

January 14, 2005

Mr. Christopher M. Crane, President
and Chief Nuclear Officer
Exelon Generation Company, LLC
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: BYRON STATION, UNITS 1 AND 2, AND BRAIDWOOD STATION, UNITS 1
AND 2 - ISSUANCE OF AMENDMENTS RE: REACTOR COOLANT SYSTEM
LEAKAGE DETECTION INSTRUMENTATION; (TAC NOS. MC0509, MC0510,
MC0507, AND MC0508)

Dear Mr. Crane:

The U.S. Nuclear Regulatory Commission (the Commission) has issued the enclosed Amendment No. 140 to Facility Operating License No. NPF-37 and Amendment No. 140 to Facility Operating License No. NPF-66 for Byron Station, Units 1 and 2, respectively, and Amendment No. 133 to Facility Operating License No. NPF-72 and Amendment No. 133 to Facility Operating License No. NPF-77 for Braidwood Station, Units 1 and 2, respectively. The amendments are in response to Exelon Generation Company, LLC application dated August 15, 2003, and a supplement dated April 9, 2004.

The amendments revise Technical Specification 3.4.15, "RCS Leakage Detection Instrumentation," to require one containment sump monitor and one containment atmosphere particulate radioactivity monitor to be operable in Modes 1, 2, 3, and 4.

A copy of the Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,

/RA by SSands for/

George F. Dick, Sr. Project Manager, Section 2
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

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

Enclosures: 1. Amendment No. 140 to NPF-37
2. Amendment No. 140 to NPF-66
3. Amendment No. 133 to NPF-72
4. Amendment No. 133 to NPF-77
5. Safety Evaluation

cc w/encls: See next page

Byron/Braidwood Stations

cc:

Dwain W. Alexander, Project Manager
Westinghouse Electric Corporation
Energy Systems Business Unit
Post Office Box 355
Pittsburgh, PA 15230-0355

Joseph Gallo
Gallo & Ross
1025 Connecticut Ave., NW, Suite 1014
Washington, DC 20036

Howard A. Learner
Environmental Law and Policy
Center of the Midwest
35 East Wacker Dr., Suite 1300
Chicago, IL 60601-2110

U.S. Nuclear Regulatory Commission
Byron Resident Inspectors Office
4448 N. German Church Road
Byron, IL 61010-9750

Regional Administrator, Region III
U.S. Nuclear Regulatory Commission
801 Warrenville Road
Lisle, IL 60532-4351

Ms. Lorraine Creek
RR 1, Box 182
Manteno, IL 60950

Chairman, Ogle County Board
Post Office Box 357
Oregon, IL 61061

Mrs. Phillip B. Johnson
1907 Stratford Lane
Rockford, IL 61107

George L. Edgar
Morgan, Lewis and Bockius
1800 M Street, NW
Washington, DC 20036-5869

Attorney General
500 S. Second Street
Springfield, IL 62701

Illinois Emergency Management
Agency
Division of Disaster Assistance &
Preparedness
110 East Adams Street
Springfield, IL 62701-1109

Byron Station Plant Manager
Exelon Generation Company, LLC
4450 N. German Church Road
Byron, IL 61010-9794

Site Vice President - Byron
Exelon Generation Company, LLC
4450 N. German Church Road
Byron, IL 61010-9794

U.S. Nuclear Regulatory Commission
Braidwood Resident Inspectors Office
35100 S. Rt. 53, Suite 79
Braceville, IL 60407

Chairman
Will County Board of Supervisors
Will County Board Courthouse
Joliet, IL 60434

Braidwood Station Plant Manager
Exelon Generation Company, LLC
35100 S. Rt. 53, Suite 84
Braceville, IL 60407-9619

Ms. Bridget Little Rorem
Appleseed Coordinator
117 N. Linden Street
Essex, IL 60935

Byron/Braidwood Stations

- 2 -

cc:

Document Control Desk - Licensing
Exelon Generation Company, LLC
4300 Winfield Road
Warrenville, IL 60555

Manager Licensing - Braidwood, Byron
and LaSalle
Exelon Generation Company, LLC
4300 Winfield Road
Warrenville, IL 60555

Site Vice President - Braidwood
Exelon Generation Company, LLC
35100 S. Rt. 53, Suite 84
Braceville, IL 60407-9619

Senior Vice President - Nuclear Services
Exelon Generation Company, LLC
4300 Winfield Road
Warrenville, IL 60555

Vice President of Operations - Mid-West
Pressurized Water Reactors
Exelon Generation Company, LLC
4300 Winfield Road
Warrenville, IL 60555

Director - Licensing and Regulatory
Affairs
Exelon Generation Company, LLC
4300 Winfield Road
Warrenville, IL 60555

Regulatory Assurance Manager - Braidwood
Exelon Generation Company, LLC
35100 S. Rt. 53, Suite 84
Braceville, IL 60407-9619

Regulatory Assurance Manager - Byron
Exelon Generation Company, LLC
4450 N. German Church Road
Byron, IL 61010-9794

Associate General Counsel
Exelon Generation Company, LLC
4300 Winfield Road
Warrenville, IL 60555

Vice President - Licensing and
Regulatory Affairs
Exelon Generation Company, LLC
4300 Winfield Road
Warrenville, IL 60555

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Dear Mr. Crane:

The U.S. Nuclear Regulatory Commission (the Commission) has issued the enclosed Amendment No. 140 to Facility Operating License No. NPF-37 and Amendment No. 140 to Facility Operating License No. NPF-66 for Byron Station, Units 1 and 2, respectively, and Amendment No. 133 to Facility Operating License No. NPF-72 and Amendment No. 133 to Facility Operating License No. NPF-77 for Braidwood Station, Units 1 and 2, respectively. The amendments are in response to Exelon Generation Company, LLC application dated August 15, 2003, and supplement dated April 9, 2004.

The amendments revise Technical Specification 3.4.15, "RCS Leakage Detection Instrumentation," to require one containment sump monitor and one containment atmosphere particulate radioactivity monitor to be operable in Modes 1, 2, 3, and 4.

A copy of the Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,
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George F. Dick, Sr. Project Manager, Section 2
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Docket Nos. STN 50-454, STN 50-455, STN 50-456 and STN 50-457

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cc w/encls: See next page

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ML050210091 (TS Braidwood) ML050250408 (Package) *via memo

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EXELON GENERATION COMPANY, LLC

DOCKET NO. STN 50-454

BYRON STATION, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 140
License No. NPF-37

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Exelon Generation Company, LLC (the licensee) dated August 15, 2003, as supplemented by letter dated April 9, 2004, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. NPF-37 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A as revised through Amendment No. 140 and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into this license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of the date of its issuance and shall be implemented within 30 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Gene Y. Suh, Chief, Section 2
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of Issuance: January 14, 2005

EXELON GENERATION COMPANY, LLC

DOCKET NO. STN 50-455

BYRON STATION, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 140
License No. NPF-66

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Exelon Generation Company, LLC (the licensee) dated August 15, 2003, as supplemented by letter dated April 9, 2004, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. NPF-66 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A (NUREG-1113), as revised through Amendment No. 140 and the Environmental Protection Plan contained in Appendix B, both of which were attached to License No. NPF-37, dated February 14, 1985, are hereby incorporated into this license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of the date of its issuance and shall be implemented within 30 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION
/RA/

Gene Y. Suh, Chief, Section 2
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of Issuance: January 14, 2005

ATTACHMENT TO LICENSE AMENDMENT NOS. 140 AND 140

FACILITY OPERATING LICENSE NOS. NPF-37 AND NPF-66

DOCKET NOS. STN 50-454 AND STN 50-455

Replace the following pages of the Appendix "A" Technical Specifications with the attached pages. The revised pages are identified by amendment number and contain marginal lines indicating the area of change.

Remove Pages

3.4.15-1
3.4.15-2
3.4.15-3

Insert Pages

3.4.15-1
3.4.15-2
3.4.15-3

EXELON GENERATION COMPANY, LLC

DOCKET NO. STN 50-456

BRAIDWOOD STATION, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 133

License No. NPF-72

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Exelon Generation Company, LLC (the licensee) dated August 15, 2003, as supplemented by letter dated April 9, 2004, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. NPF-72 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A as revised through Amendment No. 133 and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into this license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of the date of its issuance and shall be implemented within 30 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Gene Y. Suh, Chief, Section 2
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of Issuance: January 14, 2005

EXELON GENERATION COMPANY, LLC

DOCKET NO. STN 50-457

BRAIDWOOD STATION, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 133

License No. NPF-77

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Exelon Generation Company, LLC (the licensee) dated August 15, 2003, as supplemented by letter dated April 9, 2004, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. NPF-77 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A as revised through Amendment No. 133 and the Environmental Protection Plan contained in Appendix B, both of which were attached to License No. NPF-72, dated July 2, 1987, are hereby incorporated into this license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of the date of its issuance and shall be implemented within 30 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Gene Y. Suh, Chief, Section 2
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of Issuance: January 14, 2005

ATTACHMENT TO LICENSE AMENDMENT NOS. 133 AND 133

FACILITY OPERATING LICENSE NOS. NPF-72 AND NPF-77

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

Replace the following pages of the Appendix "A" Technical Specifications with the attached pages. The revised pages are identified by amendment number and contain marginal lines indicating the area of change.

Remove Pages

3.4.15-1
3.4.15-2
3.4.15-3

Insert Pages

3.4.15-1
3.4.15-2
3.4.15-3

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 140 TO FACILITY OPERATING LICENSE NO. NPF-37,
AMENDMENT NO. 140 TO FACILITY OPERATING LICENSE NO. NPF-66,
AMENDMENT NO. 133 TO FACILITY OPERATING LICENSE NO. NPF-72,
AND AMENDMENT NO. 133 TO FACILITY OPERATING LICENSE NO. NPF-77
EXELON GENERATION COMPANY, LLC
BYRON STATION, UNITS 1 AND 2
BRAIDWOOD STATION, UNITS 1 AND 2
DOCKET NOS. STN 50-454, STN 50-455, STN 50-456 AND STN 50-457

1.0 INTRODUCTION

By application dated August 15, 2003, (ML032300548) and as supplemented by letter dated April 9, 2004, (ML041070366) Exelon Generation Company, LLC (the licensee) requested changes to the Technical Specifications (TSs) for Byron Station (Byron), Units 1 and 2, and Braidwood Station (Braidwood), Units 1 and 2. The supplement dated April 9, 2004, provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on October 28, 2003, (68 FR 61477).

The proposed changes would revise TS 3.4.15, "RCS Leakage Detection Instrumentation," to require one containment sump monitor and one containment atmospheric particulate radioactivity monitor to be operable in Modes 1, 2, 3, and 4. The current TS Section 3.4.15 requires one containment sump monitor and containment atmosphere radioactivity monitor (gaseous or particulate) to be operable. The proposed amendments would eliminate the gaseous channel from Limiting Condition of Operation (LCO) 3.4.15 and restrict the LCO for the containment atmosphere radioactivity monitor to the particulate channel.

2.0 REGULATORY EVALUATION

General Design Criterion (GDC) 30 "Quality of reactor coolant pressure boundary" of Appendix A to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50 requires, in part, that means be provided for detecting and, to the extent practical, identifying the location of the source of reactor coolant leakage. Regulatory Guide (RG) 1.45, "Reactor Coolant Pressure Boundary Leakage Detection Systems" describes acceptable methods of implementing this requirement with regard to the selection of leakage detection systems for the reactor coolant boundary. The

position of RG 1.45 is that at least three different detection methods should be employed. Two of these methods should be: (1) sump level and flow monitoring and, (2) airborne particulate radioactivity monitoring. The third method may involve either monitoring of condensate flow rate from air coolers or monitoring of gaseous radioactivity. The regulatory guide recommends that the sensitivity and response time of each leakage detection system employed for unidentified leakage should be adequate to detect a leakage rate, or its equivalent, of one gallon per minute (gpm) in less than one hour.

The licensee states, in Appendix A of the Byron and Braidwood updated final safety analysis report (UFSAR), that it complies with Revision 0 of RG 1.45, with some noted clarifications. One of the clarifications stated by the licensee is, "Unidentified leak sources are monitored to as accurate an equivalent flow rate as practicable" and another clarification states that for unidentified sources "leak detector sensitivity is as low as practicable." These clarifications in effect nullify strict compliance with regulatory position C5 of RG 1.45, which recommends that leakage detection systems be adequate to detect a leak rate of 1 gpm in less than one hour.

General Design Criterion 4 states that ". . . dynamic effects associated with postulated pipe ruptures in nuclear power units may be excluded from the design basis when analyses reviewed and approved by the Commission demonstrate that the probability of fluid system piping rupture is extremely low under conditions consistent with the design basis for the piping . . ." The U.S. Nuclear Regulatory Commission (Commission) allows the application of leak-before-break (LBB) technology on the primary piping systems under the broad-scope revision to 10 CFR Part 50, Appendix A, GDC 4 (Volume 52 of the *Federal Register* pages 41288-41295, October 27, 1987). Specific guidance on LBB evaluation is discussed in draft Standard Review Plan (SRP) section 3.6.3, "Leak-Before-Break Evaluation Procedures." Additional guidance can be found in NUREG-1061, Volume 3, "Report of the U.S. Nuclear Regulatory Commission Piping Review Committee-Evaluation of Potential for Pipe Break."

3.0 TECHNICAL EVALUATION

The current leakage detection requirements for the Byron and Braidwood plants are given in TS 3.4.15. It requires the following reactor coolant system (RCS) leakage detection systems be operable.

- A. One containment sump monitor; and
- B. One containment atmosphere radioactivity monitor (gaseous or particulate).

The bases for this TS 3.4.15 state that "the containment sump, used to collect unidentified leakage, is instrumented to identify leakage of one gpm within one hour." They also state that for the containment atmosphere radioactivity monitor, the particulate monitor is capable of detecting a 1.0 gpm leak within one hour at sensitivities recommended in RG 1.45 and using the expected RCS activities in UFSAR Table 11.1-4, "Realistic Operational Basis Reactor Coolant Fission and Corrosion Product Activities." However, recently measured RCS activities are significantly lower than those in the UFSAR, and it is acknowledged in the TS bases that actual setpoints for the particulate monitor are set as low as practicable, considering the actual concentration of radioactivity in the RCS and the containment background radiation concentration.

TS 3.4.15 currently allows the operable containment atmosphere radioactivity monitor to be

either a particulate or gaseous detector type monitor. Therefore, the LCO assumes that the gaseous and particulate monitors have similar sensitivities and operating characteristics with respect to their capabilities to detect RCS leakage. Since only one of the two monitors are required for the purpose of satisfying the LCO, the monitors are assumed interchangeable. The RCS leakage detection TS is based in part on RG 1.45, which is also based on the assumption that these radiation monitors have similar operating characteristics and sensitivities.

The current TS 3.4.15 requires two RCS leakage detection systems to be operable, one containment sump monitor and one containment atmosphere radioactivity monitor (gaseous or particulate). The licensee has indicated that due to improved fuel integrity and resultant reduced RCS radioactivity levels, the gaseous channel of the containment atmosphere radiation monitor has become less effective for RCS leakage detection. Given the current normal levels of radioactivity in the reactor coolant at Braidwood and Byron, the time required to detect a 1 gpm leak with the containment atmosphere gaseous radiation monitors would range from 223 to 839 hours. The time required to detect the same leak with the particulate monitors now ranges from 3.6 to 7.3 hours, depending on the plant. In this amendment the licensee proposes to eliminate the gaseous channel from LCO 3.4.15 and restrict the LCO for the containment atmosphere radioactivity monitor to the particulate channel. The proposed change will still require two RCS leakage detection systems be operable.

A summary of the licensee's assessment of the current capability of the Byron and Braidwood leak detection systems is provided in Table 1.

Table 1 Byron/Braidwood Leak Detection Capability

RCS Leakage Detection Monitoring System	Present Assessed Capability			
	Byron Unit 1	Byron Unit 2	Braidwood Unit 1	Braidwood Unit 2
Particulate Radiation Monitor	1 gpm within 5 hours	1 gpm within 3.6 hours	1 gpm within 3.7 hours	1 gpm within 7.3 hours
Gaseous Radiation Monitor	1 gpm within 433 hours	1 gpm within 223 hours	1 gpm within 839 hours	1 gpm within 771 hours
Containment Sump Flow	1 gpm within 1 hour	1 gpm within 1 hour	1 gpm within 1 hour	1 gpm within 1 hour
Reactor Cavity Sump Flow	1 gpm within 1 hour	1 gpm within 1 hour	1 gpm within 1 hour	1 gpm within 1 hour

Radiation Monitors

Based on current reactor coolant radioactivity levels, the licensee has determined that the capability of the gaseous channel of the containment atmospheric radiation monitor is no longer sufficient to support LBB monitoring at Byron and Braidwood. The containment atmospheric particulate radioactivity channel sensitivity has a range of 10^{-11} to 10^{-5} $\mu\text{Ci}/\text{cc}$, which meets the

sensitivity criteria specified in RG 1.45. Given the current normal level of radioactivity in the reactor coolant at Braidwood and Byron, the containment atmospheric particulate radiation monitors would detect a 1 gpm leak in the range of 3.6 to 7.3 hours depending on the unit. Therefore, based on current RCS radioactivity levels the particulate radioactivity monitor system is not consistent with the instrument sensitivity and response time recommendations of regulatory position C.5 of RG 1.45. However, as previously discussed in section 2.0 of this report, the licensee has not committed to strict compliance with position C.5, but instead committed to providing leak detector sensitivity as low as practicable.

In its August 15, 2003, submittal, the licensee indicated that "using a source term based on representative real time data, with no fuel defects, and varying ambient background level, the particulate channel detectors could have a setpoint at which detectors are capable of detecting a 1 gpm leak in one hour." The licensee then states that such a setpoint would result in numerous false positive indications due to the fact that the minimum detectable activity of the detector would be in close tolerance to the chosen setpoint, and therefore alarm setpoints were set as low as practicable. The staff requested additional information concerning how the licensee determined what would be considered as low as practicable for detector sensitivity, and how much time would be required for the monitors to detect a 1 gpm leak.

The licensee provided its response to the NRC in a letter dated April 9, 2004. The licensee stated, in regard to detector sensitivity, that it chose to set the ALERT setpoint at four-sigma above the average background value. The setting reduces spurious alarms to approximately one per week. Based on the reduced frequency of spurious alarms the licensee considered the new ALERT setpoints to be as low as practicable. The licensee also described how it calculated the time required to detect a 1 gpm leak at the new setpoints. In the calculation of the monitor response time to a 1 gpm leak, ambient background was not considered.

The staff reviewed the response the licensee provided to its request for additional information, in conjunction with the licensee's original submittal. The staff found that the maximum detector sensitivity (10^{-11} $\mu\text{Ci/cc}$) exceeds that recommended in RG 1.45 (10^{-9} $\mu\text{Ci/cc}$), and that the time estimated for the monitors to respond to a 1 gpm leak, assuming no background, is only in the range of 3 to 7 hours based on current RCS activity levels. The staff concludes that the particulate monitoring system satisfies its design requirements as stated in the plant's UFSAR.

Leak-Before-Break

The basic concept of LBB is that certain piping material has sufficient fracture toughness (i.e., ductility) to resist rapid flaw propagation such that the flaw, if one exists, would not cause the pipe to rupture. Before pipe rupture, the flaw would lead to limited but detectable leakage which would be identified by the leak detection systems in time for the operator to take action.

Requests to apply the LBB methodology on primary system piping need to be submitted for NRC staff review and approval based on a demonstration that certain safety margins are satisfied to assure the structural integrity of the pipe. Draft SRP section 3.6.3 specifies a margin of / 2 to be applied to the loads to assure that leakage-size flaws are stable at the normal load plus safe-shutdown earthquake load. A margin of 10 is to be applied to leakage so that detection of leakage from the postulated flaw size is ensured when the pipe is subjected to

normal operational loads. In addition, the critical flaw size should be twice large as the leakage flaw size (i.e., a margin of 2 on leakage flaw size).

Licensees also need to demonstrate the capabilities of their leak detection systems. Draft SRP section 3.6.3 specifies that leakage detection systems for LBB applications are sufficiently redundant, diverse, and sensitive. It further specifies that leak detection systems for LBB applications are equivalent to RG 1.45 for piping inside the containment. RG 1.45 specifies a time frame of one hour or less to detect a 1 gpm leak. This time frame ensures that plant operators have timely information about unidentified leakage.

In a letter to Commonwealth Edison (the former licensee for Byron and Braidwood) dated October 25, 1996, the staff approved the LBB application for primary system loop piping at Byron and Braidwood. In the licensee's LBB submittal, the leak rate through the postulated leakage flaw was calculated to be 10 gpm; therefore, a leak detection system capable of detecting 1 gpm in less than an hour was required, to be consistent with the criteria in draft SRP section 3.6.3. In its safety evaluation, the NRC staff stated that the leak detection systems at Byron and Braidwood met the RG 1.45 guidance and confirmed that the leak detection systems could detect leakage of 1 gpm in one hour from the primary loop piping. The NRC staff also found that the fracture mechanics analysis of the postulated flaw in the primary loop piping satisfies all relevant safety margins.

The capability of the containment atmosphere radioactivity particulate monitor as a leak detection system is part of the technical basis that supports the LBB application at Byron and Braidwood. As part of the TS amendment request, the licensee changed the detection capability of the containment atmosphere radioactivity particulate monitor from 1 gpm within 1 hour to 1 gpm within 3.6 hours to 7.3 hours, depending on the unit as shown in Table 1 above. The staff believes that the time difference from 1 hour to the maximum of 7.3 hours for detecting 1 gpm does not affect the technical basis of licensee's LBB analysis because, in addition to a margin of 10 for leak rate, the licensee's fracture mechanics calculation showed that there is a margin of 2 between the critical flaw size and the postulated leakage flaw size. Even in the event of a safe-shutdown earthquake, the staff considers it unlikely that the leakage flaw will grow to the critical flaw size in 7.3 hours. The postulated flaw is demonstrated, by analysis, to maintain the necessary stability such that a time of 7.3 hours in identifying 1 gpm leakage would not affect the underlying technical basis of LBB.

In addition to the containment atmosphere radioactivity particulate monitor, Byron and Braidwood have the containment sump flow monitor and reactor cavity sump flow monitor which are capable of detecting a 1 gpm leak within 1 hour. The capability of these two systems conforms with the staff's LBB analysis guidance because they show that the leak detection systems have the necessary redundancy, diversity, and sensitivity.

The staff finds that the proposed changes to the containment atmosphere radioactivity particulate monitor system in TS LCO 3.4.15 are acceptable with respect to the current LBB licensing basis because the proposed TS changes do not significantly affect the technical basis upon which the staff approved the LBB analysis for the primary loop piping at Byron and Braidwood.

Sump Monitors

The containment sump monitors are capable of detecting a 1 gpm leak in 1 hour. The licensee states specifically that the containment floor drain sump flow indicator is capable of detecting a 1 gpm leak within 1 hour after leakage has reached the sump. Because the detection is based on sump flow, which is not dependent on RCS radioactivity concentrations, it remains capable of detecting a 1 gpm leak within an hour and therefore remains in compliance with R.G. 1.45 and continues to support the application of LBB.

The reactor cavity sump has a flow indicator to monitor flow into the sump. The reactor cavity sump flow indicator is also capable of detecting a 1 gpm leak within 1 hour after leakage has reached the sump. The sensitivity of this monitor is not affected by reduced RCS radioactivity concentrations and it continues to support the application of LBB. The reactor cavity sump flow indicator is designed to remain functional after a safe shutdown earthquake.

4.0 SUMMARY

The NRC staff has reviewed the licensee's submittal and supporting documentation. Based on its review, the NRC staff concludes that the RCS leak detection systems will continue to provide diverse methods of leak detection, it satisfies the intent of RG 1.45, and it remains capable of detecting and measuring leakage with sufficient degree of accuracy to support the application of the LBB technology used for Byron and Braidwood.

5.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Illinois State official was notified of the proposed issuance of the amendment. The State official had no comments.

6.0 ENVIRONMENTAL CONSIDERATION

The amendments change a requirement with respect to installation, or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration, and there has been no public comment on such finding (68 FR 61477). Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22b no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

7.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributors: A. Stubbs
J. Tsao

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