September 28, 2000

Mr. L. W. Myers
Senior Vice President
Beaver Valley Power Station
Post Office Box 4
Shippingport, PA 15077

SUBJECT: BEAVER VALLEY POWER STATION, UNIT NO. 2 - ISSUANCE OF AMENDMENT RE: REVISED FUEL HANDLING ANALYSIS AND ACCOMPANYING CHANGES TO THE BEAVER VALLEY, UNIT 2 TECHNICAL SPECIFICATIONS (TAC NO. MA8861)

Dear Mr. Myers:

The Commission has issued the enclosed Amendment No. 116 to Facility Operating License No. NPF-73 for the Beaver Valley Power Station (BVPS), Unit No. 2. This amendment consists of changes to the Technical Specifications (TSs) in response to your application dated May 1, 2000, as supplemented by letter dated July 21, 2000, which submitted your License Amendment Request No. 155.

The amendment revises TS requirements regarding radiation monitoring instrumentation, containment penetrations, and personnel air lock doors during movement of fuel within the containment. Additionally, the amendment authorizes revisions to the BVPS-2, Updated Final Safety Analysis Report to reflect changes to the Fuel Handling Accident analysis.

A copy of the related safety evaluation is also enclosed. The Notice of Issuance will be included in the Commission's biweekly Federal Register notice.

Sincerely,

***/RA/***

Daniel S. Collins, Project Manager, Section 1
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-412

Enclosures: 1. Amendment No. 116 to NPF-73
2. Safety Evaluation

cc w/encls: See next page

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PENNSYLVANIA POWER COMPANY

OHIO EDISON COMPANY

THE CLEVELAND ELECTRIC ILLUMINATING COMPANY

THE TOLEDO EDISON COMPANY

FIRSTENERGY NUCLEAR OPERATING COMPANY

DOCKET NO. 50-412

BEAVER VALLEY POWER STATION, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 116
License No. NPF-73

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by FirstEnergy Nuclear Operating Company, et al. (the licensee) dated May 1, 2000, as supplemented by letter dated July 21, 2000, 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-73 is hereby amended to read as follows:

   (2) Technical Specifications

   The Technical Specifications contained in Appendix A, as revised through Amendment No. 116 , and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated in the license. FENOC shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

   Additionally, changes to the Updated Final Safety Analysis Report (UFSAR) to reflect revisions to the description and consequences of a Fuel Handling Accident as set forth in the application by the licensee dated May 1, 2000, are authorized. The licensee shall submit the UFSAR changes authorized by this amendment with the next update of the UFSAR in accordance with 10 CFR 50.71(e).

3. This license amendment is effective as of the date of its issuance. Changes to the Technical Specifications shall be implemented within 60 days. Changes to the UFSAR shall be implemented as specified in (2.) above.

FOR THE NUCLEAR REGULATORY COMMISSION

***/RA by Herbert Berkow for/***

Marsha Gamberoni, Chief, Section 1
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of Issuance: September 28, 2000

ATTACHMENT TO LICENSE AMENDMENT NO. 116

FACILITY OPERATING LICENSE NO. NPF-73

DOCKET NO. 50-412

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

| Remove | Insert |
|---|---|
| XII | XII |
| XIII | XIII |
| 3/4 3-41 | 3/4 3-41 |
| 3/4 3-42 | 3/4 3-42 |
| 3/4 3-44 | 3/4 3-44 |
| 3/4 9-4 | 3/4 9-4 |
| - - - - | 3/4 9-4a |
| - - - - | 3/4 9-4b |
| 3/4 9-10 | 3/4 9-10 |
| B 3/4 9-1 | B 3/4 9-1 |
| B 3/4 9-2 | B 3/4 9-2 |
| B 3/4 9-3 | B 3/4 9-3 |
| - - - - | B 3/4 9-4 |
| - - - - | B 3/4 9-5 |
| - - - - | B 3/4 9-6 |
| - - - - | B 3/4 9-7 |

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 116 TO FACILITY OPERATING LICENSE NO. NPF-73

PENNSYLVANIA POWER COMPANY

OHIO EDISON COMPANY

THE CLEVELAND ELECTRIC ILLUMINATING COMPANY

THE TOLEDO EDISON COMPANY

FIRSTENERGY NUCLEAR OPERATING COMPANY

BEAVER VALLEY POWER STATION, UNIT 2

DOCKET NO. 50-412

## 1.0 INTRODUCTION

By letter dated May 1, 2000, as supplemented by letter dated July 21, 2000, the FirstEnergy Nuclear Operating Company (FENOC; the licensee) submitted a request for changes to the Beaver Valley Power Station, Unit 2 (BVPS-2), Technical Specifications (TSs). The requested changes would revise the TS requirements that apply to radiation monitoring instrumentation, containment penetrations, and personnel air lock (PAL) doors during movement of fuel within the containment. Additionally, the amendment would revise the BVPS-2, Updated Final Safety Analysis Report (UFSAR), to reflect changes to the fuel-handling accident (FHA) analysis. The July 21, 2000, letter provided clarifying information that did not expand the scope of the amendment and did not change the initial proposed no significant hazards consideration determination.

The licensee supported its request with a revised analysis of the postulated FHA inside the reactor containment building. The proposed TS changes would make the TS consistent with the new FHA analysis and would lessen the impact of fuel movement on other outage/maintenance activities. This would provide the licensee more flexibility in the scheduling and execution of refueling outages.

## 2.0 BACKGROUND

The FHA is one of the postulated design basis accidents analyzed in the BVPS-2 UFSAR. It is a Condition IV accident, which is defined in the UFSAR as an event which is not expected to occur but is postulated to evaluate the design of mitigating features to preclude the release of a significant amount of radioactivity. The FHA is postulated to occur in the primary containment and in the fuel building.

The licensee has re-analyzed the FHA event to include new assumptions related to plant operation during refueling. Among these new assumptions is a change to the TSs to permit both containment PAL doors and certain other containment penetrations to be open during fuel handling. The Nuclear Regulatory Commission (NRC) staff has previously established the following criteria for allowing both containment PAL doors to be open during fuel movement (July 15, 1996, Safety Evaluation (SE) related to Amendment No. 114 to Facility Operating License No. NPF-30 for the Callaway Plant, Unit 1, Docket No 50-483):

1. The radiological consequences for an FHA in the containment should meet NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants," (SRP) 15.7.4 acceptance criteria without credit for the mitigation effects of the primary containment.

2. Administrative procedures should be established to:

   a. ensure that appropriate personnel are aware of the open status of the containment during fuel handling,

   b. ensure that an open air lock is capable of rapid closure (i.e., $\leq$ 30 minutes), with quick disconnect and removal capability for hoses, cables, ramps, and door seal protective covers, and

   c. ensure that an individual is designated and readily available to close the air lock following evacuation that would occur in the event of an accident.

The air in the areas adjacent to the open PAL doors and containment penetrations will be exhausted to the supplemental leak collection and release system (SLCRS). As described in Section 6.5.3.2 of the BVPS-2 UFSAR, SLCRS is a safety-related system with a primary function of ensuring that radioactive leakage from the primary containment following a design basis accident, or a radioactive release due to an FHA, is collected and filtered for iodine removal prior to discharge to the atmosphere at an elevated release point. The elevated release point in the SLCRS is located above the top of the containment. Additionally, SLCRS is actuated on a containment isolation Phase A signal, or on a high radiation signal from the radiation monitors in the ventilation exhaust from the areas contiguous to the containment (see Table 3.3-6 of the BVPS-2 TSs). For an FHA in the fuel building, the radioactivity released from the fuel pool into the fuel building atmosphere is filtered by SLCRS. Limiting Condition for Operation (LCO) 3.9.12, "Fuel Building Ventilation System-Fuel Movement," requires that the fuel building portion of the SLCRS be operating and discharging through at least one train of SLCRS filters during fuel movement within the spent fuel pool. LCO 3.9.13, "Fuel Building Ventilation System-Fuel Storage," requires the fuel building portion of the SLCRS to be operable whenever irradiated fuel is in the storage pool. These two LCOs ensure that the filtration assumptions in the licensee's FHA analyses for the fuel building are satisfied.

The NRC technical staff's evaluation of the requested changes is provided below.

## 3.0 EVALUATION

### 3.1 Technical Specifications Changes

#### 3.1.1 Technical Specification 3/4.3.3.1

TS 3.3.3.1 and its associated Table 3.3-6 specify requirements for radiation monitoring instrumentation. The licensee proposed to change the minimum number of containment purge exhaust noble gas effluent radiation monitors required to be operable specified in Table 3.3-6, Item 2.c.ii, from one to two. The licensee also proposed to change the MODE applicability in Table 3.3-6, Item 2.c.ii, for this requirement from MODE 6 (Refueling) to "during movement of fuel assemblies within the containment." In addition, the licensee proposed to revise the applicability of surveillance requirements (SRs) for the containment purge exhaust noble gas effluent monitors contained in Table 4.3-3, Item 2.c.ii, from being applicable in MODE 6 to being required "during movement of fuel assemblies within containment." These changes make the applicability requirements for radiation monitors consistent with the applicability requirements of the containment purge isolation system specified in LCO 3.9.9, "Containment Purge And Exhaust Isolation System," and the containment isolation applicability requirements of LCO 3.9.4, "Containment Building Penetrations." These changes are also consistent with NRC-approved Technical Specification Traveler Form (TSTF) 51, Revision 2, to NUREG-1431, Revision 1, "Standard Technical Specifications-Westinghouse Plants," which was approved on October 15, 1999. No design basis accident is postulated to occur when the plant is in MODEs 5 or 6 and fuel is not being handled in the containment. Therefore, there is no need to require these radiation monitors to be operable under these circumstances. The proposed revisions to Tables 3.3-6 and 4.3-3 will make the requirements for radiation monitoring instrumentation applicable during those plant evolutions that could result in an FHA. Hence, the licensee's proposed changes to TS Tables 3.3-6 and 4.3-3 are acceptable.

#### 3.1.2 Technical Specification 3/4.9.4

The containment penetration closure requirements specified in TS LCO 3.9.4 are intended to ensure compliance with Title 10 of the *Code of Federal Regulations* (10 CFR) Part 100, limits by limiting the leakage of radioactive material from containment to the environment.

##### 3.1.2.1 Changes to LCO Requirements

LCO 3.9.4 currently requires that at least one door of the PAL be maintained closed during CORE ALTERATIONS or fuel movement within the containment. The licensee proposed to change this requirement and permit both doors of the containment PAL to be open during fuel movement, provided that certain requirements, which will be specified in LCO 3.9.4, are met. These requirements are:

1. At least one of the PAL doors is capable of being closed so that the closure of the containment will always be possible, if needed.

2. A designated individual is available to close this door if needed. In response to a staff question, the licensee's July 21, 2000, letter clarified the duties of this designated individual, and stated that they will designate the refueling senior reactor operator as the person to ensure that a PAL door is closed in the event of an FHA. Additionally, the letter stated that this individual will not have other unrelated duties.

3. The PAL area is being exhausted to at least one OPERABLE filtered SLCRS train with all doors, except for the air lock doors, to the PAL area closed. In response to an NRC staff question, the licensee's July 21, 2000, letter defined a plant area as compartments serviced by SLCRS and bounded by floors, walls with closed doors, and ceilings.

4. SR 4.9.4.4 has been satisfied with both PAL doors open. This SR requires that the licensee verify, at least once per 7 days, that the filtered SLCRS can maintain areas required to be exhausted to the SLCRS (except for the containment) at a negative pressure of $\leq$ -0.125 inches of water gauge with respect to atmospheric pressure.

The licensee described the operational considerations which led to this proposal. Frequent opening of the PAL doors to accommodate the increased number of personnel requiring containment access during an outage produces wear and tear on the doors of the air lock. Another consideration is the possible need to evacuate a large number of personnel from containment in case of an FHA while maintaining containment closure.

The licensee also proposed a revision of LCO 3.9.4 that will permit containment penetrations with direct access from the containment atmosphere to the outside atmosphere to be open during movement of fuel within the containment. The licensee states that during a typical refueling outage, a number of containment isolation valves are leak tested as required by 10 CFR Part 50, Appendix J . This testing requires the associated containment penetrations to be drained of process liquid. In order to satisfy this test condition, both containment penetration isolation valves for a penetration are usually required to be open, along with the necessary vent and drain valves. The licensee's proposed revision to permit both valves in a penetration to be open would allow leak testing to continue during fuel handling. The licensee proposed to revise LCO 3.9.4.c to include the following requirements for containment penetrations (excluding the PAL) that provide direct access from the containment atmosphere to the outside atmosphere:

a. The penetration is capable of being closed by an isolation valve, blind flange, manual valve, or approved functional equivalent,

b. The maximum equivalent containment penetration opening size for the associated plant area is not exceeded,

c. A designated individual is available to close the penetration, and

d. The area(s) outside of containment where the open containment penetration piping is located is being exhausted to at least one operable filtered SLCRS train, and all doors to the area(s) that is required to be serviced by the SLCRS are closed (except for exit and entry).

These LCO 3.9.4.c requirements are similar to the LCO 3.9.4.b requirements for simultaneous opening of both containment PAL doors, and they are consistent with the NRC staff guidelines.[1]

The NRC staff notes that a significant margin is maintained by the LCO 3.9.10 requirement that at least 23 feet of water be maintained over the top of the reactor pressure vessel flange; and, the LCO 3.9.3 requirement that fuel not be moved until at least 150 hours after shutdown of the reactor to allow for decay of short half-life radionuclides. Additionally, the licensee assumed only 100 hours for decay of short half-life radionuclides in the offsite dose calculations. This adds conservatism to the FHA analyses.

As stated above, one of the LCO 3.9.4 requirements proposed by the licensee for handling fuel assemblies in containment with the containment PAL doors open and open containment penetrations, which connect the containment atmosphere to the environment, is operation of a filtered SLCRS train.

SRP Section 15.7.4.II.5 states:

> The containment design is acceptable with respect to the FHA if it possesses the capability for prompt radiation detection by use of redundant radiation monitors and automatic isolation if fuel handling operations inside containment occur when the containment is open to the environment (i.e., with a containment purge exhaust system). An acceptable alternative approach is containment venting through an [engineered safety feature] ESF atmosphere cleanup system or containment isolation during fuel handling operations.

The licensee has proposed allowing containment penetrations and containment PAL doors to be open during movement of fuel assemblies provided that a filtered SLCRS train is exhausting the area where the open penetration or containment PAL is located. This change satisfies the criteria of SRP 15.7.4 since the open containment penetrations or the containment air lock will be venting through an ESF atmosphere cleanup system (i.e., the SLCRS) prior to release to the environment.

SRP 15.7.4, Section III.4, states that if fuel-handling operations occur only when the containment is exhausted to the environment via an ESF filter system (such as SLCRS), the radiological consequences should be calculated giving appropriate credit for this system. The licensee's dose analyses for an FHA inside containment give appropriate credit for the SLCRS and have assumed the same filtration capabilities that were assumed for the fuel-handling building.

The proposed change to LCO 3.9.4 requires at least one train of the filtered SLCRS to be operating and operable. Requiring a single train of SLCRS to be operating ensures that there are no undetected failures preventing system operation, if required.

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[1] For example, see July 15, 1996, SE related to Amendment No. 114 to Facility Operating License No. NPF-30 for the Callaway Plant, Unit 1, Docket No 50-483, that permitted movement of irradiated fuel and core alterations with the containment personnel air locks open. The criteria proposed by the BVPS-2 licensee are similar to the criteria discussed in approving the Callaway Amendment No. 114, and are summarized in the Background Section of this SE.

The licensee proposed to add a footnote to LCO 3.9.4 to permit doors in the boundary for the PAL area, or the boundaries for areas adjacent to the containment that are serviced by the SLCRS, to be opened for personnel entry and exit. The licensee stated in its May 1, 2000, letter that "the normal room entry and exit doors have automatic closures installed on them." The majority are fire protection doors. The licensee also proposed to revise the associated surveillance to verify proper lineup and operation of the SLCRS, and verify that required area doors are closed every 12 hours. This requirement for periodic verification that area doors are closed will ensure that any potential release of radioactive material will be filtered by the SLCRS and, thereby, will ensure that the limits of 10 CFR Part 100 will not be exceeded. Because the area doors have automatic closures and the licensee will routinely verify that they are closed, the NRC staff finds this proposed footnote to be acceptable.

The licensee proposes to revise LCO 3.9.4.c.2 to make the LCO terminology more consistent with the proposed terminology of LCO 3.9.4. This is an editorial change that clarifies the TS and is acceptable.

The NRC staff finds the licensee's proposal to allow both of the PAL doors and containment penetrations, which connect the containment atmosphere to the environment, to be open during fuel handling to be acceptable. This is based on (1) compliance with the provisions of the SRP, (2) the licensee's compliance with the NRC staff's criteria for allowing both containment PAL doors to be open during fuel movement, as described in the Background Section of this SE, and (3) the results of the licensee's dose calculations, which demonstrate that both the 10 CFR Part 100 and General Design Criterion (GDC) 19 dose limits have been satisfied. The dose analysis evaluation is discussed further in Section 3.2 of this SE. With respect to item (2), the licensee's revised FHA analysis does not take credit for the mitigation effects of the primary containment; and, the proposed revisions to LCO 3.9.4, and associated clarifications provided in the TS Bases, incorporate controls to ensure that the PAL and any open containment penetrations will be closed in a timely manner in the event of an FHA.

3.1.2.2 Changes to LCO Applicability

The licensee also proposed to revise the applicability of LCO 3.9.4 from "During CORE ALTERATIONS or movement of irradiated fuel within the containment," to "During movement of fuel assemblies within the containment." The FHA is the only event during CORE ALTERATIONS that is postulated to result in fuel damage and radiological release. Since CORE ALTERATIONS, which includes the movement of unirradiated fuel assemblies over irradiated fuel in the vessel, is being deleted, it is necessary to modify the applicability of this specification to apply to the movement of unirradiated as well as irradiated fuel assemblies in the containment. The modification is needed to address the possibility that an unirradiated fuel assembly could potentially drop onto an irradiated fuel assembly. The licensee's proposed revised wording for TS 3.9.4 appropriately reflects this change, and will result in the LCO being applicable during those plant evolutions that could result in an FHA. Additionally, the revised wording for containment penetration requirements of LCO 3.9.4 is consistent with TSTF 51, Revision 2, which was approved by the NRC staff on October 15, 1999. Therefore, this proposed change to the applicability of LCO 3.9.4 is acceptable.

3.1.2.3 Changes to Surveillance Requirements

3.1.2.3.a Changes to Surveillance Requirement 4.9.4.1

The licensee proposed to revise SR 4.9.4.1 to: (a) verify that each penetration is in a condition required by LCO 3.9.4; and, (b) for areas outside containment that have open penetrations, including PAL doors, verify at least once every 12 hours that the areas are being exhausted to the filtered SLCRS and that all required area doors are closed.

The current SRs 4.9.4.1 and 4.9.9 require that each of the applicable containment penetrations of LCO 3.9.4 be determined to be closed as specified in LCO conditions a, b, or c within 150 hours prior to the start of CORE ALTERATIONS or the movement of irradiated fuel in the containment. The licensee's proposal will eliminate the requirement to determine that these requirements are satisfied at least 150 hours prior to CORE ALTERATIONS or movement of irradiated fuel. BVPS-2 TSs, SR 4.0.4, requires that a surveillance be successfully performed and current prior to entering the mode of applicability of an LCO. Therefore, this requirement is superfluous and may be removed.

As previously noted, a footnote will be added to LCO 3.9.4 which permits closed doors to be opened for personnel entry and exit. The licensee stated in the May 1, 2000, letter that "the normal room entry and exit doors have automatic closures installed on them." The majority are fire protection doors. The proposed SR 4.9.4.1.b requires verification every 12 hours that, for all areas located outside containment containing open penetrations including PAL doors, these areas are being exhausted to the filtered SLCRS and that the required area doors are closed. This requirement for periodic verification that area doors are closed will ensure that any potential release of radioactive material will be filtered by the SLCRS and, thereby, will ensure that the limits of 10 CFR Part 100 will not be exceeded. Thus, the NRC staff finds the proposed changes to SR 4.9.4.1 to be acceptable.

3.1.2.3.b Changes to Surveillance Requirement 4.9.4.2

SR 4.9.4.2 requires that, "the containment purge and exhaust system shall be demonstrated OPERABLE...." The licensee proposed changing the requirement of SR 4.9.4.2.a from "verifying the flow rate through the SLCRS at least once per 24 hours...," to "verifying the flow rate *to filtered* SLCRS at least once per 24 hours ..." (emphasis added). This proposed change is consistent with the LCO and will result in verification of the actual parameter of interest. Since the flow rate through the SLCRS is comprised of flows from other plant areas in addition to the containment purge and exhaust flow, verification of the flow through the SLCRS might not actually demonstrate the operability of the containment purge and exhaust system. Thus, verification of the flow rate to the SLCRS provides a more accurate indication of the operability of the containment purge and exhaust system. Therefore, the NRC staff finds the proposed change to SR 4.9.4.2.a to be acceptable.

The licensee also proposed to incorporate the current requirement of SR 4.9.4.2.c, for testing of the SLCRS in accordance with Specification 4.7.8.1, into a separate surveillance requirement, SR 4.9.4.3. Because the SLCRS operability will become a requirement applicable to open containment penetrations during fuel movement, demonstration of the SLCRS operability is necessary for more than just demonstrating operability of the containment purge and exhaust system. Thus, it is appropriate to incorporate this testing requirement as a separate SR. The NRC staff finds this change acceptable.

3.1.2.3.c Addition of Surveillance Requirement 4.9.4.4

The licensee proposed a new surveillance requirement, SR 4.9.4.4, which requires that, "for areas required to be exhausted to filtered SLCRS (except for the containment), verify at least once per 7 days that filtered SLCRS can maintain the area at a negative pressure of ≤ -0.125 inches of water gauge with respect to atmospheric pressure...." With both containment PAL doors open, the proposed LCO 3.9.4.b.4 requires that this surveillance has been satisfied in order to ensure that the opening of the containment PAL doors will not adversely affect the ability of filtered SLCRS to maintain the containment PAL area at a negative pressure.

The proposed SR 4.9.4.4 also establishes the maximum equivalent penetration opening size for each applicable plant area. This proposed SR supports the proposed LCO 3.9.4.c.1.b, which permits a containment penetration to be open if the maximum equivalent containment penetration opening size for the associated plant area is not exceeded. This ensures that the filtered SLCRS will be able to maintain the associated plant area at a negative pressure. In response to a staff question, the licensee's July 21, 2000, letter described the process of determining the maximum equivalent penetration opening size and its application. The licensee also provided a sample calculation. The NRC staff finds the licensee's method for determining maximum equivalent penetration size to be technically sound. Therefore, the proposed SR 4.9.4.4 is acceptable.

3.1.3 Technical Specification 3/4.9.9

The licensee proposes to revise LCO 3.9.9 to remove the applicability during CORE ALTERATIONS and to make it applicable during the movement of any fuel assembly, not just irradiated fuel assemblies, within the containment. SR 4.9.9 is revised from being required , "...within 150 hours prior to the start of, and every 7 days during, CORE ALTERATIONS..." to "...at least once per 7 days...." These changes are acceptable, as discussed above for LCO 3.9.4 and SR 4.9.4.1.

3.1.4 Bases Changes

The licensee proposed revisions to the TS Bases to include additional clarifying information in support of the requested TS changes. The NRC staff has reviewed the proposed Bases changes and has no objections.

3.2 Dose Analysis Evaluation

In support of the proposed amendment, the licensee performed an analysis of the radiological consequences of an FHA. The supporting analysis estimates control room operator, exclusion area boundary (EAB), and low population zone (LPZ) radiation doses following an FHA occurring within the reactor containment building given the proposed changes to the TSs discussed above, and incorporates numerous conservative assumptions (detailed in the amendment request). Doses were calculated for the whole body (effective dose equivalent, EDE), the thyroid (committed dose equivalent, CDE), and the skin (skin dose equivalent, SDE).

Because of the plant's current design, a radiological consequence analysis for an FHA in the containment building was not required. The current analysis is for the case of an FHA in the fuel-handling building. However, since the proposed amendment deals with revision of containment closure requirements during refueling, the licensee performed an analysis of a

postulated FHA in containment. The FHA in containment is a more severe and limiting accident than that postulated for the fuel-handling building. Thus, there was no need to reanalyze the FHA for the fuel-handling building and no analysis was provided.

The nature of the amendment request is such that the subsequent radiological consequences of the postulated FHA in containment are more severe and limiting than those of the postulated FHA in the fuel building. The reason for this is that the release source term for the accident in containment is higher (i.e., it is assumed that 617 fuel pins rupture) relative to that in the fuel building (where, as is currently assumed, 314 pins would rupture); all other FHA conditions and assumptions are identical. Accordingly, the licensee provided and the NRC staff evaluated an analysis of an FHA in the containment building.

For the FHA, it was assumed that, during the transfer of a fuel assembly from the reactor vessel to fuel pool storage 100 hours after shutdown from rated power (i.e., from subcriticality), a fuel assembly is dropped over the core. The dropped assembly is postulated to strike other assemblies and rupture 617 fuel elements. This releases radioactive iodine and noble gases into the pool water (Note, the minimum time to commence fuel handling after shutdown, which is established by TS LCO 3.9.3 and is not being changed, is actually 150 hours). It is assumed that all of the noble gases and 1 percent of the iodine from the fuel-cladding gap of the ruptured fuel elements escape the water into the containment building. This airborne radioactivity is assumed to be vented to the environment over a 2-hour period (with an assumed front-loaded, exponential release profile) via the SLCRS exhaust path, except for that removed by the system's charcoal and high-efficiency particulate air filters (assumed to be 95 percent efficient for iodine removal) and radioactive decay. According to the modified TSs, both doors of the PAL and containment penetrations may be open during fuel handling (but not the equipment hatch) provided various conditions are met, as discussed above. The control room is expected to be isolated and pressurized with bottled air, which has a 60-minute supply, and filtered forced ventilation after 60 minutes. However, the analysis conservatively assumes that the control room ventilation system remains in the normal unfiltered configuration during the release.

The results of the licensee's analysis are summarized below, along with the NRC staff's criterion for evaluation of the results:

| LOCATION | Whole Body EDE(rem) | Thyroid CDE(rem) | Skin SDE(rem) |
|---|---|---|---|
| Control Room | 0.0085 | 3.5 | 0.38 |
| Criterion | 5* | 30 | 30 |
| EAB | 1.9 | 37 | 4.1 |
| LPZ | 0.090 | 1.8 | 0.20 |
| Criterion | 6** | 75** | 6 |

* From 10 CFR Part 50, Appendix A, GDC 19.
** From SRP Section 15.7.4, (These values are 25 percent of the 10 CFR 100.11 exposure guideline values and define what the staff means by "well within" the regulatory limits.)

The NRC staff has reviewed the data input to the licensee's analysis of the radiological consequences of an FHA and finds them reasonable. With these data, the NRC staff has performed an independent confirmatory analysis for the thyroid, whole-body, and control room skin doses and finds the results of the licensee's analysis acceptable.

The NRC staff concludes that there is reasonable assurance that the radiological consequences associated with an FHA inside containment with the air lock open to the environment are well within the acceptance criteria set forth in 10 CFR Part 100 and NUREG-0800, SRP, Section 15.7.4, and that the control room operator dose criteria specified in 10 CFR Part 50, Appendix A, GDC-19, and NUREG-0800, SRP, Section 6.4, "Control Room Habitability System," are readily met.

The licensee also proposes to revise the BVPS-2 UFSAR description of an FHA and its radiological consequences to reflect the revised FHA analysis. These UFSAR changes include: revision of the FHA description; revision of the FHA analysis discussion, assumptions, methodology, and description of the computer models used; and revision of the potential EAB, LPZ, and control room doses as a result of an FHA. The NRC staff has reviewed these proposed changes and finds that they are consistent with the revised FHA analysis and are, therefore, acceptable. Finally, the licensee proposes to revise UFSAR Table 15.0-12, by deleting the EAB and LPZ skin doses for the FHA. The doses of concern for the EAB and LPZ are the thyroid and whole-body doses; neither 10 CFR Part 100 or the SRP require EAB or LPZ skin doses to be listed in the UFSAR for design basis accidents. Therefore, the NRC staff finds that removal of the EAB and LPZ skin doses from UFSAR Table 15.0-12 is acceptable. These UFSAR changes will be incorporated into the UFSAR at the next update, as required by 10 CFR 50.71(e).

### 3.3 Summary

The licensee has proposed changes to the TSs that would permit movement of fuel assemblies within containment while the PAL doors and containment penetrations are open, subject to specified restrictions on plant configuration and system operation. The NRC staff finds the TS changes to be acceptable based on (1) the licensee having satisfied all applicable criteria and guidelines; and, (2) calculations which demonstrate that doses, both offsite and to the control room operators, are well within the regulatory limits. In addition, the proposed revision to the UFSAR is acceptable.

## 4.0 STATE CONSULTATION

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

## 5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes surveillance requirements. The NRC staff has determined that the amendment involves 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 amendment involves no significant hazards consideration, and there has been no public comment on such finding (65 FR 51342). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

## 6.0 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 amendment will not be inimical to the common defense and security or to the health and safety of the public.

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