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IPPOLITO,T.A. OPERATING REACTORS BRANCH 3

SUBJECT: FORWARDS INFO REQUESTED IN 780308 LTR RE ENVIRON QUALIFICATION OF ELECTRICAL CONNECTORS,POST-ACCIDENT DESIGN CRITERIA & LOWER INSULATION RESISTANCE MEASUREMENTS OCCURRING AT 20-H TO END OF TEST FOR FIVE PIN 16 CONNECTOR.

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NIAGARA MOHAWK POWER CORPORATION/300 ERIE BOULEVARD WEST, SYRACUSE, N.Y. 13202/TELEPHONE (315) 474-1511

April 18, 1979

Director of Nuclear Reactor Regulation
Attn: Mr. Thomas Ippolito, Chief
Operating Reactors/Branch #3
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Ippolito:

Re: Nine Mile Point Unit 1
Docket No. 50-220
DPR-63

Your March 8, 1978 letter requested information regarding environmental qualification of Nine Mile Point Unit 1 electrical connectors. The attached information provides responses to your requests.

Very truly yours,

NIAGARA MOHAWK POWER CORPORATION

Donald P. Dise

Donald P. Dise
Vice President-Engineering

NLR/szd

Attachment

A005
1/1

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Request 1

Identify the post-accident design criteria (temperature, pressure, humidity, and radiation) for safety related connectors located inside containment and the time periods for which connectors will be required to be operational. Also, state the consequences connector failure following the time period for which the connectors are qualified.

Response

Our letter dated March 7, 1979 provided post-accident time dependent environmental qualifications criteria for safety-related electrical connectors inside the Unit 1 primary containment for the break of a large recirculation line. Safety-related electrical connectors inside containment have been qualified to these criteria. We have reviewed the post-accident analysis and have determined that the time dependent environmental criteria previously provided conservatively bound the expected environment, except for temperature.

Table 1 on Page 29 of the First Addendum to the Technical Supplement to Petition to Increase Power Level provides further information on primary containment temperatures. The maximum temperature inside the drywell would result from a large break of a main steam line resulting in peak superheat temperatures of 334F for a matter of seconds. Smaller leaks in a steam line could result in peak superheat temperatures of 330F while the reactor pressure is between 400-500 psig. This would occur for a maximum of 1.66 minutes. For these short periods, the electrical connectors would not be significantly effected due to the rugged construction. Additionally, activation of the containment sprays would eliminate this superheat temperature while the sprays are operating.

The accident environment during and after a large recirculation line break bounds the post-accident environment except as discussed above. During a postulated recirculation line break certain electrical connectors are required to operate at different time periods. The key actions following a large recirculation line break are described below:

Steam and water are released to the primary containment. Within the first few seconds, the reactor will scram.

Within 60 seconds after an isolation signal is received, the isolation valves move to a safe postion. Core Spray is initiated and reaches design flow. Cladding temperatures are reduced to 212F within 2.7 hours. The plant reaches cold shutdown within 24 hours after the accident.

Electrical connectors for the Core Spray blocking valves, isolation valves, and relief valves would operate during the accident. The core spray blocking valves operate when initiated by reactor low low level or high drywell pressure after the reactor vessel depressurizes to 365 psig. These valves remain open after actuation.

Once isolation valves (electrical connectors) inside containment close, they are no longer required to operate. These valves remain in this position throughout the accident. In systems that have only outside isolation valves, the electrical connectors are not subject to the accident environment. These systems include Containment Atmosphere Dilution, Nitrogen Purge and Supply and Oxygen Analyzer Systems.

The relief valves are not required to operate for a large recirculation line break. However, the relief valves are required to operate for smaller line breaks for about 1,000 seconds after the accident. These electrical connectors were qualified during the previous test for 27.7 hours.

The instrumentation circuits provide indications of reactor and containment conditions, and initiate appropriate signals. After the initiation of a function occurs, instrumentation is not required to mitigate the accident. The emergency core cooling systems are automatic and can only be stopped (if deemed appropriate) by manual operation action.

Safety-related electrical connectors have been qualified for the accident environment for 27.7 hours. Failures of electrical connectors after that time has negligible safety significance. Cold shutdown is maintained by the Core Spray System flow to the reactor. Core Spray isolation valves inside containment are motor-operated and would be open at this time. Since these valves fail "as is" on loss of power, operator action to remove power would ensure the valves remain open. This would preclude the accident environment from affecting core spray flow to the reactor. Further, similar steps could be taken (if deemed appropriate) with all motor operated isolation valves inside primary containment.

Request 2

Explain lower insulation resistance measurements occurring at 20 hours to the end of the test for the five pin number 16 connector as shown in Table 3B, Page 3-5 in test results submitted under Niagara Mohawk's letter of June 14, 1978. Justify continued use of this type connector.

Response

The insulation resistance measurements during the test for the four pin number 16 connector was shown on Table 3B, Page 3-5 of our test report submitted on June 14, 1978. A low insulation resistance of this connector was related to partial immersion of the cable in a pool of water at the bottom of the test vessel. During the previous test (without radiation exposure), this connector was successfully qualified. Since the radiation exposure did not produce any visual change in the equipment, it is concluded that this connector is qualified for the 27 hour accident environment.

Additionally this type connector is not required to mitigate an accident and was tested for information only. Additionally, the low insulation resistance values are sufficient for the instrument circuit voltages used. Therefore, no modifications of the existing equipment are planned.