



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

July 18, 2007

Mr. Timothy G. Mitchell
Vice President, Operations
Arkansas Nuclear One
Entergy Operations, Inc.
1448 S. R. 333
Russellville, AR 72802

SUBJECT: ARKANSAS NUCLEAR ONE, UNITS 1 AND 2 - CONFORMING LICENSE
AMENDMENTS TO INCORPORATE THE MITIGATION STRATEGIES
REQUIRED BY SECTION B.5.b. OF COMMISSION ORDER EA-02-026
(TAC NOS. MD4494 AND MD4495)

Dear Mr. Mitchell:

This letter documents the results of the U.S. Nuclear Regulatory Commission (NRC) staff's regulatory assessment of the adequacy of the actions taken by the Entergy Operations, Inc., for the Arkansas Nuclear One, Units 1 and 2, in response to Section B.5.b. of the February 25, 2002, Interim Compensatory Measures (ICM) Order (EA-02-026) and related NRC guidance.

The ICM Order was issued following the events of September 11, 2001, as part of a comprehensive effort by the NRC, in coordination with other government agencies, to improve the capabilities of commercial nuclear reactor facilities to respond to terrorist threats. Section B.5.b. of the Order required licensees to develop specific guidance and strategies to maintain or restore core cooling, containment, and spent-fuel pool cooling capabilities using existing or readily available resources (equipment and personnel) that could be effectively implemented under the circumstances associated with loss of large areas of the plant due to explosions or fire, including those that an aircraft impact might create. Although it was recognized prior to September 11, 2001, that nuclear reactors already had significant capabilities to withstand a broad range of attacks, implementing these mitigation strategies would significantly enhance the plants' capabilities to withstand a broad range of threats. It should be noted that portions of the ICM Order, as well as other documents referenced in this letter, contain security-related or safeguards information, and are not publicly available.

Licensee actions to implement Section B.5.b mitigation strategies have been ongoing since the issuance of the 2002 ICM Order. In 2005, the NRC issued guidance to more fully describe the NRC staff's expectations for implementing Section B.5.b of the ICM Order. The NRC guidance relied upon lessons learned from detailed NRC engineering studies and industry best practices. Additionally, the NRC conducted two on-site team assessments at each reactor facility that identified additional mitigating strategies for preservation of core cooling, containment integrity, and spent fuel pool cooling. In total, these efforts have added defense in depth through the use of additional equipment and strategies. Moreover, these enhancements that have strengthened the interface between plant safety and security operations now include fire-fighting response strategies; plant operations to mitigate fuel damage; and actions to minimize releases.

NOTICE: The attachments to the Safety Evaluation contain Security-Related Information. Upon separation from these attachments, this letter and Enclosures 1 and 2 are DECONTROLLED.

T. G. Mitchell

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The enclosed Safety Evaluation (SE) details the interactions between the NRC staff and the Entergy Operations, Inc., as well as the rest of the nuclear industry, related to the final resolution of Section B.5.b. of the ICM Order.

The NRC is incorporating requirements for the B.5.b mitigating strategies into the Facility Operating Licenses. This letter, therefore, also transmits the license condition that captures the ICM Order Section B.5.b mitigation strategy requirements and incorporates them into the licensing basis.


This proposed license condition was transmitted by the NRC to the Entergy Operations, Inc., in a letter dated October 13, 2006. By letter dated January 10, 2007, the Entergy Operations, Inc., informed the NRC staff that it would accept the proposed license condition, with a minor change that the NRC staff finds acceptable. The effectiveness of the licensee's actions to implement the mitigative strategies contained in this license condition will be subject to future NRC review and inspection.

Consistent with the Order, administrative license changes to Renewed Facility Operating License Nos. DPR-51 and NPF-6 for the Arkansas Nuclear One, Units 1 and 2, respectively, are being made to incorporate the agreed upon license condition. These changes comply with the standards and requirements of the Atomic Energy Act of 1954, as amended, and the Commission's rules and regulations set forth in Title 10 of the *Code of Federal Regulations* (10 CFR) Chapter I. In addition, formatting and editorial changes were made to both licenses at the request of the licensee. Please replace the affected pages of the Renewed Facility Operating Licenses with the enclosed pages (Enclosure 1).

The attachments to the SE are designated exempt from public disclosure under 10 CFR 2.390(d)(1) since they contain security-related information and are Official Use Only.

If you have any questions, please contact me at (301) 415-1445.

Sincerely,

for 

Alan B. Wang, Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-313 and 50-368

Enclosures:

1. Revised Pages of Renewed Facility Operating License Nos. DPR-51 and NPF-6
2. Safety Evaluation

cc w/o atts to Encl. 2: See next page

Arkansas Nuclear One

cc w/o atts to Encl. 2:
Executive Vice President
& Chief Operating Officer
Entergy Operations, Inc.
P.O. Box 31995
Jackson, MS 39286-1995

General Manager Plant
Operations
Entergy Operations, Inc.
Arkansas Nuclear One
1448 SR 333
Russellville, AR 72802

Director, Nuclear Safety Assurance
Entergy Operations, Inc.
Arkansas Nuclear One
1448 SR 333
Russellville, AR 72802

Manager, Licensing
Entergy Operations, Inc.
Arkansas Nuclear One
1448 SR 333
Russellville, AR 72802

Director, Nuclear Safety & Licensing
Entergy Operations, Inc.
1340 Echelon Parkway
Jackson, MS 39213-8298

Section Chief, Division of Health
Radiation Control Section
Arkansas Department of Health and
Human Services
4815 West Markham Street, Slot 30
Little Rock, AR 72205-3867

Section Chief, Division of Health
Emergency Management Section
Arkansas Department of Health and
Human Services
4815 West Markham Street, Slot 30
Little Rock, AR 72205-3867

Senior Resident Inspector
U.S. Nuclear Regulatory Commission
P.O. Box 310
London, AR 72847

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

County Judge of Pope County
100 W. Main Street
Russellville, AR 72801

Vice President, Operations Support
Entergy Operations, Inc.
P.O. Box 31995
Jackson, MS 39286-1995

ENCLOSURE 1

REVISED PAGES OF RENEWED FACILITY OPERATING LICENSE NOS. DPR-51 AND NPF-6

DOCKET NOS. 50-313 AND 50-368

ARKANSAS NUCLEAR ONE, UNIT NOS. 1 AND 2

Replace the following pages of the Facility Operating Licenses. The revised pages are identified by the date of the letter issuing these pages and contain marginal lines indicating the areas of change.

REMOVE

License DPR-51

Page 2
Page 3
Page 4
Page 5

License NPF-6

Page 2
Page 3
Page 4
Page 5
Page 6
Page 7
Page 8
Page 9

INSERT

License DPR-51

Page 2
Page 3
Page 4
Page 5
Page 6

License NPF-6

Page 2
Page 3
Page 4
Page 5
Page 6
Page 7
Page 8

- g. The renewal of this operating license will not be inimical to the common defense and security or to the health and safety of the public;
 - h. After weighing the environmental, economic, technical, and other benefits of the facility against environmental costs and considering available alternatives, the issuance of the renewed Facility Operating License No. DPR-51 is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied; and
 - i. The receipt, possession, and use of source, byproduct and special nuclear material as authorized by this renewed license will be in accordance with the Commission's regulations in 10 CFR Parts 30, 40 and 70, including 10 CFR Section 30.33, 40.32, 70.23 and 70.31.
2. On the basis of the foregoing findings regarding this facility, Facility Operating License DPR-51, issued on May 21, 1974, is superceded by renewed Facility Operating License No. DPR-51, which is hereby issued to Entergy Arkansas, Inc. and Entergy Operations, Inc. to read as follows:
- a. This renewed license applies to Arkansas Nuclear One, Unit 1, a pressurized water reactor and associated equipment (the facility), owned by Entergy Arkansas, Inc. The facility is located in Pope County, Arkansas, and is described in the "Safety Analysis Report" (SAR) as supplemented and amended, and the Environmental Report as supplemented and amended.
 - b. Subject to the conditions and requirements incorporated herein, the Commission hereby licenses:
 - (1) Entergy Arkansas, Inc., pursuant to Section 104b of the Act and 10 CFR Part 50, to possess but not operate the facility at the designated location in Pope County, Arkansas, in accordance with the procedures and limitations set forth in this renewed license.
 - (2) EOI, pursuant to Section 104b of the Act and 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," to possess, use, and operate the facility at the designated location in Pope County, Arkansas in accordance with the procedures and limitations set forth in this renewed license;
 - (3) EOI, pursuant to the Act and 10 CFR Part 70, to receive, possess and use at any time at the facility site and as designated solely for the facility, special nuclear material as reactor fuel, in accordance with the limitations for storage and amounts required for reactor operation, as described in the SAR, as supplemented and amended;
 - (4) EOI, pursuant to the Act and 10 CFR Parts 30, 40 and 70, to receive, possess and use at any time any byproduct, source and special nuclear material as sealed neutron sources for reactor startup, sealed sources for reactor instrumentation and radiation monitoring equipment calibration, and as fission detectors in amounts as required;

- (5) EOI, pursuant to the Act and 10 CFR Parts 30, 40 and 70, to receive, possess and use in amounts as required any byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components;
- (6) EOI, pursuant to the Act and 10 CFR Parts 30 and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility.

c. This renewed license shall be deemed to contain and is subject to the conditions specified in the following Commission regulations in 10 CFR Chapter I: Part 20, Section 30.34 of Part 30, Section 40.41 of Part 40, Sections 50.54 and 50.59 of Part 50, and Section 70.32 of Part 70; is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

(1) Maximum Power Level

EOI is authorized to operate the facility at steady state reactor core power levels not in excess of 2568 megawatts thermal.

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 230, are hereby incorporated in the renewed license. EOI shall operate the facility in accordance with the Technical Specifications.

(3) Safety Analysis Report

The licensee's SAR supplement submitted pursuant to 10 CFR 54.21(d), as revised on March 14, 2001, describes certain future inspection activities to be completed before the period of extended operation. The licensee shall complete these activities no later than May 20, 2014.

(4) Physical Protection

EOI shall fully implement and maintain in effect all provisions of the Commission-approved physical security, training and qualification, and safeguards contingency plans, including amendments made pursuant to provisions of the Miscellaneous Amendments and Search Requirements revisions to 10 CFR 73.55 (51 FR 27817 and 27822) and to the authority of 10 CFR 50.90 and 10 CFR 50.54(p). The combined set of plans, which contains Safeguards Information protected under 10 CFR 73.21, is entitled: "Arkansas Nuclear One Physical Security Plan, Training and Qualifications Plan, and Safeguards Contingency Plan," as submitted on May 4, 2006.

(5) Implementation of the Improved Technical Specifications (ITS)

The licensee is authorized to relocate certain Technical Specification requirements previously included in Appendix A to licensee controlled documents, as described in Table R, Relocated Specifications, and Table LA, Removal of Details, attached to the Safety Evaluation for Amendment No. 215. These requirements shall be relocated to the appropriate documents as part of the implementation of the ITS.

The schedule for performing Surveillance Requirements (SRs) that are new or revised in Amendment No. 215 shall be as follows:

1. For SRs that are new in this amendment, the first performance shall be due at the end of the first surveillance interval, which begins on the date of implementation of this amendment.
2. For SRs that existed prior to this amendment whose intervals of performance are being reduced, the first reduced surveillance interval shall begin upon completion of the first surveillance performed after implementation of this amendment.
3. For SRs that existed prior to this amendment that contained modified acceptance criteria, the performance shall be due at the end of the first surveillance interval that began on the date the surveillance was last performed prior to the implementation of this amendment.
4. For SRs that existed prior to this amendment whose interval of performance are being extended, the first extended surveillance interval shall begin upon completion of the last surveillance performed prior to the implementation of this amendment.

(6) Deleted

(7) Deleted

(8) Fire Protection

EOI shall implement and maintain in effect all provisions of the approved Fire Protection Program as described in Appendix 9A to the SAR and as approved in the Safety Evaluation dated March 31, 1992, subject to the following provision:

1. AP&L¹ may proceed with and is required to complete the modifications identified in Paragraphs 3.1 through 3.19 of the NRC's Fire Protection Safety Evaluation on the facility dated August 22, 1978, and supplements thereto. These modifications shall be completed as specified in Table 3.1 of the Safety Evaluation Report or supplements thereto. In addition, the licensee may proceed with and is required to complete the modifications identified in Supplement 1 to the Fire Protection Safety Evaluation Report, and any future supplements. These modifications shall be completed by the dates identified in the supplement.
2. The licensee may make changes to the approved Fire Protection Program without prior approval of the Commission only if those changes would not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire.

(9) Mitigation Strategies

The licensee shall develop and maintain strategies for addressing large fires and explosions that include the following key areas:

1. Fire fighting response strategy with the following elements:
 - (a) Pre-defined coordinated fire response strategy and guidance
 - (b) Assessment of mutual aid fire fighting assets
 - (c) Designated staging areas for equipment and materials
 - (d) Command and control
 - (e) Training of response personnel
2. Operations to mitigate fuel damage considering the following:
 - (a) Protection and use of personnel assets
 - (b) Communications
 - (c) Minimizing fire spread
 - (d) Procedures for implementing integrated fire response strategy
 - (e) Identification of readily-available pre-staged equipment
 - (f) Training on integrated fire response strategy
 - (g) Spent fuel pool mitigation measures
3. Actions to minimize release to include consideration of:
 - (a) Water spray scrubbing
 - (b) Dose to onsite responders

¹ The Original licensee authorized to possess, use, and operate the facility was AP&L. Consequently, certain historical references to AP&L remain in the license conditions.

3. This renewed license is effective as of the date of issuance and shall expire at midnight, May 20, 2034.

FOR THE NUCLEAR REGULATORY COMMISSION

Original Signed by:
Jon R. Johnson

Jon R. Johnson, Acting Director
Office of Nuclear Reactor Regulation

Attachment:

Appendix A - Technical Specifications and
Technical Specifications Bases (ML011710071 and ML011710100)

Date of Issuance: June 20, 2001

- F. EOI is technically and financially qualified to engage in the activities authorized by this renewed operating license in accordance with the regulations of the Commission;
 - G. Entergy Arkansas, Inc. has satisfied the applicable provisions of 10 CFR Part 140, "Financial Protection Requirements and Indemnity Agreements," of the Commission's regulations;
 - H. The issuance of this renewed operating license will not be inimical to the common defense and security or to the health and safety of the public;
 - I. After weighing the environmental, economic, technical and other benefits of the facility against environmental and other costs and considering available alternatives, the issuance of Renewed Facility Operating License No. NPF-6 subject to the conditions for protection of the environment set forth herein, is in accordance with 10 CFR Part 51 (formerly Appendix D to 10 CFR Part 50) of the Commission's regulations and all applicable requirements have been satisfied; and
 - J. The receipt, possession, and use of source, byproduct and special nuclear material as authorized by this renewed license will be in accordance with the Commission's regulations in 10 CFR Parts 30, 40 and 70, including 10 CFR Sections 30.33, 40.32, 70.23 and 70.31.
2. Facility Operating License No. NPF-6, issued September 1, 1978, is superceded by Renewed Facility Operating License No. NPF-6, which is hereby issued to Entergy Arkansas, Inc. and Entergy Operations, Inc. to read as follows:
- A. This renewed license applies to Arkansas Nuclear One, Unit 2, a pressurized water reactor and associated equipment (the facility) owned by Entergy Arkansas, Inc. The facility is located in Pope County, Arkansas and is described in the Final Safety Analysis Report as supplemented and amended (Amendments 20 through 47) and the Environmental Report as supplemented and amended (Amendments 1 through 7).
 - B. Subject to the conditions and requirements incorporated herein, the Commission hereby licenses:
 - (1) Entergy Arkansas, Inc. pursuant to Section 103 of the Act and 10 CFR Part 50, to possess, but not operate, the facility at the designated location in Pope County, Arkansas in accordance with the procedures and limitations set forth in this renewed license.
 - (2) EOI, pursuant to Section 103 of the Act and 10 CFR Part 50, "Licensing of Production and Utilization Facilities," to possess, use, and operate the facility at the designated location in Pope County, Arkansas in accordance with the procedures and limitations set forth in this renewed license;
 - (3) EOI, pursuant to the Act and 10 CFR Part 70, to receive, possess and use at any time at the facility site and as designated solely for the facility, special nuclear material as reactor fuel, in accordance with the limitations for storage and amounts required for reactor operation; as described in the Final Safety Analysis Report, as supplemented and amended;

- (4) EOI, pursuant to the Act and 10 CFR Parts 30, 40 and 70 to receive, possess and use at any time any byproduct, source and special nuclear material as sealed neutron sources for reactor startup, sealed sources for reactor instrumentation and radiation monitoring equipment calibration, and as fission detectors in amounts as required;
- (5) EOI, pursuant to the Act and 10 CFR Parts 30, 40 and 70, to receive, possess, and use in amounts as required any byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components; and
- (6) EOI, pursuant to the Act and 10 CFR Parts 30 and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility.

C. This renewed license shall be deemed to contain and is subject to conditions specified in the following Commission regulations in 10 CFR Chapter 1; Part 20, Section 30.34 of Part 30, Section 40.41 of Part 40, Sections 50.54 and 50.59 of Part 50, and Section 70.32 of Part 70; and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

(1) Maximum Power Level

EOI is authorized to operate the facility at steady state reactor core power levels not in excess of 3026 megawatts thermal. Prior to attaining this power level EOI shall comply with the conditions in Paragraph 2.C.(3).

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 272 are hereby incorporated in the renewed license. The licensee shall operate the facility in accordance with the Technical Specifications.

Exemptive 2nd paragraph of 2.C.2 deleted per Amendment 20, 3/3/81.

(3) Additional Conditions

The matters specified in the following conditions shall be completed to the satisfaction of the Commission within the stated time periods following issuance of the renewed license or within the operational restrictions indicated. The removal of these conditions shall be made by an amendment to the renewed license supported by a favorable evaluation by the Commission.

2.C.(3)(a) Deleted per Amendment 24, 6/19/81.

(b) Fire Protection

EOI shall implement and maintain in effect all provisions of the approved fire protection program as described in Amendment 9A to the Safety Analysis Report and as approved in the Safety Evaluation dated March 31, 1992, subject to the following provision:

The licensee may make changes to the approved fire protection program without prior approval of the Commission only if those changes would not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire.

(c) Less Than Four Reactor Coolant Pump Operation

EOI shall not operate the reactor in operational Modes 1 and 2 with fewer than four reactor coolant pumps in operation, except as allowed by Special Test Exception 3.10.3 of the facility Technical Specifications.

2.C.(3)(d) Deleted per Amendment 24, 6/19/81.

- (e) Arkansas Power & Light (AP&L)¹ shall complete the following modifications by the indicated dates in accordance with the staff's findings as set forth in the fire protection evaluation report, NUREG-0223 "Fire Protection Safety Evaluation Report."

Implementation Dates for Proposed Modifications

Applicable Section of NUREG-0223		Date
3.1	Portable Radio Communication Equipment	March 31, 1979
3.2	Separation of Power Cables in Manholes	*
3.3	Protection from Water Spray	*
3.4	Protection of Redundant Cables in the MCC Room (2096-M)	December 30, 1978
3.5	Protection of Redundant Cables in the Hallway – Elevation 372 (2109-U)	*, **
3.6	Protection of Redundant Cables in the Cable Spreading Room (2098-L)	*
3.7	Protection of Redundant Cables in the Switchgear Room (2100-Z)	*

¹ AP&L is the predecessor to Entergy Arkansas, Inc.

Applicable
Section of
NUREG-0223

Date

3.8	Protection of Redundant Cables in the Electrical Equipment Room (2091-BB)	September 30, 1978
3.9	Protection of Redundant Cables in the Lower South Piping Penetration Room (2111-T)	September 30, 1978
3.10	Protection of Safe Shutdown Cables in the Upper South Piping Penetration Room (2084-DD)	September 30, 1978
3.11	Protection of Redundant Reactor Protection System Cables (2136-I)	*, **
3.12	Fire Dampers	September 30, 1978
3.13	Portable Extinguisher for the Control Room (2199-J)	November 15, 1978
3.14	Smoke Detectors	*, **
3.15	Manual Hose Stations (2055-JJ, 2084-DD, Containment, Elev. 317' of Auxiliary Building)	*, **
3.16	Portable Smoke Exhaust Equipment	December 1, 1978
3.17	Emergency Lighting	December 1, 1978
3.18	Reactor Coolant Pump Oil Collection System	*
3.19	Control of Fire Doors	March 31, 1979
3.20	Administrative Control Changes	December 1, 1978

(Numbers in parentheses refer to fire zone designations in the AP&L fire hazards analysis.)

* Prior to startup following the first regularly scheduled refueling outage.

** Technical Specifications covering these items should be proposed not later than 90 days prior to implementation.

2.C.(3)(f) Deleted per Amendment 24, 6/19/81.

2.C.(3)(g) Deleted per Amendment 93, 4/25/89.

2.C.(3)(h) Deleted per Amendment 29, (3/4/82) and its correction letter, (3/15/82).

(i) Containment Radiation Monitor

AP&L shall, prior to July 31, 1980 submit for Commission review and approval documentation which establishes the adequacy of the qualifications of the containment radiation monitors located inside the containment and shall complete the installation and testing of these instruments to demonstrate that they meet the operability requirements of Technical Specification No. 3.3.3.6.

2.C.(3)(j) Deleted per Amendment 7, 12/1/78.

2.C.(3)(k) Deleted per Amendment 12, 6/12/79 and Amendment 31, 5/12/82.

2.C.(3)(l) Deleted per Amendment 24, 6/19/81.

2.C.(3)(m) Deleted per Amendment 12, 6/12/79.

2.C.(3)(n) Deleted per Amendment 7, 12/1/78.

2.C.(3)(o) Deleted per Amendment 7, 12/1/78.

2.C.(3)(p) Deleted per Amendment 255, 9/28/04.

2.C.(4) (Number has never been used.)

2.C.(5) Deleted per Amendment 255, 9/28/04.

2.C.(6) Deleted per Amendment 255, 9/28/04.

2.C.(7) Deleted per Amendment 78, 7/22/86.

(8) Antitrust Conditions

EOI shall not market or broker power or energy from Arkansas Nuclear One, Unit 2. Entergy Arkansas, Inc. is responsible and accountable for the actions of its agents to the extent said agent's actions affect the marketing or brokering of power or energy from ANO, Unit 2.

(9) Rod Average Fuel Burnup

Entergy Operations is authorized to operate the facility with an individual rod average fuel burnup (burnup averaged over the length of a fuel rod) not to exceed 60 megawatt-days/kilogram of uranium.

(10) Mitigation Strategies

The licensee shall develop and maintain strategies for addressing large fires and explosions that include the following key areas:

- (i) Fire fighting response strategy with the following elements:
 1. Pre-defined coordinated fire response strategy and guidance
 2. Assessment of mutual aid fire fighting assets
 3. Designated staging areas for equipment and materials
 4. Command and control
 5. Training of response personnel
- (ii) Operations to mitigate fuel damage considering the following:
 1. Protection and use of personnel assets
 2. Communications
 3. Minimizing fire spread
 4. Procedures for implementing integrated fire response strategy
 5. Identification of readily-available pre-staged equipment
 6. Training on integrated fire response strategy
 7. Spent fuel pool mitigation measures
- (iii) Actions to minimize release to include consideration of:
 1. Water spray scrubbing
 2. Dose to onsite responders

D. Physical Protection

EOI shall fully implement and maintain in effect all provisions of the Commission-approved physical security, training and qualification, and safeguards contingency plans, including amendments made pursuant to provisions of the Miscellaneous Amendments and Search Requirements revisions to 10 CFR 73.55 (51 FR 27817 and 27822) and to the authority of 10 CFR 50.90 and 10 CFR 50.54(p). The combined set of plans, which contains Safeguards Information protected under 10 CFR 73.21, is entitled: "Arkansas Nuclear One Physical Security, Safeguards Contingency and Training & Qualification Plan," as submitted on May 4, 2006.

E. This renewed license is subject to the following additional condition for the protection of the environment:

Before engaging in additional construction or operational activities which may result in an environmental impact that was not evaluated by the Commission, EOI will prepare and record an environmental evaluation for such activity. When the evaluation indicates that such activity may result in a significant adverse environmental impact that was not evaluated, or that is significantly greater than that evaluated, in the Final Environmental Statement (NUREG-0254) or any addendum thereto, and other NRC environmental impact assessments, EOI shall provide a written evaluation of such activities and obtain prior approval from the Director, Office of Nuclear Reactor Regulation.

F. Updated Final Safety Analysis Report Supplement

The Final Safety Analysis Report supplement, as revised, shall be included in the next scheduled update to the Final Safety Analysis Report required by 10 CFR 50.71(e)(4) following issuance of this renewed license. Until that update is complete, ANO-2 may make changes to the programs and activities described in the supplement without prior Commission approval, provided that ANO-2 evaluates each such change pursuant to the criteria set forth in 10 CFR 50.59 and otherwise complies with the requirements of that section.

The ANO-2 Final Safety Analysis Report supplement, submitted pursuant to 10 CFR 54.21(d), describes certain future activities to be completed prior to the period of extended operation. ANO-2 shall complete these activities no later than July 17, 2018, and shall notify the NRC in writing when implementation of these activities is complete and can be verified by NRC inspection.

G. Reactor Vessel Material Surveillance Capsules

All capsules in the reactor vessel that are removed and tested must meet the test procedures and reporting requirements of American Society for Testing and Materials (ASTM) E 185-82 to the extent practicable for the configuration of the specimens in the capsule. Any changes to the capsule withdrawal schedule, including spare capsules, must be approved by the NRC prior to implementation. All capsules placed in storage must be maintained for future insertion.

4. This renewed license is effective as of the date of issuance and shall expire at midnight, July 17, 2038.

FOR THE NUCLEAR REGULATORY COMMISSION

Original signed by J. E. Dyer

J. E. Dyer, Director
Office of Nuclear Reactor Regulation

Attachments:

1. Appendix A - Technical Specifications
2. Preoperational Tests, Startup Tests and other items which must be completed by the indicated Operational Mode

Date of Issuance: June 30, 2005

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

SAFETY EVALUATION BY
THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO ORDER NO. EA-02-026
ENTERGY OPERATIONS, INC.
ARKANSAS NUCLEAR ONE, UNIT NOS. 1 AND 2
DOCKET NOS. 50-313 AND 50-368

1.0 INTRODUCTION

1.1 Purpose

The purpose of this Safety Evaluation (SE) is to document the U.S. Nuclear Regulatory Commission (NRC) staff's regulatory assessment of the adequacy of the actions taken by the Entergy Operations, Inc. (the licensee), in response to the February 25, 2002, Interim Compensatory Measures (ICM) Order and the subsequent NRC letter to licensees dated February 25, 2005, transmitting NRC guidance (Phase 1 guidance document). This SE describes the basis for finding licensee strategies adequate to satisfy the requirements of the ICM Order. This SE also discusses the license condition that satisfactorily captures the mitigation strategy requirements. If the licensee makes future changes to its strategies within its commitment management program, this SE will be useful to the NRC staff in determining if the changed strategies are adequate to meet the license condition. It should be noted that portions of the ICM Order, as well as other documents referenced in this SE, contain security-related or safeguards information, and are not publicly available.

1.2 Background

The February 25, 2002, ICM Order that imposed interim compensatory measures on power reactor licensees required in Section B.5.b, Mitigative Measures, the development of "specific guidance and strategies to maintain or restore core cooling, containment, and spent fuel pool cooling capabilities using existing or readily available resources (equipment and personnel) that can be effectively implemented under the circumstances associated with loss of large areas of plant due to explosions or fire." These actions were to be implemented by the end of August 2002. Inspections of the implementation of the Section B.5.b requirements were conducted in 2002 and 2003 (Temporary Instruction (TI) 2515/148). The inspections identified large variabilities in scope and depth of the enhancements made by licensees. As a result, the NRC determined that additional guidance and clarification was needed for nuclear power plant licensees.

NOTICE: The attachments to the Safety Evaluation contain Security-Related Information. Upon separation from these attachments, this Safety Evaluation is DECONTROLLED.

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Subsequent to the conduct of the TI 2515/148 inspections, engineering studies conducted by the NRC Office of Regulatory Research (RES) provided insights into the implementation of mitigation strategies to address the loss of large areas of a plant due to explosions or fire, including those that an aircraft impact might create. The NRC actions resulting from these studies included: (1) inspections of licensee actions that address plant-specific consequences, (2) issuance of advisories that involve processes and protocols for licensee notification of an imminent aircraft threat, and (3) identification of mitigative measures to enhance plant response to explosions or fire.

On November 24, 2004, the NRC issued a letter to licensees providing information on the Commission's phased approach for enhancing reactor mitigative measures and strategies for responding to Section B.5.b of the ICM Order. On February 25, 2005, the NRC issued guidance (Phase 1 guidance document) to describe more fully the NRC staff's expectations for implementing Section B.5.b of the ICM Order. Determination of the specific strategies required to satisfy the Order, elaborated on by the Phase 1 guidance document, was termed Phase 1. Further information on the Commission's phased approach and its reliance on the Phase 1 guidance document and related workshop was described in an NRC letter to licensees dated January 14, 2005.

The NRC Phase 1 guidance document relied upon lessons learned from recent NRC engineering studies involving plant assessments, as well as industry best practices. This guidance also included the spent fuel pool mitigative measures described in a NRC letter to licensees dated July 29, 2004, "Issuance of Spent Fuel Pool Mitigative Measures." These best practices were identified during the inspections conducted in 2002 and 2003. The Phase 1 guidance document also incorporated industry comments made at two B.5.b-related workshops held on January 14, 2005, and February 2, 2005.

2.0 REGULATORY EVALUATION

Section B.5.b of the ICM Order required licensees to develop specific guidance and strategies to maintain or restore core cooling, containment, and spent fuel pool cooling capabilities using existing or readily-available resources (equipment and personnel) that can be effectively implemented under the circumstances associated with loss of large areas of the plant due to explosions or fire. Determination of the specific strategies required to satisfy the Order, elaborated on in the Phase 1 guidance document, was termed Phase 1.

In order to assure adequate protection of public health and safety and common defense and security, the NRC determined that differences in plant design and configuration warranted independent assessments to verify that the likelihood of damage to the reactor core, containment, and spent fuel pools and the release of radioactivity is low at each nuclear power plant. The Commission directed the NRC staff to conduct site-specific security and safety assessments to further identify enhanced mitigation capabilities. Site-specific assessments of spent fuel pools were deemed Phase 2 and site-specific assessments of reactor core and containments were deemed Phase 3.

The goal of the Phase 2 and 3 mitigation strategy assessments was for the NRC and the licensees to achieve a new level of cognition of safety and security through a comprehensive understanding of the capabilities and limitations of the plants under normal, abnormal, and

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severe circumstances (from whatever cause). Based on this improved understanding, licensees could take reasonable steps to strengthen their capabilities and reduce their limitations. The NRC expected that safety and security would be well served by further enhancing the licensee's severe accident management strategies for mitigating a wide spectrum of events through the use of readily-available resources and by identifying potential practicable areas for the use of beyond-readily-available resources.

During 2005, the NRC staff performed inspections (TI 2515/164) to determine licensees' compliance with Section B.5.b of the ICM Order (Phase 1). Subsequent meetings were held with licensees to resolve identified open issues. Confirmatory B.5.b Phase 1 inspections (TI 2515/168) were conducted during the period of June to December 2006. The NRC staff conducted site visits as part of the Phase 2 assessments during 2005. In 2006, the NRC staff observed licensee Phase 3 studies and conducted independent Phase 3 assessments.

On January 24, 2006, the Nuclear Energy Institute (NEI) submitted a letter (M. Fertel to L. Reyes) describing an industry proposal for resolving ("closing") Phase 2 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML060260220). The industry proposed high level functional mitigating strategies for a spectrum of potential scenarios involving spent fuel pools. In a letter to all Holders of Licenses for Operating Power Reactors dated June 21, 2006 (ADAMS Accession No. ML061670146), the NRC accepted the Phase 2 proposal pending review of site-specific details of its application and implementation. In arriving at this conclusion, the NRC staff placed significant weight on portions of the proposal that rely on industry commitments to provide beyond-readily-available resources not previously available. These additions will significantly enhance licensees' mitigating strategies capabilities.

On June 27, 2006, the NEI submitted two letters (M. Fertel to W. Kane). In one of the letters, the NEI proposed a license condition to capture the Section B.5.b requirements and addressed items deferred from Phase 1 to Phase 2 (ADAMS Accession No. ML061790400). The license condition includes 14 items in the same broad categories as the February 25, 2005, Phase 1 guidance document; fire fighting response strategy, plant operations to mitigate fuel damage, and actions to minimize releases. The proposal suggested that the implementing details found to be an acceptable means of meeting the license condition would be treated as commitments, and managed in accordance with NEI 99-04, "Guidelines for Managing NRC Commitment Changes." In the second letter, the NEI proposed generic strategies for closure of Phase 3 (ADAMS Accession No. ML061860753). The required strategies for all three phases would be covered by the license condition and all implementing details would be managed by NEI 99-04.

The February 25, 2005, Phase 1 guidance document included 34 expectations. Two of these items were deferred to Phase 2 and seven items (i.e., six expectations and one element of a seventh expectation) were deferred to Phase 3. The NRC staff reached agreement with licensees on the non-deferred items under Phase 1.

Table 1 provides a cross reference of how the 34 elements of the February 25, 2005, Phase 1 guidance document and Phases 2 and 3 mitigating strategies correspond to the sections of the license condition.

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On June 29, 2006, the NRC staff issued a letter to the NEI conditionally accepting its proposed license condition and strategies (ADAMS Accession No. ML061790306). The letter reiterated that mitigation strategies in NEI's proposals that were identified during the Phase 2 and 3 assessments, which utilize reasonable, evident, readily-available resources (as identified in the February 25, 2005, Phase 1 guidance document) are required pursuant to Section B.5.b of the ICM Order. The implementing details of the required strategies will be implemented by commitment and managed in accordance with the NEI commitment management guideline, NEI 99-04. The NRC staff believes the NEI proposal reasonably justifies excluding from formal regulatory controls those additional strategies identified during the site-specific Phases 2 and 3 assessments that the NRC previously deemed required under Section B.5.b of the ICM Order, but not identified in NEI's proposals. Inherent in this conclusion is recognition of the addition of beyond-readily-available resources included in the proposals. The implementing details of mitigation strategies included in the proposal, including those that utilize beyond-readily-available resources, will be treated as commitments, which will become part of the licensing basis of the plant. Additional strategies identified during site-specific assessments which licensees deem acceptable and valuable to promote diversification and survivability, will be incorporated into licensees' Severe Accident Management Guidelines, Extreme Damage Mitigation Guidelines, or appended to other site implementation guidance. To verify compliance, the NRC staff evaluated the site-specific implementation and documentation of the proposed Phases 2 and 3 mitigating strategies for each U.S. nuclear power plant.

3.0 TECHNICAL EVALUATION

The NRC staff's technical evaluation for strategies identified in Phase 1 of Section B.5.b is found in Appendix A. The NRC staff's technical evaluation for strategies identified in Phases 2 and 3 of Section B.5.b is found in Appendix B.

The Mitigating Strategies Table (MST) is included as Appendix C. The purpose of the MST is to capture, at the functional level, a summary of licensee strategies for compliance with the 34 measures presented in the February 25, 2005, Phase 1 guidance document and to indicate how the 34 items correlate to the 14 items in the license condition.

In addition, the following formatting and editorial changes were made to both Renewed Facility Operating Licenses at the request of the licensee. The formatting changes were made primarily to accommodate the addition of the new license condition and moving text to make the license easier to read. The NRC staff has reviewed these changes and concluded that they are administrative in nature. These changes are described below:

Unit 1

1. Added "Revised by letter dated July 18, 2007" to footer except on page 1 (no changes to page 1).
2. On page 2 moved item 2.b.(4) from page 3 to page 2.
3. On page 3 moved the carryover of item 2.c.(4) from page 4 to page 3.
4. On page 4 revised the footer to only have one "Revised by letter dated" phrase, followed by scratching out previous letters.

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5. On page 5 added the required statements under new Item 9 titled "Mitigation Strategies." The parenthesis from Item 8, bullets (1) and (2) were replaced with a period mark instead to be consistent with the other bullets in the license.
6. New page 6 was made for all the carryover items as result of the addition of the changes associated with page 5 above.

Unit 2

1. Added "Revised by letter dated July 18, 2007" to footer except on page 1 (no changes to page 1).
2. On page 2 moved remainder of item 2.B.(2) and all of item 2.B.(3) from page 3 to page 2.
3. On page 3 moved the remainder of item 2.C.(2) through item 2.C.(3)(a) from page 4 to page 3.
4. On page 4 corrected format margin in 2nd paragraph of 2.C.(3)(b). Also moved item 2.C.(3)(d), 2.C.(3)(e), and a portion of the associated table from page 5 to page 4.
5. On page 5 remainder of Table, including notes, moved from page 6 to page 5.
6. On page 6 moved items 2.C.(3)(h) through 2.C.(3)(p) and items 2.C.(4) through 2.C.(9) from pages 7 and 8 to page 6.
7. On page 7 added required text to top of page 8 under new item 10 and moved item 2.D. through 2.E from page 8 to page 7.
8. On page 8 Removed hyphen marks from page number to be consistent with previous pages. Moved all remaining items from page 9 to page 8 (page 9 to be deleted). Corrected mis-numbering (changed item 2.H to item 4).
9. Deleted page 9.

4.0 REGULATORY COMMITMENTS

The implementing details of the mitigating strategies required by the license condition are identified in licensee submittals dated January 10, 2007 (ADAMS Accession No. ML070160047), March 29, 2007 (ADAMS Accession No. ML071000080), and June 15, 2007 (ADAMS Accession No. ML071770147). These details will be implemented by commitment and managed in accordance with the NEI commitment management guideline, NEI 99-04. The NRC staff concludes this provides reasonable controls for mitigating strategy implementation and for subsequent evaluation of licensee-identified changes.

Because the 14 items required by the license condition correlate to the 34 items presented in the February 25, 2005, Phase 1 guidance document and the mitigating strategies within NEI's Phase 2 and 3 proposals, and because the implementing details will be managed under

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NEI 99-04, the NRC staff is satisfied that there will be sufficient controls to ensure that the strategies are adequately maintained.

5.0 CONCLUSION

Based on the NRC staff's review described in Appendices A, B, and C of this SE, the licensee's responses to the February 25, 2005, Phase 1 guidance document and the spent fuel pool and reactor core and containment mitigating strategy assessments meet the requirements of Section B.5.b, Mitigative Measures, of the February 25, 2002, ICM Order that imposed interim compensatory measures on power reactor licensees. The NRC staff concludes that full implementation of the licensee's enhancements in the submittals identified in Section 4.0, above, constitutes satisfactory compliance with Section B.5.b and the licensee condition, and represents reasonable measures to enhance the licensee's effectiveness in maintaining reactor core and spent fuel pool cooling and containment integrity under circumstances involving the loss of large areas of the plant due to fires or explosions.

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.

Attachments (Official Use Only - Security-Related Information - ADAMS Accession No. ML071920524):

1. Phase 1 Assessment (Appendix A)
2. Phases 2 and 3 Assessment (Appendix B)
3. Mitigating Strategies Table (Appendix C)

Principal Contributors: David J. Nelson
Michael K. Webb
Nathan T. Sanfilippo

Date: July 18, 2007

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Table 1

CROSS REFERENCE BETWEEN LICENSE CONDITION AND
GUIDANCE DOCUMENT ELEMENTS

License Condition section	Guidance Document Elements
A. Fire fighting response strategy with the following elements:	
1. Pre-defined coordinated fire response strategy and guidance	B.1.b Staging of personnel B.1.e Outside organization Support B.1.j Treatment of casualties B.1.k Site assembly areas (mass casualties) B.1.m Industry best practice - feeding fire protection ring header
2. Assessment of mutual aid fire fighting assets	B.1.c Airlifted resources B.1.f Mobilization of fire fighting resources - existing or new MOUs B.1.g Mobilization of fire fighting resources - coordination with other than local mutual aid fire fighting resources (i.e, Industrial facilities, large municipal fire departments, airports, and military bases)
3. Designated staging areas for equipment and materials	B.1.a Staging of equipment B.1.h Controlling emergency response vehicles (includes rad monitoring)
4. Command and Control	B.1.d Command and control B.1.i Communications enhancements
5. Training of response personnel	B.1.l Training considerations

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B. Operations to mitigate fuel damage considering the following:	
1. Protection and use of personnel assets	B.2.a Personnel considerations
2. Communications	B.2.b Communications measures
3. Minimizing fire spread	B.2.h Compartmentalization of plant areas
4. Procedures for implementing integrated fire response strategy	<p>B.2.c Procedures (Included in Phase 3 strategies)</p> <p>B.2.d Evaluation of vulnerable buildings and equipment (Included in Phase 3 strategies)</p> <p>B.2.e Industry best practice - Containment venting and vessel flooding</p> <p>B.2.f Industry best practice for compensatory function (Included in Phase 3 strategies)</p> <p>B.2.g Best practice for use of plant equipment</p> <p>B.2.i Best practice involving plant areas potentially affected by fire or explosions (Included in Phase 3 strategies)</p> <p>B.2.k Best practice for establishing supplemental response capabilities</p> <p>B.2.l Best practice for establishing supplemental response capabilities</p>
5. Identification of readily-available, pre-staged equipment	<p>B.2.g Best practice for use of plant equipment - portable generator and transformer (Included in Phase 3 strategies)</p> <p>B.2.j Best practice involving reliance on portable and offsite equipment (Included in Phase 3 strategies)</p>

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6. Training on integrated fire response strategy	B.2.n Training considerations
7. Spent fuel pool mitigation measures	B.2.m.1 Dispersal of Fuel B.2.m.2 Hot fuel over rack feet B.2.m.3 Downcomer area B.2.m.4 Enhanced air circulation (Included in Phase 2 strategies) B.2.m.5 Emergency pool makeup, leak reduction/repair (Included in Phase 2 strategies)
C. Actions to minimize release to include considerations of:	
1. Water spray scrubbing	B.3.a Water spray scrubbing B.3.b Prestaging of equipment
2. Dose to onsite responders	B.3.c Dose projection models (Included in Phase 3 strategies)

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T. G. Mitchell

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The enclosed Safety Evaluation (SE) details the interactions between the NRC staff and the Entergy Operations, Inc., as well as the rest of the nuclear industry, related to the final resolution of Section B.5.b. of the ICM Order.

The NRC is incorporating requirements for the B.5.b mitigating strategies into the Facility Operating Licenses. This letter, therefore, also transmits the license condition that captures the ICM Order Section B.5.b mitigation strategy requirements and incorporates them into the licensing basis.

This proposed license condition was transmitted by the NRC to the Entergy Operations, Inc. in a letter dated October 13, 2006. By letter dated January 10, 2007, the Entergy Operations, Inc. informed the NRC staff that it would accept the proposed license condition, with a minor change that the NRC staff finds acceptable. The effectiveness of the licensee's actions to implement the mitigative strategies contained in this license condition will be subject to future NRC review and inspection.

Consistent with the Order, administrative license changes to Renewed Facility Operating License Nos. DPR-51 and NPF-6 for the Arkansas Nuclear One, Units 1 and 2, respectively, are being made to incorporate the agreed upon license condition. These changes comply with the standards and requirements of the Atomic Energy Act of 1954, as amended, and the Commission's rules and regulations set forth in Title 10 of the *Code of Federal Regulations* (10 CFR) Chapter I. In addition, formatting and editorial changes were made to both licenses at the request of the licensee. Please replace the affected pages of the Renewed Facility Operating Licenses with the enclosed pages (Enclosure 1).

The attachments to the SE are designated exempt from public disclosure under 10 CFR 2.390(d)(1) since they contain security-related information and are Official Use Only.

If you have any questions, please contact me at (301) 415-1445.

Sincerely,
/RA/
Alan B. Wang, Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-313 and 50-368

Enclosures:

- 1. Revised Pages of Renewed Facility Operating License Nos. DPR-51 and NPF-6
- 2. Safety Evaluation

cc w/o atts to Encl. 2: See next page

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(Letter & Encl 2: ML071980041, Encl 1: ML071990354, Attachments to SE (OUO): ML071920524)

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NAME	MFields	Dbaxley, Jburkhardt for	DNelson	Awang, Kalyanam for	THiltz
DATE	7/18/07	7/18/07	7/17/07	7/18/07	7/18/07

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7RA by N. Kalyanam for/
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NAME	MFields	DBaxley JCB2	DNelson	AWang, Kalyanam	THiltz
DATE	7/18/07	7/18/07	7/17/07	7/18/07	7/18/07

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