Mr. C. Randy Hutchinson
Vice President, Operations ANO
Entergy Operations, Inc.
1448 S. R. 333
Russellville, AR 72801

April 16, 1999

SUBJECT: ARKANSAS NUCLEAR ONE, UNITS 1 AND 2 - ISSUANCE OF AMENDMENTS RE: OPEN CONTAINMENT EQUIPMENT HATCH DURING CORE ALTERATIONS (TAC NOS. M95895, M95896, MA2401, AND MA2402)

Dear Mr. Hutchinson:

The Commission has issued the enclosed Amendment No. 195 to Facility Operating License No. DPR-51 and Amendment No. 203 to Facility Operating License No. NPF-6 for the Arkansas Nuclear One (ANO), Units 1 and 2 respectively. The amendments consist of changes to the Technical Specifications (TSs) in response to your application dated June 28, 1996, as supplemented by letters dated February 23 and March 15, 1999.

The amendments revise the TSs for ANO-1 and ANO-2 to permit the containment equipment hatch to be open during handling of irradiated fuel in containment and core alterations provided that the capability for quick closure is maintained. In a letter dated November 19, 1996, the NRC staff had informed you that its review of this request had been suspended because of rulemaking activities that were then underway in the area of controlling shutdown operations. The rulemaking was subsequently canceled. The staff has, therefore, completed the review of this longstanding request and determined that the available plant-specific information pertaining to ANO was adequate to justify the issuance of the subject amendments.

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

Sincerely,
ORIGINAL SIGNED BY:
Nicholas D. Hilton, Project Manager, Section 1
Project Directorate IV & Decommissioning
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-313 and 50-368

Enclosures:
1. Amendment No. 195 to DPR-51
2. Amendment No. 203 to NPF-6
3. Safety Evaluation

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

April 16, 1999

Mr. C. Randy Hutchinson
Vice President, Operations ANO
Entergy Operations, Inc.
1448 S. R. 333
Russellville, AR 72801

SUBJECT: ARKANSAS NUCLEAR ONE, UNITS 1 AND 2 - ISSUANCE OF AMENDMENTS RE: OPEN CONTAINMENT EQUIPMENT HATCH DURING CORE ALTERATIONS (TAC NOS. M95895, M95896, MA2401, AND MA2402)

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The amendments revise the TSs for ANO-1 and ANO-2 to permit the containment equipment hatch to be open during handling of irradiated fuel in containment and core alterations provided that the capability for quick closure is maintained. In a letter dated November 19, 1996, the NRC staff had informed you that its review of this request had been suspended because of rulemaking activities that were then underway in the area of controlling shutdown operations. The rulemaking was subsequently canceled. The staff has, therefore, completed the review of this longstanding request and determined that the available plant-specific information pertaining to ANO was adequate to justify the issuance of the subject amendments.

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Docket Nos. 50-313 and 50-368

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cc w/encls: See next page

cc:

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

ENTERGY OPERATIONS, INC.

DOCKET NO. 50-313

ARKANSAS NUCLEAR ONE, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 195
License No. DPR-51

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

   A. The application for amendment by Entergy Operations, Inc. (the licensee) dated June 28, 1996, as supplemented by letters dated February 23 and March 15, 1999, 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 license 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.

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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. DPR-51 is hereby amended to read as follows:

   (2) Technical Specifications

   The Technical Specifications contained in Appendix A, as revised through Amendment No. 195 , are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

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

FOR THE NUCLEAR REGULATORY COMMISSION

Robert A Gramm

Robert A. Gramm, Chief, Section 1
Project Directorate IV & Decommissioning
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of Issuance: April 16, 1999

ATTACHMENT TO LICENSE AMENDMENT NO. 195

FACILITY OPERATING LICENSE NO. DPR-51

DOCKET NO. 50-313

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 area of change.

Remove	Insert
59	59
59b	59b

3.8.6 During the handling of irradiated fuel in the reactor building, at least one door on the personnel and emergency hatches shall be capable* of being closed. The equipment hatch cover shall also be capable* of being closed. At least 23 feet of water shall be maintained over the top of irradiated fuel assemblies seated within the reactor pressure vessel.

3.8.7 Isolation valves in lines containing automatic containment isolation valves shall be operable, or at least one shall be closed.

3.8.8 When two irradiated fuel assemblies are being moved simultaneously by the bridges within the fuel transfer canal, a minimum of 10 feet separation shall be maintained between the assemblies at all times.

3.8.9 If any of the above specified limiting conditions for fuel loading and refueling are not met, movement of fuel into the reactor core shall cease; action shall be initiated to correct the conditions so that the specified limits are met, and no operations which may increase the reactivity of the core shall be made. The provisions of Specification 3.0.3 are not applicable.

3.8.10 The reactor building purge isolation system, including the radiation monitors shall be tested and verified to be operable within 7 days prior to refueling operations. The provisions of Specification 3.0.3 are not applicable.

3.8.11 Irradiated fuel shall not be removed from the reactor until the unit has been subcritical for at least 100 hours. In the event of a complete core offload, a full core to be discharged shall be subcritical a minimum of 175 hours prior to discharge of more than 70 assemblies to the spent fuel pool. The provisions of Specification 3.0.3 are not applicable.

3.8.12 All fuel handling in the Auxiliary Building shall cease upon notification of the issuance of a tornado watch for Pope, Yell, Johnson, or Logan counties in Arkansas. Fuel handling operations in progress will be completed to the extent necessary to place the fuel handling bridge and crane in their normal parked and locked position. The provisions of Specification 3.0.3 are not applicable.

3.8.13 No loaded spent fuel shipping cask shall be carried above or into the Auxiliary Building equipment shaft unless atmospheric dispersion conditions are equal to or better than those produced by Pasquill Type D stability accompanied by a wind velocity of 2 m/sec. In addition, the railroad spur door of the Turbine Building shall be closed and the fuel handling area ventilation system shall be in operation. The provisions of Specification 3.0.3 are not applicable.

3.8.14 Loads in excess of 2000 pounds shall be prohibited from travel over fuel assemblies in the storage pool. The provisions of Specification 3.0.3 are not applicable.

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* Administrative controls shall ensure that appropriate personnel are aware that both personnel airlock doors and/or equipment hatch are open, a specific individual(s) is designated and available to close an airlock door and the equipment hatch cover following a required evacuation of the reactor building, and any obstruction(s) (e.g., cables and hoses) that could prevent closure of an airlock door and the equipment hatch cover be capable of being quickly removed.

replacement. The keff with all rods in the core and with refueling boron concentration is approximately 0.9. Specification 3.8.5 allows the control room operator to inform the reactor building personnel of any impending unsafe condition detected from the main control board indicators during fuel movement.

The specification requiring testing reactor building purge termination is to verify that these components will function as required should a fuel handling accident occur which resulted in the release of significant fission products.

Because of physical dimensions of the fuel bridges, it is physically impossible for fuel assemblies to be within 10 feet of each other while being handled.

Per specification 3.8.6, the reactor building personnel and/or emergency airlock doors and the equipment hatch may be open during movement of irradiated fuel in the reactor building provided at least one door of each airlock and the equipment hatch are capable of being closed in the event of a fuel handling accident and the plant is in REFUELING SHUTDOWN with 23 feet of water above the fuel seated within the reactor pressure vessel. Should a fuel handling accident occur inside the reactor building, at least one of the personnel and/or emergency airlock doors and the equipment hatch will be closed following evacuation of the reactor building. For closure, the equipment hatch cover will be in place with a minimum of four bolts securing the cover to the sealing surface.

Specification 3.8.11 is required as: 1) the safety analysis for the fuel handling accident was based on the assumption that the reactor had been shutdown for 100 hours ([3]); and, 2) to assure that the maximum design heat load of the spent fuel pool cooling system will not be exceeded during a full core offload.

Specification 3.8.14 will assure that damage to fuel in the spent fuel pool will not be caused by dropping heavy objects onto the fuel. Administrative controls will prohibit the storage of fuel in locations adjoining the walls at the north and south ends of the pool, in the vicinity of cask storage area and fuel tilt pool access gates.

Specifications 3.8.15 and 3.8.16 assure fuel enrichment and fuel burnup limits assumed in the spent fuel safety analyses will not be exceeded.

Specification 3.8.17 assures the boron concentration in the spent fuel pool will remain within the limits of the spent fuel pool accident and criticality analyses.

REFERENCES

(1) FSAR, Section 9.5

(2) FSAR, Section 14.2.2.3

(3) FSAR, Section 14.2.2.3.3

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

ENTERGY OPERATIONS, INC.

DOCKET NO. 50-368

ARKANSAS NUCLEAR ONE, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 203
License No. NPF-6

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

   A. The application for amendment by Entergy Operations, Inc. (the licensee) dated June 28, 1996, as supplemented by letters dated February 23 and March 15, 1999, 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 license 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-6 is hereby amended to read as follows:

   (2) Technical Specifications

   The Technical Specifications contained in Appendix A, as revised through Amendment No. 203, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

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

FOR THE NUCLEAR REGULATORY COMMISSION

Robert A Gramm

Robert A. Gramm, Chief, Section 1
Project Directorate IV & Decommissioning
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of Issuance: April 16, 1999

ATTACHMENT TO LICENSE AMENDMENT NO. 203

FACILITY OPERATING LICENSE NO. NPF-6

DOCKET NO. 50-368

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 area of change.

Remove	Insert
3/4 9-4	3/4 9-4
B 3/4 9-1	B 3/4 9-1

CONTAINMENT BUILDING PENETRATIONS

LIMITING CONDITION FOR OPERATION

3.9.4 The containment building penetrations shall be in the following status:

a. The equipment door is capable* of being closed,

b. A minimum of one door in each airlock is capable* of being closed, and

c. Each penetration providing direct access from the containment atmosphere to the outside atmosphere shall be either:

1. Closed by an isolation valve, blind flange, or manual valve, or

2. Exhausting through OPERABLE containment purge and exhaust system HEPA filters and charcoal adsorbers.

APPLICABILITY: During CORE ALTERATIONS or movement of irradiated fuel within the containment.

ACTION:

With the requirements of the above specification not satisfied, immediately suspend all operations involving CORE ALTERATIONS or movement of irradiated fuel in the containment. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.4.1 Each of the above required containment penetrations shall be determined to be in its above required conditions within 72 hours prior to the start of and at least once per 7 days during CORE ALTERATIONS or movement of irradiated fuel in the containment.

4.9.4.2 The containment purge and exhaust system shall be demonstrated OPERABLE at the following frequencies:

a. At least once per 18 months or (1) after any structural maintenance on the HEPA filter or charcoal adsorber housings, or (2) following painting, fire or chemical release in any ventilation zone communicating with the system by:

* Administrative controls shall ensure that appropriate personnel are aware that both personnel airlock doors and/or equipment door are open, a specific individual(s) is designated and available to close an airlock door and the equipment door following a required evacuation of containment, and any obstruction(s) (e.g., cables and hoses) that could prevent closure of an airlock door and the equipment door be capable of being quickly removed.

3/4.9.1 BORON CONCENTRATION

The limitations on reactivity conditions during REFUELING ensure that: 1) the reactor will remain subcritical during CORE ALTERATIONS, and 2) a uniform boron concentration is maintained for reactivity control in the water volume having direct access to the reactor vessel. These limitations are consistent with the initial conditions assumed for the boron dilution incident in the accident analyses.

3/4.9.2 INSTRUMENTATION

The OPERABILITY of the source range neutron flux monitors ensures that redundant monitoring capability is available to detect changes in the reactivity condition of the core.

3/4.9.3 DECAY TIME

The minimum requirement for reactor subcriticality prior to movement of irradiated fuel assemblies in the reactor pressure vessel ensures that sufficient time has elapsed to allow the radioactive decay of the short-lived fission products. This decay time is consistent with the assumptions used in the accident analyses.

The minimum requirement for reactor subcriticality prior to movement of more than 70 irradiated fuel assemblies to the spent fuel pool ensures that sufficient time has elapsed to allow radioactive decay of the short-lived fission products such that the heat generated will not exceed the cooling capacity of the spent fuel pool cooling system. This decay time and total assembly limitation is conservatively within the assumptions used in the accident analyses.

3/4.9.4 CONTAINMENT PENETRATIONS

The requirements on containment penetration closure and OPERABILITY of the containment purge and exhaust system HEPA filters and charcoal adsorbers ensure that a release of radioactive material within containment will be restricted from leakage to the environment or filtered through the HEPA filters and charcoal adsorbers prior to discharge to the atmosphere. The OPERABILITY and closure restrictions are sufficient to restrict radioactive material release from a fuel element rupture based upon the lack of containment pressurization potential while in the REFUELING MODE. Operation of the containment purge and exhaust system HEPA filters and charcoal adsorbers and the resulting iodine removal capacity are consistent with the assumptions of the accident analyses.

The containment personnel airlock doors may be open during movement of irradiated fuel in the containment and during CORE ALTERATIONS provided a minimum of one door in the airlock and the equipment door are capable of being closed in the event of a fuel handling accident and the plant is in MODE 6 with 23 feet of water above the fuel seated within the reactor pressure vessel. Should a fuel handling accident occur inside containment, a minimum of one personnel airlock door and the equipment door will be closed following an evacuation of containment. For closure, the equipment door will be held in place by a minimum of four bolts.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NOS. 195 AND 203 TO

FACILITY OPERATING LICENSE NOS. DPR-51 AND NPF-6

ENTERGY OPERATIONS, INC.

ARKANSAS NUCLEAR ONE, UNIT NOS. 1 AND 2

DOCKET NOS. 50-313 AND 50-368

1.0 INTRODUCTION

By letter dated June 28, 1996 (0CAN069601), as supplemented by letters dated February 23, 1999 (0CAN029905) and March 15, 1999 (0CAN039905), Entergy Operations, Inc. (the licensee), submitted a request for changes to the Arkansas Nuclear One (ANO), Units 1 and 2, Technical Specifications (TSs). The TSs currently specify that, during movement of irradiated fuel in containment and core alterations, "the equipment hatch cover shall be in place with a minimum of four bolts securing the cover to the sealing surface." The proposed amendments would revise the TSs to permit the containment equipment hatch to be open during handling of irradiated fuel in containment and during core alterations subject to the condition that capability for quick containment closure be maintained.

The licensee has previously requested similar amendments to permit the air locks to be open during core alterations. Amendment 166 was issued for ANO-2 on September 28, 1995, and Amendment 184 was issued for ANO-1 on September 26, 1996, granting the requested changes pertaining to the air locks. In a letter dated November 19, 1996, the Nuclear Regulatory Commission (NRC) staff informed the licensee that the review of the request pertaining to the equipment hatch had been suspended because of rulemaking activities that were then underway in the area of controlling shutdown operations. The rulemaking was subsequently canceled and the staff reinitiated its review of the amendment request pertaining to the control of the equipment hatches at ANO during core alterations.

The February 23 and March 15, 1999, letters provided clarifying information that did not change the scope of the original application and the initial proposed no significant hazards consideration determination.

2.0 BACKGROUND

Containment barriers are provided for nuclear power plants as the final barrier of the defense-in-depth concept to protect against the uncontrolled release of radioactivity to the environs. The containment function, in combination with other fission product barriers and accident mitigating systems, limits the radiological dose consequences of design-basis transients and accidents to less than the regulatory limits defined by Title 10 of the Code of Federal Regulations (10 CFR) Part 100.

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Prior to 1977, the staff did not require licensees to analyze the radiological consequences of a fuel handling accident inside containment (FHA-IC), since the FHA-IC accident consequences were bounded by the "outside containment" FHA case. However, on January 3, 1977, Commissioner Victor Gilinsky received a letter from Mr. Robert Pollard that forwarded information indicating that fuel handling accidents in containment could have potential radiological dose consequences in excess of Part 100 limits if containment isolation and filtration were not available. Subsequently, on January 14, 1977, B. Rusche, Director of the Office of Nuclear Reactor Regulation, requested all nuclear power reactor licensees having an operating license (including Arkansas Power & Light Company) to act on Mr. Pollard's request to analyze the radiological consequences of an FHA-IC, and provide the results to the staff. As part of its reviews, the staff ensured that TSs included containment and engineered safety feature filtration systems operability requirements during handling of irradiated fuel in containment, to the extent necessary to ensure acceptable accident consequences. Prior to this generic action, facilities' TSs did not typically require that containment integrity be maintained during periods when the reactor coolant system temperature was ≤ 210 °F, but only required that containment vent/purge isolation systems be operable. In a July 1981 revision to the Standard Review Plan (SRP), Section 15.7.4 was revised to specifically require the analysis of an FHA-IC, since the guidance of Regulatory Guide 1.25 (March 1972) assumes an accident in the "fuel handling and storage facility."

The acceptance criteria of SRP 15.7.4, paragraph II.5, allow a containment to be "open" to the environment during fuel handling, it being expected that the containment will be undergoing ventilation to minimize worker radiation exposure and for worker comfort. However, if fuel handling operations are to be conducted with the containment open, capability for prompt detection of radiation and automatic isolation is to be provided and reflected in the analysis of FHA radiological consequences. The ANO licensee's proposal would result in containment conditions wherein containment closure would not meet these criteria (i.e., would not be automatic and immediate). Equipment hatch closure time would require manual actions taking up to possibly 15 minutes.

For the purpose of evaluating the ANO application, the staff focused on two features:
(1) acceptability of manual personnel actions to initiate containment closure, and
(2) acceptability, from the standpoint of incremental dose increase, of the additional time delay in closing the containment. The acceptability of dependence on manual operator actions for operation of safety systems is well-recognized for actions required in the "long-term" phase of an accident (i.e., loss-of-coolant accident post-recirculation switchover). For short-term required actions, the staff accepts limited operator manual actions as substitutes for automatic controls subject to a stringent review of human factors considerations including implementation of appropriate procedures and training.

3.0 EVALUATION

The staff undertook discussions with the licensee regarding the human factors considerations and reliability considerations involved in the use of manual personnel action to close the containment under FHA conditions. The staff found that during outages, the licensee designates a "Reactor Building Coordinator" (RBC) to be responsible for containment evacuation and closure in the event of an FHA-IC or potential loss of decay heat removal. The RBC is trained on the containment evacuation and hatch closure procedure. All individuals

qualified for the RBC position are given "dry runs" in hatch closure. Also, unannounced drills are conducted. The RBC position is continuously manned during an outage. The RBC is responsible for air lock closure in addition to all other penetrations. The air lock location is an approximately 3-minute walk from the equipment hatch. The RBC has other duties during an outage and is in direct contact with the outage desk at all times. In the event of an accident, the RBC would be immediately dedicated to the task of evacuating the containment and establishing containment closure. In this configuration, the containment has multiple evacuation pathways, which include the equipment hatch, the personnel air lock, and the escape hatch. By letter dated June 28, 1996, the licensee stated that the equipment hatch could be closed within 15 minutes based on the performance of plant personnel during drills. By letter dated March 15, 1999, the licensee committed to closing the equipment hatch within 30 minutes of the determination of the need to evacuate containment. The NRC staff has based its conclusions, in part, on the licensee's 30-minute closure time for the containment equipment hatch. The NRC staff has concluded that the 30-minute closure time is an appropriate time limit to allow for the evacuation of personnel from containment while ensuring that the equipment hatch is in place to provide a barrier in the event of an accident. In addition, based on the number of evacuation pathways, it is reasonable to ensure the closure of the equipment hatch within 30 minutes regardless of the status of the evacuation.

The radiological consequences of an FHA-IC were submitted by the licensee in support of previous amendments (Amendment No. 166 (ANO-2) and Amendment No. 184 (ANO-1)) pertaining to the control of airlock doors during fuel handling. The staff also performed confirmatory analyses related to possible offsite and control room doses for FHA-IC as part of its evaluations that justified approval of Amendments 184 and 166. The methodology used the guidance of SRP Section 15.7.4. and Regulatory Guides 1.4 and 1.25 and results were found acceptable in the safety evaluation. The fission products from the damaged fuel bundle that had been subcritical for at least 100 hours were assumed to be instantaneously released into water covering the fuel and then released from the containment over a 2-hour period. The thyroid doses calculated by the staff for the exclusion area boundary were 33.0 rem for ANO-2 and 52 rem for ANO-1. The dose acceptance criteria in the SRP for the fuel handling accident are well below the 10 CFR Part 100 criteria. For the limiting dose organ (the thyroid), the well-below dose criterion is 75 rem at the exclusion area boundary. Other doses (whole body and control room) were found to be a smaller fraction of the acceptance criteria. The analysis model for the FHA-IC for Amendments 184 and 166 assumed that all of the radioactive material released to the containment escapes the containment within 2 hours. Given the conservative nature of the calculations, the results are applicable to and support the case for allowing equipment hatch closure following the actual damage of a fuel assembly during an FHA. Based on the proposed requirement to maintain the capability to close the equipment hatch and on the conservative nature of the referenced calculations, the staff finds that the potential radiological consequences of an FHA-IC at ANO-1 or ANO-2 remain well-below the criteria of 10 CFR Part 100. There is also a potentially beneficial effect of an open equipment hatch on radiological consequences of an FHA-IC. The staff finds credible the licensee's statement that the exposure of personnel in containment (and perhaps overall radiological consequences) could be lower as a result of the faster evacuation of containment if an FHA-IC occurred when an equipment hatch is available as an escape route.

In NUREG-1449, "Shutdown and Low-Power Operation at Commercial Nuclear Power Plants in the United States," Final Report, September 1993, the staff reported the findings of an investigation of shutdown risk. Paragraph 6.9.1 of the report noted that a closed containment

can provide a significant reduction in the potential radiological dose associated with loss of decay heat removal and severe core damage. The report also noted that in the event of boiling, workers could be exposed to considerable radiation. In view of these findings, the staff has determined that, if containment penetrations and the reactor coolant system are both open during shutdown operations, the containment should be capable of closure prior to coolant boiling. As discussed in NUREG-1449, an open equipment hatch will be the most limiting containment opening with respect to establishment of containment closure in the event of an outage accident. Therefore, the staff has determined that, with respect to loss of decay heat removal considerations, the equipment hatch should be permitted to be open during fuel handling in containment subject to the condition that it can be closed prior to coolant boiling.

Paragraph 6.9.2 of NUREG-1449 identifies the considerations involved in rapid equipment hatch closure. They are: (1) radiological and environmental conditions in containment resulting from coolant boiling, (2) number and location of hatch closure bolts, (3) need for and availability of compressed air and electrical power, (4) nearness of required tools, and (5) training and rehearsing of personnel. Each of these five factors are discussed below.

(1) Radiological and environmental conditions in containment resulting from coolant boiling: This item is not a consideration for the proposed amendment, as the staff has determined that the hatch must be capable of being closed prior to boiling.

(2) Number and location of hatch closure bolts: Appendix B of NUREG-1449 provides the details of the staff's Equipment Hatch Survey conducted as part of the NUREG-1449 investigation. It is noted that the ANO hatch design is particularly well-suited for rapid closure in that it uses swing bolting, and no access platform is required. At times, a temporary hatch closure, which provides more rapid closure capability, is installed.

(3) Need for and availability of compressed air and electrical power: Table B.2 of NUREG-1449 notes that ANO equipment hatch closure does not require services such as compressed air or electrical power. The ANO equipment hatch can be rapidly closed without service power.

(4) Nearness of required tools: NUREG-1449, paragraph 3.3.8, notes that at ANO tools are kept in a closed box at the hatch and are clearly labeled for emergency use.

(5) Training and rehearsing of personnel: NUREG-1449, paragraph 3.3.8, notes that the investigation team found that "Arkansas Nuclear One had a requirement that an equipment hatch be capable of closure within 15 minutes of a loss of RHR [residual heat removal]. Responsibilities were established for such actions as notifications of loss of RHR, containment evacuation, closure operations, and verifications. Unannounced closure exercises had been conducted." The investigator stated that "few other sites were as well-prepared." (The investigation team visited 11 sites.)

Based on the onsite findings of the NUREG-1449 investigation team, and the information documented in the application, the proposed amendments are acceptable with respect to shutdown risk loss of decay heat removal considerations.

Generic Letter (GL) 88-17, "Loss of Decay Heat Removal," discusses problems with shutdown modes of plant operation, provides recommendations, and requests information from licensees pertaining to (1) prevention of accident initiation, (2) mitigation of accidents before they

potentially progress to core damage, and (3) control of radioactive material if a core damage accident should occur. The guidance provided by GL 88-17, including the recommended time limits for closure of containment penetrations, is primarily aimed at reduced inventory "mid-loop" operations, a condition of increased vulnerability to core damage due to a more rapid boiloff. The proposed amendments would apply primarily to refueling operations during which there is a greatly increased inventory compared to the events described in GL 88-17. The staff has previously found that the ANO licensee has implemented plans and procedures to comply with the GL 88-17 guidance related to loss of decay heat removal during shutdown operations. The bases for the staff's acceptance of the licensee's response to GL 88-17 is not affected by the changes included in the proposed amendments.

The staff has determined that the proposed amendments are acceptable with respect to the potential dose consequences of a fuel handling accident inside containment. The staff has also determined that the proposed amendments are consistent with precautions considered necessary to minimize the risks associated with a loss of decay heat removal during outage operations. Based on these findings, the staff concludes that the proposed amendments are acceptable.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Arkansas State official was notified of the proposed issuance of the amendments. The State official had no comment.

5.0 ENVIRONMENTAL CONSIDERATION

The amendments change a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration and there has been no public comment on such finding (61 FR 42280, August 14, 1996). Accordingly, the amendments meet 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 amendments.

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

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