

RS-09-146

10 CFR 50.90

November 17, 2009

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

Clinton Power Station, Unit 1  
Facility Operating License No. NPF-62  
NRC Docket No. 50-461

**Subject:** Additional Information Supporting the Request for a License Amendment to Modify Clinton Power Station Facility Operating License in Support of the Use of Isotope Test Assemblies

- References:**
1. Letter from Mr. Jeffrey L. Hansen (Exelon Generation Company, LLC) to U. S. NRC, "License Amendment Request to Modify Clinton Power Station Facility Operating License in Support of the Use of Isotope Test Assemblies," dated June 26, 2009
  2. Letter from U. S. NRC to Mr. Charles G. Pardee (Exelon Generation Company, LLC), "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)," dated October 16, 2009
  3. Letter from Mr. Jeffrey L. Hansen (Exelon Generation Company, LLC) to U. S. NRC, " Additional Information Supporting the Request for a License Amendment to Modify Clinton Power Station Facility Operating License in Support of the Use of Isotope Test Assemblies," dated November 4, 2009

In Reference 1, Exelon Generation Company, LLC (EGC) requested an amendment to the facility operating license for Clinton Power Station (CPS), Unit 1. Specifically, the proposed change would modify CPS 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. In addition to the proposed license condition changes, EGC also requests an amendment to Appendix A, Technical Specifications (TS), of the CPS Facility Operating License. This proposed change would modify TS 4.2.1, "Fuel Assemblies," to describe the Isotope Test Assemblies (ITAs) being used.

In Reference 2, the NRC requested that EGC provide additional information in support of their review of Reference 1. EGC provided the NRC requested additional information in Reference 3, with the exception of the response to NRC Question 2. It was noted in Reference 3 that the response to NRC question 2 would be provided at a later date. The EGC response to this question is provided in Attachment 1 to this letter.

EGC has reviewed the information supporting a finding of no significant hazards consideration that was previously provided to the NRC in Reference 1. The additional information provided in this submittal does affect the bases for concluding that the proposed license amendment does not involve a significant hazards consideration. The revised No Significant Hazards Consideration Determination is provided as part of the RAI response included in Attachment 1.

A new regulatory commitment is established by this submittal and documented in Attachment 2 to this letter.

If you have any questions concerning this letter, please contact Mr. Timothy A. Byam at (630) 657-2804.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 17<sup>th</sup> day of November 2009.

Respectfully,



Jeffrey L. Hansen  
Manager – Licensing  
Exelon Generation Company, LLC

Attachments

- Attachment 1: Additional Information Supporting the Request for a License Amendment to Modify Clinton Power Station Facility Operating License in Support of the Use of Isotope Test Assemblies
- Attachment 2: Summary of Regulatory Commitments

## ATTACHMENT 1

### Additional Information Supporting the Request for a License Amendment to Modify Clinton Power Station Facility Operating License in Support of the Use of Isotope Test Assemblies

#### **NRC RAI 2:**

*Attachment 1, Section 4.3, Reference 1*

*In the section for "No Significant Hazards Consideration" of Attachment 1, it stated that: "the effects on the spent fuel pool are minimal; post-irradiation handling of the assemblies and the isotope rods will be performed under approved procedures, by experienced personnel."*

*Enclosure 3 of the application (NEDC-33505P, Section 4.7.1) indicates that the maximum incident (gamma) radiation due to a GE14i bundle placed one foot from the spent fuel pool (SFP) wall is approximately  $7.2E+10$  MeV/cm<sup>2</sup>-sec, so concrete heating due to gamma would be significant. At 4 feet, it has been shown that the energy deposition rate of  $1.4E+8$  MeV/cm<sup>2</sup>-sec is well below that required to cause significant concrete heating. Therefore, in order to minimize the effect of gamma heating on the SFP concrete walls, the irradiated fuel storage procedures are modified to specify that the GE14i fuel bundles be stored at least 4 feet from the pool walls with no limitation on the amount of time a GE14i bundle may remain in the pool.*

*The applicant should modify the section on "No Significant Hazards Consideration," the significant heating effect of gamma on the SFP and procedures adopted to mitigate the heating effect.*

#### **Response 2:**

Exelon Generation Company, LLC (EGC) agrees that the No Significant Hazards Consideration Determination needs to be revised to address the gamma heating conditions present in the Clinton Power Station (CPS) SFP due to placing the irradiated GE14i bundles near the SFP walls. As noted in the above RAI and in Reference 1, EGC plans to revise the applicable SFP procedures to require storage of the irradiated GE14i bundles at least four feet from a wall of the SFP. EGC has documented this commitment in Attachment 2 to this letter. The following revised No significant Hazards Consideration reflects the addition of heating effects of gamma radiation on the SFP walls.

#### **No Significant Hazards Consideration**

In accordance with 10 CFR 50.90, "Application for amendment of license, construction permit, or early site permit," Exelon Generation Company, LLC (EGC) requests an amendment to Facility Operating License No. NPF-62 for Clinton Power Station (CPS), Unit 1. Specifically, the proposed change modifies CPS License Condition 2.B.(6) and creates 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. The Co-60 would ultimately be sold to licensed users in the medical industry for use in cancer treatments, blood and instrument sterilization, radiography and security industry for imaging, and to the food industry for cold pasteurization or irradiation sterilization. In addition to the proposed license condition changes, EGC also requests an amendment to Appendix A, Technical Specifications (TS), of the CPS Facility Operating License. This proposed change would modify TS 4.2.1, "Fuel Assemblies," to describe the Isotope Test Assemblies (ITAs) being used.

## ATTACHMENT 1

### Additional Information Supporting the Request for a License Amendment to Modify Clinton Power Station Facility Operating License in Support of the Use of Isotope Test Assemblies

EGC 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 changes to the license conditions provide clarification and do not impact plant operation in any way. The handling of byproduct material (i.e., Co-60) will continue to be done in accordance with the requirements of 10 CFR 30 and the requirements of the CPS Facility Operating License. The proposed change to TS 4.2.1 also provides clarification and additional description of the proposed ITAs to be used in the CPS core. These changes provide clarification and do not involve an increase in the probability or consequences of an accident previously evaluated.

The use of the GE14i ITAs, has been evaluated for impact on the previously evaluated transients and design basis accidents for CPS. GE-Hitachi report NEDC-33505P, "Safety Analysis Report to Support Introduction of GE14i Isotope Test Assemblies (ITAs) in Clinton Power Station," dated June 2009, documents the results of the analyses completed to demonstrate the impact on operation following introduction of the ITAs in the CPS core. The use of these ITAs does not adversely affect accident initiators or precursors nor alter the design assumptions, conditions, and configuration or the manner in which the plant is operated and maintained. The Cycle 13 (i.e., the first cycle of operation with the GE14i assembly) core, and subsequent cores, will be designed so that the ITAs will be placed in non-limiting locations with respect to thermal limit margins and shutdown margins. The ITAs do not adversely affect the ability of any structures, systems or components (SSCs) to perform their intended safety function to mitigate the consequences of an initiating event within the assumed acceptance limits.

In addition to evaluation of the impact to operation with the introduction of the GE14i assemblies, EGC has also evaluated the effects of these assemblies on post-irradiation conditions. The additional heat from the Co-60 decay is insignificant when compared to the total heat from a normal refueling discharge. The small amount of extra heat added by the cobalt isotope rods poses no additional risk of spent fuel pool (SFP) local boiling over that previously analyzed. The maximum incident radiation due to an irradiated GE14i bundle placed one foot from the spent fuel pool walls is in excess of the radiation that would result in significant gamma heating of the concrete. However, analysis has demonstrated that at four feet, the energy deposition rate is well below that required to cause significant concrete heating. CPS procedures exist to guide placement of irradiated fuel bundles in the SFP to avoid gamma heating of the wall concrete. These procedures will be modified to specify that the irradiated GE14i bundles be stored at least four feet from the pool walls. With the four foot distance

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requirement in effect, there is no limitation on the amount of time an irradiated GE14i bundle may remain in the pool.

Handling of the licensed transfer casks will be in accordance with the guidance in NUREG 0612, "Control of Heavy Loads at Nuclear Power Plants," using the Fuel Building Crane. These precautions will support safe movement of the casks within the Fuel Building.

The consequences of a previously analyzed event are dependent on the initial conditions assumed in the analysis, the availability and successful functioning of equipment assumed to operate in response to the analyzed event, and the setpoints at which these actions are initiated. The consequences of a previously evaluated accident are not significantly increased by the proposed change. As documented in NEDC-33505P, the proposed change does not affect the performance of any equipment credited to mitigate the radiological consequences of an accident. Evaluation of operation with the GE14i assemblies in the CPS core, demonstrated that the licensing basis radiological analyses are not impacted by the introduction of eight GE14i assemblies at CPS. This includes the analyses done for transients and design basis accident events.

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 revision to the CPS license conditions and TS 4.2.1 will not introduce any new or modified equipment since these changes are intended to provide clarification only. These clarifications will not result in operation of the facility in a different way than currently operated.

While the proposed ITA program does result in the introduction of several modified fuel assemblies (i.e., the GE14i assembly), these assemblies are essentially the same as the GE14 assemblies currently in use in the CPS core. The only difference being the use of a number of isotope rods in place of fuel rods. The GE14i assembly was designed for mechanical, nuclear, and thermal-hydraulic compatibility with the GE14 fuel design. The details of the design differences between the GE14 and GE14i are documented in NEDC-33505P. Use of the proposed ITAs does not involve the addition or modification of any plant equipment other than the assemblies modified to include the cobalt target rods. Also, use of the proposed ITAs will not alter the design configuration or method of operation of plant equipment beyond its normal functional capabilities. The ITA program does not create any new credible failure mechanisms, malfunctions or accident initiators.

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

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

Response: No.

The proposed change to the CPS operating license conditions are intended to provide clarification as to how the generation of byproduct material in the CPS reactor core meets the requirements of 10 CFR Part 30. The proposed change to TS 4.2.1 also provides clarification and additional description of the proposed ITAs to be used in the CPS core. These proposed changes would not affect the design or operation of any equipment important to safety. In addition, since the proposed changes to the license conditions and TS provide clarification only, these changes do not affect the results of any safety calculations.

Cycle specific analyses will be performed for CPS Reload 12 Cycle 13 to establish fuel operating limits for the ITAs that assure compliance with regulatory limits. Results of these analyses will be documented in the CPS Reload 12 Cycle 13 Supplemental Reload Licensing Report. Furthermore, licensing analyses will be performed for the ITAs for each cycle of their operation, wherein the effect of the ITAs is considered for each of the appropriate licensing events and anticipated operational occurrences (AOOs) to establish the appropriate reactor thermal limits for operation.

The proposed introduction of the ITAs has no impact on equipment design or fundamental operation, other than the modifications made to the fuel assembly as part of the program. There are no changes being made to safety limits or safety system allowable values that would adversely affect plant safety as a result of the proposed ITAs. The performance of the systems important to safety is not significantly affected by the use of the proposed ITAs. The margin of safety can be affected by the thermal limits existing at the time of the postulated accident; however, the ITA design has been evaluated and demonstrated to have no significant effect on the calculated thermal limits as described above. The proposed change does not affect safety analysis assumptions or initial conditions and therefore, the margin of safety in the original safety analyses is maintained.

As documented above, the proposed change does not involve a significant reduction in a margin of safety.

Based on the above, EGC concludes that the proposed amendment does not involve a significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of no significant hazards consideration is justified.

ATTACHMENT 1  
Additional Information Supporting the Request for a License Amendment  
to Modify Clinton Power Station Facility Operating License  
in Support of the Use of Isotope Test Assemblies

**References:**

1. Letter (RS-09-074) from Exelon Generation Company (J. L. Hansen) to US NRC with attachments, "License Amendment Request to Modify Clinton Power Station Facility Operating License in Support of the Use of Isotope Test Assemblies," Exelon Nuclear, June 26, 2009

ATTACHMENT 2

**SUMMARY OF REGULATORY COMMITMENTS**

The following table identifies those actions committed to by Exelon Generation Company, LLC (EGC) in this document. Any other statements in the submittal are provided for information purposes and are not considered to be regulatory commitments.

| COMMITMENT  | COMMITTED DATE OR "OUTAGE"                                | COMMITMENT TYPE          |                       |
|---|---|--------------------------|-----------------------|
|   |   | ONE-TIME ACTION (Yes/No) | Programmatic (Yes/No) |
| Revise applicable Spent Fuel Pool Storage procedures to require storage of irradiated GE14i fuel bundles at least four feet from the wall of the SFP. | Prior to implementation of the approved license amendment | Yes                      | No                    |