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W3F1-2011-0020

March 7, 2011

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

Subject: Response to Request for Additional Information Associated with
Technical Specification Table 3.4-1 Isolation Valve Addition
Waterford Steam Electric Station Unit 3
Docket No. 50-382
License No. NPF-38

- REFERENCES:
1. W3F1-2010-0019, Technical Specification Table 3.4-1 Isolation Valve Addition, February 22, 2010.
 2. NRC Request For Additional Information on the LAR to Revise TS 3.4-1 Isolation Valve Addition, January 18, 2011 [ADAMS Accession Number ML110180654].
 3. NRC RAI on the Similarity Qualification Test Report on Solenoid Valve, January 24, 2011 [ADAMS Accession Number ML110240374].
 4. NRC Request For Additional Information on the LAR to Revise TS 3.4-1 Isolation Valve Addition, February 18, 2011 [ADAMS Accession Number ML110490519].

Dear Sir or Madam:

In letter W3F1-2010-0019 [Reference 1], Entergy Operations, Inc. (Entergy) proposed a change to Waterford Steam Electric Station Unit 3 (Waterford 3) Technical Specifications (TS) Table 3.4-1 Isolation Valve Addition.

During the submittal review process, the Nuclear Regulatory Commission (NRC) determined that Requests for Additional Information (RAI) were required. Reference 2, 3, and 4 provided the NRC RAIs that were generated. The RAI responses are provided Attachment 1.

This letter contains no new commitments.

If you have any questions or require additional information, please contact William Steelman at 504-739-6685.

I declare under penalty of perjury that the foregoing is true and correct. Executed on March 7, 2011.

Sincerely,

A handwritten signature in cursive script, appearing to read "J. K. Williams". The signature is written in black ink and is positioned above the typed name "JAKWJS".

JAKWJS

Attachment 1: Response to Request for Additional Information

cc: Mr. Elmo E. Collins, Jr.
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U. S. Nuclear Regulatory Commission
Region IV
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NRC Senior Resident Inspector
Waterford Steam Electric Station Unit 3
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Attachment 1 to

W3F1-2011-0020

Response to Request for Additional Information

NRC REQUEST FOR ADDITIONAL INFORMATION

In letter W3F1-2010-0019 [Reference 1], Entergy Operations, Inc. (Entergy) proposed a change to Waterford Steam Electric Station Unit 3 (Waterford 3) Technical Specifications (TS) Table 3.4-1 Isolation Valve Addition. During the submittal review process, the Nuclear Regulatory Commission (NRC) determined that a Request for Additional Information (RAI) was required. Three RAI responses are contained in this letter [References 2, 3, and 4].

Reference 2 provided the NRC RAI that was generated on January 18, 2011. The RAI response is provided below.

Request For Additional Information (RAI) [Reference #2]

Please provide additional information to demonstrate the environmental qualification of the associated components such as cables, splices, junction boxes, that are required as a result of the valve-assembly system (SI-4052A and SI-4052B) modification for WF3.

RAI Response

Waterford 3 investigated the question on the remaining cable, boxes, and splices. No new cables are installed for this modification. The modification uses existing junction boxes and cables which have been previously qualified.

Waterford 3 verified that the existing cables being used (Bill of Materials D50-05 & D50-07) were previously qualified for Class IE service in accordance with IEEE-278, IEEE-323 and IEEE-383 (reference Ebasco Spec LOU 1564.267). Previously qualified Okonite cable EQ documentation can be found in Report No. LPL-EQA-06.01. The previously qualified splices are installed in accordance with approved plant procedures and are located above containment flood level which is not subject to submergence. Existing junction boxes are installed with weep holes to prevent moisture from accumulating inside the junction box.

Reference 3 provided the NRC RAI that was generated on January 24, 2011. The RAI response is provided below.

RAI #1 [Reference #3]

The Code Compliance for Waterford Unit 3 (WF3) (Referring to drawing V526-6040-22 in Similarity Report and Regulatory Commitment in the license amendment request (LAR) Dated 2/22/2010) indicates ASME Sect. III Class 1, while the tested Parent valves V526-6180-1 and V526-6042-1A are of ASME Sect III Class 2. Please explain how the Class 1 requirement for WF3 valve V526-6040-22 for application in WF3 is similar to the Class 2 certification for the Parent valves.

RAI #1 Response

All Valcor valves are designed analyzed in accordance with ASME Class 1 requirements. The Valves are stamped per the original design specifications as Class 1, 2 or 3 as applicable.

RAI #2 [Reference #3]

The WF3 valve specification (Drawing for valve V526-6040-22) fluid is borated water whereas the Parent valve V526-6180-1 is for water (not borated). Explain if this is the reason for similarity analysis performed with a different parent valve such as V526-6042-1A suitable for borated water for LOCA testing.

RAI #2 Response

The body material for the subject valve and parent valves is 300 series stainless steel and is suitable in all cases for borated water exposure. Since borated water does not affect the valve internal parts, it has no effect on qualification.

RAI #3 [Reference #3]

It is noted that the Seal (Body to Bonnet) is "seal-weld" for the loss of coolant accident (LOCA) test valve but the seal for WF3 valve is a "K-seal". Please explain how these seals are similar.

RAI #3 Response

The K seal is similar to a seal weld in that it provides a positive, metallic, body to bonnet seal. However, the K seal affords easier maintenance since there is no seal weld cutting required. The K seal was separately qualified and reported in MR52618-6102-12-1.

RAI #4 [Reference #3]

Table III of the Similarity Report shows that Zener Diode and Rectifier are used in the Parent valve V526-6042-1A and Zener Diode is used for Parent valve V526-6180-1, but are not applicable for WF3 valve V526-6040-22. Explain why this combination is not required for WF3 valve.

RAI #4 Response

All Valcor solenoid valves use DC coils. The rectifier was included in V526-6042-1A since that was an AC application. It has no effect on qualification since the coil is the same DC coil as the subject valve. The zener diodes are provided to protect plant equipment from electrical surges caused by de-energization of the solenoid coil. The zener has no effect on the valve or on qualification.

RAI #5 [Reference #3]

The parent valve V526-6180-1 is indicated as stem-vertical mounting. Provide mounting/orientation details for the WF3 valve and the LOCA Testing Parent valve V526-6042-1A, and show how the test configurations are similar.

RAI #5 Response

Valcor valves are designed to be mounted in any orientation. Typically stem-vertical can be considered worst case since the solenoid must overcome the deadweight of the valve internals.

Per QR526-6180-1-1, Rev. C:

3.6 Mounting and Interfaces

Solenoid Operated Valve V526-6180-1 was mounted and qualified in the stem-vertical position, including mounting on the seismic table, which is one of the positions in accordance with Line 18 of Data Sheet 11602 (Reference 1.1.1.1). Pipes and flanges were welded onto a production-version of Model V526-6180-1 to facilitate qualification testing. Paragraph 3.10 discusses the qualification valve further.

Solenoid Operated Valve V526-6180-1 was qualified with fittings attached to the flange that was bolted onto the existing flange. Standard pressure tubing with conventional fittings supplied the required water pressure during the qualification tests. No other special mounting requirements above those called out in the test procedures were performed.

For seismic testing, the test specimens were bookend mounted to a test fixture using 16 commercial grade, 7/8" nuts, and torqued to 250 ft-lbs. This information can be found in Appendix F, in the Trentec Test Report on page 093.

Per QR526-6042-1A, Rev. A:

During seismic testing, the valves under test were mounted in the stem-vertical position in accordance with Figure 1 of S1424 and Figure 2 of S1447. Per Appendix J, LOCA Test Photographs, the units under test were mounted in the stem-vertical position.

RAI #6 [Reference #3]

Sheet 6 of Similarity Report indicates that the Quick Disconnect Switch (QDC) for leadwire has been qualified to IEEE Standard 323-1983. This version of IEEE Standard 323 is not endorsed for use by NRC regulations. It is, however, noted that other tests are per IEEE-323-1974 elsewhere in the Similarity Report. Explain how this Quick Disconnect Switch meets the qualification requirements of IEEE 323-1974 which is endorsed by NRC regulations.

RAI #6 Response

Valcor takes credit for these two EGS reports:

- 5.5 EGS-TR-913601-01, Rev. B, EGS Nuclear Environmental Qualification Report of EGS 3/4 Inch Quick Disconnect Electrical Connector (Candidate Valve)
- 5.6 EGS-TR-949300-01, SAIC/EGS Test Report (Parent Valve)

Per EGS-TR-913601-01, Page No. iv, Abstract:

The analyses and test data presented demonstrate qualification in accordance with IEEE 572-1985, IEEE 323-1974/83, IEEE 344-1975/87, IEEE 382-1980 and 10CFR50.49.

RAI #7 [Reference #3]

With respect to the LOCA Temperature vs. Time, LOCA Pressure vs. Time, and Parent Valve LOCA curves, provide explanation of the curves and demonstrate how the margins required by IEEE Standard 323-1974 (temperature, pressure, etc.) have been accounted for.

RAI #7 Response

Per MR526-6040-22-3, Rev. B, Para. 4.1.4:

...and Appendix III contains the LOCA temperature and pressure parameters experienced by Parent Valve V526-6042-1A superimposed on the Customer Requirement curves showing the LOCA requirement has been fully met by the Parent Valve.

Per IEEE std 323-1974, Para. 6.3.1.5 Margins:

Suggested factors to be applied to service conditions for type testing are as follows: Temp +15°F, Pressure +10%, Radiation +10%, Voltage +10%, Perform LOCA peak twice, and Vibration +10%.

Per QR526-6042-1A, Rev. A:

NTS performed the LOCA testing in accordance with S-1447. Per S-1447, Para. 3.1.1, Applied LOCA margin factors are in accordance with the values given in Table II, which include: Temp +15°F except at saturated steam conditions not to exceed 10 psig, Pressure +10% not to exceed 10 psig, Radiation +10%, Voltage +10%, Perform LOCA peak twice, and Vibration +10%.

RAI #8 [Reference #3]

It is noted that the WF3 valve is different from the Parent valves in size (3/4" vs. 2", 1"), flow capacity, position configuration (such as normally closed for WF3 vs. normally open for Parent valve), number of reed switches (4 position for WF3 vs. 2 position for Parent valves), and lead conductors to the solenoids. Please explain how these differences will not adversely impact the WF3 valve from performing its safety function in its proposed application, location, configuration (packaging, mounting, and type of connections), and environment (service condition). Also show how the type of technology used to design and manufacture the valves is similar.

RAI #8 Response

- a) Number of position indication switches is dictated by the customer specification. The switches do not have any effect on valve function since they merely show position. The number of switches therefore has no impact on qualification.
- b) The respective valve bodies are rigid structures. The only affect that port size has is the required minimum walls at the valve ports and the associated stresses in those areas. The minimum wall requirements and associated stresses are analyzed and reported in the Design report provided for the

Waterford 3 valve. Port size has no effect on valve function and therefore no impact on similarity. Valve size is irrelevant because it has no impact on seismic response due to the rigidity of the structure and individual seismic and pressure induced stresses are analyzed and accounted for in the individual design reports.

- c) The respective valves have internal parts designed to specific requirements for flow and pressure. Solenoid valve performance is a function of the force balance between pressure force on the disc, solenoid force and return spring force. These balanced spring and solenoid forces are relatively the same for normally open and normally closed valve configurations. Since the solenoid coils are similar the resultant forces are similar for all valves. The actual force balance concerning the operability of the Waterford 3 valve is included in the Design Report provided for the Waterford 3 valve. The operability calculations show that the valve will operate under worse case conditions. Similarity is provided in that the coil and internal part materials and methods of manufacture are all identical in parent and subject valves. Flow capacity and failure position of the valve therefore has no affect on valve qualification.
- d) The design and technology used to produce Valcor nuclear class solenoid valves is controlled by Valcors Nuclear QA Manual. All materials have traceable, auditable links. The design methods and technology used for all parent and subject valves is identical.

Reference 4 provides the NRC RAI that was generated on February 18, 2011. The RAI response is provided below. These NRC RAIs provided clarifications to the Reference 3 RAI request.

RAI #1 [Reference #4]

Need clarification and validation that all Valcor valves are Class 1.

RAI #1 Response

The valves supplied to Entergy Waterford 3 are designed and analyzed as Class 1 in accordance with ASME Sect III, Subsection NB. The applicable ASME design reports are on file and auditable at Valcor. These design reports demonstrate the Class 1 analysis and certification.

RAI #5 [Reference #4]

Provide validation that all Valcor valves are designed to be mounted in any orientation/ configuration and that the stem vertical orientation is the worst case installation.

RAI #5 Response

All Valcor nuclear valves are analyzed with the maximum seismic g load applied as a static load acting in the worst case condition. For example, the loads are applied downwards when analyzing the valves ability to open, and the loads are then applied upwards when analyzing the valves ability to close. These analyses are documented, on file and auditable at Valcor.

RAI #6 [Reference #4]

We require confirmation that The Quick Disconnect Switch (QDC), for the leadwire, is qualified in accordance with IEEE 323-1974 solely.

RAI #6 Response

EGS has certified in the referenced qualification reports that the quick disconnect meets with the requirements of both the 1974 and 1983 versions of IEEE 323.

RAI #7 [Reference #4]

Referring to the second paragraph of the response, clarify why an exception is taken for satisfying the +15F margin, under saturated steam conditions not exceeding 10 psig.

RAI #7 Response

No exception was taken: Per IEEE Std 323-1974, Para. 6.3.1.5 Margins: Suggested factors to be applied to service conditions for type testing are as follows: Temp +15°F. When qualification testing is conducted under saturated steam conditions, the temperature margin shall be such that test pressure will not exceed saturated steam pressure corresponding to peak service temperature by more than 10 lb_f/in², Pressure +10%, Radiation +10%, Voltage +10%, Perform LOCA peak twice, and Vibration +10%.

RAI Similarity Report [Reference #4]

Similarity Report dated Oct 26, 2010 is stamped as "For Approval". The staff needs to have this document approved by the licensee prior to finalizing the safety evaluation and the licensee needs to notify the staff for any changes to the document once finalized.

RAI Similarity Report Response

Valcor Engineering requires that Waterford 3, provide approval of the Similarity Report. Waterford 3 has approved the similarity report and will attach to a subsequent RAI response letter.

REFERENCES:

1. W3F1-2010-0019, Technical Specification Table 3.4-1 Isolation Valve Addition, February 22, 2010.
2. NRC Request For Additional Information on the LAR to Revise TS 3.4-1 Isolation Valve Addition, January 18, 2011 [ADAMS Accession Number ML110180654].
3. NRC RAI on the Similarity Qualification Test Report on Solenoid Valve, January 24, 2011 [ADAMS Accession Number ML110240374].
4. NRC Request For Additional Information on the LAR to Revise TS 3.4-1 Isolation Valve Addition, February 18, 2011 [ADAMS Accession Number ML110490519].