



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION IV  
611 RYAN PLAZA DRIVE, SUITE 400  
ARLINGTON, TEXAS 76011-4005**

April 14, 2004

Jeffrey S. Forbes, Site Vice President  
Arkansas Nuclear One  
Entergy Operations, Inc.  
1448 S.R. 333  
Russellville, AR 72801-0967

**SUBJECT: ERRATA FOR ARKANSAS NUCLEAR ONE, UNITS 1 AND 2 - NRC TRIENNIAL  
FIRE PROTECTION INSPECTION REPORT 50-313/01-06; 50-368/01-06**

Dear Mr. Forbes:

Please replace the first page of the supplemental information attachment to NRC Inspection Report 50-313/01-06; 50-368/01-06, dated August 20, 2001, with the attached revised page. On the Supplemental Information page, unresolved items that were opened during this inspection were placed in error under a section titled "Items Opened and Closed." At the time of the report, these unresolved items were open.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/NRC/ADAMS/index.html> (the Public Electronic Reading Room).

Should you have any questions concerning this correction, we will be pleased to discuss them with you.

Sincerely,

**//RA//**

Linda J. Smith, Chief  
Plant Engineering Branch  
Division of Reactor Safety

Enclosure:  
Supplemental Information Attachment page from  
NRC Inspection Report 50-313/01-06; 50-368/01-06

Entergy Operations, Inc.

-2-

Dockets: 50-313  
50-368

Licenses: DPR-51  
NPF-6

cc w/enclosure:

Senior Vice President  
& Chief Operating Officer  
Entergy Operations, Inc.  
P.O. Box 31995  
Jackson, MS 39286-1995

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

Manager, Washington Nuclear Operations  
ABB Combustion Engineering Nuclear  
Power  
12300 Twinbrook Parkway, Suite 330  
Rockville, MD 20852

County Judge of Pope County  
Pope County Courthouse  
100 West Main Street  
Russellville, AR 72801

Winston & Strawn  
1400 L Street, N.W.  
Washington, DC 20005-3502

Bernard Bevill  
Radiation Control Team Leader  
Division of Radiation Control and  
Emergency Management  
Arkansas Department of Health  
4815 West Markham Street, Mail Slot 30  
Little Rock, AR 72205-3867

Mike Schoppman  
Framatome ANP, Inc.  
Suite 705  
1911 North Fort Myer Drive  
Rosslyn, VA 22209

Electronic distribution by RIV:  
 Regional Administrator **(BSM1)**  
 DRP Director **(ATH)**  
 DRS Director **(DDC)**  
 Senior Resident Inspector **(RWD)**  
 Branch Chief, DRP/D **(TWP)**  
 Senior Project Engineer, DRP/D **(NLS)**  
 Staff Chief, DRP/TSS **(PHH)**  
 RITS Coordinator **(KEG)**  
 Rebecca Tadesse, OEDO RIV Coordinator **(RXT)**  
 ANO Site Secretary **(VLH)**

ADAMS:  Yes     No    Initials: ljs  
 Publicly Available     Non-Publicly Available     Sensitive     Non-Sensitive

DOCUMENT: S\DRS\DRSLTRS\ANO errata 2001 FP.wpd

RIV:PEB/RI	C:PEB			
TAMcConnell:jlh	LJSmith			
/RA/	/RA/			
4/13 /04	4/13 /04			

ATTACHMENT

Supplemental Information

**PARTIAL LIST OF PERSONS CONTACTED**

Licensee

L. Blocker, Shift Manager  
R. Cuiilty, Procedure Group Writer  
G. Dobbs, Supervisor, Electrical Engineering  
M. Goecke, Procedure Group Writer  
R. Hendrix, Technical Specialist  
E. Jacks, Procedure Group Supervisor  
J. Johnson, Technical Specialist  
R. Kulbeth, Electrical Engineer  
B. Pace, Control Room Supervisor  
B. Passage, Reactor Operator  
M. Smith, Manager, Programs and Components  
R. Rispoli, Supervisor, Engineering  
T. Robinson, Technical Specialist  
J. Walker, Senior Lead Engineer  
D. Williams, Systems Engineer

NRC

R. Bywater, Senior Resident Inspector, ANO  
J. S. Hyslop, Risk and Reliability Analyst, NRR  
K. Kennedy, Senior Reactor Analyst  
G. Mizuno, Senior Attorney, Office of General Council  
P. Qualls, Fire Protection Engineer, NRR  
M. Salley, Fire Protection Engineer, NRR  
K. Weaver, Resident Inspector, ANO

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-313;368//0106-01	URI	Three conduits located in Fire Zone 98-J containing safe-shutdown cables were wrapped using Hemyc. The acceptability of Hemyc for use as a 1-hour fire barrier is currently being reviewed by the NRC. This is considered an unresolved item, pending the completion of that review.
50-313;368/0106-02	URI	The acceptability of the use of manual actions in lieu of providing protection for cables associated with equipment necessary for achieving and maintaining hot shutdown (for a fire in Fire Zones



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION IV  
611 RYAN PLAZA DRIVE, SUITE 400  
ARLINGTON, TEXAS 76011-8064**

August 20, 2001

Craig G. Anderson, Vice President,  
Operations  
Arkansas Nuclear One  
Entergy Operations, Inc.  
1448 S.R. 333  
Russellville, Arkansas 72801-0967

**SUBJECT: ARKANSAS NUCLEAR ONE, UNITS 1 AND 2 - NRC INSPECTION  
REPORT 50-313/01-06; 50-368/01-06**

Dear Mr. Anderson:

On June 22, 2001, the NRC completed a 2-week onsite team triennial fire protection baseline inspection of your Arkansas Nuclear One facility. Additional in-office inspection was performed by team members during the weeks of July 2 - 6 and July 9 -13, 2001. The enclosed report documents the inspection findings which were discussed on August 3, 2001, with your and other members of your staff.

The inspection involved an examination of the effectiveness of activities conducted under your license as they relate to the implementation of your NRC-approved Fire Protection Program and compliance with the Commission's rules and regulations and with the conditions of your license. Within these areas, the inspection consisted of selected examination of procedures and representative records, observations of activities, and interviews with personnel.

No findings of significance were identified.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/NRC/ADAMS/index.html> (the Public Electronic Reading Room).

Sincerely,

/RA/

Charles S. Marschall, Chief  
Engineering and Maintenance Branch  
Division of Reactor Safety

Entergy Operations, Inc.

-2-

Docket: 50-313; 50-368  
License: DPR-51; NPF-6

Enclosure:  
NRC Inspection Report 50-313/01-06; 50-368/01-06

cc w/enclosure:  
Executive Vice President  
& Chief Operating Officer  
Entergy Operations, Inc.  
P.O. Box 31995  
Jackson, Mississippi 39286-1995

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

Manager, Washington Nuclear Operations  
ABB Combustion Engineering Nuclear  
Power  
12300 Twinbrook Parkway, Suite 330  
Rockville, Maryland 20852

County Judge of Pope County  
Pope County Courthouse  
100 West Main Street  
Russellville, Arkansas 72801

Winston & Strawn  
1400 L Street, N.W.  
Washington, DC 20005-3502

David D. Snellings, Jr., Director  
Division of Radiation Control and  
Emergency Management  
Arkansas Department of Health  
4815 West Markham Street, Mail Slot 30  
Little Rock, Arkansas 72205-3867

Mike Schoppman  
Framatome ANP, Inc.  
Suite 705  
1911 North Fort Myer Drive  
Roslyn, Virginia 22209

Electronic distribution from ADAMS by RIV:  
 Regional Administrator (**EWM**)  
 DRP Director (**KEB**)  
 DRS Director (**ATH**)  
 Senior Resident Inspector (**RLB3**)  
 Branch Chief, DRP/D (**LJS**)  
 Senior Project Engineer, DRP/D (**vacant**)  
 Section Chief, DRP/TSS (**PHH**)  
 RITS Coordinator (**NBH**)  
 Scott Morris (**SAM1**)  
 NRR Event Tracking System (**IPAS**)  
 ANO Site Secretary (**VLH**)

r:\\_ano\2001\an200106rp-rln.wpd

SRI:EMB	SRI:EMB	SRI:EMB	C:EMB	C:PBD	C:EMB
RNease/lmb*	RMullikin*	CJohnson	CMarschall	LJSmith	CMarschall
/RA/	/RA/	/RA/	/RA/	/RA/	/RA/
08/2/01	08/2/01	08/12 /01	08/15 /01	08/16 /01	08/20/01

OFFICIAL RECORD COPY

T=Telephone

E=E-mail

F=Fax

\* Previously concurred

**ENCLOSURE**

U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

Dockets: 50-313; 50-368

Licenses: DPR-51; NPF-6

Report No.: 50-313/01-06; 50-368/01-06

Licensee: Entergy Operations, Inc.

Facility: Arkansas Nuclear One, Units 1 and 2

Location: Junction of Hwy. 64W and Hwy. 333 South  
Russellville, Arkansas

Dates: June 11-22, 2001  
July 2 - 13, 2001 (in office)

Inspectors: R. Nease, Team Leader  
Engineering and Maintenance Branch  
  
C. E. Johnson, Senior Reactor Inspector  
Engineering and Maintenance Branch  
  
R. Mullikin, Senior Reactor Inspector  
Engineering and Maintenance Branch

Accompanying Personnel: K. Sullivan, Contractor  
Brookhaven National Laboratory

Approved By: C. Marschall, Chief  
Engineering and Maintenance Branch  
Division of Reactor Safety

Attachment Supplemental Information



## SUMMARY OF FINDINGS

IR 05000313-01-06; 05000368-01-06, on 6/11-22/2001 (onsite), and 07/2-13, 2001 (in-office); Entergy Operations, Inc., Arkansas Nuclear One; Triennial Fire Protection Inspection.

This report covers a 2-week onsite inspection by a team of three regional inspectors and one contractor from Brookhaven National Laboratory during June 11 - 22, 2001. Additional in-office inspection was performed by team members during the weeks of July 2 - 13, 2001. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using IMC 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply are indicated by "no color" or by the severity level of the applicable violation. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described at its Reactor Oversight Process website at <http://www.nrc.gov/NRR/OVERSIGHT/index.html>.

## Report Details

### 1. REACTOR SAFETY

#### 1R05 Fire Protection

The purpose of this inspection was to review the Arkansas Nuclear One (ANO) fire protection program for selected risk significant fire areas. Emphasis was placed on verification that the post-fire safe shutdown capability and the fire protection features provided for ensuring that at least one post-fire safe shutdown success path is maintained free of fire damage. The inspection was performed in accordance with the new Nuclear Regulatory Commission (NRC) regulatory oversight process using a risk-informed approach for selecting the fire areas and attributes to be inspected. The team used licensee Calculation 85-E-0053-47, "Individual Plan Examination of External Event/Fire," to choose several risk-significant areas for detailed inspection and review. The fire areas chosen for review during this inspection were:

- Fire Area B/Fire Zone 197-X (turbine building)
- Fire Area G/Fire Zone 97-R (cable spreading room)
- Fire Area I/Fire Zone 98-J (emergency diesel generator corridor)
- Fire Area I/Fire Zone 99-M (north switchgear room)
- Fire Area C/Fire Zone 34-Y (pipe penetration room)

For each of the selected fire zones, the team focused the inspection on the fire protection features, and on the systems and equipment necessary for the licensee to achieve and maintain safe shutdown conditions in the event of a fire in those fire zones.

#### .1 Systems Required to Achieve and Maintain Post-Fire Safe Shutdown

##### a. Inspection Scope

The team reviewed the licensee's piping and instrumentation diagrams and the list of safe shutdown equipment documented in the Appendix R, Post Fire Shutdown Topical Design Criteria Document, to verify whether the licensee's shutdown methodology had properly identified the components and systems necessary to achieve and maintain safe shutdown conditions for equipment in the fire areas selected for review. The team focused on the following functions that must be ensured to achieve and maintain post-fire safe shutdown conditions: (1) reactivity control capable of achieving and maintaining cold shutdown reactivity conditions; (2) reactor coolant makeup capable of maintaining the reactor coolant level within the level indication in the pressurizer; (3) reactor heat removal capable of achieving and maintaining decay heat removal; (4) supporting systems capable of providing all other services necessary to permit extended operation of equipment necessary to achieving and maintaining hot shutdown conditions; and (5) process monitoring capable of providing direct readings to perform and control the above functions.

##### b. Findings

No findings of significance were identified.

.2 Fire Protection of Safe Shutdown Capability; Fire Protection Systems, Features, and Equipment

a. Inspection Scope

For the selected fire areas, the team evaluated the adequacy of fire suppression and detection systems, fire area barriers, penetration seals, and fire doors to verify that at least one train of safe shutdown equipment was free of fire damage. To do this, the team observed the material condition and configuration of the installed fire detection and suppression systems, fire barriers, and construction details and supporting fire tests for the installed fire barriers. In addition, the team reviewed license documentation, such as exemptions from NRC regulations and National Fire Protection Association code deviations to verify that fire protection features met license commitments.

b. Findings

The team identified an unresolved item concerning the acceptability of Hemyc for use as a 1-hour fire barrier.

The team observed that several conduits in Fire Zone 98J (emergency diesel generator corridor) containing safe-shutdown circuits were wrapped in Hemyc fire wrap material. The licensee used Hemyc as a 1-hour fire barrier to satisfy the separation requirement of 10 CFR Part 50, Appendix R, Section III.G.2.c. The team reviewed the licensee's fire test report of the Hemyc fire wrap material used as a 1-hour fire rated barrier to separate safe shutdown functions within the same fire area. The review included the evaluation of the application of the material as a fire barrier system for the protection of safe shutdown functions and the fire endurance testing, which substantiated the fire barrier system's construction and installation attributes and its ability to perform as a 1-hour barrier. The review of the fire test report indicated that the testing of Hemyc-wrapped conduits was performed on a 4-inch diameter conduit only. The team could not determine whether this testing was adequate to qualify Hemyc fire wrap as a 1-hour fire-rated barrier for conduits less than 4-inches in diameter. The team noted that three conduits (one 2-inch and two 3-inch diameter conduits) located in Fire Zone 98-J containing safe-shutdown cables were wrapped using Hemyc. These safe shutdown cables included: (1) a power cable for makeup pump P36B; (2) 120 Vac feeder cable from inverter Y12 to distribution panel RS-3; (3) 120 Vac feeder cable from inverter Y11 to distribution panel RS-1; (4) load center B5 feeder breaker control cable; and (5) load center B5 to B6 tie breaker control cable. The acceptability of the qualification of Hemyc as a 1-hour fire barrier is currently being reviewed by the NRC. This is considered an unresolved item (50-313;368/0106-01) pending the completion of that review.

.3 Post-Fire Safe Shutdown Circuit Analysis

a. Inspection Scope

On a sample basis, the team verified that cables of equipment required to achieve and maintain hot shutdown conditions in the event of fire in selected fire zones had been properly identified and either adequately protected from the potentially adverse effects

of fire damage or analyzed to show that fire-induced faults (e.g., hot shorts, open circuits, and shorts to ground) would not prevent safe shutdown. During the inspection a sample of redundant components associated with systems required to achieve and maintain hot shutdown conditions were selected for review. The sample included components associated with the emergency feedwater (EFW), reactor coolant system makeup, and service water (SW) systems. From this list of components, the team reviewed cable routing data depicting the routing of power and control cables associated with each of the selected components. Additionally, on a sample basis the team verified the adequacy of electrical protective device coordination (e.g., circuit breaker, fuse, relay), and the adequacy of electrical protection provided for non-essential cables which share a common enclosure (raceway, junction box, conduit, etc.) with cables of equipment required to achieve and maintain safe shutdown conditions.

b. Findings

The team identified an unresolved item concerning the acceptability of the licensee's use of manual actions to remotely operate equipment necessary for achieving and maintaining hot shutdown, in lieu of providing protection to the cables associated with that equipment, as a method of complying with 10 CFR Part 50, Appendix R, Section III.G.2.

Title 10 of the Code of Federal Regulations (CFR), Part 50.48, "Fire Protection," and 10 CFR Part 50, Appendix R, "Fire Protection Program for Nuclear Power Facilities Operating Prior to January 1, 1979," establish specific fire protection features required to satisfy 10 CFR Part 50, Appendix A, General Design Criterion 3, "Fire Protection." Appendix R applies to licensed nuclear power electric generating stations that were operating prior to January 1, 1979, which includes ANO, Unit 1. Section III.G.2 of Appendix R to 10 CFR Part 50 requires that, "where cables or equipment, including associated non-safety circuits that could prevent operation or cause maloperation due to hot shorts, open circuits, or shorts to ground, of redundant trains of systems necessary to achieve and maintain hot shutdown conditions are located within the same fire area outside of primary containment, one of the following means of ensuring that one of the redundant trains is free of fire damage shall be provided:

- (1) Separation of cables and equipment and associated non-safety circuits of redundant trains by a fire barrier having a 3-hour rating. Structural steel forming a part of or supporting such fire barriers shall be protected to provide fire resistance equivalent to that required of the barrier;
- (2) Separation of cables and equipment and associated non-safety circuits of redundant trains by a horizontal distance of more than 20 feet with no intervening combustible or fire hazards. In addition, fire detectors and an automatic fire suppression system shall be installed in the fire area; or
- (3) Enclosure of cable and equipment and associated non-safety circuits of one redundant train in a fire barrier having a 1-hour rating, In addition, fire detectors and an automatic fire suppression system shall be installed in the fire area;"

From a review of cable routing information for selected components, the team found that in Fire Zones 98J and 99M, cables associated with redundant trains of equipment necessary to achieve and maintain hot shutdown conditions were not ensured to be free of fire damage by one of the methods specified in Section III.G.2 of Appendix R to 10 CFR Part 50. For much of the equipment required to achieve hot shutdown conditions whose power and/or control cables could be damaged by a fire in Fire Zones 98J and 99M, the licensee credited local manual action outside the fire zones. The license did not consider the cables associated with this equipment to be necessary for achieving and maintaining hot shutdown conditions, and did not provide the protection from fire damage specified in Section III.G.2 of Appendix R to 10 CFR Part 50. However, the team noted that fire damage to these cables could cause misoperation of equipment necessary for achieving and maintaining hot shutdown conditions. Further NRC review is necessary to determine the acceptability of the licensee's position with respect to crediting manual actions outside the fire zones to mitigate fire damage to power and control cables associated with equipment required to achieve and maintain hot shutdown conditions. This is considered to be an unresolved item (50-313; 368/0106-02), pending completion of the NRC's review. The licensee entered this issue into their corrective action program as CR-ANO-1-2001-0723 and CR-ANO-1-2001-0726 and established compensatory measures.

Upon a fire in either of these fire zones, no immediate operator actions are implemented to prevent the failure of potentially affected equipment. Rather, the licensee credits a symptom-based approach which relies on the operator's ability to detect each misoperation as it occurs and perform manual actions as necessary to mitigate its effects. To alert operators of the potential effects of fire damage in each zone, the licensee has listed in the pre-fire plans, the potential failures that could be expected from a fire in each fire zone. Due to the number of components that may be affected as a result of fire and uncertainty regarding the timing and synergistic impact that potential failures may have on the operator's ability to accomplish required shutdown functions, the inspection team was unable to confirm the adequacy of these manual actions to mitigate the potential failures to ensure that at least one train of systems required to achieve and maintain hot shutdown conditions was available. Therefore, the team could not determine if an unmitigated fire in Fire Zones 98J or 99M could adversely affect the availability of redundant trains of components credited in the licensee's fire hazards analysis for achieving and maintaining hot shutdown conditions. The determination of the significance of this issue is part of the above-described unresolved item (50-313; 368/0106-02).

The specifics of the unresolved item are discussed below, by fire zone.

(1) Fire Zone 98J (emergency diesel generator corridor)

In Fire Zone 98J, the team found that the following cables associated with redundant trains of components credited in the licensee's fire hazards analysis for achieving and maintaining hot shutdown conditions were not protected from fire damage by one of the methods required in Section III.G.2 of Appendix R to 10 CFR Part 50. This list is a result of sampling by the team and is not all-inclusive.

- Control cables associated with emergency diesel generators (EDGs): Fire damage to these cables could prevent automatic or manual start (from the control room) of the EDGs, or could cause the EDGs to trip once started. The licensee credits local/manual start of the EDGs.
- Control cables of redundant EDG lockout relays - Damage to these cables could prevent a normal local start at the EDG control panel and require additional operator actions at two locations to bypass.
- Cables associated with both trains of EDG output breakers - Damage to control cables could lead to a loss of both EDG power supply trains. In the pre-fire plan, the licensee credits local/manual operation of the breakers after isolating control power from the switchgear and local/manual operation of the EDGs.
- Control cables associated with service water (SW) to EDG jacket water cooler valves, CV 3806 and CV 3807 - Damage to these cables prevent automatic opening of these normally-closed valves resulting in a loss of cooling water to the EDGs. Under this circumstance, to prevent damage to the EDGs, operators would trip EDGs. Under a loss of offsite power scenario, tripping the EDGs would result in a station blackout condition. It should be noted that the licensee did not analyze the potential for a fire in this fire area to cause loss of offsite power. Rather, the fire hazards analysis assumed that a fire would result in loss of offsite power.
- Control cables associated with EFW pumps P7A and P7B. Damage to these cables could result in failure of the emergency feedwater pumps to start. The licensee credits operation of P7B at the switchgear.
- Control cables associated with numerous EFW valves - Damage to these control cables could result in a loss of EFW flow to both steam generators, requiring local manual operation and/or deenergizing to restore.
- Control cables for EFW pump P7B suction valves, CV2800, 2803, and 3850 - Damage to these cables could cause spurious closure leading to pump damage on loss of suction. The pre-fire plan for this fire zones recommends deenergizing these valves to ensure proper alignment prior to operating EFW pump P7B.
- Control cables associated with the turbine-driven EFW pump steam supply valves - Damage to these cables could cause the valves to spuriously close resulting in a loss of motive steam to the turbine-driven EFW pump.
- Control cables associated with makeup pumps P36A, B and C - Damage to these cables could result in the inability to start and control makeup

pumps from the main control room. Credit is taken for local manual breaker and local operations.

- Control cables associated with steam generator atmospheric dump and block valves for both steam generators (CV 2668, 2676, CV-2618, and 2619) - Damage to these cables could cause loss of pressure relief control in the steam generators. In the pre-fire plan for this fire zone, the licensee credits manual valve operation and/or deenergizing the valves in their pre-fire position.
- Control cables associated with CV-3643 (SW discharge to auxiliary cooling water) - Damage to these cables could result in diverting of SW flow from emergency cooling loads. Credit is taken for manual operation of this valve.
- Control cables associated with pressurizer emergency relief valves and emergency relief block valves, PSV-1000 and CV-1000 - Damage to these cables could cause loss of controlled pressure relief. The licensee credits manual operation of PSV-1000 at motor control center B61.
- Control cables associated with the three SW pumps, P4A, P4B, and P4C. - Damage to these cables could result in the loss of all SW. The licensee takes credit for local manual breaker operation for restoring the pumps to service.

(2) Fire Zone 99M (north electrical switchgear room):

In Fire Zone 99J, the team found that the following cables associated with redundant trains of components credited in the licensee's fire hazards analysis for achieving and maintaining hot shutdown conditions were not protected from fire damage by one of the methods specified in Section III.G.2 of Appendix R to 10 CFR Part 50. This list is a result of sampling by the team and is not all-inclusive.

- Control cables associated with all three SW pumps, P4A, P4B, and P4C and power cables associated with SW pumps P4B and P4C - Damage to these cables could result in loss of all SW cooling to the EDGs. Under these circumstance, to prevent damage to the EDGs, operators may trip EDGs. Operators could manually start SW pumps P4A and P4B from the red train switchgear room, before restarting the EDGs. Under a loss of offsite power scenario, tripping the EDGs would result in a station blackout condition. It should be noted that the licensee did not analyze the potential for fire in this fire area to cause a loss of offsite power. Rather, the fire hazards analysis assumed that a fire in this fire zone would result in loss of offsite power. The licensee's pre-fire plan for this fire area suggested that operators deenergize the DC control power for breakers A302 and A303 to prevent a spurious trip of SW pumps during EDG operation.

- Output breaker for EDG 4KB and cables for EDG 4KA output breaker - A fire in this area could result in the loss of both EDG power supply trains. The licensee credits local/manual operation of these breakers after isolating control power from the switchgear or deenergizing EDG output breaker control power. The licensee's pre-fire plan credits manual restart of the EDG. However, a fire in this area could also cause the EDG lockout relay to trip. A fire-induced trip of the EDG lockout relay would prevent a normal local start of the EDG at the EDG control panel and require operators to perform additional actions at two locations to bypass the EDG lockout condition. The performance of these additional actions is not listed in the pre-fire plan.
- Instrument cables for EFW pump P7A and control cables for EFW pump P7B - Damage to these cables could result in the loss of the operator's ability to control feedwater to the steam generators. The licensee credits manual operation EFW pump P7B at the breaker and local manual operation of EFW pump P7A.
- Control cables associated with both trains of EFW flow valves - Damage to these cables may result in a loss of EFW to either steam generator. The fire pre-plan for this fire area credits manual local operation, which could require control power to be isolated.
- Control cables associated with EFW pump P7B suction valves, CV2800, 2803, and 3850 - Damage to these cables could cause spurious closure which could lead to pump damage due to loss of suction. The licensee credits deenergizing these valves to ensure proper alignment prior to operating the EFW pump P7B.
- Control cables for all makeup pumps P36A, P36B, and P36C, and power cables for makeup pumps P36B and P36C - Damage to these cables could render the reactor coolant makeup function unavailable. The licensee credits manual operation of P36A and P36B from the south switchgear room.

#### .4 Alternative Safe Shutdown Capability

##### a. Inspection Scope

The team reviewed the licensee's systems required to achieve alternative safe shutdown to determine if the licensee had properly identified the components and systems necessary to achieve and maintain safe shutdown conditions from stations other than the control room. The team also focused on the adequacy of the systems to perform reactor pressure control, reactor coolant makeup, decay heat removal, process monitoring, and support system functions.

##### b. Findings



No findings of significance were identified.

.5 Operational Implementation of Alternative Shutdown Capability

a. Inspection Scope

The team performed a walkdown of the actions defined in Procedure 1203.002, "Alternate Shutdown," Change 015-02-0. This procedure documented the method for performing an alternative shutdown of the plant from outside the control room by manipulating certain equipment located in various areas of the plant. The team reviewed the ability of the operators to perform the procedural actions within applicable plant shutdown time requirements and verified that equipment labeling was consistent with the procedure.

The team reviewed the training program for licensed and nonlicensed personnel to verify it included training on the alternative safe shutdown capability. The team also observed simulator training of operators using the alternate shutdown procedure.

b. Findings

No findings of significance were identified.

.6 Communications

a. Inspection Scope

The team reviewed the adequacy of the communication system to support plant personnel in the performance of alternative safe shutdown functions and fire department duties. The licensee credited the portable radios for post-fire safe shutdown actions that require prompt control room operator response. The team observed the radios in the alternate shutdown cabinet and reviewed records to assure that the radios were being maintained in an operable condition. The team reviewed a sample of preventative maintenance activities to verify radios were available and operational for emergency use by operators.

b. Findings

No findings of significance were identified.

.7 Emergency Lighting

a. Inspection Scope

The team reviewed the emergency lighting system required for safe shutdown activities in the selected fire areas to verify it would provide for adequate access to perform manual actions required to achieve and maintain hot shutdown conditions. The team also reviewed the adequacy of emergency lighting for performing actions required in Procedure 1203.002, "Alternate Shutdown," Change 015-02-0. The team reviewed test

procedures and test data to verify that the individual battery operated units were operable. The team also verified that routine preventive maintenance was being performed to assure that the 8-hour battery powered lights were being maintained in an operable manner.

b. Findings

No findings of significance were identified.

.8 Cold Shutdown Repairs

a. Inspection Scope

The team reviewed licensee procedures to determine whether repairs were required to achieve cold shutdown and whether repair material was available onsite.

b. Findings

No findings of significance were identified.

.9 Compensatory Measures

a. Inspection Scope

The team verified that adequate compensatory measures were put in place by the licensee for out-of-service, degraded or inoperable fire protection and post-fire safe shutdown equipment, systems or features (e.g., detection and suppression systems, or passive fire barrier features).

b. Findings

No findings of significance were identified.

4. **OTHER ACTIVITIES (OA)**

4OA2 Identification and Resolution of Problems

c. Inspection Scope

The team reviewed a sample of condition reports to verify that the licensee was identifying fire protection-related issues at an appropriate threshold and entering those issues into the corrective action program.

d. Findings

No findings of significance were identified.

.4OA6 Meetings, including Exit

On, June 22, 2001, at the conclusion of the team's onsite inspection, the team leader debriefed Craig G. Anderson, Vice President, Operations, and other licensee staff members on the preliminary inspection results.

On August 3, 2001, a tele-conference exit meeting was held with Mr. Craig G. Anderson, Vice President, Operations, and other licensee staff members, during which the team leader characterized the results of the inspection. The licensee's management acknowledged the findings presented.

The licensee was asked whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

ATTACHMENT

Supplemental Information

**PARTIAL LIST OF PERSONS CONTACTED**

Licensee

L. Blocker, Shift Manager  
R. Culty, Procedure Group Writer  
G. Dobbs, Supervisor, Electrical Engineering  
M. Goecke, Procedure Group Writer  
R. Hendrix, Technical Specialist  
E. Jacks, Procedure Group Supervisor  
J. Johnson, Technical Specialist  
R. Kulbeth, Electrical Engineer  
B. Pace, Control Room Supervisor  
B. Passage, Reactor Operator  
M. Smith, Manager, Programs and Components  
R. Rispoli, Supervisor, Engineering  
T. Robinson, Technical Specialist  
J. Walker, Senior Lead Engineer  
D. Williams, Systems Engineer

NRC

R. Bywater, Senior Resident Inspector, ANO  
J. S. Hyslop, Risk and Reliability Analyst, NRR  
K. Kennedy, Senior Reactor Analyst  
G. Mizuno, Senior Attorney, Office of General Council  
P. Qualls, Fire Protection Engineer, NRR  
M. Salley, Fire Protection Engineer, NRR  
K. Weaver, Resident Inspector, ANO

ITEMS OPENED AND CLOSED

Opened and Closed

50-313;368//0106-01	URI	Three conduits located in Fire Zone 98-J containing safe-shutdown cables were wrapped using Hemyc. The acceptability of Hemyc for use as a 1-hour fire barrier is currently being reviewed by the NRC. This is considered an unresolved item, pending the completion of that review.
50-313;368/0106-02	URI	The acceptability of the use of manual actions in lieu of providing protection for cables associated with equipment necessary for achieving and maintaining hot shutdown (for a fire in Fire Zones 98J and 99M) for meeting 10 CFR Part 50, Appendix R, Section

III.G.2 is an unresolved item pending further NRC review. The significance of this issue is also part of this unresolved item.

### LIST OF DOCUMENTS REVIEWED

The following documents were selected and reviewed by the inspectors to accomplish the objectives and scope of this inspection:

#### CALCULATIONS

<u>Number</u>	<u>Title</u>	<u>Revision</u>
85-E-0072-03	Time to loss of subcooling or Loss of Pressurizer Liquid Inventory From Plant Trip With No Makeup Available Under Various RCS Leak Path Scenarios	1
85-E-0086-01	Safe Shutdown Capability Assessment, Volumes 1 and 2	3
85-E-0053-47	Individual Plant Examination of External Events/Fire	2
95-E-0066-02	ANO-1 IPEEE Fire P2 Values	1

#### CONDITION REPORTS

CR-ANO-1-1998-0626	CR-ANO-1-1998-0720
CR-ANO-1-2000-0206	CR-ANO-1-2001-0173
CR-ANO-1-2001-0514	CR-ANO-2-1999-0789
CR-ANO-2-2000-0246	CR-ANO-2-2001-0051
CR-ANO-2-2001-0198	CR-ANO-2-2001-0291
CR-ANO-2-2000-0827	CR-ANO-2-1998-0552
CR-ANO-1-2001-0699	CR-C-96-0278, Action Item 13

#### DRAWINGS

<u>Drawing Number</u>	<u>Title</u>	<u>Revision</u>
E661, Sheet 1	Conduit & Tray Layout - Auxiliary Bldg. Area 3 - Elev. 335'-0" & 341'-0"	62
E-669, Sheet 1	Conduit & Tray Layout - Auxiliary Building - Area 4 - Elev. 372'-0"	77
E-669, Sheet 2	Conduit & Tray Layout - Auxiliary Building - Area 4 - Elev. 372'-0"	29

<u>Drawing Number</u>	<u>Title</u>	<u>Revision</u>
E-669, Sheet 4	Conduit & Tray Layout - Auxiliary Building - Area 4 - Elev. 372'-0	37
E690	Conduit Layout - Cable Spreading Room	65
FP-312	Emergency Lighting & Access Routes - Elev. 368'-0" to 374' - 6"	2
M-204, Sheets 3, 5, and 6	Piping and Instrument Diagram (P&ID) Drawing, Emergency Feedwater	28, 14, and 15
M-206, Sheets 1 and 2	Piping and Instrument Diagram (P&ID) Drawing, Steam Generator Secondary System	122 and 20
M-210, Sheet 1	Piping and Instrument Diagram (P&ID) Drawing, Service Water System	135
M-217, Sheets 1, 2, and 3	Piping and Instrument Diagram (P&ID) Drawing, Emergency Diesel Generator	87, 38, and 20
M-230 Sheets 1 and 2	Piping and Instrument Diagram (P&ID) Drawing, Reactor Cooling System	104 and 34
M-231, Sheets 1, 2, and 3	Piping and Instrument Diagram (P&ID) Drawing, Makeup and Purification System	104, 43, and 8
E-1	Electrical Drawing, Station One Line Diagram	
E-5	Electrical Drawing, Single Line Meter and Relay Diagram 4160V System Engineered Safeguard	
E-8	Electrical Drawing, Single Line Meter and Relay Diagram 480V load Centers	
E-17	Electrical Drawing, Red Train Vital AC and 125V DC Single Line and Distribution	

FIRE IMPAIRMENTS (as of June 12, 2001)

Door 65 failed inspection and is inoperable

Barrier watch for Door 40 pending door hardware replacement

Barrier watch for Door 39 pending door hardware replacement

Fire wrapping missing on EB1288, EB1287 & EC1008

Door 494 is inoperable due to door failure

PROCEDURES

<u>Number</u>	<u>Title</u>	<u>Revision</u>
1203.002	Alternate Shutdown	Change No. 015-02-0
1306.035	Fire Damper Surveillance Test	Change No. 001-02-0
1903.061	Communications Equipment Tests	Change No. 029-00-0
1203.002	Alternate Shutdown	Change No. 015-02-0
1305.016	Safe Shutdown Instrumentation and Equipment Periodic Testing	Change No. 012-02-0 performed March 16, 2001
1000.47	Control of Combustibles	Change No. 015-00-0

MISCELLANEOUS DOCUMENTS

Entergy Arkansas, Inc., Entergy Operations, Inc., Arkansas Nuclear One, Unit 1, Docket No. 50-313, Facility Operating License, License No. DPR-51, Amendment No. 187.

Fire Protection Safety Evaluation Report by the Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, in the Matter of Arkansas Power & Light Company, Arkansas Nuclear One - Unit 1, Docket No. 50-313," dated August 27, 1978.

Amendment No. 35 to Facility Operating License No. DPR-51, dated August 27, 1978.

"Safety Evaluation by the Office of Nuclear Reactor Regulation Related to Exemption from 10 CFR 50, Appendix R, Arkansas Power & Light, Arkansas Nuclear One, Unit No. 1, Docket No. 50-313, dated March 22, 1983.

"Safety Evaluation by the Office of Nuclear Reactor Regulation, Arkansas Nuclear One - Units 1 and 2, Dockets Nos. 50-313 and 50-368, Appendix R to 10 CFR 50, Items III.G.3 and III.L," dated May 13, 1983.

Engineering Request 010149E301, Revision 0, and Calculation No. 85-E-0122-00, "Evaluation of Arkansas Nuclear One Radio System Suitability for Alternate Shutdown Communications."

Engineering Report 9-R-1014-37, "Penetration Seal Analysis for Penetration 2026-04-0055," Revision 1.

Repetitive Maintenance Item (MAI) # 42380, Task No. 9261.

Repetitive Maintenance Item # 40949, Task No. 8775.

Component Reports for Conduits EC-1154, EC-1193, EC-1182, EC-2006, and EC-3007.

ANO-1 Alternate Shutdown Procedure Basis Document, 1203.002, dated 4/25/01.

Alternate Shutdown Procedure Time Line.

Training Document, ANO-1-SPG-LOR-CYCLE, CYCLE 01-04, Revision 0.

Appendix R Emergency Lighting Failure Trending.

Letter dated 3/22/83, from R. Clark and J. F. Stolz (NRC) to J. M. Griffin (Arizona Power & Light) concerning exemptions to certain requirements of Appendix R to 10 CFR 50.

Letter dated 8/22/78, from: R. Reid (NRC) to: W. Cavanaugh (Arizona Power & Light) concerning facility modifications for fire protection.

Letter dated 5/13/83 from R. Clark and J. F. Stolz (NRC) to J. M. Griffin (Arizona Power & Light) concerning the safety evaluation of safe shutdown capability of ANO Units 1 and 2.

Arkansas Nuclear One, Unit 1 Fire Hazards Analysis, Revision 6, dated April 10, 2000.

Arkansas Nuclear One, Units 1 & 2, Fire Hazards Analysis Supporting Information, February 28, 1978.

PDMS Cable Routing Data: "SS Equipment with Associated Cable Routing," dated June 14, 2001.