U.S. NUCLEAR REGULATORY COMMISSION

REGION V

Report No:	50-397/92-22
Docket No:	50-397
License No:	NPF-21
Licensee:	Washington Public Power Supply System P. O. Box 968 Richland, WA 99352
Facility Name:	Washington Nuclear Project No. 2 (WNP-2)
Inspection at:	WNP-2 site near Richland, Washington
Inspection Conducted:	June 1 through June 26, 1992
Inspector:	K. E. Johnston, Project Inspector

Approved by: P. H. Johnson, Chief, Reactor Projects Section 1 — 7/24/92 Date Signed

Summary:

Inspection on June 1 through 26, 1992 (Inspection Report No. 50-397/92-22)

Areas Inspected: Inspection of high pressure core spray diesel generator loss-of-power testing, in accordance with complex surveillance Inspection Procedure No. 61701. In addition, the inspector reviewed open items in accordance with Inspection Procedure No. 92701.

Safety Issues Management System (SIMS) Items: None.

Results:

General Conclusions and Specific Findings:

The inspector observed the performance of high pressure core spray diesel generator (HPCS DG) loss-of-power (LOP) testing. Although the test verified compliance with WNP-2 Technical Specifications, the inspector observed that:

- Procedure discrepancies indicated weaknesses in the licensee's procedure validation process. In all cases, the licensee responded to procedure discrepancies appropriately and proceeded with due caution (paragraph 2.a).

- The testing did not verify the ability of certain diesel generator support equipment, necessary for LOP operation, to respond as designed (non-cited violation, paragraph 2.b).

In addition, the inspector found that the licensee's disposition of a leaking relief valve on the HPCS DG starting air system was limited in scope and did not address other system discrepancies which could also affect reliability. As a result of the inspector's findings, the licensee found a replacement valve in warehouse stock and installed it before plant restart (paragraph 2.c).

Significant Safety Matters: None.

Summary of Violations and Deviations: One non-cited violation was noted, involving inadequate testing of diesel generator room fans which are required to operate following a loss of offsite power (paragraph 2.b).

Open Items Summary: One open item was closed and one new item was opened.

DETAILS

1. Persons Contacted

*J. Baker, Plant Manager
*L. Harrold, Assistant Plant Manager
*D. Pisarcik, Health Physics and Chemistry Manager
*R. Webring, Plant Technical Manager
*W. Shaeffer, Acting Operations Manager
*J. Rhoads, Manager, Operating Events Analysis and Resolution
*C. McGilton, Manager, Operations Assurance Programs
*M. Reis, Compliance Supervisor
*R. Latorre, Supervisor, Corporate Licensing
T. Meade, Supervisor, Electrical Systems, Plant Technical
*S. Willman, Senior Engineer, Quality Assurance

The inspector also talked to other licensee employees during the course of the inspection.

*Attended the Exit Meeting on June 26, 1992.

2. High Pressure Core Spray (HPCS) Diesel Generator (DG) Loss of Power (LOP) Testing (61701)

The inspector observed the performance of Surveillance Procedure 7.4.8.1.1.2.6, "HPCS Diesel Generator Loss of Power Test," performed on June 24 and 25, 1992. The inspector found that the test verified compliance with WNP-2 Technical Specification surveillance requirements 4.8.1.1.2.e.2, .3, .8, and .13. However, the inspector made the following observations:

- Procedure discrepancies indicated weaknesses in the licensee's procedure validation process. In all cases, the licensee responded to procedure discrepancies appropriately and proceeded with due caution.

- While the test verified compliance with the Technical Specifications, it was not used to demonstrate that some diesel generator support equipment necessary for LOP operations would respond as designed.

- The licensee's disposition of a leaking relief valve on the HPCS DG air start system was limited in scope and did not address other system discrepancies which would also affect reliability.

a. Procedure Weaknesses

The inspector observed portions of HPCS DG testing performed on June 24 and 25. During the testing, the inspector observed that weaknesses with procedures resulted in substantial delay. In each instance, the licensee proceeded with appropriate caution while troubleshooting and did not continue the test until the problems were resolved and the procedure revised. However, as discussed below, the weaknesses indicated that attention to detail in the procedures and in test preparations could be improved.

Inadequate filling and venting of the HPCS DG fuel oil lines: On June 23, 1992, the licensee was attempting to perform a temporary test (8.3.232 TP) to verify the performance of a DG starting air system design change. The test required that the HPCS DG be lined up in accordance with its operating procedure. The operating procedure, Plant Procedures Manual (PPM) procedure 2.7.3, required that fuel oil pressure be verified on a local gage. The system engineer observed that fuel oil pressure could not be established.

Plant maintenance personnel determined that the fuel oil system had not been adequately filled and vented following design change work on the system. The system was subsequently filled and vented.

The inspector discussed this weakness at the exit meeting. The plant manager committed to determine at what point the fuel oil system should have been filled and vented and revise appropriate procedures.

Local indication of DG voltage inoperable during test: On June 24, 1992, after the first LOP initiation, DG voltage could not be determined at the local panel as expected. Following troubleshooting, it was determined that a switch at the local panel (which selected either DG voltage or "normal" bus voltage) was in the "normal" position, as required by PPM 2.7.3.

Incorrect instructions for power assisted rotation of the DG: On June 24, 1992, the licensee's attempt at a controlled rotation of the HPCS DG using the starting air system failed due to procedure errors.

All of the licensee's procedures which required the DG to be started for testing included steps to check the cylinders for water. The procedures required the HPCS DG to be rotated once using the starting air system and the test cock valves on each cylinder to be opened to check for fluid discharge. To facilitate HPCS DG rotation using starting air, during the refueling outage, a bypass switch was installed during the outage to allow one of the two starting air isolation solenoid valves to be energized without a start signal.

The LOP surveillance procedure included two mistakes which prevented starting air from turning the DG:

- The DG mode switch must be in the "MAINT" position; it was in the "LOCAL" position.

- The west starting air header supply valve must be opened to turn the DG; the procedure called for the east starting air header supply valve to be open.

Similar procedures (such as the HPCS response to a LOCA) included these steps. The inspector determined that the procedure had been through a verification and validation process, including a procedure walk-through. At the exit meeting, the plant manager committed to review the circumstances surrounding these procedure weaknesses.

b. DG Room Ventilation Response to LOP

On July 17, 1992, the licensee's design engineering group identified that diesel room air supply fans DMA-FN-12, 22, and 32 (one for each DG) tripped on a LOP and did not automatically restart. Further, it was determined that operation of these fans was assumed in the design basis. This finding was verified for DMA-FN-22 during LOP testing for the Division 2 DG.

The inspector observed that the licensee did not use the HPCS DG LOP test to verify that the HPCS DG supply and exhaust fans performed their design basis function. In addition, documentation of the testing, as completed, could have indicated to a future reviewer that the fans had responded appropriately.

The inspector noted the following during the HPCS DG LOP testing:

- DMA-FN-32 did not restart following a LOP.
- DEA-FN-31, the exhaust fan for the DG room, was cleared for preventive maintenance and did not start.
- In response to the LOP test, the local operator observed that DMA-FN-32 had stopped, and turned it and fans DEA-FN-32 and DEA-FN-33 on (each 1/2 h.p. fans exhausting the fuel oil day tank room and fuel oil pump room). Although there was no specific step in the procedure to do so, the equipment operators had recently been trained to turn on the fans following a LOP.
- The equipment operators logged in attachment 9.3 to the procedure that all fans, except DEA-FN-31, were on, without indicating which fans were manually started.

The inspector reviewed Problem Evaluation Request (PER) 292-705 to evaluate the root cause determination of the June 17, 1992 discovery that some DG room fans would not automatically restart. The inspector discussed the ongoing review with the licensee root cause reviewer. The licensee reviewer stated that he was investigating why it was not recognized during previous tests that DMA-FN-12, 22, and 32 did not restart. The reviewer had determined that equipment operators had apparently always restarted the fans and listed the fans as running and had not noted that any of the fans had stopped.

At the exit meeting, the Plant Manager acknowledged that the procedure had not been used to the extent possible and that there may be some misunderstanding of the intent and implementation of the verification checklist. He committed that this would be followed up as part of the PER resolution.

Criterion XI of 10 CFR 50, Appendix B, requires that a test program be established to assure that testing required to demonstrate that systems and components will perform satisfactorily in service is identified and performed in accordance with written test procedures. The licensee's failure to include the diesel room fans in their

testing program is an apparent violation. This licensee-identified violation is not being cited because the criteria specified in Section VI.B(2) of the Enforcement Policy were satisfied (NCV 92-22-01, Closed).

c. Leaking DG Starting Air Receiver Relief Valve

On June 22, 1992, the inspector observed that a relief valve (DSA-RV-13) on one of the HPCS diesel starting air receivers was leaking. The inspector also observed that a maintenance deficiency tag had been hung on the valve.

The inspector noted that air receiver pressure would bleed from 243 psig (the compressor high pressure shutoff setpoint) to 220 psig (the compressor low pressure start setpoint) in approximately 15 minutes. The compressor would then start to make up the air volume.

The inspector discussed this deficiency with the maintenance engineer responsible for the relief valve program and determined the following:

- The setpoint of the relief valve was 250 psig, only 7 psi greater than the compressor high pressure shutoff point.
- The relief valve had been set and leak tested during the outage. There had been four attempts, followed by maintenance, to get the relief valve to be leak tight.
- Soon after the relief valve was reinstalled, it began to leak.
- New valves were on order for installation. The new relief valves would be less susceptible to leakage and would have an adjustable blowdown setting. The new valves were due to arrive at WNP-2 at the beginning of August.

The licensee dispositioned valve DSA-RV-13 acceptable for "use-as-is" on June 25, 1992. The inspector reviewed the licensee's disposition and found that it did not address several aspects which could have affected the conclusion of the disposition. The disposition did not address the following:

- The status of other HPCS starting air system equipment which was in a degraded condition.
- The possibility that the leakage could affect the lift setpoint of the relief valve.
- The leakage rate which would affect the operability of the starting air system and compensatory actions to monitor the system to determine when that threshold would be reached.

The inspector reviewed the 10 CFR 50.59 evaluation associated with the use-as-is disposition of the leaking relief valve. It appeared to conclude the following:

- The function of the relief valves to prevent overpressurization of the air receiver was not affected by the leaking condition.

- The air compressor maintained pressure above required pressure (between 220 and 240 psig).

- The air compressor, which is rated for continuous duty at 200 psig and intermittent duty to 250 psig, could operate three times an hour for five minutes at a time, as had been observed, until the relief valve was replaced.

Status of Other Starting Air Equipment: During a walkdown of the system, the inspector noted the following licensee identified deficiencies:

- The air compressor supplying the air receiver with the leaking relief valve had a deficiency tag. The maintenance engineer responsible for the HPCS DG stated that a reed switch between stages of the compressor was leaking. As a result, the compressor would be less efficient and take longer to restore air receiver pressure. The maintenance engineer did state that since the compressor was operating more frequently, the problems with the leaking reed switch had disappeared.

- The redundant air compressor, which is diesel powered, had a deficiency tag which indicated that the compressor would not automatically start. The maintenance engineer indicated that the compressor had an electrical problem and parts were on order.

- The local annunciator for low starting air pressure was lighted. A similar annunciator in the control room was not lighted. The cause of the lighted local annunciator had not been determined at the time the relief valve evaluation was reviewed.

In addition to the above discrepancies, there was an outstanding Problem Evaluation Request (PER 292-445) regarding the need to revise appropriate setpoints for low starting air receiver pressure annunciation and compressor starting to ensure enough capacity to provide three diesel starts (see section 3.a. of this report).

Effect of leakage on relief valve lift setpoint: Early on June 25, 1992, the inspector asked the maintenance engineer responsible for relief valves whether the lift point of DSA-RV-13 would be affected by leakage. The maintenance engineer indicated that while setpoints of some relief valves could be affected, this was probably not the case for DSA-RV-13. The authors of the disposition did not ask this question of the maintenance engineer prior to the disposition's approval.

Point of inoperability and compensatory actions: The disposition did not specifically discuss at what leakage rate the starting air system became inoperable. However, the inspector learned at the

exit meeting that the Plant Operations Committee, in reviewing the 10 CFR 50.59 analysis, had requested that Engineering determine the service limits of the air compressor and provide an enhanced monitoring plan.

At the exit meeting the plant manager concurred that these issues should be explored, and committed to pursue their resolution. On July 1, 1992 the Plant Manager informed the inspector that a replacement for DSA-RV-13 had been found in the warehouse and would be installed prior to plant startup. He also indicated his disappointment that the replacement valve had not been discovered earlier, and stated that he would determine why it had not been.

3. Followup of Open Items (92701)

a. DG Air Start Receiver Volume Calculations (91-24-02, OPEN)

Inspection report 91-24 noted that the licensee did not have calculations or test data to support the FSAR commitment that starting air systems for the Division 1 and 2 DGs could provide a minimum of seven starts and the starting air system for the HPCS DG could provide three starts (FSAR section 9.5). The licensee had previously identified this concern and was pursuing its resolution.

On June 4, the inspector was provided with a calculation supporting seven starts for Division 1 and 2 DGs and test data supporting three HPCS DG starts. The inspector reviewed these calculations and found the calculations supporting commitments for the Divisions 1 and 2 DGs acceptable. With respect to the HPCS DG, however, the inspector noted that the following issues were outstanding:

- Testing of the HPCS DG indicated that for the third start to occur with air pressure greater than the vendor's recommended minimum start pressure of 160 psig, the first start had to occur at an air receiver pressure of 217 psig. A May 26, 1992 Problem Evaluation Request (PER 292-445) disposition indicated that an alarm setpoint change would be made. As of June 26, 1992, the change had not been made.

- The HPCS DG air start motors apparently consume twice as much air per motor per start as the vendor information suggests and as used by the Division 1 and 2 DG air start motors.

This item will remain open for resolution of the above issues.

b. Inadequate Standby Gas Treatment System (SGTS) Design Change (91-42-01, CLOSED)

Inspection report 91-42 included a violation regarding failure to follow the procedure implementing the requirements contained in 10 CFR 50.59. The analysis supporting a design change to allow greater SGTS fan flow did not thoroughly address the capability of the SGTS fan motors to support this change.

The inspector reviewed the licensee's response and found it to be acceptable. This item is closed based on the following:

- A review of the licensee's revised analysis supporting greater SGTS fan flow which took into account appropriate adverse conditions.

- The review of the licensee's revised 10 CFR 50.59 program documented in Inspection Report No. 92-09.

c. SGTS Fan Inlet Damper Failure

The inspector reviewed the licensee's resolution of PER 292-206 regarding the failure of the inlet damper to SGTS fan 1A1 and found it to be acceptable.

On March 9, 1992, the inlet damper to SGTS fan 1A1 (SGT-EHO-1A1) failed to respond to remote actuation when the actuating rod (the linkage between the actuator and the damper) became disconnected. The inspector reviewed the PER, maintenance work requests AR 7894 and AR 7905, and licensee drawings CVI 02-28-00-96 and 97, and interviewed the system engineer. The licensee's evaluation determined the following.

- The root cause was not specifically determined. The actuating rod, which was threaded on both ends, became disengaged on one end.

- Jam nuts shown on the referenced drawings were not installed. The licensee's review of maintenance records did not identify maintenance which would have removed the jam nuts; the reviewers speculated that the actuating rods had been installed without jam nuts during plant construction.

- Vibration could not have loosened the actuating rod.

- The actuating rod had right hand threads on both end. The licensee speculated that an individual familiar with similar style dampers, with threads reversed on one end to allow convenient adjustment, may have attempted an adjustment and left the actuator rod with insufficient engagement on one end.

- Three of the four SGTS inlet fan damper actuating rods were 3/8" diameter with 3/8" threads. One was 1/2" diameter with 3/8" threads. The referenced drawings did not specify a thread diameter. The licensee could find no maintenance records which would have changed the actuating rod diameter and speculated that this was the diameter used during plant construction. The licensee concluded, based on engineering judgement that a 3/8" diameter was acceptable.

- The licensee installed jam nuts in accordance with the design drawings on all four SGTS inlet dampers. The licensee also

determined that no other dampers of similar configuration were installed in the plant.

The inspector found the licensee's review to be acceptable.

4. Exit Meeting

An exit meeting was conducted with the indicated personnel (refer to paragraph 1) on June 26, 1992. The scope of the inspection and the inspector's findings, as noted in this report, were discussed with and acknowledged by the licensee representatives.

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