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10 CFR 50.90

NMP1L3192

June 26, 2018

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

Nine Mile Point Nuclear Station, Unit 1
Renewed Facility Operating License No. DPR-63
NRC Docket No. 50-220

Subject: License Amendment Request - Revise Technical Specification 3.3.1 for Primary Containment Oxygen Concentration

In accordance with 10 CFR 50.90, "Application for amendment of license, construction permit, or early site permit, "Exelon Generation Company, LLC (Exelon) requests changes to the Technical Specifications (TS) of the Nine Mile Point Nuclear Station, Unit 1 (NMP1).

The proposed change modifies TS 3.3.1, Oxygen Concentration, to adopt the inerting/de-inerting requirements of the Improved Standard Technical Specifications, which require 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. Also, a new TS condition will be added to identify required actions if the primary containment oxygen concentration increases to greater than or equal to four volume percent while in the Power operating condition.

Attachment 1 provides an evaluation supporting the proposed TS change. Attachment 2 contains the marked-up TS pages for the proposed changes. The TS Bases pages are provided for information only, and do not require NRC approval.

Exelon requests approval of these changes by June 30, 2019. This license amendment will be implemented within 60 days of approval.

The proposed change has been reviewed by the NMP Plant Operations Review Committee in accordance with the requirements of the Exelon Quality Assurance Program.

There are no regulatory commitments contained within this letter.

In accordance with 10 CFR 50.91, "Notice for public comment; State consultation," paragraph (b), Exelon is notifying the State New York of this application for license amendment by transmitting a copy of this letter and its attachments to a designated State Official.

Should you have any questions concerning this letter, please contact Ron Reynolds at (610) 765-5247.

I declare under penalty of perjury that the foregoing is true and correct. This statement was executed on the 26th day of June 2018.

Respectfully,

James Barstow
Director - Licensing and Regulatory Affairs
Exelon Generation Company, LLC

Attachments:
1. Evaluation of Proposed Change
2. Markup of Proposed Technical Specifications Pages
3. Revised Technical Specifications Bases Pages

cc: NRC Regional Administrator, Region I
NRC Senior Resident Inspector, NMP
NRC Project Manager, NMP
A. L. Peterson, NYSERDA

ATTACHMENT 1

EVALUATION OF PROPOSED CHANGE

License Amendment Request

Nine Mile Point Nuclear Station, Unit 1

Docket No. 50-220

SUBJECT: Containment Oxygen Concentration Technical Specifications Change

1.0 SUMMARY DESCRIPTION

In accordance with 10 CFR 50.90, "Application for amendment of license, construction permit, or early site permit," Exelon Generation Company, LLC (Exelon) requests changes to the Technical Specifications (TS) of the Nine Mile Point Nuclear Station, Unit 1 (NMP1).

The proposed change revises the NMP1 Operating License to modify TS 3.3.1, Oxygen Concentration, to adopt the inerting/de-inerting requirements of the improved Standard Technical Specifications (STS) (Reference 1). The improved STS allows inerting the containment to less than four (4) percent (%) by volume oxygen concentration within 24 hours of exceeding fifteen (15) % of rated thermal power (RTP), and allows de-inerting the containment 24 hours prior to reducing thermal power to less than or equal to 15% of RTP.

2.0 DETAILED DESCRIPTION

The proposed change modifies TS 3.3.1 by adopting inerting and de-inerting requirements that are consistent with the guidance of Reference 1. Reference 1 uses 15% RTP as the reference condition for inerting and de-inerting the containment, rather than reactor system pressure and being in the power operating condition. The proposed change allows inerting containment to less than 4% by volume oxygen concentration within 24 hours of exceeding 15% RTP during startup and allows de-inerting the containment 24 hours prior to reducing thermal power to less than or equal to15% of RTP. The change will also establish consistency with the improved STS required action in the event primary containment oxygen concentration is not within the specified limit.

Further, the proposed change would incorporate the improved STS Bases (Reference 2) for the primary containment oxygen concentration into the NMP1 TS Bases.

Attachment 2 contains proposed TS marked-up pages for the proposed change.

Attachment 3 contains the proposed TS Bases marked-up pages provided for information only.

3.0 TECHNICAL EVALUATION

During normal operation and following a design basis accident (i.e., Loss of Coolant Accident (LOCA)) the primary containment atmosphere must be inerted to ensure that hydrogen combustion cannot occur. Inerting is achieved by purging the primary containment with nitrogen until oxygen concentration is less than four percent by volume.

When the primary containment atmosphere is inerted, operators cannot access the containment to perform required surveillances and leak inspections unless they wear self-contained breathing apparatus. The current NMP1 TS 3.3.1 provides for a 24-hour time period following startup or before shutdown in which the primary containment atmosphere does not have to be inerted. The 24-hour time period is a reasonable amount of time for plant personnel to perform required inspections and then to complete inerting or shutdown evolutions. The current reference condition for this 24-hour time period is when the reactor mode switch is a combination of reactor system pressure being greater than 110 psig and in the power operating condition (mode switch in startup or run), and for shutdown the reference condition for the 24-hour time period is 24 hours prior to reaching the shutdown condition.

Currently, in order to maximize time for surveillances and leak inspections during startup, transfer to the run mode is delayed as long as possible to delay the start of the 24-hour inerting window. In addition, the current TS 24-hour time period requirement does not provide sufficient time to perform in-containment equipment maintenance without a complete shutdown of the reactor.

The proposed change modifies TS 3.3.1 by adopting inerting and de-inerting requirements which are consistent with the guidance provided in Reference 1. The improved STS uses the reference condition of 15% RTP for inerting and de-inerting rather than the reactor mode switch being in the run position during startup, and prior to a scheduled shutdown.

The value of RTP is currently defined as 1850 MWt (thermal) in the NMP1 Operating License Condition 2.C.(1).

The proposed change to TS 3.3.1 will require inerting the containment to less than 4% by volume oxygen concentration until 24 hours after exceeding 15% RTP and allow de-inerting 24 hours prior to reducing reactor power to less than 15% RTP. The basis for this change, as stated in the improved STS, is that at less than or equal to 15% RTP, the potential for an event that generates significant hydrogen is low and the primary containment need not be inert. The improved STS Bases (Reference 2) further states that the probability of an event that generates hydrogen occurring within 24 hours of greater than 15% RTP is low enough when the primary containment is not inert, is justified.

Making the 24-hour time period contingent upon core thermal power will allow additional time to perform surveillances and maintenance inside the primary containment before the containment is inert. Therefore, implementing this change will improve overall plant operation and reliability.

Further, basing the 24-hour time period to de-inert the containment on when the reactor power is less than or equal to 15% RTP, rather than "prior to a major refueling outage or other scheduled shutdown," provides a more explicit requirement as to when the 24-hour time period starts. Also, the proposed change avoids reference to the ambiguous term "scheduled shutdown" since this activity is not defined in either the improved STS or the NMP1 TS.

Finally, the proposed change adopts the Limiting Condition for Operation (LCO) actions requirement in the improved STS. The current TS LCO 3.3.1.c requires the reactor be placed in shutdown (reactor coolant pressure reduced to ≤ 110 psig) within 10 hours in the event the containment oxygen concentration is not in compliance with this LCO. The improved STS action statement for the containment oxygen concentration LCO limits the required action to reducing reactor power to less than or equal to 15% RTP within the following 8 hours, if primary containment oxygen concentration cannot be restored within 24 hours. The 24-hour time period to restore primary containment oxygen concentration to the TS value or reduction to less than or equal to 15% RTP avoids unnecessary plant transients and shutdowns.

4.0 REGULATORY EVALUATION

4.1 Applicable Regulatory Requirements/Criteria

10 CFR 50.36, "Technical Specifications," provides the regulatory requirements for the content required in a licensee's TS. Criterion 3 of 10 CFR 50.36(c)(2)(ii) requires a LCO to be established for a process variable, design feature, or operating restriction that is an initial condition of a design basis accident or transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier. While the LOCA analysis results in a hydrogen concentration level significantly below the concentration at which hydrogen can ignite in air, the containment inerting design feature was provided to preclude a hydrogen-oxygen reaction under conditions more severe than can currently be foreseen (Reference 3).

The proposed change does not affect the assumptions or conclusions contained in the plant safety analyses. The proposed change does not involve any physical changes to the plant design, nor does it impact any accident initiators. The accident analysis in Chapter 15 of the Updated Final Safety Analysis Report (UFSAR) (Reference 4) assumes that a LOCA occurs at 100% RTP. The consequences of a LOCA occurring at or below 15% RTP would be less severe and would produce less hydrogen.

4.2 Precedent

The NRC approved similar license amendments for:

1) The Oyster Creek Nuclear Generating Station on May 30, 2008 (Amendment 266) (TAC No. MD7413). (ML081230303)

2) The Pilgrim Nuclear Power Station on April 10, 2006 (Amendment 218) (TAC No. MC7056). (ML053140433)

4.3 No Significant Hazards Consideration

Exelon Generation Company, LLC (Exelon) has evaluated whether or not a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

1. **Does the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated?**

   Response: No.

   The proposed change modifies the Technical Specifications (TS) by adopting containment inerting and de-inerting requirements that are consistent with the guidance of NUREG-1433, "Standard Technical Specifications - General Electric BWR/4 Plants, Volume 1, Revision 4.0," published April 2012. The proposed change will allow inerting of the primary containment within 24 hours of exceeding 15 percent (%) Rated Thermal Power (RTP), and de-inerting 24 hours prior to reducing reactor power to less than or equal to 15% RTP. Also,

a new TS condition will be added to identify required actions if the primary containment oxygen concentration increases to greater than or equal to 4% by volume while in the power operating condition. The proposed change does not alter the physical configuration of the plant, nor does it affect any previously analyzed accident initiators. The accident analysis assumes that a Loss of Coolant Accident (LOCA) occurs at 100% RTP. The consequences of a LOCA at less than or equal to 15% RTP would be much less severe, and produce less hydrogen than a LOCA at 100% RTP.

Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. **Does the proposed amendment create the possibility of a new or different kind of accident from any accident previously evaluated?**

   Response: No.

   The proposed change adopts the STS guidance regarding containment inerting/de-inerting requirements. The proposed change introduces no new mode of plant operation and does not involve any physical modification to the plant. The proposed change is consistent with the current safety analysis assumptions. No setpoints are being changed which would alter the dynamic response of plant equipment. Accordingly, no new failure modes are introduced.

   Therefore, the proposed change does not create the possibility of a new or different kind of accident from any previously evaluated.

3. **Does the proposed amendment involve a significant reduction in a margin of safety?**

   Response: No.

   The proposed change revises the Applicability presentation of the Oxygen Concentration TS. No safety limits are affected. The Oxygen Concentration TS requirements assure sufficient safety margins are maintained, and that the design, operation, surveillance methods, and acceptance criteria specified in applicable codes and standards (or alternatives approved for use by the NRC) will continue to be met as described in the plants' licensing basis. The proposed change does not adversely affect existing plant safety margins or the reliability of the equipment assumed to operate in the safety analysis. As such, there are no changes being made to safety analysis assumptions, safety limits, or limiting safety system settings that would adversely affect plant safety.

   Therefore, the proposed change does not result in a significant reduction in a margin of safety.

4.4 Conclusions

In conclusion, based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

5.0 ENVIRONMENTAL CONSIDERATION

A review has determined that the proposed amendment would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. However, the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

6.0 REFERENCES

1) NUREG-1433, "Standard Technical Specifications- General Electric BWR/4 Plants, Volume 1, Specifications, Revision 4.0," published April 2012.

2) NUREG-1433, "Standard Technical Specifications- General Electric BWR/4 Plants, Volume 2, Bases, Revision 4.0," published April 2012.

3) Nine Mile Point, Unit 1 Updated Final Safety Analysis Report, Section VII.G.2.0, Containment Inerting System.

4) Nine Mile Point, Unit 1 Updated Final Safety Analysis Report, Table XV-9, "Significant Input Parameters to the Loss-of-Coolant Accident Analysis."

ATTACHMENT 2

MARKUP OF PROPOSED TECHNICAL SPECIFICATIONS PAGES

EVALUATION OF PROPOSED CHANGES

License Amendment Request

Nine Mile Point Nuclear Station, Unit 1

Docket No. 50-220

REVISED TECHNICAL SPECIFICATIONS PAGES

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LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT
3.3.1 OXYGEN CONCENTRATION	4.3.1 OXYGEN CONCENTRATION
Applicability:	Applicability:
Applies to the limit on oxygen concentration within the primary containment system.	Applies to the periodic testing requirement for the primary containment system oxygen concentration.
Objective:	Objective:
To assure that in the event of a loss-of-coolant accident any hydrogen generation will not result in a combustible mixture within the primary containment system.	To assure that the oxygen concentration within the primary containment system is within required limits.
Specification:	Specification:
~~a. The primary containment atmosphere shall be reduced to less than four percent by volume oxygen concentration with nitrogen gas whenever the reactor coolant pressure is greater than 110 psig and the reactor is in the power operating condition, except as specified in "b" and "c" below.~~	In accordance with the Surveillance Frequency Control Program, oxygen concentration shall be determined.
Insert A	

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT
b. Within the 24-hour period subsequent to the reactor being placed in the run mode for the power operating condition, the containment atmosphere oxygen concentration shall be reduced to less than four percent by volume, and maintained in this condition. Deinerting may commence 24 hours prior to a major refueling outage or other scheduled shutdown.	
c. If the containment oxygen concentration is greater than or equal to the four percent by volume limit, except as allowed during startup and shutdown in "b" above, restore the oxygen concentration to within the limit within 24 hours.	
d. If Specifications "a," "b," or "c" above are not met, the reactor coolant pressure shall be reduced to 110 psig or less within ten hours.	

INSERT A

a. 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".

b. 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.

c. 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.

d. If Specifications “a”, “b”, or “c” above are not met, reactor power shall be reduced to less than or equal to 15 percent rated thermal power within eight hours.

ATTACHMENT 3

REVISED TECHNICAL SPECIFICATIONS BASES PAGES

EVALUATION OF PROPOSED CHANGES

License Amendment Request

Nine Mile Point Nuclear Station, Unit 1

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REVISED TECHNICAL SPECIFICATIONS BASES PAGES

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BASES FOR 3.3.1 AND 4.3.1 OXYGEN CONCENTRATION

The four percent by volume oxygen concentration eliminates the possibility of hydrogen combustion following a loss-of-coolant accident (Section VII-G.2.0 and Appendix E-II.5.2)*. The only way that significant quantities of hydrogen could be generated by metal-water reaction would be if the core spray system failed to sufficiently cool the core. As discussed in Section VII-A.2.0*, each core spray system will deliver, as a minimum, core spray sparger flow as shown on Figure VII-2*. In addition to hydrogen generated by metal-water reaction, significant quantities can be generated by radiolysis. (Technical Supplement to Petition for Conversion from Provisional Operating License to Full Term Operating License).

~~Inerting the primary containment is an operational problem because it prevents containment access without an appropriate breathing apparatus. Therefore, the primary containment is inerted as late as possible in the plant startup and deinerted as soon as possible in the plant shutdown. The probability of an event that generates hydrogen occurring within the first 24 hours of a startup, or within the last 24 hours before a shutdown, is low enough that these "windows," when the primary containment is not inerted, are also justified. The 24 hour time period is a reasonable amount of time to allow plant personnel to perform inerting or deinerting.~~

~~If oxygen concentration is greater than or equal to four percent by volume at any time while in the power operating condition, with the exception of the relaxations allowed during startup and shutdown, oxygen concentration must be restored to less than four percent by volume within 24 hours. The 24 hour completion time is allowed when oxygen concentration is greater than or equal to four percent by volume because of the low probability and long duration of an event that would generate significant amounts of hydrogen occurring during this period.~~

~~If oxygen concentration cannot be restored to within limits within the required completion time, reactor coolant pressure must be reduced to less than or equal to 110 psig within 10 hours.~~

~~At reactor pressures of 110 psig or less, the reactor will have been shutdown for more than an hour and the decay heat will be at sufficiently low values so that fuel rods will be completely wetted by core spray. The fuel clad temperatures would not exceed the core spray water saturation temperature of about 344°F.~~

INSERT B

The primary containment is normally slightly pressurized during periods of reactor operation. Nitrogen used for inerting could leak out of the containment but air could not leak in to increase the oxygen concentration. Once the containment is filled with nitrogen to the required concentration, no monitoring of oxygen concentration is necessary. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

*FSAR

INSERT B

All nuclear reactors must be designed to withstand events that generate hydrogen either due to the zirconium metal water reaction in the core or due to radiolysis. The primary method to control hydrogen is to inert the primary containment. With the primary containment inert, that is, oxygen concentration less than four percent by volume, a combustible mixture cannot be present in the primary containment for any hydrogen concentration. An event that rapidly generates hydrogen from zirconium metal water reaction will result in excessive hydrogen in primary containment, but oxygen concentration will remain less than four percent by volume and no combustion can occur. The primary containment oxygen concentration must be within the specified limit when the primary containment is inert, except as allowed by Specifications 3.3.1.a or 3.3.1.b. The primary containment must be inert when reactor power is greater than or equal to 15 percent rated thermal power, since this is the condition with the highest probability of an event that could produce hydrogen. Specification 3.3.1.a allows for primary containment be inerted up to 24 hours after exceeding 15 percent rated thermal power. Specification 3.3.1.b allows de-inerting to commence 24 hours prior to reaching 15 percent rated thermal power.

Inerting the primary containment is an operational problem because it prevents containment access without an appropriate breathing apparatus. As long as power is less than 15 percent rated thermal power, the potential for an event that generates significant hydrogen is low and the primary containment need not be inert. Furthermore, the probability of an event that generates hydrogen occurring within 24 hours of greater than 15 percent rated thermal power is low enough when the primary containment is not inert, is also justified. The 24-hour time period is a reasonable amount of time to allow plant personnel to perform inerting or de-inerting.