R. Boyd, Assistant Director for Reactor Projects
THRU: S. Levine, Assistant Director for Reactor Technology, DRL
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JAN 26 1968

FLORIDA POWER CORPORATION, CRYSTAL RIVER NUCLEAR GENERATING PLANT (UNITS 3 & 4), DOCKET 50-302/303; QUESTIONS RELATING TO INSTRUMENTATION & CONTROL

I&PTB:DRL:TAI - RT-341

This is to submit questions that were informally provided by Mr. T. A. Ippolito on December 8, 1967, as well as those he orally asked the applicant during the meeting held on January 5, 1968.

The attached list does not include questions on the radiation monitoring system and the electric power system since the description of these systems is undergoing revision.

The applicant's design proposes to use a limited number of instrument channels for both protection and control purposes. The attached list of questions requests that the design be evaluated with respect to the proposed IEEE Standard, Nuclear Power Protection Systems which conditionally permits the use of instrument channels for both protection and control. However, in light of the ACRS's Diablo Canyon letter, the applicant should also evaluate his design with the more restrictive position taken by the ACRS.

cc: S. Levine
V. Moore
O. D. Parr
T. A. Ippolito
C. Long
D. Ross

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SURNAME ▶	TIppolito/am	VMoore	SLevine			
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Form AEC-318 (Rev. 9-53)

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QUESTIONS RELATING TO CRYSTAL RIVER UNITS 3 & 4, DOCKET 50-302/303

1. The PSAR contains a number of inconsistencies. Will you please resolve the inconsistencies listed below:

   A. Page 7-5 does not agree with Fig. 7-2 with respect to the power supplied to the undervoltage coils of the scram circuit breakers.

   B. Fig. 3-66 does not agree with Fig. 3-68 with respect to whether single phase AC or DC power will be used as input to the rod drive power supply.

   C. On Page 9-20 of the PSAR it is stated that the surge tank overflow is diverted to the Rad Waste System upon receipt of a radiation alarm. Figure 9-3 shows that level instruments are used.

2. Upon resolution of questions 1A & B, please perform an analysis to show that this portion of the reactor protection system meets the Section 4.2 of the proposed IEEE Standard for Nuclear Power Plant Protection Systems (IEEE Standard).

3. The PSAR does not adequately describe the preliminary design of the power/flow instrumentation. Please provide a more detailed description. Perform an analysis to show that an indirect, stepwise measurement of flow is adequate for plant safety. Also, show that use of flux & flow instrument channels for both protection and control meets Section 4.7 of the proposed IEEE Standard.

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4. Please provide a description of the protection system preliminary design to show that the following sections of the proposed IEEE Standard are satisfied:

   Section 4.9 Capability for Sensor Checks

   Section 4.10 Capability for Test & Calibration

   Section 4.11 Channel Bypass or Removal

   Section 4.12 Operating Bypasses

   Section 4.13 Indication of Bypasses

   Section 4.14 Access to Means for Bypassing

   Section 4.15 Multiple Trip Settings

   Section 4.16 Access to Trip Setting, Calibration & Test Points

   When addressing Sections 4.11, 4.14, 4.15, please provide a listing of all bypasses and variable trip settings.

5. Figure 7-11 shows that temperature and pressure instrument channels are used for both protection and control of the plant. Show that the design of these channels meets Section 4.7 of the proposed IEEE Standard.

6. Please provide justification for the lack of instrument channel redundancy in the boric acid mix tank and the borated water storage tank.

7. Assuming that it becomes necessary to abandon the control room during plant operation, please describe the procedures and the instrumentation

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available (external to the control room) or to be provided to insure cold shutdown of both units. The evaluation should consider this capability with and without off-site power. Also, provide a description of the permissive circuit design which will be provided to insure against the use of these external controls without the reactor operator's knowledge.

8. As presently designed, the flux level of each power range detector (12 in all) is not indicated to the operator. Please perform an analysis to show that the present design of the power range flux models is capable of detecting and indicating abnormal flux patterns and is therefore adequate for plant safety.

9. We believe that diversity of emergency core cooling actuation signals is essential. Please indicate what changes will be made to provide diversity.

10. In Section 7 of the PSAR it is stated that all instrumentation will be subjected to "Qualification Tests." Please provide a description of these tests.

11. Please identify those equipments and components located in the primary containment which are required during and subsequent to a DBA and describe the tests which will be performed on each of these items to insure their availability in a combined high humidity, pressure, and

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temperature environment.

12. On Page 9-37 of the PSAR it is stated that the control room ventilation system will be manually controlled. Please justify the lack of automatic controls for the emergency operation of this system.

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