

ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

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Report No.: 50-397/98-21
Licensee: Washington Public Power Supply System
Facility: Washington Nuclear Project-2
Location: Richland, Washington
Dates: August 30 through October 10, 1998
Inspector(s): S. A. Boynton, Senior Resident Inspector
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Project Branch E
Division of Reactor Projects
ATTACHMENT: Supplemental Information

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EXECUTIVE SUMMARY

Washington Nuclear Project-2 NRC Inspection Report 50-397/98-21

This information covers a 6-week period of resident inspection with input from a senior reactor analyst.

Operations

- During a walkdown of the service water supply to the System A residual heat removal pump room cooler, the inspectors determined that the locking device to an isolation valve was unattached, contrary to plant procedures. Since the valve was found in the correct position, no safety impact would have resulted. This failure to properly lock the valve is a violation of minor significance and is not subject to formal enforcement action (Section O2.1).

Engineering

- The manual startup and shutdown of the reactor core isolation cooling system for level control, following the March 1998 main steam isolation valve closure, challenged the operators. The proceduralized method to control reactor vessel level by diverting reactor core isolation cooling flow through the test return line could not be accomplished because of valve design deficiencies. The method used to maintain the reactor core isolation cooling system test return line isolation valves decreased the reliability of the system and challenged the containment isolation function since the valves may not have closed against high differential pressure. Unresolved Item 50-397/98005-05, involving exclusion of the reactor core isolation cooling test return line valves from the scope of the maintenance rule, was determined not to be a violation of NRC requirements (Section M8.1).

Report Details

Summary of Plant Status

The plant operated in Mode 1 at full power for the duration of the inspection period.

I. Operations

O2 Operational Status of Facilities and Equipment

O2.1 Engineered Safety Feature System Walkdowns

a. Inspection Scope (71707)

The inspectors walked down accessible portions of the following systems:

- Standby Service Water System A
- Emergency Diesel Generators (Division I, II, and III)
- Standby Gas Treatment (SGT) System A
- Containment Atmosphere Control Systems A and B

b. Observations and Findings

The material condition of the systems was generally very good with some minor deficiencies identified for the emergency diesel generators. Those deficiencies were brought to the attention of the control room supervisor for appropriate action. Configuration of the systems was verified to be in conformance with Mode 1 requirements, with the exception that Valve SW-V-24A, standby service water isolation valve to the Train A residual heat removal pump room cooler, was not locked as required; however, the valve was in the correct position (open) with the locking chain hanging from the manual handwheel. Technical Specification (TS) Surveillance Requirement 3.7.1.3 requires manual valves in the standby service water system to be verified in their correct position every 31 days, unless they are locked, sealed, or otherwise secured in their position. Procedure 1.3.29, "Locked Valve Checklist," Revision 29, requires Valve SW-V-24A to be locked open to satisfy TS 3.7.1.3.

Noting that Valve SW-V-24A was open, the inspectors determined that the actual safety significance of the unlocked valve was low. A nonsafety-related flow switch associated with service water flow to the room cooler provides annunciation in the control room under low flow conditions. Since operators routinely operate the standby service water system, any low flow would have resulted in an alarm and alerted the control room operators. Thus, qualitatively, the risk significance was considered to be low. A potential consequence of the valve being mispositioned would be the inability to maintain long-term operability of Residual Heat Removal System A because of high pump room temperatures following a design basis accident.

This finding was essentially identical to a poor valve locking practice documented in NRC Inspection Report 50-397/97-12. In the previous instance, the locking chain remained attached to the valve handwheel and the manual adjustment knob, but a significant amount of slack existed in the valve locking chain, which could have allowed

the locking chain to be unsecured. The unlocked valve in this instance demonstrates that there is an inherent vulnerability in the locking method for the emergency core cooling system pump room cooler inlet isolation valves. Specifically, the use of the manual adjustment knobs on the motor operators as anchor points has not assured locking of the valves, in that a small amount of slack in the locking chain allows for the chain to be readily removed. The failure to properly lock Valve SW-V-24A in accordance with Procedure 1.3.29 constitutes a violation of minor significance and is not subject to formal enforcement action.

The licensee did not identify any cause for the unattached locking chain; however, since the valve was found in the correct position and since flow had continued to the room cooler, the licensee did not suspect tampering. To prevent recurrence, the anchor point of the locking chains on each of the emergency core cooling system pump room cooler service water isolation valves was moved to the valve yoke. The corrective action was found to be appropriate to address the concern.

c. Conclusions

During a walkdown of the service water supply to the System A residual heat removal pump room cooler, the inspectors determined that the locking device to an isolation valve was unattached contrary to plant procedures. Since the valve was found in the correct position, no safety impact would have resulted. This failure to properly lock the valve is a violation of minor significance and is not subject to formal enforcement action.

O8 Miscellaneous Operations Issues (92901)

O8.1 (Closed) Violation 50-397/96327-01013: operational mode change with equipment inoperable

On June 2, 1996, operators entered Mode 2 with a train of the control room emergency filtration system inoperable. The licensee relied provisions contained in the ACTIONS section of a Limiting Condition for Operation when entering Mode 2. Entry into a Mode while relying upon provisions in the ACTIONS section violated TS 3.0.4. The corrective actions consisted of discussing the event with operating crews and modifying specific procedures controlling mode changes to require an electronic global log search for mode change restrictions.

The inspectors reviewed the training attendance log and subject training and found that the target audience and subject training presented were adequate for the issues. The inspectors also reviewed Procedure 1.3.40, "Outage Mode Change or Refueling Activity Readiness Evaluation," Revision 11; and Procedure 3.1.2, "Reactor Plant Startup," Revision 43, and found that steps were added to require an electronic global log search for mode change restrictions. The inspectors also reviewed several other plant procedures to determine if similar changes were required. The inspectors did not identify any other procedures requiring similar changes.



O8.2 (Closed) Violation 50-397/96327-01023: various surveillances inappropriately deferred until after mode change

In June 1996 on three separate occasions, operators failed to meet TS surveillance requirements required for the mode entered. Specifically, the TS surveillance requirements not met were associated with: (1) turbine throttle valve closure, (2) rod block monitor channel checks, and (3) average power range monitor downscale rod block channel functional test and fixed neutron flux upscale trips. The corrective actions included: (1) consisted of training for operations, licensing, and compliance personnel; (2) voiding an inaccurate TS interpretation; (3) reviewing other TS interpretations for inaccuracies; (4) assessing generic impacts; and (5) performing plant modifications.

The inspectors noted that, when the license implemented the Improved TS, the scope of some corrective actions changed. The inspectors reviewed training attendance records and training information and found that the target audience and subject training presented were adequate for the issues. The inspectors found that the licensee voided TS Interpretation 94-06, which had provided an inaccurate interpretation of TS and that the licensee had identified and voided several other TS interpretations that were no longer needed. The inspectors reviewed the assessment of generic impacts and considered the assessment thorough as demonstrated by the items reviewed and the resulting type and number of required surveillance procedure changes. The inspectors also found the Technical Evaluation Request 96-0177-0, Equivalent Change Evaluation TER 96-0177, and screening for licensing basis change were adequate for the corrective action design changes.

O8.3 (Closed) Violation 50-397/96327-01033: inadequate startup procedures

On June 12, 1996, the licensee changed modes without testing of the containment function of specific reactor core isolation cooling (RCIC) valves. The corrective actions consisted of discussing the event with operations crews, clarifying startup procedure requirements regarding RCIC testing, establishing a field in the maintenance work order software to display mode change restrictions which apply to a work order, and establishing an administrator position for outage-associated equipment testing.

The inspectors reviewed the training attendance log and subject training and found that the target audience and subject training presented were adequate for the issues. The inspectors also reviewed Procedure 3.1.2, "Reactor Plant Startup," Revision 43, and found that the testing requirements for RCIC were clarified. During the review of the method used to identify and track work items that impact the ability to change modes, the inspectors noted that the corrective action originally specified was no longer implemented. Subsequently, the inspectors found that the licensee had implemented an adequate process for tracking work items that impact the ability to change modes. Specifically, the licensee used a "Technical Specification Inoperable Equipment/LCO/RFO Status Log" that contains an entry titled "Mode Change Allowed: Yes___No___." The log was used to track all inoperable equipment and mode change restrictions and was required to be reviewed by operations personnel prior to mode change.



The inspectors found that the licensee did not establish measures to ensure that a postmaintenance/surveillance administrator position would be established for outage-associated equipment testing as committed to in Letter G02-96-250. However, despite the fact that measures were not in place to establish an administrator position, the inspectors found upon review of licensee procedures that sufficient requirements are in place to ensure that required postmaintenance testing and surveillances are performed prior to change in mode.

The two instances where the licensee failed to fully implement or appropriately change regulatory commitments in accordance with Procedure SWP-LIC-01, "Regulatory Commitment Change Process," Revision 0, indicated a weakness in the regulatory commitment tracking system and commitment change process.

O8.4 (Closed) Violations 50-397/96327-01043 and -01053: missed recirculation loop flow mismatch surveillance and missed average power range monitor channel check surveillance

On June 13 and 14, 1996, the licensee, while in Mode 2, failed to verify at least once per 24-hour period that recirculation loop flow mismatch was within limits. Similarly on June 21 and 23, 1996, the licensee, while in Mode 1, failed to perform required daily average power range monitor channel checks. The corrective actions for both violations consisted of discussing the event with operating crews, modifying surveillance and startup procedures, and reviewing other surveillance procedures to determine if similar problems existed.

The inspectors reviewed the training attendance log and subject training and found that the target audience and subject training were adequate for the issues. The inspectors reviewed Procedure OSP-RRC-D701, "Jet Pump Operability and Recirculation Loop Flow Mismatch," Revision 2; Procedure 3.1.2, "Reactor Plant Startup," Revision 43; and Procedure OSP-INST-H101, "Shift and Daily Instrument Checks (Modes 1, 2, and 3)," Revision 11. The inspectors found that the procedure changes clarified the TS requirements, added steps to perform required surveillances, clarified when surveillances were to be performed, and improved the method of verification. The inspectors noted that the procedure changes should ensure that the missed surveillances are now captured by procedure. In addition, the inspectors found that the licensee's review of other operations surveillance procedures for similar problems resulted in proposed procedure changes.

O8.5 (Closed) Licensee Event Report (LER) 50-397/98-002-00: reactor scram and transient because of failed closed main steam isolation valve

The licensee performance and regulatory compliance aspects of the subject report are adequately documented in NRC Inspection Report 50-397/98-05.

- O8.6 (Closed) LER 50-397/98-003-00: reactor scram while shut down because of low reactor water level.

The licensee performance and regulatory compliance aspects of the subject report are adequately documented in NRC Inspection Report 50-397/98-05.

- O8.7 (Closed) LER 50-397/98-011-00: emergency core cooling system pump room flooding because of fire protection system pipe break.

The licensee performance and regulatory compliance aspects of the subject report are adequately documented in NRC Inspection Report 50-397/98-20.

II. Maintenance

M1 Conduct of Maintenance

M1.1 General Comments

a. Inspection Scope (61726, 62707)

The following maintenance and surveillances were observed and/or reviewed:

- Procedure 10.24.32, "PM Cal/Test - Rosemount DP Transmitters," Revision 9 (residual heat removal heat exchanger service water flow)
- Procedure OSP-ELEC-M703, "HPCS Diesel Generator Monthly Operability Test," Revision 4
- Procedure ICP-CRD-X901, "HCU Scram Accumulator Pressure Low/Leak Detection - CFT/CC," Revision 0
- Procedure MSP-SGT-B102, "Standby Gas Treatment System Unit B HEPA Filter Test," Revision 2

a. Observations and Findings

The observed work activities were properly implemented in accordance with the established instructions. Where appropriate, operators properly entered and complied with TS action statements. A spot check of personnel qualifications found that personnel implementing the maintenance activities were qualified. The inspectors also reviewed operational logs associated with the SGT system testing and found that they were inaccurate or not complete. Following are several examples:

- (1) An October 7, 1998, 11:35 p.m. log entry indicates Fan SGT-FN-1B2 was shutdown; however, there is not a previous entry for starting the fan.



- (2) An October 8 12:20 a.m. log entry indicates that Procedure MSP-SGT-B104 was being performed when actually Procedure MSP-SGT-B102 was being performed.
- (3) An October 8 2:08 a.m. log entry indicates Fan SGT-FN-1B2 was shutdown; however, there is not a previous entry for starting the fan.

M8 Miscellaneous Maintenance Issues (92902)

M8.1 (Closed) Unresolved Item 50-397/98005-05: condensate storage tank return valves not within scope of maintenance rule

The NRC staff concluded that Valves RCIC-V-22 and RCIC-V-59 (RCIC test return line valves) were not required to be within the scope of the maintenance rule. This conclusion was based on the licensee having implemented the actions identified with Generic Letter 96-05, "Periodic Verification of Design-Basis Capability of Safety-Related Motor-Operated Valves." Specifically the RCIC system was declared inoperable whenever Valves RCIC-V-22 and RCIC-V-59 were open. This is in recognition that the valves were outside the scope of their Generic Letter 89-10, "Motor-Operated Valve Testing and Surveillance," program. The licensee stated that Valve RCIC-V-59 was not designed to be able to open against system operating pressure. Thus, when establishing the test return flow path, operators are expected to open Valve RCIC-V-59 prior to opening Valve RCIC-V-22, which would expose it to system operating pressure. During the March 1998 reactor scram, the licensee suspected that Valve RCIC-V-22 had been opened prior to opening Valve RCIC-V-59, which resulted in Valve RCIC-V-59 binding. Generic Letter 89-10, Supplement 4, "Consideration of Valve Mispositioning in Boiling Water Reactors," does not require establishing testing of valves for conditions caused by operational errors from the control room.

However, the inspectors noted that the operation of the RCIC system during the March 1998 event challenged the system reliability and the passive containment isolation function of Valves RCIC-V-22 and RCIC-V-59. A study (AEOD/S97-02) of RCIC system reliability for the period 1987-1993 (conducted for the Reliability and Risk Analysis Branch, Safety Programs Division, Office of Analysis and Evaluation of Operational Data, U.S. NRC) identified that the failure probability of the RCIC system to restart was twice that of the failure probability to initially start. The inspectors found that the inability to establish recirculation flow through the test return line and subsequent startup and shutdown of the system to control reactor vessel level unnecessarily challenged the reliability of the RCIC system to support decay heat removal and short-term cooling.

M8.2 (Closed) Violations 50-397/97014-02, -03 and LER 50-397/97-009-00: missed inservice testing (IST) for Valve TIP-V-6, transversing incore probe purge check valve, and failure to maintain containment penetration isolated with inoperable containment isolation valve

The violations and LER specifically addressed the following issues: (1) At the completion of Refueling Outage R12 (July 4, 1997), surveillance testing in accordance with the requirements of the IST program had not been performed on Valve TIP-V-6;

and (2) between July 18 and August 12, 1997, while the unit was in Mode 1 with Valve TIP-V-6 inoperable, the affected penetration was unisolated continuously and was not under administrative controls as required by TS.

The corrective actions for Violation 50-397/97014-02 consisted of all associated corrective actions identified in LER 50-397/97-009-00 in addition to several other corrective actions. The licensee: (1) modified the surveillance procedure for Valve TIP-V-6 to clarify when local leak rate testing results can be used, (2) reviewed other IST procedures performed during the subject refueling outage to ensure all IST program plan requirements were met, (3) tested Valve TIP-V-6 as required by TS amendment, (4) reviewed other IST procedures to determine if clarification of acceptance criteria was required, (5) trained control room personnel, and (6) modified the startup checklist to include a step that requires the IST program lead's signature verifying that all IST procedures, having a mode change impact, have been reviewed prior to startup.

The inspectors noted that Procedure OSP-TIP/IST-R701, "TIP Valve Operability - Refueling Shutdown," Revision 1, was modified to clarify when local leak rate test results could be used for purposes of the surveillance. The inspectors found that testing had been completed in accordance with Procedure OSP-TIP/IST-R701 on March 13, 1998. Based on the number of IST procedure performances reviewed by the licensee, the inspectors concluded the licensee performed an appropriate review. In addition, the inspectors determined that the licensee review of IST program plan procedures for clarity was satisfactory, based on the identification and modification of ten IST procedures that required clarification of requirements.

The inspectors reviewed training provided to control room personnel on IST program issues during requalification Cycle 98-2 and found it to be adequate. The training was provided to "enable the control room staff's adequate review of performed IST procedures." However, the inspectors did not find measures established to ensure that IST program training would be provided to control room personnel in the future. The lack of continuous training does not appear to be a significant problem because of the implementation of other corrective actions.

The inspectors reviewed Procedure 3.1.1, "Master Startup Checklist," Revision 24, and found that the licensee modified the procedure to require the IST program lead's signature after the lead had verified that all mode change requirements had been completed related to IST.

The corrective actions for Violation 50-397/97014-03 consisted of an immediate corrective action of isolating the subject penetration and a followup corrective action of training licensing personnel on verbatim interpretation of TS. The inspectors found that the penetration was isolated, as indicated, and that licensing personnel did receive training on verbatim interpretation of TS. The corrective actions were appropriate for the circumstances.

M8.3 (Closed) LER 50-397/97-007-00: voluntary report of automatic start of emergency diesel generators because of undervoltage condition



The licensee initiated this voluntary report when the Division I and II emergency diesel generators automatically started because of a momentary bus undervoltage condition. The root cause of the event was determined to be an internal fault in the Train C circulating water pump motor. The internal fault momentarily dropped voltage on the Division I and II 4160 Vac vital buses until the fault was cleared. The emergency diesel generator output breakers did not close as the buses continued to be powered from the station startup transformer. The corrective actions to address the failure of the nonsafety-related circulating water pump were appropriate.

- M8.4 (Closed) LER 50-397/98-007-00: inadvertent full scram and Division I emergency core cooling safety injection

The licensee performance issues and regulatory compliance aspects of the subject report are adequately captured in NRC Inspection Report 50-397/98-13.

- M8.5 (Closed) LER 50-397/98-008-00: inadvertent full scram during reactor pressure vessel leak testing in Mode 4

The licensee performance issues and regulatory compliance aspects of the subject report are adequately captured in NRC Inspection Report 50-397/98-13.

- M8.6 (Closed) LER 50-397/98-009-00: nuclear steam supply shutoff system, Groups 3 and 4, isolations during testing

The licensee performance issues and regulatory compliance aspects of the subject report are adequately captured in NRC Inspection Report 50-397/98-13.

III. Engineering

E8 Miscellaneous Engineering Issues (92903)

- E8.1 (Closed) LER 50-397/97-003-00: notification of noncompliance with TS

The response time testing for reactor protection system, emergency core cooling system, and containment isolation system instrumentation did not comply with TS. The licensee concluded that the root cause of the TS violations was inadequate change management for regulatory requirements. Specifically, the licensee revised its methodology for performing response time testing of instrumentation using the provisions of Licensing Topical Report NEDO-32291. The methodology in NEDO-32291 was approved by the NRC staff and provides for a more qualitative assessment of instrument loop response time compared to the traditional quantitative testing prescribed by TS. However, in implementing the provisions of the NEDO report, the licensee failed to request a change to the instrumentation TS. As a result, the approved TS continued to require quantitative testing of instrumentation loop response time.

Following the NRC staff's identification of the discrepancy between the WNW-2 TS and licensee implementation of the NEDO report, the licensee requested and received approval for a Notice of Enforcement Discretion to allow continued plant operation while



ATTACHMENT

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Licensee

D. Coleman, Regulatory Affairs Manager
F. Diya, System Engineering Manager
D. Giroux, System Engineering
V. Harris, Assistant Maintenance Manager
P. Inserra, Licensing Manager
S. Oxenford, Operations Manager
G. Smith, Plant General Manager

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

Closed

50-397/96327-01013 (EEI 96019-01)	VIO	operational mode change made with equipment inoperable (Section O8.1)
50-397/96327-01023 (EEI 96019-02)	VIO	various surveillances inappropriately deferred until after mode change (Section O8.2)
50-397/96327-01033 (EEI 96019-03)	VIO	inadequate startup procedures (Section O8.3)
50-397/96327-01043 (EEI 96019-04)	VIO	missed recirculation loop flow mismatch surveillance (Section O8.4)
50-397/96327-01053 (EEI 96019-05)	VIO	missed average power range monitor channel check surveillance (Section O8.4)
50-397/97138-01013 (EEI 96022-01)	VIO	failure to perform reactor protection system response time testing in accordance with TS (Section E8.3)

50-397/97138-01023 (EEI 96022-02)	VIO	failure to perform isolation system response time testing in accordance with TS (Section E8.3)
50-397/97138-01033 (EEI 96022-03)	VIO	failure to perform emergency core cooling system response time testing in accordance with TS (Section E8.3)
50-397/97138-01043 (EEI 96022-04)	VIO	failure to obtain NRC approval for elimination of TS requirement (Section E8.3)
50-397/97014-02	VIO	failure to perform inservice testing of Valve TIP-V-6 (Section M8.2)
50-397/97014-03	VIO	failure to maintain containment penetration isolated with inoperable containment isolation valve (Section M8.2)
50-397/97-003-00	LER	notification of noncompliance with TS (Section E8.1)
50-397/97-004-00	LER	TS-required manual scram resulting from an indication of entry into Region A of the power-to-flow map (Section E8.2)
50-397/97-004-01	LER	TS-required manual scram resulting from an indication of entry into Region A of the power-to-flow map (Section E8.2)
50-397/97-007-00	LER	voluntary report of automatic start of emergency diesel generators because of an undervoltage condition (Section M8.3)
50-397/97-009-00	LER	missed inservice testing for Valve TIP-V-6 (Section M8.2)
50-397/98-002-00	LER	reactor scram and transient because of failed closed main steam isolation valve (Section O8.5)
50-397/98-003-00	LER	reactor scram while shut down because of vessel low level (Section O8.6)
50-397/98-007-00	LER	inadvertent full scram and Division I emergency core cooling system injection (Section M8.4)
50-397/98-008-00	LER	inadvertent full scram during reactor pressure vessel leak testing in Mode 4 (Section M8.5)
50-397/98-009-00	LER	nuclear steam supply shutoff system, Groups 3 and 4 isolations during testing (Section M8.6)

50-397/98-011-00

LER emergency core cooling system pump room flooding because of fire protection system pipe break (Section O8.7)

50/397/98005-05

URI condensate storage tank return valves not within scope of maintenance rule (Section M8.1)

LIST OF ACRONYMS USED

CAR	Code of Federal Regulations
FSAR	Final Safety Analysis Report
IST	inservice testing
LER	licensee event report
NRC	U.S. Nuclear Regulatory Commission
PDR	Public Document Room
RCIC	reactor core isolation cooling
SGT	standby gas treatment
TS	Technical Specifications
VIO	violation
WNW-2	Washington Nuclear Project-2

SITE COVERAGE FOR RI COUNTERPART MEETING - NOVEMBER 17-19, 1998

SITE	COVERAGE
ANO	Russ Bywater
CALL	Howard Bundy
CNS	Bill McNeill
CPSES	Paula Goldberg/Paul Gage
DC	Cliff Clark
FCS	Claude Johnson
GG	
PV	Dennis Schaefer
RBS	
SONGS	John Whitemore
STP	Mike Runyan
WAT3	Rebecca Nease
WC	Lee Ellershaw
WNP-2	Chuck Paulk

