

U.S. NUCLEAR REGULATORY COMMISSION

REGION V

Report No: 50-397/89-13
Docket No: 50-397
Licensee: Washington Public Power Supply System
P. O. Box 968
Richland, WA 99352
Facility Name: Washington Nuclear Project No. 2 (WNP-2)
Inspection at: WNP-2 Site near Richland, Washington
Inspection Conducted: April 17 - June 3, 1989
Inspectors: C. J. Bosted, Senior Resident Inspector
R. C. Sorensen, Resident Inspector
Approved by: P. H. Johnson 6/21/89
P. H. Johnson, Chief Date Signed
Reactor Projects Section 3

Summary:

Inspection on April 17 - June 3, 1989 (50-397/89-13)

Areas Inspected: Routine inspection by the resident inspectors of control room operations, licensee action on previous inspection findings, engineered safety feature (ESF) status, surveillance program, maintenance program, licensee event reports, special inspection topics, procedural adherence, and review of periodic reports. Inspection Procedures 30703, 35502, 35702, 37700, 37828, 40500, 40702, 40704, 60710, 61726, 62703, 71707, 71710, 86700, 90712, 90713, 92700, 92701, 92702 and 93702 were utilized.

Results: Three violations of NRC requirements were identified and one unresolved item was noted.

Seven followup items and five LERs were closed: four new items were opened.

A weakness was observed in the licensee's reporting of events to the NRC as indicated by two of the violations. Another weakness was seen in the amount of attention given to the frequency of loss-of-shutdown-cooling events. Although these events were not individually of safety significance, several resulted from insufficient controls and indicated a need for additional management attention.

A strength was observed in the conduct of refueling activities. Of particular note were the licensee's activities involved with removal of a significant hotspot in a reactor vessel drain line (paragraph 10).

DETAILS

1. Persons Contacted

- *C. McGilton, Manager, Safety and Assurance
- *C. Powers, Plant Manager
- *J. Baker, Assistant Plant Manager
 - K. Cowan, Nuclear Safety Assurance Manager
 - C. Edwards, Quality Control Manager
- *R. Graybeal, Health Physics and Chemistry Manager
- *J. Harmon, Maintenance Manager
- *A. Hosler, Licensing Manager
- *D. Kobus, Quality Assurance Manager
- *R. Koenigs, Technical Manager
- *S. McKay, Operations Manager
- *J. Peters, Administrative Manager
 - W. Shaeffer, Assistant Operations Manager
 - R. Webring, Assistant Maintenance Manager
 - M. Wuestefeld, Assistant Technical Manager

The inspectors also interviewed various control room operators; shift supervisors and shift managers; and maintenance, engineering, quality assurance, and management personnel.

*Attended the Exit Meeting on June 5, 1989.

2. Plant Status

At the start of the inspection period, the plant was operating at 78% power. It was restricted to this power level due to an inoperative main steam isolation valve which had been shut and deactivated. On April 22, while performing a surveillance of recirculation pump ATWS (anticipated transient without scram) trip setpoints, a recirculation pump was inadvertently tripped, reducing reactor power to approximately 35%. The pump was subsequently restarted and power was returned to 78%. On April 29, the plant was shut down to begin the fourth annual refueling outage. Major tasks scheduled during the outage included the modification of two sets of main steam isolation valves (on the "A" and "D" steam lines, including the inoperable MS-V-28A) and the removal of a 1700 - 2000 R/Hr hotspot in the non-isolable section of the reactor vessel bottom drain line. This entailed the insertion of a plug in the bottom drain, cutting and removal of the hotspot and replacing the line with a different design (see paragraph 10 for further details). Inspection of the low pressure rotors of the main turbine found cracks on 17 blades on the last stage of the "C" turbine rotor which required the removal of that rotor and replacement of the cracked blades. Forty control rod drive mechanisms were also replaced with reworked mechanisms. During the report period, a number of loss-of-shutdown-cooling events occurred (see paragraph 14 for additional details). The outage was continuing at the end of the reporting period.

3. Previously Identified NRC Inspection Items (92701, 92702)

The inspectors reviewed records, interviewed personnel, and inspected plant conditions relative to licensee actions on previously identified inspection findings:

a. (Closed) Violation (397/86-25-15): Violation of Procedures

This violation involved the failure of the fire protection staff to review all plant design changes to determine their impact on fire protection. It also involved failure to review welding and cutting activities and failure to investigate fires. The licensee responded by revising PPM 1.3.10, "Fire Protection Program," in the following ways:

- (1) All Design Change Packages (DCPs) and basic design changes are now reviewed by Industrial Safety and Fire Protection personnel for fire protection program impact.
- (2) The program ensures that welding and cutting activities are properly performed through training and procedure enhancement.
- (3) The position of "Fire Marshall" was established to ensure implementation of fire protection requirements.
- (4) Enhanced procedures were established to ensure that fires are promptly reported and investigated.

This item is closed.

b. (Closed) Enforcement Item (397/88-24-01): Not Reporting RPS Trips per 10 CFR 50.72

An unscheduled reactor protection system (RPS) actuation occurred on August 26, 1988 while the plant was shut down. The actuation occurred during troubleshooting to identify the cause of a loss of power on one of the RPS buses the previous day. Members of the plant staff concluded that the actuation was not reportable because it was due to subsequent testing. The testing was not logged in the control room logs nor was a maintenance work request available to document that this trip was an expected occurrence.

Procedure PPM 1.3.42, "Troubleshooting Plant Systems and Equipment" was revised April 28, 1989 to include a guidance document to assist plant personnel in determining when an RPS or engineered safety feature (ESF) actuation is reportable. Several caution statements were included which specify that troubleshooting which is expected to cause an ESF or RPS actuation must be documented in writing prior to implementing the troubleshooting plan. The inspector reviewed the procedure revision and has noted that the Shift Manager's log now references potential actuations while performing troubleshooting.

This item is closed.

c. (Closed) Enforcement Item (397/88-24-02): Unauthorized Procedure Changes

This notice of violation was written following observation that a procedure was changed without a deviation being written before the work was completed. The licensee's procedures allow a verbal deviation to the procedures. This violation was denied. The licensee did revise plant procedure PPM 1.2.3, "Use of Plant Procedures," on May 1, 1989, to require that a verbal deviation to the procedures to be used only when work must continue while the deviation is being processed. The verbal deviation must be logged in the Shift Manager's log and the deviation be processed before the end of that shift manager's shift.

The inspector reviewed the above procedure revision and discussed this revision with several shift managers. The inspector concluded that the verbal deviations could be necessary but should not be used in a routine manner.

This item is closed.

d. (Closed) Enforcement Item (397/88-24-03): Failure to Use Determination/Retermination Sheets as Required

Two cases were noted wherein records indicated that electrical connection retermination sheets had not been completed. The records did not indicate that removed wires had been reinstalled.

The wires were checked and verified to have been reinstalled. The work scope had not been changed; the documentation was incomplete.

The licensee revised PPM 1.3.9, "Control of Electrical and Mechanical Jumpers and Lifted Leads," on May 1, 1989 to require separate independent verification for all lifted leads and jumpers. The inspector reviewed training records which indicated that training was conducted for all craft personnel and operators on this procedure revision.

This item is closed.

e. (Closed) Enforcement Item (397/88-24-04): Failure to Follow up on Measuring and Test Equipment (M&TE) Being Out of Calibration

Two torque wrenches and a leak detection tester were out of calibration and the disposition was not completed in a timely manner. The out of calibration notices were issued in August 1987 and had not been completed by August 1988.

The administrative control procedure PPM 1.5.4, "Control of Measuring and Test Equipment," was revised on January 31, 1989, and issued on February 7, to include time limits for review and corrective actions on all out-of calibration M&TE. Maintenance department management and supervisors received training on the

revision on January 31, 1989. The maintenance service supervisors will track M&TE (instead of the instrumentation and controls section) and will issue a plant problem evaluation report (PER) if there is no response to a late notice within seven days.

This item is closed.

f. (Closed) Followup Item (397/87-19-33): Correction of Hand Written Notes on Control Panels

Several hand written notes were identified on the control panels in the control room. These 'operator aids' were being controlled informally under the conduct of shift operations procedure PPM 1.3.1.

A new procedure, PPM 1.3.50, "Control of Operator Aids", issued on April 17, 1989, formally controls information used as an operator aid. The procedure is based on INPO guidelines and specifically states that operator aids are not to replace formal written procedures. The inspector conducted a tour of the control room and out-lying panels and observed that handwritten notes had been removed.

This item is closed.

g. (Closed) Followup Item (397/89-08-01): Personnel Contamination Monitor (PCM) Damage

Several unexplained incidents of damage to the newly installed personnel contamination monitors were noted between February 2 and February 20, 1989. The licensee conducted an investigation of the damage.

The licensee's investigation concluded that some of the damage could be explained in that the new detectors had to be used differently than the older detectors; i.e., the operators had to remove their radio belts before using the new detectors, and equipment on their belts could have been the source of the damage. The inspector noted that after the licensee started conducting staff interviews about the damage, the number of failures dropped dramatically. The incidence of damage since the investigation has been about equal to the damage experienced by the older type of PCMs.

This item is closed.

4. Operational Safety Verification (71707)

a. Plant Tours

The following plant areas were toured by the inspectors during the course of the inspection:

- * Reactor Building
- * Control Room
- * Diesel Generator Building
- * Radwaste Building
- * Service Water Buildings
- * Technical Support Center
- * Turbine Generator Building
- * Yard Area and Perimeter

b. The following items were observed during the tours:

- (1) Operating Logs and Records. Records were reviewed against Technical Specification and administrative control procedure requirements.
- (2) Monitoring Instrumentation. Process instruments were observed for correlation between channels and for conformance with Technical Specification requirements.
- (3) Shift Manning. Control room and shift manning were observed for conformance with 10 CFR 50.54.(k), Technical Specifications, and administrative procedures. The attentiveness of the operators was observed in the execution of their duties and the control room was observed to be free of distractions such as non-work related radios and reading materials.
- (4) Equipment Lineups. Valves and electrical breakers were verified to be in the position or condition required by Technical Specifications and Administrative procedures for the applicable plant mode. This verification included routine control board indication reviews and conduct of partial system lineups. Technical Specification limiting conditions for operation were verified by direct observation.
- (5) Equipment Tagging. Selected equipment, for which tagging requests had been initiated, was observed to verify that tags were in place and the equipment was in the condition specified.
- (6) General Plant Equipment Conditions. Plant equipment was observed for indications of system leakage, improper lubrication, or other conditions that would prevent the system from fulfilling its functional requirements. Annunciators were observed to ascertain their status and operability.
- (7) Fire Protection. Fire fighting equipment and controls were observed for conformance with Technical Specifications and administrative procedures.
- (8) Plant Chemistry. Chemical analyses and trend results were reviewed for conformance with Technical Specifications and administrative control procedures.

- (9) Radiation Protection Controls. The inspectors periodically observed radiological protection practices to determine whether the licensee's program was being implemented in conformance with facility policies and procedures and in compliance with regulatory requirements. The inspectors also observed compliance with Radiation Exposure Permits, proper wearing of protective equipment and personnel monitoring devices, and personnel frisking practices. Radiation monitoring equipment was frequently monitored to verify operability and adherence to calibration frequency.

During a tour of the reactor building on May 16, the inspector observed a contract outage worker entering and leaving a radiation area that appeared to be improperly posted. The area immediately outside the reactor water cleanup (RWCU) heat exchanger room on the 548' elevation of the reactor building was posted as a "Radiation Area" and the area inside the RWCU room was posted as a "High Radiation/Contamination Area". The "Radiation Area" posting was attached to a folding barrier that is normally fully extended across the opening. With the folding barrier partially open, the radiation barrier rope was removed from a portion of the open space which allowed access to the high radiation barrier. The high radiation area was properly posted with a barrier installed. This opening allowed an approximately four foot wide access into the radiation area that was not marked with a radiation barrier. After the inspector talked to the radiation protection technician (RP), the RP moved the barrier with the radiation area posting to include the formerly open access. At this time, the contract outage worker told the inspector that he was not supposed to enter the radiation area. Later the inspector confirmed that the worker had not signed a radiation work permit that allowed him to enter a radiation area. The inadequate posting and the incomplete barrier across the opening to the radiation area are considered a violation of 10 CFR 20.203; PPM 11.2.7.1, "Area Posting;" and PPM 1.11.11, "Entry Into, Conduct In, and Exit From RCA" (Enforcement Item 89-13-01).

- (10) Plant Housekeeping. Plant conditions and material/equipment storage were observed to determine the general state of cleanliness and housekeeping. Housekeeping in the radiologically controlled area was evaluated with respect to controlling the spread of surface and airborne contamination.
- (11) Security. The inspectors periodically observed security practices to ascertain that the licensee's implementation of the security plans was in accordance with site procedures, that the search equipment at the access control points was operational, that vital area portals were kept locked and alarmed, that personnel allowed access to the protected area were badged and monitored, and monitoring equipment was functional.

One violation was identified.

5. Engineered Safety Feature System Walkdown (71707)

Selected engineered safety feature systems (and systems important to safety) were walked down by the inspectors to confirm that the systems were aligned in accordance with plant procedures. During the walkdown of the systems, items such as hangers, supports, electrical power supplies, cabinets, and cables were inspected to determine that they were operable and in a condition to perform their required functions. The inspectors also verified that the system valves were in the required position and locked as appropriate. The local and remote position indication and controls were also confirmed to be in the required position and operable.

Accessible portions of the following systems were walked down on the indicated dates.

<u>System</u>	<u>Dates</u>
Diesel Generator Systems, Divisions 1, 2, and 3.	April 24, May 28
Hydrogen Recombiners	April 27
Low Pressure Coolant Injection, (LPCI) Trains "A", "B", and "C"	April 27
Low Pressure Core Spray (LPSCS)	April 27
High Pressure Core Spray (HPCS)	April 27
Residual Heat Removal (RHR), Trains "A" and "B"	May 2, 11, 16
Scram Discharge Volume System	April 27
Standby Liquid Control (SLC) System	April 24
Standby Service Water System	
125V DC Electrical Distribution, Divisions 1 and 2	April 18, May 11
250V DC Electrical Distribution	April 18

No violations or deviations were identified.

6. Surveillance Testing (61726)

- a. Surveillance tests required to be performed by the Technical Specifications (TS) were reviewed on a sampling basis to verify that: (1) the surveillance tests were correctly included on the facility schedule; (2) a technically adequate procedure existed for performance of the surveillance tests; (3) the surveillance tests had

been performed at the frequency specified in the TS; and (4) test results satisfied acceptance criteria or were properly dispositioned.

- b. Portions of the following surveillance tests were observed by the inspectors on the dates shown:

<u>Procedure</u>	<u>Description</u>	<u>Dates Performed</u>
7.4.8.2.1.20	Weekly Battery Testing	April 19
7.4.3.2.3.11	Reactor Water Cleanup (RWCU) Isolation on Differential Flow	May 3
7.4.4.3.1.2A	Containment Monitoring System Particulate Monitor Channel Check	May 3
10.25.132	MOVATS Testing of RCIC-V-22	May 9
7.4.3.1.1.68	Scram Discharge Volume Level Transmitter B&D Channel Functional Test (CFT)	May 21
7.4.3.7.5.36D	Accident Monitoring Noble Gas High Range Rad Monitor Channel Check	May 22
7.4.6.3.3	CSP & CEP Containment Isolation Valve Operability	May 22
7.4.1.3.5.2	Scram Accumulator Pressure Detector Channel check	May 23
7.4.9.6	Refueling Platform Crane & Hoist Interlock Surveillance	May 23

No violations or deviations were identified.

7. Plant Maintenance (62703)

During the inspection period, the inspectors observed and reviewed documentation associated with maintenance and problem investigation activities to verify compliance with regulatory requirements and with administrative and maintenance procedures, required QA/QC involvement, proper use of safety tags, proper equipment alignment and use of jumpers, personnel qualifications, and proper retesting. The inspectors verified reportability for these activities was correct.

The inspectors witnessed portions of the following maintenance activities:

<u>Description</u>	<u>Dates Performed</u>
Replace temperature modules in leakage detection system per AT 8662	May 3
Replace control room panel recorders per AT 9008	May 5
Troubleshoot voltage changes on reactor protection system (RPS) MG 'A' per AS 0138	May 5
Install new cable and conduit for new inverter per AT 8734	May 5
Replace seats on reactor building to wetwell vacuum breakers per AT 8251	May 9
Repair MSIVs per AT 7745	May 11
Investigate crack in steam dryer per AS 0237	May 11
Rebuild "A" RPS MG set per AV 1976	May 22
Repair governor booster on Div 2 diesel generator per AV 1977	May 22

No violations or deviations were identified.

8. Review of Plant Operations Committee (POC) and Nuclear Safety Assurance Group (NSAG) Activities (40500)

The inspector reviewed a sample of POC meeting minutes for a two-month period in early 1989 to verify that Technical Specification requirements had been met with regard to composition, meeting frequencies, and fulfillment of responsibilities. The inspector also reviewed the qualifications of the POC members and verified the existence of a tracking system for tracking POC open items. Finally, the inspector observed portions of several POC meetings to confirm that the Technical Specification requirements for POC review functions were being fulfilled.

The inspector reviewed the NSAG monthly reports for the previous eight months and noted that the quality of them had declined during that period. They were once technically oriented, and documented technical assessments and corrective actions for various issues affecting the plant; however, in recent months they had degenerated into a status keeping document for backlogged issues and corrective actions. Although NSAG does provide detailed technical recommendations for improvement to the plant staff via the operating experience issue forms, this has not been reflected in the monthly reports to corporate management. The



monthly reports have been primarily devoted to the progress made working off the backlog of items on the Plant Tracking Log (PTL), which is NSAG's method of tracking open items. The inspector recognized that a significant backlog once existed and that this was being effectively dealt with by the licensee; however, this could be impacting the NSAG's Technical Specification required functions. This weakness in the monthly reports was discussed with the NSAG manager who acknowledged the inspector's comments.

The licensee's compliance with section 6.2.3 of the Technical Specifications is unresolved (89-13-02).

9. Local Leak Rate Testing (LLRT) (61720)

The inspectors observed portions of LLRTs for various containment isolation valves. Testing was performed per PPM 7.4.6.1.2.4, Revision 2. Technicians responsible for conduct of the LLRT procedure were interviewed to determine their familiarity. Portions of LLRTs for the following valves were observed:

FDR-V-647	May 4
RHR-V-27B	May 8
TIP-V-13	May 9
RHR-V-53B	May 10
CAS-V-455	May 12
CIA-V-30B	May 12

The inspection of the LLRTs will be continued in the upcoming inspection period and the results will be evaluated after the licensee has reviewed the test data.

No violations or deviations were identified.

10. Reactor Water Cleanup Drain Line Hotspot Removal (37700, 37828)

One of the more significant work items conducted during the outage was the removal of a 1700 - 2000 R/Hr hotspot on the non-isolable section of the reactor vessel bottom drain line. The hotspot developed in an idle section of drain line which had accumulated activated deposits since startup of the plant. This particular hotspot problem appears to be a generic condition due to the design of the RWCU piping. The removal of this hotspot had been planned since it was identified nearly three outages ago. Prior to removal, the inspector reviewed the procedures, attended planning meetings, and reviewed ALARA calculations. The removal required that the center-of-core control rod, four fuel assemblies, fuel support piece, and control rod guide tube be removed to gain access to the reactor vessel bottom head drain to the RWCU. A hydraulically-operated mechanical plug was installed in the bottom drain, and after testing for leaks and draining of the line, the RWCU piping containing the hotspot was cut out. The drain line was initially designed with a "T" installed in the normal drain line, with the vertical portion of the "T" providing the connection to the idle section of the drain loop. The



"T" and the rest of the idle section of piping were removed and the "T" section was replaced with a straight spoolpiece that will not be a future source of radiation problems.

The drain plug was designed to allow the drain line to be hydrostatically tested after being replaced. Following other non-destructive testing on the welds, the line was hydrostatically tested satisfactorily on May 13. During the installation of the bottom head drain plug, the licensee experienced difficulties with the monitoring of the plug. An initial inspection of the drain hole with a remote TV camera was successful on May 8, but a later inspection, on the same day just prior to installation of the plugging device, caused the camera cable to become stuck in the surrounding control rod guide tubes below the core. The camera cable was freed on May 10 after the fabrication of several special tools. The initial attempt to install the drain plug was not successful due to the guide ring on the lower end of the plug extension being too large to fit through the lower core support plate. The guide ring was modified and the drain plug was installed on May 10. The inspector witnessed the installation of the drain plug, the subsequent hydrostatic pressure tests, pipe cutting, and portions of the post installation testing. The inspector observed that the evolution was well planned and executed, and that difficulties encountered were resolved in a careful and deliberate manner.

No violations or deviations were identified.

11. Review of the Audit Program and Audit Program Implementation (40702, 40704)

The inspector reviewed the licensee's audit program and verified that it was in compliance with Technical Specification requirements for audits conducted under the cognizance of the Corporate Nuclear Safety Review Board (CNSRB). A schedule is periodically developed by the Programs and Audits Manager and approved by the CNSRB which coincides with the audit frequency requirements of the Technical Specifications. Various responsibilities for overall management of the program have been assigned; most of these responsibilities have been assigned to the Programs and Audits Manager.

Each audited organization is required to respond in writing to audit findings, and implementation of corrective action is followed up by the auditors. Audit reports are directed to the most senior manager in the audited organization, usually the Assistant Managing Director for Operations. A copy of all audit reports is forwarded to the Managing Director, who reviews it with the Programs and Audits Manager.

The inspector reviewed the qualifications of a sample of lead auditors and concluded that they conformed to the guidelines of ANSI N45.2.23-1978 as endorsed by Regulatory Guide 1.146, to which the licensee has committed. Three recently completed audit packages, selected at random and required by Technical Specifications, were reviewed for adequacy and content. Each was found by the inspector to be a fairly in-depth assessment of the area audited, with a number of good findings. The



audited organizations had responded in writing to the findings. The inspector noted that plant responses to audit findings appeared to be improving compared to previous performance in this area.

No violations or deviations were identified .

12. Effectiveness of Quality Verification (35702)

The effectiveness of the various quality verification organizations was performed to ascertain whether technical problems were being identified and corrected in a timely manner. Several recent plant problems were followed up and a review was performed on the recent safety system functional inspection which was performed by the licensee. A review of the past year's quality assurance monthly reports was also conducted.

The inspector observed that the recent trend has been to involve the plant QA organization in plant activities. A member of QA and the nuclear safety assurance group (NSAG) have been observed by the inspector to be in the control room during all major plant evolutions. This included the plant shutdown for the start of the 1989 refueling outage and significant activities such as installation of the reactor vessel drain plug and hot spot removal (discussed in paragraph 10). During the recent number of shutdown cooling isolation events, the inspector was told that the root cause group would be reviewing these events to determine potential root causes.

The inspector determined that the quality verification organizations are performing in an acceptable manner. The licensee's staff appear to have sufficient planning and general training to conduct their inspections. The number of individuals with specific backgrounds in critical areas has improved; however, there exists weaknesses in areas of electrical, mechanical, and instrument maintenance. The QA staff has two individuals with operations background, one of whom holds a current senior reactor operator license on WNP-2; however, neither of these individuals has operations experience at WNP-2. The inspector concluded that additional depth of WNP-2 operations experience is needed on the QA staff. Expertise in health physics and chemistry, engineering/technical, and management also appeared to be underrepresented on the QA staff.

The timely resolution of QA-identified conditions has been a problem for the plant staff. Several management initiatives have been implemented as a result of NRC and INPO inspections. The inspector noted during his inspection that an increased effort has been initiated to work down the backlog that has developed during the recent years as problems were identified but not resolved. The monthly QA reports track the age and status of the outstanding QA findings.

Findings from the self-performed SSFI have, in general, been corrected in a timely manner. Several of the larger items, identified by both the SSFI team and the QA group (e.g., Control Room Essential Ventilation) were awaiting NRC licensing action.

No violations or deviations were identified.

13. Broken Socket Weld in High Pressure Core Spray Test Return Line (61726)

During restoration of the high pressure core spray (HPCS) system on May 12, a leak was discovered on the test return line going into the suppression pool. This line allows water flow from the pump discharge to be returned to the suppression pool during pump performance testing. The leak occurred on a portion of the line that connects directly to the suppression pool downstream of the isolation valve. The leak was determined to be from a failed socket weld on a vent line. The test loop orientation is such that the line traverses the HPCS room, then runs vertically along the containment wall to a level above the suppression pool water level, then penetrates the containment. At the high point on the test line, the vent line (with two isolation valves) was attached. The vent piping was attached to the test loop with a socket weld and the piping and two valves were not supported.

During dynamic testing of the pump, a flow control valve is throttled to simulate expected system conditions. Flow through the throttled valve can cause significant vibration in the test loop. This vibration seen by the vent line, and the weight of the unsupported vent valves at the end of the moment arm created by the vent line piping, are believed to have caused the weld failure, resulting in the leak. Once the leak was discovered, the primary containment barrier had been breached. The plant was in mode 5 (Refueling) and at this time a safety concern did not exist. Repairs were made to the vent line by eliminating the vent piping and installing the valves directly to the socket piece. This is expected to eliminate the moment arm and reduce stress fatigue at this point.

The leak was discovered at 3:15 a.m. on May 12, and corrective action was promptly taken. However, the licensee did not notify the NRC of this event via the ENS phone until 12:05 p.m., after reportability was questioned by the inspector. This delay in reporting was in apparent violation of the four-hour reportable requirements of 10 CFR 50.72 (Enforcement Item 397/89-13-03).

One violation was identified.

14. Losses of Shutdown Cooling (93702)

During the 1989 refueling outage, a number of events have occurred which resulted in the loss of shutdown cooling. These events occurred with significant reactor coolant inventory present in the reactor vessel. The events were initiated by automatic closure of one of the two motor-operated valves in the shutdown cooling suction line, and did not relate to the vortexing conditions previously encountered by several PWRs during reduced inventory conditions. A followup of these events at the time of occurrence indicated that no safety concerns were evident. Although these events did not present a safety concern, a later review was initiated to determine whether they indicated reduced effectiveness of the controls and programs used to direct work activities within the plant. To establish a reference for comparison, a review was conducted of previous outages to determine the types of conditions which had

resulted in a loss of shutdown cooling. The license event reports for the years 1986 to 1989 were reviewed and the causes of the events were tabulated.

These events were separated into three causes: personnel error, procedure/instruction error, and equipment failure. The results of the tabulation were as follows:

<u>Year</u>	<u>Personnel</u>	<u>Procedure</u>	<u>Equipment</u>	<u>Total</u>
1989	3	-	6	9
1988	3	-	2	5
1987	3	1	-	4
1986	-	-	1	1

These events were summarized as follows:

1989 Personnel Errors:

- * Operator pulled wrong fuse causing a loss of RPS power
- * Craft pulled high temperature relay without work scope review initiating a Nuclear Steam Supply Shutoff System (NSSSS) actuation
- * Craft lifted leads without authorization initiating a NSSSS actuation

1989 Equipment Failures

- * Spurious trip of RPS "A" EPA Breaker caused loss of power (twice)
- * RPS MG "A" motor failure caused loss of power to RPS "A"
- * Isolation of RHR-V9 during LLRT of V8 due to spurious high flow signal
- * Spurious trip of RPS "B" EPA breaker caused loss of power
- * Spurious trip of RPS "B" EPA Breaker While Starting Recirc Pump "A"

1988 Personnel Errors

- * Valving error during system swapover caused a level 3 isolation
- * Loss of RPS "A" due to inadvertent deenergization of MC 7A
- * NSSSS Group 6 isolation due to operator pulling wrong fuse

1988 Equipment Failures

- * Loss of RPS "A" due to lightning strikes on 500KV line to plant (note: this occurred twice)



1987 Personnel Errors

- * Loss of SDC due to electrician lifting neutral wire
- * Loss of RPS "B" while shifting power from standby to normal

1987 Procedural Errors

- * I&C technician error while working on DPIS-12A
- * Loss of TRS and SM-7 (RPS "A") due to procedural error

1986 Equipment Failure

- * RPS "B" EPA breaker spurious trip

The leading cause of the isolations during the past few years appears to be deenergizing the RPS electrical buses (11) by personnel error (3), procedure error (1), or equipment problems (7). The next leading cause was logic system actuations (6) caused by personnel errors (4) and spurious equipment actuations (1).

The isolations experienced during the 1989 refueling outage appeared to significantly outnumber those of previous years, with the largest increase related to equipment failures. Several of the events, however, indicated a need for additional management involvement to ensure effective control of outage activities. This will be examined further during the next inspection period (Followup Item 397/89-13-04).

The NSSSS is used to isolate the reactor and containment systems in the event of an accident. The fail-safe (actuates upon loss of power) logic system is powered from the reactor protection system (RPS) motor generators (MGs), consisting of two trains, an "A" and a "B" MG. The logic is arranged in a nominal one-out-of-two taken twice. For several systems, including the shutdown cooling system, a double set of valves are used in series, one valve powered from and controlled by the "A" train and the other from the "B" train. Either valve can isolate the system. A single logic signal or a loss of power to the logic circuit can cause one valve to actuate, initiating the isolation. This changes the logic scheme to one that is one-out-of-two taken once. This type of logic is very prone to single failure initiation. The licensee was evaluating a plant design change, for possible installation during the 1990 refueling outage, to provide a logic which would be less susceptible to inadvertent actuation.

No violations or deviations were identified.

15. Licensee Event Report (LER) Followup (90712, 92700)

The following LERs associated with operating events were reviewed by the inspectors. Based on the information provided in the reports, it was concluded that reporting requirements had been met, root causes had been identified, and corrective actions were appropriate. The below LERs are considered closed.

LER NUMBER	DESCRIPTION
LER 88-30-01	RPS Actuation Caused By Loss of Power on Both RPS Divisions Due to Misapplication of Switch Type.
LER 88-36-01	Failure to Perform Division 1 4160 V Emergency Bus Degraded Voltage Protection Surveillance Due to Inadequate Procedure.
LER 89-03	Missed Control Room Emergency Filtration System Charcoal Sample Due to Misinterpretation of Requirements.
LER 89-04	Mobile Crane Near Safety Related Structures and Components Without a Safety Evaluation Due to Lack of Procedures.
LER 89-09	RPS Actuation Due to Low Control Rod Drive Scram Air Header Pressure.

During a review of previous plant events, the inspector determined that a previously reported event (discussed in NRC Inspection Report 89-08) was not reported in a LER. The event dealt with a failure of HPCS valve V-15 on February 10, 1989. This valve failed partially open during surveillance testing and was declared inoperable, and the limiting condition for operation (LCO) action statement in the Technical Specifications was entered. When the LCO action statement time limits were exceeded, a normal reactor shutdown was initiated. The failure was determined to be in the motor operator, and after disassembly of the motor operator, the valve was operated manually and closed. The action statement was exited when the valve was determined to be closed.

The valve failed in the partially open mode and was not able to be closed. This condition was such that the valve could not perform its switchover function on low condensate tank level or high suppression pool level which could have rendered the HPCS system incapable of performing its safety function. The valve was also not capable of its containment isolation function if a suction piping failure had occurred during an event. This event was not reported under 10CFR 50.73 and is an apparent violation (Enforcement Item 397/89-13-05).

One violation was identified.

16. Evaluation of Licensee Quality Assurance Program Implementation (35502)

A review of the previous year's inspection reports, SALP reports, Region V open items list, and corrective actions for NRC inspection findings was conducted. This information was reviewed to determine trends or overall problems with the performance of the licensee's quality assurance programs.



Based on this review the inspector determined that the license's quality assurance programs are meeting the requirements as set forth in ANSI N-45.2. A recognized weakness has existed during the last two SALP periods in that the plant staff has been slow to respond to identified problems. During the last year, this condition has seen more management attention. NRC-identified items were documented in the routine plant tracking system and acted upon in the normal manner. This has caused several items to take much longer to be resolved than expected. Since January 1989, each NRC-identified item is assigned a plant problem evaluation report (PER) and is sent to the Management Review Committee (MRC) which is composed of members of the Plant Operations Committee (POC) members and receive full plant management attention. The inspector concluded that this new method has improved response to the problems identified in the plant by both the plant staff and the NRC. Other identified continuing trends were seen in the lack of formal implementation of procedures at the craft level. This was evident in several minor events during the past year. A improvement has been observed in maintenance and operations and the trend has been improving; however, there remains much to be accomplished in both of these areas.

The inspector concluded that the QA staff and other quality verification groups are on an upward trend, and that plant management has also taken efforts to insure that their concerns are communicated down to the craftsman and operator level.

No violations or deviations were identified.

17. Refueling Activities (60710, 86700)

The inspector assessed the licensee's refueling activities during the current refueling outage by reviewing PPM 6.3.2, "Fuel Shuffling During Refueling," interviewing responsible personnel, and observing refueling operations on numerous occasions. The licensee conducted refueling operations in a three-shift rotation with some of the more experienced (SRO-licensed) shift support supervisors acting as refueling floor supervisor.

The inspector observed refueling operations from the refueling bridge. All three shifts were observed conducting fuel shuffles at various times. PPM 6.3.2 incorporated the use of a Nuclear Components Transfer List (NCTL) which provided step-by-step instructions for the initial and final location of each fuel bundle to be moved. The inspector observed the conduct of various portions of the NCTL and noted that they were performed in a controlled and deliberate manner. The licensee completed the fuel shuffle in approximately five days, a plant record. No problems or events occurred which were judged to be unusual or deficient.

The inspector periodically checked in the control room to ensure that there were direct, continuous communications with the refueling bridge, and that core alterations were continuously being updated on the plant computer. Also, certain limiting conditions for operation required for core alteration were independently verified by the inspector. Finally,

surveillance testing to verify the operability of refueling bridge interlocks was witnessed. The inspector concluded that the licensee's overall refueling activities were well controlled and were completed in a professional manner.

No violations or deviations were identified.

18. Rosemount Transmitter Generic Concerns (92703)

This issue involved failures of Rosemount pressure and differential transmitters identified at another plant. The cause was loss of oil in the sensing module, which was potentially generic to all Model 1153 and 1154 transmitters. Through conversations with various levels of plant staff, the inspector concluded that the licensee had become aware of the potential problem through various INPO, General Electric, and industry publications. They had responded by developing a list of transmitters that could potentially be affected and by ensuring that responsible technical and maintenance personnel were aware of the problem and could look for it during normal surveillance and maintenance activities.

No violations or deviations were identified.

19. Review of Periodic and Special Reports (90713)

Periodic and special reports submitted by the licensee pursuant to Technical Specifications 6.9.1 and 6.9.2 were reviewed by the inspector.

This review included the following considerations: the report contained the information required to be reported by NRC requirements; test results and/or supporting information were consistent with design predictions and performance specifications; and the reported information was valid. Within the scope of the above, the following reports were reviewed by the inspectors.

- * Monthly Operating Report for April 1989.
- * Annual Environmental Operating Report 1988 Calendar Year.

No violations or deviations were identified.

20. Unresolved Items

Unresolved items are matters about which more information is required to determine whether they are acceptable items, violations or deviations. An unresolved item addressed during this inspection is discussed in paragraph 8 of this report.

21. Exit Meeting (30703)

The inspectors met with licensee management representatives periodically during the report period to discuss inspection status, and an exit meeting was conducted with the indicated personnel (refer to paragraph 1) on



June 5, 1989. The scope of the inspection and the inspectors' findings, as noted in this report, were discussed and acknowledged by the licensee representatives.

The licensee did not identify as proprietary any of the information reviewed by or discussed with the inspector during the inspection.

