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July 31, 1985

Director of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
7920 Norfolk Avenue
Bethesda, MD 20814

Attention: Mr. Walter Butler, Chief
Licensing Branch 2
Division of Licensing

Gentlemen:

RESPONSE TO THE NRC REQUEST FOR ADDITIONAL INFORMATION (RAI)
SAFETY PARAMETER DISPLAY SYSTEM (SPDS) ISOLATION
HOPE CREEK GENERATING STATION
DOCKET NO. 50-354

Enclosed for NRC staff review, please find the Public Service Electric and Gas Company (PSE&G) item-by-item response to the subject RAI regarding SPDS isolation discussed in the May 1985 telecon. Please note that the detailed reports referenced in responses to items 2.a, 2.b, 2.c, and 2.d will be available for NRC review in mid-October 1985.

This information is pertinent to Hope Creek Safety Evaluation Report (SER) Outstanding Issue 15. Should there be any questions or concerns on this matter, please do not hesitate to contact us.

Very truly yours,

R L Mittl / RP Douglas

Enclosure

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C D. H. Wagner
USNRC Licensing Project Manager

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USNRC Senior Resident Inspector

M P85 139/14 1/2-dh

Enclosure 1 - Response to NRC Request for Additional Information on SPDS Isolators

NRC Item No. 1

"The SPDS safety systems shall be suitably isolated from electrical or electronic interference with equipment and sensors that are in use for safety systems."

Response

The HCGS SPDS interfaces with Class 1E safety-related circuits via qualified isolation devices. All isolation devices used at HCGS to interface between safety-related Class 1E circuits and non-safety-related circuits are described in the response to FSAR Question 421.13. Those isolators used in SPDS interfaces are described in parts (b), (c.3), and the optical isolation device description of the NSSS part of the question response.

NRC Item No. 2.a

"For each type of device used to accomplish electrical isolation at (HCGS), describe the specific testing performed to demonstrate that the device is acceptable for its application(s). This description should include elementary diagrams, where necessary, to indicate the test configuration and how the maximum credible faults were applied to the devices."

Response

General descriptions of the testing performed on each isolation device are provided in the response to FSAR question 421.13. Detailed descriptions of the testing performed are contained in the test procedures/reports provided by the vendor performing the testing. The response to FSAR question 421.13 will be revised to provide test report references as they become available.

NRC Item No. 2.b

"[Provide] data to verify that the maximum credible faults applied during the test were the maximum voltage/current to which the device would be exposed and how the maximum voltage/current was determined."

Response

The response to FSAR Question 421.13 will be revised to include the calculated maximum credible "hot short" voltage and short circuit current values for each isolation device. The following description of how these fault values were calculated will also be included in the revised question response.

Maximum credible "hot short" voltage and short circuit current calculation methodology:

A. Assumptions:

1. Maximum "hot short" voltage conditions occur when the phase conductors of one cable become faulted with the phase conductors of a higher voltage cable without shorting to ground.

2. Maximum "hot short" voltage conditions and short circuits (to ground) do not occur simultaneously.

3. Maximum short circuit current is based on maximum connected source voltage and cable impedance.

4. None of the non-Class 1E electrical protection devices (i.e., fuses, circuit breakers, etc.) function to remove the fault identified in assumption 3.

5. Cable impedance is based on temperature at 10°C for conservatism. Actual temperature is expected to be higher, which would result in lower short circuit currents than those calculated at 10°C.

B. Maximum credible "hot short" voltage calculation methodology:

1. The adjacent cable with the highest voltage potential that could be shorted to the cable of concern is determined from engineering drawings.

2. A 10 percent factor representing nominal voltage fluctuations is then added to the voltage potential of the cable identified in Step 1.

3. The maximum credible "hot short" voltage is then calculated by adding the fault voltage obtained in Step 2 to the nominal voltage of the cable of concern.

C. Maximum credible short circuit current calculation methodology:

1. Calculate the maximum voltage from the normal source by summing the rated voltage, the voltage due to nominal voltage fluctuations, and where applicable, the voltage due to transformer tap fluctuations.

2. Calculate the cable impedance by multiplying the length of the cable of concern (actual constructed length or 95 percent of engineered length, if actual constructed length is not available) by the impedance per length value (based on 10°C) obtained from the manufacturer's specifications for the particular cable type and size.

3. The maximum credible short circuit current is then calculated by dividing the maximum voltage value obtained in Step 1 by the cable impedance value obtained in Step 2.

The test report for each isolation device will identify that the device was tested to these calculated (or higher) fault values.

NRC Item No. 2.c

"[Provide] data to verify that the maximum credible fault was applied to the output of the device in the transverse mode (between signal and return) and other faults were considered (i.e., open and short circuits)."

Response

The test report for each isolation device will identify that the maximum credible "hot short" voltage and short circuit current faults were applied in transverse mode.

NRC Item No. 2.d

"Define the PASS/FAIL acceptance criteria for each type of device."

Response

The PASS/FAIL criteria will be defined in the test procedure for each isolation device. The basic PASS/FAIL criteria is that no credible fault on the non-Class 1E side (including maximum credible "hot short" voltage and short circuit current faults) will cause misoperations or degradation of operation on the Class 1E (safety-related) side of the isolation device.

NRC Item No. 2.e

"Provide a commitment that the isolation devices comply with the environmental qualifications (10CFR50.49 and the seismic qualificiations which were the basis for plant licensing."

Response

The environmental and seismic qualification requirements for each isolation device are identified in the response to FSAR Question 421.13.

NRC Item No. 2.f

"Provide a description of the measures to protect the safety systems from electrical interference (i.e., Electrostatic Coupling, EMI, Common Mode, and Crosstalk) that may be generated by the SPDS."

Response

The electrical interference testing performed on each isolation device is identified in the response to FSAR Question 421.13.