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

May 19, 2009

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

SUBJECT: CLINTON POWER STATION, UNIT NO. 1 – WITHDRAWAL OF LICENSE AMENDMENT REQUEST REGARDING BULK ISOTOPE GENERATION PROJECT (TAC NO. ME0657)

Dear Mr. Pardee:

By letter dated April 8, 2009, (Agencywide Documents Access and Management System (ADAMS) Accession No. ML090990454), Exelon Generation Company, LLC (Exelon) submitted a license amendment request for Clinton Power Station (CPS), Unit No. 1. The proposed amendment would revise the CPS operating license and technical specifications to allow the intentional production of the isotope Cobalt (Co)-60 from Co-59 targets inserted into the reactor.

By letter dated May 11, 2009, (ADAMS Accession No. ML091320432), Exelon requested the withdrawal of the application from the U.S. Nuclear Regulatory Commission (NRC) staff's review. The NRC acknowledges your request to withdraw the application. NRC staff activities on the review have ceased and the associated Technical Assignment Control number has been closed.

The NRC staff was in the process of completing its acceptance review when it received your request for withdrawal, and notes that its review identified areas where your application did not provide sufficient technical information to enable the staff to complete its detailed review. Consistent with Section 50.90 of Title 10 of the *Code of Federal Regulations* (10 CFR), an amendment to the license (including the technical specifications) must fully describe the changes requested, and following as far as applicable, the form prescribed for original applications. Section 50.34 of 10 CFR addresses the content of technical information required. This section stipulates that the submittal address the design and operating characteristics, unusual or novel design features, and principal safety considerations.

Should you decide to re-submit your request, the NRC staff is enclosing guidance that may assist you in preparing your application. Since the NRC staff had not completed its acceptance review, the enclosed guidance is limited to issues identified at the time of your withdrawal request. If you submit a revised application, the NRC staff will conduct an acceptance review of that application and additional issues may be indentified.

Please contact me at 301-415-2833, if you have any questions.

Sincerely,

Peter Bamford

Peter Bamford, Project Manager
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-461

Enclosure:
As stated

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UNITED STATES
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LICENSE AMENDMENT REQUEST GUIDANCE

REGARDING THE BULK ISOTOPE GENERATION PROJECT

CLINTON NUCLEAR POWER STATION, UNIT NO. 1

By letter dated April 8, 2009, (Agencywide Documents Access and Management System (ADAMS) Accession No. ML090990454), Exelon Generation Company, LLC (Exelon) submitted a license amendment request for Clinton Power Station (CPS), Unit No. 1. The proposed amendment would change the CPS operating license and technical specifications as part of a pilot program to irradiate Cobalt (Co)-59 targets to produce Co-60. This limited scope pilot program is intended to provide assurance of in-reactor performance prior to any expanded application involving a more significant number of isotope production rods. The Co-60 would ultimately be sold to the medical industry for use in cancer treatments and to the food industry for irradiation sterilization. By letter dated May 11, 2009, (ADAMS Accession No. ML091320432), Exelon notified the U.S. Nuclear Regulatory Commission (NRC) staff that they were withdrawing the application. The NRC staff has reviewed the original application and concluded that, at a minimum, the information delineated below should be included in a re-submitted request, should CPS elect to do so.

Background:

The license amendment request (LAR), dated April 8, 2009, states that the General Electric (GE)14i Lead Test Assemblies (LTAs) are intended to be inserted into the CPS reactor using the LTA program under the provisions of Title 10 of the *Code of Federal* Regulations (10 CFR) 50.59. The CPS LTA program is implemented in accordance with the General Electric Standard Application for Reactor Fuel (GESTAR), NEDE-24011-P-A and associated letters, known as GESTAR-II. The NRC staff has reviewed the application and concluded that the use of the GESTAR-II LTA process is unacceptable for the following reasons:

(1) The LTA program was defined to allow the limited use of, and the gathering of test data from, demonstration fuel assemblies with enhanced design features and materials engineered to improve the nuclear performance, thermal-hydraulic performance, or mechanical performance of the fuel. The substitution of Co-59 target rods in place of fuel rods as outlined in this LAR does not achieve any of these program objectives.

(2) The LTA program was reviewed and approved using the review and safety criteria of 10 CFR Part 50. The GE14i LTAs are being loaded into Clinton Cycle 13 to demonstrate the in-reactor performance of Co-60 production rods. These LTAs relate to activities proposed to be licensed under 10 CFR Part 30 (e.g., production of by-product material). Hence, the proposed activity is beyond the scope and intent of the originally approved LTA program.

(3) The GESTAR-II process does not address the specific use of isotope production rods, nor does the staff approval of the GESTAR-II and its LTA program address the use of isotope production rods.

Information Needed:

1.) As described above, the NRC staff has determined that this specific request is beyond the scope of both the GESTAR-II and the LTA programs, as well as the staff's approval of these processes. In order to review this application, it must be structured so that it can be evaluated without reliance on the LTA program and GESTAR-II. Therefore, sufficient technical information should be provided that gives the NRC staff the ability to independently assess the following:

   a. GE14i fuel thermal-mechanical design, including the following:
      i. Isotope production rod failure modes
      ii. Isotope production rod design limits, including, but not limited to, the expected and design maximum Co-60 activities per rod model. Also, describe the prototype testing associated with the conditions of use (high neutron and gamma fields for years, exposure to corrosive materials, temperature, pressure, puncture, dropped source, torque, and build up of expected radioactivity including activation of contaminants).
      iii. Detailed drawings and specifications

   b. Impact of Co-60 rods on radiological source terms and accident dose. This should include a description of the analyses (input parameters, assumptions and models) used to evaluate the impact of the proposed change on radiological consequences of design-basis accidents (DBAs) in the CPS design bases (i.e. loss of coolant accident, fuel-handling accident, etc.). Alternatively, provide the calculations used to perform these evaluations. Also, provide an evaluation of a canister handling accident.

   c. Impact of Co-60 rods on anticipated operational occurrences and DBAs

   d. Impact of Co-60 rods on predicted core power

   e. Impact of Co-60 rods on instrumentation and measured core power

   f. Impact of Co-60 rods on shielding and spent fuel pool (SFP) components

   g. Detailed description of any other associated licensing analyses. Furthermore, the application should include definition of terms such as "predetermined number of cycles," "periodic harvesting of Co-60 rods," "non-limiting core regions," "maximization of Co-60 production," "high specific activity," and "low specific activity."

2.) Sufficient technical information should be provided to the staff that describes the design features, manufacturing techniques, and quality assurance program, to insure that:

   a. The target pellets are of high purity to minimize the production of unwanted/unanalyzed isotopes;
   b. No cobalt contamination (i.e., no un-encapsulated Co-59) is loaded into the reactor.

3.) Technical information regarding target rod removal from the Co-60 isotope production assemblies must be provided including:

   a. The maximum curie content of the rods/rod segments;
   b. The design of rod segment disassembly and handling tools to ensure operator doses are as low as reasonably achievable;
   c. The maximum dose rate of the receiving basket;
   d. The potential impact of the rod disassembly operations (including a fully loaded receiving basket) on the shielding design of the SFP;
   e. Contingency plans if during disassembly rod integrity issues are encountered.

4.) The application does not indicate any restrictions on the reintroduction of cobalt rod segments. The application should describe if there are any plans to shuffle rod segments (i.e., disassemble rods and swap rod segments within a rod, or with a rod in a different location in the same or different Co-60 isotope production assembly), between power cycles (during refueling outages).

5.) For a new submittal, the No Significant Hazards Consideration Determination must reflect the submittal's revised scope.

6.) The proposed license changes submitted with the current application reflect a general authorization to produce, and remove from the reactor, any byproduct material at CPS. The application describes the proposed production of Co-60 only. Therefore, consistent with the application, the license markups should be written specific to Co-60 production only.

7.) The application does not describe any methods for Co-60 source tracking before and after removal from the reactor. The application should describe any methods to be employed to accomplish this function. For example, the application should describe rod and rod segment manufacturer and model numbers to facilitate registration in the National Source Tracking System and also describe how the individual rod segments are marked.

8.) The application should clearly define (1) the scope of the Co-60 isotope production assembly program (e.g., specify a limit on the number and placement of Co-59 target rods within GE14i assemblies and specify a limit on the number of GE14i assemblies in the core), (2) the scope of post-irradiation measurements and examinations, and (3) the intended licensing path for migrating from the initial Co-60 isotope production assemblies to full production mode.

Please contact me at 301-415-2833, if you have any questions.

Sincerely,

/RA/

Peter Bamford, Project Manager
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-461

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ADAMS Accession Number: ML091280171 NRR-106

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