



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

June 28, 2000

Garry L. Randolph, Vice President and
Chief Nuclear Officer
Union Electric Company
P.O. Box 620
Fulton, Missouri 65251

SUBJECT: CALLAWAY PLANT INSPECTION REPORT NO. 50-483/00-09

Dear Mr. Randolph:

On May 8 to 12 and 22 to 26, 2000, the NRC conducted an onsite safety system design and performance capability inspection at the Callaway Plant facility. The enclosed report presents the results of this inspection. The results of the onsite inspection were discussed on May 26, 2000, with Messrs. J. Blosser, Manager, Operations Support, J. Laux, Manager, Quality Assurance, and other members of your staff.

This inspection was an examination of engineering activities conducted under the Callaway Plant license by your onsite engineering organization. Within these areas, the inspection consisted of a selected examination of procedures and representative records, observations of activities, and interviews with personnel.

Based on the results of this inspection, the NRC has identified two issues that were evaluated under the risk significance determination process as having very low safety significance (green). The NRC determined that a violation is associated with one of these issues. This violation is being treated as a Non-Cited Violation, consistent with Section VI.A of the Enforcement Policy. The Non-Cited Violation is described in the subject inspection report. If you contest the violation or significance of the Non-Cited Violation, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the 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, and the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001, and the NRC Resident Inspector at the Callaway Plant facility.

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).

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

Sincerely,

/RA/

Jeffrey L. Shackelford, Chief
Engineering and Maintenance Branch
Division of Reactor Safety

Docket No.: 50-483

License No.: NPF-30

Enclosure:

NRC Inspection Report No.
50-483/00-09

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ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket No.: 50-483
License No.: NPF-30
Report No.: 50-483/00-09
Licensee: Union Electric Company
Facility: Callaway Plant
Location: Junction Highway CC and Highway O
Fulton, Missouri
Dates: Onsite weeks May 8-12 and 22-26, 2000
Team Leader: L. E. Ellershaw, Senior Reactor Inspector
Engineering and Maintenance Branch
Inspectors: C. A. Clark, Reactor Inspector
Engineering and Maintenance Branch
V. Gaddy, Senior Resident Inspector
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Accompanying Personnel: R. W. Deese, Reactor Inspector
Engineering and Maintenance Branch
J. Leivo, Contractor
Beckman & Associates, Inc.
Approved By: Jeffrey L. Shackelford, Chief
Engineering and Maintenance Branch
Division of Reactor Safety

ATTACHMENTS:

Attachment 1: Supplemental Information
Attachment 2: NRC's Revised Reactor Oversight Process

SUMMARY OF FINDINGS

Callaway Plant
NRC Inspection Report No. 50-483/00-09

This report covers a 2-week onsite inspection by a team of six Region IV inspectors and one contractor. The report includes the results of a safety system design and performance capability team inspection of the auxiliary feedwater and main steam systems. The significance of issues is indicated by their color (green, white, yellow, red) and was determined by the Significance Determination Process in Inspection Manual Chapter 0609.

Cornerstone: Mitigating Systems

- Green. The licensee failed to recognize that a plant modification which capped two of the four floor drains in Rooms 1206 and 1207 (below the auxiliary feedwater pump rooms), resulted in the facility being outside the design and licensing basis for internal flooding with respect to the consequences of a postulated break in the non-seismic condensate storage tank piping. The team considered this to be a violation of Criterion III of Appendix B to 10 CFR Part 50, which requires assurance that the design basis is correctly translated into drawings and procedures, and that the adequacy of design is verified or checked. This violation is being treated as a Non-Cited Violation (50-483/0009-01), consistent with Section VI.A of the NRC Enforcement Policy. The condition resulting in the violation is in the licensee's corrective action system as Suggestion Occurrence Solution 00-1214 initiated May 25, 2000.

This issue was evaluated to have very low risk significance for the safety-related instruments or electrical connections in these rooms because flooding would be limited to approximately 6-inches, which is below the instrumentation installation height. Other equipment in the rooms subject to flooding at this elevation would not be required for safe shutdown (Section 1R21.5b).

- Green. During review and closure of Unresolved Item 50-483/0003-01 (essential service water reliability issues), the team noted that licensee personnel had documented several component failures in the essential service water system, which were attributable to cyclic stress caused by excessive vibration. These components started failing after implementation of modifications (a May 1992 modification, which increased the size of Orifices EFFF0005 and EFFF0006 located in the essential service water return to the ultimate heat sink, and the October 1996 and February 1997 changeout of two system Butterfly Valves EFV0090 and EFV0058). The licensee had not considered either additional vibration or cumulative effects caused by modifications to essential service water, which had experienced high vibration levels since initial plant startup.

The team noted that, until May 1999, the licensee had not implemented any significant initiatives to address these issues. At that time, comprehensive corrective actions were finalized, some of which have been implemented. The team concluded after review of the plans, that the licensee is now effectively managing essential service water system vibration and that the reliability of the system should no longer be challenged by vibration.

The licensee determined, and the team agreed, that the essential service water system had remained operable throughout this period. Therefore, the team concluded that the vibration issues had a very low risk significance and did not pose a significant safety concern. This issue was determined to be GREEN after being evaluated in the significance determination process.

Report Details

Summary of Plant Status

The plant was at 100 percent power throughout the inspection period.

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

Introduction

The inspection of safety system design and performance capability was performed at the Callaway Plant to verify that the initial design and subsequent modifications have preserved the design basis of selected systems and related support systems. Additionally, the inspection effort served to monitor the capability of the selected systems to perform the design basis functions. This inspectable area verifies aspects of the initiating events, mitigating systems, and barrier cornerstones.

The probabilistic risk analysis model for the Callaway Plant is based on the capability of the as-built safety systems to perform their intended safety functions successfully. The area and scope of the inspection were determined by reviewing the licensee's probabilistic risk analysis model to identify the dominant systems, structures, and components, ranked by importance, and their potential contribution to dominant accident sequences and/or initiators. The inspection team reviewed in detail the auxiliary feedwater system and main steam system. The primary review prompted a parallel review of support systems, such as, electrical power, instrument air, essential service water, and the condensate storage tank.

The objective of this inspection was to assess the adequacy of calculations, analyses, other engineering documents, and engineering and operating practices that were used to support the performance of the auxiliary feedwater system and main steam system and the necessary support systems during normal, abnormal, and accident conditions. The inspection was performed by a team of inspectors that consisted of a team leader, Region IV inspectors, the Callaway Plant senior resident inspector, and a contractor. Acceptance criteria utilized by the NRC inspection team included the Callaway Plant technical specifications, applicable sections of the Final Safety Analysis Report, applicable industry codes, and industry initiatives implemented by the licensee's programs.

1R21 Safety System Design and Performance Capability (71111.17)

.1 System Requirements

a. Inspection Scope

The team reviewed the following attributes for the auxiliary feedwater system and main steam system: process medium (water, air, electrical signal, or the atmosphere being processed), energy sources (electrical and air), control systems, and equipment protection. The team also evaluated operator actions by review of normal, abnormal, and emergency operating procedures, and by verification that instrumentation and alarms were available to operators for making necessary decisions. The team also verified that operators had been trained to use operator aids specified by the procedures and that these aids were in their specified locations. The review also included a consideration of requirements and commitments identified in the Final Safety Analysis Report, technical specifications, design basis documents, and plant drawings.

b. Issues and Findings

There were no findings identified and documented during this inspection.

.2 System Condition and Capability

a. Inspection Scope

The team reviewed periodic testing and calibration procedures (listed in the attachment) and results to verify that the design requirements were demonstrated by the performance of tests. The team also verified the environmental qualification of a sample of system components for operation under design environmental conditions and assumed operating parameters (e.g., voltage, speed, and power).

The team reviewed procedures to ensure automatic initiations occurred within assumed times and that testing performed to validate the procedure was consistent with design basis assumptions.

The team also reviewed each system's operations by conducting system walkdowns, review of normal, abnormal, and emergency operating procedures; and review of the Final Safety Analysis Report, technical specifications, and design calculations, drawings, and procedures.

b. Issues and Findings

There were no findings identified and documented during this inspection.

.3 Identification and Resolution of Problems

a Inspection Scope

The team reviewed a sample of main steam and auxiliary feedwater system's issues identified by the licensee in their corrective action program to evaluate the effectiveness of corrective actions related to design issues. Inspection Procedure 71152, "Identification and Resolution of Problems," was used as guidance. The licensee procedures reviewed are listed in the attachment to this report, as well as their specific corrective action documents "Suggestion Occurrence Solutions" that were sampled and reviewed. The sample of suggestion occurrence solutions was established by selection of design issues identified in suggestion occurrence solutions during the last 3 years for the main steam and auxiliary feedwater systems.

b Issues and Findings

There were no findings identified and documented during this inspection.

.4 System Walkdowns

a. Inspection Scope

The team performed walkdowns of the auxiliary feedwater and main steam systems, and portions of the support systems. The walkdowns focused on the installation and configuration of piping, components, and instruments; the placement of protective barriers and systems; the susceptibility to flooding, fire, or other environmental concerns; the physical separation; the provisions for seismic concerns; accessibility for operator action; and the conformance of the currently installed configuration of the systems with the design and licensing bases.

b. Issues and Findings

With the exception of the issue dealing with the vulnerability of the auxiliary feedwater system to internal flooding discussed in Section .5 below, there were no findings identified and documented during this inspection.

.5 Design Review

a. Inspection Scope

The team reviewed the design to verify that the systems would function as required under accident conditions. The review included design assumptions, calculations, boundary conditions, and models. The team also performed single failure reviews of individual components to determine the potential effects of such failures on the capability of the systems to perform their safety functions. Instrumentation was reviewed to verify its appropriateness for the applications and its setpoints with regard to the function it was required to perform. Additionally, the team performed analyses in several areas to verify that design values were correct and appropriate. Documentation reviewed included drawings, procedures, calculations, design modifications, suggestion occurrence solutions, requests for resolution, and maintenance work orders identified in

the attachment, as well as the technical specifications and the Final Safety Analysis Report. The purpose of the reviews was to determine whether the design bases of the systems were met by the installed and tested configurations.

b. Issues and Findings

Auxiliary Feedwater System Vulnerability to Internal Flooding

While investigating vulnerability of the auxiliary feedwater system to internal flooding from a seismic event, the team identified that in Rooms 1206 and 1207 (below the auxiliary feedwater pump rooms), there were two nonseismic lines (10- and 8-inch) connecting the condensate storage tank with the hotwell. The 8-inch line was isolated by a locked closed valve. However, the team determined that a break of the 10-inch line as a result of a seismic event could exceed the room floor drain capacity and result in flooding the room to about 6 inches and draining through the ladderway into the auxiliary building rather than via the drain system. This was contrary to the flooding analysis presented in the Final Safety Analysis Report, which stipulated that flooding would be limited to 0 inches in the rooms, and that credit could only be taken for floor drains in limiting the flood level in any room.

Bechtel Power Corporation's Calculation FL-04, "Summary of Flood Levels in All Auxiliary Building Rooms Due to Pipe Break or Crack," Revision 2, prepared in 1998 (Revision 0 was issued in 1986) identified that a break of the 10-inch line would result in 3500 gpm of flooding into the room. The calculation took credit for four floor drains in limiting the flood level to zero by assuming a drain rate of 3940 gpm. However, Request for Resolution 05259A performed in 1988 had justified capping two of the four drains and permitting overflow through the ladderway, without recognizing the design and licensing basis for internal flooding. The licensee capped the two floor drains to prevent long-term backflow of "keep-warm" steam leakage into Rooms 1206 and 1207 via the drain system serving the turbine driven auxiliary feedwater pump room and equipment. Capping two of the four drains invalidated the result of the calculation and would result in flooding the room to about 6 inches, and draining the overflow into lower elevations of the auxiliary building. Thus, in addition to exceeding the 0-inch flooding level in the rooms as stipulated in the Final Safety Analysis Report, the licensee's actions to cap two of the floor drains resulted in a configuration contrary to Final Safety Analysis Report Section 3.6.1.1, Assumption 4, which stipulated that, "Rooms drain through the floor drain(s). No credit is taken for drainage through uncapped or unsealed equipment drains. Typically, no credit is taken for drainage out under doors."

The team, however, agreed with the licensee's conclusion that the important auxiliary feedwater instruments or electrical connections would not be submerged at a depth of 6 inches, and the instruments were about 30 feet (horizontally) from the nonseismic piping. In addition, based on a walkdown of the 1974' elevation, which would receive the flooding overflow, the team agreed with the licensee's conclusion in Requests for Resolution-05259A that equipment subject to flooding at this lower elevation would not be required for safe shutdown. Thus, the overall risk significance of this issue was determined to be very low.

To address the issue regarding nonconformance to the Final Safety Analysis Report licensing basis for flooding, the licensee initiated Suggestion Occurrence

Solution-00-1214. To further address the impact of a seismic event on these instruments (including their susceptibility to spray impingement and the consequences should this occur), the licensee initiated Requests for Resolution 20670.

The licensee failed to recognize that a plant modification, which capped two of the floor drains in the room below the auxiliary feedwater pump rooms, placed the consequences of a postulated break in the non-seismic condensate storage tank piping outside the design and licensing basis for internal flooding. The team considered this to be a violation of Criterion III of Appendix B to 10 CFR Part 50, which requires assurance that the design basis is correctly translated into drawings and procedures, and that the adequacy of design is verified or checked. This violation is being treated as a Non-Cited Violation (50-483/0009-01), consistent with Section VI.A of the NRC Enforcement Policy. The condition resulting in the violation is in the licensee's corrective action system as Suggestion Occurrence Solution 00-1214 initiated May 25, 2000.

Post Loss of Coolant Accident Essential Service Water Supply to Auxiliary Feedwater

During review of auxiliary feedwater system Requests for Resolutions, the team identified two evaluations (Requests for Resolutions 17893, dated June 12, 1997, and 18244, dated September 9, 1998) that dealt with the capability of essential service water to supply water to the auxiliary feedwater pumps when the condensate storage tank was not available. The condensate storage tank was not safety-related and would not be considered available during accident conditions. Prior to these evaluations, the licensee had not accounted for the auxiliary feedwater system loads that would be placed on the essential service water system during accident conditions. Request for Resolution 17893 concluded that the essential service water flow balance procedures did not simulate auxiliary feedwater demand on the essential service water system. The team reviewed the applicable flow balance procedures (Procedures ETP-EF-0002A, "Essential Service Water Train A Flow Verification," Revision 003, and ETP-EF-0002B, "Essential Service Water Train B Flow Verification," Revision 004) and noted that the licensee, as a result of their evaluation, had revised the procedures to simulate auxiliary feedwater supply demands. The licensee concluded that, by adding an auxiliary feedwater flow of 1550 gpm, sufficient design margin was available to ensure that essential service water supplied components would perform their design functions. However, this conclusion was based on essential service water pump flow balance tests conducted in 1997. The team found that their operability evaluation only considered current conditions, rather than past conditions with the original degraded pumps.

Request for Resolution 18244 was prepared to determine if essential service water would be capable of supplying sufficient water to the auxiliary feedwater system following a main steam line break. The licensee determined that the auxiliary feedwater system required 2311 gpm under this condition. The team reviewed Calculation EF-68, "Evaluate the Effect on Essential Service Water System and Flow When the Auxiliary Feedwater Demand is Increased to 2311 gpm," Addendum 1. This calculation was based on the following conditions: (1) the system was in the post refueling outage flow balanced condition; (2) the auxiliary feedwater demand on the essential service water system was 2311 gpm; and (3) the operating pump was degraded to the action level specified in Procedure OPS-EF-P0001A. The team noted that the calculation results indicated that flow rates of components cooled by essential service water would be

decreased in the range of 2.9 to 8.8 percent of their respective as-left flow balance values due to the additional 2311 gpm load. However, the licensee stated that a review of the decreased values indicated that all were above the minimum required flow rates. The licensee concluded that all affected essential service water-cooled equipment was capable of performing their respective design function. The team determined that the operability evaluation of Request for Resolution 18244A only included current conditions associated with the pumps.

As a result of the team's questions regarding past operability (i.e., would the system have been operable if the old pumps had not been replaced), the licensee initiated Suggestion Occurrence Solution 00-1186 on May 22, 2000. This suggestion occurrence solution documented that the operability evaluations, included in Requests for Resolutions 17893 and 18244, concluded that the existing essential service water flow balance conditions did not pose any operability concerns. However, a historical review of previous cycles was never documented. The licensee stated that the auxiliary feedwater system demand on essential service water was simulated during the startup flow balance procedures. The team reviewed Procedure C-U3EF1-01, "Pre-operational Test Service Water/Essential Service Water Flow Balance Mini-Test," dated April 11, 1984, and verified that auxiliary feedwater demand was included. The suggestion occurrence solution further stated that, since the startup tests, auxiliary feedwater demand was not included in the essential service water flow balance tests and the essential service water system had degraded as a result of corrosion buildup and pump degradation. During late 1997, as a result of this identification, an essential service water flow balance, including auxiliary feedwater loads, was performed. The flow rates were marginally acceptable. The essential service water pumps were replaced during 1998 and 1999. The suggestion occurrence solution requested an evaluation of the essential service water flow balance conditions prior to the dispositions of the two requests for resolutions and replacement of the two pumps. This item was identified as an unresolved item pending review of the essential service water flow balance conditions prior to installation of the new pumps (Prior essential service water flow balance issues, 50-483/0009-02).

.6 Safety System Testing

a. Inspection Scope

The team reviewed the program and procedures for testing and inspecting the safety-related valves and pumps in the auxiliary feedwater and main steam systems. The reviewed records included flow balancing and startup testing results, pump manufacturer pump curves, and pump and valve inservice test records.

b. Issues and Findings

There were no findings identified and documented during this inspection.

4 OTHER ACTIVITIES (OA)

(Closed) Unresolved Item 50-483/0003-01: Essential service water reliability issues.

The team reviewed two main issues that had been affecting essential service water system long-term reliability - microbiologically induced corrosion and vibration. These issues were discussed in detail in NRC Inspection Report 50-483/00-03. Based on review of the previous inspection report and interviews with licensee personnel, the team concluded that the licensee was taking reasonable and effective corrective action to ensure essential service water system reliability in response to its microbiologically induced corrosion and vibration problems. The licensee determined, and the team agreed, that the essential service water system had remained operable throughout this period. Therefore, the team concluded that the corrosion and vibration issues had a very low risk significance and did not pose a significant safety concern. This issue was determined to be GREEN after being evaluated in the significance determination process.

4OA6 Management Meetings

.1 Exit Meeting Summary

On May 26, 2000, the inspection team met with Messrs. J. Blosser, Manager, Operations Support, J. Laux, Manager, Quality Assurance, of the site technical and regulatory affairs organizations. The managers were informed of the inspection findings as noted in the inspection finding summary at the start of this report. The managers acknowledged the findings as presented.

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

ATTACHMENT 1

PARTIAL LIST OF PERSONS CONTACTED

Licensee

R. Affolter, Plant Manager
J. Blosser, Manager, Operations Support
T. Herrmann, Superintendent, Steam Generator Replacement/Accident Analysis
R. Lamb, Superintendent, Work Control
J. Laux, Manager, Quality Assurance
D. Maxwell, Supervisor, Mechanical Design Engineering
J. McGraw, Superintendent, Technical Support Engineering
T. Moser, Superintendent, Systems Engineering
D. Neterer, Assistant Superintendent, Operations
C. Nurnberg, Supervisor, Instrumentation and Controls
M. Reidmeyer, Supervisor, Regulatory Affairs
R. Roselius, Superintendent, Radiation Protection and Chemistry
T. Sharkey, Supervising Engineer, Mechanical Systems Engineering
M. Taylor, Manager, Nuclear Engineering
D. Waller, Supervising Engineer, Electrical/I&C Design Engineering

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

| | | |
|----------------|-----|---|
| 50-483/0009-01 | NCV | Consequences of a postulated break in the non-seismic condensate storage tank piping in the room below the alternate feedwater pump rooms were outside the design and licensing basis for internal flooding (Section 1R21.5). |
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Opened

| | | |
|----------------|-----|---|
| 50-483/0009-02 | URI | Auxiliary feedwater load on essential service water flow rates was not accounted for subsequent to plant startup in 1985, until 1997, and, with known degraded essential service water conditions, past operability had not been determined (Section 1R21.5). |
|----------------|-----|---|

Closed

| | | |
|----------------|-----|--|
| 50-483/0003-01 | URI | Essential service water reliability issues (Section 4) |
|----------------|-----|--|

DOCUMENTS REVIEWED

Calculations

| NUMBER | DESCRIPTION | REVISION |
|---------------|---|-------------------------|
| AB-11 | Callaway PRA - Failure of Main Steam Isolation Fault Tree | 0 |
| AB-14 | Main Steam Line Pressure Drop | 0 |
| AL-16 | AFW Flow at Technical Specification Discharge Pressure Limit | 001 |
| AL-17 | Maximum Aux Feedwater Flow With Essential Feedwater Boost | 000 |
| AL-18 | Verification of Adequate Water Inventory for TDAFW Pump Startup Without CST Availability and LOOP | 000 |
| AL-30 | Auxiliary Feedwater System Pump Suction Header Pressure and Automatic Switchover to ESW Setpoint for PT-37, 38, & 39; CST Level Low Setpoint for LSL-24, -25, -26; Auxiliary Feedwater Low Suction Pressure Setpoint for PSL-24, 25, & 26; and the TS Level for Ensuring Adequate CST Level | 001 |
| AP-01 | Condensate Storage Tank Level for Switchover of Auxiliary Feedwater Suction to Essential Service Water | 000 |
| AP-02 | Condensate Storage Tank Capacity Required for Extended Hot Standby | 0 |
| AP-03 | Condensate Storage Tank Low-Low Level | 000 |
| AP-05 | Calculate the Volume of the Condensate Storage Tank and the Volume Contained within the CST at the Alarm and Control Setpoints; Calculate the Level Within the Tank at the Tech Spec Volume Limit | 000 |
| EB-09 | DC Control Circuits Voltage Drops, Addenda 1, 2, 3 | 001 |
| EB-21 | LSELS Degraded Voltage Setpoint Calculation | 000 |
| EF-45 | ESW System Flow Balance Acceptance Criteria | 002 |
| EF-68 | The Ability of the ESW System to Provide Adequate Flow to Supplied Components When the System is in the Post RF9 Flow Balance Condition, AFW Demand on the ESW System is 2311 gpm, and the Operating ESW Pump has Degraded to the Action Level Delineated in OSP-EF-P001A | Rev 0, Addendum 2 |
| EM-22 | Seismic II/I Evaluation to Determine the Impact of Installing a New Manual Operated Valve, EMV0264 in the Non-Safety Related Safety Injection Test Line. | 000 |

Calculations

| NUMBER | DESCRIPTION | REVISION |
|---------------|--|-----------------|
| F-3 | Cable Sizing [Aux. Feedwater Pump Motor Feeders] | 003 |
| FL-04 | Summary of Flood Levels in All Auxiliary Building Rooms Due to Pipe Break or Crack | 002 |
| J-USA06 | Addenda 1, Instrument Loop Uncertainty Estimate, Rack Allowance, Sensor Allowance for System AL Loops 37, 38, 39 | 001 |
| J-USA06A | Addendum 1, "Determination of the Safety Setpoint, Rack Allowable Value and the System Allowable Value for System AL Loops 37, 38, 39 | 002 |
| J1GEN | Instrument Loop Uncertainty Estimates | 001 |
| KA-32 | Determine the Maximum Leakage Rate of Nitrogen From Accumulators Allowed to Maintain Valve Operation For 5 Hours, Starting With the Minimum Tech Spec Pressure of 370 psia | 000 |
| M-KA-314 | Back-up Gas Supply System | 0 Add 2 |
| NB-05 | System NB Protective Relays | 001 |
| NG-02 | Voltage Drop in Control Circuits Fed from MCC Class 1E Distribution Panels [Modutronic 10A valve operators for ALHV5, -7, -9, -11] | 000 |
| NK-05 | Class 1E Battery Capacity | 003 |
| NK-09 | 125 Vdc Short Circuit Study, Addenda 1 | 000 |
| NK-10 | Addendum 5, NK System DC Voltage Drop to FCHV0312 | 000 |
| YY-23 | Main Steam Line Break Upstream of the Main Steam Isolation Valve | A |
| ZZ-62 | Plant Load Flow Calculations | 006 |
| ZZ-214 | MOV Voltage Drop Calculation [ALHV0030 through ALHV0036] | 006 |
| ZZ-224 | MOV Sizing Calculation, Attachment E, Evaluation of FCHV0312: Compound DC Motor | 007 |
| ZZ-225 | Callaway Ampacity Analysis | 000 |
| ZZ-297 | Steam Generator Level PMA Calculations | 001 |

Design Changes

| NUMBER | DESCRIPTIONS | REVISIONS/ DATE |
|---------------|---|----------------------------|
| CMP 95-1017 | Install Mechanical Seals of the Turbine Driven Auxiliary Feedwater Pump | A |
| CMP 96-1003 | Add Condensate Level Instrument to Exhaust Line of Turbine Driver KFC02 | A |
| MP 91-1047 | Remove the Push to Test Feature on ESW and AFW Pump Hand Switches | A |
| MP 91-1047 | Remove the Push to Test Feature on ESW and AFW Pump Hand Switches | A |
| MP 91-1047 | Remove the Push to Test Feature on ESW and AFW Pump Hand Switches | A |
| MP 95-1017 | Install Mechanical Seals on Auxiliary Feed Pump | A |
| MP 95-1017 | Install Mechanical Seals on Auxiliary Feed Pump | A |
| MP 95-1017 | Install Mechanical Seals on Auxiliary Feed Pump | A |
| MP 95-2008 | Add Isolation Valves For Steam Generator Nitrogen Blanket | A |
| MP 95-2008 | Add Isolation Valves For Steam Generator Nitrogen Blanket | A |
| MP 95-2008 | Add Isolation Valves For Steam Generator Nitrogen Blanket | A |
| MP 97-1028 | Revise Limit Switch Settings on FCHV0312 | 01/09/98 |
| MP 99-1035 | Replacement of the Actuator Helper Spring and Lower Actuator Stem Guide Bushing in the Actuators of Main Steam Power Operated Relief Valves | A |
| MP 99-1035 | Replacement of the Actuator Helper Spring and Lower Actuator Stem Guide Bushing in the Actuators of Main Steam Power Operated Relief Valves | A |
| MP 99-1035 | Replacement of the Actuator Helper Spring and Lower Actuator Stem Guide Bushing in the Actuators of Main Steam Power Operated Relief Valves | A |

Drawings

| NUMBER | DESCRIPTION | REVISION |
|---------------|--|-----------------|
| CD-147C | Auxiliary Turbines System - Aux. Feedwater Pump Turbine Steamline Drain | 000 |
| E-21001(Q) | Main Single Line Diagram | 008 |
| E-21005(Q) | List of Loads Supplied by Emergency Diesel Generator | 024 |
| E-21010(Q) | DC Main Single Line Diagram | 009 |
| E-21NK01(Q) | Class 1E 125 Vdc System Meter & Relay Diagram | 006 |
| E-21NK02(Q) | Class 1E 125 Vdc System Meter & Relay Diagram | 006 |
| E-23AL01A(Q) | Schematic Diagram, Motor Driven Auxiliary Feedwater Pump A | 006 |
| E-23AL01B(Q) | Schematic Diagram, Motor Driven Auxiliary Feedwater Pump B | 006 |
| E-23AL02A(Q) | Schematic Diagram, Motor Operated Valves [ALHV36] | 006 |
| E-23AL02B(Q) | Schematic Diagram, Motor Operated Valves [ALHV34] | 007 |
| E-23AL02C(Q) | Schematic Diagram, Motor Operated Valves [ALHV35] | 000 |
| E-23AL03A(Q) | Schematic Diagram, Discharge Flow Control Motor Operated Valves [ALHV7, -9, -11] | 003 |
| E-23AL03B(Q) | Schematic Diagram, Discharge Flow Control Motor Operated Valves [ALHV5] | 003 |
| E-23AL04A(Q) | Schematic Diagram, Supply from ESW [ALHV31, -32] | 009 |
| E-23AL04B(Q) | Schematic Diagram, Supply from ESW [ALHV30, -33] | 008 |
| E-23AL05A(Q) | Schematic Diagram, Discharge Control Air Operated Valves [ALHV6, -8, -12] | 002 |
| E-23AL05B(Q) | Schematic Diagram, Discharge Control Air Operated Valves [ALHV10] | 002 |
| E-23AL09(Q) | Schematic Diagram, Miscellaneous Circuits [ALHV5, -7, -9, -11] | 002 |
| E-23FC20 | Schematic Diagram, AFWPT Steam Line Drain Strainer Bypass Valve [FCLV10] | 002 |
| E-23FC21(Q) | Schematic Diagram, AFWPT Steam Line Water Trap Drain Valve [FCFV310] | 003 |

Drawings

| NUMBER | DESCRIPTION | REVISION |
|----------------|--|-----------------|
| E-23NN01(Q) | Class 1E Instrument AC Schematic | 008 |
| J-04AL01(Q) | Instrument Isometric Drawing: Aux Fdwtr Pmp to Steam Gen D (AL-FT-1) | 004 |
| J-04AL02(Q) | Instrument Isometric Drawing: Aux Fdwtr Pmp to Steam Gen A (AL-FT-2) | 004 |
| J-04AL03(Q) | Instrument Isometric Drawing: Aux Fdwtr Pmp to Steam Gen B (AL-FT-3) | 004 |
| J-04AL04(Q) | Instrument Isometric Drawing: Aux Fdwtr Pmp to Steam Gen C (AL-FT-4) | 005 |
| J-04AL20(Q) | Instrument Isometric Drawing: ESFAS Low Suction Pressure (AL-PT-37) | 003 |
| J-04AL21(Q) | Instrument Isometric Drawing: ESFAS Low Suction Pressure (AL-PT-38) | 003 |
| J-04AL22(Q) | Instrument Isometric Drawing: ESFAS Low Suction Pressure (AL-PT-39) | 003 |
| J-04AL23(Q) | Instrument Isometric Drawing: Aux Fdwtr Flow to Steam Gen A (AL-FT-7) | 000 |
| J-04AL24(Q) | Instrument Isometric Drawing: Aux Fdwtr Flow to Steam Gen B (AL-FT-9) | 000 |
| J-04AL25(Q) | Instrument Isometric Drawing: Aux Fdwtr Flow to Steam Gen C (AL-FT-11) | 001 |
| J-24AP02 | Instrument Isometric Drawing: Condensate Storage Tank Level (AP-LT-4) | 002 |
| J-24FC06(Q) | Instrument Isometric Drawing:AFW Turb Stm Line Drn Level | 001 |
| J-27G22(Q) | Bill of Materials - Q Instrument Installations | 002 |
| J-110-0350-006 | Instrument Loop Diagram, Auxiliary Feedwater Flow Control: Turbine Driven AFP to Steam Generator D | 000 |
| J-110-0351 | Instrument Loop Diagram, Auxiliary Feedwater Flow Control: Motor Driven AFP B to Steam Generator A | 012 |
| J-110-0352-007 | Instrument Loop Diagram, Auxiliary Feedwater Flow Control: Turbine Driven AFP to Steam Generator A | 000 |
| J-110-0353 | Instrument Loop Diagram, Auxiliary Feedwater Flow Control: Motor Driven AFP A to Steam Generator B | 010 |

Drawings

| NUMBER | DESCRIPTION | REVISION |
|-------------------------|---|-----------------|
| J-110-0354 | Instrument Loop Diagram, Auxiliary Feedwater Flow Control: Turbine Driven AFP to Steam Generator B | 010 |
| J-110-0355 | Instrument Loop Diagram, Auxiliary Feedwater Flow Control: Motor Driven AFP A to Steam Generator C | 012 |
| J-110-0356-006 | Instrument Loop Diagram, Auxiliary Feedwater Flow Control: Turbine Driven AFP to Steam Generator C | 000 |
| J-110-0357 | Instrument Loop Diagram, Auxiliary Feedwater Supply Pressure from Condensate Storage Tank | 008 |
| J-110-0358 | Instrument Loop Diagram, Auxiliary Feedwater Supply Pressure from Condensate Storage Tank | 007 |
| J-110-0359-07 | Instrument Loop Diagram, Auxiliary Feedwater Supply Pressure from Condensate Storage Tank | 007 |
| J-110-0871 | Instrument Loop Diagram, Auxiliary Feedwater Flow Control: Motor Driven AFP B to Steam Generator D | 008 |
| J-110-0872 | Instrument Loop Diagram, Auxiliary Feedwater Flow Control: Motor Driven AFP A to Steam Generator A | 004 |
| J-110-0873 | Instrument Loop Diagram, Auxiliary Feedwater Flow Control: Motor Driven AFP A to Steam Generator B | 005 |
| J-110-0874 | Instrument Loop Diagram, Auxiliary Feedwater Flow Control: Motor Driven AFP A to Steam Generator C | 006 |
| J-110-0940 | Instrument Loop Diagram, Auxiliary Feedwater Flow Control: Turbine Driven AFP to Steam Generator B | 006 |
| J-110-0941 | Instrument Loop Diagram, Auxiliary Feedwater Flow Control: Turbine Driven AFP to Steam Generator B | 004 |
| M-2P1151 | Drainage Systems (LE) Auxiliary Building EI 1974'-0", 1989'- 0," & 2000'-0" Area 5. | 000 |
| 10466-M-109- 0012-06 | Details - Condensate Storage Tank | 005 |

Engineering Reports

| NUMBER | DESCRIPTION | REVISION |
|---------------------|--|-----------------|
| VTS-985- 031480-03R | Colt Industries Engineering Report: Analysis of Load Table and Predictions of Voltage Dip and Frequency Excursions at the Various Load Step Conditions | 03/14/80 |
| VTS-985-031480-04R | Colt Industries Engineering Report: Explanation of Frequency Dip Recovery Problems Encountered During the Sequential Load Testing | 03/14/80 |

Licensee Event Reports

| NUMBER | DESCRIPTION |
|---------------|--|
| 93-005-00 | Engineered Safety Feature (ESF) Actuation on High Steam Generator (S/G) Level Due to Testing of the Auxiliary Feedwater Motor-Operated Flow Control Valves |
| 96-003-00 | Auxiliary Feedwater Actuation After Main Feedwater Pump "A" Trip on High Discharge Pressure |
| 97-003-00 | Tech. Spec. Table 3.3-3 Violation Due To Error In The Tech Spec Description for Turbine-Driven Auxiliary Feedwater Start Logic |
| 97-005-06 | Missed Technical Specifications 4.3.2.1 Emergency Safety Features Actuation System Missed Surveillance Due to Inadequate System Design and Inadequate Test Procedure |
| 97-007-00 | Main Steam Safety Valve Setpoint Drift Outside Design Basis Requirements |
| 98-005-00 | Mispositioning of the Warm-up Steam Supply Valves to the Turbine Driven Auxiliary Feedwater Pump Results in Technical Specification 3.0.4 Violation During Refuel 9 |
| 99-002-00 | Missed Technical Specification Surveillance Due To Misinterpretations of Surveillance Requirements |

Maintenance Package Documents

P655962
P655644
P654486

Miscellaneous Documents and Correspondence

| DESCRIPTION | DATE |
|--|-------------|
| Division Action Plan 99-106 | 4/19/00 |
| Union Electric letter ULNRC 2146: Callaway Plant Response to Generic Letter 89-13, Service Water System Problems Affecting Safety-Related Equipment | 1/29/90 |
| Union Electric letter ULNRC-2324: Callaway Plant response to Generic Letter 89-13, Service Water System Problems Affecting Safety-Related Equipment | 11/14/90 |
| Essential Service Water System Vibration Update Management Presentation | 4/19/00 |
| UOTCR 98-112, Cycle 9 Raw Water Report | 11/20/98 |
| UOTCR 99-062, Raw Water Steering Committee Meeting Minutes | 5/17/99 |
| Microbiologically Influenced Corrosion Index | |
| Microbiologically Influenced Corrosion Cycles 8/9/10 average comparisons | 11/17/95 |
| Overview of ESW Microbiologically Influenced Corrosion Program Callaway Plant | 3/14/00 |
| Division Action Plan 99-805 | |
| Division Action Plan E-6 | |
| Operating Experience Journal | |
| INPO Plant Event Report Data Base | |
| Maintenance Rule Data Base | |
| Memorandum SAE-TA-97-164 | 5/9/97 |
| Inservice Test Program | |
| Callaway Equipment Lists | |
| Loop Calibration Report AAEP1411 | |
| General Electric Motor Data Sheet and Speed-Torque-Current Curves, E-12.2-008-2 | 12/7/76 |
| Ingersoll-Rand Co. Test Record, Motor Driven Auxiliary Feedwater Pump, July 4, 1978, 10466-M-021-102-01 | 07/24/78 |
| Database Report: Cable & Raceway Tracking System (Ampacity Margins), Raceways 1B2F02, 1B1B11, 1B1B09, 1B1B08, 1B1B07, 1B1B06, 4B2F01, 4B1B11, 4B1B09, 4B1B08, 4B1B07, 4B1B06, 4B1B01 | 05/23/00 |
| Check Valve Predictive Performance Report for Valve ALV0029 | 3/29/00 |

Miscellaneous Documents and Correspondence

| DESCRIPTION | DATE |
|--|---------|
| Callaway Nuclear Plant Inservice Testing Program | 7/31/98 |

Operator Aids

| NUMBER | DESCRIPTION | REVISION |
|--------------|---|----------|
| OOA-AB-0002 | MSIV Accumulator Charge Pressures | 2 |
| OOA-ZZ-SEC06 | Turbine Building Area 5 Operator Aid | 3 |
| | Emergency Equipment Box Inventory | |
| | Inventory Condensate Storage Tank Emergency Fill Hose House | |
| | Emergency Operating Procedure Equipment Inventory | |

Piping & Instrumentation Diagrams

| NUMBER | TITLE | REVISION/DATE |
|-------------|--|---------------|
| M-22AB01(Q) | Main Steam System | 13 |
| M-22AB02(Q) | Main Steam System | 11 |
| M-22AB03(Q) | Main Steam System | 09 |
| M-22AB04 | Steam Generators Secondary Side Composite Loop 1 | 08 |
| M-22AB05 | Steam Generators Secondary Side Composite Loop 2 | 02 |
| M-22AB06 | Steam Generators Secondary Side Composite Loop 3 | 02 |
| M-22AB07 | Steam Generators Secondary Side Composite Loop 4 | 02 |
| M-22AL01(Q) | Auxiliary Feedwater System | 17 |
| M-22LE01 | Piping & Instrument Diagram, Turbine Building & Auxiliary Feedwater Pump Rooms Oily Waste System | 08 |
| M-22FC02(Q) | Auxiliary Turbines Auxiliary Feedwater Pump Turbine Piping Isometric | 15 |
| M-23AB01(Q) | Main Steam System Reactor Bldg. & Aux. Bldg.-Area 5 | 07 |
| M-23AL01(Q) | Auxiliary Feedwater Pumps Suction Piping | 07 |

Piping & Instrumentation Diagrams

| NUMBER | TITLE | REVISION/ DATE |
|---------------|---|---------------------------|
| M-23AL02(Q) | Motor Driven Aux. Feedwater Pump "A" Discharge Piping | 01 |
| M-23AL03(Q) | Motor Driven Aux. Feedwater Pump "B" Discharge Piping | 01 |
| M-23AL04(Q) | Turb. Driven Aux. Feedwater Pump Discharge Piping | 02 |
| M-23AL05(Q) | Auxiliary Feedwater Pumps Recirculation Piping | 04 |
| M-23FC01(Q) | Auxiliary Feedwater Pump Turbine Steam Inlet and Exhaust | 07 |
| M-23FC02(Q) | Aux. F.W. Pump Turbine Drains - Aux. Bldg. | 02 |
| M-23FC06(Q) | Auxiliary Feedwater Pump Turbine Drains - Aux. Bldg.Hanger Location Drawings | 11 |
| M-25AL01(Q) | Auxiliary Feedwater Pumps Suction Piping | 14 |
| M-25AL02(Q) | Motor Driven Aux Feedwater Pump "A" Discharge Piping | 01 |
| M-611-004 | Central Station Air Handling Units | 04 |

Procedures

| NUMBERS | TITLE | REVISION |
|----------------|--|-----------------|
| APA-ZZ-00330 | Preventive Maintenance Program | 015 |
| APA-ZZ-00356 | Pump and Valve Inservice Test Program | 010 |
| APA-ZZ-00500 | Corrective Action Program | 029 |
| APA-ZZ-00604 | Requests for Resolution | 017 |
| APA-ZZ-00605 | Temporary System Modifications | 12 |
| C-U3EF1-01 | Pre-Operational Test Service Water/Essential Service Water Mini Flow Balance Test | 000 |
| E.2.6.4 | Bechtel Design Guide: Cable Derating Practice | 002 |
| E-0 | Reactor Trip or Safety Injection | 13B |
| E-1 | Loss of Reactor or Secondary Coolant | 1B2 |
| E-2 | Faulted SG Isolation | 1B0 |
| E-3 | Steam Generator Tube Rupture | 1B2 |
| ECA-2.1 | Uncontrolled Depressurization of All Steam Generators | 1B2 |

Procedures

| NUMBERS | TITLE | REVISION |
|----------------|---|-----------------|
| EDP-ZZ-01122 | Check Valve Predictive Performance Manual | 005 |
| EDP-ZZ-04015 | Evaluating and Processing Requests for Resolution | 033 |
| EDP ZZ-04054 | Conduct of Equipment Seismic Qualification Activities | 001 |
| EE-004-00 | Cable Ampacity | 000 |
| ES-1.1 | SI Termination | 1B2 |
| ETP-EF-0002A | Essential Service Water Train A Flow Verification | 003 |
| ETP-EF-0002B | Essential Service Water Train B Flow Verification | 004 |
| GDP-ZZ-01690 | Administration of Suggestion, Occurrence, Solution Corrective Action Program | 0 |
| IDP-ZZ-00013 | Trending of Instrument Drift and Failure | 003 |
| ISF-AL-00P37 | I&C Functional Test Surveillance Procedure Auxiliary Feedwater Pumps Suction Pressure, performed May 8, 2000. | 05/08/00 |
| ISF-AL-00P38 | I&C Functional Test Surveillance Procedure, CST to AFP Suction Header Pressure, performed April 17, 2000. | 04/17/00 |
| ISF-AL-00P39 | I&C Functional Test Surveillance Procedure, CST to AFP Suction Header Pressure, performed April 24, 2000. | 04/24/00 |
| ISL-AE-0LPS1 | Loop-LVL: S/G A, B,C, D NR LVL PROT SET 1 | 4 |
| ISL-AE-0LPS1 | Loop-LVL: S/G A, B, C, D NR LVL PROT SET 1 | 5 |
| ISL-AL-00P24 | Loop-Press; MD AFP 1B Suction Pressure | 4 |
| ISL-AL-00P25 | Loop-Press; MD ADP 1A Suction Pressure | 4 |
| ISL-AL-00P26 | Loop-Press; TD AFP Suction Pressure | 4 |
| ITL-AE-OF550 | Loop-Flow; S/G 'A' Feedwater Bypass Flow | 7 |
| ITL-AL-00P15 | Loop-Press; Motor Driven Aux Feedwater Pump 'A' Disch | 3 |
| ITL-AL-00P18 | Loop-Press; Motor Driven Aux Feedwater Pump 'A' Disch | 3 |
| ITL-AL-00P21 | Loop-Press; TD AFP Disch Press | 4 |
| JDP-ZZ-04100 | Operating Experience Review Procedure | 10 |
| MPM-ZZ-QV018 | Relief Valve Test | 005 |

Procedures

| NUMBERS | TITLE | REVISION |
|----------------|---|-----------------|
| MSM-ZZ-QV003 | Inspection of Turbine Drive Aux Feed Pump Steam Supply Check Valves | 005 |
| ODP-ZZ-00016 | Reactor Operator Watchstation Practice and Logs | 042 |
| ODP-ZZ-0016E | Equipment Operator Watchstation Practices and Logs | 003 |
| OPS-AL-V0002 | Auxiliary Feedwater Mode 5 Valve Operability | 011 |
| OPS-AL-V002A | Auxiliary Feedwater and Steam Supply Check Valve Operability | 006 |
| OSP-AB-V002A | S/G Atmospheric PORV Inservice Test | 022 |
| OSP-AB-V002B | Main Steam Isolation Valves Operability | 12 |
| OSP-AE-V02HS | Main Feedwater Isolation Valve Operability | 16 |
| OSP-AL-00002 | Aux. Feedwater to Steam Generators Flow Path Verification | 003 |
| OSP-AL-P0002 | Turbine Driven Aux. Feedwater Pump Quarterly Test | 027 |
| OSP-AL-P0002 | Turbine Driven Aux. Feedwater Pump Operability In Service Test | 027 |
| OSP-AL-P001A | A Motor Driven Aux. Feedwater Pump Quarterly Test | 023 |
| OSP-AL-P001B | B Motor Driven Aux. Feedwater Pump Quarterly Test | 022 |
| OSP-AL-V001A | A Auxiliary Feedwater Valve Operability | 020 |
| OSP-AL-V001B | B Auxiliary Feedwater Valve Operability | 018 |
| OSP-AL-V001C | Turbine Driven Auxiliary Feedwater Valve Operability | 017 |
| OSP-AL-V001D | Turbine Driven Auxiliary Feedwater Pump Suction Check Valve Test | 007 |
| OSP-AL-V0002 | Auxiliary Feedwater Mode 5 Valve Operability | 011 |
| OSP-AL-V002A | Auxiliary Feedwater and Steam Supply Check Valve Operability | 006 |
| OSP-AL-V0003 | Auxiliary Feedwater Pump Discharge Check Valve Closure Test | 002 |
| OSP-KA-V0003 | Nitrogen Accumulators Leak Rate Tests | 0 10 |
| OSP-RP-0001 | Auxiliary Shutdown Panel Channel Check | 009 |
| OTA-RL-RK108 | Windows 108A Through 108F | 004 |

Procedures

| NUMBERS | TITLE | REVISION |
|-------------------------|--|-----------------|
| OTA-RL-RK109 | Windows 109A Through 109F | 005 |
| OTA-RL-RK110 | Windows 110A Through 110F | 003 |
| OTA-RL-RK111 | Windows 111A Through 111F | 004 |
| OTA-RL-RK112 | Windows 112A Through 112F | 001 |
| OTA-RL-RK127 | Windows 127A Through 127F | 004 |
| OTN-AL-00001 | Auxiliary Feedwater Valve Alignment | 006 |
| OTO-AB-00002 | Steam Flow Channel Failure | 003 |
| OTO-AB-00003 | Steam Generator Pressure Channel Failure | 005 |
| OTO-SA-00001 | Engineered Safety Feature Actuation Verification and Restoration | 009 |
| OTS-ZZ-0001 | Cooldown From Outside The Control Room | 002 |
| UEND-WORK CONTROL-01 | Workarounds | 003 |

Requests For Resolution

| | | | | |
|--------|---------|--------|--------|--------|
| 02359 | 13058A | 16173 | 17893A | 19342A |
| 02359A | 13786 | 16987C | 18244 | 19358A |
| 02359C | 14020 B | 16987D | 18267A | 20302A |
| 04780 | 14020 C | 17044A | 18479 | 20302B |
| 05259A | 14421F | 17767 | 18479A | 20473 |
| 10176B | | | | |

Safety Evaluations

| NUMBER | DESCRIPTION | REVISION |
|---------------|--|-----------------|
| RFR 05259A | Steaming from Area 5 Floor Drains [block two floor drains] | June 29, 1988 |
| MP 97-1028 | Revise Limit Switch Settings on FCHV0312 | January 9, 1998 |

Suggestion Occurrence Solutions

| | | | | |
|---------|---------|---------|---------|---------|
| 94-1366 | 97-0962 | 98-3072 | 99-0926 | 99-3301 |
| 94-1466 | 97-1146 | 98-3078 | 99-0926 | 99-3308 |
| 94-1495 | 98-0025 | 98-3497 | 99-1026 | 99-3534 |
| 95-0508 | 98-0116 | 98-3582 | 99-1026 | 00-0066 |
| 96-1200 | 98-0122 | 98-3704 | 99-1192 | 00-0153 |
| 96-1271 | 98-0170 | 98-3711 | 99-1239 | 00-0206 |
| 97-0407 | 98-0282 | 98-3967 | 99-1284 | 00-0207 |
| 97-0421 | 98-0623 | 99-0087 | 99-1284 | 00-0386 |
| 97-0555 | 98-0784 | 99-0148 | 99-1412 | 00-0474 |
| 97-0602 | 98-1403 | 99-0367 | 99-1618 | 00-0669 |
| 97-0610 | 98-2145 | 99-0374 | 99-1897 | 00-0679 |
| 97-0615 | 98-2167 | 99-0439 | 99-1949 | 00-0735 |
| 97-0696 | 98-2276 | 99-0466 | 99-1988 | 00-0750 |
| 97-0729 | 98-2386 | 99-0569 | 99-2004 | 00-0753 |
| 97-0731 | 98-2516 | 99-0662 | 99-2418 | 00-0805 |
| 97-0803 | 98-2623 | 99-0746 | 99-3183 | 00-0839 |
| 97-0957 | 98-2809 | 99-0747 | 99-3288 | 00-1186 |
| 97-0957 | 98-3026 | 99-0901 | | |

Work Package Documents

G601695 022
G601723 012
G601723 013

ATTACHMENT 2

NRC's REVISED REACTOR OVERSIGHT PROCESS

The federal Nuclear Regulatory Commission (NRC) recently revamped its inspection, assessment, and enforcement programs for commercial nuclear power plants. The new process takes into account improvements in the performance of the nuclear industry over the past 25 years and improved approaches of inspecting and assessing safety performance at NRC licensed plants.

The new process monitors licensee performance in three broad areas (called strategic performance areas): reactor safety (avoiding accidents and reducing the consequences of accidents if they occur), radiation safety (protecting plant employees and the public during routine operations), and safeguards (protecting the plant against sabotage or other security threats). The process focuses on licensee performance within each of seven cornerstones of safety in the three areas:

| Reactor Safety | Radiation Safety | Safeguards |
|---|---|---|
| <ul style="list-style-type: none">● Initiating Events● Mitigating Systems● Barrier Integrity● Emergency Preparedness | <ul style="list-style-type: none">● Occupational● Public | <ul style="list-style-type: none">● Physical Protection |

To monitor these seven cornerstones of safety, the NRC uses two processes that generate information about the safety significance of plant operations: inspections and performance indicators. Inspection Findings will be evaluated according to their potential significance for safety, using the Significance Determination Process, and assigned colors of GREEN, WHITE, YELLOW or RED. GREEN Findings are indicative of issues that, while they may not be desirable, represent very low safety significance. WHITE Findings indicate issues that are of low to moderate safety significance. YELLOW Findings are issues that are of substantial safety significance. RED Findings represent issues that are of high safety significance with a significant reduction in safety margin.

Performance indicator data will be compared to established criteria for measuring licensee performance in terms of potential safety. Based on prescribed thresholds, the indicators will be classified by color representing varying levels of performance and incremental degradation in safety: GREEN, WHITE, YELLOW, and RED. GREEN indicators represent performance at a level requiring no additional NRC oversight beyond the baseline inspections. WHITE corresponds to performance that may result in increased NRC oversight. YELLOW represents performance that minimally reduces safety margin and requires even more NRC oversight. And RED indicates performance that represents a significant reduction in safety margin but still provides adequate protection to public health and safety.

The assessment process integrates performance indicators and inspection so the agency can reach objective conclusions regarding overall plant performance. The agency will use an Action Matrix to determine in a systematic, predictable manner, which regulatory actions should be taken based on a licensee's performance. The NRC's actions in response to the significance (as represented by the color) of issues will be the same for performance indicators as for inspection findings. As a licensee's safety performance degrades, the NRC will take more and increasingly significant action, which can include shutting down a plant, as described in the Action Matrix.

More information can be found at: <http://www.nrc.gov/NRR/OVERSIGHT/index.html>.