Mr. Garry L. Randolph
Vice President and Chief Nuclear Officer
Union Electric Company
Post Office Box 620
Fulton, MO 65251

September 9, 2002

SUBJECT: CALLAWAY PLANT, UNIT 1 - ISSUANCE OF AMENDMENT RE: EQUIPMENT HATCH AND EMERGENCY AIR LOCK OPEN DURING CORE ALTERATIONS OR MOVEMENT OF IRRADIATED FUEL ASSEMBLIES INSIDE CONTAINMENT (TAC NO. MB3605)

Dear Mr. Randolph:

The Commission has issued the enclosed Amendment No. 152 to Facility Operating License No. NPF-30 for the Callaway Plant, Unit 1. The amendment consists of changes to the Technical Specifications (TSs) in response to your application dated December 6, 2001 (ULNRC-04574), as superseded by letter dated June 17, 2002 (ULNRC-04674).

The amendment revises Limiting Conditions for Operation (LCOs), Required Actions for LCOs, Surveillance Requirements, and Tables specifying requirements on instrumentation in (1) TS 3.3.6, "Containment Purge Isolation Instrumentation"; (2) TS 3.3.7, "Control Room Emergency Ventilation System (CREVS) Instrumentation"; (3) TS 3.3.8, "Emergency Exhaust System (EES) Actuation Instrumentation"; and (4) TS 3.9.4, "Containment Penetrations." The revisions allow the equipment hatch and the emergency air lock to be open in refueling outages during core alterations and/or movement of irradiated fuel within containment.

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

Sincerely,

/RA/

Jack Donohew, Senior Project Manager, Section 2
Project Directorate IV
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-483

Enclosures: 1. Amendment No. 152 to NPF-30
2. Safety Evaluation

cc w/encls: See next page

Mr. Garry L. Randolph
Vice President and Chief Nuclear Officer
Union Electric Company
Post Office Box 620
Fulton, MO 65251

September 9, 2002

SUBJECT: CALLAWAY PLANT, UNIT 1 - ISSUANCE OF AMENDMENT RE: EQUIPMENT HATCH AND EMERGENCY AIR LOCK OPEN DURING CORE ALTERATIONS OR MOVEMENT OF IRRADIATED FUEL ASSEMBLIES INSIDE CONTAINMENT (TAC NO. MB3605)

Dear Mr. Randolph:

The Commission has issued the enclosed Amendment No. 152 to Facility Operating License No. NPF-30 for the Callaway Plant, Unit 1. The amendment consists of changes to the Technical Specifications (TSs) in response to your application dated December 6, 2001 (ULNRC-04574), as superseded by letter dated June 17, 2002 (ULNRC-04674).

The amendment revises Limiting Conditions for Operation (LCOs), Required Actions for LCOs, Surveillance Requirements, and Tables specifying requirements on instrumentation in (1) TS 3.3.6, "Containment Purge Isolation Instrumentation"; (2) TS 3.3.7, "Control Room Emergency Ventilation System (CREVS) Instrumentation"; (3) TS 3.3.8, "Emergency Exhaust System (EES) Actuation Instrumentation"; and (4) TS 3.9.4, "Containment Penetrations." The revisions allow the equipment hatch and the emergency air lock to be open in refueling outages during core alterations and/or movement of irradiated fuel within containment.

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

Sincerely,

/RA/
Jack Donohew, Senior Project Manager, Section 2
Project Directorate IV
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-483

Enclosures: 1. Amendment No. 152 to NPF-30
2. Safety Evaluation

cc w/encls: See next page
PKG: ML022630179
TS: ML022630467
ACCESSION NO.: ML022620599

DISTRIBUTION:
PUBLIC
PDIV-2 Reading
RidsNrrDlpmPdiv (WRuland)
RidsNrrPMJDonohew
RidsNrrLaEPeyton
RidsOgcRp
RidsACRSACNWMailCenter
GHill (2)
WBeckner
LHurley, RIV
WJohnson, RIV

*** See previous concurrence NRR-058**

OFFICE	PDIV-2/PM	PDIV-2/LA	SPLB/BC	EEIB/SC	OGC	PDIV-2/SC
NAME	JDonohew	EPeyton	JHannon*	EMarinos*	RHoefling*	SDembek
Sections			3.1	3.2 to 3.5		
DATE	9/4/02	9/6/02	08/20/02	08/22/02	08/29/02	9/6/02

OFFICIAL RECORD COPY

cc:
Professional Nuclear
Consulting, Inc.
19041 Raines Drive
Derwood, MD 20855

John O'Neill, Esq.
Shaw, Pittman, Potts & Trowbridge
2300 N. Street, N.W.
Washington, D.C. 20037

Mr. Mark A. Reidmeyer, Regional
Regulatory Affairs Supervisor
Regulatory Affairs
AmerenUE
Post Office Box 620
Fulton, MO 65251

U.S. Nuclear Regulatory Commission
Resident Inspector Office
8201 NRC Road
Steedman, MO 65077-1302

Mr. J. V. Laux, Manager
Quality Assurance
AmerenUE
Post Office Box 620
Fulton, MO 65251

Manager - Electric Department
Missouri Public Service Commission
301 W. High
Post Office Box 360
Jefferson City, MO 65102

Regional Administrator, Region IV
U.S. Nuclear Regulatory Commission
Harris Tower & Pavilion
611 Ryan Plaza Drive, Suite 400
Arlington, TX 76011-8064

Mr. Ronald A. Kucera, Deputy Director
for Public Policy
Department of Natural Resources
205 Jefferson Street
Jefferson City, MO 65101

Mr. Otto L. Maynard
President and Chief Executive Officer
Wolf Creek Nuclear Operating Corporation
Post Office Box 411
Burlington, KA 66839

Mr. Dan I. Bolef, President
Kay Drey, Representative
Board of Directors Coalition
for the Environment
6267 Delmar Boulevard
University City, MO 63130

Mr. Lee Fritz
Presiding Commissioner
Callaway County Court House
10 East Fifth Street
Fulton, MO 65151

Mr. David E. Shafer
Superintendent Licensing
Regulatory Affairs
AmerenUE
Post Office Box 66149, MC 470
St. Louis, MO 63166-6149

Mr. John D. Blosser, Manager
Regulatory Affairs
AmerenUE
P.O. Box 620
Fulton, MO 65251

Mr. Gary McNutt, Director
Section for Environmental Public Health
P. O. Box 570
Jefferson City, Missouri 65102-0570

UNION ELECTRIC COMPANY

CALLAWAY PLANT, UNIT 1

DOCKET NO. 50-483

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 152
License No. NPF-30

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

   A. The application for amendment by Union Electric Company (UE, the licensee) dated June 17, 2002, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's 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-30 is hereby amended to read as follows:

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 152 and the Environmental Protection Plan contained in Appendix B, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This amendment is effective as of its date of issuance and shall be implemented, including the incorporation of the changes to the Bases of the Technical Specifications and to the Final Safety Analysis Report for Callaway, as described in the licensee's letter of June 17, 2002, prior to entry into Mode 6 during Refueling Outage 12 that is scheduled for the Fall of 2002.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Stephen Dembek, Chief, Section 2
Project Directorate IV
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of Issuance: September 9, 2002

ATTACHMENT TO LICENSE AMENDMENT NO. 152

FACILITY OPERATING LICENSE NO. NPF-30

DOCKET NO. 50-483

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 vertical lines indicating the areas of change.

REMOVE	INSERT
3.3-57	3.3-57
3.3-59	3.3-59
3.3-62	3.3-62
3.3-63	3.3-63
3.3-64	3.3-64
3.3-65	3.3-65
3.3-66	3.3-66
3.3-67	3.3-67
3.3-68	3.3-68
3.9-6	3.9-6
3.9-7	3.9-7

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 152 TO FACILITY OPERATING LICENSE NO. NPF-30

UNION ELECTRIC COMPANY

CALLAWAY PLANT, UNIT 1

DOCKET NO. 50-483

1.0 INTRODUCTION

By application dated December 6, 2001, as superseded by letter dated June 17, 2002 (hereafter referred to as the application), Union Electric Company (the licensee) requested changes to the Technical Specifications (TSs, Appendix A to Facility Operating License No. NPF-30) for the Callaway Plant, Unit 1 (Callaway).

The proposed amendment would revise Limiting Conditions for Operation (LCOs), Required Actions for LCOs, Surveillance Requirements (SRs), and Tables specifying requirements on instrumentation in (1) TS 3.3.6, "Containment Purge Isolation Instrumentation;" (2) TS 3.3.7, "Control Room Emergency Ventilation System (CREVS) Instrumentation;" (3) TS 3.3.8, "Emergency Exhaust System (EES) Actuation Instrumentation;" and (4) TS 3.9.4, "Containment Penetrations." The revisions allow the equipment hatch and the emergency air lock to be open in refueling outages during core alterations and/or movement of irradiated fuel within containment. There are also changes to the TS Bases and the Final Safety Analysis Report (FSAR) for the proposed changes to TS 3.9.4.

2.0 BACKGROUND

In its letter of June 17, 2002 (the application), the licensee proposed to revise the TSs in the following manner:

1. Revise LCO 3.9.4 for the equipment hatch and emergency air lock, add a new SR requiring the verification of the capability to install the equipment hatch, and revise SR 3.9.4.2 to replace the requirement to verify an actual or simulated actuation signal by a requirement to verify a manual actuation signal.

2. Delete footnotes (a) and (b) from Functions 2 and 3 of TS Table 3.3.6-1, "Containment Purge Isolation Instrumentation," and revise Condition C of the Actions for LCO 3.3.6, which is only applicable during core alterations or movement of irradiated fuel assemblies within containment, to eliminate the automatic signal for containment purge isolation (CPIS).

3. Revise Action Condition E for LCO 3.3.7 and TS Table 3.3.7-1, "CREVS Actuation Instrumentation," and add SR 3.3.7.6 to TS 3.3.7.

4. Add Required Action A.2 and revise Required Actions B.1.2, B.2, C.1.2, and C.2 for TS 3.3.8.

In proposing the above amendment, the licensee has not proposed to change the applicability of LCO 3.9.4. The proposed changes to TS 3.9.4 listed in Items 1 and 2 above are to allow the equipment hatch, or the emergency air lock, to be open during core alterations or movement of irradiated fuel assemblies inside containment, and to verify that the capability to close the equipment hatch, if this is needed, is in place. This allowance would be used during refueling operations when the reactor is shut down, and there is 23 feet of water above the reactor flange in accordance with TS 3.9.7, "Refueling Pool Water Level," which requires at least that level of water above the flange during movement of irradiated fuel assemblies within containment.

TS 3.3.6 is proposed to be revised to eliminate the requirement for automatic actuation of containment purge isolation during core alterations or movement of irradiated fuel assemblies inside containment, in the case of an accident releasing radioactivity inside containment. Therefore, the automatic CPIS upon high radiation levels in the containment purge exhaust from containment would be eliminated. As the licensee stated in its application, this would allow the containment purge and exhaust system (CPES) to remain in operation in the event of the design basis fuel handling accident (FHA) inside containment. This would be during refueling when the equipment hatch or the emergency air lock is open and the operating CPES would ensure that potential radioactivity released from the damaged fuel would be directed to and monitored by the purge exhaust, and not released directly to the environment through the open equipment hatch or emergency air lock. The licensee stated that the manual capability for isolation of the CPES and the alarm and indication functions of the redundant radiation monitors in the CPES would remain available to the control room operators.

With the proposed elimination for automatic actuation of containment purge isolation in the proposed changes for TS 3.3.6, the isolation of the control room is affected because the licensee will no longer take credit for the radiation monitors in the CPES for the control room isolation function in response to the FHA inside containment. Control room isolation in response to the FHA inside containment will be initiated from the radiation monitors in the control room ventilation intakes. Initiation of control room isolation in response to the FHA in the fuel building will remain with the radiation monitors in the fuel building ventilation exhaust. The proposed elimination of control room isolation from the CPIS is accounted for in the proposed changes to TS 3.3.7.

For TS 3.3.7, on the control room emergency ventilation system (CREVS) actuation instrumentation, requirements are added to ensure that the signal for control room ventilation isolation (CRVIS) occurs in response to the FHA inside containment. The CREVS provides an enclosed control room environment from which the plant can be operated following an uncontrolled release of radioactivity. Automatic actuation of the CREVS is from the radiation monitors in the control room intakes, the containment purge exhaust, and the fuel building ventilation exhaust. The proposed changes are to add the requirement for engineered safety feature (ESF) response time testing of the radiation monitors for the FHA inside containment

and to extend TS 3.3.7 to also apply during core alterations. Also, the fuel building exhaust radiation function being added to TS Table 3.3.7-1 refers to TS 3.3.8. This is proposed so that the requirements in Table 3.3.7-1 for the FHA inside containment and inside the fuel building are separated in the table.

For TS 3.3.8, on the EES actuation instrumentation, requirements are added to ensure that the CREVS is in the CRVIS mode when the EES instrumentation is inoperable. The EES instrumentation is credited by the licensee with limiting the doses in the control room for an FHA accident in the fuel building. The licensee stated that proposed changes are necessary in the event of an FHA in the fuel building while the automatic CPIS (and associated automatic CRVIS) is bypassed, when the equipment hatch or emergency air lock are open, because of the above changes to TS 3.3.6. The radiation monitors for the CRVIS for the FHA inside containment will become those in the intake for the control room, but for the FHA inside the fuel building the radiation monitors for the CRVIS are not changed.

The licensee stated that the equipment hatch provides a means for moving large equipment and components into and out of containment during plant outages, such as a refueling outage. It is a large, welded steel assembly with a double-gasketed, flanged, and bolted cover, which is raised and lowered with two dedicated hoists, both of which are needed to close the hatch. The hoists are powered from non-Class 1E power; however, there is a diesel generator backup power supply in the case that the non-Class 1E power is not available to close the hatch. There is a moveable missile shield on the outside of the reactor building to protect the equipment hatch from external missiles. Because it is part of the containment pressure boundary, the current TSs require that the equipment hatch is closed and held in place by bolts when (1) the containment must be closed and operable (this is in reactor Modes 1 through 4 in accordance with TS 3.6.1, "Containment"), and (2) there are core alterations or irradiated fuel movement in Mode 6 (this is in accordance with TS 3.9.4). The licensee stated, and the staff agrees, that the TS 3.9.4 requirement is to restrict fission product radioactivity released from the containment due to an FHA accident inside containment during refueling.

The emergency air lock is a circular welded steel assembly (approximately 5 feet 9 inches in diameter) that penetrates containment with a door at each end that are normally interlocked to prevent both doors being open when containment operability per TS 3.6.1 is required (i.e., in Modes 1 through 4). As described in Section 3.8.2.1.1 of the FSAR for Callaway, the emergency air lock, or auxiliary hatch, is enclosed outside containment within an exterior tornado-resistant concrete structure.

The licensee explained that the proposed changes to TS 3.9.4 will allow it to optimize refueling outages by permitting planned outage work to proceed in conjunction with critical path activities, thereby shortening the outage without a reduction in plant safety. The proposed amendment will permit operations currently scheduled for early in the refueling outage, when there is no core alterations or movement of irradiated fuel assemblies inside containment and the containment may be open, to occur later in the outage when the reactor vessel is open and covered by 23 feet of water when the risk of severe core damage is lower. Therefore, the amendment could reduce the overall risk and duration of refueling outages.

3.0 EVALUATION

In evaluating the proposed amendment, the staff first considered the proposed changes to TS 3.9.4 to allow the equipment hatch or the emergency air lock to be open during core alterations or movement of irradiated fuel assemblies inside containment. This is evaluated in Section 3.1. Then, the proposed changes to TSs 3.3.6, 3.3.7, and 3.3.8 were considered and evaluated in Sections 3.2 through 3.4, respectively.

3.1 Proposed Changes for the Equipment Hatch and Emergency Air Lock

The proposed changes in TS 3.9.4 are the following:

- Add the phrase, "or if open, capable of being closed," to the existing item a of LCO 3.9.4 for the equipment hatch, and a new SR requiring the verification of the capability to install the equipment hatch. The new SR would be numbered SR 3.9.4.2 and the current SR 3.9.4.2 would be renumbered SR 3.9.4.3.

- Delete the word "closed" from the existing item b of LCO 3.9.4 for the emergency air lock.

The postulated accidents that could result in a release of radioactive material through an open equipment hatch or emergency air lock in a refueling outage are the following: (1) an FHA inside containment, and (2) a loss of cooling to the core that leads to core boiling, fuel uncovery, and then fuel damage. The licensee has addressed these events in its application.

In its evaluation of the proposed changes to TS 3.9.4, the staff considered the administrative controls to close the equipment hatch and emergency air lock in the event of an FHA inside containment or loss of cooling to the core, tornado missiles protection with the equipment hatch or emergency air lock open, and the potential radiological consequences from the FHA inside containment.

3.1.1 Administrative Controls

The licensee has proposed to have the equipment hatch and emergency air lock under administrative controls whenever the equipment hatch and/or the emergency air lock is open in an outage when there are core alterations or fuel movement inside containment. Both would be maintained in an isolable condition (i.e., capable of being closed and bolted) and there would be procedures in place that would require the following:

- Appropriate personnel are aware of the open status of the containment (i.e., an open equipment hatch or emergency air lock) during movement of irradiated fuel or core alterations.

- Specified individuals are designated and readily available to close the equipment hatch and emergency air lock following an evacuation that would occur in the event of an FHA.

- Any obstructions (e.g., cables and hoses) that would prevent rapid closure of an open

equipment hatch or emergency air lock can be quickly removed.

- Following closure of the equipment hatch and emergency air lock, and then closure of the personnel air lock, the CPIS would be manually initiated and containment purge would be shut down.

The open emergency air lock provides a pathway for the cables associated with the diesel generator backup power supply that could be needed to close the equipment hatch if there is a station blackout, and no non-Class 1E power is available. These cables would have to be removed to close the emergency air lock, and the emergency air lock may have to be closed after closure of the equipment hatch. The licensee stated that it expects to close the open equipment hatch in less than one hour and the time to close the emergency air lock is less than 30 minutes. The licensee based these estimates on past experience and discussions with containment coordinators.

3.1.2 Tornado Missiles

In its application, the licensee addressed tornado missiles and the protection provided in the design of Callaway. Section 3.5.1.4 of the Callaway FSAR addresses missiles generated by natural phenomena. FSAR Section 3.5.2, which discusses systems which are to be protected, states in part that "All safety-related systems and components to be protected from tornado missiles are enclosed within protective structures which meet the requirements of Regulatory Guide 1.117[, 'Tornado Design Classification,']. Openings to these structures are designed to prevent the entry of the design basis missile when the result would preclude the safety functions of the enclosed system or components. Prevention of missile entry includes the use of missile doors and barriers at openings and adjacent buildings as shields in penetration areas. The missile barriers are designed utilizing the procedures given in [FSAR] Section 3.5.3."

In its application, the licensee stated that the equipment hatch does not provide missile protection for the containment. This protection is provided by the moveable missile shield, which is located outside the containment to protect the equipment hatch. During Modes 1 through 4, when the containment is required to be operable by TS 3.6.1, the missile shield covers the equipment hatch. For Modes 5 and 6, during plant shutdown conditions when the containment is not required to be operable, the licensee stated that the missile shield is still required because the equipment hatch cover with 4 bolts does not provide adequate missile protection for the safety-related equipment inside the containment. Therefore, based on what the licensee has stated, the NRC staff concludes that the equipment hatch with 4 bolts in place and the missile shield would provide severe weather missile protection for the safety-related systems and components within the containment.

In addressing what will happen at the site during refueling with severe weather, the licensee stated that procedures require that the equipment hatch shall be in place with 4 bolts installed and the missile shield in place upon the arrival of any threatening weather conditions that could generate missiles. The equipment hatch and missile shield are closed for a severe weather watch, which is when severe weather (i.e., tornados) are possible within the designated watch area. This has the licensee responding earlier than for a severe weather warning, which is when severe weather has been reported or is imminent in the watch area. The licensee

reported that the watch area is a 140-mile monitoring radius of the plant. The staff concludes that the licensee action to provide missile protection for inside containment by closing the equipment hatch and missile shield in response to a severe weather watch or warning (in this

case the licensee stated it would be in response to a severe weather watch) is acceptable for providing severe weather missile protection at Callaway during a refueling outage. Because the emergency air lock is enclosed outside containment within an exterior tornado-resistant concrete structure, the staff concludes that the licensee does not have to take action to close the air lock for a tornado watch or warning.

3.1.3 Postulated Accidents

The limiting event during refueling when there are core alterations or fuel handling inside the containment is the FHA inside containment. The licensee has described this event in Section 15.7.4 of the FSAR for Callaway and the NRC acceptance criteria is given in Standard Review Plan (SRP) 15.7.4 of NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants." The NRC acceptance criteria for the exposure of the control room operators is General Design Criterion (GDC) 19 in Appendix A to 10 CFR Part 50.

The licensee's and the staff's calculated potential dose consequences for the FHA inside containment at the exclusion area boundary and the assumptions used for the calculated dose consequences are in the attached Tables 1 and 2, respectively. The staff's calculated values of the potential dose consequences to the control room operators are also given in Table 1 and the assumptions are provided in Table 2.

The licensee's dose consequences in Table 1 came from FSAR Table 15.7-8 (exclusion area boundary dose consequences for the FHA inside the reactor building and containment) and Table 15.6-8 (for the control room operator doses for the large-break loss-of-coolant accident which bounds the FHA). The assumptions for these values are in FSAR Tables 15.7-7, 15.A-1, and 15.A-2. The staff's dose consequences were reported in Amendment No. 114 issued July 15, 1996, and Amendment No. 129 issued January 19, 1999. The potential dose consequences in Amendment No. 114 were part of the basis of the approval to have both containment personnel air lock doors open during refueling with core alterations or irradiated fuel movement inside containment. The dose consequences reported by the staff in Amendment No. 129 are higher than those in Amendment No. 114 because, as reported in the safety evaluation for Amendment No. 129, the staff's assumptions were increased to 1.2 fuel assemblies damaged and 30 percent noble gases released (for the extended burnup due to the higher fuel enrichment) from the damaged fuel.

Because the licensee has assumed the same 2-hour period of release that the staff assumed for the FHA inside containment, the staff concludes that the time to close the containment penetrations under the licensee's administrative controls discussed above will not be more than the 2-hour period assumed in the licensee's and staff's dose calculations reported in Table 1.

The proposed amendment does not change the staff's assumptions for the design basis FHA inside containment and does not change the potential dose consequences for the accident,

including those calculated for the control room operators. Sections 3.2, 3.3 and 3.4 discuss the licensee's elimination of the automatic CPES isolation and maintaining automatic actuation of the CREVS to mitigate radiation exposure of the control room operators based on the radiation monitoring detectors in the control room air intakes and the fuel building ventilation exhaust, respectively. The control room operators' doses are based on the initiation of CREVS by the radiation monitors in the control room ventilation intakes. The potential dose consequences for the FHA inside containment (including the control room operators) assume a ground level release over two hours with no holdup in the containment. The licensee's proposal to have the equipment hatch and the emergency air lock open does not change this assumption, or any other assumption for the accident. Therefore, the proposed amendment does not change the potential dose consequences previously reported by the staff, and given in Table 1, for the FHA inside containment.

Because the potential dose consequences from the licensee and the staff given in Table 1 for the FHA inside containment are within the acceptance criteria given in SRP Section 15.7.4 and GDC 19, the staff concludes that the potential dose consequences for the amendment are acceptable.

For the case of a loss of cooling to the core, the licensee has stated that the equipment hatch is typically closed in less than one hour and the emergency air lock may be in 30 minutes more. The licensee stated that the minimum time to core boiling is 5 hours (at the beginning of fuel offload). Therefore, the staff concludes that the time to close the equipment hatch and emergency air lock is shorter than the time for the core to start boiling, which is before there is any fuel damage or release of radioactivity to containment. Based on this conclusion, the staff also concludes that the amendment does not change the potential consequences of a loss of core cooling during the outage, which is bounded by the potential consequences for the FHA inside containment.

The time to core boiling for reduced water inventory in mid-loop operation in a refueling outage is not applicable to this review because TS 3.9.7 requires 23 feet of water above the top of the reactor vessel flange during movement of irradiated fuel assemblies within containment. Therefore, the proposed amendment does not apply to mid-loop operations.

3.1.4 Conclusion for Changes to TS 3.9.4

Based on the administrative controls described in the licensee's application, which will be added to the TS Bases; the demonstrated short time to close the equipment hatch in the case of an accident inside containment; the acceptable potential consequences of the design basis FHA inside containment (including the doses to control room operators); and the protection of equipment needed to keep the plant safely shut down from tornado missiles during refueling with the equipment hatch or the emergency air lock open; the NRC staff concludes that the proposed additions to LCO 3.9.4 are acceptable.

The licensee also proposed to add SR 3.9.4.2 to the TSs to assure that the administrative controls to close the equipment hatch are in place when the hatch is open during core alterations or movement of irradiated fuel inside containment. The licensee proposed the following: (1) a frequency of seven days for the periodic surveillance, and (2) a note that states

SR 3.9.4.2 is only required when the equipment hatch is open. The licensee states in the changes to the Bases for SR 3.9.4.2 that (1) the surveillance interval of seven days was selected to be commensurate with the normal duration of time to the fuel handling operations, and is considered adequate because the hardware, tools, and equipment needed to close the equipment hatch are dedicated to the equipment hatch and not used for other functions, and (2) the note only requires that the surveillance requirement be met when the equipment hatch is open. The proposed frequency is consistent with similar SRs in the TSs, and the surveillance needs only to be conducted when the equipment hatch is open. Also, the proposed SR is the same as that approved for Vogtle Electric Generating Plant, Units 1 and 2, on September 11, 2000, and Comanche Peak, Units 1 and 2, on February 20, 2002, for the same amendment. Based on this and the fact that SR 3.9.4.2 is only necessary when the equipment hatch is open, the NRC staff concludes that the proposed SR 3.9.4.2 is acceptable.

With the new SR 3.9.4.2 being added to the TSs, the existing SR 3.9.4.2 will be renumbered SR 3.9.4.3, with no other changes being made to the SR. The NRC staff concludes that the change is acceptable.

Therefore, based on the above, the NRC staff further concludes that the proposed changes to TS 3.9.4 are acceptable.

The NRC staff has reviewed the description of the administrative controls in the revised TS Bases pages for TS 3.9.4 in Attachment 5 of the revised application and has no disagreement with the description for the open air lock and the open equipment hatch, which are addressed separately. The acceptable administrative controls are also given in the summary of the licensee's regulatory commitments for the proposed amendment, which are in Attachment 7 of the revised application. In the summary of regulatory commitments, the licensee agreed to add this description to the TS Bases during the implementation of the amendment. Because the staff is relying on this description being in the TS Bases, the incorporation of the description into the TS Bases will be a condition of the amendment to the operating license. Therefore, when the amendment is incorporated into the TSs, the description of the administrative controls will become a part of the Bases of the TSs. Any changes to the description of the administrative controls will then be controlled by Section 5.5.14, "Technical Specifications (TS) Bases Control Program," of the Administrative Section of the TSs.

3.2 Proposed Changes to Verification of Actuation Signal in Current SR 3.9.4.2

The current SR 3.9.4.2 is the requirement to verify each required containment purge isolation valves actuates to the isolation position on the actuation signal. The current requirement is for verification using an actual or simulated actuation signal. The licensee has proposed to replace "an actual or simulated" actuation signal by "a manual" actuation signal. The licensee has proposed this change because the current automatic isolation of the containment purge upon high radiation during core alterations or movement of irradiated fuel assemblies within containment has been proposed to be eliminated in the proposed changes for TS 3.3.6, which are discussed in the next section. Based on the acceptability of the proposed changes to TS 3.3.6, as discussed in Section 3.3, the staff concludes that the proposed change to the manual actuation signal being verified in the current SR 3.9.4.2 is acceptable.

3.3 Proposed Changes to TS 3.3.6

The proposed changes are the following:

- Revise Condition C for LCO 3.3.6 to delete references to more than one function in TS Table 3.3.6-1 and to the automatic function of the containment purge isolation

- instrumentation during core alterations or movement of irradiated fuel assemblies inside containment.

- Delete footnotes (a) and (b) from Functions 2 and 3 of TS Table 3.3.6-1, "Containment Purge Isolation Instrumentation."

These changes are to account for the proposed elimination of the automatic CPIS during core alterations or movement of irradiated fuel assemblies inside containment. The licensee has proposed this to maintain the containment purge in operation during a FHA inside containment while the equipment hatch or the emergency air lock would be open. Because the licensee has previously been approved to have the personnel air lock and containment penetrations with direct access to the outside atmosphere open during core alterations or movement of irradiated fuel assemblies in Amendments Nos. 114 and 138, the licensee is, therefore, also proposing to eliminate the same requirements for these containment penetrations when the equipment hatch is open.

The licensee stated in its application that elimination of the automatic CPIS would (1) allow the CPES to remain in operation in the event of the FHA inside containment and continue to draw air from inside containment, and (2) ensure that potential radioactivity released from the damaged fuel would be directed to and monitored by the purge exhaust, and not released directly to the environment. The release to the environment would be through the open equipment hatch, emergency air lock, personnel air lock, or other containment penetrations with direct access to the outside atmosphere. The licensee also stated that the manual capability for isolation of the CPES, and the alarm and indication functions of the redundant radiation monitors in the CPES would remain available to the control room operators.

The purpose of the automatic CPIS is to prevent the discharge of the radioactivity released to containment from damaged fuel in the FHA inside containment through the CPES. The automatic CPIS does not affect the potential dose consequences for the accident because the radioactivity released from the damaged fuel is assumed to be released to the environment at ground level over a two hour period. Therefore, maintaining the automatic CPIS or eliminating the CPIS does not affect the potential dose consequences of the FHA inside containment. Also, eliminating the CPIS and maintaining the CPES will ensure the radioactivity will be monitored. Based on this, the staff concludes that the proposed elimination of the automatic CPIS is acceptable.

In the proposed changes to Condition C of LCO 3.3.6, the licensee is proposing to have Condition C apply only to the manual CPIS being inoperable by deleting references to (1) more than one function in TS Table 3.3.6-1 because the manual CPIS is only one function, and (2) the automatic CPIS and the radiation monitoring channels which actuate the automatic CPIS,

and the statement that "Required Action and associated Completion Time for Condition A not met."

With the elimination of the automatic CPIS, there is only one function in TS Table 3.3.6-1 that is applicable during core alterations or movement of irradiated fuel assemblies inside containment. This is Function 1 or manual initiation. With the proposed deletion of the two phrases "One or more Functions with" and "or automatic actuation trains" to the first part of Condition C, the condition will read "One or more manual channels inoperable." This condition is consistent with the elimination of the automatic CPIS (i.e., only the manual initiation function in the table will be applicable during core alterations or movement of irradiated fuel assemblies inside containment). Based on this, the staff concludes that this proposed change is acceptable.

The licensee has also proposed to delete the statement "Both radiation monitoring channels inoperable" from Condition C. Because the radiation monitoring channels are for the automatic CPIS, which is being eliminated, the staff concludes that the proposed deletion of the statement is acceptable.

Lastly, the licensee has proposed to delete the statement "Required Action and associated Completion Time for Condition A not met" in Condition C. Condition A refers to one radiation monitoring channel not being operable. Because the radiation monitoring channels are for the automatic CPIS and this is being eliminated, the staff concludes that the proposed change to delete the reference to Condition A is acceptable.

For TS Table 3.3.6-1, footnotes (a) and (b) are proposed to be deleted for the two following functions: (1) the automatic actuation logic and actuation relays, and (2) the containment purge exhaust radiation - gaseous function. Footnote (a) states during core alterations and Footnote (b) states during movement of irradiated fuel assemblies inside containment. The two functions comprise the automatic CPIS. The first function is the actuation of CPES isolation and the second is the radiation monitors that detect the high radiation from the radioactivity released from the FHA inside containment. Therefore, elimination of the automatic CPIS for core alterations or movement of irradiated fuel assemblies inside containment is the deletion of Footnotes (a) and (b) for the two functions. Based on this, the staff concludes that the proposed changes to TS Table 3.3.6-1 are acceptable.

Therefore, on the basis of the above evaluation, the staff concludes that the proposed changes to TS 3.3.6 are acceptable.

Based on the acceptability of the proposed changes to TS 3.3.6 to eliminate the automatic CPIS and keep the manual actuation signal, the proposed changes to the current SR 3.9.4.2 to verify the "manual" actuation signal are acceptable. This is discussed in more detail in Section 3.2.

3.4 Proposed Changes to TS 3.3.7

The proposed changes are the following:

- Add the phrase "or during CORE ALTERATIONS," to Condition E for LCO 3.3.7.
- Add SR 3.3.7.6 to require verification that control room ventilation isolation ESF response times are within limits.
- Revise Table 3.3.7-1 for the two functions of (1) the automatic actuation logic and actuation relays, and (2) control room radiation - control room intakes.
- Add the fuel building exhaust radiation - gaseous function to Table 3.3.7-1.

With the elimination of the automatic CPIS, the licensee will be relying on the radiation monitors in the control room ventilation intakes to generate the CRVIS and actuate the CREVS for the FHA inside containment. Actuation of the CREVS will terminate the supply of unfiltered outside air, initiate filtration, and pressurize the control room. The proposed changes to TS 3.3.7 are to account for the CRVIS being generated for the FHA inside containment from the control room ventilation intake radiation detectors. The radiation detectors in the fuel building ventilation exhaust will remain the detectors to generate the CRVIS to initiate CREVS For the FHA inside the fuel building.

The licensee is proposing to extend the applicability of TS 3.3.7 to core alterations. This is needed because the applicability of TS 3.9.4 for an open equipment hatch or emergency air lock is during core alterations or movement of irradiated fuel assemblies inside containment. TS 3.3.7 already applies for Modes 1 through 5 and movement of irradiated fuel assemblies, but it does not currently apply to core alterations. Therefore, the licensee has proposed to extend TS 3.3.7 to core alterations. To do this, the licensee has proposed to add "during CORE ALTERATIONS or" to Condition E for LCO 3.7.3 and to Footnote (a) of TS Table 3.7.3-1. This would be consistent with the possibility of an accident inside containment during core alterations which could result in fuel damage and radioactivity released to containment and then to the control room. With the containment purge operating because the equipment hatch or the emergency air lock are open, this radioactivity could be released from containment to the control room. Footnote (a) is applied to the three functions in the table of manual initiation of the CREVS, automatic actuation logic and actuation relays for CREVS initiation, and control room radiation detectors - intakes for CREVS initiation, which are the correct functions for CREVS initiation following an accident inside containment due to core alterations. Because the licensee is proposing to add a new requirement to the TSs to be consistent with the possible actuation of the CREVS following core alterations and the Footnote (a) is applicable to the correct functions associated with the actuation of the CREVS, the staff concludes that the proposed changes to Condition E of LCO 3.3.7 and Footnote (a) of Table 3.3.7-1 are acceptable.

The radiation monitors in the control room ventilation intakes are an existing function in TS Table 3.3.7-1. Because these radiation monitors are located closer than the radiation monitors in the CPES to the intakes that initiate CREVS, the licensee has proposed to add SR 3.3.7.6 to require verification that the control room ventilation isolation ESF response times are within limits. This is to ensure that the generation of the CRVIS by the radiation monitors in the control room ventilation intakes will be in time to automatically isolates the control room ventilation intake and initiate the CREVS before unfiltered radioactivity from accidents, such as

the FHA inside containment, enters the control room. Because the addition of SR 3.3.7.6 will maintain the calculated exposure of control room operators in the accident analyses, the staff concludes that the proposed addition of SR 3.3.7.6 is acceptable.

For SR 3.3.7.6, the licensee also proposed (1) a note that radiation monitor detectors are excluded from response time testing, and (2) a frequency of 18 months on a staggered test basis for performing the surveillance. The note is based on the fact that radiation monitor detectors are not response time tested because of the difficulty in generating an appropriate radiation detector input signal and the principles of radiation detector operation ensure a virtually instantaneous response. The frequency is the same as for other instrumentation response time SRs in the TSs, such as SRs 3.3.1.16, 3.3.2.10, 3.3.5.4, and 3.3.6.6, which all have the 18 months on a staggered test basis. Based on this, the staff concludes that the proposed note and frequency for SR 3.3.7.6 are acceptable.

For revising Table 3.3.7-1, the licensee proposed the following:

1. Revise footnote (a) and add footnote (c) in terms of where the irradiated fuel movement occurs;

2. Add footnote (c) to functions 1 and 2 without revising the required channels, surveillance requirements, and nominal trip setpoint;

3. Add footnote (a) with required channels, surveillance requirements, and nominal setpoint; and

4. Add the fuel building exhaust radiation - gaseous function with a reference to LCO 3.3.8 for all initiation functions and requirements.

For items (1) and (2) above, adding "within containment" to Footnote (a) and adding a Footnote (c) which states "During movement of irradiated fuel assemblies in the fuel building" will have Footnote (a) apply for the FHA inside containment and Footnote (c) apply for the FHA inside the fuel building. Footnote (a) is associated with the functions in Table 3.3.7-1 of manual initiation of the CREVS, automatic actuation logic and actuation relays for CREVS initiation, and control room radiation detectors - intakes for CREVS initiation because the control room ventilation radiation detectors in the intakes are used to initiate the CREVS for the FHA inside containment; however, Footnote (c) is only associated with manual initiation of CREVS, and automatic actuation logic and actuation relays for CREVS initiation because the CREVS for the FHA inside the fuel building is not initiated from the radiation detectors in the control room ventilation intakes. Because the proposed changes in item (1) are consistent with the location of radiation detectors to initiate the CREVS for the FHAs inside containment and inside the fuel building, the staff concludes that the proposed changes are acceptable.

For item (3) above, the second line for applicable modes, required channels, surveillance requirements and nominal setpoint is added to the functions of automatic actuation logic and relays, and control room radiation detectors because SR 3.3.7.6 for response time testing will be required for these two functions, but only for core alterations and the movement of irradiated fuel inside containment (i.e., Footnote (a)). This applies only to the initiation of the CREVS for

the FHA inside containment because credit is taken in this accident for the radiation detectors in the control room ventilation intakes to initiate the CREVS; therefore, SR 3.3.7.6 is required only for the two functions of automatic actuation logic and relays, and control room radiation detectors - intakes. The required channels and nominal setpoint for the two functions for SR 3.3.7.6 are the same as for SR 3.3.7.3 because the number of required channels and the nominal setpoint do not depend on the required surveillance. Because SR 3.3.7.6 is required for these two functions and the number of required channels and nominal trip setpoint does not change with the required surveillance, the staff concludes that the proposed changes in item (3) are acceptable.

For item (4) above, the fuel building exhaust radiation - gaseous function represents the radiation detectors which initiate the CREVS for the FHA inside the fuel building, as described above. Because the reference to LCO 3.3.8 for all initiation functions and requirements does not remove any requirements to the TSs, and does indicate that the fuel building exhaust radiation detectors initiate the CREVS for the FHA inside the fuel building, the staff concludes that the proposed change in item (4) is acceptable.

Therefore, on the basis of the above evaluation, the staff concludes that the proposed changes to TS 3.3.7 are acceptable.

3.5 Proposed Changes to TS 3.3.8

The EES for the fuel building ensures that radioactive materials in the fuel building atmosphere following an FHA inside the building are filtered prior to being discharged to the environment. This system initiates filtered exhaust from the building following receipt of a fuel building ventilation isolation signal (FBVIS) either manually or automatically upon a high radiation signal from two gaseous radiation detectors in the fuel building ventilation exhaust. The radiation detectors that initiate the FBVIS also initiate the CREVS. In addressing the proposed changes, the licensee stated that the changes are necessary to have the required actions and the completion times for these actions address the operation of CREVS when the EES instrumentation is inoperable.

The proposed changes for Conditions A, B, and C of LCO 3.3.8, which involve the functions in Table 3.3.8-1, "EES Actuation Instrumentation," are the following:

- For one or more functions in Table 3.3.8-1, with one channel or train inoperable, add the Required Action A.2 to "Place one CREVS train in Control Room Ventilation Isolation Signal (CRVIS) mode," and add the completion time of "7 days" for the required action.

- For one or more functions with two channels or two trains inoperable, revise Required Action B.1.2 by adding the phrase "of LCO 3.7.10, 'Control Room Emergency Ventilation System (CREVS),' for one CREVS train made inoperable and enter applicable Conditions and Required Actions."

- For one or more functions with two channels or two trains inoperable, revise Required Action B.2 by adding the word "EES" before trains and adding the phrase "and both CREVS trains in the CRVIS mode."

- For both radiation monitoring channels inoperable, revise Required Action C.1.1 by adding the phrase "of LCO 3.7.10, 'Control Room Emergency Ventilation System (CREVS),' for one CREVS train made inoperable and enter applicable Conditions and Required Actions."

- For both radiation monitoring channels inoperable, revise Require Action C.1.2 by adding the phrase "and one CREVS train in the CRVIS mode."

- For both radiation monitoring channels inoperable, revise Require Action C.2 by adding the word "EES" before trains and adding the phrase "and both CREVS trains in the CRVIS mode."

The above proposed required actions and completion times for LCO 3.3.8 for the operation of CREVS inoperable EES actuation instrumentation was compared to the required actions and completion times for LCO 3.3.7 for the operation of CREVS with inoperable CREVS actuation instrumentation. In proposing the above changes, the licensee has proposed to have the same required actions and completion times for CREVS operation with inoperable EES actuation instrumentation for TS 3.3.8 as the required actions and completion times for inoperable CREVS actuation instrumentation for LCO 3.3.7. For the FHA inside containment, the CREVS actuation instrumentation initiates CREVS operation and, for the FHA inside the fuel building, the EES actuation instrumentation initiates CREVS operation. Also, the word "EES" was added to the word "trains" in Required Actions B.2 and C.2 because the trains being referred to in the required actions are those in the EES actuation instrumentation, and thus are EES trains. Since the proposed changes to TS 3.3.8 result in the same required actions and completion times for CREVS operation in TS 3.3.7, the staff concludes that the proposed changes are acceptable.

3.6 Conclusion

Based on the evaluation in Sections 3.1 through 3.5, the staff concludes that the proposed amendment is acceptable.

A description of the administrative controls is given in the licensee's revised application dated June 17, 2002, and will be added to the Bases of the TSs. The staff has reviewed this description and concludes that the description accurately describes the licensee actions to close the equipment hatch and emergency air lock that the staff is relying on in approving the amendment. In addition to this description, the licensee has also provided changes to the TS Bases and to the FSAR for Callaway for changes to TSs 3.3.6, 3.3.7, and 3.3.8. The staff has no disagreements with these changes.

The licensee has agreed to incorporate the changes to the TS Bases and FSAR during the implementation of the amendment. This has been made a condition of the license.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Missouri State official was notified of the

proposed issuance of the amendment. The State official did not offer any comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to the 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 (67 FR 48222) published July 23, 2002. 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.

Attachments: 1. Table 1, Calculated Radiological Dose Consequences (Rem)
2. Table 2, Assumptions Used in Calculating Radiological Dose Consequences

Principal Contributor: Jack Donohew

Date: September 9, 2002

Table 1

CALCULATED RADIOLOGICAL DOSE CONSEQUENCES (REM)

Exclusion Area Boundary	Licensee Doses[1]	Staff Doses Amdt 114[2]	Staff Doses Amdt 129[3]	NRC Acceptance Criteria SRP 15.7.4 Guidelines
Whole Body	0.334	Not Given	Not Given	6
Thyroid	73.0	52	62.5	75

Control Room (operator)	Licensee Doses	Staff Doses Amdt 114	Staff Doses Amdt 129	NRC Acceptance Criteria GDC-19 Guidelines
Whole Body	0.453	Not Given	Not Given	5
Thyroid	25.55	3.3	3.94	Equivalent to 5 rem whole body**

[1] Doses from Callaway Final Safety Analysis Report Table 15.7-8 for the radiological consequences at the exclusion area boundary for a fuel handling accident (FHA) in the reactor building (containment), and Table 15.6-8 for the control room operator doses for a large-break loss-of-coolant accident (which bounds the FHA in the reactor building). The doses were also reported by the licensee in its letters in support of Amendment No. 114, which was issued July 15, 1996.

[2] Doses from Amendment No. 114 issued July 15, 1996. These doses were also reported in Amendment No. 138 issued September 26, 2000.

[3] Doses from Amendment No. 129 issued January 19, 1999. These doses were also reported in Amendment No. 138 issued September 26, 2000.

** Guideline doses provided in Standard Review Plan (SRP) Section 6.4 define the dose equivalent as 30 rem to the thyroid.

TABLE 2

ASSUMPTIONS USED IN CALCULATING RADIOLOGICAL DOSE CONSEQUENCES
FUEL HANDLING ACCIDENT INSIDE CONTAINMENT

Parameters	Licensee Value [1]	Staff Value[2] (Amdt 114)	Staff Value[3] (Amdt 129)
Power lever (MWt)	3636	3565	3565
Number of fuel rods damaged		264	317
Total number of fuel rods		50,952	50,952
Number of assemblies affected	1.2	1.0	1.2
Shutdown time (hours)	100	100	100
Power radial peaking factor*	1.65	1.65	1.65
Fission product release duration (hours)	2.0	2.0	2.0
Release fractions:*			
Radioiodine	10.0%	12.0%[4]	12.0%[4]
Noble gases	10.0%	10.0%	30.0%
Krypton gases	30.0%	30.0%	30.0%
Radioiodine forms:*			
Elemental	75.0%	75.0%	75.0%
Organic	25.0%	25.0%	25.0%
Receptor Point Variables (per TID-14844)			
Exclusion area boundary			
Atmospheric relative concentration, X/Q (sec/m^3)			
0-2 hours	1.5×10^{-4}	1.5×10^{-4}	1.5×10^{-4}
Control room			
Atmospheric Dispersion, X/Q (sec/m^3)	7.2×10^{-4}	7.6×10^{-4}	7.6×10^{-4}
Control room volume ($feet^3$)	$1.5 \times 10^{+5}$	$1.5 \times 10^{+5}$	Not Given
Maximum filtration rate ($feet^3$/minute)	1440	1350-2025	Not Given
Iodine Protection factor		80	80.3

[1] Callaway Final Safety Analysis Report Tables 15.7-7, 15A-1, and 15.A-2 on parameters (including control room and atmospheric dispersion factors) used in evaluating the accident analysis of a fuel handling accident inside containment.

[2] Staff parameters from Amendment No. 114 issued July 15, 1996, and No. 138 issued September 26, 2000.

[3] Staff parameters from Amendment No. 129, issued January 19, 1999, and No. 138 issued September 26, 2000.

[4] Higher extended burnup release fraction for Iodine 131 from NUREG/CR-5009

* NRC Regulatory Guide 1.25