U. S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

REGION V

Report No. 50-397/80-06

Docket No. 50-397 License No. CPPR-93 Safeguards Group

Licensee: Washington Public Power Supply System

P. O. Box 968

Richland, Washington 99352

Facility Name: Washington Nuclear Project No. 2 (WNP-2)

Inspection at: WNP-2 Site, Benton County, Washington

Inspection conducted: April 15-18, 1980

Inspectors: T. W. Bishop, Reactor Inspector — 5-9-80 Date Signed

D. F. Kirsch, Reactor Inspector — 5-9-80 Date Signed

W. J. Wagner, Reactor Inspector — 5-9-80 Date Signed

Approved By: R. T. Dodds, Section Chief, Reactor Construction and Engineering Support Branch — 5-9-80 Date Signed

Summary:

Inspection Conducted April 15-18, 1980 (Report No. 50-397/80-06):

Areas Inspected: Routine, unannounced inspection by regional based inspectors of construction activities, including: Instrumentation work observations and quality records review, licensee response to NRC Bulletins and Circulars, followup on previous inspection items, and a site tour.

The inspection involved 75 inspection hours onsite by three NRC inspectors and one Section Chief.

Results: No items of noncompliance or deviations were identified during the inspection.

RV Form 219 (2)

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DETAILS

1. Persons Contacted

a. Washington Public Power Supply System (WPPSS)

*W. C. Bibb, Project Manager
*M. E. Witherspoon, Division Manager, Quality Assurance
*G. I. Wells, Deputy Project Manager, Construction
*R. M. Foley, Deputy Project Manager, Engineering
*K. D. Cowan, Project Engineering Manager
*L. J. Garvin, Manager, QA Engineering and Systems
*R. Johnson, Project Quality Assurance Manager
*J. M. Steidl, Construction Quality Manager
*D. C. Timmins, SSW Task Force Leader
*R. L. Corcoran, Operations Superintendent
*J. J. Bufis, Test and Startup
*R. Sabol, Quality Assurance Engineer
G. C. Sorensen, Supv. Licensing Engineer
S. R. Kasper, Electrical Construction Superintendent
J. Zimmerschied, Quality Assurance Engineer

b. Burns and Roe, Inc. (B&R)

*M. J. Parise, Special Projects Manager
G. T. Harper, Jr., Technical Support Manager
*H. R. Tuthill, Assistant Quality Assurance Manager
*R. D. Carmichael, Quality Assurance Engineer
L. Akers, Sr. Welding Engineering Supervisor
D. Graziano, Lead Manager Engineer
J. Snyder, Sr. Engineer, Design Supervisor Mechanical
G. Englert, Group Supervisor, Mechanical
M. Burnstein, Resident Project Engineer

c. WSH/Boecon/Bovee and Crail/GERI (WBG)

L. Buckner, Quality Control Supervisor

d. General Electric I&SE

G. Freeman - Site Representative

*Denotes those present at exit interview on April 18, 1980.

2. Licensee Followup on Previous Inspection Findings

a. (Open) Followup Item (50-397/78-09/05): Actions to correct electrical wiring separation defects in General Electric's Power Generation Control Complex (PGCC).

Implementation of GE's action to correct conditions of inadequate electrical wiring separation within the PGCC was examined. The deficiencies in the initial PGCC wiring were identified by GE in a Part 21 report to the NRC (see NRC Inspection Report 50-397/78-09 and 79-16). GE has issued approximately 25 field disposition

reports to date providing corrective instructions. Wire rerouting, separation, termination and inspection/test records were examined, four cables identified on FDDR No. KK1-571 and five cables identified in FDDR No. KK1-571. The inspector identified several instances where the work activities had not been accomplished as required by the FDDRs. For example: cables 8001/E22A-003 and -008 were found to be labeled with both ESSIII and XXXIII designators, both should have been labeled as XXXIII only; cable 8432/E31A-024 was not wired to device SRU1 as specified on the GE Field Interface Termination Summary Sheet 081, revision 008 and the cable was not routed in the ducting specified in the System Cable Routing Sheet 089, Revision 10; cable 4232/E31A-001 was not run inside conduit as specified in Routing sheet 040, Revision 010; cables 8342/E31A-010 and -011 were not routed in the ducting specified in Routing Sheet 083, Revision 010; cable 8432/E31A-010 was not routed in the ducting specified in Routing Sheet 088, Revision 010; conduit for cables 2301/B22H-005 and 4232/E31A-001 had not been properly secured. Licensee representatives stated that these types of problems had also been identified in a recent licensee audit of PGCC activities. The audit had resulted in the issuance of two Corrective Action Requests (CAR No. 1437 to the 218 contractor, and CAR No. 1439 to GE) requiring management attention in this area. Licensee representatives further stated that because of the nature and extent of problems identified that PGCC wiring would be reinspected. This item remains open pending review of the procedures, criteria, and the effectiveness of the reinspection program.

b. (Open) Followup Item (50-397/79-04/07) Electrical Wire Separation at Terminations.

The licensee's program to assure adequate separation of class IE wiring for BOP was examined during previous inspections (see IE Inspection Reports 50-397/79-09 and 79-16). The licensee had previously utilized Project Engineering Directive No. 218-E-460, approved October 10, 1978, to provide separation criteria. This document had been previously reviewed by the inspectors and found to be in compliance with the FSAR. The licensee has since revised the separations criteria and intends to submit the revised criteria, established in response to NRR questions, to NRR by Amendment 9 to the FSAR in about one month. Separation Guidelines for implementation of the revised criteria had been provided to B&R Engineering. B&R is currently responsible for providing all separation requirements on the installation drawings and the contractor (Fischbach/Lord) is responsible for the installation of circuits to drawing requirements. The inspector expressed concern that the revised criteria for separation of associated and reactor protection system circuits from other class IE circuits appeared to be significantly relaxed from previously established criteria. This item will be examined further pending the completion of NRR review and evaluation of the FSAR Amendment 9 submittal.

c. (Open) Unresolved Item (50-397/78-10/03) Information is not available which demonstrates that the clamping devices used to secure rigid electrical conduit will perform their intended function during a seismic event.

Burns and Roe Engineering intends to initiate a testing program to assist in the evaluation of various clamping configurations. In the interim, two Project Engineering Directives (PED Nos. 218-CS-2599 and 218-CS-2877) have been issued to restrict the type of clamping devices to be used, and to provide guidelines for their installation. Further action, which may include reinspection/retrofit, will be defined following the completion of clamp testing and evaluation. This item remains open pending completion of licensee actions.

d. (Open) Followup Item (50-397/79-04/15) Routing of Class IE Cables Seismic II Areas (50.55(e) Item).

On January 17, 1979, the licensee submitted a preliminary 50.55(e) report (letter G02-79-17) stating that certain class IE cables were routed in Seismic II areas, and that Seismic II Reactor Closed Cooling (RCC) system pipe supports were located above the IE cables. The report stated that the radwaste building was evaluated and found capable of withstanding Seismic I loads, and that the RCC pipe supports would be redesigned to Seismic I criteria. In addition, a review of other Seismic II areas was to be performed to assure the specific problem was not repeated elsewhere. In March 1979 licensee representatives stated that an FSAR amendment was being prepared to detail any class IE items and circuits in seismic class II structures (see NRC report 50-397/79-04). During the current inspection it was found that the redesign of the two RCC supports had not yet been completed, due to the low priority of the RCC system. Burns & Roe representatives reported that an analysis of Class IE items and cables in Seismic II areas had been initiated under Project Change Notice No. 6859. However, this PCN was cancelled in December 1979 (WPPSS letter WPBR-79-483 of December 11, 1979), with directions for site personnel to complete the analysis and resolution task. Site analysis/resolution had not been completed as of April 1980. This item remains open pending completion of designated analysis and resolution activities, redesign of the two RCC pipe supports, submittal of the proposed FSAR amendment, and a final 50.55(e) report to the NRC.

e. (Closed) Followup Item (50-397/79-06/02): The containment penetration for a RPV sampling line may fail due to excess thermal cycling (50.55(e) Item).

Licensee and Burns and Roe activities for the weld design on penetration no. X-77A was completed and approved on April 17, 1980 (WPPSS letter WPBR-80-153). The new design, a full penetration butt weld, does not have the limited fatigue life of other designs considered. Installation of the RPV sampling line will be accomplished in accordance with the new design and Project Engineering Directive 213A-CS-0120. The inspector has no further questions on this matter at this time.

f. (Closed) Noncompliance (50-397/79-10/02) Procedures for Operating PWHT Equipment were not developed.

Inadequate procedures for performing PWHT operations were in use by the B&R subcontractor (NRC report 50-397/79-10). The current procedure in use is "Post Weld Heat-Treat Procedure No. 1" (PWHT-1), Revision 9, dated 7/25/79. PWHT-1 was reviewed and approved by B&R on 8/3/79. The inspector examined PWHT-1 for compliance to requirements of AWS D1.1 and ASME Section III.

The inspector verified proper implementation of PWHT-1 by observing an in-process postweld heat treatment. Observed during the PWHT were the number and location of thermocouples, equipment calibration, heat rate, holding temperature and time. Operating instructions and the PWHT procedure were attached to the control panel of the equipment. In addition, the final PWHT records of four welds were inspected for correct heating and cooling rates, and time at temperature. The in-process PWHT and the PWHT records were incompliance to PWHT-1, Revision 9. This item is closed.

g. (Open) Noncompliance (50-397/79-10/03) Insufficient Quality Records for PWHT Procedures.

Sufficient records had not been maintained to furnish evidence of satisfactory heat treating of safety related pipe welding (NRC report 50-397/79-10). These records are for heat treatments performed prior to 9/12/79. Since that date WBG has been performing the PWHT operations. As stated by the licensee (WPPSS letter G1-80-55 of March 5, 1980) WBG has initiated a program to review all completed PWHT records for PWHT conducted by Seattle Industrial. This item remains open pending completion of the WBG review and further examination during a subsequent inspection.

h. (Open) Noncompliance (50-397/79-10/04) Failure to follow PWHT Procedures.

A review of the PWHT recorder charts for welds 1A, 6 and 7 revealed that the heating and cooling rates exceeded procedure and ASME Section III limitations (NRC report 50-397/79-10). Welds 1A and 6 are scheduled to be re-postweld heat treated. Final evaluation on the PWHT data of weld 7 has not been completed. This item remains open pending completion of these activities.

i. (Closed) Unresolved Item (50-397/79-10/05) Metallographic Examination of Weld Repair

Metallographic examination of valve RFW-V-10A revealed an area which appeared to have a different temperature history (microstructure) than other portions of the valve body examined, indicating a repair weld. It was concluded from this examination that the repair was made after the valve was quenched and tempered,

and that the area was never subsequently heated to above the lower critical temperature of the material (NRC report 50-397/79-10).

The inspector reviewed the valve pattern, the weld repair records, certified inspection report, certification of heat treatment, and ASME material specification SA-216. Review of Texas Steel Company's valve pattern number 3098-5 identified the area of concern as Weld Repair No. 75. The weld repair records showed that the weld repair was made on December 16, 1976. The valve body was stress relieved on June 14, 1977 by Oakland Metal Treating Company (Certification No. 23507A). The valve body was subsequently inspected by magnetic particle examination on June 15, 1977 by Peabody Testing/X-Ray Engineering Company. The weld repair, heat treatment and NDE was all performed incompliance with SA-216. This item is closed.

3. Site Tour

a. Structural Steel Welding

During the site tour the inspectors observed arc strikes on structural steel for the Main Steam Relief Valve supports inside the dry well. Further examination established that these supports had not been totally inspected or accepted by WBG. However, WBG personnel stated that the supports were being inspected for conformance to QCP-24 (Hanger Inspection-Traceable Systems) which allowed arc strikes on hanger structural steel outside the weld area. Examination of Specification 2808-215 Sections 17A, C and D verified that arc strikes were required to be removed by grinding. WBG personnel stated that certain support structural steel was not subject to the criteria of Specification 2808-215 Sections 17A, C or D. Subsequent discussions with B&R and WPPSS personnel verified that all welding activities on pipe support structural steel are subject to the criteria of specification Sections 17A, C or D, and that repair of surface blemishes is required. B&R immediately issued Project Engineering Directive No. 215-W-3154 specifying that arc strikes are rejectable defects requiring removal and further requiring WBG to reinspect all pipe hangers and pipe supports inspected to QCP-24 and remove all arc strikes. The inspector had no further questions.

The inspectors noted the following additional discrepancies during the site tour.

(a) Two pipes in the RCC system were not capped; this appeared to be an isolated occurrence.

(b) Cable trays in the cable spreading room had numerious items and debris laying on top of the cables.

(c) A steel plate was laying on cables in a pull box in the diesel generator no. 2 area.

The licensee took prompt action to correct the above discrepancies. The matter of housekeeping will be examined during a future inspection (50-397/80-06/01).

4. Instrumentation - Components and Systems

a. Observation of Work and Work Activities

The inspector examined the installed components of reactor vessel low and high water level and high drywell pressure variables in mechanical panels H22P004 and 5 for compliance with licensee installation procedures and SAR commitments. Those attributes examined included instrument identification, segregation, supports and protection and channel independence. The foundation bolting and grouting of H22P004, P005 and P026 and the mounting of the panel for package air receiver unit for diesel operator 1B were examined.

No items of noncompliance or deviations were identified.

b. Review of Quality Records

The inspector examined the following quality records for the mechanical panels H22P004 and P005 for compliance with procedural requirements:

(1) Receipt inspection.

(2) Storage, handling and identification.

(3) Installation inspection.

No items of noncompliance or deviations were identified.

5. Instrumentation - Cables and Terminations

a. Observation of Work and Work Activities

The following activities were examined for compliance with the revised separation criteria and procedural requirements: storage conditions of cable reels inside the radwaste building hallways, cable termination location, cable identification, termination configuration, tray grounding, cable location, and protection, separation and material identification.

The inspector examined about 400 cable terminations located in various areas of the plant for tightness, cable identification and separation. Discrepancies noted are summarized as follows:

(1) Loose termination screws:

(a) Circuit 2M8AA-0052-C-DIV2 terminated inside the diesel generator 1B package air receiver panel on TB-16 terminals 23 and 28. Terminations had been inspected on July 6, 1979.

(b) One unidentifiable cable terminated at TB-16 terminals 25 and 27 inside the diesel generator 1B package air receiver panel.

(c) Circuit 1RCIC-0033-C-DIV1 terminated at TM3 terminal 1 inside panel 684 Bay F in the control room.

(d) Circuit 3HCPS-0266-C-DIV3 white wire termination located in panel H22P005.

Discussions with inspection personnel indicated that these circuits had been tight when inspections were performed.

The licensee prepared inspection reports requiring correction of these loose terminations and stated that an evaluation would be conducted to determine the adequacy of determination/retermination controls.

(2) Cables of (1)(a) and (b), above, were not identified at the termination point. The licensee had a back-fit program in effect to reinspect previous terminations and provide circuit identification at termination points, as required by procedures.

(3) Cable separation - cable separation inside selected areas of vital switchgear nos. 7 and 8 were examined and appeared satisfactory.

(a) Division 5 reactor protection system circuits routed adjacent to Division 2 associated circuits without barrier inside panel P685, Bay F.

(b) Division B associated circuit routed in bundle with six Division 3 circuits inside panel P681, Bay A.

(c) Two Division B associated circuits routed adjacent to Division 1 circuits inside panel P682, Bay F.

The inspector noted that the revised circuit separation criteria, scheduled for submittal to NRR in FSAR Amendment 9 in about one month, allows the instances noted above and that the revised separation criteria had been implemented onsite (see paragraph 2.b).

(4) Circuit 1LCPS-0001 black wire had about 1/4 inch of insulation removed about 1 1/2" back from the termination lug inside panel H22P026. The licensee wrote an inspection report requiring correction of the discrepancy.

The inspector considers that the discrepancies identified by items (1) and (4), above, were isolated instances based upon the large sample size. The licensee's revised circuit separation criteria, which appears to have been significantly relaxed from previous criteria, will be submitted for NRR review. The circuit separation identified in item (3), above, conform to the revised separation criteria. The inspector had no further questions pending NRR evaluation of the revised separation criteria.

b. Review of Quality Records

The inspector examined the circuit installation documentation consisting of cable pull checklists, pull records and termination checklists for 14 circuits for compliance with procedural requirements. Applicable nonconformances or deviations were also examined. No items of noncompliance or deviations were identified.

6. Sacrificial Shield Wall Fabrication Deficiencies.

The inspector reviewed the status of the SSW Task Force program for reinspection and adequacy of the SSW. The Burns and Roe visual inspection of accessible welds is complete. The visual inspection indicated a 12% rejection rate. That is, out of 1170 welds inspected, 140 were outside the AWS acceptance criteria. Additional testing is in progress and is expected to be completed within the next few weeks. Final assessment on the structural integrity of the SSW will be made after the additional testing results are evaluated.

7. Pipe Whip Restraint Irregularities

The repair program for the 178 Class 1 pipe whip restraints to be used in the containment on the main steam and feedwater systems was reviewed. All welding and quality control activities are being performed by WBG under the WPPSS/B&R quality assurance program. Actual repair work began April 1, 1980; the major portion of this work is expected to be completed by November 1, 1980. The inspector had no further questions at this time.

8. Sacrifical Shield Wall-Potential Lamellar Tearing at Attachment Welds

A major part of the SSW are the attachments being made to it. A number of these attachments, such as the radial beams, were made with weld joints susceptable to lamellar tearing. Lamellar tearing is separation of the base metal caused by high localized stresses and strains induced by weld metal during solidification and cooling, combined with lower strength and ductility of the base metal in the

short tranverse direction (Z - direction). The SSW base metal is ASTM A36 structural steel. The reduction in area values of A36 steel are generally 0-15% in the Z - direction as compared with 50-70% in the longitudinal direction. The SSW plates were buttered prior to welding which is standard practice where lamellar tearing is a potential problem. Though some of these SSW weld joints have been ultrasonically tested there is possibility of delayed lamellar tearing failures from added loads in the Z - direction. At the exit meeting a commitment was made by the licensee representatives to evaluate weld joints for their susceptibility to lamellar tearing where high welding and operational stresses in the Z - direction are encountered (50-397/80-06/06).

9. IE Bulletins and Circulars

The inspector examined licensee's actions taken in response to fourteen IE Bulletins and Circulars. The results of the examination are provided below:

a. IEB 78-04 - Environmental qualification of stem-mounted limit switches: WPPSS letter G02-78-130 of April 27, 1978 reported that NAMCO limit switches no. D2400X will be used at WNP-2, but that they will be a newer environmentally qualified version. This item remains open pending review of the environmental qualification records for the new switches (50-397/80-06/02).

b. IEB 79-15 - Deep Draft Pump Deficiencies: WPPSS letter of September 18, 1979 (no number, same subject) reported that the licensee intends to obtain confirmation from pump suppliers that the design of the WNP-2 pumps, and instructions for assembly, installation and maintenance are adequate to ensure reliable long-term pump operation. This item will remain open pending review of the supplier replies (50-397/80-06/03).

c. IEB 79-21 - Temperature effects on level measurements: This Bulletin was reviewed by cognizant site engineers and was determined to be nonapplicable to WNP-2 since the major vertical portions of the RPV waste level instrument reference legs are located outside the containment. This item is closed.

d. IEB 79-23 - Potential failure of emergency diesel generator field exciter transformer: WPPSS letter of November 2, 1979 (no. G02-79-197) reported that the situtation described in the Bulletin would not be a problem at WNP-2 due to the circuity provided in the WNP-2 generators. In addition, full load testing is scheduled to verify proper operation. The inspector examined the results of the engineering review performed and has no further questions at this time.

e. IEB 79-24 - Frozen Lines: This Bulletin was reviewed by cognizant site personnel. No action is planned since WNP-2 safety related piping was determined to be adequately protected from freezing. This item is closed.

f. IEB 79-28 - Possible malfunction of limit switch at elevated temperatures: WPPSS letter of January 28, 1980 (no number, same subject) reported that the questionable limit switches were not in use or planned for use in high temperature safety related applications at WNP-2. The inspector reviewed the WNP-2 master equipment list and verified that none of the NAMCO EA180 switches were designated for high temperature safety related service. This item is closed.

g. IEC 79-04 - Loose locking nut on limitorque valve operators: The circular has been reviewed by site personnel who determined that the locking nuts would be examined during system lineup tests. WPPSS memorandum no. F-79-1141 stated that test procedure SLT-M-6 was being prepared to cover the inspection procedure. This item is open pending examination of the approved SLT-M-6 (50-397/80-06/04).

h. IEC 79-05 - Moisture leakage in stranded wire conductors: WPPSS memorandum F79-2123 stated that the review of the problem discussed in the circular would be scheduled. This item remains open pending completion of the technical review (50-397/80-06/05).

i. IEC 79-07 - Unexpected speed increase of reactor recirculation MG set: Cognizant site engineering personnel have reviewed the problem described in the circular and determined that the problem is not applicable to WNP-2 since the component involved is not used at the site. This item is closed.

j. IEC 79-13 - Replacement of diesel fire pump starting contactors: WPPSS memorandum of January 21, 1980 (same subject) documented the replacement of the questionable switches and contactors. This item is closed.

k. IEC 79-19 - Loose locking devices on Ingersoll-Rand pump impellers: WPPSS memo of October 2, 1979 reported the results of the engineering review of this problem, determining that the loose locking devices was not a problem on WNP-2 safety-related pumps, due to the difference in configuration. This item is closed.

l. IEC 79-23 - Motor starters and contactors failed to operate: A review of WPPSS inventory has determined that none of the defective components were provided to WNP-2. This item is closed.

m. IEC 79-24 - Proper installation and calibration of core spray pipe break detection equipment: The reported condition has been reviewed and appropriate corrective measures specified, as noted in WPPSS memoranda of January 25 and 31, 1980 (which clarify set point requirements for the core spray pipe break detector pressure switch). The inspector has no further questions on this item at this time.

n. IEC 79-25 - Shock arrester strut assembly interference: The reported condition was reviewed by cognizant site personnel and determined to be nonapplicable since the component involved is not used at WNP-2. This item is closed.

No items of noncompliance or deviation were identified.

10. Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, items of noncompliance, or deviations. The unresolved item discussed in this report is identified in paragraph 2c.

11. Management Interview

At the conclusion of the inspection, a meeting was held with licensee and Burns & Roe representatives as denoted in Paragraph 1. The activities covered during the inspection and the observations and findings of the inspectors were discussed. The inspectors expressed concern regarding the problems associated with control room wiring (paragraph 2.a), the revised cable separation criteria (paragraph 2.b), and the 215 contractor's handling of arc strikes (paragraph 3.a). Licensee representatives stated immediate actions would be taken on these and the other findings identified during the inspection. A specific commitment was made by licensee representatives to reinspect PGCC (control room) wiring.