



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

February 10, 2005

EA-01-005

Charles D. Naslund, Senior Vice
President and Chief Nuclear Officer
Union Electric Company
P.O. Box 620
Fulton, MO 65251

**SUBJECT: CALLAWAY PLANT - NRC INTEGRATED INSPECTION
REPORT 05000483/2004005**

Dear Mr. Naslund:

On December 31, 2004, the NRC completed an inspection at your Callaway Plant. The enclosed report documents the inspection findings which were discussed on January 5, 2005, with Mr. K. Young, Manager, Regulatory Affairs, and other members of your staff.

This inspection examined activities conducted under your license as they relate to safety 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.

This report documents four NRC-identified and two self-revealing findings that were evaluated under the risk significance determination process as having very low safety significance (Green). The NRC has also determined that five violations are associated with these issues. These violations are being treated as noncited violations (NCVs), consistent with Section VI.A of the Enforcement Policy. These NCVs are described in the subject inspection report. If you contest the violation or significance of these NCVs, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with copies to the Regional Administrator, U.S. Nuclear Regulatory Commission, Region IV, 611 Ryan Plaza Drive, Suite 400, Arlington, Texas 76011; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Callaway Plant facility.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be made available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Union Electric Company

-2-

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

Sincerely,

/RA/

David N. Graves, Chief
Project Branch B
Division of Reactor Projects

Docket: 50-483
License: NPF-30

Enclosure:
NRC Inspection Report
05000483/2004005
w/attachment: Supplemental Information

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

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

Mark A. Reidmeyer, Regional
Regulatory Affairs Supervisor
Regulatory Affairs
AmerenUE
P.O. Box 620
Fulton, MO 65251

Missouri Public Service Commission
Governor's Office Building
200 Madison Street
P.O. Box 360
Jefferson City, MO 65102

Ronald A. Kucera, Deputy Director
for Public Policy
Department of Natural Resources
P.O. Box 176
Jefferson City, MO 65102

Rick A. Muench, President and
Chief Executive Officer
Wolf Creek Nuclear Operating Corporation
P.O. Box 411
Burlington, KS 66839

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

Les H. Kanuckel, Manager
Quality Assurance
AmerenUE
P.O. Box 620
Fulton, MO 65251

Director
State Emergency Management Agency
P.O. Box 116
Jefferson City, MO 65102-0116

Scott Clardy, Director
Section for Environmental Public Health
P.O. Box 570
Jefferson City, MO 65102-0570

Keith D. Young, Manager
Regulatory Affairs
AmerenUE
P.O. Box 620
Fulton, MO 65251

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

Certrec Corporation
4200 South Hulen, Suite 630
Fort Worth, TX 76109

Union Electric Company

-4-

Chief Technological Services Branch
National Preparedness Division
Department of Homeland Security
Emergency Preparedness & Response Directorate
FEMA Region VII
2323 Grand Boulevard, Suite 900
Kansas City, MO 64108-2670

Electronic distribution by RIV:
 Regional Administrator (**BSM1**)
 DRP Director (**ATH**)
 DRS Director (**DDC**)
 DRS Deputy Director (**MRS**)
 Senior Resident Inspector (**MSP**)
 Branch Chief, DRP/B (**DNG**)
 Senior Project Engineer, DRP/B (**RAK1**)
 Team Leader, DRP/TSS (**RLN1**)
 RITS Coordinator (**KEG**)
 DRS STA (**DAP**)
 J. Dixon-Herrity, OEDO RIV Coordinator (**JLD**)
 CWY Site Secretary (**DVY**)
 W. A. Maier, RSLO (**WAM**)
 G. F. Sanborn, D:ACES (**GFS**)
 K. S. Fuller, RC (**KSF**)
 F. J. Congel, OE (**FJC**)
 OE:EA File (**RidsOeMailCenter**)

SISP Review Completed: **dng** ADAMS: / Yes No Initials: **dng**
 / Publicly Available Non-Publicly Available Sensitive / Non-Sensitive

R:_CW\2004\CW2004-05RP-MSP.wpd

RIV:RI:DRP/B	SRI:DRP/B	C:DRS/EB	C:DRS/OB	C:DRS/PEB
DEDumbacher	MSPeck	JAClark	ATGody	LJSmith
E - DNGraves	E - DNGraves	/RA/	/RA/	CFO'Keefe for
2/8/05	2/7/05	2/7/05	2/7/05	2/9/05
C:DRS/PSB	C:DRP/B			
MPShannon	DNGraves			
/RA/	/RA/			
2/9/05	2/10/05			

OFFICIAL RECORD COPY

T=Telephone

E=E-mail

F=Fax

ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket: 50-483
License: NPF-30
Report: 05000483/2004005
Licensee: Union Electric Company
Facility: Callaway Plant
Location: Junction Highway CC and Highway O
Fulton, Missouri
Dates: September 24 through December 31, 2004
Inspectors: M. S. Peck, Senior Resident Inspector
D. E. Dumbacher, Resident Inspector
R. W. Deese, Senior Resident Inspector
D. N. Graves, Chief, Project Branch B
M. E. Murphy, Senior Operations Engineer
B. K. Tharakan, Health Physicist
Approved By: D. N. Graves, Chief, Project Branch B

Enclosure

CONTENTS

SUMMARY OF FINDINGS	1
REPORT DETAILS	1
1. REACTOR SAFETY	1
1R01 <u>Adverse Weather Protection</u>	1
1R04 <u>Equipment Alignment</u>	1
1R05 <u>Fire Protection</u>	2
1R11 <u>Licensed Operator Requalification Program</u>	5
1R12 <u>Maintenance Effectiveness</u>	6
1R13 <u>Maintenance Risk Assessments and Emergent Work Evaluation</u>	6
1R14 <u>Personnel Performance During Nonroutine Plant Evolutions</u>	7
1R15 <u>Operability Evaluations</u>	9
1R16 <u>Operator Workarounds</u>	10
1R17 <u>Permanent Plant Modifications</u>	10
1R19 <u>Postmaintenance Testing</u>	11
1R22 <u>Surveillance Testing</u>	12
1R23 <u>Temporary Plant Modifications</u>	13
1EP6 <u>Drill Evaluation</u>	13
2. RADIATION SAFETY	14
2OS2 <u>ALARA Planning and Controls</u>	14
4. OTHER ACTIVITIES	15
4OA1 <u>Performance Indicator Verification</u>	15
4OA2 <u>Identification and Resolution of Problems</u>	15
4OA4 <u>Crosscutting Aspects of Findings</u>	19
4OA5 <u>Other Activities</u>	19
4OA6 <u>Management Meetings</u>	22
SUPPLEMENTAL INFORMATION	A-1
KEY POINTS OF CONTACT	A-1
LIST OF ITEMS OPENED AND CLOSED	A-1
DOCUMENTS REVIEWED	A-2
LIST OF ACRONYMS	A-5

SUMMARY OF FINDINGS

IR 05000483/2004005; 09/24 - 12/31/2004; Callaway Plant: Fire Protection, Personnel Performance During Nonroutine Plant Evolutions, Identification and Resolution of Problems, Other Activities.

This report covered a 3-month inspection by resident inspectors, an operations inspector, a health physics inspector and an announced inspection by the Chief of Project Branch B to followup the licensee's corrective actions following discrimination against a security officer and a training instructor after engaging in protected activities. Five Green noncited violations and one Green finding were identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter 0609, "Significance Determination Process." Findings for which the significance determination process does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG 1649, "Reactor Oversight Process," Revision 3, dated July 2000.

Inspector-Identified and Self-Revealing Findings

Cornerstone: Initiating Events

- Green. A self-revealing Green finding was identified after an operator error resulted in an unplanned secondary side chemistry excursion and a steam generator blowdown isolation. An operator failed to maintain minimum cooling tower blowdown flow during an effluent release of steam generator blowdown demineralizer flush water to the environment. The reduction in flow resulted in the isolation of the release and pressurization of the steam generator blowdown flush line. The pressurized line resulted in the transfer of flush water to the main condenser and caused steam generator chemistry to exceed the Action Level 2 threshold. This finding, which involved the failure of an operator to follow procedure, was associated with the crosscutting area of human performance (personnel).

This finding is greater than minor because the chemistry excursion had an impact on the equipment performance attribute and the initiating events objective cornerstone. The inspectors determined that this finding is of very low safety significance because the chemistry excursion did not add to the likelihood of a primary or secondary system loss of coolant accident initiator, did not contribute to loss of mitigation equipment functions, and did not increase the likelihood of a fire or internal/external flood (Section 1R14).

Cornerstone: Mitigating System

- Green. The inspectors identified a noncited violation of Technical Specification 5.4.1.d, "Fire Protection Program," after the licensee failed to maintain the integrity of an auxiliary building fire door. The inspectors identified that the fire door would not provide the rated fire confinement function because of a broken latch. The door provided the 3-hour fire barrier between auxiliary building fire Areas A-19 and A-20. The licensee had several prior opportunities to identify the degraded fire door. The plant security

Enclosure

procedure required plant security officers to verify that the fire door was properly latched during each patrol. Several security patrols passed through the door each shift.

This finding is greater than minor because the fire door was associated with the mitigating system cornerstone attribute to provide protection against external factors. The inspectors concluded that the degraded door was a fire confinement finding with a high degradation rating due to the broken latch. This finding is of very low safety significance because the degraded door did not separate unique potential fire damage targets and that the door would have provided at least 20 minutes fire endurance protection. The inspectors also concluded that no fixed or in-situ fire ignition sources or combustible or flammable materials were positioned such that the degraded door would have been subject to direct flame impingement (Section 1R05).

- Green. The inspectors identified a noncited violation of Technical Specification 5.4.1.d, "Fire Protection Program," after a plant fire occurred when the licensee failed to establish fire watches. A welder ignited a fire on the communication corridor roof. The fire burned through the roof and ignited the ceiling below. The licensee had not established a fire watch inside the room. The plant fire brigade responded and extinguished the fire. The fire brigade left the area without establishing a reflash fire watch. About 55 minutes later, an equipment operator returned to the room and identified that the fire had reignited. The plant fire brigade responded again and extinguished the reflash fire. This finding has crosscutting aspects regarding the failure of personnel to follow fire protection program procedures.

This finding is greater than minor because the mitigating systems cornerstone attribute providing protection against external factors was affected. This finding had an adverse affect on the licensee's fire protection defense-in-depth strategies related to fire detection, manual suppression, and fire brigade effectiveness. The inspectors concluded that the lack of a fire watch degraded the licensee's early fire suppression capability and resulted in the fire prevention finding with a high degradation rating. The inspectors determined that this finding is of very low significance because the fire ignition source could not have caused ignition of secondary combustible fuels and was not close enough to sufficient surrounding combustibles to cause damage consistent with any of the plant fire damage scenarios (Section 1R05).

- Green. The inspectors identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," after postmaintenance testing was not adequate to identify degraded turbine-driven auxiliary feedwater pump bearing cooling following maintenance. The licensee completed an overhaul of the turbine, performed a postmaintenance test, and returned the system to service. Twenty-four days later, the licensee observed elevated inboard turbine bearing temperatures during a surveillance test. The elevated temperatures were caused by an obstruction in the lube oil cooler. The lube oil filter had been improperly installed during the overhaul and allowed particulate material to bypass the filter. The inspectors identified that an elevated bearing temperature also occurred during the earlier postmaintenance test. However, the licensee did not monitor bearing temperatures during the test nor was

postmaintenance testing performed for a sufficient duration to allow the turbine to reach normal operating temperatures. This finding had crosscutting aspects regarding human performance (personnel) for failure to adequately test the turbine-driven auxiliary feedwater pump following maintenance, and problem identification in that indications were present during an earlier test that should have alerted the licensee to the condition.

This finding is greater than minor because, if left uncorrected, the condition would become a more significant safety concern. This finding is only of very low safety significance because the condition was not a design or qualification deficiency confirmed to result in loss of function per Generic Letter 91-18; did not result in an actual loss of safety function of a system; did not increase the likelihood of a fire; and did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event (Section 4OA3).

Cornerstone: Barrier Integrity

- Green. The inspectors identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," after the licensee failed to correct deficiencies identified during postmodification testing of the feedwater isolation valve actuators. The postmodification test revealed that the feedwater isolation valves would not meet the Mode 3 closure times described in the licensing bases. The licensee dispositioned the deficiency without adequately correcting the deficiencies. The licensee had a second opportunity to identify the inadequate corrective actions when the Independent Technical Review Team assessed the postmodification test results. The Independent Technical Review Team assessment was not effective in identifying the inadequate corrective actions. This finding had crosscutting aspects regarding failure to implement adequate corrective actions.

This finding is greater than minor because the failure of the feedwater isolation valves to meet closure times affected the barrier integrity cornerstone design control attribute to maintain the functionality of the fuel cladding, following a cooldown event, and to limit post accident containment pressure by isolating feedwater to the faulted steam generator. This finding is of very low safety significance because the condition had a potential affect on the fuel cladding. This finding is only of very low safety significance because the condition did not represent a degradation of the barrier function of the control room, auxiliary building, or spent fuel pool, nor did this finding represent an actual open pathway in the physical integrity of the containment or affect the atmospheric pressure control or hydrogen control functions of containment (Section 4OA2).

- Green. A self-revealing, Green, noncited violation of Technical Specification 5.4.1.a, "Procedures," was identified after an operator error resulted in the unplanned transfer of 3600 gallons of water from the spent fuel pool. The operating procedure required the operator to shut down refueling water storage tank recirculation before placing fuel pool cleanup in service. The operator failed to shut down recirculation, resulting in the unplanned spent fuel pool de-watering. The operating crew recognized the decreasing

Enclosure

spent fuel pool level and secured the recirculation after about 3600 gallons had been transferred. This finding had crosscutting aspects of human performance in that personnel failed to follow procedures.

This finding is greater than minor because, if left uncorrected, it would have become a more significant safety concern. This finding affected the barrier integrity cornerstone and the human performance attribute of routine Operations personnel performance to maintain functionality of containment. The inspectors determined that this finding is only of very low significance because the condition only represented a degradation of the radiological barrier function provided by the spent fuel pool (Section 1R14).

REPORT DETAILS

Summary of Plant Status: Ameren Union Electric operated the Callaway Plant at full power throughout the inspection period.

1. REACTOR SAFETY
Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R01 Adverse Weather Protection (71111.01)

a. Inspection Scope

The inspectors reviewed the licensee's preparations for cold weather conditions on two risk significant systems (two inspection samples). The inspectors performed the review to verify that the system components were properly prepared prior to the onset of extreme cold weather conditions. The inspectors reviewed the borated refueling water storage and the condensate storage and transfer systems. These systems were sampled because their safety functions could be adversely affected by cold weather. The inspectors performed a walkdown of these systems on November 16 to verify that the licensee had properly completed cold weather preparations. The inspectors also performed an in-office review of Procedures OTS-ZZ-00007, "Plant Cold Weather;" OTN-BN-00001, "Borated Refueling Water Storage System;" and OTN-QJ-00003, "Plant Freeze Protection Heat Tracing Procedure," to verify that adverse weather protection measures described in the Final Safety Analysis Report (FSAR) were adequately implemented.

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment (71111.04)

a. Inspection Scope

Partial System Walkdowns. The inspectors completed three partial system walkdowns during the inspection period (three sample sizes). The inspectors performed the walkdowns to verify proper component alignment and subsystem operability. The inspectors used the FSAR, Technical Specifications (TSs), and procedures and drawings listed in the attachment as the bases for acceptability. The inspectors completed a partial walkdown of the following systems:

- Residual heat removal system Train A, while the redundant train was out of service for maintenance. The inspectors walked down components located in the auxiliary and control buildings on September 28.
- Containment spray system Train B, while the redundant train was out of service for maintenance. The inspectors walked down components located in the auxiliary and control buildings on December 7.

Enclosure

- Emergency diesel generator (EDG) Train A, while the redundant train was out of service for testing. The inspectors walked down components located in the diesel and control buildings on December 29.

Complete System Walkdown. The inspectors conducted a detailed review of the alignment and condition of the 125 dc volt and 120 ac volt vital electrical distribution systems on November 30 and December 1 (one inspection sample). The inspectors completed a walkdown of system components located in the control and auxiliary buildings. The inspectors used the FSAR, TSs, and procedures and drawings listed in the attachment to verify proper system alignment. The inspectors also performed a review of the system health reports to determine whether the licensee had identified any significant maintenance problems with the systems.

b. Findings

No findings of significance were identified.

1R05 Fire Protection (71111.05)

.1 Routine Fire Inspection Walkdowns

a. Inspection Scope

The inspectors performed eight fire zone walkdowns to verify that the licensee maintained fire areas in accordance with the Fire Hazards Analysis Report (eight inspection samples). The fire zones were chosen based on their risk significance as described in the individual plant examination of external events. The walkdowns focused on control of combustible materials and ignition sources, operability and material condition of fire detection and suppression systems, and the material condition of passive fire protection features. The following fire zones were inspected:

- Fire Area C-21, lower cable spreading room on October 3
- Fire Area C-30, vertical cable chase on October 3
- Fire Areas C-27 and C-28, control room and service area on October 3
- Fire Area F-2, fuel pool heat exchange Room 6104 on October 31
- Fire Area F-3, fuel pool heat exchange Room 6105 on October 31
- Fire Area A-4, safety related pump area Rooms 1107 and 1110 on October 31
- Fire Area A-20, personnel hatch and component cooling water on November 1
- Fire Area A-23, main steam and feedwater valve compartment on November 30

b. Findings

Introduction. A Green, NRC-identified, noncited violation (NCV) of TS 5.4.1.d, "Fire Protection Program," was identified after the licensee failed to maintain the integrity of an auxiliary building fire door.

Description. The inspectors identified that fire Door 15031 was degraded on November 1. The latch was broken and the door would not provide the rated fire confinement function. The fire door provided the barrier between fire Area A-19, auxiliary building general area, and fire Area A-20, the containment personnel hatch and component cooling water surge tank rooms. The fire hazard analysis required that these fire areas be separated by a 3-hour fire barrier. The licensee had several prior opportunities to identify the degraded fire door. Plant security Procedure "Armed Responder/Patrol Officer," required plant security officers to verify that fire Door 15031 was properly latched during each patrol. Several security patrols passed through Door 15031 on each shift.

Analysis. Failure of the licensee to maintain the integrity of the fire door was a performance deficiency. This finding is greater than minor because the degraded fire barrier affected the mitigating system cornerstone objective to ensure response to an initiating event and the attribute providing protection against external factors. The inspectors used Manual Chapter 0609, Appendix F, "Fire Protection Significance Determination Process," to analyze this finding because the degraded door is a barrier related to the licensee's fire protection defense-in-depth strategies. The inspectors concluded that the degraded door was a fire confinement finding with a high degradation rating due to the broken latch. This finding is of very low safety significance because the degraded door did not separate unique potential damage targets and the door would have provided at least 20 minutes fire endurance protection. Also, the inspectors concluded that no fixed or in-situ fire ignition sources or combustible or flammable materials were positioned such that the degraded door would have been subject to direct flame impingement. This finding, which involved security personnel's failure to properly implement a procedure, is associated with the crosscutting area of human performance.

Enforcement. TS 5.4.1.d required that the licensee maintain a fire protection program. Administrative Procedure APA-ZZ-00700, "Fire Protection Program," required that fire doors be maintained as described in Procedure APA-ZZ-00701, "Control of Impairments of Fire Protection Systems and Components," and FSAR Section 9.5.B, "Fire Hazards Analysis." Contrary to the above, the licensee failed to ensure that fire Door 15031 was maintained as described in Procedure APA-ZZ-00701 and FSAR Section 9.5.B. Because this finding is of very low safety significance and was entered into the licensee's corrective action program (Callaway Action Request (CAR) 200408368) the violation is being treated as an NCV, consistent with Section VI.A of the NRC Enforcement Policy (NCV 05000483/2004005-01).

.2 Fire Brigade Response

a. Inspection Scope

The inspectors assessed the licensee's fire brigade response to an actual plant fire on September 18 (one inspection sample). The inspectors performed the assessment to verify the fire brigade's readiness to respond to plant fires. The inspectors attended the

postevent critique, walked down the fire areas, and conducted interviews of fire brigade members. The inspectors compared the fire brigade's response to procedures listed in the attachment.

b. Findings

Introduction. The inspectors identified a Green NCV of Technical Specification 5.4.1.d, "Fire Protection Program," after a plant fire occurred following the licensee's failure to establish a fire watch and a reflash watch.

Description. A fire and subsequent reflash occurred on September 18, requiring two activations of the plant fire brigade. The fires occurred in the communication corridor building, which was adjacent to the control room. A welder ignited the fire on the building roof. The fire watch on the roof immediately extinguished the flames. However, the fire had burned through the roof and ignited the ceiling below. The licensee had not established a fire watch inside the room as required by Procedure APA-ZZ-00742, "Control of Ignition Sources." The fire resulted in the activation of smoke alarms outside the control room door (2047 foot level) and in the communication corridor lobby (2000 foot elevation). The shift supervisor activated the plant fire brigade. The fire brigade extinguished the communication corridor ceiling fire. The fire brigade left the area without establishing a fire reflash watch as required by Procedure APA-ZZ-00742. Approximately 55 minutes later, an equipment operator returned to the room and identified that the fire had reflash. The shift supervisor reactivated the fire brigade. The fire brigade extinguished the reflash fire.

Analysis. The licensee's two failures to establish fire watches were performance deficiencies. The inspectors used Manual Chapter 0609, Appendix F, "Fire Protection Significance Determination Process," to analyze this finding because the condition had an adverse affect on fire detection, manual suppression, and fire brigade effectiveness related to the licensee's fire protection defense-in-depth strategies. This finding is greater than minor because the reactor safety mitigating systems cornerstone objective and attribute to provide protection against external factors was affected. The inspectors concluded that the lack of a fire watch degraded the licensee's early fire suppression capability and resulted in a fire prevention finding with a high degradation rating. The inspectors determined that this finding is of very low significance because the fire ignition source could not have caused ignition of secondary combustible fuels and was not close enough to sufficient surrounding combustibles to cause damage consistent with any of the plant fire damage scenarios. This finding, which involved personnel failure to implement plant procedures, was associated with the crosscutting area of human performance.

Enforcement. TS 5.4.1.d required the licensee to maintain the fire protection program. The fire protection program, as described in Administrative Procedure APA-ZZ-00700, "Fire Protection Program," required hot work fire watches to be maintained as described in Procedure APA-ZZ-00742. Procedure APA-ZZ-00742 required the licensee to establish a fire watch on the opposite side of the roof during welding and required a fire watch to be maintained at least 30 minutes following completion or interruption of the

work. Contrary to the above, the licensee failed to establish a fire watch on the opposite side of the roof during welding. Because this finding is of very low safety significance and was entered into the licensee's corrective action program (CAR 200407284) it is being treated as an NCV, consistent with Section VI.A of the NRC Enforcement Policy (NCV 05000483/2004005-02).

1R11 Licensed Operator Requalification Program (71111.11Q)

.1 Biennial Inspection

a. Inspection Scope

The inspectors reviewed the annual operating examination test results for 2004 conducted between August 13 and September 10, 2004. Since this was the first half of the biennial requalification cycle, the licensee had not yet administered the written examination. These results were assessed to determine whether they were consistent with NUREG 1021, "Operator Licensing Examination Standards for Power Reactors," Revision 8, Supplement 1, guidance and Manual Chapter 0609, Appendix I, "Operator Requalification Human Performance Significance Determination Process," requirements. This review included examination of test results, which included no crew failures out of 12 crews and no job performance measure individual failures out of a total of 64 licensed operators.

b. Findings

No findings of significance were identified.

.2 Quarterly Review

a. Inspection Scope

The inspectors observed one session of licensed operator simulator training during the inspection (one inspection sample). The inspectors performed the observation to verify that operators could adequately recognize, diagnose, and mitigate plant operational events and emergencies. The inspectors observed the simulator portion of a loss of coolant exercise in conjunction with a plant emergency drill conducted on November 3. The inspection was focused on the following key attributes to verify operator performance:

- Crew performance in terms of clarity and formality of communications
- Ability to take timely and appropriate actions
- Prioritizing, interpreting, and verifying alarms
- Correct implementation of procedures, including the alarm response procedures
- Timely control board operation during high-risk operator actions
- Oversight and direction provided by the shift supervisor

- The ability to identify and implement appropriate TSs and reporting requirements
- Group dynamics involved in crew performance

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness (71111.12Q)

a. Inspection Scope

The inspectors reviewed three equipment performance issues to assess the licensee's implementation of their maintenance rule program (three inspection samples). The inspectors conducted the review to verify that component performance problems were properly included in the scope of the licensee's maintenance rule program and that the appropriate performance criteria were established. The inspectors used the requirements outlined in 10 CFR 50.65 and Engineering Department Procedure EDP-ZZ-01128, "Maintenance Rule Program," as the bases of acceptance. The inspectors reviewed the following equipment performance problems:

- CAR 200103900, Water leakage from auxiliary building/reactor building roofs
- CAR 200307247, Unplanned inoperability of component cooling water
- CAR 200407258, Unplanned inoperability of control room ventilation system

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Evaluation (71111.13)

a. Inspection Scope

The inspectors reviewed five risk assessments for planned or emergent maintenance activities to verify that the licensee met the requirements of 10 CFR 50.65(a)(4) for assessing and managing increases in plant risk (five inspection samples). The inspectors compared the licensee's risk assessment and risk management activities against the requirements of 10 CFR 50.65(a)(4); the recommendations of Nuclear Management and Resource Council 93-01, "Industry Guidelines for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," Revision 3; and Engineering Department Procedure EDP-ZZ-01129, "Callaway Plant Risk Assessment." The inspectors reviewed the following risk assessments:

- EDG Train B outage on October 27. The inspectors performed an in-office review of the licensee's risk assessment and observed compensatory risk mitigation actions from the control room.

- Centrifugal charging pump Train B outage on November 2. The inspectors performed an in-office review of the licensee's risk assessment and observed compensatory risk mitigation actions from the control room.
- Component cooling water Train A outage on November 8. The inspectors performed an in-office review of the licensee's risk assessment and observed compensatory risk mitigation actions from the control room.
- Turbine-driven auxiliary feedwater (TDAFW) pump surveillance testing on November 22. The inspectors observed compensatory risk mitigation actions from the control room.
- TDAFW pump unplanned outage on November 23 due to a failed governor valve controller. The inspectors observed compensatory risk mitigation actions from the control room.

b. Findings

No findings of significance were identified.

1R14 Personnel Performance During Nonroutine Plant Evolutions (71111.14)

a. Inspection Scope

The inspectors reviewed two nonroutine plant events for personnel performance (two inspection samples). The inspectors reviewed each event to verify proper operator response. The inspectors used operator logs, plant computer data, and charts to determine what occurred, how the operators responded, and whether the response was in accordance with plant procedures. The inspectors reviewed operator actions associated with a November 2 spent fuel pool (SFP) de-watering event (CAR 200408297) and a secondary chemistry excursion on December 15 (CARs 200409278 and 200409284).

b. Findings

1. An Operator Error Resulted in an Unplanned SFP De-Watering

Introduction. A self-revealing, Green, NCV of TS 5.4.1.a, "Procedures," was identified after the unplanned transfer of 3600 gallons of water from the SFP occurred due to the failure of an operator to follow procedure.

Description. An operator error resulted in the inadvertent transfer of 3600 gallons of SFP water to the refueling water storage tank (RWST) on November 2. Procedure OTN-EC-00001, "Fuel Pool Cooling and Cleanup System," required the operator to shut down RWST recirculation before placing fuel pool cleanup in service. The operator failed to shut down RWST recirculation before placing fuel pool cleanup in service. This resulted in the SFP de-watering. The operating crew recognized the

Enclosure

decreasing SFP level and secured the recirculation after about 3600 gallons had been transferred. A poor prejob brief, which lacked operations supervision, and poor procedural placekeeping contributed to the event.

Analysis. Failure of the operator to follow the procedure was a performance deficiency. The inspectors used the at-power situation's significance determination process to analyze this finding. This finding affected the barrier integrity cornerstone and the human performance attribute of routine Operations personnel performance to maintain functionality of containment. This finding is greater than minor because, if left uncorrected, it would have become a more significant safety concern. The inspectors determined that this finding is only of very low significance because the condition only represented a degradation of the radiological barrier function provided by the SFP. This finding, which involved the failure of an operator to follow procedure, was associated with the crosscutting area of human performance (personnel).

Enforcement. TS 5.4.1.a required written procedures specified in Regulatory Guide 1.33, Appendix A, to be implemented. Appendix A, Item 3h, required procedures for operation of fuel storage purification and cooling systems to be implemented. Procedure OTN-EC-00001 required the operator to shut down RWST recirculation before placing the fuel pool cleanup in service. Contrary to the above, on November 2, the operator did not shut down RWST recirculation before placing the fuel pool cleanup in service. Because this finding is of very low safety significance and was entered into the licensee's corrective action program (CAR 200408297), this violation is being treated as an NCV, consistent with Section VI.A of the NRC Enforcement Policy (NCV 05000483/2004005-03).

2. Operator Error Resulted in a Secondary Chemistry Excursion

Introduction. A self-revealing Green finding was identified after an operator error resulted in a secondary side chemistry excursion and an unplanned steam generator blowdown isolation.

Description. An operator error contributed to a secondary plant chemistry excursion, requiring the licensee to enter Chemistry Action Level 2 for the steam generators. Action Level 2 defines the point where extended full power operation will result in some degree of steam generator corrosion and requires the licensee to reduce power to 30 percent within 8 hours. The chemistry excursion occurred on December 15 after the steam generator blowdown demineralizer flush water line isolated. The isolation caused the flush line to pressurize and to leak by a closed level control valve to the main condenser. The flush water contained high conductivity and sulfate levels and quickly degraded feedwater and steam generator chemistry. The licensee restored steam generator chemistry before a power reduction was required.

Pressurizing of the flush water line was due to an operator error. The flush water was transferred to the discharge monitoring tank and released to the Missouri River. The flush water was required to be diluted by at least 5000 gallons per minute cooling tower blowdown flow during the release. An operator reduced the cooling tower blowdown

flow to 3000 gallons per minute, resulting in an automatic isolation of the release. The chemistry excursion occurred about 8 minutes after the isolation. Procedure RTN-BM00100, "Steam Generator Blowdown System Operation," required the operator to maintain at least 5000 gallons per minute cooling tower blowdown flow. Operator knowledge deficiencies, a poor prejob brief, ineffective communications, and leakage by a level control valve all contributed to the chemistry excursion.

Analysis. The failure of operations personnel to maintain minimum cooling tower dilution flow during the release was a performance deficiency. The inspectors used the at-power situation's significance determination process to analyze this finding. This finding is greater than minor because the chemistry excursion had an actual impact on the objective and equipment performance attribute of the initiating events cornerstone. The inspectors determined that this finding is only of very low safety significance because the chemistry excursion did not add to the likelihood of a primary or secondary system loss of coolant accident initiator, nor contribute to loss of mitigation equipment functions, nor increase the likelihood of a fire or internal/external flood. This finding, which involved the failure of an operator to follow procedure, was associated with the crosscutting area of human performance (personnel). This event was entered into the licensee's corrective action program (CARs 200409278 and 200409284).

Enforcement. No violation of regulatory requirements occurred. The inspectors determined that this finding did not represent a noncompliance because it occurred on nonsafety-related secondary plant equipment (FIN 05000483/2004005-04).

1R15 Operability Evaluations (71111.15)

a. Inspection Scope

The inspectors reviewed five operability determinations (five inspection samples) involving risk significant equipment during the inspection. The inspectors reviewed the technical adequacy of the operability determinations to verify that operability was justified and compensatory measures were appropriate and controlled. The inspectors reviewed plant status documents such as operator shift logs, emergent work documentation, deferred modifications, and standing orders to determine if an operability determination was warranted for degraded components. The inspectors used the FSAR, TSs, and design basis documents as the bases to determine the technical adequacy of licensee prepared operability determinations. The inspectors reviewed the following equipment conditions and associated operability determinations:

- Operability Determination 200407671, Failure to use an isolation device between a Class 1E reactor protection system and associated circuit, October 10.
- Operability Determination 200408337, Feedwater isolation valves (FWIVs) would not close within 15 seconds in Mode 3 with one train of actuating solenoids, November 5.

- Operability Determination 200408558, Control room emergency ventilation system would not meet in-leakage analysis of record, November 16.
- Operability Determination 200408693, TDAFW turbine operability following loss of governor valve servo position feedback voltage, November 22.
- Operability Determination 200409206, Open resistor found on safety-related battery charger, December 15.

b. Findings

No findings of significance were identified.

1R16 Operator Workarounds (71111.16)

a. Inspection Scope

The inspectors performed an evaluation (one inspection sample) of the cumulative effect of operator workarounds during the inspection. The inspectors reviewed the December operator workaround and burden lists and assessed the effect of the workarounds on the ability of operators to implement plant emergency procedures. The inspectors completed the review to verify that the workarounds did not challenge the operators' capability to respond to plant transients and events. The inspectors also completed an in-office review and control room walkdown of the auxiliary building emergency exhaust fan workaround on December 13.

b. Findings

No findings of significance were identified.

1R17 Permanent Plant Modifications (71111.17)

a. Inspection Scope

The inspectors performed an in-depth review of one permanent plant modification (one inspection sample). The inspectors conducted the review to verify that the licensee designed and installed the modification in accordance with regulatory requirements, the plant design bases, and plant procedures. The inspectors selected the replacement of the FWIV actuators (modification CMP 00-1009) for the review because of the risk-significant feedwater isolation function. The inspectors used Licensing Amendment 159, the modification safety evaluation report, TSs, and the FSAR as the bases for acceptability of the licensee's activities.

b. Findings

No findings of significance were identified.

1R19 Postmaintenance Testing (71111.19)

a. Inspection Scope

The inspectors reviewed and/or observed seven risk significant postmaintenance tests (PMTs) to verify that the licensee adequately demonstrated the safety function of components affected by maintenance activities (seven inspection samples). The inspectors verified that testing procedures were properly reviewed and approved and incorporated appropriate acceptance criteria. The inspectors used information in the TSs, the FSAR, and American Society of Mechanical Engineers Code Section XI, as the bases for acceptability of sampled PMTs. The sample included the following PMTs:

- PMT R716656A, EDG Train B brush inspection and tension check, performed on October 27. The inspectors observed a portion of the PMT from the control room and EDG building and completed an in-office review of the completed work packages.
- PMTs R235451A, EDG Train A lube oil cooler; R23541A, EDG Train A intercooler heat exchanger; R229724A, EDG Train A starting air system; and R716835A, EDG Train A jacket water heat exchanger maintenance, performed on September 22. The inspectors observed a portion of the PMTs from the control room and the EDG building and completed an in-office review of the completed work packages.
- PMT R675443A, Essential service water discharge valve corrective maintenance, performed on September 22. The inspectors completed an in-office review of the completed work package.
- PMT R733301, TDAFW turbine governor valve hydraulic operator corrective maintenance, performed on November 23. The inspectors observed a portion of the PMT from the control room and auxiliary building and completed an in-office review of the completed work package.
- PMT R712971A, Containment spray pump Train A preventative and corrective maintenance, performed on December 9. The inspectors completed an in-office review of the completed work packages.
- PMTs R714293A and R714285A, Residual heat removal Train B pump motor and breaker preventive maintenance, performed on September 22. The inspectors completed an in-office review of the completed work packages.
- PMT R605100A, Component cooling water Valve EGHV0102 repair, performed on September 29. The inspectors completed an in-office review of the completed work packages.

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing (71111.22)

a. Inspection Scope

The inspectors reviewed and/or observed seven risk significant surveillance tests to verify that the licensee adequately demonstrated component safety function and to assess operational readiness (seven inspection samples). The inspectors verified that testing procedures were properly reviewed and approved and incorporated appropriate acceptance criteria. The inspectors used information in the TSs, the FSAR, and American Society of Mechanical Engineers Code Section XI, as the bases for acceptability of sampled surveillance tests. The sample included the following surveillance tests:

- Surveillance S727126, Engineered safety features Train A actuation test performed on October 21. The inspectors observed the test and performed an in-office review of the completed surveillance package.
- Surveillance S730469, Heat flux hot channel factor performed on October 21. The inspectors completed an in-office review of the completed surveillance package.
- Surveillance S730468, Nuclear enthalpy rise hot channel factor performed on October 21. The inspectors completed an in-office review of the completed surveillance package.
- Surveillance S729503, EDG Train A slow start and one-hour run performed on September 22. The inspectors completed an in-office review of the surveillance package.
- Surveillance 727128, Essential service water pump Train A inservice test, performed on September 22. The inspectors completed an in-office review of the surveillance package.
- Surveillance S733430, TDAFW pump inservice test performed on December 20. The inspectors observed testing from the auxiliary building and control room and completed an in-office review of the surveillance test package.
- On-demand surveillance (following a load decrease) of reactor calorimetric power performed on September 25. The inspectors completed an in-office review of the surveillance package.

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modifications (71111.23)

a. Inspection Scope

The inspectors sampled one temporary plant modification during the inspection (one inspection sample). The inspectors selected a temporary alteration of the reactor protection system over temperature/delta temperature circuit (Work Request W233349) because of the risk-significance of the reactor trip function. The inspectors reviewed the configuration control of the modification to verify that the plant documents, such as drawings and procedures, were updated, including applicable operating and maintenance procedures. The inspectors performed a control building walkdown of the temporary modification on October 3 and performed an in-office review to verify that the installation was consistent with the modification documents and the plant design bases as described in the FSAR and TSs. The inspectors compared the temporary modification documentation against the requirements established in Administrative Procedure APA-ZZ-00605, "Temporary System Modifications."

b. Findings

No findings of significance were identified.

Cornerstone: Emergency Preparedness

1EP6 Drill Evaluation (71114.06)

a. Inspection Scope

The inspectors observed one emergency drill on November 3 to evaluate the adequacy of the drill conduct and to verify proper emergency action level classification and protective action recommendations (one inspection sample). The inspectors observed portions of the drill from the control room simulator and the Technical Support Center. The inspectors compared drill observations against Operations Procedure ODP-ZZ-0025, "EOP Usage;" Emergency Plan Implementing Procedure EIP-ZZ-00101, "Classification of Events;" and Emergency Plan Implementing Procedure EIP-ZZ-00201, "Notifications," as a basis for acceptability. The inspectors also completed an in-office review of the Quality Assurance Audit of Emergency Preparedness AP04-013, December 9, 2004

b. Findings

No findings of significance were identified.

2. RADIATION SAFETY
Cornerstone: Occupational Radiation Safety

2OS2 ALARA Planning and Controls (71121.02)

a. Inspection Scope

The inspectors assessed licensee performance with respect to maintaining individual and collective radiation exposures as low as is reasonably achievable (ALARA). The inspectors used the requirements in 10 CFR Part 20 and the licensee's procedures required by TSs as criteria for determining compliance. The inspectors interviewed licensee personnel and reviewed the following:

- Current 3-year rolling average collective exposure
- Site-specific ALARA procedures
- Four work activities of highest exposure significance completed during the last outage
- ALARA work activity evaluations, exposure estimates, and exposure mitigation requirements
- Intended versus actual work activity doses and the reasons for any inconsistencies
- Interfaces between operations, radiation protection, maintenance, maintenance planning, scheduling and engineering groups
- Integration of ALARA requirements into work procedure and radiation work permit (or radiation exposure permit) documents
- Postjob (work activity) reviews
- Assumptions and basis for the current annual collective exposure estimate, the methodology for estimating work activity exposures, the intended dose outcome, and the accuracy of dose rate and man-hour estimates
- Method for adjusting exposure estimates, or replanning work, when unexpected changes in scope or emergent work were encountered
- Source-term control strategy or justifications for not pursuing such exposure reduction initiatives

- Declared pregnant workers during the current assessment period, monitoring controls, and the exposure results
- Self-assessments, audits, and special reports related to the ALARA program since the last inspection
- Corrective action documents related to the ALARA program and followup activities such as initial problem identification, characterization, and tracking

The inspectors completed nine of the required 15 samples and five of the optional samples.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification (71151)

a. Inspection Scope

The inspectors reviewed two licensee performance indicators for the period September 1, 2003, through September 30, 2004. The inspectors used the definitions and guidance of Nuclear Energy Institute 99-02, "Regulatory Assessment Indicator Guideline," Revision 2, to verify that the licensee accurately reported performance indicator data during the assessment period.

Reactor Safety Strategic Areas

- Auxiliary feedwater system
- Residual heat removal system

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems (71152)

.1 Daily Reviews

a. Inspection Scope

The inspectors performed a daily review of items entered into the licensee's corrective action program. The inspectors performed the screening to identify any repetitive

equipment failures or adverse human performance trends for followup. The inspectors also attended selected conditions adverse to quality report screenings and daily plant status meetings.

b. Findings

No findings of significance were identified.

.2 Annual Sample Review

Routine Review of Identification and Resolution of Problems

a. Inspection Scope

The inspectors performed detailed in-office reviews and walkdowns of plant equipment related to two significant conditions adverse to quality (two inspection samples). The inspectors reviewed the licensee's CAR reports to verify that the full extent of the issues were identified, that the licensee performed appropriate evaluations, and that adequate corrective actions were specified and prioritized. The inspectors evaluated the reports against the requirements of Administrative Procedure APA-ZZ-00500, "Corrective Action Program," and 10 CFR Part 50, Appendix B. The inspectors reviewed the following two samples:

- CAR 200404815, FWIVs failed to meet postmodification testing acceptance criteria
- CAR 200403258, Adverse trend in human performance

b. Findings

Inadequate Corrective Action Following Failure of FWIVs' Postmodification Test

Introduction. The NRC identified a Green NCV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," after the licensee failed to take adequate corrective actions for deficiencies identified during postmodification testing of the FWIV actuators. The postmodification test revealed that the FWIVs would not meet the Mode 3 closure times described in the licensing bases.

Description. The licensee modified the FWIV actuators during Refueling Outage 13. The new actuators used feedwater system pressure as the motive force to close the valves. The licensing bases, described in License Amendment 159, established that the valves would close within 15 seconds with greater than or equal to 90 psig system pressure. TS Surveillance Requirement 3.7.3, FWIVs, required each FWIV to stroke in 15 seconds using only one actuating train. Post modification Test ETP-SA-ST001, "Site Acceptance Test for Main Steam and Feedwater Isolation Actuation Systems," revealed that the 15-second stroke-time requirement was not met when the FWIVs were tested at 109 psig system pressure. The licensee entered the failure to meet the test acceptance

Enclosure

criteria into the corrective action program as CAR 200404815. However, the licensee dispositioned CAR 200404815 without adequately correcting the failure of the FWIVs to meet the licensing bases stroke-time requirements. The licensee had a second opportunity to identify the inadequate corrective action when the Independent Technical Review Team assessed the postmodification test results during July 2004. The Independent Technical Review Team assessment failed to recognize the significance of the testing results and did not recommend corrective actions.

Analysis. The licensee's failure to correct deficiencies identified during FWIV postmodification testing was a performance deficiency. The inspectors used the at-power situation's significance determination process to analyze this finding. This finding is greater than minor because the failure of the FWIVs to meet closures times affected the barrier integrity cornerstone objective for the fuel and containment physical design barriers. The FWIV design control attribute function is to limit containment overpressure conditions and faulted steam generator related reactor coolant system cooldown effects on fuel cladding. This finding is only of very low safety significance because the condition did not represent a degradation of the barrier function of the control room, auxiliary building, or SFP, nor did this finding represent an actual open pathway in the physical integrity of the containment or affect the atmospheric pressure control or hydrogen control functions of containment. The licensee implemented corrective actions, including a proposed revision to clarify the TSs requirements and administrative controls to ensure that the valve remains functional in all modes or that the required actions of the TSs are adhered to. This finding, which involved the failure to implement adequate corrective actions, was associated with the crosscutting area of problem identification and resolution.

Enforcement. Appendix B, Criterion XVI, of 10 CFR Part 50, required that measures be established to assure that conditions adverse to quality, such as deficiencies, are promptly corrected. Contrary to the above, the licensee failed to promptly correct deficiencies associated with the failure of the FWIVs to meet licensing bases stroke-time requirements. Because of the very low safety significance and the licensee's action to place this issue in their corrective action program as CAR 200408337, this violation is being treated as an NCV in accordance with Section VI.A.1 of the Enforcement Policy (NCV 05000483/2004005-05)

.3 Semiannual Trend Review

a. Inspection Scope

The inspectors performed a review of the licensee's corrective action program and associated documents to identify trends that could indicate the existence of a more significant safety issue. The inspectors focused on repetitive equipment issues and considered the results of daily CAR screening reviews. The inspectors also considered licensee trending efforts and licensee human performance assessment results. The inspector's review nominally considered the 6-month period of July through December, although some examples expanded beyond those dates when the scope of the trend warranted. Inspectors also reviewed specific CAR items associated with a continued

Enclosure

negative trend in human performance events that occurred during the period. The review included issues documented outside the normal corrective action program in major equipment problem lists, repetitive and/or rework maintenance lists, departmental problem/challenge lists, system health reports, quality assurance audit/surveillance reports, self-assessment reports, and maintenance rule assessments. The specific items reviewed are listed in the Documents Reviewed section attached to this report. The inspectors compared and contrasted their results with the results contained in the licensee's latest quarterly trend reports. Corrective actions associated with a sample of the issues identified in the licensee's trend report were reviewed for adequacy. The inspectors also reviewed Callaway Plant Quarterly Performance Analysis Report Third Quarter. The inspectors used Procedure APA-ZZ-00500, the corrective action program, and 10 CFR Part 50, Appendix B, as the bases for acceptability.

b. Findings and Observations

There were no findings of significance identified. The inspectors evaluated the licensee's trending methodology and observed that the licensee had performed a detailed review and monitoring of several adverse trends:

- Adverse trend in human performance (CAR 200403258)
- Poor configuration management (CAR 200306478)
- Poor radworker practices (CAR 200400454)
- Decreasing simulator training quality (CAR 200405533)
- Degraded emergency response equipment (CAR 200405784)

The licensee concluded that the adverse human performance trend had not improved. The inspectors concurred with the licensee's conclusion. The inspectors discussed several examples of continued poor human performance in Section 4OA4 of this report.

The inspectors also identified an adverse trend in the licensee's ability to correctly translate licensing bases requirements into operating practices and specifications. In addition to this finding, described in Sections 1R23 and 4OA2 of this report, the inspectors considered the following examples of inadequate licensing bases related technical reviews:

- Failure to incorporate steam generator overfill safety evaluation report into the licensing bases, Licensee Event Report 2003-003
- Inadequate corrective actions taken following identification of an unanalyzed condition which resulted in postulated postaccident control room dose limits to be exceeded, NCV 05000483/2003005-03
- Engineering evaluation incorrectly approved leaving health physics doors open, Licensee Event Report 2003-007

- Failure to assure that applicable regulatory requirements and the design basis for the containment radiation gas monitors was correctly translated, NCV 05000483/2003005-04

.4 Cross-Reference to PI&R Findings Documented Elsewhere

- Section 4OA5 documents a finding where the licensee failed to identify degraded turbine-driven auxiliary feedwater pump bearing cooling given prior indication.

4OA4 Crosscutting Aspects of Findings (71152)

Section 1R05 documents two findings with human performance crosscutting aspects which involved the failure to maintain the integrity of an auxiliary building fire door and the failure to post a fire watch and reflash watch.

Section 1R14 documents two findings with human performance crosscutting aspects which involved an operator error that resulted in a transfer of 3600 gallons of SFP water to the RWST and an operator error that resulted in a secondary chemistry excursion reaching Action Level 2 threshold.

Section 4OA5 documents a finding with human performance crosscutting aspects, which involved a failure to implement required PMT conditions and a failure to identify degraded TDAFW turbine bearing cooling.

4OA5 Other Activities

- .1 (Closed) Unresolved Item 05000483/2004004-03: Postmaintenance test failed to identify degraded TDAFW pump turbine bearing cooling.

a. Inspection Scope

The inspectors completed an in-office review of the licensee's evaluation of the TDAFW pump performance with degraded turbine bearing cooling (CAR 200406231). The inspectors performed the review to determine if the TDAFW pump was capable of performing the design basis function for a 24-hour postaccident mission time. The inspectors reviewed the licensee's analysis to predict the maximum postulated bearing temperatures and loading.

b. Findings

Inadequate Postmaintenance Test Following TDAFW Pump Turbine Overhaul

Introduction. The inspectors identified a Green NCV of 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," after an inadequate PMT failed to identify degraded TDAFW turbine bearing cooling following a turbine overhaul.

Description. The licensee completed an overhaul of the TDAFW turbine and performed a PMT on June 9. The licensee concluded that the maintenance activity was correctly performed and returned the TDAFW turbine back to service. On August 3, the licensee observed elevated TDAFW pump inboard turbine bearing temperatures during a routine surveillance test. The licensee disassembled and inspected the turbine lube oil system. The licensee identified that the orifice supplying cooled lube oil to the inboard bearing was partially obstructed by ferrous debris. Inspection of the turbine lubricating system revealed significant ferrous particulate contamination in the oil. The licensee also determined that the lubricating system oil filter had been improperly installed during the overhaul and allowed flow to bypass the cartridge. The debris originated from corrosion inside the lube oil system instrument branch. The direct cause of elevated bearing temperatures was the introduction and buildup of particulate material over an extended period of time, coupled with ineffective fluid filtration.

The inspectors identified that the PMT performed on June 9 was not adequate. The licensee's PMT program, as described in Procedure PDP-ZZ-00011, "Postmaintenance Testing," stated that testing should be conducted under conditions representative of normal operating parameters, including temperature. The licensee only operated the turbine for 25 minutes during the June 9 PMT. Twenty-five minutes of operation was not an adequate duration for the turbine to reach thermal equilibrium conditions. Corrective action (CAR 200208352, Action 34), following a previous turbine failure, stated that turbine PMTs should have a 4-hour duration following governor valve maintenance. This action was to ensure that the governor valve stem would reach thermal equilibrium conditions during the PMT. The turbine overhaul also included governor valve maintenance. The previous corrective action to operate the TDAFW pump to thermal equilibrium conditions was not implemented during the June 9 PMT.

The inspectors concluded that the licensee had a second opportunity to detect the inboard bearing obstruction during the June 9 PMT. The turbine bearing temperatures normally decrease about 15°F after turbine startup due to lube oil cooling. Plant data indicated that the inboard bearing temperature increased about 10° F following turbine startup on June 9. The increased temperature was indicative of degraded bearing cooling. The turbine overhaul had the potential to affect the function of lube oil cooling. However, the licensee did not monitor turbine bearing temperatures during the PMT or address bearing temperature acceptance criteria.

The licensee completed an operability determination (OD 200406231) of the TDAFW pump with degraded turbine bearing cooling. The licensee concluded that the turbine would function for at least 24 hours before bearing failure due to high temperature. The licensee's probabilistic risk assessment considered the 24-hour operation as the limiting TDAFW pump mission time. The operability evaluation used a heat transfer model to predict bearing temperature as a function of time and a stress analysis to predict the bearing babbitt performance. The operability evaluation assumed total blockage of cooling oil supplied to the bearing.

Analysis. The inspectors used the at-power situation's significance determination process to analyze this finding. This finding affected the mitigation systems cornerstone

because of the TDAFW pump safety function. This finding is greater than minor because, if left uncorrected, the inadequate PMT would become a more significant safety concern. This finding is only of very low safety significance because the condition was not a design or qualification deficiency confirmed to result in loss of function per Generic Letter 91-18; did not result in an actual loss of safety function of a system; did not increase the likelihood of a fire; and did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. This finding is similar to Example 5.b in NRC Inspection Manual Chapter 0612, Appendix E. This finding involved the failure of maintenance personnel to implement the PMT scoping procedure and was associated with the crosscutting area of human performance (personnel). Additionally this finding has crosscutting aspects regarding problem identification and resolution in that the deficient condition was not identified even though indications were present during an earlier test.

Enforcement. Appendix B, Criterion XI, of 10 CFR Part 50, required the licensee to establish a test program to demonstrate that structures, systems, and components will perform satisfactorily in service and will perform in accordance with written test procedures which incorporate the requirements and acceptance limits contained in applicable design documents. Contrary to the above, the PMT performed on June 9 was not adequate to demonstrate that the TDAFW turbine would perform satisfactorily in service following major maintenance. Specifically, the PMT was of insufficient duration to allow the turbine to reach thermal equilibrium conditions, and turbine bearing temperatures and key parameters affected by the maintenance were not addressed by PMT acceptance limits. Because of the very low safety significance and the licensee's action to place this issue in their corrective action program as CAR 200406231, this violation is being treated as an NCV in accordance with Section VI.A.1 of the Enforcement Policy (NCV 05000483/2004005-06).

- .2 (Closed) Violation EA-01-005: Discrimination against a security officer and a training instructor for having engaged in protected activity.

This violation was related to the termination of a security officer and the reprimand of a training instructor for bringing a discrepancy in another individual's educational background to management's attention. A violation was issued in a letter dated May 14, 2001, and the licensee responded in a letter dated January 22, 2002, in which the proposed violation was denied. Subsequently, on May 16, 2002, an order imposing a civil penalty was issued regarding the violation.

The licensee's corrective actions associated with the violation included: reviewing allegation history for adverse trends, enhancing the employee concerns program procedure, developing and posting a safety-conscious work environment policy, including training on the safety-conscious work environment policy and employee concerns procedure during General Employee Training, enhancing outage handbooks to include guidance on the safety-conscious work environment policy and employee concerns program procedure, reviewing with contractor management the licensee's expectations regarding safety-conscious work environment, and developing an access authorization team to review access issues arising from unfavorable terminations.

Enclosure

These corrective actions were reviewed by the inspector and determined to have been appropriately implemented. In addition to the actions specified in the violation response, the licensee has taken other steps to highlight the employee concerns program via closed-circuit television, posters on bulletin boards, and issuance of brochures and handbooks addressing the employee concerns program and reinforcing a safety-conscious work environment.

4OA6 Management Meetings

Exit Meeting Summary

The health physics inspector presented inspection results to Mr. K. Young, Manager, Regulatory Affairs, and other members of licensee management at the conclusion of the inspection on October 8, 2004. The licensee acknowledged the inspection results.

On December 14 the Chief, Project Branch B, Division of Reactor Projects, conducted a regulatory performance meeting with the licensee's Mr. C. Naslund, Vice President, Nuclear Operations, to discuss the licensee's actions related to the performance indicator for unplanned scrams per 7000 hours critical exceeding the White threshold. No outstanding issues were identified.

On January 5, 2005, the resident inspectors presented their inspection results to Mr. K. Young, Manager, Regulatory Affairs, and other members of his staff who acknowledged this findings.

The inspectors verified that no proprietary information was reviewed during the inspection.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

R. Farnham, Supervisor, Health Physics
K. Gilliam, ALARA Coordinator, Health Physics
L. Graessle, Superintendent, Protective Services
C. Graham, Senior Health Physicist, Health Physics
M. Hale, Superintendent, Health Physics
T. Herrmann, Manager, Nuclear Engineering Services
J. Hiller, Engineer, Regulatory Affairs
G. Hurla, Radiation/Chemistry Supervisor, Health Physics
T. Moser, Manager, Plant Engineering
C. Naslund, Vice President, Nuclear Operations
R. Nelson, Shift Supervisor, Operations Training
D. Neterer, Superintendent, Operations
H. Osborn, Senior Health Physicist, Health Physics
M. Reidmeyer, Supervisor, Regional Regulatory Affairs
C. Younie, Plant Manager
K. Young, Manager, Regulatory Affairs

LIST OF ITEMS OPENED AND CLOSED

Opened and Closed

05000483/2004005-01	NCV	Failure to ensure that fire Door 15031 was maintained per procedure (Section 1R05)
05000483/2004005-02	NCV	Failure to establish a fire watch (Section 1R05)
05000483/2004005-03	NCV	Failure to follow procedure (Section 1R14)
05000483/2004005-04	FIN	Failure to follow procedure caused a chemistry excursion (Section 1R14)
05000483/2004005-05	NCV	Failure to implement adequate corrective actions on FWIV modification test results (Section 4OA2)
05000483/2004005-06	NCV	Inadequate PMT after major maintenance on the TDAFW turbine (Section 4OA5)

Closed

05000483/2004004-03	URI	Postmaintenance test failed to identify degraded TDAFW pump turbine bearing cooling (Section 4OA5)
05000483/EA-01-005	VIO	Discrimination against a security officer and a training instructor for having engaged in protected activity (Section 4OA5)

DOCUMENTS REVIEWED

Procedures

APA-ZZ-00407, Control of Onsite Contractors, Revisions 13, 14, and 16
APA-ZZ-00700, Fire Protection Program, Revision 12
APA-ZZ-00742, Control of Ignition Sources, Revision 14
APA-ZZ-00930, Employee Concerns Program, Revisions 4 through 9
APA-ZZ-01000, Callaway Plant Health Physics Program, Revision 17
APA-ZZ-01001, Callaway Plant ALARA Program, Revision 10
APA-ZZ-01104, Access Authorization for Callaway Plant, Revisions 16 and 20
ESP-ZZ-00014, Heat Flux Hot Channel Factor, Revision 25
ESP-ZZ-00017, Nuclear Enthalpy Rise Hot Channel Factor, Revision 11
HDP-ZZ-06001, Health Physics Department Calculation Index, Revision 1
HDP-ZZ-01300, Internal Dosimetry Program, Revision 22
HDP-ZZ-01500, Radiological Posting, Revision 16
HTP-ZZ-01102, Pre-Work ALARA Planning and Briefing, Revision 17
HTP-ZZ-01103, Post-Work ALARA Review, Revision 13
HTP-ZZ-01302, Response to Positive Whole Body Counts, Revision 1
HTP-ZZ-03300, Airborne Radioactivity Surveys, Revision 6
ODP-ZZ-00001, Operations Department Code of Conduct, Revision 21
ODP-ZZ-00003, Shift Relief and Turnover, Revision 21
ODP-ZZ-0016E, Equipment Operator Watchstation Practices and Rounds, Revision 7
OSP-AL-P0002, TDAFW Pump Operability Inservice Test, Revisions 43, 44 and 45
OSP-EF-P001A, ESW Pump Train A Inservice Test, Revision 41
OSP-KJ-V002A, Standby Diesel Generator A Air Start Check Valve Tests, Revision 6
OSP-NE-00001A, Standby Diesel Generator A Periodic Tests, Revisions 15 and 18
OSP-NE-0002A, Diesel Generator A Normal Operating Parameter Log, Revision 10
OSP-NE-0024A, Diesel Generator A Rocker Arm Lubrication, Revision 8
OSP-EF-00001, Essential Service Water Valve Lineup, Revision 5
OSP-EJ-P0001A, Residual Heat Removal Train A In-Service Test, Revision 33
OSP-SA-0017A, SRT-LSELS, Engineered Safety Features Train A, Revision 14
OSP-EN-P001A, Containment Spray Pump Train A, Revision 23
OSP-NB-00001, Class 1E Electrical Source Verification, Revision 20
OTA-NK-00001, 125 VDC Class IE Panel NK01, Revision 4
OTA-NK-00002, 125 VDC Class IE Panel NK02, Revision 4
OTA-NK-00003, 125 VDC Class IE Panel NK03, Revision 4
OTA-NK-00004, 125 VDC Class IE Panel NK04, Revision 4
OTN-EC-00001, Fuel Pool Cooling and Cleanup System, Revision 20

OTN-EF-00001, Essential Service Water System, Revision 27
 OTN-NE-0001A, Standby Diesel Generator Train A, Revision 13
 OTN-NK-00001, Class IE 125 VDC Electrical System, Revision 9
 OTN-NN-00001, 120V Vital AC Instrument Power - Class IE, Revision 11

Callaway Action Requests

200307337	200407682	200407608	200408645
200307789	200407683	200407609	200408711
200308807	200407335	200407680	200408713
200402108	200407390	200407697	200408715
200402114	200407395	200407701	200408730
200402317	200407409	200407709	200408768
200402335	200407411	200408201	200408803
200403013	200407413	200408206	200408912
200403160	200407414	200408229	200408927
200403268	200407425	200408230	200409052
200403520	200407437	200408232	200409075
200404051	200407439	200408233	200409081
200404322	200407441	200408234	200409197
200405056	200407442	200408236	200409206
200407633	200407451	200408239	200409252
200407638	200407455	200408297	200409278
200407646	200407457	200408337	200409284
200407653	200407458	200408481	200409290
200407655	200407471	200408461	200409298
200407660	200407480	200408474	200409373
200407667	200407537	200408595	200409556
200407668	200407567	200408596	200409558
200407671	200407599	200408626	200409563
200407679	200407607	200408642	

Self-Assessment and Quality Verification

SP04-041, dated, August 20, 2004, Verify work performed in response to high turbine inboard bearing temperature on the TDAFW pump.

AP04-012, Audit of Radwaste, December 22, 2004

Drawings

E-21010(Q), DC Single Line Diagram, Revision 9
 E-23NB12(Q), Schematic Diagram 152NB0112, Revision 6
 E-23NB13(Q), Schematic Diagram 152NB0109, Revision 4
 E-23NB14(Q), Schematic Diagram 152NB0209, Revision 5
 E-23NB15(Q), Schematic Diagram 152NB0212E, Revision 4
 E-21NK01(Q), 125 VDC System, Revision 4
 E-21NK02(Q), 125 VDC System, Revision 6

E-23NN01(Q), 120 VAC System, Revision 8
E-22NF01(Q), LSELS Logic, Revision 3
Piping and Instrumentation Diagram M-22EC01, Fuel Pool and Clean Up System, Revision 18
Piping and Instrumentation Diagram M-22EC02, Fuel Pool and Clean Up System, Revision 21
Piping and Instrumentation Diagram M-22EF01, Essential Service Water System, Revision 46
Piping and Instrumentation Diagram M-22EF02, Essential Service Water System, Revision 51
Piping and Instrumentation Diagram M-22KJ-01, Standby Diesel Generator, Revision 18
Piping and Instrumentation Diagram M-22KJ-02, Standby Diesel Generator, Revision 17
Piping and Instrumentation Diagram M-22KJ-03, Standby Diesel Generator, Revision 18
Piping and Instrumentation Diagram M-22KJ-04, Standby Diesel Generator, Revision 17
Piping and Instrumentation Diagram M-22KJ-05, Standby Diesel Generator, Revision 20
Piping and Instrumentation Diagram M-22KJ-06, Standby Diesel Generator, Revision 17
Performance Monitoring Report for the NN Instrument AC Power System, November 30, 2004
Performance Monitoring Report for the NK 125 volt DC Power System, November 30, 2004

Meeting Minutes

Maintenance Rule Expert Panel Meeting, NET# 04-0145, September 30, 2004
Maintenance Rule Expert Panel Meeting, NET# 04-0149, October 7, 2004
Maintenance Rule Expert Panel Meeting, NET# 04-0150, October 14, 2004
Maintenance Rule Expert Panel Meeting, NET# 04-0155, November 10, 2004
Maintenance Rule Expert Panel Meeting, NET# 04-0157, November 18, 2004

Radiation Work Permits

C707691, Install New Sludge Lance Platforms Including All Associated Support Work on A, D, B, and C Sludge Lance Platforms

C707696, SGT Inspections, Surveillance and Walk-Downs in Containment

453322INSTALL, Installation of Steam Generator Nozzle Dams

453323EC, Steam Generator Tube Eddy Current Testing in all Four Steam Generators

Audits and Assessments

AP04-003, Quality Assurance Audit of Radiation Protection, February 2, 2004

UOTH 04-0007, Radiation Protection Corrective Action Performance Assessment, 4th Quarter 2004, February 4, 2004

UOTH 04-0027, Radiation Protection Corrective Action Performance Assessment, 1st Quarter 2004, May 25, 2004

UOTH 04-0035, Radiation Protection Corrective Action Performance Assessment, 2nd Quarter 2004, July 19, 2004

Miscellaneous

General Employee Training, T68.0030.6

Outage Handbooks for Refuel Outages 10, 11, 12, and 13

Safety-Conscious Work Environment Policy, UEND-Safety-09, Revisions 0 through 3

Wackenhut Nuclear Services Procedure #113, SAFE-2-SAY Program, Revision 3

Wackenhut Nuclear Services Procedure #114, Open Door Policy, Revision 1

Plant ALARA Review Committee Meeting Minutes from October 1, 2003, through September 8, 2004

Health Physics Calculation Index 04-007, Determination of Effective Derived Air Concentration for Alpha Emitting Transuranic Nuclides

Changes to the Alpha100 Nuclide Library, Changes resulting from Health Physics Calculation Index 04-007

Health Physics Calculation Index 93-0012, Calculation of RF6 TRU DAC Relative to Ce-144

LIST OF ACRONYMS

ALARA	as low as is reasonably achievable
CAR	Callaway action request
EDG	emergency diesel generator
FWIVs	feedwater isolation valves
FSAR	Final Safety Analysis Report
NCV	noncited violation
PMTs	postmaintenance tests
RWST	refueling water storage tank
SFP	spent fuel pool
TSS	Technical Specifications
TDAFW	turbine-driven auxiliary feedwater