ENCLOSURE 2

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket No.: 50-397

License No.: NPF-21

Report No.: 50-397/97-20

Licensee: Washington Public Power Supply System

Facility: Washington Nuclear Project-2

Location: Richland, Washington

Dates: December 21, 1997, through January 31, 1998

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ATTACHMENT: Supplemental Information

EXECUTIVE SUMMARY

Washington Nuclear Project-2
NRC Inspection Report 50-397/97-20

Operations

- The professionalism of the control room operators and shift management ownership of crew activities supported good operational performance over the inspection period. Operators were generally knowledgeable of plant and equipment status, with several minor exceptions (Section O1.1).

- The licensee's program to assure that corrective lenses for self-contained breathing apparatus (SCBA) for operators requiring them was implemented successfully. However, procedural guidance for maintenance of the SCBA corrective lens program was considered weak in that periodic inventories were not required and written expectations were not provided to operators on the need to have SCBA qualified lenses, regardless of the type of corrective lenses normally used (Section O1.2).

- A personnel error on the part of an equipment operator during the performance of clearance order activities resulted in the momentary deenergization of the Division II 4160V vital bus and the loss of residual heat removal assist cooling of the spent fuel pool. A noncited violation was identified associated with this 1996 licensee event report (Section O8.1).

Maintenance

- Observed maintenance and surveillance activities were generally well coordinated and executed with appropriate craft supervision and system engineering participation (Section M1.1).

- The failure of maintenance personnel to read and adhere to the instructions on a caution tag prior to manipulating a breaker resulted in the loss of the Division I 125VDC critical instrument power inverter, the initiation of several essential safety features, and isolation of several containment isolation valves. The event occurred while the plant was defueled in Mode 5. A noncited violation was identified associated with this 1996 licensee event report (Section M8.1).

Engineering

- Licensee procedures for controlling the configuration of the 4160V vital switchgear breakers did not ensure that configurations would be consistent with the seismic qualification of the switchgear. A noncited violation was identified associated with this 1996 licensee event report (Section E8.1).

- Calibration and surveillance procedures for the rod block monitor system were found to be inadequate to ensure the rod block monitors were operable prior to exceeding 30 percent rated thermal power as required by Technical Specifications. As a result, the

system did not enforce rod blocks until power was approximately 33 percent. A noncited violation was identified for this 1997 licensee event report (Section E8.2).

- In establishing the flow switch high flow isolation setpoint for the reactor water cleanup system blowdown line, engineering personnel did not adequately review the instrument loop design. This resulted in the application of an improper conversion factor for the flow switch and a nonconservative high flow isolation setpoint that exceeded the maximum allowable Technical Specification value. A noncited violation was identified associated with this 1997 licensee event report (Section E8.3).

- Three examples were identified in which the licensee had evaluated and implemented a change to the facility, as described in the Final Safety Analysis Report, but failed to update the report in accordance with 10 CFR 50.71(e). The licensee is implementing a broad review of the Final Safety Analysis Report to identify and correct any additional errors. A noncited violation was identified (Section E8.4).

Plant Support

- Corrective actions to address inadequate labeling of radioactive material containers have not been effective in preventing recurrence, as evidenced by several recent noncompliances identified by the inspectors and the licensee, and resulted in a violation of 10 CFR 20.1904(a). Additionally, a lack of defined ownership of areas in the radwaste building contributed to poor radiological housekeeping practices on the 507 foot elevation (Section R1.1).

- Engineering controls placed upon the traversing in-core probe Drive C were insufficient in preventing movement of the probe during troubleshooting activities. The unexpected movement of the probe required personnel action to prevent the probe from withdrawing from its shielded location and going into the area where the troubleshooting was being performed. Based upon other barriers to personnel overexposure that were in place and the immediate actions taken in response to the event, the likelihood of a significant overexposure was low (Section R1.2).

- The licensee's analysis and root cause evaluation of the unexpected movement of the traversing in-core probe accurately characterized the event and identified a number of areas for improvement, including personnel level of knowledge of TIP system operation and level of involvement of radiation protection supervision in the ALARA planning process for high radiological risk jobs (Section R1.2).

Report Details

Summary of Plant Status

The plant began the inspection period at 100 percent power. On January 12, power was reduced to approximately 99 percent when the licensee identified a minor but nonconservative input error to the plant process computer's heat balance calculation. The licensee corrected the error and returned the plant to full power on January 22. The plant remained at 100 percent power for the balance of the inspection period.

I. Operations

O1 Conduct of Operations

O1.1 General Comments (71707)

a. Inspection Scope

During the inspection period, the inspectors performed extended observations of the conduct of activities in the control room. All six crews were observed during approximately 75 hours (including 26 shift turnovers) of observation in the control room.

b. Observations and Findings

The operators were generally alert, responsive to alarms, professional, and safety conscious. The inspectors observed that operators used good operator self-checking when manipulating controls and three-way communication when appropriate. The inspectors observed appropriate shift management involvement in daily activities. Shift turnovers were thorough, efficient, and covered all plant activities planned for the shift. The shift supervisor also reviewed any problem evaluation requests (PERs) and new night orders. When questioned on various aspects of plant status and systems, operators were generally found to be knowledgeable, except as noted below:

- During a morning shift crew briefing, the inspectors noted that the night shift crew had turned over to the oncoming crew that the off-gas condenser level controller had to be vented due to a buildup of gas. When questioned, the oncoming crew did not know the reason for the gas buildup and had accepted the venting as routine. Subsequent investigation by the licensee identified a faulty level controller and the problem was corrected.

- A review of control board process parameters noted that the indicated flow for Main Steam Line A was approximately 8 to 9 percent lower than the other three steam lines. From questioning operators from several different crews, the inspectors determined that none of the operators could adequately explain the difference in the flow indications. In subsequent discussions with the cognizant

system engineers, the inspectors found that the flow difference is a physical phenomenon that resulted from the licensee's main turbine governor valve optimization modification.

Operating Instruction (OI) 9, "Expectations for Supervisory and Peer Oversight," provides guidelines for reinforcing performance expectations and coaching of the operations staff through direct observation of routine activities. OI-9 also delineates the number of observations that each of the members of the shift crews are expected to perform on a shift or weekly basis. A review of the observations performed by each of the six crews during the months of December and January found that the expectations of OI-9 were generally being met. The number of observations performed within each crew also showed a renewed emphasis on implementing the OI-9 program at the crew level. The inspectors concluded that this level of coaching likely contributed to the good performance during December and January. It was also recognized that performance was improved from similar periods during the past several years.

c. Conclusions

The professionalism of the control room operators and shift management ownership of crew activities supported good operational performance over the inspection period. Operators were generally knowledgeable of plant and equipment status with several minor exceptions.

O.1.2 Licensed Operator SCBA Qualified Lenses

a. Inspection Scope

The inspectors verified operator license conditions regarding operator licenses which specified the need for corrective lenses. The inspection included a review of the licensee's processes for ensuring that SCBA qualified corrective lenses were readily available in the control room.

b. Observations and Findings

Licensed operators who, as a condition of their license, are required to wear corrective lenses during the performance of licensed activities, are also required to have SCBA qualified corrective lenses readily available in the control room. The inspectors interviewed two operators with conditions for corrective lenses and were informed that SCBA qualified lenses were in individual lockers in the control room. The inspectors also verified that the licensee has administrative and training procedures in place that require biennial SCBA fit tests and reminders for operators to check that they have SCBA qualified lenses, if necessary.

However, the inspectors found that the licensee did not have in place instructions or procedures that require an independent periodic inventory of SCBA qualified lenses for

licensed operators in the control room. The licensee also did not have a system that could readily list which operators are required to have SCBA qualified lenses. The inspectors found from interviews with licensee management that it was their expectation that all licensed operators that have licenses with conditions for corrective lenses have SCBA qualified lenses readily available, whether or not they normally wear contacts or glasses. However, this expectation was not communicated to operators in writing. Operations management committed to revise their conduct of operations procedures to require licensed operators to periodically verify inventory for their SCBA qualified corrective lenses, as necessary. The licensee also committed to provide written expectations of their policy regarding SCBA qualified corrective lenses. The lack of procedural guidelines and written expectations to require and monitor the continued availability of SCBA qualified corrective lenses in the control room was considered a weakness in the implementation of the SCBA program.

c. Conclusions

The licensee's program to assure that corrective lenses for SCBA for operators requiring them was implemented successfully. However, procedural guidance for maintenance of the SCBA corrective lens program was considered weak in that periodic inventories were not required and written expectations were not provided to operators on the need to have SCBA qualified lenses, regardless of the type of corrective lenses normally used.

O2 Operational Status of Facilities and Equipment

O2.1 Engineered Safety Feature System Walkdowns (71707)

The inspectors walked down accessible portions of the following engineered safety feature systems:

- Control Room Ventilation
- Emergency Diesel Generators (Div. I, II, III)
- 4160V Vital Switchgear
- Standby Service Water System (Train A)

Each of the systems was found to be properly aligned for the current plant conditions. Material condition of system components was found to be generally good, with deficiencies properly identified. However, during tours of the emergency diesel generator (EDG) rooms, the inspector found the "Ready for AUTO Start" light on the Division II EDG local control panel and the "ON" light for Division III Fan DEA-FN-31 not lit. Subsequent investigation by the licensee showed that the indicating lights had burned out. Failed indicating lights on the diesel generator motor control centers were noted as a concern in NRC Inspection Report 50-397/97-14.

O8 Miscellaneous Operations Issues (92901)

O8.1 (Closed) LER 50-397/96002-00: inadvertent loss of power to vital bus and automatic start of associated EDG. On May 4, 1996, with the reactor defueled, critical safety Bus SM-8 lost power when supply Breaker 3-8 tripped open due to personnel error. As a result, the Division II EDG started, the backup transformer automatically provided power to Bus SM-8, and residual heat removal Pump 2B lost power. This pump had been supplying fuel pool cooling in the assist mode. The plant was immediately restored to normal lineup. The licensee determined the cause of the event was momentarily opening of the Bus SM-3 potential transformer (PT) fuse compartment by an equipment operator (EO). The EO had erroneously opened and then reclosed the PT compartment, leaving it in an abnormal condition. The EO was installing clearance orders in and around Bus SM-8.

The licensee took the following immediate actions:

- Operations management suspended ongoing clearance order restoration activities and initiated a PER .
- Residual Heat Removal Pump 2B was returned to service within 45 minutes.

The licensee took the following additional corrective actions:

- Revised procedures/instructions regarding clearance order preparation to ensure the need for simultaneous verification is noted.
- Took appropriate personnel action against the EO.
- Counseled the production reactor operator and senior reactor operator that were involved concerning the necessity of performing adequate prejob briefs prior to performance of critical clearance activities.

Because the licensee event report (LER) did not address labeling of the fuse compartments as a potential contributor, the inspectors independently observed the associated Bus SM-3 fuse panels and found them to be well labeled. The inappropriate opening of the Bus SM-3 PT fuse compartment was determined to be a violation of the licensee's clearance order procedure and Technical Specification (TS) 6.8.1.a. This nonrepetitive, licensee-identified and corrected violation is being treated as a noncited violation consistent with Section VII.B.1 of the NRC Enforcement Policy (NCV 50-397/97020-01).

O8.2 (Closed) VIO 50-397/96003-02: failure to draw a reactor coolant chemistry sample within 2-6 hours following a power change of greater than 15 percent, in accordance with TS 3.4.5. The licensee determined that the root cause of the violation was an inadequate procedure. Specifically, the licensee found that neither Plant Procedure

Manual (PPM) 3.2.1, "Shutdown to Cold Shutdown," nor PPM 3.2.2, "Shutdown to Hot Shutdown," contained steps in the body of the procedure to notify chemistry of the need to perform a sample following the recirculation pump shift, an evolution that resulted in a power change of greater than 15 percent. A prejob brief that failed to identify a responsible individual to track reactor power changes and notify the chemistry department and insufficient information in the control room log identifying specific power changes were considered to be contributing factors.

In addressing the root cause and contributing factors, the licensee revised PPMs 3.2.1 and 3.2.2 to include the assignment of an individual to track reactor power changes and to notify chemistry, as appropriate. A performance improvement plan was implemented to address critical behaviors for effective crew prejob briefs while the licensee's performance oversight process was also revised to include a prejob brief observation as a performance feedback tool.

The inspectors noted that the licensee's Improved Technical Specifications, implemented in March 1997, no longer require a reactor coolant system sample to be drawn when reactor power is changed by greater than 15 percent in a 1-hour period.

II. Maintenance

M1 Conduct of Maintenance

M1.1 General Comments

a. Inspection Scope (62707)

The inspectors observed and/or reviewed the following maintenance and surveillance activities:

- Work Order Task HJJ301, Off-gas Hydrogen Analyzer B Channel Check
- Work Order Task JRJ701, Service Water Process Radiation Monitor Adjustment
- Work Order Task HVB001, Reactor Building Fan ROA-FN-1B Lubricate Bearings
- Work Order Task HTZ901, Reactor Core Injection Cooling Water Leg Pump, RCIC-P-3 Oil Change and Lubrication
- Work Request 98000012, Reactor Water Feed GE FANUC CPU Scanner Module Failure
- Work Order Task JSZ6T2, Replace Reactor Heat Removal Pump, RHR-P-3, Packing

- Work Order Task HYR300, Replacement of Instrument Test Valves on Main Steam Instrument Rack E-IR-H22/PO15
- Work Request 98000009, WCH-DPT-50 Air Separator Controller Reset
- Work Order Task HML704, Standby Liquid Control Pump, SLC-P-2B, Replacement of Lube Oil

b. Observations and Findings

The inspectors observed that, with the one exception noted below, the work was performed professionally and was consistent with the licensee's work control procedures and expectations. The inspectors also observed frequent maintenance management and operations personnel supervision and observation during this inspection period.

On January 15, 1998, the inspectors periodically observed craft personnel replace lubricating oil on standby liquid control (SLC) Pump SLC-P-2B. On one occasion the inspectors arrived at the work location and noticed tools and other loose items lying about, with no licensee personnel and no work-in-progress sign present. The inspectors found that it is the licensee management expectation to have an appropriately filled out work-in-progress sign in place when it is necessary to abandon the work site. The inspectors also observed that the personal protection shield over the motor-to-pump coupling had been removed and the coupling left exposed. The inspectors determined that this was in accordance with the licensee's foreign material exclusion procedures in that the procedures only required foreign material exclusion for internal pump or motor components. However, the inspectors concluded that the missing sign, disarrayed tools, and uncovered shaft coupling with the absence of personnel present to be poor work practices which did not meet the licensee management expectations.

c. Conclusions

The observed maintenance and surveillance activities were generally well coordinated and executed with appropriate craft supervision and system engineering participation.

M8 Miscellaneous Maintenance Issues (92902)

M8.1 (Closed) LER 50-397/96001-00: inadvertent engineered safety feature (ESF) actuation due to tripping temporary power supply. On April 25, 1996, two temporary electricians inadvertently opened the fused disconnect supplying the uninterruptible power supply Inverter IN-3 loads. This caused a loss of power to the loads and subsequent ESF actuations and containment isolations. Since the plant was in an outage and defueled, there was little impact and the operators quickly restored the affected systems. Inverter IN-3 loads were being temporarily supplied through a disconnect switch that was labeled as a spare breaker. A caution tag on the disconnect handle identified it as the

temporary power supply to Inverter IN-3 with instructions to contact the control room before operating the disconnect. The two electricians said that they did not read the caution tag. The licensee determined the root cause of the event to be human error.

The licensee took the following immediate actions:

- Operations restored power to Inverter IN-3 loads and reset the ESF actuations without further incident.
- Restricted the two electricians from the power block for the remainder of the outage.
- Reiterated management expectations concerning equipment clearance requirements and the appropriate approvals needed prior to entering panels, components, or systems, during briefings with plant and contractor maintenance personnel.

The licensee took the following additional corrective actions:

- Revised PPM 10.25.1, "Maintenance Programs and Procedures," Revision 9, to include the requirement to provide field identification of spare disconnects that are providing temporary power.
- Revised applicable maintenance lesson plans to include lessons learned from this event regarding clearance orders and the opening of panels.

The failure of the electricians to read and adhere to the instructions on the supply breaker's caution tag was identified as a violation of the licensee's clearance order procedure and TS 6.8.1.a. This nonrepetitive, licensee-identified and corrected violation is being treated as noncited violation consistent with Section VII.B.1 of the NRC Enforcement Policy (NCV 50-397/97020-02).

M8.2 (Closed) Violation 50-397/9602-01: Plant Procedure Manual Procedure 2.10.4, "Diesel Generator (DG) and Cable Cooling Heating Ventilation, and Air Conditioning (HVAC)," Revision 12, date January 11, 1996, did not provide adequate instruction for troubleshooting for low DG room temperature conditions. The procedure did not include provisions for other possible causes, such as the standby DG heating and ventilation unit damper positions.

The licensee identified that, in past revisions, inclusion of checks of possible inleakage past the emergency ventilation unit dampers was considered unnecessary. This was because the dampers were not thought to be likely sources of outside air inleakage. The licensee has included steps to check the dampers and to consider other possible sources as contributors to cold room temperature in Revision 13 to PPM Procedure 2.10.4.

NRC Inspection Report 50-397/96-06 identified further examples of this violation. Corrective actions for those specific violations included changes to PPM Procedure 1.3.7B to further define management expectation of the use of emergency maintenance.

PPM Procedure 1.3.7B was superseded by Site Wide Procedure SWP-MAI-01, "Work Management - Planning, Scheduling and Work Activities," Revision 0. The inspector examined Procedure SWP-MAI-01 and determined that the procedure in Section 3.1 provides guidance that defines the circumstances under which emergency maintenance can proceed. The inspector concluded that the guidance was sufficient to ensure proper control of emergency maintenance activities.

Procedure SWP-MAI-01 also provides guidance on management expectations for postmaintenance testing and determination of operability. The inspector concluded that guidance was sufficient to assure that adequate postmaintenance testing is identified and that testing is sufficient to determine operability.

The licensee's corrective actions were considered appropriate.

III. Engineering

E8 Miscellaneous Engineering Issues (92903)

E8.1 (Closed) LER 50-397/96007-00: electrical breakers not seismically qualified in test/disconnect position. On November 22, 1996, the licensee identified that the plant was in an unanalyzed condition due to a spare electrical circuit breaker in a safety-related 4160 V switchgear being in a racked out condition not assessed by seismic analysis. Specifically, seismic testing of the vital 4160V switchgear was not conducted with breakers in a racked out condition. The licensee immediately reported this condition to the NRC and removed the spare breaker from the switchgear and placed it in a qualified position.

The licensee concluded that the root cause of the event was the failure of the manufacturer to test the vital switchgear with breakers in the racked out condition. However, the LER further states that the switchgear was tested in accordance with Electrical Standard IEEE-344, 1971, which only specifies testing in the service mounted or racked in condition. The inspector considered the licensee's identified root cause of the event to be inappropriate based on the IEEE testing requirements and the corrective actions taken to address the issue. The licensee's corrective actions included revising procedures for racking out breakers to ensure that they are not placed in a nonseismic qualified position. Also, seismic qualification files for existing safety-related switchgear were revised to specify the lack of seismic qualification for breakers in the racked out condition. The corrective actions taken were considered appropriate.

The failure of plant procedures and instructions to control the configuration of the vital 4160V switchgear to ensure that its seismic qualification was maintained was identified as a violation of 10 CFR Part 50, Appendix B, Criterion III (Design Control). This nonrepetitive, licensee-identified and corrected violation is being treated as a noncited violation consistent with Section VII.B.1 of the NRC Enforcement Policy (NCV 50-397/97020-03).

E8.2 (Closed) LER 50-397/97002-00: rod block monitor calibration values not in accordance with Technical Specifications. On February 18, 1997, the licensee determined that they were not in compliance with TS Table 3.3.6-1 and TS 3.1.4.3 regarding the operability of the rod block monitoring (RBM) system. A vendor surveillance procedure to calibrate RBM channels caused an error that did not allow RBM to become operable until 33 percent power. The TS limit was 30 percent power. This condition had existed since the original plant startup. The licensee also found similar errors in the TS RBM surveillance procedures.

The licensee immediately corrected the vendor procedures, recalibrated the RBM channels, and reperformed the channel surveillance to verify that the RBM systems became operable at 30 percent power. The licensee then revised the TS RBM surveillance procedures to correct the errors. The licensee also implemented the Improved Technical Specifications which also checked or corrected other TS related instrument surveilances. The failure of the RBMs to be operable prior to exceeding thermal power levels of 30 percent was considered to be a violation of TS 3.0.4.

The inspectors reviewed the corrective actions and found them to be acceptable. However, the inspectors noted that the licensee's root cause analysis had not addressed why operators did not identify the concern with the RBMs during the many plant startups since the initial startup. Current procedures do include a step to verify that the RBM downscale alarm is clear prior to going above 30 percent power. This nonrepetitive, licensee-identified and corrected violation is being treated as a noncited violation consistent with Section VII.B.1 of the NRC Enforcement Policy (NCV 50-397/97020-04).

E8.3 (Closed) LER 50-397/97001-00: reactor water cleanup (RWCU) blowdown flow isolation setpoint above TS allowable limit. On February 11, 1997, the licensee determined that they did not comply with TS 3.3.2 for the maximum allowable RWCU blowdown flow of equal to or less than 271.1 gpm. The licensee determined that an improper dc voltage setpoint for the associated leak detection system flow switches had been used in the original RWCU high blowdown flow isolation trip signal calculation. The calculation error was in the nonconservative direction. The licensee took the following corrective actions:

- Immediately isolated RWCU blowdown flow.
- Modified applicable channel calibration, channel functional checks, and response time testing procedures to incorporate the corrected setpoints from the corrected calibration.

- Recalibrated applicable flow switches, realigned the RWCU system, and restored blowdown capability.

- Initiated a plan to conduct a review of plant instrument setpoint calculations and associated master data sheets.

The failure to set the flow switches to isolate RWCU prior to exceeding a blowdown flow of 271.1 gpm was determined to be a violation of TS 3.3.2.

The inspectors reviewed the corrective actions and found them to be acceptable. This nonrepetitive, licensee-identified and corrected violation is being treated as a noncited violation consistent with Section VII.B.1 of the NRC Enforcement Policy (NCV 50-397/97020-05).

E8.4 (Closed) Inspection Followup Item 50-397/96003-04: failure to update the Final Safety Analysis Report (FSAR). The inspectors identified three examples in which the licensee made changes to the facility, as described in the FSAR, but failed to update the FSAR to reflect those changes. The three examples included:

- Removal of the diesel-driven air compressor for the Division II EDG starting air system (FSAR Section 9.5.6.2).

- Removal from service of the 522 foot reactor building elevation electronics air conditioning unit (FSAR Section 9.4.2.2.4.d).

- Elimination of the electrohydraulic operator for Valve WOA-V-52D, control room HVAC purge isolation valve (FSAR Section 6.4.4.1).

For each of these changes, the licensee had performed a written safety evaluation in accordance with 10 CFR 50.59. As a corrective action to these and other examples identified by the NRC and the licensee, the licensee has undertaken a broad program review to identify any additional discrepancies and update the FSAR. A description of the licensee's program was provided in NRC Inspection Report 50-397/97-14. From a review of the scope and depth of the licensee's review program, the inspector concluded that the licensee would likely have identified and corrected the above discrepancies. The failure to update the FSAR was determined to be a violation of 10 CFR 50.71(e). This noncompliance is being treated as a noncited violation, consistent with Section VII.B.3 of the NRC Enforcement Policy (NCV 50-397/97020-06). An inspection followup item will be opened to evaluate the licensee's corrective actions for FSAR discrepancies (Inspection Followup Item (IFI) 50-397/97020-07).

E8.5 (Closed) Unresolved Item 50-397/96026-04: failure of standby service water Pump 1A. Standby service water Pump 1A tripped unexpectedly on December 20, 1996, when control room operators attempted to start the pump. This issue was closed in NRC Inspection Report 50-397/97-04 in the review of LER 96009-00.

E8.6 (Closed) Inspection Followup Item 50-397/97018-05: review of transient hydraulic loads on standby service water loop piping. The licensee's analysis of service water Loop B piping was documented in Calculation Modification Record ME-02-96-25. The calculation was to evaluate the service water Loop B piping hydraulic transients in response to PER 295-1275. This IFI was initiated on closure of IFI 50-397/95033-01. The results of the calculation did not indicate there were any substantive stresses imparted to the piping or supports. At the time of NRC Inspection Report 50-397/97-18, the inspector had not completed a review of the calculational methodology.

After the inspections, the licensee conducted an analysis of the effects of the water hammer to quantify the stresses incurred during the event. The inspector reviewed the calculation and determined that the methodology appeared to be appropriate. The results of the calculation indicate low stress levels and no apparent potential for damage to the piping. Maximum indicated stress to the piping itself was 842 psi, with an allowable stress of 15,000 psi. For the pipe support lugs on the return line hanger at SW-1063-12, where the highest stress was identified, the stress was 7,600 psi with an allowable stress of 18,000 psi.

The inspector concluded that the calculations were appropriate, addressing the most significant portions of the piping and confirming the observations of no damage to the piping or supports.

IV. Plant Support

R1 Radiological Protection and Chemistry Controls

R1.1 Inadequate Marking of Radioactive Material Containers and Radiation Signs

a. Inspection Scope (71750)

The inspectors conducted frequent plant tours to evaluate, in part, radiation protection controls and practices.

b. Observations and Findings

Radioactive Material Labeling

On December 31, 1997, while conducting a general tour of the 507 foot level of the radwaste building, the inspectors found three sealed bags containing HEPA filters just outside of a radiological work isolation room. The sealed bags were not labeled as to any potential radiological hazard. The inspectors also found a large internally contaminated piece of machinery that was wrapped and sealed in a radiological control bag which was also not labeled. In addition, the inspectors noted an apparent contamination control area that was posted with unmarked radiation signs. On

January 22, 1998, the inspectors noted another radiological control bag that was apparently not labeled. This was also found on the 507 foot level of the radwaste building. Subsequent investigation by the licensee found that a label was attached to the material inside the bag which was not readily visible to the inspector. From discussions with the radiation protection manager, this labeling practice did not meet management expectations.

The unmarked radiation signs for the apparent contamination control area were a concern because they lacked information on the general hazards within the area and also have the potential to desensitize licensee personnel to radiation signs. For each of the sealed bags of contaminated equipment noted above, a clearly visible label could not be identified that provided information on the quantity of radioactivity, radiation levels, and kinds of material present. The inadequate labeling of the radioactive material was determined to be a violation of 10 CFR 20.1904(a) which requires containers of licensed material be labeled with sufficient information to permit personnel to take precautions to avoid or minimize exposures (VIO 50-397/97020-08).

The failure to properly label containers of radioactive material has been the subject of several recent PERs. PER 296-0346 was initiated due to an adverse trend in compliance with the licensee's radioactive material labeling procedure. Subsequent to the initiation of PER 296-0346, 15 additional noncompliances with the labeling procedure were identified, 3 of which occurred after closure of the PER. As a result, the licensee initiated another adverse trend PER for those concerns (PER 296-0839). The licensee's root cause analysis showed that the earlier events were generally caused by errors made by health physics technicians. As a result, enhancements were made to the licensee's labeling procedure and specific training was provided to the health physics technicians.

The licensee's review of the more recent concerns with labeling found that the errors were generally caused by inadequate radiation worker performance. Additional improvements to plant procedures were implemented as a result. To improve radiation worker performance, it was also recommended, through the disposition of PER 296-0839, that a request be submitted to the cognizant training advisory groups (TAGs) to address radioactive material labeling requirements in their training programs. However, the request that was actually sent to the TAGs did not require any modifications to their programs and only asked that the TAGs consider addressing this issue. The inspectors considered this to be an important corrective action that had weak implementation, due to the open-ended nature of the request to the TAGs.

PERs 297-0485, dated May 26, 1997, and 297-0721, dated August 15, 1997, were also initiated due to inadequate labeling of radioactive material. PERs 297-0485, 297-0721, and the more recent examples identified by the inspectors indicate that the corrective actions to improve radiation worker performance have not been fully effective.

Housekeeping in Radiologically Controlled Areas

On December 31, 1997, the inspectors noted anticontamination clothing loosely lying about on the floor, just outside the step-off pad of a contaminated area of the 507 foot elevation of the radwaste building. On January 22, 1998, the inspectors again noted poor housekeeping practices on the 507 foot level of the radwaste building. Loose tools, bolts, rope, and plastic straps were lying about both in and outside of controlled contaminated areas near the step-off pad receptacles. From discussions with the plant manager, it was determined that organizational ownership of the area was not clearly defined for purposes of housekeeping and cleanliness. The radiation protection manager walked down the areas noted by the inspectors and agreed that the housekeeping conditions found did not meet management expectations.

c. Conclusions

Corrective actions to address inadequate labeling of radioactive material containers have not been effective in preventing recurrence as evidenced by several recent noncompliances identified by the inspectors and the licensee and resulted in a violation of 10 CFR 20.1904(a). Additionally, a lack of defined ownership of areas in the radwaste building contributed to poor radiological housekeeping practices on the 507 foot elevation.

R1.2 External Exposure Controls

a. Inspection Scope (83750)

On January 7, 1998, while troubleshooting was being performed on traversing in-core probe (TIP) Machine C, withdrawal of the probe towards the TIP machine occurred unexpectedly. Selected radiation workers and radiation protection personnel involved in the troubleshooting were interviewed. Additionally, the problem evaluation request which documented the event was reviewed.

b. Observations and Findings

The inspectors reviewed Problem Evaluation Request (PER) 298-0019, which documented the events associated with the unexpected movement on January 7, 1998, and found the PER and its associated root cause evaluation to be an accurate reflection of the event. The inspectors determined that the root cause evaluation, including the addendum, identified and captured a number of areas for improvement to help prevent a similar occurrence in the future.

During the review of this event, the inspectors interviewed the radiation protection supervisor who had approved the radiation work permit (9700390-01) for the TIP drive work and the radiation protection technician who performed the ALARA plan and provided job coverage for the task. Both of these individuals were under the mistaken

impression that the TIP could not fully withdraw into the TIP drive room where the troubleshooting was being performed on TIP Machine C. From discussions with the system engineer, he was aware that the TIP could fully withdraw into the TIP drive room; however, he was under the mistaken impression that the logic circuit was working properly and would prevent this from happening. As a result, the implemented engineering controls were not comprehensive to ensure movement of the TIP probe was precluded.

The inspector also concluded it was for this reason that the system engineer did not discuss the possibility of the TIP completely withdrawing into the TIP drive room during the ALARA prejob briefing with the personnel involved with this task.

From interviews with the radiation protection technician who performed the ALARA planning aspects of the task, the inspectors determined that the radiation protection technician researched the plant's radiological job history files to identify past radiation work permits and historical radiological survey information which was used for similar work. However, the inspector found that the files did not contain industry events or NRC information notices for similar work. The inspectors commented that maintaining industry events and NRC information notices in job history files could help identify problems that might be encountered. The licensee acknowledged the inspectors' comment.

The licensee provided the inspectors an estimate of the worst case radiological conditions in the event that the TIP was to completely withdraw into an unshielded portion of the TIP system. The licensee estimated, and the inspectors concurred, that the radiation exposure levels could have been as high as 110 rems per hour at 30 centimeters (about 1 foot) from the TIP. The licensee's investigation determined that, although the radiation protection personnel involved in the task knew that the exposure rates could be substantial, they did not have a complete understanding of the radiological conditions in the event the TIPs were fully withdrawn.

The inspectors noted that the radiation protection supervisor who had approved the radiation work permit was not involved in any of the job planning meetings and was only briefed by the radiation protection technician who performed the ALARA job planning. The inspectors commented that not involving the radiation protection supervisor who was responsible for approving a potential high radiological risk radiation work permit could lead to the permit being approved without a complete understanding of the task. The radiation protection and station managers acknowledged the inspectors' comment and stated that they would review the process of approving radiation work permits.

From interviews with the personnel involved and a review of the radiation work permit and ALARA prejob briefing, the inspectors determined that the personnel involved knew the radiological conditions in the area and their response to unexpected radiological conditions. It was also noted that each person carried an alarming, electronic dosimeter

for monitoring their accumulative dose and area dose rate. These measures, coupled with the immediate actions taken to leave the room when the TIP drive began to move, significantly reduced the likelihood of an overexposure.

The inspectors' review of the station's procedures, GEN-RPP-01 "ALARA PROGRAM DESCRIPTION," Revision 1, 11.2.2.5, "ALARA JOB PLANNING AND REVIEWS," Revision 7, and 11.2.2.11, "EXPOSURE EVALUATIONS FOR MAINTAINING TEDE ALARA," Revision 2, identified that these procedures did not discuss management's expectations and requirements for involving second and/or third line radiation protection supervision in the review of high radiological risk jobs. The radiation protection and plant managers also noted that they had identified this issue as an area of improvement and would review their program to clearly involve second and/or third line radiation protection supervision in the ALARA review process for certain high risk radiological tasks.

C. Conclusion

Engineering controls placed upon the traversing in-core probe Drive C were insufficient in preventing movement of the probe during troubleshooting activities. The unexpected movement of the probe required personnel action to prevent the probe from withdrawing from its shielded location and into the area where the troubleshooting was being performed. Based upon other barriers to personnel overexposure that were in place, and the immediate actions taken in response to the event, the likelihood of a significant overexposure was low.

The licensee's analysis and root cause evaluation of the unexpected movement of the traversing in-core probe accurately characterized the event and identified a number of areas for improvement, including personnel level of knowledge of TIP system operation and level of involvement of radiation protection supervision in the ALARA planning process for high radiological risk jobs.

V. Management Meetings

X1 Exit Meeting Summary

The inspectors presented the inspection results to members of licensee management after the conclusion of the inspection on February 9, 1998. The licensee acknowledged the findings presented.

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

ATTACHMENT

Supplemental Information

PARTIAL LIST OF PERSONS CONTACTED

Licensee

P. Bemis, Vice President for Nuclear Operations
F. Diya, Engineering Programs Manager
D. Hillyer, Radiation Protection Manager
P. Inserra, Licensing Manager
A. Langdon, Assistant Operations Manager
E. Neasham, Reactor Engineering
G. Smith, Plant General Manager
R. Webring, Vice President Operations Support
J. Weers, System Engineer

INSPECTION PROCEDURES USED

IP 37551:	Onsite Engineering
IP 61726:	Surveillance Observations
IP 62707:	Maintenance Observations
IP 71707:	Plant Operations
IP 71750:	Plant Support
IP 92901:	Followup - Operations
IP 92902:	Followup - Maintenance
IP 92903:	Followup - Engineering

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-397/97020-01	NCV	inappropriate opening of the SM-3 PT fuse compartment
50-397/97020-02	NCV	failure of the electricians to read and adhere to the instructions on the supply breaker's caution tag
50-397/97020-03	NCV	failure of plant procedures and instructions to control the configuration of the vital 4160V switchgear to ensure that its seismic qualification was maintained
50-397/97020-04	NCV	failure of the RBMs to be operable prior to exceeding thermal power levels of 30 percent

50-397/97020-05	NCV	failure to set the flow switches to isolate RWCU prior to exceeding a blowdown flow of 271.1 gpm
50-397/97020-06	NCV	failure to update the FSAR
50-397/97020-07	IFI	effectiveness of the licensee's FSAR upgrade program
50-397/97020-08	VIO	inadequate labeling of radioactive material

Closed

50-397/96002--01	VIO	inadequate troubleshooting procedures for EDG HVAC
50-397/96003-02	VIO	failure to draw a reactor coolant chemistry sample within 2-6 hours following a power change of greater than 15 percent
50-397/96003-04	IFI	failure to update the Final Safety Analysis Report
50-397/96006-05	IFI	lack of work instructions for maintenance/cleaning
50-397/96026-04	URI	failure of standby service water Pump 1A
50-397/96001-00	LER	inadvertent engineered safety feature actuation due to tripping temporary power supply
50-397/96002-00	LER	inadvertent loss of power to vital bus and automatic start of associated EDG
50-397/96007-00	LER	electrical breakers not seismically qualified in test/disconnect position
50-397/97001-00	LER	RWCU blowdown flow isolation setpoint above TS allowable
50-397/97002-00	LER	rod block monitor calibration values not in accordance with Technical Specifications
50-397/97018-05	IFI	review of transient hydraulic loads on standby service water loop piping
50-397/97020-01	NCV	inappropriate opening of the SM-3 PT fuse compartment
50-397/97020-02	NCV	failure of the electricians to read and adhere to the instructions on the supply breaker's caution tag

50-397/97020-03	NCV	failure of plant procedures and instructions to control the configuration of the vital 4160V switchgear to ensure that its seismic qualification was maintained
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50-397/97020-06	NCV	failure to update the FSAR

LIST OF ACRONYMS USED

ALARA	as low as reasonably achievable
DG	diesel generator
EDG	emergency diesel generator
EO	equipment operator
ESF	engineered safety feature
FSAR	Final Safety Analysis Report
HVAC	heating, ventilation, and air conditioning
IEEE	electrical standard
IFI	inspection followup item
LER	licensee event report
NRC	U.S. Nuclear Regulatory Commission
OI	operating instruction
PER	problem evaluation request
PPM	Plant Procedures Manual
PT	potential transformer
RBM	rod block monitoring
RWCU	reactor water cleanup
SCBA	self contained breathing apparatus
SLC	standby liquid control
TAG	training advisory group
TIP	traversing in-core probe
TS	Technical Specifications
URI	unresolved item
WNP-2	Washington Nuclear Project-2