July 12, 2013

MEMORANDUM TO: Veronica Rodriguez, Acting Chief
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

FROM: Peter Bamford, Project Manager ***/ra/***
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

SUBJECT: THREE MILE ISLAND, UNIT NO. 1 - ELECTRONIC TRANSMISSION, DRAFT REQUEST FOR ADDITIONAL INFORMATION REGARDING PROPOSED REVISION TO PRESSURE AND TEMPERATURE LIMIT CURVES AND EXEMPTION REQUEST FOR INITIAL REFERENCE TEMPERATURE VALUES (TAC NOS. MF0425 AND MF0426)

The attached draft request for additional information (RAI) was transmitted by electronic transmission on July 11, 2013, to Mr. Thomas Loomis, at Exelon Generation Company, LLC (Exelon, the licensee). This draft RAI was transmitted to facilitate the technical review being conducted by the Nuclear Regulatory Commission (NRC) staff and to support a conference call (if needed) with Exelon in order to clarify the licensee's proposed revision to the pressure and temperature limit curves and low temperature overpressure protection limits contained in the Three Mile Island, Unit No. 1, Technical Specifications. The draft RAI is related to the licensee's submittal dated December 14, 2012. The draft questions were sent to ensure that they were understandable, the regulatory basis was clear, and to determine if the information requested was previously docketed. This memorandum and the attachment do not represent an NRC staff position.

Docket No. 50-289

Enclosure:
Request for Additional Information

July 12, 2013

MEMORANDUM TO: Veronica Rodriguez, Acting Chief
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

FROM: Peter Bamford, Project Manager ***/ra/***
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

SUBJECT: THREE MILE ISLAND, UNIT NO. 1 - ELECTRONIC TRANSMISSION, DRAFT REQUEST FOR ADDITIONAL INFORMATION REGARDING PROPOSED REVISION TO PRESSURE AND TEMPERATURE LIMIT CURVES AND EXEMPTION REQUEST FOR INITIAL REFERENCE TEMPERATURE VALUES (TAC NOS. MF0425 AND MF0426)

The attached draft request for additional information (RAI) was transmitted by electronic transmission on July 11, 2013, to Mr. Thomas Loomis, at Exelon Generation Company, LLC (Exelon, the licensee). This draft RAI was transmitted to facilitate the technical review being conducted by the Nuclear Regulatory Commission (NRC) staff and to support a conference call (if needed) with Exelon in order to clarify the licensee's proposed revision to the pressure and temperature limit curves and low temperature overpressure protection limits contained in the Three Mile Island, Unit No. 1, Technical Specifications. The draft RAI is related to the licensee's submittal dated December 14, 2012. The draft questions were sent to ensure that they were understandable, the regulatory basis was clear, and to determine if the information requested was previously docketed. This memorandum and the attachment do not represent an NRC staff position.

Docket No. 50-289

Enclosure: Request for Additional Information

DISTRIBUTION:
PUBLIC
RidsNrrPMThreeMileIsland Resource LPL1-2 R/F

Accession No.: ML13193A145 * via memo

OFFICE	LPL1-2/PM	EVIB/BC
NAME	PBamford	SRosenberg*
DATE	07/12/2013	07/02/13

OFFICIAL RECORD COPY

REQUEST FOR ADDITIONAL INFORMATION

THREE MILE ISLAND NUCLEAR STATION, UNIT 1

PROPOSED REVISION TO PRESSURE AND TEMPERATURE LIMIT CURVES AND

EXEMPTION REQUEST FOR INITIAL REFERENCE TEMPERATURE VALUES

DOCKET NO. 50-289

By letter dated December 14, 2012 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML12353A319), Exelon Generation Company, LLC (Exelon, the licensee), submitted a license amendment request (LAR) for Three Mile Island Nuclear Station, Unit 1 (TMI-1). The LAR relates to a proposed revision to the pressure and temperature (P-T) limit curves and low temperature overpressure protection limits contained in the TMI-1 Technical Specifications (TS). In addition to the LAR, Exelon also submitted an exemption request relating to the use of alternate initial reference temperature (RT_{NDT}) values for Linde 80 welds used in fabricating the TMI-1 reactor vessel. In order for the NRC staff to complete its review of the LAR and exemption request, a response to the following request for additional information (RAI) is requested.

RAI 1:

Issue: Section 4.6 of Attachment 4, AREVA Document No. ANP-3102, "Three-Mile Island, Unit 1 Appendix G Pressure-Temperature Limits at 50.2 EFPY [Effective Full Power Years] with MUR [Measurement Uncertainty Recapture Uprate]," describes the reactor coolant temperature-time histories used in the calculations of the revised P-T limits, as specified below:

> The following input temperate-time histories are considered:
>
> > Normal Ramp Heatup, 50 °F/hr.
> > Normal Step Heatup, 50 °F/hr.
> > Normal Ramp Cooldown, 100 °F/hr to 225 °F then 30 °F/hr to 70°F.
> > Normal Step Cooldown, 100 °F/hr to 225 °F then 30 °F/hr to 70°F.

Note 2 to Figure 3.1-2 in the proposed TS markup, Attachment 2, shows the cooldown ramp history as follows:

> T > 255°F 100 °F/hr or 15°F / 9 min. Steps
> T > 255°F 30°F/hr or 15°F / 30 min. Steps

Request: Explain this discrepancy, or revise the submittal to make the text consistent, either 255°F [degrees Fahrenheit] or 225°F, with the actual cooldown history that was used. Also, please clarify whether Attachment 4 is considered revision 1 or 2, because the attachment listing does not appear to match the attached document.

RAI 2:

Background: P-T limit calculations for ferritic reactor coolant pressure boundary (RCPB) components that are not reactor vessel (RV) beltline shell materials, may define curves that are more limiting than those calculated for the RV beltline shell materials. This may be due to the following factors:

1. Some ferritic RCPB components that are not RV beltline shell materials, such as nozzles, penetrations, and other discontinuities, are complex geometry components that exhibit significantly higher stress intensities than those for the RV beltline region. These higher stresses can potentially result in more restrictive P-T limits, even if the RT_{NDT} for these components is not as high as that of RV beltline materials that have simpler geometries.

2. Ferritic RCPB components that are not RV beltline shell materials may have material properties, in particular initial RT_{NDT} values, which may define more restrictive P -T limits that those for the RV beltline shell materials.

Issue: In Attachment 4 to the submittal dated December 14, 2012, the licensee submitted information indicates that the beltline weld P-T curves are more conservative (limiting) than the P-T curves for the inlet and outlet nozzles. Attachment 4 also provided all of the inputs (per NRC Generic Letter 92-01) for evaluating the properties at the end of extended life for the beltline materials (chemistry and initial RT_{NDT} and upper shelf Charpy energy, as well as neutron fluence) used to generate the limiting beltline weld P-T curves. Attachment 4, section 4.7 indicates that P-T curves for the inlet and outlet nozzles were based on an assumed RT_{NDT} of 60°F for the limiting nozzle, but does not provide any justification for this assumption. TMI-1 Updated Final Safety Analysis Report, Table 4.3-3, provides Charpy impact data for the nozzles, but no copper content. Neutron fluence values for the nozzle forgings are not included in any of the attachments to the submittal dated December 14, 2012.

Request: The NRC staff requests that the licensee provide the inputs for evaluating the properties at the end of extended life for the inlet and outlet nozzles - chemistry and initial unirradiated RT_{NDT}, unirradiated upper shelf Charpy energy, and fluence.