional mA output signal is only applicable to the chosen measuring range.

** Oxygen alarm always includes relay output (switch-over contact).

WARNING:

An external fine filter must always be at the sample gas inlet of the 5200-P analyzer.

Depending on the specification of the sample gas to be measured, it may be necessary to use a gas conditioning system.

Without precautions, the 5200-P analyzer is only suitable for measuring of non-hazardous gases and gas mixtures in non-hazardous areas.