ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

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License No.:	NPF-21
Report No.:	50-397/97-05
Licensee:	Washington Public Power Supply System
Facility:	Washington Nuclear Project-2
Location:	Richland, Washington
Dates:	March 2 through April 12, 1997
Inspectors:	G. D. Replogle, Resident Inspector M. D. Tschiltz, Senior Resident Inspector, Diablo Canyon G. W. Johnston, Senior Project Engineer D. E. Corporandy, Project Engineer J. M. Keeton, Resident Inspector, South Texas Project
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Attachment: Supplemental Information

EXECUTIVE SUMMARY

Washington Nuclear Project-2
NRC Inspection Report 50-397/97-05

Operations

- Operations was challenged during a test of plant response to the loss of a reactor feedwater pump. The unexpected performance of the reactor recirculation control system caused the reactor to enter the instability region of the power-to-flow map and resulted in operators manually initiating a reactor scram. The NRC plans to conduct a special inspection of the event (Section O1.2).

- The material condition of the high pressure core spray (HPCS) system was found to be very good with system deficiencies being tracked and monitored by the system engineer (Section O2.2).

- The Improved Technical Specifications (ITS) were implemented on March 10, 1997. Licensee planning had assured that actions necessary to support ITS implementation (operator training and procedure changes) had occurred prior to implementation (Section O8.1).

- An unusual event was declared on March 20, due to the determination that the licensee had not appropriately determined the response time of certain instruments. The NRC subsequently granted enforcement discretion on March 20, 1997 (Section O8.2).

Maintenance

- Maintenance was generally performed in a thorough and professional manner. Technicians routinely demonstrated good work practices (Section M1.1).

- Coordination and communications between maintenance and operations personnel were considered very good during the performance of a source range monitor functional test (Section M1.2).

- An inadequate procedure and the failure of a maintenance worker to follow procedural requirements contributed to the inadvertent initiation of the HPCS diesel generator. The issue was reported to the NRC in Licensee Event Report 50-397/94-015 and was considered a noncited violation (Section M8.1).

- Testing in accordance with the Inservice Testing (IST) Program was not performed for 85 excess flow check valves during Refueling Outage R10. The licensee subsequently determined that the valves were not required to be within the scope of the Inservice Testing Program, as they were not relied upon in accident analyses (Section M8.2).

Engineering

- Performance and material condition of the HPCS system indicated a proper level of attention by the system engineer and the maintenance organization. Additionally, design basis information and plant procedures were properly maintained (Section 02.2).

Report Details

Summary of Plant Status

The inspection period began on March 2, 1997, with the reactor at 55 percent power. Power was adjusted, as necessary, between 70 and 100 percent from March 3-20 to accommodate power needs in the Northwest. On March 20, the licensee declared an Unusual Event (see Section O8.2) and initiated a plant shutdown in accordance with Technical Specification (TS) 3.0.3 requirements. Power had been reduced to 40 percent when the licensee exited TS 3.0.3. and raised power to 55 percent. On March 26, power was increased to 70 percent, and then increased again to 96 percent on March 27 in preparation for reactor feedwater (RFW) and reactor recirculation control (RRC) testing. On March 27, operators initiated a manual reactor scram as a result of the testing, and the plant entered the economic dispatch shutdown period. The plant remained shut down for the remainder of the inspection period in anticipation of the refueling outage, which was scheduled to start April 19.

I. Operations

O1 Conduct of Operations

O1.1 General Comments (71707)

Using Inspection Procedure 71707, the inspectors observed licensed operators in the control room. The operators were generally alert, responsive to alarms, professional, and safety conscious.

O1.2 Loss of RFW Pump Trip Test

a. Inspection Scope (71707)

On March 27, 1997, during conduct of a test of plant response to a RFW pump trip, operators initiated a reactor scram. The inspector was in the control room at the time of the event and observed the operators' actions.

b. Observations and Findings

Background: On March 27, operators tested the RRC and RFW control systems scram mitigation capabilities in accordance with Plant Procedures Manual (PPM) 8.3.339, "Test Instructions - Reactor Recirculation Adjustable Speed Drive and Reactor Digital Feedwater Control Power Ascension Test Program," Revision 3. The licensee had installed new digital control systems for the RRC and RFW systems during the most recent refueling outage (R11). The systems were designed to be sufficiently responsive so that upon tripping one RFW pump (from as high as 100 percent power), a scram on low level would not occur. This capability is described in the Final Safety Analysis Report (FSAR), Section H.2.3.3.2.2, "Feedwater Pump Trip Runback."

Test: At 9:06 a.m. (PST), with the reactor at 96 percent power, control room operators manually tripped RFW Pump B. The RRC pumps then ran back from 60 to 27 Hertz, as designed. Subsequently, the RRC pumps unexpectedly tripped to 15 Hertz on a low differential temperature between the steam dome and pump suction (cavitation protection interlock).

Within 30 seconds of the second RRC pump speed change, the shift technical advisor identified that Region A on the power-to-flow map (instability region) was entered and informed the control room supervisor (CRS) of the occurrence. The CRS immediately ordered a manual scram, which was consistent with the TS requirements.

In response to the scram, and as expected, reactor water level decreased to below 13 inches (an Emergency Operating Procedure (EOP) entry condition). The CRS immediately entered the EOPs until the entry condition was cleared and the plant was verified to be in a safe condition.

In response to the low level condition, RFW flow increased and level was recovered to above 13 inches. Although the RFW level control system appeared to be working properly, RFW Pump A failed to decrease speed in response to the control signal. Reactor water level surpassed level 8 (56 inches) and RFW Pump A tripped on high level. Operators quickly restored both RFW pumps to service and maintained reactor vessel level within an acceptable range.

The licensee was evaluating the causes of the event at the close of the inspection and had additionally assembled a separate team, composed of offsite personnel, to perform an independent review of the event. The licensee's plans are described in a letter to the NRC dated April 9, 1997. The NRC plans to conduct a special inspection (Inspection Report 50-397/97-10) of the issues and to review the results of the licensee's evaluations.

c. Conclusions

The RRC and RFW systems performed in an unexpected manner during the test, which ultimately resulted in operators initiating a manual reactor scram and automatic tripping of the operating RFW pump. The NRC plans to conduct a special inspection of the event.

O1.3 Scram Signal Initiation While in Mode 4

a. Inspection Scope (71707)

On March 27, while in Mode 4, an automatic reactor scram signal was experienced due to a low reactor vessel level condition. The inspector performed a preliminary review of the event.

b. Observations and Findings

At the time of the event, all main steam isolation valves were closed and operators were controlling plant pressure utilizing safety relief valves. When an operator closed a safety relief valve, the associated "level shrink" resulted in reactor vessel level going below the scram setpoint of 13 inches. The CRS entered the EOPs until the entry condition was cleared. The licensee stated that the plant response was unexpected.

The inspectors verified that the plant was returned to a safe condition and that the associated TS and procedures were followed. The licensee was preparing a Licensee Event Report (LER) for the event. The inspector will perform additional followup as part of the LER review.

c. Conclusions

An automatic scram was experienced on March 27, 1997, while in Mode 4. The licensee will issue an LER to report the event.

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:

- Standby Gas Treatment System
- High Pressure Core Spray (HPCS) System
- Low Pressure Coolant Injection System, Trains A and B
- HPCS Diesel Generator

O2.2 HPCS Detailed System Review

a. Inspection Scope (71707, 37551)

A detailed review of the HPCS system was performed in accordance with Inspection Procedure 71707. Additionally, the inspectors reviewed the design basis information and plant procedures associated with the system. Maintenance Rule performance criteria, system availability criteria and tracking records, as well as the disposition of recent system problems affecting system operability, were also reviewed.

b. Observations and Findings

The inspector had the following observations:

- Material condition of the HPCS system was very good.
- System performance and material condition monitoring by the system engineer was effective in identifying, tracking, and correcting system deficiencies.
- The design basis information and plant procedures associated with the HPCS system were properly maintained.
- The system availability criteria, established to meet the requirements of the Maintenance Rule, matched that assumed in the Individual Plant Examination for overall system availability, which was acceptable.

c. Conclusions

Performance and material condition of the HPCS system indicated a proper level of attention by the system engineer and the maintenance organization. Design basis information and plant procedures were properly maintained. Maintenance Rule performance criteria was appropriate to the circumstances.

O8 Miscellaneous Operations Issues (92901, 71707)

O8.1 Improved Technical Specifications (ITS) Implementation

On March 10, 1997, the licensee implemented the Improved TS. The inspectors reviewed a sample of the licensee's efforts in this area, which included procedure changes, operator training, and distribution of the ITS, and found no problems.

O8.2 Unusual Event, Unacceptable Response Time Testing (RTT)

In a letter dated March 20, 1997, the NRC informed the licensee that during Refueling Outage R11 the licensee did not demonstrate, in accordance with TS requirements, that reactor protection system, isolation system, and emergency core cooling system response time limits were met. The NRC had concluded that the WNP-2 approach to verification of instrument response time operability was generally consistent with an approach that the NRC had found acceptable. However, the approach was inconsistent with the licensee's current TS. The licensee had revised the approach to RTT without first amending the TS to permit the changes.

At 5:40 p.m. (PST), the licensee declared the affected safety systems inoperable, declared an Unusual Event, and commenced a plant shutdown from 100 percent power in accordance with TS 3.0.3.

By letter dated March 20, the licensee requested enforcement discretion for TS 3.3.1.1.15, 3.3.6.1.7, and 3.3.5.1.7 until April 18, 1997, (when the plant would be in a refueling outage and the affected safety systems would no longer be required) or until NRC approval of a pertinent TS amendment, whichever came first. The NRC verbally granted the enforcement discretion on March 20, and formally acknowledged the intent to exercise enforcement discretion in a letter to the licensee dated March 24, 1997.

The lowest power level observed during the shutdown was 40 percent. After enforcement discretion was granted, power was increased to 55 percent.

NRC Inspection Report 50-397/96-22 will document the NRC's review of the licensee's actions in the performance of RTT activities for these instruments.

O8.3 (Closed) Violation 50-397/95096-1053 (9507-05): operators removed the incorrect fuse and inadvertently de-energized the Vacuum Breaker 1EF indication while hanging Clearance Order 95-02-0076. Further, the operators did not resolve questionable, labeling with the shift manager prior to removing the fuse.

The licensee determined the cause of the violation to be inadequate labeling of panel internals. A contributing cause was inadequate equipment operator training on wire identification within panels.

The corrective actions taken by the licensee included:

- counseling the individuals involved regarding proper wire and fuse identification techniques,
- additional training on reading and interpreting drawings and wire identification techniques, and
- creating terminal board and fuse arrangement drawings for the affected panel.

The inspectors verified that fuse identification labels were in place in random instrument panels. The licensee's corrective actions were considered appropriate.

O8.4 (Closed) Violation 50-397/95096-1093 (9507-09): the licensee failed to meet the TS requirement for entry into the operational condition of Startup/Hot Standby because two of four instrument channels in one trip system were inoperable. The violation resulted from reliance on an improper operability assessment for intermediate range monitor Channel E. This resulted from a lack of understanding of system operating characteristics and system status. A contributing cause was considered to be a lack of independent technical review prior to declaring the system operable.

The corrective actions involved training and counseling the system engineers. The licensee also established a requirement that all operability assessments be reviewed and approved by engineering management. The inspector reviewed the corrective actions and considered them to be reasonable and complete.

O8.5 (Closed) LER 50-397/95-008: TS wording leads to a potential for a TS violation. On January 25, 1994, with the reactor at 100 percent power, the licensee identified an inoperable water level instrument (MS-LS-61D) associated with the traversing incore probe (TIP) system isolation logic. The requirements for the minimum number of channels required by TS 3.3.2 were not met and the licensee subsequently placed the trip system in the tripped condition. However, this was the only trip system utilized by the TIP isolation logic, and a TIP system isolation resulted. Repairs were completed and the instrument returned to service on January 28, 1994.

Upon further review of TS 3.3.2, the licensee determined that the TS was not clear with regard to required actions. Specifically, TS Action Statement 3.3.2.b.1.b required a plant shutdown for those channels that cause an isolation if placed in the tripped condition (if repairs could not be completed within 24 hours). For inoperable channels that would not result in an isolation, TS 3.3.2.b.2.b required that the channel be placed in the tripped condition within 24 hours. In the case of the noted instrument, the TS could have been interpreted as requiring a plant shutdown, instead of tripping the system, even though the resultant isolation had no impact on safe plant operation.

To clarify the requirements, the licensee issued TS Interpretation 95-002, which stated that the TS 3.3.2.b.1.b words "cause an isolation" shall be interpreted as "cause an unacceptable isolation." The TS Interpretation explained that taking an isolation is "acceptable" so long as it does not impact continued safe operation of the plant. The licensee's corrective actions were acceptable.

The inspector reviewed the current ITS requirements. ITS 3.3.6.1 currently requires that an inoperable trip system be placed in the trip condition, which is consistent with the licensee's past actions.

II. Maintenance

M1 Conduct of Maintenance

M1.1 General Comments

a. Inspection Scope (61726, 62707)

The inspector observed the following maintenance and surveillance activities:

- PPM *ISP-SRM-W401, Revision 0, "Source Range Monitor Channel A Functional Test"

- Work Order Task BBB001, Scram Solenoid Pilot Valve Installation

- PPM 8.3.339, "Test Instructions - Reactor Recirculation Adjustable Speed Drive and Reactor Digital Feedwater Control Power Ascension Test Program"

Maintenance was generally performed in a thorough and professional manner. Technicians routinely demonstrated good work practices. One issue associated with the functional test of source range monitor, Channel A, is discussed in Section M1.2 below. Several problems identified during the performance of PPM 8.3.339 are discussed in Section O1.2.

M1.2 Source Range Monitor Channel A Functional Test

a. Inspection Scope (61726)

The inspector observed the performance of PPM *ISP-SRM-W401, "Source Range Monitor Channel A Functional Test."

b. Observations and Findings

The technicians demonstrated good work practices and exhibited a detailed knowledge of the system. Self-checking and peer-checking were evident throughout the performance of the surveillance. Coordination and communications between the technicians and the licensed operator were considered very good.

During the surveillance the inspector identified a minor procedural deficiency. PPM *ISP-SRM-W401 provided instructions to reposition the reactor mode switch to either the "Startup/Hot Standby" or "Refuel" position. However, the procedure did not contain a corresponding instruction, toward the end of the surveillance, to ensure that the mode switch was appropriately returned to the "Shutdown" position. Despite of the lack of guidance, operators appropriately repositioned the mode switch to the shutdown position at an appropriate time.

The inspector discussed the issue with the CRS. The CRS immediately contacted appropriate personnel to process a temporary change.

c. Conclusions

Coordination and communications between maintenance and operations personnel were very good. Technicians demonstrated good work practices. A minor procedure deficiency was identified and corrective actions were promptly taken.

M8 Miscellaneous Maintenance Issues (92902)

M8.1 (Closed) LER 50-397/94-015: HPCS diesel generator (DG) actuation caused by inappropriate valve manipulation. This LER involved the actuation of the HPCS DG while the plant was in Mode 4. The actuation resulted when technicians working on the reactor pressure vessel (RPV) backfill modification opened two boundary valves which isolated the control rod drive system from the reactor vessel level instruments (RVLIs). The valve manipulations were performed in accordance with PPM 3.1.6, "Startup Instrument Rack Valve Line-up."

The backfill modification provides continuous backfill from the control rod drive to the reference legs of the RVLI to minimize the noncondensible gases in the RVLI reference legs. Opening of the two boundary valves caused a fluid surge into the RVLI reference legs, which resulted in the invalid RPV low level signals and actuation of the HPCS DG. The HPCS system did not inject, as the HPCS pump was removed from service at the time.

The licensee issued Problem Evaluation Request 294-0668 to investigate and determine the cause of the improper valve manipulation. The licensee concluded that the following contributed to the event:

- Procedures were inadequate in that valve positions for the two mispositioned boundary valves were inappropriately included in PPM 3.1.6. At the time, the valves positions should have been deleted from PPM 3.1.6, as their manipulation was under the control of a different procedure.

- A maintenance technician did not follow the requirements of PPM 3.1.6, in that he failed to contact operations prior to manipulating these valves.

In response to the event, the licensee completed the following corrective actions.

- The control of the boundary valves was transferred from PPM 3.1.6 to PPM 10.27.64, "RPV Level Instrumentation Reference Leg Purge System Operation."

- The boundary valve handles were painted red to alert valve manipulators to the sensitivity of the valve function.

The inspectors reviewed the corrective actions and found them to be acceptable.

The failure to properly update PPM 3.1.6 to remove the subject valves and the failure of the maintenance technician to follow PPM 3.1.6 are examples of a violation of 10 CFR Part 50, Appendix B, Criterion V, which requires that procedures covering activities important to quality be appropriate to the circumstances and be properly

implemented. This licensee-identified and corrected violation is being treated as a noncited violation consistent with Section VII.B.1 of the NRC Enforcement Policy (NCV 50-397/9705-01).

M8.2 (Closed) URI 50-397/9608-02: failure to perform inservice testing (IST) of reactor core isolation cooling containment isolation valves and 85 excess flow check valves. The failure to perform IST of the reactor core isolation cooling containment isolation valves was discussed in NRC Inspection Report 50-397/9619. This section only addresses the failure to test the excess flow check valves during Refueling Outage R10 (described in Problem Evaluation Request 296-0426).

The licensee had included the subject excess flow check valves within the scope of the IST Program, which specified that the valves be tested each refueling outage. Additionally, TS 4.6.3.4 required that the valves be stroke tested at least every 18 months. In an effort to minimize the work during Refueling Outage R10, the licensee utilized the TS allowed 25 percent grace period to defer the subject tests to Refueling Outage R11. The licensee failed to appropriately consider the requirements of the IST program when this decision was made.

The licensee subsequently determined that the excess flow check valves were not credited in the Final Safety Analysis Report accident analysis (Section 15.6.2, "Instrument Line Pipe Break"). The analysis relied exclusively on the flow-limiting orifices (also located in each instrument line) to ensure that offsite doses would not exceed the 10 CFR Part 100 limits. Therefore, the valves were not safety-related and were not required to be within the scope of the IST program. The inspector agreed with the licensee's assessment regarding the safety classification of the valves.

The cause of the oversight was determined to be inadequate procedural guidance. Specifically, test procedures did not appropriately reference the IST program. When no procedural reference was found, the workers erroneously assumed that the IST program requirements did not apply and deferred the tests. As corrective measures, the licensee identified all IST implementing procedures and made appropriate changes to ensure that the IST program was appropriately referenced. The inspector reviewed a sample of the procedural changes and found the corrective measures to be acceptable. Since the subject valves were not safety-related, the inadequate procedural guidance was not a violation of NRC requirements.

III. Engineering

E2 Engineering Support of Facilities and Equipment

The HPCS system engineer was effective in identifying, tracking and correcting system deficiencies. Details are provided in Section O2.2 of this report.

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 April 23, 1997. 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
D. Atkinson, Quality Assurance Manager
J. Harmon, Nuclear Safety Issues Program Coordinator
M. Monopoli, Operations Manager
J. Muth, Quality Support Supervisor
B. Pfitzer, Acting Licensing Manager
G. Smith, Plant General Manager
J. Swailes, Engineering Director
D. Swank, Regulatory Affairs Manager
R. Webring, Vice President Operations Support

INSPECTION PROCEDURES USED

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

ITEMS OPENED AND CLOSED

Opened

50-397/9705-01 NCV Inadvertent HPCS DG actuation

Closed

50-397/95096-1053 (EEI 9507-05)	VIO	Operator pulled incorrect fuse
50-397/95096-1093 (EEI 9507-09)	VIO	Inoperable intermediate range monitors during operational mode change
50-397/95-008	LER	Unclear TS wording
50-397/94-015	LER	Inadvertent HPCS DG actuation
50-397/9608-02	URI	Failure to perform IST for valves
50-397/9705-01	NCV	Inadvertent HPCS DG actuation

LIST OF ACRONYMS USED

CRS	control room supervisor
DG	diesel generator
EOP	emergency operating procedure
HPCS	high pressure core spray
IFI	inspection followup item
IST	inservice testing
ITS	Improved Technical Specifications
LER	Licensee Event Report
NRC	U.S. Nuclear Regulatory Commission
PER	problem evaluation request
PPM	Plant Procedures Manual
RFW	reactor feedwater
RRC	reactor recirculation control
RPV	reactor pressure vessel
RTT	response time testing
RVLI	reactor vessel level instrument
TIP	traversing incore probe
TS	Technical Specifications
URI	unresolved item
WNP-2	Washington Nuclear Project-2
VIO	violation