Florida Power
CORPORATION

January 2, 1985
3F0185-01

Director of Nuclear Reactor Regulation
Attention: Mr. John F. Stolz, Chief
Operating Reactors Branch #4
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Crystal River Unit 3
Docket No. 50-302
Operating Licensing No. DPR-72
Control Complex Dedicated Cooling System

Dear Sir:

Your letter dated January 6, 1983, transmitted the Safety Evaluation Report (SER) accepting Florida Power Corporation's (FPC's) plan for compliance with 10CFR50, Appendix R, Sections III.G and III.L regarding safe shutdown capability. This letter also requested submittal of the design of a dedicated HVAC system to provide ventilation and cooling for the dedicated shutdown panel, power supply and switchgear.

The attachment to this letter fulfills that request. Should there be any questions, please contact this office.

Sincerely,

G. R. Westafer
Manager, Nuclear Operations
Licensing and Fuel Management

AEF/feb

Attachment

cc: Mr. J. P. O'Reilly
Regional Administrator, Region II
Office of Inspection & Enforcement
U.S. Nuclear Regulatory Commission
101 Marietta Street N.W., Suite 2900
Atlanta, GA 30323

A006 1/1

CONCEPTUAL DESIGN

CRYSTAL RIVER UNIT 3

CONTROL COMPLEX DEDICATED COOLING SYSTEM

1. BACKGROUND

An analysis of the Crystal River-Unit 3 (CR3) safe shutdown equipment and circuits required to meet the criteria of Section III.G.2 of Appendix R to 10CFR50 was performed as required by NRC Generic Letter No. 81-12 dated February 20, 1981. Included in this analysis was a review of the Control Complex ventilation system. The results of this review determined that the majority of the system components (e.g., fans, dampers, chilled water cooling units, etc.) were located in one fire area (Control Complex, 164 ft. elevation) and that the existing air handling system consisted of a single duct feeding rooms in series, such that a single fire could close a fire damper which would result in the loss of HVAC to all rooms downstream of the fire. It was determined to be economically impractical and technically unfeasible to protect the existing system components as required by 10CFR50, Appendix R, Section III.G.2.

To ensure that the areas within the Control Complex containing required safe shutdown equipment would be cooled adequately in the event of a postulated fire that disabled the existing HVAC system, a separate dedicated cooling system, complying with Appendix R criteria, was recommended. The following Control Complex areas were identified as requiring cooling:

a. The new remote shutdown room on the 108 ft. elevation.
b. Divisions A and B 4160-V switchgear rooms on the 108 ft. elevation.
c. Divisions A and B inverter rooms on the 108 ft. elevation.
d. Divisions A and B battery charger rooms on the 108 ft. elevation.
e. Divisions A and B 480-V switchgear rooms on the 124 ft. elevation.
*f. Divisions A, B, C, and D EFIC rooms on the 124 ft. elevation.

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* During the development of this conceptual design, an additional area was identified as requiring cooling from the dedicated HVAC system. This area is the new Emergency Feedwater Initiation and Control (EFIC) rooms. This is required since the EFIC room air handling cooling unit normally is to be supplied by the existing Control Complex chilled water system which is also subject to common equipment failure due to redundant equipment being located in one fire area.

CONTROL COMPLEX DEDICATED COOLING SYSTEM

The Control Complex dedicated cooling system flow diagram is shown on Attachment 1. Each Control Complex area required for Appendix R safe shutdown is cooled by individual fan coil cooling units located in the respective areas. An air-cooled, chilled water unit located outside the Control Complex on the roof of the Clean Machine Shop provides the chilled water for each unit. Supply and return piping from the chilled water unit to each fan coil unit, chilled water circulating pump, and expansion tank are provided to complete the system. The system cooling capacity is designed to handle, at a minimum, the required design heat loads.

SYSTEM MECHANICAL EQUIPMENT AND PIPING DESIGN

The system piping arrangement is seismically supported within the Control Complex so as not to damage any safety-related equipment in a seismic event. Components and piping outside the Control Complex are not seismically qualified or supported. Stainless steel piping material has been selected to reduce corrosion potential and to eliminate the need for chemically treating the circulating cooling water with corrosion inhibitors.

The fan coil units in each room have been designed to remove the following heat loads:

a.	New remote shutdown room (108 ft. elevation)	8,600	BTU/HR
b.	Division A 4160-V ES switchgear room (108 ft. elevation)	30,000	BTU/HR
c.	Division B 4160-V ES switchgear room (108 ft. elevation)	30,000	BTU/HR
d.	Division A inverter room (108 ft. elevation)	70,000	BTU/HR
e.	Division B inverter room (108 ft. elevation)	89,500	BTU/HR
f.	Division A battery charger room (108 ft. elevation)	6,000	BTU/HR
g.	Division B battery charger room (108 ft. elevation)	6,000	BTU/HR
h.	Division A 480-V switchgear room (124 ft. elevation)	83,500	BTU/HR
i.	Division B 480-V switchgear room (124 ft. elevation)	83,500	BTU/HR
j.	EFIC rooms (124 ft. elevation)	181,600	BTU/HR
		588,700	BTU/HR

A total of 13 fan coil cooling units have been provided. The fan coil unit for the EFIC rooms will be the normal duty HVAC unit, but will be supplied with chilled water from the dedicated system upon loss of the normal duty chillers. The 480-V switchgear and inverter rooms are provided with two units to remove their heat load; this is required since the maximum capacity unit commerically available is not sufficient to handle the entire room heat load. The remainder of the rooms are provided with one fan coil unit apiece.

The chilled water unit is air-cooled to eliminate the ne[illegible] to use a secondary cooling water supply system. This chiller furnishes chilled water to [illegible] fan coil units in the areas listed above. The chiller unit is located on the roof of the Clean Machine Shop. The chilled water pump and expansion tank are located in the Turbine Building. The chiller compressor is of a reciprocating design, and the chiller condenser is of the air-cooled type.

There is one chilled water pump sized for 100 percent of the design water flow. This pump is of the closed-coupled, centrifugal type provided with a mechanical seal to reduce leakage.

An expansion tank is included in the design and has been sized based on expansion of the total water volume in the systems due to temperature variations.

ELECTRICAL DESIGN

The electrical power supplied to the chilled water unit, circulating water pump, and local fan coil units will be from ES buses. The chilled water unit will be fed from the 480-V switchgear bus. The circulating water pump and 480-V/120/240-V transformer distribution panel combination, for the fan coil units, will be fed from an MCC. Since the cooling system components are not safety related, they will be shed from the bus upon loss of offsite power. This system is available after being shed and can be block loaded if necessary.

SYSTEM CONTROLS

Manual controls switches and status indication for the chilled water unit, circulating water pump, and local fan coil units will be from a local control panel in the Turbine Building at the 145 ft. elevation (operating floor). In the event of a fire disabling the Control Complex, normal HVAC, the dedicated HVAC system will be started from its local control panel. Emergency lighting has been provided at this local control panel and along the access and egress routes to this local control panel.

The cooling system components, e.g., the chilled water unit, circulating water pump, and local fan coil units, are not safety related.

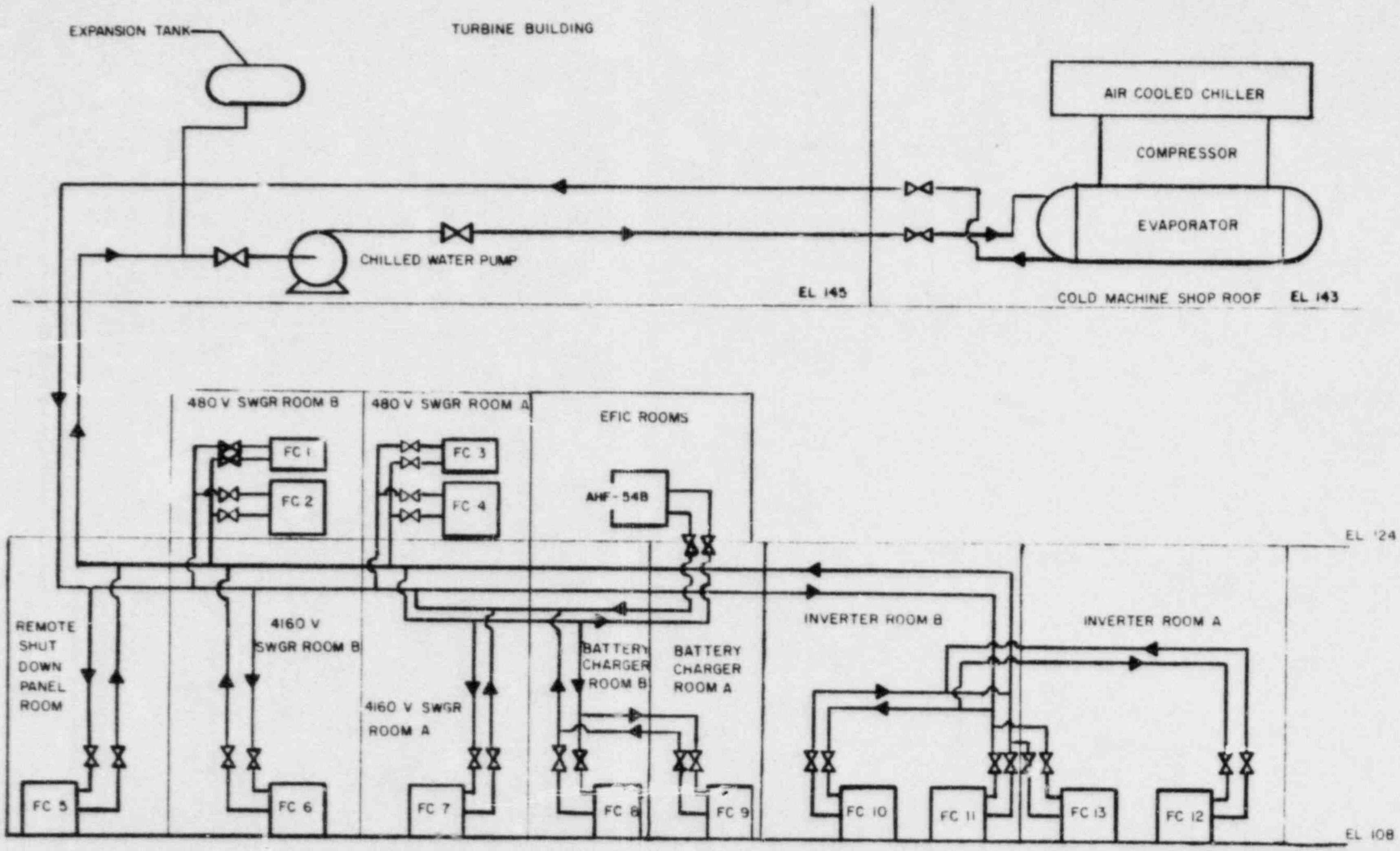
IMPACT TO PLANT INTERFACES

This proposed conceptual design interfaces with the plant electrical system, the EFIC air handling unit being provided, and the Clean Machine Shop roof structure.

The impact to the plant electrical system is negligible since the dedicated HVAC system is rarely operating. It would only be required during a fire event which disables the existing Control Complex normal HVAC system. It will not degrade the safety function of the ES bus since the power supply to the dedicated system is properly isolated from the ES bus.

The chilled water interface with the EFIC air handling unit normally will be isolated. The EFIC air handling unit normally will be supplied with chilled water from the existing Control Complex chilled water system. Supply from the dedicated system will be required only in the event of a fire that makes the existing chilled water system inoperable.

The air-cooled chilled water unit will interface structurally with the Clean Machine Shop roof. The roof support structure will be reinforced to accept the additional weight of the unit.



ATTACHMENT 1

FLOW DIAGRAM
CONTROL COMPLEX
DEDICATED COOLING SYSTEM