



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

November 2, 2009

Mr. Charles G. Pardee  
President and Chief Nuclear Officer  
Exelon Generation Company, LLC  
4300 Winfield Road  
Warrenville, IL 60555

SUBJECT: CLINTON POWER STATION, UNIT NO. 1 - REQUEST FOR ADDITIONAL INFORMATION RELATED TO LICENSE AMENDMENT REQUEST TO MODIFY CLINTON POWER STATION FACILITY OPERATING LICENSE IN SUPPORT OF THE USE OF ISOTOPE TEST ASSEMBLIES (TAC NO. ME1643)

Dear Mr. Pardee:

By letter to the Nuclear Regulatory Commission (NRC) dated June 26, 2009 (Agencywide Documents Access and Management System Accession No. ML091801061), Exelon Generation Company, LLC (EGC) submitted a request to modify License Condition 2.B.(6) and create new License Conditions 1.J and 2.B(7) as part of a pilot program to irradiate Cobalt (Co)-59 targets to produce Co-60, for the Clinton Power Station, Unit No. 1 (CPS). EGC also requests an amendment to Appendix A, Technical Specifications (TS), of the CPS Facility Operating License, which would modify TS 4.2.1, "Fuel Assemblies," to describe the isotope test assemblies being used.

The NRC staff is reviewing your submittal and has determined that additional information is required to complete the review. The specific information requested is addressed in the enclosure to this letter. During a discussion with your staff on October 29, 2009, it was agreed that you would provide a response within days 14 from the date of this letter.

The NRC staff considers that timely responses to requests for additional information help ensure sufficient time is available for staff review and contribute toward the NRC's goal of efficient and effective use of staff resources. If circumstances result in the need to revise the requested response date, please contact me at (301) 415-3719.

Sincerely,

A handwritten signature in cursive script, appearing to read "Cameron S. Goodwin".

Cameron S. Goodwin, Project Manager  
Plant Licensing Branch III-2  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-461

Enclosure:  
Request for Additional Information

cc w/encl: Distribution via Listserv

## REQUEST FOR ADDITIONAL INFORMATION

### CLINTON POWER STATION, UNIT NO. 1

#### DOCKET NO. 50-461

In reviewing the Exelon Generation Company's submittal dated June 26, 2009 (Agencywide Documents Access and Management System Accession No. ML091801061) (Reference 1), related to modifying License Condition 2.B.(6) and create new License Conditions 1.J and 2.B.(7) as part of a pilot program to irradiate Cobalt (Co)-59 targets to produce Co-60, for the Clinton Power Station, Unit No. 1 (CPS), the Nuclear Regulatory Commission (NRC) staff has determined that the following information is needed in order to complete its review:

#### Question 1

The release fraction for Cobalt 60 (Co-60) used in the design bases analyses assumes that the Co-60 is in the fuel cladding and structural materials. For the proposed change, the Co-60 available to be released during a design-basis accident (DBA) is not mixed with cladding and structural materials, but is in high concentrations within the isotope rods. Please justify why the DBA Co-60 release fraction used is applicable for the proposed isotope test assemblies. Please include any experimental data to justify the proposed release fraction.

#### Question 2

Attachment 4, Section 4.3, "Evaluation of Design-Basis Accidents," of Reference 1 it states: The CPS Design-Basis Accidents (DBAs) to be evaluated are identified in Chapter 15.0 of the Clinton Power Station (CPS) Updated Safety Analysis Report (USAR). The Control Rod Drop Accident (CRDA), Main Steamline Break (MSLB) accident outside containment, Fuel Handling Accident (FHA), and Loss-of-Coolant Accident (LOCA) are licensed under Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.67, "Accident Source Term," per Regulatory Guide (RG) 1.183, "Alternate Radiological Source Terms for Evaluating Design-Basis Accidents at Power Reactors." In Reference 2, it states that the information needed includes a description of the analyses used to evaluate the impact of the proposed change on radiological consequences of DBAs in the CPS design bases. The proposed change only evaluates the impact on the DBAs described above. Please provide the information requested in Reference 2 for all DBAs in the CPS design bases or justify why this information is not needed.

#### Question 3

Reference 1 states "The CPS licensing basis MSLB analyzed in Section 15.6.4 [Steam System Piping Break Outside Containment] of the CPS UFSAR assumes no fuel damage occurs as a result of the event." The NRC staff is concerned that the analysis assumes that no fuel damage occurs, but does not state whether damage occurs to the isotope rods. Confirm that no damage to the isotope rod occurs because of the event.

Enclosure

#### Question 4

During circulation, the reactor coolant acquires radioactive materials due to release of fission products from fuel leaks into the coolant and activation of corrosion products in the reactor coolant. These radioactive materials in the coolant can plate out in the reactor coolant system (RCS), and, at times, an accumulation will break away to spike the normal level of radioactivity. The release of coolant during a DBA could send radioactive materials into the environment. Limits on the maximum allowable level of radioactivity in the reactor coolant are established to ensure, in the event of a release of any radioactive material to the environment during a DBA, radiation doses are maintained within the limits of 10 CFR 100 "Reactor Site Criteria" and 10 CFR 50.67. The limits on RCS specific activity are also used for establishing standardization in radiation shielding and plant personnel radiation protection practices.

Technical Specification Limiting Condition for Operation (LCO), 3.4.8 "RCS [Reactor Coolant System] Specific Activity," states that "the DOSE EQUIVALENT I-131 specific activity of the reactor coolant shall be  $< 0.2 \mu\text{gCi/gm.}$ " Per the definition in Technical Specifications, DOSE EQUIVALENT I-131 is based upon I-131, I-132, I-133, I-134, and I-135. The NRC staff is concerned about whether the LCO adequately addresses the release of Co-60 into the RCS, since the DBA accident analyses (MSLB) does not appear to consider Co-60, nor does the RCS specific activity Surveillance Requirement monitor Co-60 in the RCS. In addition, Co-60 isotopic rods might fail independently of any fuel rod failures and operational data does not appear to exist for Clinton with the proposed isotope rods.

While no "fuel damage" due to the event is assumed, the current design basis safety analysis conservatively assumes the fuel pins leak. Clarify whether the operational design limit for the isotope rods is no leakage. Since the technical specifications are derived from the safety analysis, describe how the technical specifications will ensure that this assumption remains valid. Justify how LCO 3.4.8 remains able to insure that 10 CFR 50.67 and 10 CFR 100 limits (as applicable), and radiation shielding and plant personnel radiation protection design limits are met, or modify LCO 3.4.8 so that and these limits continue to be met after the proposed change.

#### Question 5

Please provide calculations/dose information on the dose rate changes that can occur in the occupied areas of the plant as the result of handling a spent fuel assembly with the Co-60 in lieu of a fuel assembly (e.g., in the dry well), and the impact of those changes on occupational doses.

REFERENCES:

1. Letter from Jeffrey L Hansen (Exelon) to U.S. Nuclear Regulatory Commission, entitled "License Amendment Request to Modify Clinton Power Station Facility Operating License in Support of the Use of Isotope Test Assemblies," dated June 26, 2009 (Attachment 4 ML091801064 - Nonpublic).
2. Letter from Peter Bamford (USRNC) to Charles G. Pardee, entitled, "Clinton Power Station, Unit 1 – Withdrawal of License Amendment Request Regarding Bulk Isotope Generation Project (TAC. No. ME0657), dated May 19, 2009.

November 2, 2009

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President and Chief Nuclear Officer  
Exelon Generation Company, LLC  
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Sincerely,

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Cameron S. Goodwin, Project Manager  
Plant Licensing Branch III-2  
Division of Operating Reactor Licensing  
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NRR-088

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