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March 14, 1986
5211-86-2040

Office of Nuclear Reactor Regulation
Attn. John F. Stolz, Project Director
PWR Project Directorate #6
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Stolz:

Three Mile Island Nuclear Station Unit 1 TMI-1)
Operating License No. DPR-50
Docket No. 50-289
EFW/HSPS

Attached is GPUN's response to your request for additional information dated December 5, 1985. Items 8 and 9 are in response to additional requests over the telephone from J. Thoma.

Sincerely,

M. D. Hukill
Director, TMI-1

HDH:gpa
2821f/0503A
Attachment

cc: J. Thoma
R. Conte

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ATTACHMENT I

ITEM 1 Do all valves which are operable from the control room have position indication (mimics, etc.) provided in the control room? For those valves which do not, provide justification for not providing position indication in the control room and discuss how this issue relates to Paragraph 4.20 of IEEE-STD-279-1971.

RESPONSE See Table 1.

Please note that compliance with Section 4.20 is not a requirement of NUREG 0737 II.E.1.2; nor does Section 4.20 require position indication for valves operable from the control room.

ITEM 2 Bypass switches HS-1086 and 1087 and "43/SSI" (shown on Impell Drawing Nos. 0370-064-091 and 092) and test switches such as "69" (shown on Gilbert Drawing No. SS-208-138) and "TS 29" (shown on Sheet 1 of Foxboro Drawing No. 84N35833 FD 0005) have bypass/inoperable status indication provided in the control room? For those switches which do not and are used more frequently than once per year, provide justification for not providing bypass/inoperable status indication in the control room. Discuss how this issue relates to Paragraph 4.13 of IEEE-STD-279-1971 with guidance from R.G. 1.47.

RESPONSE HS-1086 and 1087 (bypasses for EF initiation on R.B. Hi Press) will be indicated via control room alarm. This is not yet reflected in drawings.

Existing plant selector switch "43/SSI" is alarmed in the control room as shown on Drawing Nos. 0370-064-091 and 092.

Existing plant test switch "69" shown on Gilbert Drawing No. SS-206-138 does not isolate a remote start signal.

"TS 29" and other test switches internal to the HSPS are not individually indicated but are addressed by the alarms associated with test panels containing these test switches. To clear the test panel alarm, the test switches must be in their normal position and the test panel cover secured. Please note that compliance with RG 1.47 is not a requirement of NUREG-0737 II.E.1.2.

ITEM 3 The switches discussed in Question 2 above may be used to block automatic initiation during testing. What assurance (test, indication, etc.) is provided that the specific contacts performing the block function return to their normal position? Discuss how the detectability (or non-detectability) of contact failure relates to this issue and to the single failure criterion in accordance with Paragraph 4.2 of IEEE-STD-279-1971 as amplified by IEEE-STD-379.

RESPONSE

This item is appropriate for type a/b contact switches as opposed to HS-1086 and 1087. Please note that compliance with IEEE-STD-379 is not a requirement of NUREG-0737 II.E.1.2.

Within HSPS, most a/b contacts on the analog side (i.e., "TS 29") which fail to close will cause a channel trip. On the logic side, the test/bypass switch associated with the Bistable/Isolation relays is proven via the test sequence. All four test switches at the input of the 2/4 matrix are exercised. One of the test switches is proven immediately by the channel test. Each time the surveillance is performed a different channel is tested.

The "69" device's use is not of concern as per Item 2 response.

The "43/SSI" device contact closure will be proved via the test. However, every use of the switch is not always followed immediately by a test.

ITEM 4

Channel trip and train actuation indicators are provided in the control room for Train A only. Discuss the design philosophy for not providing channel trip and train actuation indicators for Train B also. Discuss how this issue relates to Paragraph 4.19 and 4.20 of IEEE-STD-279-1971.

RESPONSE

As noted in the review of NUREG 0737 II.E.1.2, compliance with Item 4.19 and 4.20 of IEEE-STD-279-1971 is not required. Channel trip and train actuation indicators are provided in the control room as shown in Table 3 of GPUN's letter dated April 29, 1985 (5211-85-2057).

Channel trip indication is provided on a per channel basis. A channel trip logic signal is provided to each train via an isolation relay. The HSPS architecture provides most non-1E outputs via Train A. Failures of isolation relays will be detected during testing or via monitoring of the status lights at the HSPS.

Train actuations are provided for Train A and not Train B. An invalid actuation of a single Train B 2/4 will not cause a plant upset or an unsafe condition. A valid Train B actuation without Train A would be accompanied by alarms (any channel) that the variable has approached the actuation setpoint. The channel trip indications would also function, and the actuation of Train B would be noticed.

ITEM 5 Foxboro drawings do not show test switches for the steam generator level channel bistables. Discuss how the lack of these switches impacts testing of these bistables. Discuss how this issue relates to Paragraph 4.10 of IEEE-STD-279-1971.

RESPONSE Test switches are provided for feedwater rupture detection/Hi R.B. press. Test switches are not provided for steam generator level Bistables (or Main Steam Rupture Detection/Steam Generators Pressure Bistables). These test switches were provided for the R.B. press bistables because of possible future use as inputs for E.S./R.P.S. Normal test signal injection takes place at the "P" test block at the I/E converter. As can be seen, this exercises additional analog function cards.

ITEM 6 Manual control is provided for some components (pumps and valves). Provide justification for not providing manual initiation capability of the system level and discuss how this issue relates to Paragraph 4.17 of IEEE-STD-279-1971.

RESPONSE For the EFW system the only system level protective action is EFW injection which requires starting the EFW pumps and opening the control valves. It is obvious this involves the operation of minimum equipment minimizing the potential for operator error, and therefore meets the requirement of Section 4.17 of IEEE-STD-279-71.

ITEM 7 NUREG-0737, Action Item II.E.1.2, Part 1 specifically required that each licensee provide a discussion of the design with respect to specific paragraphs of IEEE-STD-279-1971. Provide the required discussion covering your conformance to those specific paragraphs.

RESPONSE 4.1 General Functional Requirements

The Heat Sink Protection System for automatic initiation automatically initiates by starting all EFW pumps and opening the EFW control valves (if required) for transient and accident conditions for which it is relied upon. The EFW system (EFW pump turbine is not an EQ component) has been environmentally qualified in accordance with 10CFR50.49 and will continue to be qualified environmentally with the HSPS system installed. The HSPS responds quickly, accurately and over the entire range of system performance. [See Section 1.4 of GPUN's letter dated April 29, 1985 (5211-85-2057)].

4.2 Single Failure

The HSPS for auto initiation is single failure proof utilizing a 2 out of 4 logic sequence. A single failure of either train will not prevent at least one train of EFW from operating. [See Section 1.4 of GPUN's letter dated April 29, 1985 (5211-85-2057); Response to Item 4 of GPUN letter dated December 19, 1985 (5211-85-2209); and Section IB of GPUN letter dated August 23, 1983 (5211-83-232)].

4.3 &
4.4 Qualification

The Foxboro Spec 200 is high quality electronic equipment used generally throughout the nuclear industry and is tested and calibrated in accordance with manufacturers specifications. [Section 5 and 6 of GPUN's letter dated April 29, 1985 (5211-85-2209)]. Transmitters and cable located in the Auxiliary Building, Reactor Building and Intermediate Building will be qualified in accordance with 10CFR50.49. [Section IV.A.3 of GPUN's letter dated August 23, 1983 (522-83-232)]. The HSPS panels are located in a mild environment for the accidents for which it is required.

4.6 Channel Independence

The HSPS for auto initiation contains 4 independent and seperate Channels for the A and B trains of EFW. Isolation devices are provided for interfaces with non-1E equipment. [See Section 1.7 of GPUN letter dated April 29, 1985 (5211-85-2057) and Item 4 of GPUN letter dated December 19, 1985 (5211-85-2209)].

4.7 Control and Protection System Interaction

The HSPS is a control and protection system which uses isolation devices which are duly qualified. Since the HSPS used a 2 out of 4 logic, the system is single failure proof even with one channel bypassed (2/3) for maintenance or testing. [Items 4 & 5 GPUN letter dated December 19, 1985 (5211-85-2209)]. The HSPS system shares common components with the ICS which are protected by qualified isolation devices.

4.9 &
4.10 Capability for Testing

All devices in the EFW auto initiation circuitry can be tested at power. However, level and pressure transmitters will only be tested at refueling intervals. The low OTSG level and high RB pressure actuations are tested using built in test features of the HSPS. [Item 7 GPUN letter dated December 19, 1985 (5211-85-2209)]. The remaining EFW actuations (loss of both EFW pumps and loss of RCP's) are existing auto start circuitry previously reviewed.

4.11 Channel Bypass

The HSPS for auto initiation of EFW is designed to permit any one channel to be maintained or tested at power with a single active failure (See Item 4.7 above).

4.12 Operating Bypass

There are no requirements for operating bypasses in EF initiation although the HSPS does contain an operat ng bypass associated with Main Steam Rupture Detection. This bypass is fully compliant with IEEE-STD-279-1971.

4.13 Indication of Bypass

Internal to the HSPS, bypass associated with testing is indicated when access is made to the test panel.

Operator initiated bypasses are directly alarmed.

4.17 Manual Initiation

The operator may override the automatically selected setpoints by means of controls at each of the controller display stations in the control room. The operator may also switch to manual control. The auto initiation circuitry involves starting the EFW pumps and opening the control valves which is minimum equipment. [Section 3.2 of GPUN letter dated April 29, 1985 (5211-85-2057)].

ITEM 8 EFV-30 A/B/C/D Air to Actuator Drawing and Electrical Schematic for I/P Converter.

RESPONSE The following drawings were provided to NRC (J. Thoma) by express mail on January 31, 1986.

1. GAI Drawing Nos. E-304-279 Rev. IA-1, E-304-280 Rev. IA-1.

2. Impell Drawing Nos. 0370-064-045 Rev. 1, 0370-064-046 Rev. 1, 0370-064-159 Rev. 0.

3. Copes-Vulcan Drawing No. E-266/63 Rev. 2.

4. ITT Conoflow Instruction & Maintenance Manual (Model #GT25CA 1926).

Item 9 The licensee is to send to the NRC a copy of the drawings of the control panels which relate to EFW controls.

Response The following drawings were provided to NRC (J. Thoma) by express mail on January 21, 1986.

0370-064-010 Rev. 2 Main Control Panel CC Revisions
0370-064-011 Rev. 2 Main Control Panel CL Revisions
0370-064-090 Rev. 2 HSPS Mod Vertical Panel PLF Cutouts and Front Views.

This responds to Item 2 of your letter of October 24, 1985 and supplements our letter of December 19, 1985 (5211-85-2209).

TABLE 1

EFW SYSTEM AND BACKUP WATER SUPPLY VALVES[1]

Valve No.	Normal Position	Position on Loss of Control Signal	Position on Loss of Motive Power
EF-V1A/B	Open	As-is	As-is
EF-V2A/B	Open	As-is	As-is
EF-V4	Locked Closed	As-is	As-is
EF-V5	Locked Closed	As-is	As-is
EF-V30A/B/C/D	Closed	Closed	Closed
CO-V10A/B	Locked Open	As-is	As-is
CO-V14A/B	Open	As-is	As-is
CO-V111A/B	Open	As-is	As-is
MS-V1A/B/C/D	Open	As-is	As-is
MS-V2A/B	Open	As-is	As-is
MS-V8A/B	Open	As-is	As-is
MS-V10A/B	Closed	As-is	As-is
MS-V13A/B	Closed	Open	Open
MS-V3A-F	Closed	As is	Closed
MS-V4A/B	Closed	As is	Closed
CO-V12	Closed	As-is	As-is
CO-V13	Open	As-is	As-is

(1) All of the valves listed above in Table 1 are equipped with a handwheel and have position indication in the control room. For EFV-30A/B/C/D, the control room indication is not a true position indication, but a demand signal only.