ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket No.:	50-483
License No.:	NPF-30
Report No.:	50-483/98-20
Licensee:	Union Electric Company
Facility:	Callaway Plant
Location:	Junction Hwy. CC and Hwy. O Fulton, Missouri
Dates:	August 17 through September 4, 1998
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ATTACHMENT: Supplemental Information

EXECUTIVE SUMMARY

Callaway Plant
NRC Inspection Report 50-483/98-20

Four NRC Region IV inspectors performed a corrective action program implementation team inspection at the Callaway Plant from August 17 through September 4, 1998. The team used NRC Inspection Procedure 40500 to evaluate the licensee's effectiveness in identifying, resolving, and preventing issues that could degrade the quality of plant operations or safety.

The team determined that the Callaway Plant had a good corrective action program. Conditions that could degrade the quality of plant operations were, for the most part, being effectively identified, resolved, and corrected.

Operations

- Conditions adverse to quality were generally being appropriately identified, evaluated, and corrected. The occurrence of mispositioned components, however, continued to be a problem for which the corrective action process had not been effective (Section O1.1).

- Because of the continuing identification of tagging errors, corrective actions for workman's protection assurance performance deficiencies had not improved performance in this area (Section O1.2).

- The criteria for operator workarounds were appropriate and had been effectively applied. Unresolved issues meeting these criteria were being appropriately addressed (Section O1.3).

- The licensee had performed effective quality assurance audits in the corrective action area. Assessments of operating performance were objective and comprehensive in scope. Strengths and weaknesses in safety performance were candidly reported. Corrective actions were appropriate and timely (Sections O7.1 and O7.2).

- The Callaway Nuclear Safety Review Board and Onsite Review Committee reviews were effective and met regulatory requirements (Sections O7.3 and O7.4).

- Independent safety engineering group examinations of plant design and operating experience information were effective and met the requirements of Technical Specification 6.2.3. The independent safety engineering group provided useful performance trend analyses to station management and provided valuable feedback to the plant staff on operational events at other plants (Section O7.5).

Maintenance

- Maintenance personnel implemented the corrective action program effectively in spite of corrective action program Procedure APA-ZZ-00500, which lacked clarity and was cumbersome to use (Section M1.1).

- The external material condition of the systems inspected was good. The equipment was free of water, air, and oil leaks; significant corrosion or rust; and external damage (Section M2.1).

- The quality assurance audits in the maintenance area were determined to be good. The audit findings were consistent with the team findings (Section M7.1).

Report Details

Summary of Plant Status

Callaway Plant operated at approximately full power during the onsite inspection period.

I. Operations

O1 Conduct of Operations

O1.1 Condition Reporting Process

a. Inspection Scope (40500)

The team reviewed the effectiveness of the licensee's process for identifying, evaluating, and resolving problems that could degrade plant safety. The team reviewed plant documents, interviewed both management and working level personnel, and attended licensee meetings.

b. Observations and Findings

Administrative Procedure APA-ZZ-00500, "Corrective Action Program," Revision 28, established the requirements and program for the identification, documentation, reporting, tracking, trending, and resolution of concerns at the Callaway Plant. The procedure defined the use of the suggestion-occurrence-solution (SOS) report for identifying conditions adverse to quality. The team reviewed the procedure and made the following observations.

- The procedure was comprehensive and contained the necessary steps for the identification, evaluation, and correction of conditions adverse to quality.

- The procedure did not always clearly specify the individual or group that was responsible for performing various procedure steps. The team noted that the actions required for the individual who identified a condition adverse to quality should be clearly defined to facilitate implementation of the corrective action process.

The team discussed the implementation of the procedure with quality assurance, operations, engineering, and maintenance personnel. The team found that all personnel interviewed expressed a willingness to identify conditions adverse to quality. The team found that maintenance personnel were comfortable with the work request process, but they expressed a preference for reporting conditions adverse to quality to their supervisors or quality assurance personnel rather than initiating an SOS report themselves.

Mispositioning Events

The NRC noted in the last systematic assessment of licensee performance report, issued on June 13, 1997, that there were continuing problems with protective tagging and valve misalignments. The licensee's operations organization, recognizing that there had been a number of occurrences related to configuration control or inadvertently mispositioned components (valves, switches, breakers, etc.), created a task team to collect and analyze information to determine and implement the needed corrective action. During the last week of the inspection, the licensee's operations organization identified the task team members and finalized a charter to guide the assessment effort.

Prior to the inspection, the team reviewed a summarized list of more than 4,000 SOS reports initiated since May 1997 (the start of the assessment period). The team selected for review, a sample of 7 SOS reports related to component mispositioning or configuration control. Early in the inspection, the team requested that the licensee provide a list of SOS reports dealing with configuration control issues since the start of the assessment period. Licensee personnel subsequently searched the database and provided the team with a list of 36 SOS reports.

The team asked a licensee operations representative how the task team would determine the scope of their review. The representative provided a list that included a population of 60 components (valves, switches, breakers, etc.) mispositioning events reported in SOS reports since September 1995. The list consisted of the 36 provided to the team plus an additional 24 dated between September 1995 and March 1997. The team noted that 5 of the 7 SOS reports selected for review prior to the inspection were not included in the licensee's list acquired from the data base search. The team informed a licensee representative about the 5 SOS reports that were not identified for inclusion into the scope of the review.

During the course of the inspection, the team independently identified two additional events reported in SOS reports that were not identified by the licensee for the task team's scope. Further, the team identified that the licensee's independent safety engineering group (ISEG) had compiled a list of mispositioning events that included 12 more SOS reports that were not included in the task team's scope. The team determined and informed the appropriate licensee representatives that the scope of the intended task team review had not yet been accurately determined.

Operations-Related Suggestion-Occurrence-Solution Report Issues

The team did not identify any safety issues during a review of 55 SOS reports that identified and reported problems related to the operations functional area. Generally, the performance of operations regarding identification of problems and implementation of corrective action was good. However, the team identified minor problems, most of which were previously identified, but were still occurring. The following examples were isolated observations related to SOS reports in the operations area:

- Suggestion-Occurrence-Solution Report 95-0508 was initiated on May 24, 1995, to report out-of-tolerance set lift pressure for 14 of 20 main steam safety valves.

These valves are normally on-line tested just prior to shutdown for refueling outages. The SOS report was eventually closed by obtaining an analysis from the NSSS vendor. The team learned that the licensee planned to request an amendment to the operating license expanding the main steam safety valves lift set point tolerance, on the basis of the vendor analysis. Prior to closing the SOS report, an NRC engineering inspection team determined that the licensee had failed to comply with reporting requirements and issued Violation 50-483/97-05. During the Maintenance Rule Baseline team inspection in August 1997, the team inquired about the functional failure resolution for these failures. The team was told that the evaluation was still in progress. A determination was reached in June 1998 that the valves had undergone functional failures, but the failures were not maintenance preventable.

Since the 1995 failures, one main steam safety valve test failure occurred prior to each of the 1996 and 1998 outages. Suggestion-Occurrence-Solution Report 98-0623 remained open to track planned corrective action to amend the license. As for amending the license, the analysis was completed in August 1997 and the amendment request is pending. During interviews, licensee personnel indicated other corrective action was ongoing to track specific serial-numbered valve test performance. The team could not verify that individual valve test performance tracking was occurring. The team noted that during a period of more than 3 years, 14 of 20 valves failed with corrective action not yet implemented. The team also found that the sequence of events, event analysis, and determination of corrective action was very difficult to understand from the documentation provided by the licensee.

- Suggestion-Occurrence-Solution Report 97-1071 dated September 15, 1997, reported the failure of the Service Water Pump C discharge valve to automatically open when the pump was started, which in turn caused the pump to trip. After cycling the local HAND-OFF-AUTO switch several times, the valve functioned normally on a subsequent start attempt. The team identified that there had been 14 similar failures of Pumps A, B, and C since 1992. However, only the failures that occurred in 1993 and 1994 were reported in SOS reports, which resulted in cause determinations. The causes were not verified for the other failures because they were dispositioned in work requests, generic repair and trouble shooting tasks, or as action items. The latest prior episode occurred with the Pump C discharge valve on March 31, 1997 and was dispositioned with Generic Task G598853 028.

  As a result of the September 15, 1997, event, work requests were written to remove particulate matter from the hydraulic operator fluid and to disassemble and clean or replace the slide valves and flow control on the valve operator. The operator hydraulic fluid had been filtered and cleaned. An action item was issued to operations to revise the operating procedure to require cycling of discharge valves prior to starting pumps that were idle for longer than 2 weeks. The operations corrective action was noted to be overdue at the end of this inspection.

- Suggestion-Occurrence-Solution Report 98-2276 was initiated to report the identification of safety-related valves not being correctly positioned prior to surveillance on the steam-driven auxiliary feedwater pump. The steam warmup supply valves were discovered to be closed prior to pump surveillance, rather than open for existing plant conditions (Mode 3). The licensee's staff effectively determined the cause, implemented corrective action to prevent recurrence, and closed the SOS report. However, a question posed by the onsite review committee went unanswered. This came to light when the team questioned the status of the corrective action. The licensee's staff reopened the SOS report and addressed the onsite review committee's concern. The problem appeared to result from careless documentation of the onsite review committee's concern within the SOS report text. Incidentally, the team noted that this particular event had not been included in the scope of review for the licensee's task team on component mispositioning or configuration control events.

A detailed review and followup of SOS reports and the resultant implementation of corrective action provided the following observations related to corrective action effectiveness:

- Searches for documents in the SOS report database were ineffective. This caused difficulty in baselining or determining the scope of potential programmatic issues.

- Suggestion-occurrence-solution reports were difficult to understand, in that causes, immediate or remedial actions, and corrective actions were not always in the proper areas, but intermixed and dispersed throughout the documents.

- The determination and implementation of corrective action in the operations functional area were not always timely.

<u>High Ambient Temperature in Rooms With Safety-Related Equipment</u>

The team reviewed a sample of SOS reports related to occurrences of high ambient temperature in rooms and spaces containing safety-related equipment. The licensee identified a problem that resulted from silt accumulation in flow restricted areas, which reduced essential service water flow to the room coolers. Through evaluation it was determined that high ambient temperature could be reduced by increasing essential service water flow to the coolers and the resultant increased flow velocity would flush the entrapped silt through the system. As a result of this determination, preventive maintenance in the form of either quarterly or semiannual high-velocity flushes was implemented for eight room coolers. All SOS reports related to this problem except one had been closed. Suggestion-Occurrence-Solution Report 97-1112 remained open to evaluate the long-term effectiveness of the corrective action. The corrective action to implement a preventive maintenance program to address the problem of silting of safety-related room coolers appears to have been effective in the short term.

Loose Parts Monitoring System Alarms

It was the licensee's policy to thoroughly review and understand the reason for all loose parts monitoring system alarms. Further, the applicable annunciator response procedure specifically required the initiation of corrective action. During a discussion with a reactor engineering representative, it was explained that any unrestrained material in the reactor coolant system represented a potential for fuel damage and a consequential threat to public safety. Therefore, the cause for all alarms was determined through the initiation of an SOS report.

The team reviewed a total of nine SOS reports that had been initiated and evaluated during the current assessment period. The cause of most of the alarms had been determined to result from normal thermal expansion or contraction of the reactor coolant system due to normal plant transients. One alarm had resulted from equipment malfunction, and another from an improper switch lineup, which, incidentally, had not been included in the scope of the mispositioning events task team review.

Suggestion-Occurrence-Solution Report 98-2508 identified a loss of channel signal in Mode 2 during reactor startup. The team determined that the operability requirements for the loose parts monitoring system were Chapter 16.3.3.5 of in the Final Safety Analysis Report. Technical Specification 6.9.2 requires a special report if one or more channels are inoperable for longer than 30 days in Mode 2 or above. The team reviewed a single report issued on June 6, 1998, that reported failure due to loss of signal from Channel 3 (accelerometer) of the loose parts monitoring system, which is mounted on the reactor vessel head. The licensee planned to troubleshoot and correct this failure during the next outage of sufficient duration that would allow access to the equipment.

As a result of the licensee's inability to determine the exact cause of some loose parts monitoring system alarms, the licensee had installed Plant Modification MP 97-2004. This modification enhanced the ability to collect data earlier in an event by installing a second, more-sensitive recording system. Reactor engineering was also evaluating the feasibility of changing channel alarm set points. The current set points were below the midpoint of the set point range referenced in the Final Safety Analysis Report. The team determined that the corrective action process had been effective in addressing issues related to the performance of the loose parts monitoring system.

Gold Cards

Plant operations had implemented a "Gold Card" observation program described in Callaway Plant Policy, Ops-Assessment, "Event Free Operation," Revision 01. The team reviewed the policy, and then performed a scan review of 514 gold cards that had been initiated from the start of the current assessment period until the start of the inspection on August 17, 1998. This review yielded 35 gold cards that warranted additional detailed review.

The majority of the cards initiated and reviewed were related to desired procedure enhancements. The team verified that the majority of requested procedure enhancements were placed in planned revision files or on-the-spot changes were made. A small fraction of requested revisions was evaluated and determined not to be necessary. For the cards not related to procedure enhancement, all were appropriately reviewed and addressed. All the gold card items requiring action beyond the gold card program were appropriately referred to SOS reports, maintenance work requests, or the action item tracking system.

The program policy did not require supervisory review, but extensive supervisory review was occurring and was effective. The team noted that the present gold card program did not have independent cataloguing and trending capability. This enhancement would have provided for early indication and subsequent detection of potential programmatic issues. However, in spite of this shortcoming, the program was an effective observation program that had resulted in many improvements and enhancements, and when required, corrective action.

c. Conclusions

The team concluded that conditions adverse to quality were generally being appropriately identified, evaluated, and corrected.

The previously identified issue of excessive occurrence of mispositioned components, however, continued to be a problem. The corrective action process had not been effective in addressing this problem. The licensee's task team responsible for addressing the issue of component mispositioning or configuration control had not accurately determined the scope of the intended review. The poor search capability of the SOS report database presented difficulty in the identification and tracking of generic or programmatic issues. In addition, corrective action implementation by operations was not always timely. The sequence of events and status of some implemented corrective actions was difficult to determine.

O1.2 Workman's Protection Assurance

a. Scope of Inspection (40500)

The team reviewed performance in the area of workman's protection assurance and valve misalignments to determine if corrective actions had been effective in addressing previously identified deficiencies. This included interviews with licensee personnel and reviews of applicable plant procedures and SOS reports.

b. Observations and Findings

Weaknesses had been evident in the licensee's program for protective tagging for over a year. In March 1997, the licensee established a workman's protection assurance task team to address weaknesses in Administrative Procedure APPA-ZZ 00310, "Workman's Protection Assurance and Caution Tagging." In June 1997, the NRC noted continuing

problems with protective tagging and valve misalignments in NRC Inspection Report 50-483/97-99, "Systematic Assessment of Licensee Performance (SALP)," for the period April 30, 1995, through May 10, 1997. Operations Self-Assessment OS 1-97, conducted by the licensee in November 1997, identified the need to improve configuration control of valve and breaker positions and to improve safety tagging methods. At the time of this inspection, most corrective actions for this self assessment remained open with due dates of December 31, 1998, or later.

Continuing performance deficiencies had occurred in the area of workman's protection assurance. The trend of workman's protection assurance occurrences reported by SOS reports was not improving. This was particularly evident for high priority SOS reports (i.e., those assigned a priority of 15 or higher) where eight workmans' protection assurance occurrences were reported through the period ending August 25 for refueling year 1998, and a total of nine were reported for the previous refueling year, 1996. Independent Safety Evaluation Group Report 98-07-08, dated July 23, 1998, noted a disturbing trend in the number of mispositionings involving components that had workman's protection assurance placed on them. This trend was based on review of six SOS Reports (98-0232, -1906, -2896, -2999, -0166, and -0311). A review of 1998 SOS reports by the team identified the occurrence of 14 additional mispositioning events involving workman's protection assurance's during the period January 1, 1998, through August 16, 1998 (SOS Reports 98-0219, -0318, -2403, -3184, -0398, -1658, -2118, -2753, -0220, -1669, -2777, -2881, -1036, and -0989). A total of 77 SOS reports related to workman's protection assurance were issued during this period. Although most of these 77 SOS reports were of low safety significance and most did not involve mispositionings, the number is large and some may be precursors for more significant events. Conditions reported included:

- Accomplishment of field work without required workman's protection assurances in place (SOS Reports 98-2679, -1436, -2129, -0937, and -0245).

- Workman's protection assurances that did not provide adequate protection (SOS Reports 98-0176, -0949, and -0830).

- Operation of workman's protection assurance tagged components (SOS Reports 98-0398 and -1327).

- Missing and damaged tags (SOS Reports 98-2177, -1511 and -1023).

- Tag hung on wrong breaker (SOS Report 98-2898).

- Workman's protection assurance tag hung on Train A safety injection pump discharge pressure gage during Train B week (SOS Report 98-3223).

The licensee took corrective action to improve performance following each occurrence. Corrective actions included:

- Management discussions with involved workers, as well as, discussions with all workers during a Refueling Outage 9 safety standdown.

- Reminding senior reactor operators to use dual verification to the extent possible for hold-off tags requiring independent verification.
- Development of training for this dual verification.
- Changes to work instructions and additions to requalification training.
- Developing Procedure ODD-ZZ-00026, "Component Configuration Control," for restoration of positions.
- Workman's protection assurance implementation audits.

The workman's protection assurance task team was developing a major revision to Administrative Procedure APPA-ZZ-00310, "Workman's Protection Assurance and Caution Tagging," to improve the workman's protection assurance process. This revision was being developed to incorporate lessons learned at the Callaway Plant, as well as those learned at a Union Electric fossil plant. The revision and associated training were scheduled for completion by October 31, 1998. There was significant worker participation in the development of this revision.

c. Conclusions

The team concluded that because of the continuning identification of tagging errors, corrective actions for workman's protection assurance performance deficiencies had not improved performance in this area.

O1.3 Workarounds

a. Scope of Inspection (40500)

Operator work practices were reviewed to determine the extent to which operators were required to take nonroutine actions to compensate for or adjust for abnormal conditions. Such abnormal conditions are referred to as operator workarounds. Assessment was based on review of reactor operator and shift supervisor daily logs, control room night orders, interviews of operators, inspection of plant conditions, and review of applicable management policy in this area.

b. Observations and Findings

Nuclear Division Policy UEND-WORK CONTROL-01,"WORKAROUNDS," Revision 002, provided appropriate criteria for classifying abnormal conditions as workarounds. Four unresolved conditions meeting these criteria were identified by the licensee on the workaround list dated August 18, 1998. Responsibilities for addressing each issue were clearly assigned. Identification dates for the four listed workarounds were June 9, 1995, April 18, 1997, March 20, 1998, and July 17, 1998. Resolution of the 1995 item will require installation of a more reliable intake pump control system, which had been

designed and scheduled for installation during the next refueling outage. In an effort to identify additional workarounds, the team accompanied an equipment operator during routine operations, reviewed reactor operator daily logs, shift supervisor daily logs, and night orders for the period August 1-19, 1998, and inspected plant conditions.

The material condition of the plant was observed to be good. No conditions, other than those listed on the licensee's workaround list, were identified for which nonroutine compensatory operator actions were required. The team found that licensee operations personnel were knowledgeable of the conditions associated with the workarounds.

c. Conclusions

The criteria provided by nuclear division policy for identifying operator workarounds were appropriate and had been effectively applied. Unresolved issues meeting these criteria were being appropriately addressed. Performance in this area was an indication of good plant material condition and management sensitivity to the needs of operators.

O7 Quality Assurance in Operations

O7.1 Corrective Action Audits

a. Inspection Scope (40500)

The team reviewed the two latest quality assurance audits (identified in the attachment) conducted in the corrective action area during December 1997 and June 1998.

b. Observations and Findings

The team observed that the checklists developed for these audits included 26 of the 29 critical attributes required to be evaluated by the corrective action audit planning guide. The 3 attributes that were not addressed were specified to be evaluated at 2- and 3-year frequencies.

The findings identified by the two audits included the following examples:

- The semiannual trend reports were not informative or timely.
- There was an adverse trend in SOS report generation rate.
- There was a high percentage of employees that were reluctant to use the corrective action system.
- There was an inconsistent threshold among various groups for SOS report initiation.
- There was ineffective and untimely implementation of corrective action task team recommendations.

The team found the two most recent audits to have been effective.

c. Conclusions

The licensee had performed effective quality assurance audits in the corrective action area.

O7.2 Operations Assessments

a. Inspection Scope (40500)

Licensee assessments of performance of the operations department were reviewed to determine if they were adequate to identify deficiencies in safety performance and to determine if appropriate corrective actions were taken or planned. The status of selected corrective actions was independently verified.

b. Observations and Findings

In November 1997, a team of individuals from industry performed an assessment of plant operations. The results of this assessment provided a candid assessment of operational strengths and weaknesses. The assessment included an employee survey and interviews, which identified perceived weaknesses in areas such as leadership, empowerment, trust, morale, accountability and responsibility. Specific performance weaknesses were also identified, including alarm response, self checking, shift turnovers, configuration control, and communications. Action Plan 98-802 was issued to assign and track corrective actions for 32 findings. At the time of this inspection, 15 of these 32 items had been closed. A sample of closed action items (Action Plan Items 3.a, 4.a, 4.b, 6.b, 7.b, and 8.b) was inspected by the team to determine if appropriate corrective actions had been taken. Corrective actions for the closed items were appropriate and due dates for the remaining open items were reasonable.

In July 1998, a different industry team performed an assessment of plant operations. Areas assessed included leadership, training, housekeeping, operating culture, safety culture, and work planning. Documented findings were predominantly positive with the exception of a few occupational safety hazards and housekeeping deficiencies of low safety significance. Corrective Action Plan 98-801 was issued and corrective actions were in progress. None of these corrective actions had been completed at the time of this inspection.

The operations department relied primarily on the quality assurance department, and ISEG in particular, for routine analyses of performance trends. The quality assurance department had issued semiannual trend analysis reports, which provided a historical perspective on performance trends. The ISEG had provided "Out of the Box" human performance trend reports, which included plots of operations human performance success rate as a leading performance indicator. The ISEG also provided additional special trend analysis reports upon request. In general, these reports accurately characterized performance trends.

c. Conclusions

Assessments of operating performance were objective and comprehensive in scope. Strengths and weaknesses in safety performance were candidly reported. Corrective actions were appropriate and timely.

O7.3 Callaway Nuclear Safety Review Board

a. Inspection Scope (40500)

The team reviewed Callaway Nuclear Safety Review Board meeting minutes that were held in the last year to determine compliance with selected requirements from the operating quality assurance manual, and to assess the effectiveness of committee reviews. Review by the team was limited to the review of meeting minutes and interviews of committee members because no meetings were conducted during the period of this inspection.

b. Observations and Findings

The team found, through review of the Callaway Nuclear Safety Review Board meeting minutes, that the board met the requirements of paragraph 1.26 in the Operating Quality Assurance Manual, Revision 19. The board included four members from other utilities. The meeting minutes documented a good interchange of information between members. The meeting minutes documented a briefing of the vice president by the board. The team considered the direct reporting by the board to the vice president, as a good mechanism for fulfilling their assigned functions for review of Callaway Plant activities and for providing advice to the vice president.

c. Conclusions

The Callaway Nuclear Safety Review Board reviews were effective and met regulatory requirements.

O7.4 Onsite Review Committee

a. Inspection Scope (40500)

The team reviewed records of the first onsite review committee meeting each month during 1998, to determine compliance with the requirements in paragraph 1.26 of the Operating Quality Assurance Manual and to assess the effectiveness of committee reviews. Review by the team was limited to the review of meeting minutes and interviews of committee members because no meetings were conducted during the period of this inspection.

b. Observations and Findings

Minutes of the eight selected meetings indicated that the onsite review committee approved 82 documents with no changes, approved 16 with modifications, and disapproved 2 documents. In general, appropriate rationale was documented to support each modification to the reviewed document. Most of the modifications were made to correct mistakes in the documents submitted to the committee. Review comments indicated that members provided thorough and critical reviews that were focused on reactor safety. The sample of onsite review committee meetings reviewed met the operating quality assurance manual requirements. The team noted that the vice president and chief nuclear officer was not included on the distribution list for the minutes of seven of the eight meetings reviewed. Station administrative staff informed the team that they had sent copies to the vice president and that the vice president had been added to the routine distribution list in August.

c. Conclusions

Onsite review committee reviews were effective and met regulatory requirements.

O7.5 Independent Safety Engineering Group

a. Inspection Scope (40500)

The team reviewed the functions, composition, and responsibilities of the ISEG and reviewed reports issued by this group to determine its effectiveness and to determine compliance with Technical Specification 6.2.3, "Independent Safety Engineering Group (ISEG)." Sources of information also included interviews of the ISEG supervisor and other station managers, documents describing the plant operating experience program, and records of staff qualifications.

b. Observations and Findings

Technical Specification 6.2.3.1 requires that the ISEG examine plant design and operating experience information and make detailed recommendations for revised procedures, equipment modifications, maintenance activities, operations activities or other means of improving plant safety, to the quality assurance manager and the Callaway Plant manager. The ISEG had routinely examined plant design and operating experience information and had developed case study reports and safety evaluation group reports, which informed the plant staff of performance trends, compared Callaway Plant performance with that of industry peers, and described significant events that had occurred at other plants. These reports provided trend analyses, which indicated opportunities for improvement, and provided readers with information about events at other plants to help them avoid similar events or to be better prepared should such events occur at Callaway Plant.

The ISEG performance met the requirements of Technical Specification 6.2.3.1, but performance in the area of providing detailed recommendations was not consistent. For example, the February 1998 operating experience journal issued by Safety Evaluation

Group Report 98-02-003, which highlighted human performance issues in the control room, contained a list of key lessons learned and a statement of expectations by the operations superintendent, which provided specific direction to the operating staff. However, several safety evaluation group reports issued later in 1998 contained no detailed recommendations for improving plant safety even though these safety evaluation group reports noted the need for corrective action to improve performance. For example, the March 1998 operating experience journal issued by Safety Evaluation Group Report 98-03-002 highlighted numerous significant industry events but provided no detailed recommendations. The team noted that Procedure APPA-ZZ-00007, "Quality Assurance Organization, Responsibility and Conduct of Operations," Revision 14, which specifies ISEG responsibilities, does not assign ISEG responsibility for making detailed recommendations for revising procedures, equipment modifications, maintenance activities, operations activities, or other means of improving plant safety.

Technical Specification 6.2.3.2 requires that the ISEG be staffed with at least five engineers and that each have a bachelor's degree in engineering or related science and at least 2 years' professional level experience in his field. Interviews and data from an ISEG staffing report dated August 3, 1998, indicated that the group was staffed with seven engineers, including a supervising engineer, each of whom had at least a bachelor's degree in engineering and more than 2 years' professional experience. Moreover, the staff members averaged more than 17 years of professional nuclear experience and two members had received senior reactor operating licenses for the Callaway Plant. The ISEG supervisor said that members had visited other power plants and had participated in industry initiatives to maintain current knowledge of issues at other sites that could impact Callaway Plant. Performance in this area met the Technical Specification 6.2.3.2 requirements and indicated a strong management commitment to maintaining an effective ISEG function.

Technical Specification 6.2.3.3 requires that the ISEG provide independent verification that plant activities are performed correctly and that human errors are reduced. Organizational independence was assured by placing the ISEG in the quality assurance organization and operational independence was evident from the large number of SOS reports written by ISEG that were critical of the line organization. Shift technical advisors, who were members of ISEG, used their position as members of control room operating crews to maintain surveillance of operating activities. Performance in this area met the Technical Specification 6.2.3.3 requirements.

Technical Specification 6.2.3.4 requires that records of activities performed by ISEG be prepared, maintained, and forwarded each calendar month to the quality assurance manager and the Callaway Plant manager. The team confirmed compliance with this requirement by reviewing copies of records provided to these managers in 1998.

c. Conclusions

Independent safety engineering group examinations of plant design and operating experience information were effective and met the requirements of Technical Specification 6.2.3. The independent safety engineering group provided useful performance trend analyses to station management and provided valuable feedback to the plant staff on operational events at other plants. The qualifications and experience of ISEG members met Technical Specification 6.2.3.2 and indicated a strong management commitment to maintaining an effective ISEG function.

II. Maintenance

M1 Conduct of Maintenance

M1.1 Corrective Action Program Implementation

a. Inspection Scope (40500)

The team reviewed the licensee's corrective action program, a computer listing of SOS reports for the past 2 years, and selected a sample of 81 SOS reports for detailed review. In addition, the team reviewed a computer listing of requests for resolution issued within the past 2 years, and selected a sample of 32 requests for resolution for detailed review. The team also reviewed the licensee's minor maintenance program, a computer listing of minor maintenance performed within the past 2 years, and selected a sample of 15 work requests for detailed review. Finally, the team interviewed licensee personnel in the maintenance department to determine the extent of their understanding of the corrective action program and how they implemented it.

b. Observations and Findings

Suggestion-Occurrence-Solution Reports

The team did not identify any problems that the licensee had not already identified, and noted that identified problems had been corrected and/or identified for trending purposes in accordance with the corrective action program. The team noted that the quality of SOS report packages was not consistent. Some of the packages were found to be clear and concise, where the identified problems and the recommended corrective actions were clearly listed. Other packages were not so clear. In some of these packages, the identified problems were buried in the text, and the corrective actions were alluded to but not specifically defined. This problem was due, in part, to the fact that the licensee's corrective action program Procedure APA-ZZ-00500 did not specifically provide any guidance or expectation on the format of how problems and corrective actions should be listed in an SOS report, thus, there was a lack of standardization. The team found this to be of concern because of the potential for problems that had already been identified, as not being appropriately addressed because they were not clearly defined. Licensee personnel and management also indicated a concern in this area, stating that some of their own internal audits had identified similar concerns. The licensee's personnel also indicated that part of the

problem, with regard to write-up clarity, had to do with the SOS report system computer program. Specifically, the licensee's representative stated that the computer system, which was used for creating an SOS report, was programmed to automatically freeze a person's writeup to prevent unauthorized changes to an already existing SOS report. Unfortunately, this feature also prevented the licensee from editing a poorly written SOS report. The licensee's representative indicated that they expected to alleviate this problem to a certain extent when they introduce a new SOS report system writeup program in the near future.

Following interviews with maintenance craft and management personnel, the team found that, overall, licensee personnel understood the significance of identifying problems and the need to report these problems so that they could be corrected. Based on these interviews, the team found that licensee personnel were readily willing to raise issues, and that management had created an environment where problem identification was encouraged. It was found, though, that the maintenance craft personnel were not fully familiar with the SOS report portion of the corrective action program. This was due, in part, to the fact that Procedure APA-ZZ-00500 was not sufficiently clear to the craft as to when an identified problem qualifies to be escalated to an SOS report. In addition, the SOS report portion of the licensee's corrective action program was found to be cumbersome. Finally, craft personnel access to computers was limited and craft personnel were not comfortable with writing SOS reports against other craft personnel of other disciplines regarding performance problems. As a result, the team found that the craft personnel preferred writing condition tags to identify equipment problems in the field. If this problem was identified on safety-related equipment, the craft personnel indicated that they would contact the control room to notify operations of the problem identified. On other occasions, especially with regard to a personnel performance problem or equipment problem that they felt definitely warranted an SOS report, the craft would raise the issue to their supervision, who would write the SOS report. Maintenance management personnel were found to have a full understanding on when and how an SOS report should be written.

The team reviewed SOS Report 98-0250. ITE Gould molded-case circuit breakers were replaced with Westinghouse breakers because of a high failure rate. The failure mechanism occurred when the breaker was indicated opened; however, the breaker was not always open. As a result, electricians were required to do a voltage check to verify the circuits to be open. The SOS report was written to suggest that the replacement, Westinghouse circuit breakers did not need a voltage check. This suggestion was adopted, but not fully implemented because the location of all Westinghouse circuit breakers was not identified, and not all breakers had been replaced. This disposition appeared nonconservative, in that, not checking open breakers could result in a personal safety problem.

Condition Tags

The condition tag process, while outside the SOS report program as described in Procedure APA-ZZ-00500, was integral to the licensee's corrective action program. As described above, the condition tag process was the preferred method by which craft personnel identify equipment problems in the field. This process is described in

Procedure APA-ZZ-00325, "Initiating, Authorizing, and Removing Condition Tags." The team found that condition tags, once written, received the appropriate amount of scrutiny by operations personnel. The condition tags were found to be sent to either the control room or the workman's protection assurance work control center where they were reviewed by senior reactor operator licensed personnel on a daily basis. During these reviews, it would be determined if these identified equipment problems should be written up in SOS reports. This is one reason why the operations department issues more SOS reports than the maintenance department. In addition, every morning a planning meeting was held in which condition tags were reviewed to determine how they should be addressed. It is during this meeting that a second opportunity exists for operations personnel to determine if an identified problem should be written as an SOS report.

The team reviewed a number of condition tags and noted no problems. The team noted that although the licensee's procedures indicated that identified equipment problems should get the appropriate review to determine if they warrant being written up as an SOS report, the procedures do not specifically indicate who would perform this review, or when.

Work Requests (Minor Maintenance Activities)

The team found that the licensee's work processing program included two programs called tool pouch and minor maintenance. These programs were low level, in that little planning and documentation was associated with the program activities. Work was accomplished based on a condition tag or in the case of tool pouch maintenance, without the development of a work order. Work was accomplished based on a condition tag and a work request in the case of minor maintenance. The work request procedure defined the programs. Tool pouch activities included corrective work activities, such as removal or replacing valve handwheel, removing or replacing handrails and gratings, noninvasive readings, etc. Minor maintenance included maintenance such as troubleshooting, filter change outs, removing corrosion, lubricating, replacing fuses and lamps, replacing gaskets, bolting, valve packing and stationary seals, and tightening or replacement of fittings.

The team found no problems in its review of work requests.

Maintenance Rule Reports

The team reviewed system Maintenance Rule reports on four risk-significant systems to determine if unidentified problems existed and if any unidentified negative trends existed. In addition, the team reviewed reliability and unavailability reports to determine if any problems or unidentified trends existed. Also, the team reviewed 81 SOS reports issued within the last 2 years on the three systems. Systems reviewed by the team were the auxiliary feedwater, the essential service water, and the emergency diesel generators.

The team found no problems in its review of Maintenance Rule reports.

c. Conclusion

Overall maintenance personnel were found to have implemented the corrective action program effectively. It was found though that this was done, in spite of the corrective action program Procedure APA-ZZ-00500, which was found to lack clarity and was cumbersome to use.

M2 Maintenance and Material Condition of Facilities and Equipment

M2.1 Plant Walkdowns

a. Inspection Scope (40500)

The team performed a visual inspection of the external material condition of the systems inspected as part of the vertical slices to determine the effectiveness of licensees' actions in maintaining the material condition of the systems. The team inspected the 125 Vdc, essential service water, emergency diesel generators, and reactor core isolation cooling systems. Team members toured the plant to assess material condition, observed control room operations, attended shift turnovers, and observed equipment operators in the plant.

b. Observations and Findings

The team found the material condition of the plant's structures, systems, and components to be generally good. Specifically, the team observed:

- Few visible leaks
- Little rust or corrosion
- Generally good labeling
- Good housekeeping in most areas
- Few lit or disabled annunciators in control room

In addition supports, insulation, and coatings appeared acceptable.

c. Conclusions

The external material condition of the systems inspected was good in that the equipment was free of water, air, and oil leaks; significant corrosion or rust; and external damage.

M7 Quality Assurance in Maintenance Activities

M7.1 Corrective Action Audits

a. Inspection Scope (40500)

The team reviewed the three latest quality assurance audits identified in the attachment and conducted in the corrective action area during December 1997, and June and July 1998.

b. Observations and Findings

Two of the audits specifically addressed the mechanical activities during the most recent diesel generator outages. These audits generally praised the quality of the work and the efficiency of the maintenance workers, but identified an issue of inadequate preparation and preplanning with regard to MOVATS testing. An SOS report was initiated to document improvement opportunities.

The third audit addressed the overall maintenance department performance. This audit was performed by a team, which consisted of licensee personnel from different departments, and personnel from four other utilities. This audit was found to have a broad focus, and concentrated on 36 maintenance activities. Overall, the audit praised the quality of maintenance personnel and the support they received from maintenance planners and the engineering department. The audit also identified some areas for improvement including work scheduling and work packages. In addition, the audit identified that the licensee's SOS report system was cumbersome for craftsmen working in the field when there was a need to identify problems below the threshold of an SOS. The audit team was concerned that this increased the chance that improvement opportunities recognized by maintenance personnel may not be identified. In addition, craftsmen displayed a reluctance to use the system. When a problem was identified, the maintenance supervisor often originated the SOS. The licensee issued five SOS reports to address the findings of the audit. The licensee was, during the period of this inspection, still in the process of determining how to address the corrective action program issues raised by the audit.

c. Conclusions

The licensee's quality assurance audits in the maintenance area were determined to be good. The audit findings, with regard to the cumbersome nature of the corrective action program, were consistent with the team findings.

V. Management Meetings

X1 Exit Meeting Summary

The team presented the inspection results to members of licensee management at the conclusion of the inspection during an exit meeting on September 4, 1998. The licensee personnel acknowledged the results of the inspection.

The team asked licensee management and staff whether any material examined during the inspection contained proprietary information. No proprietary information was identified. No proprietary information is included in this report.

ATTACHMENT

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Licensee

R. Affolter, Plant Manager
G. Belchik, Supervising Engineer, Plant Operations
H. Bono, Supervising Engineer, Quality Assurance
R. Carver, Supervisor, Electrical Maintenance
D. Cornwell, General Supervisor, Electrical Maintenance
M. Evans, Superintendent, Emergency planning
M. Heinzer, Shift Supervisor, Operations
J. Hogg, Supervising Engineer Maintenance Rule/Valve Program
G. Hughes, Supervisor, Independent Safety Engineering Group
J. Laux, Manager, Quality Assurance
D. Neterer, Assistant Superintendent, Operations
J. Patterson, Shift Supervisor, Operations
G. Randolph, Vice President and Chief Nuclear Officer
M. Reidmeyer, Engineer, Quality Assurance
T. Sharkey, Supervisor, System Engineering
M. Taylor, Vice Chairman, Onsite Review Committee
D. Waller, Supervisor, Electrical Design

NRC

F. Brush, Resident Inspector
D. Passehl, Senior Resident Inspector
D. Powers, Chief, Maintenance Branch

INSPECTION PROCEDURES USED

40500	Effectiveness of Licensee Controls in Identifying, Resolving and Preventing Problems

DOCUMENTS AND PROCEDURES REVIEWED

Procedures

APA-ZZ-00007, "Quality Assurance Organization, Responsibility and Conduct of Operations," Revision 14

APA-ZZ-00310, "Workmen's Protection Assurance and Caution Tagging," Revision 11

APA-ZZ-00320, "Processing Work Requests," Revision 23

APA-ZZ-00325, "Initiating, Authorizing, and Removing Condition Tags," Revision G

APA-ZZ-00500, "Corrective Action Program," Revisions 027 and 028

APA-ZZ-00604, "Requests for Resolution," Revision 016

APA-ZZ-00605, "Temporary System Modifications," Revision 009

OPD-ZZ-00310, "WPA Tagging," Revision 005

OPD-ZZ-00004, "Locked Component Control," Revision 022

OPD-ZZ-00026, "Component Configuration Control," Revision 000

OTN-SQ-00001, "Normal Operating Procedure, Loose Parts Monitoring System," Revision 007

OTA-RL-RK019, "Switchgear Room A Temperature High," Revision 005

OTA-RL-RK022, "Switchgear Room B Temperature High," Revision 006

OTA-RL-RK079, "Loose Parts Monitor," Revision 012

OTO-GK-00001, "Loss of Control Room HVAC," Revision 002

PDP-ZZ-00003, "Work Document Processing," Revision 28

Requests for Resolution

14020C	18226A	18376A	18455A	18583A	18744A	18874A
17570B	18244A	18376B	18550A	18654A	18744B	19044A
18103A	18267A	18391A	18557A	18683A	18840A	19110A
18112C	18268A	18404A	18559A	18700B	18775A	19216A
18112D	18365B					

Work Requests

W172187	W187600	W192731	W194360	W196381
W180470	W187628	W192792	W194424	W199747
W181368	W189742	W193732A	W194651	W199979
W185909	W191085	W193814	W195605	W199998
W186641	W191455	W193827	W195725	W602157
W186641A	W191505	W193841	W196380	
W186642	W192726			

Suggestion Occurrence Solution Reports

94-0875	97-1037	97-1334	98-0176	98-0355	98-1511	98-2772
97-0569	97-1065	97-1335	98-0181	98-0375	98-1530	98-2777
97-0625	97-1066	97-1336	98-0182	98-0385	98-1572	98-2809
97-0790	97-1071	97-1366	98-0184	98-0389	98-1621	98-2823
97-0796	97-1079	97-1399	98-0219	98-0398	98-1658	98-2828
97-0801	97-1081	97-1403	98-0220	98-0435	98-1669	98-2839
97-0811	97-1103	97-1429	98-0230	98-0591	98-1753	98-2844
97-0847	97-1112	97-1477	98-0232	98-0594	98-1906	98-2881
97-0850	97-1117	98-0024	98-0235	98-0623	98-2118	98-2896
97-0874	97-1120	98-0025	98-0237	98-0633	98-2129	98-2898
97-0885	97-1150	98-0028	98-0244	98-0701	98-2167	98-2931
97-0895	97-1152	98-0072	98-0245	98-0748	98-2177	98-2934
97-0905	97-1156	98-0085	98-0250	98-0830	98-2222	98-2941
97-0909	97-1168	98-0093	98-0261	98-0937	98-2234	98-2999
97-0928	97-1174	98-0100	98-0281	98-0949	98-2276	98-3008
97-0933	97-1236	98-0101	98-0288	98-0989	98-2403	98-3051
97-0940	97-1249	98-0119	98-0290	98-1023	98-2439	98-3054
97-0947	97-1292	98-0120	98-0299	98-1036	98-2508	98-3064
97-0971	97-1297	98-0128	98-0301	98-1088	98-2511	98-3089
97-0976	97-1302	98-0135	98-0311	98-1273	98-2536	98-3184
97-0979	97-1310	98-0157	98-0318	98-1327	98-2666	98-3223
97-0987	97-1311	98-0158	98-0351	98-1343	98-2679	98-3245
97-1014	97-1315	98-0166	98-0352	98-1436	98-2753	

Case Studies

ISEG-98-01, "Case Study on Reactivity Control and Nuclear Instrumentation Events," August 1998

ISEG-98-02, "Case Study on Power Availability Events," August 1998

ISEG-98-03, "Case Study on Inventory Control Events," August 1998

ISEG-98-04, "Case Study on Loss of Decay Heat Removal (RHR)," August 1998

ISEG-98-05, "Case Study on Work Coordination and System Alignment, Venting and Filling, Overpressure and Hydro Related Events," August 1998

ISEG-98-06, "Case Study on Fuel Handling and Associated Support Events," August 1998

ISEG-98-07, "Case Study on General Outage Concerns," August 1998

ISEG-98-01, "Case Study on Containment Integrity Events," August 1998

Safety Evaluation Group Reports

SEGR 98-02-003, "Operating Experience Journal," February 1998

SEGR 98-02-004, "Operations Department Mispositioning Events," February 5, 1998

SEGR 98-02-005, "Operations Department Human Performance Issues," February 5, 1998

SEGR 98-02-008, "Out of the Box Year-End 1997 Human Performance Trend Report," February 10, 1998

SEGR 98-02-009, "Human Performance Indicator MIER PI-23," February 18, 1998

SEGR 98-02-012, "Human Performance Indicators Report," February 23, 1998

SEGR 98-03-002, "Operating Experience Journal," March 1998

SEGR 98-03-004, "Preliminary Health Physics SOS Pattern Analysis," April 4, 1998

SEGR 98-06-002, "Maintenance SOS Pattern Analysis," June 26, 1998

SEGR 98-06-003, "WANO US Performance Indicators," June 24, 1998

SEGR 98-06-010, "Operations Human Performance Graph," June 30, 1998

SEGR 98-07-008, "1998 Midyear Mispositioning Event Update," July 23, 1998

Self Assessment and Audit Reports

AP 97-017, "Corrective Action," January 5, 1998

AP 98-011, "Corrective Action," August 11, 1998

OS 1-97, "Operation's Self-Assessment Final Report," November 21, 1998.

"Maintenance Rule Periodic Assessment for Cycle 9," July 31, 1998

UOM 97-0102, "Calloway Maintenance Department Self Assessment," December 12, 1997

SP98-074, ""Observation of Mechanical Activities During "A" Diesel Generation Outage," July 10, 1998

SP98-076, "Observation of Mechanical Activities During "A" Diesel Generation Outage," July 9, 1998

Other Documents

Callaway Nuclear Safety Review Board Minutes of Meeting 97-13, November 25, 1997

Callaway Nuclear Safety Review Board Minutes of Meeting 98-01, February 26, 1998

Callaway Nuclear Safety Review Board Minutes of Meeting 98-02, March 19, 1998

Callaway Nuclear Safety Review Board Minutes of Meeting 98-03, April 7, 1998

Callaway Nuclear Safety Review Board Minutes of Meeting 98-04, July 6, 1998

Callaway Nuclear Safety Review Board Minutes of Meeting 98-05, July 15, 1998

Callaway Nuclear Safety Review Board Minutes of Meeting 98-06, August 3, 1998

Site Visit to Callaway NPP, Ontario Hydro Nuclear, July 20th to July 24th, 1998.

Reactor Operator Daily Logs and Shift Supervisor Daily Logs for the period August 1, 1998 through August 19, 1998

Workaround List, July 17, 1997

Action Plan 98-802, Operations Self-Assessment (OS 1-97), Matrix Findings and Recommendations, August 21, 1998

Report of July 20-24, 1998, visit to Callaway by team from Ontario Hydro Nuclear

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Quality Assurance Planning Guide for Operations

"Predictive Performance Program Summary," July 1, 1998

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"NPDRS CFAR Analysis," July 28, 1997

"Failure/Unavailability Report for Callaway 1"