January 24, 2002

Mr. Oliver D. Kingsley, President
Exelon Nuclear
Exelon Generation Company, LLC
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: QUAD CITIES NUCLEAR POWER STATION, UNITS 1 AND 2 - REVISION TO REACTOR VESSEL MATERIAL SPECIMEN REMOVAL SCHEDULE (TAC NOS. MB2266 AND MB2267)

Dear Mr. Kingsley:

By letter dated June 21, 2001, Exelon Generation Company, LLC (EGC), the licensee, submitted a request for NRC review and approval of a proposal to defer removal of surveillance capsules within both Quad Cities Units 1 and 2 reactor pressure vessel (RPV) surveillance capsule withdrawal schedules. EGC's submittal was made in accordance with the provision of Title 10 of the Code of Federal Regulations, Part 50, Appendix H, paragraph B.3 which specifies that "[a] proposed withdrawal schedule must be submitted with a technical justification as specified in [10 CFR 50.4]. The proposed schedule must be approved prior to implementation." In addition, Quad Cities Units 1 and 2 are members of the Boiling Water Reactor (BWR) Vessel and Internals Project (BWRVIP), which has developed a plan for an RPV Integrated Surveillance Program (ISP). The NRC staff set three guidelines which must be met for surveillance capsule deferral, which were addressed in the submittal by EGC for Quad Cities Units 1 and 2.

Following its review of your submittal, the staff has determined that your proposed extension is acceptable. Both Quad Cities Units 1 and 2 can defer removal of their surveillance capsules until outages in November 2004 for Unit 1 and February 2004 for Unit 2. The enclosed safety evaluation provides the details of the staff's conclusions on this issue.

If you have any questions regarding this matter, please call me at (301) 415-2296.

Sincerely,

/RA/

Carl F. Lyon, Project Manager, Section 2
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos.: 50-254 and 50-265

Enclosure: Safety Evaluation

cc w/encl: See next page

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REQUEST TO DEFER REACTOR PRESSURE VESSEL

SURVEILLANCE CAPSULE REMOVAL

EXELON GENERATION COMPANY, LLC

QUAD CITIES NUCLEAR POWER STATION, UNITS 1 AND 2

DOCKET NOS. 50-254 AND 50-265

1.0 INTRODUCTION

By letter dated June 21, 2001, Exelon Generation Company, LLC (EGC), the licensee, submitted a request for Nuclear Regulatory Commission (NRC) review and approval of its proposal to defer removal of surveillance capsules within the Quad Cities Units 1 and 2 reactor pressure vessel (RPV) surveillance capsule withdrawal schedules. EGC's submittal was made in accordance with the provision of Title 10 of the Code of Federal Regulations, Part 50, Appendix H, paragraph B.3 which specifies that "[a] proposed withdrawal schedule must be submitted with a technical justification as specified in [10 CFR 50.4]. The proposed schedule must be approved prior to implementation."

Quad Cities Units 1 and 2 are members of the Boiling Water Reactor (BWR) Vessel and Internals Project (BWRVIP), which has developed a plan for an RPV Integrated Surveillance Program (ISP). This plan was formulated in accordance with 10 CFR Part 50 Appendix H, Section III.C, "Requirements for an Integrated Surveillance Program." The NRC staff is currently completing its review of the ISP.

2.0 REGULATORY REQUIREMENTS AND STAFF POSITION

Nuclear power plant licensees are required by Appendix H to 10 CFR Part 50 to implement RPV surveillance programs to "monitor changes in the fracture toughness properties of ferritic materials in the reactor vessel beltline region . . . which result from exposure of these materials to neutron irradiation and the thermal environment." Regarding RPV surveillance program design and specimen testing, 10 CFR Part 50 Appendix H, Section III.C, "Requirements for an Integrated Surveillance Program," the BWRVIP developed a plan for RPV ISP. By letter dated May 16, 2000, from Jack Strosnider (NRC), to Carl Terry (BWRVIP) (Ref. 1), the NRC staff set three conditions for the approval of deferral requests while the NRC staff completes its review of the project. In general, adequate technical basis was required to demonstrate that the deferral would not adversely impact the licensee's ability to ensure that the integrity of the RPV would be maintained through the period of the deferral.

3.0 LICENSEE'S DETERMINATION

In its June 21, 2001, submittal, EGC provided the following justification in answer to the three requirements of the NRC staff for a deferral request.

EGC explained that, based on the selection criteria in the BWRVIP-78 program plan, e.g., chemistry match, baseline data, and fabrication details, the BWRVIP did not select Quad Cities' capsules for analysis. Therefore, in accordance with the BWRVIP program, no Quad Cities' capsules will have to be withdrawn during the Quad Cities' operating license period.

In order to explain how the acquisition of materials property data is not necessary to ensure RPV integrity through the deferral period in accordance with 10 CFR Part 50 Appendix H, EGC provided that currently the Quad Cities' technical specifications contain pressure-temperature (P-T) curves applicable for up to 32 effective full power years (EFPY). Further, no capsule removal is required to support these P-T curves. In addition, the data from the capsules would not be expected to provide Charpy shift values above the 56 °F for welds and 34 °F for plates to be distinguishable from the scatter in the Charpy test method based on Regulatory Guide 1.99, "Radiation Embrittlement of Reactor Vessel Materials," Revision 2, Equation (2). Accordingly, no capsule removal is required to support the P-T curves.

In order to explain how capsule dosimetry data testing would not affect the validity of the facility's RPV integrity assessments through the deferral period, EGC provided that Quad Cities Units 1 and 2 vessel exposures will be 22.4 EFPY and 21.2 EFPY, respectively, at the projected deferral dates. These operational times would represent, at maximum, 70 percent of the current 32 EFPY boundary for the P-T Limits.

EGC noted the deferral should be acceptable because it is consistent with the intent of the proposed BWR ISP, would not delay needed data, and would not affect the reactor vessel integrity assessment.

4.0 STAFF EVALUATION

The NRC staff reviewed the information supplied by the licensee and the regulatory requirements stated in Section 2.0 above. Regarding the requirements of American Society for Testing and Materials (ASTM) E185-62, "Practice for Conducting Surveillance Tests for Light Water-Cooled Nuclear Power Reactor Vessels," the staff concluded that the licensee's requested modifications to their surveillance capsule withdrawal schedules would be acceptable. The staff's conclusions on the technical justifications provided in response to the three criteria given in the NRC staff's May 16, 2000, letter (Ref. 1) are given below.

The staff accepts that deferral of the Quad Cities Unit 1 and 2 capsules are acceptable within the BWRVIP ISP plan. Based on the NRC staff's discussions with the BWRVIP, some modifications to the withdrawal schedule proposed as part of the ISP are expected. In addition, the ISP is intended to improve the quality of data acquired to assess the embrittlement of BWR RPVs. In addition, the licensee concluded that since no Quad Cities capsule would have to be withdrawn during the Quad Cities' operating license period according to the proposed BWRVIP-78 program, the deferral would have no effect on the program.

The period of the requested surveillance capsule deferral is less than the range over which the most recently approved P-T limits remain valid. Therefore, the staff has concluded that through the period of the requested capsule deferral, the most recently approved Quad Cities Units 1 and 2 P-T limits will continue to ensure that the integrity of the RPV will be maintained for heatup, cooldown, normal power operation, and leak rate testing. Further, the additional materials test data from the capsules to be deferred would not be expected to lead to significant modification of the Quad Cities P-T limit curves, if the capsules were tested in accordance with the current withdrawal schedule, since the data obtained would not be different from a data scatter. No additional material test (i.e., Charpy impact test) data or dosimetry data is required to ensure, nor would be expected to contribute to the evaluation of, the integrity of the Quad Cities RPVs through the period of the deferral.

5.0 CONCLUSION

The NRC staff has concluded that, in accordance with the provisions of Appendix H to 10 CFR Part 50, removal of the Quad Cities surveillance capsules can be safely deferred for one cycle until the November 2004 refueling outage for Unit 1, and February 2004 refueling outage for Unit 2.

6.0 REFERENCES

1. Jack Strosnider, Director NRR/DE to Carl Terry, BWRVIP Chairman, “BWR Integrated Surveillance Program (BWRVIP-78) (TAC NO. M99894),” May 16, 2000.

Principal Contributor: J. Collins

Date: January 24, 2002