U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-483/90021(DRP)

Docket No. 50-483 License No. NPF-30

Licensee: Union Electric Company
Post Office Box 149 - Mail Code 400
St. Louis, MO 63166

Facility Name: Callaway Plant, Unit 1

Inspection at: Callaway Site, Steedman, MO 65077

Inspection Conducted: November 16, 1990, through January 15, 1991

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2/7/91
Date

Inspection Summary

Inspection from November 16, 1990, through January 15, 1991
(Report No. 50-483/90021(DRP))
Areas Inspected: Routine unannounced safety inspections of onsite follow up of events, Generic Letter 88-17 (Loss of Decay Heat Removal), plant operations, cold weather protection, maintenance/surveillance, licensee use of overtime, and containment integrated leak rate test (CILRT) were conducted.
Results: Of the areas inspected, one non-cited violation was identified and discussed in paragraph 6a of this report. An executive summary follows.

Executive Summary

Plant operations continued its superior performance; however, multiple examples of weaknesses in the control room logs were noted. The areas of security and radiological controls were found to have ample and effectively used resources based upon routine observations of facilities, equipment, and practices. The area of emergency planning was found to be well maintained and implemented as determined by inspectors' observations of a licensee practice drill. The area of maintenance/surveillance was found to be effective in ensuring plant safety. However, a number of examples were identified where maintenance staff encountered difficulties in ensuring equipment was ready to

be returned to service. In the area of engineering/technical support, the licensee was found to be strong. In the area of safety assessment/quality verification, plant management and quality verification functions continued to be well planned and implemented.

DETAILS

1. Persons Contacted

D. F. Schnell, Senior Vice President, Nuclear
*G. L. Randolph, General Manager, Nuclear Operations
*J. D. Blosser, Manager, Callaway Plant
C. D. Naslund, Manager, Operations Support
*J. V. Laux, Manager, Quality Assurance
J. R. Peevy, Assistant Manager, Operations and Maintenance
*W. R. Campbell, Manager, Nuclear Engineering
M. E. Taylor, Assistant Manager, Work Control
D. E. Young, Superintendent, Operations
R. R. Roselius, Superintendent, Health Physics
T. P. Sharkey, Supervising Engineer, Site Licensing
G. J. Czeschin, Superintendent, Planning and Scheduling
G. R. Pendegraff, Superintendent, Security
C. E. Slizewski, Supervisor, Quality Assurance Program
G. A. Hughes, Supervisor, Independent Safety Engineer Group
*J. C. Gearhart, Superintendent, Operations Support, Quality Assurance
*C. S. Petzel, Quality Assurance Engineer
J. A. McGraw, Superintendent, Design Control

*Denotes those present at one or more exit interviews.

In addition, a number of equipment operators, reactor operators, senior reactor operators, and other members of the quality control, operations, maintenance, health physics, and engineering staffs were contacted.

2. Onsite Follow Up of Events (93702)

a. On November 24, 1990, at 12:51 AM (CST), the licensee experienced a turbine trip, followed by a reactor trip, from 48 percent power.

The unit had been returning to full power operation following refueling outage IV and was at 73 percent power when a resin intrusion occurred. Due to reactor coolant system (RCS) chemistry concerns, the licensee decided to take the unit off line. Just after clearing P-9 (reactor power less than 50%), a turbine trip on a spurious high water level in the "A" moisture separator reheater (MSR) occurred. Since P-9 had cleared, an automatic reactor trip did not occur; however, a few seconds later, low low steam generator level did trip the reactor.

Discussed below are specific issues raised by this trip:

(1) Resin Intrusion: On November 23, 1990, at 8:30 PM (CST), the licensee placed the chemical and volume control system (CVCS) cation bed demineralizer (FBG01) in service Due to decreasing flow and increasing pressure across the demineralizer, the licensee suspected that resin beads had left the filter and

were in the RCS. A chemistry sample confirmed that there were approximately 510 ppb sulfates in the RCS. The reactor vendor was notified of the RCS resin intrusion. Due to a concern that the sulfates would form sulfuric acid, causing the pH to drop, resulting in material plating out on the fuel assemblies and causing long term damage, the vendor recommended a plant shutdown until the sulfates were back to normal. Within 24 hours, sulfates had been reduced to 49 ppb. The licensee contracted with an independent laboratory to perform an analysis of the chemical affects of the resin intrusion. Computer models showed that sulfuric acid levels were insufficient to cause a significant decrease in pH. The laboratory informed the licensee that the main area of concern was sulfites and that, since sulfites peaked at 3 ppb no damage had occurred. The licensee flushed the CVCS of any remaining resin.

The root cause of the resin intrusion has not yet been determined. Cation bed FBG01 was removed from service and inspected. A possible tear was identified in the retention element. Root cause of the tear and a repair mechanism have not yet been identified.

(2) Turbine Trip: The turbine trip was due to a spurious high water level in the "A" MSR. The licensee recognized immediately that the trip was spurious, due to not having received the MSR drain tank high level alarms or the dump valve annunciators prior to receiving the trip. Each MSR has three level switches and it takes two of the three switches to cause a turbine trip. The licensee determined that all 12 level switches (three per MSR, four MSRs total) had been worked on during the recently completed refueling outage. One of the three switches on "A" MSR had been reinstalled upside down. This meant that for "A" MSR, the trip logic had gone from two out of three to one out of two, since one half of the logic had already been made up. The licensee determined that the calibration procedure had left these switches set in an overly sensitive manner. During power level maneuvers, vibrational transients are often encountered. Apparently vibration caused one of the two remaining level switches on the "A" MSR to pick-up, resulting in the turbine trip. The licensee modified the calibration procedure and recalibrated all 12 level switches. Other similar switches are being evaluated for any necessary corrective action.

(3) Reactor Trip: The reactor trip was due to low low steam generator levels following the turbine trip. The reactor protection system had cleared P-9 at the time of the trip. The design of the unit is such that a 50% turbine generator step-load reduction should not result in a reactor trip. The inspectors questioned the licensee on their inability to ride-out a transient and prevent a challenge to the reactor protection system. The licensee's response was that, with the

unit right on the edge of the design envelope and the control rods in manual, the unit would not normally ride-out this transient. Updated safety analysis report (USAR) section 10.4.4.2.1 concerning the steam dump system states, in part, "The capacity of the system, combined with the capacity of the RCS to accept a ten percent step-load change, provides the capability to shed 50% of the turbine-generator rated load without reactor trip . . ." The capability of the RCS to accept a 10% step-load change is dependent upon the control rods being in automatic; during this transient they were in manual. Not withstanding this, the steam dump system did not fully open all 12 steam dump system valves. This was because the error signal between Tavg (temperature of the RCS) and Tref (turbine impulse pressure converted to a desired Tavg) only reached approximately eight degrees prior to the trip. This caused only two of the four groups of steam dumps to fully open. Process control block diagram M-761-00090 shows that during a loss of load, the Tref signal goes through a time delay circuit. The time delay is currently set to let the signal decay by a factor of e (2.7183) over 30 seconds. Since the reactor trip occurred approximately 18 seconds after the loss of load, the present steam dump circuitry would not have prevented the reactor trip from occurring. Through discussions with the vendor, the licensee has determined that the time delay should be reduced.

With the time delay installed, the as-built condition of the unit was not in accordance with section 10.4.4.2.1 of the USAR. The unit did not have the capability to shed 50% of the turbine-generator rated load. The tests performed by the licensee to verify this capability during initial power ascension (ETT-ZZ-07101 and 07102) failed to identify the discrepancy. The start-up tests did not initiate a true step-change but instead ramped the load decrease in over approximately 30 seconds.

Several other issues related to this event were followed up on by the inspectors:

- Following the reactor trip, an annunciator and computer printout indicated that "B" and "C" pressurizer code safety relief valves had lifted and not reclosed. The maximum primary pressure recorded was 2270 psig. Since the safety valves were set at 2485 psig, the primary system pressure was stable, and tail pipe temperatures not unduly elevated, the licensee believed that the valves did not, in fact, open. The licensee adjusted the valve indicating switches and was changing the maintenance procedure to take advantage of lessons learned.

- The inspectors' review of the control room logs identified several deficiencies. The control room supervisor's log

book stated that a power reduction was being commenced but failed to state why the down power was occurring, how fast it was occurring, what power level they were going to, who directed that power be reduced, and why the rate of decrease was altered. The inspectors had identified other log deficiencies, including failure to mention a 100 MWe load swing, failure to mention the failure of the residual heat removal pump room cooler to start during a surveillance test, failure to mention that certain RCS check valves were experiencing backleakage, and occasionally failure to mention major equipment status changes.

- With the exception of the control room logs, the licensee's response to this event was outstanding. Even though the trip occurred early in the morning of a major holiday weekend, an event review team was promptly initiated and sufficient personnel were called in to support the unplanned outage. Plant personnel response to the trip and subsequent events was prompt, thorough, and professional.

The licensee documented this event in Licensee Event Report (LER) 90-016. The inspectors' review and follow up of this event also included LER 90-016. This LER is closed.

b. On November 19, 1990, at approximately 10:19 PM (CST), the "A" emergency diesel generator auto-started due to a loss of 4160 volts AC to bus NB01. At the time of the event, the unit was in the process of being returned to service following the completion of its fourth scheduled refueling outage. In an attempt to synchronize the unit to the grid, the balance-of-plant reactor operator (RO) proceeded to close T-G output breaker V-55, but was unsuccessful. The RO then attempted and was able to close T-G output breaker V-53, which is in parallel with breaker V-55. With the unit on-line, the RO again attempted to operate breaker V-55, which would not close. The breaker remained in the open condition for approximately 10 minutes, after which an indicated flashover occurred. The indicated flashover caused breakers V-45 and V-85 to open, which deenergized bus NB01 and resulted in the auto-start of the diesel generator. The licensee removed the SF6 gas from V-55 and performed a visual inspection of the 345 KV breaker to determine what caused it to malfunction. The inspection did not reveal any physical evidence of breaker arcing, i.e., blown out capacitors, pitting of the contacts, or black markings/powder around the bushing.

After extensive troubleshooting efforts did not identify a root cause of the the breaker malfunction, the licensee decided to refill the breaker with gas and operate it. The breaker was closed and operated successfully.

The licensee documented this event in LER 90-015. The inspectors' review and follow up of this event also included LER 90-015. This LER is closed.

No violations or deviations were identified in this area.

3. Loss of Decay Heat Removal (Generic Letter 88-17) (Closed)

Generic Letter (GL) 88-17, concerning loss of decay heat removal (DHR), was issued on October 17, 1988. This GL concerned plant operations during outages with a reduced reactor coolant system (RCS) inventory. The GL requested the licensee to respond to eight expeditious actions and six program enhancements. The eight expeditious actions have previously been inspected using Temporary Instruction (TI) 2515/101 and were documented in inspection report 50-483/89004, paragraph 7. During this inspection period, an evaluation of the licensee's program enhancements was performed in accordance with TI 2515/103. The licensee's response to the program enhancement recommendations was stated in letter ULNRC-1900, dated February 1, 1989.

a. Instrumentation: The inspectors verified that the licensee provided reliable indications in the control room (CR) the state of the RCS and the operation of the systems used to cool the RCS. In addition, procedures and administrative controls were verified to reasonably assure indications were operational when needed.

(1) RCS Level: During refueling outage IV (completed November 1990), the licensee completed the installation of two independent RCS level indications. Level transmitters (LT) BB LT-0053A and BB LT-0053B were installed under the control of Callaway Modification Package (CMP) 88-1040. The two level loops are fully independent in that power is supplied from different control groups, the upper and lower taps for each LT are not interconnected, and there are two separate level indicators. The lower taps are located in hot leg loops one and four in close proximity to the suction of the residual heat removal (RHR) pumps, thus minimizing any potential level difference between sensed level and level at the RHR pumps suction. In order to achieve this independence, the licensee provided new penetrations in the RCS pressure boundary. Each of the new level loops can actuate either a low level annunciator (set for five inches below normal level) or a high level annunciator (set for five inches above normal level). Each level loop has a narrow range and a wide range. The wide range goes through the plant computer and can be displayed on one of the control room computer screens. The narrow range bypasses the plant computer and reads out on level indicators in the control room. Both LTs cover the range from five inches above the bottom of the hot leg to the reactor vessel head flange. One of the LTs also has the ability to cover

the range from five inches above the bottom of the hot leg up to the low point of the cold calibrated pressurizer level instrumentation.

(2) Reactor Vessel Temperature: Licensee procedures state that "at least two core outlet thermocouples will be connected to provide indication in the control room and shall be operable while at mid-loop condition with the reactor vessel head in place." The licensee does not provide specific requirements for core outlet thermocouples when the vessel head is removed, however, the licensee does not enter reduced inventory conditions with the head removed, therefore, the actions described above are considered adequate to meet the generic letter guidance.

(3) Decay Heat Removal System Monitoring: The licensee's procedures direct the operators to call up a group computer display. The group display shows RHR pump flow rate, motor amps, heat exchanger inlet temperatures, and core outlet thermocouple temperatures. Alarm setpoints are set by the operators so that if any parameter exceeds a set value, the operators are alerted. While the core outlet thermocouples and RHR motor amps are not trended, the heat exchanger temperatures and pump flow rates are trended on permanently installed chart recorders. The licensee committed to change the procedure to trend pump motor amps and core outlet thermocouples.

(4) Visible and Audible Alarms: The licensee has two low level alarms which have a common annunciator. In addition, each of the two RHR trains have low flow alarms and procedures require that when computer points are established by the operators for reduced inventory operations, computer alarms will also be established.

b. Procedures: The inspectors verified that procedures and administrative controls were implemented for reduced inventory operation.

(1) Normal Operation: The inspectors verified that the licensee had implemented procedures covering normal operation of systems important during reduced inventory activities. Proper operation of the RCS, RHR, Essential Service Water, and control of the containment barrier were covered. During reduced inventory, the licensee maintains the equipment hatch closed and reinstalls the interlock on the personnel hatch. In addition, the licensee controls work on containment penetrations, ensuring that containment control is maintained at all time.

(2) Off-Normal Operation: The inspectors verified that the licensee had implemented procedures that cover emergency, abnormal, and

off-normal operation of systems important for reduced inventory operations. Procedures were written governing loss of RHR, venting of RHR, RCS level recovery both with and without AC power, containment closure, and RCS level perturbations.

(3) Administrative Controls: The licensee has in place the appropriate administrative controls on outage work activities affecting reduced inventory conditions and supporting activities. This includes, for example, instructions to containment/cavity coordinators governing their responsibilities and actions in the event of a loss of RHR. All responsibilities, training, and supplemental activities were found to be clear and appropriate.

c. Equipment: The inspection verified that adequate equipment was available to mitigate the consequences of a loss of RHR.

(1) and (2) Equipment: The licensee responded to the Generic letter recommendation under expeditious action item six. This addressed the equipment that would be available during reduced inventory conditions with or without four loops blocked by nozzle dams. The program was inspected and closed in Inspection Report 50-483/89004. The inspectors verified that the licensee's commitment in this area was still being met.

The licensee removed the RHR suction valve autoclosure interlock. This was done after analysis verified that a significant increase in the probability or consequences of an accident was not involved.

(3) Communications: The licensee's various communication systems are highly reliable and are maintained operable during reduced inventory conditions.

d. Analysis: The licensee utilized vendor document WCAP-11916 for the purpose of meeting this requirement. The licensee reviewed the analysis to ensure that the Callaway Plant was within its bounds. The inspectors reviewed WCAP-11916 and verified that selected assumptions and conclusions were applicable to the licensee and had been properly implemented.

e. RCS Perturbations: The inspector verified that the licensee has implemented programs and procedures to minimize the likelihood of a loss of RHR. The licensee reexamined and then implemented necessary procedure and administrative control changes prior to the fourth refueling outage in the Fall of 1990.

Temporary instruction 2515/103 and Generic letter 88-17 are closed.

No violations or deviations were identified in this area.

4. Plant Operations (71707)

a. Operational Safety Verification

Inspections were routinely performed to ensure that the licensee conducted activities at the facility safely and in conformance with regulatory requirements. The inspections focused on the implementation and overall effectiveness of the licensee's control of operating activities, and on the performance of licensed and non-licensed operators and shift technical advisors. The inspections included direct observation of activities, tours of the facility, interviews and discussions with licensee personnel, independent verification of safety system status and limiting conditions of operation (LCO), and reviews of facility procedures, records, and reports. The following items were considered during these inspections:

- Adequacy of plant staffing and supervision.
- Control room professionalism, including procedure adherence, operator attentiveness, and response to alarms, events, and off-normal conditions.
- Operability of selected safety-related systems, including attendant alarms, instrumentation, and controls.
- Maintenance of quality records and reports.

The inspectors observed that control room supervisors, shift technical advisors, and operators were attentive to plant conditions, performed frequent panel walkdowns, and were responsive to off-normal alarms and conditions.

On November 28, 1990, the licensee determined that the safety injection (EM) test line flow indicator was reading 0.7 GPM which was indicative of RCS check valve backleakage. The licensee had previously determined that at least one RCS check valve in the RHR system was exhibiting signs of backleakage. The backleakage had apparently pressurized the low pressure portion of the RHR system causing relief valves to lift. The licensee initially cycled the EM test line isolation valves in order to prevent pressurizing the RHR system, and eventually left the isolation valves in the open position. This resulted in the backleakage being drained to the Refueling Water Storage Tank. The licensee determined that RCS check valves BB-8948D and EP-8816D were leaking, allowing the RHR discharge piping to become pressurized. Request For Resolution (RFR) 4979, Revision A, issued February 24, 1988, reviewed and approved the safety evaluation to modify the valve lineup. The new valve lineup allowed the EM test line isolation valves to be opened to relieve the check valve backleakage. The isolation valves are capable of closing against full RCS differential pressure, fail close on a loss of air, and receive an automatic closure signal during a safety injection. The licensee has subsequently determined that RCS check valve BB-8948C is also leaking. The total leakage through these check

valves is approximately 0.7 GPM. The Technical Specification (T/S) limit is 1.0 GPM per check valve. The leakage has remained constant and does not appear to be increasing. In the event of a Mode 3 outage of sufficient duration, the licensee plans to implement various measures that could reduce the backleakage. The licensee initially performed RCS leakage test (OSP-BB-00009) once per 72 hours as required by T/S. In response to the check valve leakage, the test frequency was changed to once per 24 hours. As the leakage was found to remain constant, this was changed to three times per week.

The licensee's response to this issue was prompt and extensive. Procedures were modified to bound the problem, teams were dispatched to identify possible leak paths, surveillances were increased to ensure conditions were safe, and NRC personnel were kept up-to-date on all findings.

The inspectors observed portions of the integrated leak rate test performed on the containment structure during the refueling IV outage. The procedure, ESP-GP-01007, Revision 5, was observed to be followed and the raw data was logged as required. Some data was miscommunicated and was noted and corrected by the licensee. The "as left leak rate" met the Technical Specification requirement of less than or equal to 75% of the allowable leak rate of 0.20 wt.%/day. Further inspection of the integrated leak rate test is discussed in paragraph 8.

b. Off-shift Inspection of Control Room

The inspectors performed routine inspections of the control room during off-shift and weekend periods, including inspections between the hours of 10:00 p.m. and 5:00 a.m. The inspections were conducted to assess overall crew performance and, specifically, control room operator attentiveness during night shifts.

The inspectors determined that both licensed and non-licensed operators were attentive to their duties, and that the administrative controls relating to the conduct of operation were being adhered to.

c. Plant Material Conditions/Housekeeping

The inspectors performed routine plant tours to assess material conditions within the plant, ongoing quality activities, and plantwide housekeeping. The inspectors also accompanied the licensee's management on monthly plant tours. No concerns were identified.

d. Radiological Controls

The licensee's radiological controls and practices were routinely observed by the inspectors during plant tours and during the

inspection of selected work activities. The inspection included direct observations of health physics (HP) activities relating to radiological surveys and monitoring, maintenance of radiological control signs and barriers, and contamination and radioactive waste controls. The inspection also included a routine review of the licensee's radiological and water chemistry control records and reports. No concerns were identified.

e. Security

Each week during routine activities or tours, the inspectors monitored the licensee's security program to ensure that observed actions were being implemented according to their approved security plan. The inspectors noted that persons within the protected area displayed proper photo-identification badges and those individuals requiring escorts were properly escorted. The inspectors also verified that checked vital areas were locked and alarmed. Additionally, the inspectors also verified that observed personnel and packages entering the protected area were searched by appropriate equipment or by hand.

No violations or deviations were identified in this area.

5. Cold Weather Protection (71714)

The inspectors reviewed the preparations made for cold weather protection. Plant procedure APA-ZZ-00302, "Plant Weather Preparation," had been completed during the first week of November. The procedure provided for draining of outside water lines, checking insulation on piping and tanks, and verifying heat tracing operability. Space heaters and outside doors were checked for proper operation. The inside doors in the stairwells of the turbine building were blocked open during the coldest weather to allow the warmer air into the wells to prevent firewater line freezing.

No violations or deviations were identified in this area.

6. Maintenance/Surveillance (62703) (61726)

Selected portions of the plant surveillance, test, and maintenance activities on safety-related systems and components were observed or reviewed to ascertain that the activities were performed in accordance with approved procedures, regulatory guides, industry codes and standards, and the Technical Specifications. The following items were considered during these inspections: the limiting conditions for operation were met while components or systems were removed from service; approvals were obtained prior to initiating the work; activities were accomplished using approved procedures and were inspected as applicable; functional testing and/or calibrations were performed prior to returning the components or systems to service; parts and materials that were used were properly certified; and appropriate fire prevention, radiological, and housekeeping conditions were maintained.

a. Maintenance

The following maintenance activities were reviewed:

Work Request No.	Activity
C 487248	Replace relief valves KAV070B and KAV0712.
P 468947	Perform sleave alignment of SGK05B.
W 134850	Main turbine lube oil cooler "B".
P 468035	Work penetrations, non-eddy current cable.
P 479483	SI pump "B" room cooler, clean and inspect.
W 136341	CCP "B" discharge miniflow valve scheme check/rewire.
P 461973	Inspect and service limitorque operator on BG HV-8111.

During this inspection period, several examples of problems with restoring systems to service following maintenance were noted. While the examples were not numerous, there is a concern that these examples do represent a potential weakness in an otherwise strong maintenance program. In all of the examples, the licensee promptly repaired the equipment and initiated efforts to identify the root cause. The examples are listed below:

- During the recently completed fourth refueling outage, the service water system was being refilled with water following maintenance when a leak was observed on the turbine generator lube oil (TGLO) heat exchanger. The TGLO heat exchanger had been disassembled for maintenance earlier in the outage. Work request W 134850 was written to repair this new leak. When the TGLO heat exchanger was disassembled for this rework, the licensee identified that tape had been left across the seating surface of the two halfs of the heat exchanger.

- Following the TGLO repair effort, the lube oil had to have moisture removed. Temporary fine filters were placed in the system as part of the cleanup and then later removed. During the initial synchronization of the main generator to the grid, an operator observed a lack of lube oil flow from the number three bearing. By the time the turbine could be stopped, the bearing babbit had been damaged. The licensee determined that one of the temporary fine filters had not been removed following the cleanup and had become blocked.

- Callaway Modification Package (CMP) 90-1029 implemented Request for Resolution (RFR) 8210, Revision A. Due to a conflict between integrated leak rate test (ILRT) personnel and eddy current testing personnel, it had been decided to modify a spare penetration (OP131W1310) between auxiliary building corridor No. 1 (Room 1301) and the outside, so it could be used to pass cables through. This six inch penetration was supposed to remain sealed in Modes one through four unless the heating, ventilation, and air conditioning (HVAC) engineer had approved opening it. A note to this effect was added to Drawing M-2Y1901A. Work request P 468035 was issued to set up the eddy current equipment, including opening and reclosing OP131W1310. In auxiliary document A 468035B, the quality control inspection record showed that the penetration was reclosed on November 9, 1990. At the time the penetration was reclosed, the unit was in Mode three. As the HVAC engineer was unaware of the open penetration, this was in violation of drawing M-2Y1901A, Revision 1. The inspectors determined this on December 4, 1990 and informed the HVAC engineer. Suggestion, Occurrence, Solution (SOS) concern number 90-3001 was written that same day by the licensee documenting this event. On December 7, 1990, the licensee performed a test on the auxiliary building. They reopened the penetration (people were standing by on both sides of the penetration with caulking material) and, using the weak emergency exhaust train, they verified that pressure still went to at least the TS limit of -0.25 inches of water. The root cause determination and corrective action implementation by the licensee are still ongoing.

  The licensee's failure to follow drawing M-2Y1901A, Revision 1, is a violation of T/S 6.8.1 (483/90021-01(DRP)). The violation met the test of 10 CFR 2, appendix C, section V.G.1; consequently, no notice of violation will be issued. This violation is closed.

- During the licensee's return to service following the fourth refueling outage, the main steam isolation valves (MSIVs) and the main feedwater isolation valves (MFIVs) were returned to service. This involved pressurizing the hydraulic actuators of the eight valves to slightly over 5000 psig. During the pressurization the licensee identified numerous leaks. The leaks were repaired and the valves returned to service. The leaks were caused by connections not being completely tightened following maintenance by the valve vendor.

b. Surveillance

The following surveillance tests were reviewed:

Procedure No.	Activity
OSP-ZZ-00001	Control room shift and daily log readings and channel checks.

Procedure No.	Activity
ISF-AB-OP534	Functional-Pressure; steam generator "C" pressure.
ISF-AE-OL548	Functional-Level; steam generator "D" narrow range level protection.
ISL-GS-00A2B	Loop-Analysis; containment hydrogen analyzer train "B".
OSP-BB-00009	RCS Inventory Balance.
ISF-BB-OP458	RCS pressurizer protection "B" pressure transmitter functional.
ISF-AE-OL522	Functional test of steam generator "B" narrow range level.
MPE-ZZ-QY118	Operational test sequence of centrifugal charging pump DPBG05B air circuit breaker 152NB0201.
OSP-GN-00002	Containment cooler flow rate test.

One non-cited violation was identified in this area.

7. Licensee Use of Overtime (71707)

Overtime should be controlled per the guidelines of Generic Letter 82-12, the licensee's technical specifications, and procedures. At Callaway, the controlling procedure is APA-ZZ-00905 which limits overtime hours, with a few exceptions, when work is being performed on safety related systems or components.

The procedure states that the hours worked should be no more than 16 hours in a 24 hour period, 24 hours in a 48 hour period, and 72 hours in a seven day period. These hours can be exceeded if the plant manager signs a letter stating what may be exceeded, generally on a case by case occurrence. During a long outage a group may have a blanket exemption. The procedure requires contract personnel to conform to overtime limitations if they are performing safety related work.

The inspectors reviewed "time on site" for selected contract personnel during the recent refueling outage and interviewed licensee personnel to verify control of overtime worked. There were 16 contract personnel (out of 44 selected) that appeared to have exceeded the overtime restrictions. Eleven of the 16 worked on safety related systems and 9 had individual authorizations in accordance with procedure APA-ZZ-00905. However, blanket authorizations were previously issued authorizing the above personnel to exceed the overtime limits. The engineers normally stayed within the restrictions, but were not considered by the licensee to be controlled by procedure APA-ZZ-00905. Operations' personnel were on a 60 hour work week for the duration of the outage, with no extra hours worked over the 60.

The licensee's QA audit of this area (on a much larger sample) noted essentially the same items and also commented on the use of blanket overtime authorizations. An action item was issued to review procedure revisions addressing tighter control of contract personnel and possible limitations on the use of the blanket authorization to exceed the overtime restrictions. A revision to include the engineers when they are "directing" safety related work is also to be reviewed.

No violations or deviations were identified in this area.

8. CILRT In-Office Review of Licensee Results (70323)

a. Followup on Previous Inspection Findings

(Closed) Open Item (438/87008-01): Temperature Survey

Upon review of the temperature survey performed by the licensee, the inspectors noted that the licensee's temperature survey contained more than one reading per subvolume. This method verified that the sensors adequately covered the volume measured. Therefore, this item is considered closed.

b. CILRT Test Procedure Review and 10 CFR 50 Appendix J Clarifications

(1) Procedure Review

In December of 1990, the inspectors reviewed licensee's engineering surveillance procedure no. ESP-GP-01007, Rev. 5, "Reactor Building Integrated Leak Rate Test."

The review of the test procedure did not result in any items of concern by the inspectors.

(2) Clarifications of Appendix J Requirements

To ensure the licensee's understanding of Appendix J requirements, the following clarifications are provided:

(a) Periodic Type A, B, and C tests must include the as-found results as well as the as-left. If Type B and C tests are conducted prior to a Type A test, the as-found condition of the containment must be calculated by adding any improvements in leakage rates, which are the results of repairs and/or adjustments (R/A), to the Type A test results using the "minimum pathway leakage" methodology. This methodology is defined as the minimum leakage value that can be quantified through a penetration leakage path (e.g., the smallest leakage through two valves in series). This assumes no single active failure of redundant leakage. This method requires that:

1. In the case where individual leak rates are assigned to two valves in series (both before and after R/A), the penetration through-leakages would simply be the smaller of the two valves' leakage rates.

2. In the case where a leakage rate is obtained by pressurizing between two isolation valves and the individual valve's leak rates are not quantified, the as-found and the as-left penetration through-leakage for each valve would be 50% of the measured leakage rate, if both valves are repaired.

3. In the case where a leakage rate is obtained by pressurizing between two isolation valves and only one valve is repaired, the as-found penetration leakage rate would be either the final measured leakage, or one half of the originally measured leakage, whichever is less. However, in either case, the as-left penetration through-leakage rate is zero. (This assumes the repaired valve leakage to be zero.)

4. In the cases where a leakage rate is determined by pressurizing between three or more isolation valves, appropriate guidance shall be provided such that the calculated minimum pathway leakage, for the penetration and valves repaired, can be conservatively established. As an alternative, maximum pathway leakages may be used.

(b) The periodic retest schedule for each penetration subject to Type B or C testing, except for airlocks and penetrations employing a continuous leakage monitoring system, shall be tested every refueling outage. However, in no case shall the interval be greater than two years.

(c) All air sources left inside containment during a CILRT must be vented to atmosphere during the test. If they are not vented, then they must be monitored. In the latter case, the CILRT penalty taken needs to take into account the readability and sensitivity of the monitoring instrumentation. If the air sources are neither vented nor monitored, the penalty added to the CILRT results must assume that the air source pressure dropped from its design pressure to the test pressure during the course of the test.

(d) When determining the results of the Type B and C tests, the minimum readability, accuracy, and sensitivity of the instrumentation needs to be accounted for. No leakage rate should be reported as zero, but rather reported as the minimum discernable value.

c. Test Results Evaluation

(a) CILRT Data Evaluation

A 24-hour CILRT was performed on October 29, 1990, concluding on October 31, 1990. The test was performed at 63.7 psia after satisfactory completion of the required temperature stabilization period. Data for this test was collected every 15 minutes.

The inspectors independently calculated the as-left leak rate using licensee-supplied data on dry air masses. The licensee's results and the inspector's independent calculated results are noted below. [Units are in weight percent per day (wt%/day)].

Measurement	Licensee	Inspector
Leak Rate Measured During CILRT (Lam)	0.045	0.045
Lam at Upper 95% Confidence Level (UCL)	0.051	0.047

Appendix J acceptance criterion at 95% UCL: Less than 0.75 La or 0.15 wt%/day.

(2) Volume Change

Due to liquid coolant leakage into containment, the available volume of containment subject to leak test was reduced by the quantity of in-leakage. This reduction in volume amounts to 903.6 gallons, which is equivalent to 0.005 wt%/day, thus increasing UCL from 0.047 to 0.052.

(3) Supplemental Test Data Evaluation

After satisfactory completion of the CILRT, a known leakage rate of 15 scfm was induced. Data was collected every 15 minutes. The inspector independently converted the induced leakage to wt%/day, and calculated the final leakage rate. The supplemental test was terminated after four hours, with results as indicated by the following summary.

Measurement	Licensee	Inspector
Measured Leakage Rate, Lc During Supplemental Test	0.244	0.244
Induced Leakage Rate, Lo	0.199	0.199
Lc-(Lo+Lam)	0.0	0.0

Appendix J acceptance criteria: Lo-(Lo+Lam) must be greater than -0.05 and less than 0.05.

(4) CILRT Valve Lineup Penalties

Due to valve lineup configurations which deviated from the ideal penetration requirements for the CILRT, the results of local leak rate tests for such penetrations must be added as a penalty to Lam at the 25% UCL. The licensee had 12 penetrations which were not in an ideal lineup. These were penetrations:

P-17	P-28	P-34	P-40	P-51	P-71
P-22	P-29	P-39	P-41	P-67	P-73

Using the minimum pathway methodology, a penalty of 2366 standard cubic centimeters per minute (sccm) should be added to the as-left results. Converting 2366 sccm to wt%/day added a penalty of 0.001 to the upper confidence level, resulting in a final as-left value of 0.053 wt%/day, well within the acceptance criterion.

(5) As-Found Condition of Containment

The as-found condition is the condition of the containment at the beginning of the outage prior to any repairs or adjustments to the containment boundary. The inspectors reviewed the licensee's summary of the containment penetration local leak rate tests (Type B&C) performed prior to the CILRT in order to determine the amount of leakage rate improvement due to repairs and adjustments.

Based on the results reviewed, it was determined that the amount of leakage improvement prior to the CILRT equals to 307,265 sccm, which is equivalent to 0.1463 wt%/day. This results in an as-found leakage rate of 0.1993 wt%/day. Based on this, the containment failed the CILRT in the as-found conditions and the licensee is considered to be in TS surveillance requirement 4.6.1.2.b.

No violations or deviations were identified in this area.

9. Violation for Which a "Notice of Violation" Will Not be Issued

The NRC uses the Notice of Violation as a standard method for formalizing the existence of a violation of a legally binding requirement. However, because the NRC wants to encourage and support licensee initiatives for self-identification and correction of problems, the NRC will not generally issue a Notice of Violation for a violation that meets the tests of 10 CFR 2, Appendix C, Section V.G.1. These tests are: (1) the violation was identified by the licensee; (2) the violation would be categorized as Severity Level IV or V; (3) the violation was reported to

the NRC, if required; (4) the violation will be corrected, including measures to prevent recurrence, within a reasonable time period; and (5) it was not a violation that could reasonably be expected to have been prevented by the licensee's corrective action for a previous violation.

Violation for which a Notice of Violation will not be issued is identified in Paragraph 6.a of this report.

10. Exit Meeting (71707)

The inspectors met with licensee representatives (denoted under Persons Contacted) at intervals during the inspection period. The inspectors summarized the scope and findings of the inspection. The licensee representatives acknowledged the findings as reported herein. The inspectors also discussed the likely informational content of the inspection report with regard to documents or processes reviewed by the inspectors during the inspection. The licensee did not identify any such documents/processes as proprietary.