From:	Marshall, Michael
To:	[Licensee] Ron Reynolds (Exelon)
Cc:	Kristensen, Kenneth J:(GenCo-Nuc); James Danna (James.Danna@nrc.gov)
Subject:	NINE MILE POINT, Unit 1 – REQUEST FOR ADDITIONAL INFORMATION REGARDING Primary CONTAINMENT OXYGEN CONCENTRATION LICENSE AMENDMENT REQUEST (L-2018-LLA-0183)
Date:	Friday, January 25, 2019 11:19:00 AM

Hello Ron,

By letter dated June 26, 2018 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18177A044), Exelon Generation Company, LLC submitted a license amendment request (LAR) for the Nine Mile Point Nuclear Station, Unit 1 (Nine Mile Point 1). The proposed amendment would revise the Nine Mile Point 1 Technical Specifications by allowing inerting the primary containment to less than 4 percent by volume oxygen concentration within 24 hours of exceeding 15 percent of rated thermal power, and allow de-inerting the containment 24 hours prior to reducing thermal power to less than or equal to 15 percent of rated thermal power.

The U.S. Nuclear Regulatory Commission (NRC) staff has reviewed the information provided in the LAR and has determined that additional information is needed to complete its review. Below is the NRC staff's request for additional information. The request for additional information was discussed with you on January 24, 2019, and it was agreed that your response would be provided within 30 days from the date of this email.

REQUEST FOR ADDITIONAL INFORMATION

Title 10 of the Code of Federal Regulations (10 CFR) Section 50.44(b)(2), "Combustible gas control," sub-item (i) requires that all Boiling Water Reactors (BWRs) with Mark I and Mark II type containments have an inerted atmosphere. The 10 CFR 50.44(b)(2) provision was retained in the 2003 risk-informed revision of the regulation (68 FR 54123) to maintain a low conditional probability of Mark I and Mark II containment failure by preventing hydrogen detonation in the very unlikely event that an accident could result in significant core damage (severe accident).

Although the 2003 revision of the regulation was risk-informed, the related standard technical specification (STS) retained its association with the design-basis loss of coolant accident to preventing hydrogen detonation following a severe accident. The NRC staff retained STS 3.6.3.2, "Primary Containment Oxygen Concentration," in the improved "Standard Technical Specifications – General Electric BWR/4 Plants," NUREG-1433, without modification from Revision 0 (1992) through the current Revision 4. The bases note that operational considerations justify inerting late in the startup process and early in the shutdown process to support containment entry without special breathing apparatus to conduct necessary inspections with the reactor coolant system pressurized. The applicability statements include a 24 hour period to complete inerting once reactor thermal power (RTP) exceeds 15 percent following startup and a 24 hour period to de-inert prior to going below 15 percent RTP in preparation for a scheduled shutdown. These infrequent transitory periods of reactor operation with the containment not inert are reasonably consistent with conditions considered in development of the risk-informed 10 CFR 50.44 regulation, where the staff assumed a high probability that the containment would be inerted during an event that progresses to a severe accident.

Contrary to the risk informed basis of the revised regulation in 10 CFR 50.44, the bases for STS 3.6.3.2 continues to be derived from design basis analyses, as evidenced by the discussion contained in the "Applicable Safety Analyses" section of the bases. Thus, the following statement included in the "Applicability" section of the bases applies to design-basis conditions following a loss of coolant accident: "As long as reactor power is < 15% RTP, the potential for an event that generates significant hydrogen is low and the primary containment need not be inert." A risk-informed evaluation of potential events initiated from <15 percent RTP indicates operation at low power may decrease the likelihood that events progress to conditions generating substantial amounts of hydrogen generation. However, the current 10 CFR 50.44(b)(2)(i) presumes core damage condition has been experienced and identifies the requirements to minimize the conditional primary containment failure probability.

In the current Nine Mile Point 1 TS 3.3.1 "Oxygen Concentration", the mode of applicability exceptions during reactor startup and prior to scheduled shutdown are thought sufficient to limit this to an infrequent transitory operating condition. TS 3.3.1, items a & b currently require the primary containment atmosphere to be reduced to less than 4 percent by volume oxygen concentration whenever the reactor coolant pressure is greater than 110 pounds per square inch gauge (psig) and the reactor is in power operating condition, with a 24 hour exception to this requirement during startup and shutdown. In addition, TS 3.3.1.c provides 24 hours to bring oxygen concentration to below 4 percent by volume if oxygen concentration were found to be greater than 4 percent by volume at any time during power operation (e.g. surveillances), except as allowed by the exceptions during startup and shutdown. TS 3.3.1.d states that failure to bring oxygen concentration to less than 4 percent oxygen concentration requires the reactor coolant pressure to be reduced to 110 psig or less within 10 hours (effectively a shutdown requirement).

Based on the current requirements in Nine Mile Point 1 TS 3.3.1, the containment would be inerted at all times during power operation, except as provided by the exceptions during startup and shutdown (i.e., an infrequent transitory operating condition). The possibility of an undefined duration of operation at =15 percent reactor thermal power (RTP) with containment de-inerted is not permitted under the current TS 3.3.1.

Exelon proposed to delete existing items a, b, c, and d in their entirety and replace them with new items TS 3.3.1.a.b.c, and d. Specifically,

- Proposed TS 3.3.1.a states, "The primary containment atmosphere shall be less than four percent by volume oxygen concentration during reactor power operation greater than 15 percent rated thermal power, except as specified in 'b' ".

- Proposed TS 3.3.1.b states, "Not required to be met until 24 hours after reactor power operation is greater than 15 percent rated thermal power. De-inerting may commence 24 hours prior to reducing reactor power operation to less than or equal to 15 percent rated thermal power".

- Proposed TS 3.3.1.c states, "If the containment oxygen concentration is greater than or equal to the four percent by volume limit, except as allowed in "b" above, restore the oxygen concentration to within the limit within 24 hours."

- Proposed TS 3.3.1.d states, "If Specifications 'a', 'b', or 'c' above are not met, the reactor power shall be reduced to less than or equal to 15 percent rated thermal

power within 8 hours."

Information Request

1. Proposed TS 3.3.1.a and 3.3.1.b lack controls or limitations, such as a linkage to startup and scheduled shutdowns, that appear necessary to ensure operation up to 15 percent RTP while de-inerted would be infrequent and transitory, consistent with the risk-informed basis of 10 CFR 50.44(b)(2). Propose additional controls or limitations for these TSs to ensure operation at power while de-inerted would be infrequent and transitory, consistent with the applicability statement of STS 3.6.3.2.

2. Proposed TS 3.3.1.d permits continued operation with the containment oxygen concentration greater than 4 percent if the oxygen concentration could not be restored to less than the 4 percent limit within 24 hours. Provide justification that the proposed end state and completion time (i.e., indefinite operation at up to 15 percent RTP within 8 hours of the inability to restore oxygen concentration within limits) is consistent with the risk-informed basis of 10 CFR 50.44(b)(2) or propose an alternative end state and completion time with an appropriate justification. Justification for indefinite operation at low power should include supporting analyses demonstrating that, during reactor power operation at 15 percent RTP or less, the potential for hydrogen generation for all accident conditions (i.e., design-basis accidents and beyond design-basis accidents, including severe accidents) would be low enough that it would not cause an uncontrolled hydrogen and oxygen combination in the containment that could result in containment failure.

Best Regards,
Michael L. Marshall, Jr.
Senior Project Manager

Plant Licensing Branch I
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

301-415-2871

Docket No. 50-220