U.S. NUCLEAR REGULATORY COMMISSION

REGION V

| 50-397/92-33 |
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| 50-397 |
| NPF-21 |
| Washington Public Power Supply System (WPPSS) |
| Washington Nuclear Plant, Unit 2 Benton County, Washington |
| <u>ted</u> : October 5-9, 1992 |
| D. Acker, Reactor Inspector |
| M. Royack, Acting Chief, Engineering Section $\frac{10/16/92}{10/16/92}$ |
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Inspection Summary:

Inspection during the period of October 5-9, 1992 (Report No. 50-397/92-33)

<u>Areas Inspected:</u>

The inspection was a routine announced inspection of quality assurance functions and followup of engineering open items. Inspection Procedures 35702, "Quality Verification Function;" 92701, "Followup;" 92702, "Followup on Corrective Actions for Violations and Deviations;" and Temporary Instruction 2515/111, "Electrical Distribution System Followup Inspection," were used for this inspection.

Safety Issues Management System (SIMS) Item:

None

<u>Results</u>

General Conclusions and Specific Findings:

The licensee's quality assurance organizations appeared to be identifying safety significant problems.

The time between the identification of problems and the issuance of several quality assurance reports did not appear to support timely resolution of the problems.

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Significant Safety Matters:

None

Summary of Violation or Deviations:

None

Open Items_Summary:

Seven open items were closed.

Temporary Instruction 2515/111, "Electrical Distribution System Followup Inspection," was left open since only 7 of 21 Electrical Distribution System Functional Inspection open items have been closed to date.

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1. **Persons Contacted**

Washington_Public Power Supply System

- *J. Baker, Plant Manager *L. Harrold, Assistant Plant Manager *G. Sorensen, Regulatory Programs Manager *D. Schumann, Principal Engineer, Operating Experience Assessment Review *J. Muth, Principal Engineer, Operating Experience Assessment Review *R. Koenigs, Design Engineering Manager *J. Cantrell, Plant Technical Engineer *S. Davidson, Plant Quality Assurance Manager *S. Washington, Nuclear Safety Engineering Manager T. Meade, Plant Technical Supervisor *D. Feldman, Assistant Maintenance Manager *C. Fies, Licensing Engineer *J. Gearhart, Quality Assurance Director *L. Grumme, Nuclear Safety Assurance Manager R. Matthews, Electrical and I&C Engineering Manager *D. Larkin, Engineering Services Manager *W. Shaeffer, Operations Manager *C. Powers, Engineering Director
- *R. Webring, Technical Manager

Bonneville Power Administration

*B. Milbrot, Bonneville Power Administration Representative

<u>US Nuclear Regulatory Commission</u>

*B. Ang, Acting Senior Resident Inspector *D. Proulx, Resident Inspector *K. Johnston, Project Inspector

*Denotes those attending the exit meeting on October 8, 1992.

The inspector also held discussions with other licensee personnel during the course of the inspection.

2. Quality Verification Function (35702)

The inspector reviewed quality assurance (QA) records and interviewed QA personnel. The inspector evaluated the effectiveness of the licensee's QA organizations to identify safety significant issues and ensure effective corrective actions. The inspector also discussed effective identification and correction of the root causes of problems with the Director of QA.

Α. Organization

The licensee's QA organization consisted of three separate audit groups. The Operational Assurance Programs group performed









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quality assurance surveillances. The Nuclear Safety Assurance group performed technical assessments. The Programs and Audits group performed audits.

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B. <u>Identification of Safety Significant Problems</u>

The inspector reviewed a sample of quality assurance surveillance reports, technical assessment reports and audit reports to assess the significance of the findings.

The inspector found that all three types of QA reports contained examples of safety issues and problems, including informal bypassing of reactor protective system functions, Motor Operated Valves (MOV) program deficiencies, and equipment and personnel safety problems with work in the licensee's switchyard. The QA reports also identified numerous procedure compliance problems.

Based on the sample reviewed, the inspector concluded that the licensee's QA organization was identifying safety significant problems.

C. <u>Verification of Effective Corrective Actions</u>

The inspector reviewed a sample of quality assurance surveillance reports, technical assessment reports and audit reports to assess the effectiveness of the corrective actions.

The inspector found that the corrective actions were generally adequate. However, the inspector noted QA reports that did not appear to be issued in a timely manner, especially technical assessments. The inspector noted a technical assessment that was issued almost 6 months after the end of the assessment period.

The inspector considered that late issue of a QA report would lower the effectiveness of the report and potentially allow problems to continue until the report was issued. The inspector discussed late issue of QA reports with the Nuclear Safety Engineering (NSE) Manager. The NSE Manager noted that the past Director of QA had required that corrective actions be agreed to by the audited organizations before QA reports were issued. The NSE Manager noted that late issue of most of the QA reports was due to getting agreement on the corrective actions.

The inspector considered that QA independence could be lost if agreement from the audited organization was required prior to issuing QA reports. The NSE Manager noted that a new Director of QA had been recently hired and that the new Director had required more timely issue of reports.

The inspector discussed QA independence and timely issue of reports with the new Director of QA. The Director of QA noted that he shared the inspector's concerns regarding timely issue of



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reports and QA independence. The Director of QA noted that he would still allow audited organizations to comment on potential QA findings but QA reports would be issued, when necessary, without agreement on corrective actions.

The licensee provided the inspector with examples of recent QA reports which were issued in a timely manner.

The inspector concluded that the licensee had recently been issuing reports in a timely manner.

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D. Identification of the Root Cause of Problems

The Electrical Distribution System Functional Inspection (EDSFI) team noted that the licensee's QA organization had performed a Safety System Functional Inspection (SSFI) of selected electrical systems in 1989. The self-SSFI identified many technical issues and a number of root causes. The self-SSFI report required resolution of the technical issues. The self-SSFI did not require resolution of the associated root causes.

The NRC EDSFI team later identified many technical issues similar to the technical issues identified by the self-SSFI. The EDSFI team noted that many of the EDSFI technical issues had the same root causes as the technical issues identified by the self-SSFI. The EDSFI team concluded that lack of effective corrective action for the root causes of the technical issues identified in the self-SSFI, contributed to the large number of technical issues identified by the EDSFI team.

The inspector discussed the EDSFI team's root cause finding with the new Director of QA. The Director of QA considered that the QA organization should identify and follow up on corrective actions for underlying root causes. The Director of QA provided to the inspector a copy of a recent QA memorandum. This memorandum identified, for corrective action, eight of the most significant problems at the site, including underlying root causes.

The inspector concluded that the Director of QA's action to request corrective actions for the eight significant problems was a positive step.

3. Followup (92701 and TI 2515/111)

A. <u>(Closed) Followup Item 50-397/91-16-05: Evaluation of Motor</u> <u>Operated Valve Degraded Voltage Calculations</u>

The NRC motor operated valve (MOV) inspection team identified that the licensee had not included appropriate ambient temperatures for MOV degraded voltage calculations.

The NRC EDSFI team identified that electrical test data for MOV



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RCIC-8 did not appear to match calculated data. The EDSFI team's concern was that the characteristics of the RCIC-8 circuit were not the same as assumed in the calculation. The licensee agreed to again take current and voltage measurements for RCIC-8 during the R7 outage as part of this followup item.

During the R7 outage the licensee measured the starting current for RCIC-8 to be 20.2 amps with 130 volts direct current (vdc) on the associated bus. The licensee also operated the valve at a bus voltage of 110.5 vdc (calculated worst case degraded voltage) and at a bus voltage of 105 vdc. The valve operated satisfactorily at both 110.5 and 105 vdc, but starting and run current values were not properly recorded. These current values could have provided additional information in assessing the potential difference between the actual circuit characteristics and the circuit characteristics assumed in calculations.

The licensee also completed MOV degraded voltage calculations. Calculation E/I-02-92-02, Revision 0, "Voltage and Torque Evaluation for DC Motor Operated Valves," indicated that all dc MOVs would be operable at worst case degraded voltage. Valves RCIC-8 and RCIC-13 had the lowest margins, about 25%.

The inspector reviewed the new test data for RCIC-8 and Calculation E/I-02-92-02. The results of this review are provided in the following paragraphs.

1) Background

The inspector noted that most calculations for dc degraded voltage operability assume a linear torque/voltage relationship. Recent independent testing of dc MOVs confirmed this linear torque-voltage relationship for Peerless and Reliance dc motors.

The accuracy of torque/voltage calculations is dependent upon the difference between the specific motor locked rotor torque and the motor class locked rotor torque provided by the manufacturer.

The independent test data indicated that for seven of eight motors tested the specific torque measured matched or exceeded the motor class locked rotor torque. The data also showed that the measured starting current matched or exceeded the motor class locked rotor current for these seven motors. The motor that did not produce the rated locked rotor torque also had lower starting current than the manufacturer's rated locked rotor current.

2) <u>Calculation</u>

Calculation E/I-02-92-02, based on installed circuit and





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manufacturer's motor class data, determined that 20.2 amps of starting current would be available at 110.5 vdc. Based on the calculated 20.35 amps of current available, the licensee used the manufacturer's motor class torque curve to show that 8.6 ft-lbs of torque would be produced by the motor at a bus voltage of 110.5 vdc.

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For RCIC-8, the manufacturer's motor class torque curve showed that the motor was rated for 7.5 ft-lbs but would produce 15 ft-lbs of torque as the motor reached a locked rotor current of 32 amps. The licensee assumed that the motor for RCIC-8 would produce 15 ft-lbs of torque.

3) <u>Required Torque</u>

The licensee had calculated the required torque to be 6.5 ft-lbs.

4) Observations

The inspector noted, although not specifically calculated by the licensee, that the voltage at RCIC-8 would be approximately 78 vdc at a bus voltage of 110.5 vdc.

The inspector noted that the licensee's measured starting current for RCIC-8 was affected by circuit resistance. However, the circuit resistance did not completely account for the difference between the licensee's measured 20.35 amps of starting current and the manufacturer's motor locked rotor current rating of 32 amps.

5) <u>Conclusion</u>

The inspector concluded that calculation E/I-02-92-02 did not completely account for the measured data. As noted by the independent testing, a lower starting current would suggest a lower locked rotor torque for the motor for RCIC-8 and less than 8.6 ft-lbs of torque available at 110.5 vdc.

The inspector discussed his observations and conclusions with the licensee. The inspector noted that this finding suggested that MOV test data needed to be reviewed against calculations to ensure that the calculations adequately bounded the test data. The licensee agreed that the test data for RCIC-8 suggested that less than 8.6 ft-lbs of torque was available at worst case degraded voltage. The licensee agreed to review test data for other dc MOVs to ensure the test data supports the degraded voltage operability determined by the calculations.

The licensee noted that due to the uncertainties in both the mechanical and electrical calculations for RCIC-8, they plan to replace the existing motor. The licensee also noted that they









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planned to test all dc MOVs at degraded voltages.

For RCIC-8, the inspector concluded that the satisfactory operation of the valve at a dc voltage approximately 5% below the expected degraded voltage level and the licensee's commitment to upgrade the motor adequately resolved the inspector's concern for the degraded voltage operability of this valve.

For the other dc MOVs, the inspector concluded that the licensee's calculation was a technically correct method for predicting degraded voltage torque, subject to errors created by incorrect field installations or motor characteristics different than the motor class.

The inspector concluded that the licensee's dc degraded voltage calculations and confirmatory test program were adequate based on the licensee's commitment to test dc MOVs at degraded voltages and review the test data to confirm calculation assumptions. Therefore, this item is closed.

B. (Open) Followup Item 50-397/92-01-08: Control of the Switchyard

The EDSFI team noted that the administrative control of the switchyard was not sufficient to ensure that maintenance activities were safely performed. The licensee had contracted to the Bonneville Power Administration (BPA) for much of the work on switchyard components. Bonneville Power Administration work was done under a licensee/BPA agreement.

The EDSFI team noted that the licensee/BPA agreement was not being followed and did not include quality assurance and quality control review of BPA work. The EDSFI team also identified a number of other safety issues.

As part of the review of QA functions, discussed in Section 2 above, the inspector noted that three separate QA surveillances had recently been performed on switchyard work, including BPA activities. Quality Assurance personnel identified that BPA personnel left the area with a crane extended over a deenergized main transformer and that contractor mechanical work was accomplished without the proper notifications and controls.

The inspector concluded that the licensee was performing adequate quality control surveillances of switchyard activities.

The inspector noted that a new draft licensee/BPA agreement was being circulated for signature. The draft agreement resolved a number of the EDSFI team's concerns. This item will remain open until the licensee/BPA agreement is completed and reviewed.

C. <u>(Closed) Followup Item 50-397/92-01-10: Determination of</u> <u>Acceptance Criteria for Circuit Breaker Contact Millivolt Drop</u>

<u>Tests</u>

The EDSFI team identified that maintenance procedures for safety related molded case circuit breakers required recording the results of a millivolt drop contact test, but provided no acceptance criteria. The team reviewed the most recent data for several circuit breakers and found that the recorded data showed that voltage drops measured across the closed main contacts indicated poor contact mating. The EDSFI team was concerned about the long term performance of these circuit breakers.

The licensee performed thermography checks of the circuit breakers with recorded high voltage drops across closed main contacts. The thermography checks showed that there were no signs of overheating on the closed main contacts for the circuit breakers in question. The licensee concluded that the recorded data was in error. The licensee committed to add acceptance criteria to the circuit breaker maintenance procedures before they would be performed again.

The inspector reviewed the thermography data and agreed with the licensee that the data indicated proper contact mating.

The inspector concluded that this followup item was adequately resolved, based on the thermography data and the licensee's commitment to improve the procedures by adding acceptance criteria. Therefore, this item is closed.

D. <u>(Closed) Followup Item 50-397/92-01-19: Licensee Evaluation of</u> <u>Grounding System</u>

The EDSFI team identified that the licensee could not find any test results to verify adequate system grounding. The team noted that IEEE Standard 142-1972, "Recommended Practice for Grounding of Industrial and Commercial Power Systems," recommended periodic testing of system grounds. The licensee was not committed to IEEE Standard 142-1972.

The licensee found test data from September 1977 which indicated that system grounding within the station boundaries was less than 1 ohm. The EDSFI team had concluded that less than 1 ohm was acceptable based on IEEE Standard 142-1972 guidance. The licensee also concluded that no periodic testing was warranted due to the stable soil conditions in the area.

The inspector reviewed the September 1977 station grounding test data and concluded that the test demonstrated satisfactory system grounding.

The inspector concluded that this followup item was adequately resolved, based on the review of the ground test data and the fact that the licensee was not committed to perform periodic ground

checks. Therefore, this item is closed.

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- Followup on Corrective Actions for Violations and Deviations (92702 and TI 2515/111)
 - A. <u>(Open) Violation 50-397/89-06-06: Pipe Supports Outside Plan</u> <u>Requirements</u>

This item reported that pipe supports were found outside plan requirements. The licensee corrected the installation and made process improvements. Subsequent NRC reviews of this issue in 1990 noted that the licensee had not considered whether this problem could exist in other areas.

The inspector checked on the progress of the licensee's action on this item. The inspector found that the licensee's records for this item showed the item was closed in 1989. The licensee could not find any records which addressed the NRC's concerns about other pipe support problems raised by NRC inspection reports 50-397/90-11 and 50-397/90-27. During the exit meeting the inspector observed that the licensee's review of the original problem did not fully assess the potential for the original problem to exist at other locations in the plant. The licensee acknowledged the inspector's concern and agreed to review the problem and provide the results of their review to the inspector. This item will remain open pending the licensee's review.

B. <u>(Closed) Deviation 50-397/92-01-01: Degraded Voltage Relay</u> <u>Setpoints</u>

The EDSFI team noted that the licensee had committed in 1988 to submit a Technical Specification (TS) amendment to change the degraded voltage relay setpoints. At the time of the EDSFI inspection in January 1992, no amendment had been submitted.

The licensee stated that the amendment had not been submitted when the licensee realized that the effects of the degraded voltage trip points on 480 volt and lower voltage circuits had not been considered.

The licensee also stated that the commitment to the NRC to submit the amendment was not adequately tracked. The licensee changed their tracking system to prioritize NRC commitments.

The licensee completed the degraded voltage relay setpoint calculation and submitted a TS amendment on September 2, 1992.

The inspector reviewed a sample of the technical documents supporting the TS amendment, Problem Evaluation Request 292-895 and Calculation 2.12.58, Revision 3, "Degraded Voltage Relay Settings Calculation."





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The inspector found that the sample of the supporting technical documents reviewed appeared to be technically adequate.

The inspector concluded the original item was adequately resolved based on:

• The licensee's actions to complete the calculations

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- The licensee's submittal of the TS amendment request
- The licensee's action to upgrade their tracking systems
- The inspector's satisfactory review of a sample of the supporting technical documents

This item is closed.

C. <u>(Closed) Violation 50-397/92-01-15:</u> Failure to Update Top Tier Drawings

The EDSFI team identified that the licensee had not adequately updated drawings to reflect actual plant changes.

The licensee determined that the root cause for this finding was that Project Engineering Directives (PEDs) had not been properly tracked to completion. Some on these PEDs had been completed but the tracking record never updated. Drawing changes were keyed to PED completion. The licensee concluded that the scope of this drawing update problem was limited to PEDs.

The licensee reviewed all incomplete safety related PEDs. The licensee identified those PEDs which had actually been completed but the tracking record and associated drawings were not updated. The licensee updated the tracking record and drawings or assigned plant changes to complete the PEDs.

The inspector reviewed selected drawings and found that they had been correctly updated to show PED changes. The inspector noted that all drawings had been updated but one, which was waiting a plant modification. The inspector also noted that the original NRC finding involved only PED associated drawing updates.

The inspector concluded the original item was adequately resolved based on:

- The licensee's completed PED review
- The licensee's drawing updates
- The inspector's satisfactory review of a sample of the drawing updates







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This item is closed.

D. <u>(Closed) Violation 50-397/92-01-16: Updated Final Safety Analysis</u> <u>Report Does Not Contain Current Data</u>

The EDSFI team identified that the licensee Updated Final Safety Analysis Report (UFSAR) had not been updated per NRC requirements. The team identified 11 examples where the UFSAR was not current; 2 of these examples were included in the violation.

The licensee identified that the causes of the problem included not cross referencing calculations and the UFSAR, and inadequate administrative controls of the UFSAR change review process. In some of the examples, new calculations were required to resolve the problems.

The licensee completed all but one of the calculations and submitted the changes for UFSAR update. The last calculation was in the review cycle. The licensee changed the administrative controls on the UFSAR change review process to provide more timely inclusion of changes in the UFSAR.

The inspector reviewed a sample of the UFSAR changes and their associated calculations. The changes and the calculations appeared adequate. The inspector verified that the licensee's organization responsible for issue of the UFSAR changes had received the requested changes and was tracking approval and issue of these changes.

The inspector concluded that the original item was adequately resolved based on the licensee's administrative and technical actions and the satisfactory technical review of a sample of the UFSAR updates. This item is closed.

E. <u>(Closed) Violation 50-397/92-01-21: Management Review of</u> <u>Maintenance</u>

The EDSFI team identified that the maintenance manager was not reviewing the maintenance schedule every two years as required by licensee Maintenance Procedure 10.1.5, Revision 13, "Scheduled Maintenance Systems."

The licensee changed the procedure to reflect their ongoing reliability centered maintenance program review. The licensee stated that the reliability centered maintenance program was performing a continuous review of the maintenance program. The licensee committed to review their task tracking system to verify that other similar overdue actions were reviewed and evaluated.

The inspector reviewed the licensee actions. The inspector considered that the licensee was now in compliance with Maintenance Procedure 10.1.5.





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The inspector concluded the original item was adequately resolved based on the licensee's committed action to review their tracking system and the licensee's compliance with Maintenance Procedure 10.1.5. This item is closed.

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5. <u>Exit_Meeting</u>

The inspector conducted an exit meeting on October 8, 1992, with members of the licensee staff as indicated in Section 1. During this meeting, the inspector summarized the scope of the inspection activities and reviewed the inspection findings as described in this report. The licensee acknowledged the concerns identified in the report.







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