



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

July 22, 2009

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

SUBJECT: BRAIDWOOD STATION, UNITS 1 AND 2, AND BYRON STATION, UNIT NOS. 1 AND 2 - REQUEST FOR ADDITIONAL INFORMATION RELATED TO UPPER CABLE SPREADING ROOM FIRE PROTECTION REQUIREMENTS (TAC NOS. ME0971, ME0972, ME0973, AND ME0974)

Dear Mr. Pardee:

By letter to the Nuclear Regulatory Commission (NRC) dated March 26, 2009, (Agencywide Documents Access and Management System Accession No. ML090861015), Exelon Generation Company, LLC (the licensee), submitted a license amendment request to revise the fire protection program to eliminate the requirement for the backup manual carbon dioxide (CO₂) fire suppression system in the upper cable spreading rooms.

The NRC staff is reviewing your March 26, 2009, letter, and has determined that additional information is required to complete its review. The specific information requested is addressed in the enclosed Request for Additional Information (RAI). Your staff has agreed to provide a response to this RAI within 45 days after the date of this letter.

The NRC staff considers that timely responses to RAIs 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) 415-1547.

Sincerely,

A handwritten signature in black ink, appearing to read "Marshall J. David".

Marshall J. David, Senior Project Manager
Plant Licensing Branch III-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. STN-456, STN-457,
STN 50-454, and STN 50-455

Enclosure:
Request for Additional Information

cc w/encls: Distribution via Listserv

REQUEST FOR ADDITIONAL INFORMATION

BRAIDWOOD STATION, UNITS 1 AND 2

AND BYRON STATION, UNIT NOS. 1 AND 2

DOCKET NOS. STN 50-456, STN 50-457

STN 50-454, AND STN 50-455

The Nuclear Regulatory Commission (NRC) staff is reviewing Exelon Generation Company, LLC's (the licensee's) letter dated March 26, 2009 (Agencywide Documents Access and Management System Accession No. ML090861015), which requested a license amendment concerning a change to the fire protection program requirements for Braidwood Station (Braidwood), Units 1 and 2, and Byron Station (Byron), Unit Nos. 1 and 2. The license amendment request (LAR) relates to the removal of the backup manually-actuated carbon dioxide (CO₂) fire suppression systems for the upper cable spreading rooms (UCSRs) at Braidwood and Byron. In addition to the LAR, the NRC staff has reviewed the applicable licensing and regulatory documents, i.e., Braidwood's and Byron's fire protection program, related safety evaluation reports, and Updated Final Safety Analysis Report.

The backup manually-actuated CO₂ fire suppression systems in the UCSRs at both stations have been removed from service. In July 2007, the licensee permanently mechanically isolated the backup CO₂ fire suppression system for the Unit 1 and Unit 2 UCSRs at Braidwood after an internal evaluation. In 2002, the licensee disabled the backup CO₂ fire suppression system for the Unit No. 1 and Unit No. 2 UCSRs at Byron through an internal clearance order.

The licensee committed to install gaseous fire suppression systems (Halon 1301 and backup CO₂ systems) at Braidwood and Byron instead of a water fire suppression system per Section C.7.c of NRC Branch Technical Position (BTP) Chemical and Mechanical Engineering Branch (CMEB) 9.5-1, "Guidelines for Fire Protection for Nuclear Power Plants," Revision 2, July 1981. The licensee requested and received a deviation from the BTP, which allowed them to install automatic Halon 1301 and manually-actuated backup CO₂ fire suppression systems in lieu of an automatic water sprinkler system. Each station was issued a safety evaluation report, NUREG-1002, Supplement No. 2, "Safety Evaluation Report related to the operation of Braidwood Station, Units 1 and 2," October 1986, and NUREG-0876, Supplement No. 5, "Safety Evaluation Report related to the operation of Byron Station, Units 1 and 2," October 1984, in which the NRC staff found that their programs satisfied the BTP CMEB 9.5-1 guidance based on their commitments to enhance the Halon 1301 system reliability and effectiveness. Based on their commitment for compliance with BTP CMEB 9.5-1, both stations were found to meet the requirements of Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.48 "Fire Protection," and General Design Criterion 3 (GDC 3), "Fire Protection," of Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50.

The NRC staff notes that the March 26, 2009, LAR relied solely on the primary automatic Halon 1301 fire suppression system backed up with a fire brigade, standpipe/hose stations and

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portable fire extinguishers to comply with 10 CFR 50.48. In order to evaluate the ability of the Halon 1301 fire suppression systems installed in the UCSRs to provide an equivalent level of fire protection to that required by GDC 3 of Appendix A to 10 CFR Part 50, and Appendix R, "Fire Protection Program for Nuclear Power Facilities Operating Prior to January 1, 1979," to 10 CFR Part 50, the NRC staff requires additional information. Although, Braidwood and Byron were licensed to operate after January 1, 1979, (post-'79 plants), the requirements of 10 CFR Part 50, Appendix R, were incorporated into their approved fire protection program.

Specifically, the NRC staff has determined that the following additional information is required to complete its review.

1. Your letter dated March 26, 2009, Attachment Page 2, states that,

"...Each of the upper cable spreading rooms has an automatically actuated Halon fire suppression system that is designed and tested to provide sufficient Halon 1301 gas to suppress a surface or deep seated cable fire in any of the upper cable spreading rooms..."

"...With the proposed change, fire suppression capability would continue to be maintained by the Halon gaseous suppression system, with manual backup fire fighting capabilities that utilize hose stations and fire extinguishers dedicated to the upper cable spreading rooms..."

To evaluate the adequacy of the Halon 1301 system and to verify system performance, provide the following:

- Most recent full discharge test results including:
 - National Fire Protection Association 12A, "Standard on Halon 1301 Fire Extinguishing Systems," Edition (Year) of Code of Record for both station installations
 - Halon 1301 concentration levels in UCSRs
 - Number, location, and height of sensors in UCSRs
- Have any Halon 1301 system or other plant modifications, subsequent to the original discharge tests of the Halon 1301 fire suppression systems, been made in the UCSRs that could potentially affect Halon 1301 concentrations, such as new dampers or penetrations that might leak? If such modifications have been made, what subsequent testing or evaluation was performed to ensure that proper concentrations were maintained for the required soak time?
- In the absence of the backup CO₂ fire suppression system, do the UCSR primary automatic Halon 1301 fire suppression systems maintain a backup or secondary Halon 1301 supply?
- Further, discuss operating experience related to the Halon 1301 fire suppression systems at both stations.
- Provide details of any fires that have occurred in the UCSRs at either station.

2. Your letter dated March 26, 2009, Attachment Page 4, states that,

"...Halon 1301 gaseous suppression system is highly reliable and capable of suppressing postulated fires in the upper cable spreading rooms without compromising the ability to achieve and maintain safe shutdown in the event of a fire..."

Provide a basis for why you believe that the installed Halon 1301 fire suppression systems are highly reliable and capable of suppressing postulated fires, and that they will deliver and maintain 6 percent concentration in the entire volume of the UCSRs for 20 minutes.

3. Your letter dated March 26, 2009, Attachment Page 6, states that,

"...The fire brigade is adequately equipped and trained to manually fight a fire in any of the upper cable spreading rooms. This conclusion is based on brigade experience, walkdown of the upper cable spreading rooms, and actual fire scenarios in other plant areas with conditions similar to those present in the upper cable spreading rooms..."

Manual fire-fighting of large amounts of burning cables is a considerable challenge even to the most well-trained and equipped fire brigade. Further, many rooms of this nature have cable trays located high above the floor which may be inaccessible to the fire brigade personnel. Describe how the facility fire brigade personnel have been instructed about the potential for deep-seated fire hazards associated with cable re-ignition. Further, discuss the methods to manually extinguish or control and minimize the effects of a deep-seated fire located high above the floor in inaccessible locations (if Braidwood and Byron UCSRs have any inaccessible locations).

4. Your letter dated March 26, 2009, Attachment Page 6, states that,

"...Additionally, because the cables in these rooms are IEEE-383 qualified, a self-ignited fire is not postulated. A fire in qualified cable trays is difficult to start and spreads at a slow rate, providing ample time for an automatically actuated Halon system to suppress a fire in the early stages before the fire becomes fully developed..."

Provide a basis for not postulating a self-ignited fire and why a fire in qualified IEEE-383 cables is difficult to start and spreads at a slow rate. Further, confirm that there are no non-IEEE-383 qualified cables installed in the UCSRs.

5. Your letter dated March 26, 2009, Attachment Page 6, states that,

"...In the unlikely event a fire did start, and the suppression systems failed to operate, the fire would be contained within the room by the fire barriers..."

Your evaluation did not specify the number and types of ignition sources present in the UCSRs. Identify the types and locations of all ignition sources within the UCSRs at both stations.

6. Your letter dated March 26, 2009, Attachment Page 6, states that,

"...the control room heating, ventilation, and air conditioning (HVAC) ductwork inside the room may be damaged and/or the fusible link fire dampers inside the ductwork or electro thermal link fire dampers would close and restrict the flow of air..."

The March 26, 2009, LAR did not discuss effects of fire damage on equipment required for safe-shutdown. Discuss the effects that fire damage would have on the equipment that is associated with cables likely to sustain damage, and provide a basis for adequacy of damage, i.e., provide a basis for determining that, in spite of damage, adequate safe-shutdown will be maintained.

7. Your letter dated March 26, 2009, Attachment Page 7, states that,

"...Based on the multiple echelons of fire safety provided for the upper cable spreading rooms, the ability to achieve and maintain safe shutdown in the event of a fire is maintained with the removal of the manually actuated CO₂ system from the upper cable spreading rooms..."

Removing the manually-actuated backup CO₂ fire suppression system from the UCSRs could be viewed as compromising a second element of defense-in-depth (DID) involving fires in the UCSRs, resulting in the reduction of DID required by the regulation (Section II of Appendix R to 10 CFR Part 50).

The NRC staff requests that you provide a description of the remaining DID features in the UCSRs at both stations as well as a discussion of how the required level of DID will be maintained despite the removal of the backup CO₂ fire suppression systems.

In your response, discuss why the CO₂ fire suppression system was originally installed as backup to the Halon 1301 fire suppression system (i.e., why was it deemed necessary for the original licensing basis). Also explain why you now believe that the backup CO₂ system is not required, such that suppression capability would be maintained by the Halon 1301 fire suppression system only. What has changed in terms of the fire protection needs and licensing basis for the UCSRs since the original installation that now apparently renders the backup CO₂ fire suppression system as unnecessary.

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/RA/

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NRR-088

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