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U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Subject: Waterford 3 SES
Docket No. 50-382
License No. NPF-38
Safety Classification of Instrument Air Tubing and Components for Safety Related Valve Top Works

Gentlemen:

Recent questions by our engineering staff accentuate the need to ensure Waterford 3 (W3) and the Nuclear Regulatory Commission (NRC) have a common understanding of the Safety Classification of Instrument Air (IA) tubing and components for safety-related valve top works. The purpose of this letter is to promote that understanding and communicate that IA tubing and components for safety-related valves were installed as American National Standard Institute (ANSI) B31.1, yet W3 never received explicit NRC approval for that alternative design. In consequence, W3 is requesting an exception to Regulatory Guide (RG) 1.26, "Quality Group Classifications and Standards for Water-, Steam-, and Radioactive-Waste-Containing Components of Nuclear Power Plants," as stipulated in Standard Review Plan (SRP), NUREG-0800. The SRP states exceptions to the specified quality group classifications of RG 1.26 are acceptable if justification can be demonstrated by alternate design rules based on the use of a more conservative design. W3 does not consider this exception request to be a startup restraint.

In January of 1989, W3 identified a discrepancy in the design and installation of IA tubing and components between the accumulators and valve top works for safety-related air operated valves. IA tubing and components were purchased as American Society of Mechanical Engineers (ASME) Class 2 and installed in accordance with ANSI B31.1. Although it was determined that the material installed met the

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requirements of ASME Section III, with the exception of hydrostatic testing and inspection by an American Nuclear Insurer (ANI), W3 licensing and design documents were not properly updated to address the discrepancy. This discrepancy was recently rediscovered as a result of design basis reviews being performed as part of W3's renewed effort to find and fix our own problems.

RG 1.26 describes a quality classification system related to specified national standards that may be used to determine quality standards acceptable to the NRC staff for satisfying General Design Criterion (GDC) 1 for safety-related components in nuclear power plants. RG 1.26 states, "this guide does not cover instrument and service air, and this system should be designed, fabricated, erected, and tested to quality standards commensurate with the safety function to be performed."

The SRP was prepared for the guidance of the Office of Nuclear Reactor Regulation (NRR) staff responsible for the review of applications to construct and operate nuclear power plants. Section 3.2.2, part III states there are systems of light-water-cooled reactors important to safety that are not identified in RG 1.26 and which the staff (NRR) considers should be classified Quality Group C [synonymous with ASME Class 3]. Examples include instrument and service air systems required to perform a safety function.

Final Safety Analysis Report (FSAR) Section 3.2.2 states, "components important to safety and the containment boundary are classified in accordance with ANSI N18.2, 1973 and ANSI N18.2a, 1975, as clarified by Table 3.2-1." N18.2a Section 2.3.2 states that Safety Class 3 and ASME Section III Code Class 3 are synonymous. This relationship requires Safety Class 3 piping and tubing be designed, fabricated and installed in accordance with ASME Section III. Section 2.3.1.3g of N18.2a further states that Safety Class 3 applies to compressed air systems required to ensure another safety system function. This statement specifically pertains to the tubing which supplies compressed air or gas for the safety functions of Safety Class 1, 2, and 3 valves.

In NUREG-0787, W3's Safety Evaluation Report (SER), Section 3.2.2, the NRC stated:

> The staff concludes that construction of the components in fluid systems important to safety in conformance with the ASME Code, the Commission's regulations, and the guidance provided in RG 1.26 and ANSI-18.2, provides

assurance that component quality is commensurate with the importance of the safety function of these systems and constitutes an acceptable basis for satisfying the requirements of GDC 1 and is, therefore, acceptable.

On January 25, 1989, W3 identified a discrepancy with the safety classification of IA tubing that supplies the actuators of Safety Injection (SI) valves SI-602A and SI-602B (SI Sump Outlet Header A(B) Isolation). This condition was reported to the NRC in W3 Licensee Event Reports (LER) 89-002-00 and 89-002-01. The LER's identified IA tubing that supplies valve actuators for SI-602 A&B as being installed as non-nuclear safety (NNS), but the tubing supports were installed as Seismic Category I. The root cause of the event was insufficient documentation of code interpretations by the Architect Engineer during initial construction. The conclusion of the LER reported that walkdowns, dye penetrant testing of welds, and document reviews of SI-602 A&B have confirmed that this tubing can be classified as Safety Class 3 and would perform its design function. IA tubing for other safety-related air operated valves required to perform a safety function was installed in accordance with the same standards as that of SI-602 A&B IA tubing. Thus, this event did not adversely affect the health or safety of the public or plant personnel.

Corrective actions for the LER included walkdowns of the tubing and welds and reviews of construction documentation to confirm the subject tubing classification met Safety Class 3 requirements. This revealed ANSI B31.1 instrument tubing and fittings used at W3 were drawn from the same qualified stock as those used for ASME Section III installation. The tubing heat numbers correspond to ASME Section III Code Class 2. The welder identification numbers were checked to verify that the welders were qualified to weld code class tubing. This tubing was considered to be classified as Safety Class 3 and the tubing would perform its design function.

Other corrective actions included a W3 review of instrument installation drawings to identify any valves with similar problems. Air operated valves in the following systems were identified (for a complete listing of the valves, see Attachment I):

- Auxiliary Component Cooling Water (ACC)
- Component Cooling Water (CCW)
- Containment Vacuum Relief (CVR)
- Emergency Feedwater (EFW)
- Main Steam (MS)
- Safety Injection (SI)

NRC Inspection Report IR 89-01 generated an Unresolved Item (382/8901-04) to track the issue associated with the 1989 LER. In Inspection Report 90-08, the NRC closed the Unresolved Item by stating the following:

> The follow-up of the event by the licensee included a review and determination regarding the applicable design specifications, the verification of the actual installed conditions of the specific configuration, and a review and walkdown of additional valves which had instrument tubing installed to the same standards as valves SI-602A(B). A number of discrepancies were identified with the hardware installation and had been corrected. The licensee's determination that the installation of the compressed air system to the requirements of ANSI B31.1 (where required) and the Seismic Category 1 supports considerations, the identification and walkdown of the additional installations, and the correction of the identified deficiencies appeared to be acceptable.

The inspector had no further questions regarding this matter and the item was closed.

As a result of this information, W3 drawings were revised reclassifying NNS tubing lines as ANSI B31.1. Licensing Document Change Request (LDCR) 89-0553 was initiated to prevent confusion in the future on the design basis of the compressed air system which supplies safety related valves. The LDCR was a weak effort to revise FSAR Section 3.2.2. The LDCR stated system components important to safety and the containment boundary are ***generally*** classified in accordance with ANSI N18.2 and N18.2a ***as clarified by Table 3.2-1.*** However, when the change was made, the word ***generally*** was omitted and the design basis inconsistency still exists.

Subsequently on March 19, 1996, W3 rediscovered the discrepancy and issued a corrective action document identifying a contradiction between AE specification 1564.407A and instrumentation detail drawings. The specification requires Safety Class 2 and 3 tubing to be installed in accordance with the requirements of ASME Section III Class 2 and 3 respectively, and Nuclear Safety Related. However, the instrumentation detail drawings (B430) for several ASME Section III Code Class 2 and 3 valves show tubing required to be Safety Class 3 as ANSI B31.1, Seismic Category I as modified following the 1989 discovery.

The tubing being installed B31.1 with ASME Class III material is a more conservative design than required by RG 1.26. This is based on ANSI B31.1 standards imposing very conservative design requirements for piping. The ASME Boiler and Pressure Vessel Code, Section III was developed from B31.1. The ASME code removed some conservatism by having higher stress allowables, in exchange for increased quality control on materials. W3's alternate design has the lower stress allowables from ANSI B31.1 and the increased quality control of materials from ASME. Therefore, this design is considered a more conservative design than required by the SRP and RG 1.26.

Upon approval of this exception request, W3 will commit to the following:

- W3 will continue to perform accumulator drop testing on all safety-related air operated valves each refueling outage in accordance with existing site procedures. This testing ensures pressure boundary integrity and demonstrates the IA system will perform its specified safety function.

- When IA tubing/component replacement is required, W3 will acquire materials and components in accordance with the original specifications. Tubing and components will be installed in accordance with ANSI B31.1. Components which cannot be supplied with ASME Section III material and are not specifically exempted from the code shall be designed in accordance with other recognized industry codes or standards, procured non-ASME, safety-related (QC-3) and dedicated for safety-related use. In addition, a post-replacement accumulator drop test will be performed.

- W3 will update the FSAR to clearly delineate the design and installation bases of IA tubing for safety related air operated valves.

- Applicable drawings will be revised to clearly show the tubing, fittings, and components are of ASME code material and installed in accordance with ANSI B31.1, Seismic Category I requirements.

W3 believes the tubing procured to ASME Section III and installed to ANSI B31.1 provides a more conservative design and when used in conjunction with the above commitments, satisfies the condition required for an alternative design rule as required by the SRP. Furthermore, W3 is confident that the IA system will perform

its necessary safety function and, therefore, request NRC approval of the subject alternative design rule.

If you have any questions or require additional information, please contact me at (504) 739-6242 or David Matthews at (504) 739-6469.

Very truly yours,

for

E.C. Ewing
Director
Nuclear Safety & Regulatory Affairs

ECE/WDM/tjs
Attachment

cc: E.W. Merschoff, NRC Region IV
C.P. Patel, NRC-NRR
J. Smith
N.S. Reynolds
NRC Resident Inspectors Office

ATTACHMENT I: SAFETY RELATED AIR OPERATED VALVES

- ACC-112 A&B: ACC Header A(B) Essential Chiller Isolation
- ACC-126 A&B: ACC Header A(B) CCW Heat Exchanger Outlet Temperature Control Valve
- ACC-139 A&B: ACC Header A(B) Return From Essential Chillers Isolation
- CC-114 A&B: CCW Pump A(B) to AB Suction Cross Connect
- CC-115 A&B: CCW Pump AB to A(B) Suction Cross Connect
- CC-126 A&B: CCW Pump A(B) to AB Discharge Cross Connect
- CC-127 A&B: CCW Pump AB to A(B) Discharge Cross Connect
- CC-134 A&B: Dry Cooling Tower A(B) CCW Bypass
- CC-135 A&B: Dry Cooling Tower A(B) CCW Inlet Isolation
- CC-200 A&B: CCW Header A(B) to AB Supply Isolation
- CC-301 A&B: CCW Header A(B) to Essential Chillers Isolation
- CC-322 A&B: CCW Header A(B) Return From Essential Chillers Isolation
- CC-807 A&B Containment Fan Cooler C(B) CCW Inlet Isolation
- CC-808 A&B: Containment Fan Cooler A(D) CCW Inlet Isolation
- CC-822 A&B: Containment Fan Cooler A(D) CCW Outlet Isolation
- CC-823 A&B : Containment Fan Cooler B(C) CCW Outlet Isolation
- CC-563: CCW Header AB to B Return Isolation
- CC-641: CCW to Containment Outside Containment Isolation
- CC-710: Containment CCW Return Header Inside Containment Isolation
- CC-713: Containment CCW Return Header Outside Containment Isolation
- CC-727: CCW Header AB to A Return Isolation
- CC-963A: Shutdown Heat Exchanger A CCW Flow Control Valve
- CVR-101: Containment Vacuum Relief Train B Control Valve
- CVR-201: Containment Vacuum Relief Train A Control Valve
- EFW-223 A&B: Emergency Feedwater Header A(B) to Steam Generator 1(2) Backup Flow Control Valve
- EFW-224 A&B: Emergency Feedwater Header A(B) to Steam Generator 1(2) Primary Flow Control Valve
- EFW-228 A&B: Emergency Feedwater to Steam Generator 1(2) Primary Isolation Valve
- EFW-229 A&B: Emergency Feedwater to Steam Generator 1(2) Backup Isolation Valve
- MS-116 A&B: Steam Generator 1(2) Atmospheric Dump Valve
- SI-106 A&B: Refueling Water Storage Pool Outlet Header A(B) Isolation Valve