

U. S. NUCLEAR REGULATORY COMMISSION

REGION V

Report No 50-397/82-14

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

Licensee: Washington Public 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: June 7 - July 9, 1982

Inspectors: R T Dodds m 8/2/82
Date Signed

A. D. Toth, Senior Resident Inspector
Construction

R T Dodds m 8/2/82
Date Signed

R. A. Feil, Senior Resident Inspector
Pre-Operational Testing

Date Signed

Approved by: R T Dodds 8/2/82
Date Signed

R. T. Dodds, Chief
Reactor Construction Projects Section 2

Date Signed

Summary:

Inspection June 7 - July 9, 1982 (Report No. 50-397/82-14)

Areas Inspected: Routine, unannounced inspection of reactor coolant loop piping welding, the mechanical contractor's documentation review and correction activities, review of the status of previously identified NRC inspection findings, and licensee and contractor activities to re-evaluate and improve detailed work methods. The inspection involved 62 inspection hours on-site by the resident inspectors.

Results: Two items of noncompliance were identified in the area of piping fabrication. (Pipe bending procedures were not properly qualified and approved and prompt measures were not initiated to document the condition or identify the nonconforming material--Paragraph (5)).

DETAILS

1. Persons Contacted:

Washington Public Power Supply System

- * H. Crisp, Project Construction Manager
- +J. Garvin, Manager of Quality Performance & Measurements
- * R. Glasscock, Quality Assurance Director
- * P. Harness, Project Engineering
- * B. Holmberg, Assistant Program Director, Engineering
- *+R. Johnson, Project Quality Assurance Manager
- * R. Matlock, Program Director

Bechtel Power Corporation (BFC)

- K. Conway, Quality Control Inspection Lead, Civil
- *+D. Cosgrove, Quality Assurance Engineer
- N. Deever, Non-Destructive Examination Level II
- I. Evans, Contract Coordinator, Civil
- *+J. Gatewood, Project Quality Assurance Engineer
- *+C. Headrick, Project Construction Quality Control Engineer
- +D. Johnson, Manager of Quality
- * P. Lindstrom, Construction Engineering Manager
- +V. Matson, Non-Destructive Testing Supervisor
- * G. Ross, Quality Assurance Engineer
- +G. Stoll, Non-Destructive Examination Level III
- B. Young, Non-Destructive Examination Level II

Burns and Roe Engineering

- *A. Luksic, Project Licensing Manager
- *R. Sabol, Quality Assurance Engineer

Hartford Insurance Company

- * M. Coates, Authorized Nuclear Inspector
- D. Howland, Authorized Nuclear Inspector

Bonneville Power Administration

- * W. Chin, Site Representative

Wright-Schuchart-Harbor/Boecon/General Energy Resources Ins. (WBG)

- B. Koontz, N-5 Certificate of Conformance Group Leader
- T. Page, System Completion Documentation Coordinator
- R. Walters, Field Engineering Boundaries Manager

Other General Contacts and Notes

In addition to the persons identified above, the inspectors interviewed other construction supervision, crafts, engineering, and quality control personnel from the site contractor organizations.

*Denotes personnel present at the exit management meeting.

+Denotes personnel present at a radiography review meeting on July 2, 1982.

2. General

On June 21 the resident inspector at the WNP-1 site (Mr. A. Toth) was re-assigned to the WNP-2 site for follow-up of previous NRC inspection findings and routine examination of current construction activities. Mr. Toth had previously served as the resident inspector at the WNP-2 site between June 1980 and October 1981.

Resident inspectors were on-site June 7-11, 14-17, 12-25, June 28-July 2, and July 6-9. During this period, the inspectors performed routine examinations of activities, including plant tours, record reviews, and interview of personnel. They interviewed several craft individuals, quality control inspectors, engineers and managers regarding any quality concerns which they may have and the applicability of NRC regulations to their work.

A regional office inspector (Mr. P. Narbut) was on-site June 7-11; his activities are documented in a separate inspection report.

A regional inspector (A. D'Angelo) and an inspection supervisor (R. Dodds) were at the architect-engineer (Burns & Roe) offices at Woodbury, New York June 7-11. Their activities are documented in a separate report.

Mr. T. Bishop, Chief of the Construction Projects Branch of the NRC Region V office, was on-site June 23-25 to observe status of the facility and activities of the resident inspection office.

NRC Commissioner T. M. Roberts visited the site on June 29, for a brief orientation and site tour.

3. Significant Project Events Noted

The reactor vessel and primary system hydrotest is planned for early August 1982, with construction priorities being given to repairs and completions of piping and other work for systems to be involved in the test. Planning includes identification of each item of remaining work and incorporation into detailed work schedules.

Documentation reviews by the mechanical contractor, which have been underway for almost a year, are nearing completion within the next two months.

4. Reactor Coolant Loop Piping Welding

The inspector examined work and records and interviewed personnel regarding welding of the reactor coolant loop piping. He considered requirements of the FSAR, the applicable ASME Code, and governing project specification and the quality assurance program. He also reviewed quality control planning and schedule records associated with repairs of nonconforming conditions identified during the reverification program. Specific welding activities examined included:

- a. Air-arc cut-out of a weld on a feedwater line at its penetration of the containment building (RFR-418-3 weld FW-14). This repair was one arising from the WBG documentation review and associated review of radiographs.
- b. Grinding excavation of a weld on a residual heat removal system line inside the containment (RHR-899-46.47 weld FW-10A). This repair was one arising from the Bechtel review of radiographs of prior work, under the reverification program.
- c. Post-weld heat treatment of a weld on the feedwater line outside the containment building, at the isolation valve (RFR-419-3 weld FW-11).
- d. Weld build-up repair of a 26-inch main steam line at an isolation valve within the containment (weld MS-1-BC/C-213-9). This repair was one arising from wall thinning measurements associated with prior grinding preparations for ultrasonic testing.
- e. Welding of lugs on 12-inch residual heat removal system piping (RHR-899-46.47 welds of eight lugs.)
- f. Liquid penetrant examination of lug removal areas of 12-inch residual heat removal system piping (RHR-899-46.47 hanger RHR-SB-39).
- g. Partially completed lugs on residual heat removal piping (RHR-897-20.24 R2 RHR-286-FW25 and RHR-524-FW21).

No items of noncompliance were identified.

5. Reactor Recirculation System Hydraulic Pipe

Examination of stainless steel pipe bending by the instrument contractor disclosed that 24 bends were made in the reactor recirculation system hydraulic piping in accordance with a Johnson Controls Incorporated (JCI) pipe bending procedure using a pipe bender. The pipe bending procedure and the pipe bender had not been qualified as required by the ASME Boiler and Pressure Vessel Code (B&PV) Section III and BPC Procedure No. SWP/P-P-4. The instrument contractor's contract requires the use of BPC procedures. The pipe bending occurred between June 1, 1982 and June 6, 1982. On June 10, 1982 the inspector determined that the pipe containing the unqualified bends was to be installed without the deviation of loss of process control being properly dispositioned.

The ASME Authorized Nuclear Inspector (ANI) notified BPC on June 3, 1982 that portions of the JCI pipe bending procedure were unacceptable because JCI does not have design authority for the BPC contract therefore cannot waive procedure qualification requirements. The ANI did not witness nor had he been made aware of any qualification bends. The ANI had requested that he be made aware of and have the opportunity to witness bending qualifications prior to the performance of production bends. The lack of notification is contrary to the ASME - B&PV Code, Section III, Subarticle NA-5210.

BPC had reviewed and approved the use of the JCI pipe bending procedure with comments relating to use of stainless steel shoes and qualification tests of each heat number. This review and approval is contrary to B&PV Section III which requires special process procedures to be reviewed and accepted by the responsible design organization. Burns and Roe Incorporated is the responsible design organization. Also, the JCI procedure had not been approved by the PFE, the PCQCE and the PQAE as required by BPC Quality Assurance Manual.

On June 9, 1982 BPC Procedure No. SWP/P-P-4 Revision 3 was issued for field use without being reviewed and approved by the responsible design organization. On June 11, 1982 Revision 3 was issued as a controlled document.

Work on the subject hydraulic piping was stopped on June 10, 1982 after inquiry by the NRC inspector. On June 11, 1982, nonconformance report (NCR) No. 881 was issued indicating that (1) the hydraulic piping had been bent without qualification of the pipe bending

procedure or bender and (2) SWP-P-P-4, Revision 3 was issued for field use prior to proper approval. The NCR was written five (5) days after the nonconforming condition was identified by the QAE. The subject piping was not tagged out as nonconforming until the NCR was issued on June 11, 1982.

On June 15, 1982, a Project Engineering Directive (Field Resolution) (FRPED) was issued by BRI at the verbal request of BPC authorizing the deletion or relocation of couplings by the constructor to accommodate fabrication and installation. The FRPED was issued because the Drawing Interim Revisions (DIRs) to Isometric Drawings HY 4237-2- Revision 7, HY 4232-2, HY 4235-2-Revision 7, HY 4236-2-Revision 7 indicated that a coupling was installed in each of the pipe lines. The actual as built pipe did not contain any couplings. This action was done in accordance with applicable procedures.

On June 23, 1982, the licensee issued a Management Corrective Action Request (MCAR) for improvements in process control. The MCAR identified for action by BPC the issues which evolved from the bending of the hydraulic pipe with an unqualified procedure.

The apparent loss of process control in the bending of stainless steel pipe with an unqualified and unapproved pipe bending procedure and using an unqualified pipe bender appears to be an item of noncompliance. The timeliness to effect corrective action once the condition was recognized by the ANI and QAE is an item of noncompliance that warrants special licensee management attention. This was discussed with the licensee during the exit interview. (50-397/82-14-01 and -02).

6. Licensee Actions On Previous NRC Inspection Findings

The licensee has assigned Bechtel Quality Assurance the responsibility to resolve prior NRC findings. The inspector examined these files and related contractor records and interviewed available personnel knowledgeable in the matter.

a. (Open) Unresolved Item (397/79-06-01)

A Leckenby drawing specified a fillet weld size less than the minimum prescribed by the AWS Code, for attaching a bracket plate to the sacrificial shield wall (SSW). This bracket plate would support a pipe whip restraint (PWR).

NRC follow-up reports (Nos. 50-397/79-12 and 79-13) identified that the licensee had corrected the design drawings for the specific brackets in question but had not reviewed the design for other brackets to assure absence of similar errors.

In 1979 the licensee had reported to NRC, under 10 CFR 50.55 (e), a situation of defective welds in the PWR brackets, and corrective actions taken. Repairs of the brackets did not encompass correction of the specified attachment welds; neither did the extensive programs that the licensee recently conducted for repair of welds in the PWRs and the SSW.

The licensee's "NRC INSPECTION OPEN ITEM" log shows that as of April 1, 1980, 50 structural steel drawings had been reviewed for specified fillet weld size, encompassing PWRs, wetwell supports and supporting steel. It notes that "Approximately 90 typical joint configurations specified on design welds drawings for the PWR use fillets which are smaller than the minimum fillet weld size specified in the applicable code".

The engineer's review concluded that the specified weld sizes were structurally adequate, although the Code minimum size criteria may not have been met. The review refers to the AWS D1.2-77 Commentary, AWS-D1.1-75 Code, and the AISC Code, and notes that the Code minimum fillet weld size is based upon concerns over weld heat-input, heat-sink/rapid-cooling, and potential cracking effects. It discusses the installation of the weld beads in one pass, and relates to pre-qualified welding procedures of the AWS Code. It assumes that the actual welds have been installed in accordance with the design with "...no reason to question these (contracts 213A and 215) two contractor's weld documentation at this time." (Subsequent developments, such as the June 17, 1980 civil penalty and 10 CFR 50.54 (f) request, indicate significant cause to question such documentation). The review also conditions its conclusions on, "If field inspection of these welds reveals that no cracks have occurred in the weld zones".

The licensee follow-up files for this item identified no re-inspections of the fillet welds in question, nor evidence that the welding procedures actually used had been qualified by testing to demonstrate adequacy in lieu of complying with the general AWS requirements (which appear to be applicable to use of the AWS pre-qualified welding procedures.)

This item remains unresolved pending availability and review of evidence of proper weld inspection and demonstration that the welding procedures were properly qualified.

b. (Closed) Follow-up Item (397/81-21-03)

The construction manager (Bechtel) had requested the ASME authorized inspector to avoid use of documented findings

and attempt to resolve discrepancies through less formal means. It appeared that this reduced the visibility of identified deficiencies in Bechtel implementation of the quality assurance program, such as to reduce the data available for consideration by the licensee auditors and management.

By January 4, 1982, memorandum to the WPPSS quality assurance manager, the Bechtel Manager of Quality clarified that the ANI was requested to allow Bechtel to document and control the ANI concerns via the Bechtel internal nonconformance report system rather than generating a separate ANI SIS Report. This recognized that the ANI may issue an SIS Report if the Bechtel nonconformance report disposition does not resolve the ANI concerns. All nonconformance reports are evaluated for trends by the Bechtel quality assurance department. Interview of the responsible quality assurance engineer and review of his records shows that such trending is in-fact performed and corrective actions prescribed and documented.

Also, the Bechtel quality assurance organization now obtains copies of each SIS and monitors timeliness of the disposition. The responsible Bechtel quality assurance engineer stated that the licensee last requested and obtained a copy of the SIS Reports issued to date in November 1981. However, the reports are all available for review by the licensee auditors when required. Review of the SIS file indicates that the ANI issues an SIS Report each month, even when no unresolved discrepancies were identified. The ANI stated that he did not feel inhibited from issuing SIS Reports which call for corrective action, when necessary.

This matter is closed.

7. Allegation - Water Loss From Spray Pond

"Spray pond is losing an estimated 18000 gallons a day. The allegor advised that one area he believed where the water is being lost is around the bolts that secure the spray rings to the base of the pond. He advised that, when the bolts were installed, the contractor drilled holes completely through the concrete and installed Hilti type fasteners without properly water proofing the holes."

The allegation relates to a reported 10 CFR 50.55(e) item identified in Report No. 50-397/82-07. The loss of water from the spray pond was identified by the licensee on January 20, 1981. The licensee performed a review for reportability in accordance

with 10 CFR 50.55(e) and reported the item to the NRC on February 1, 1981. This item is being pursued in accordance with the licensee's program as detailed in Paragraph 8.a, below and therefore is not substantiated.

8. Matters Reported to NRC Under 10 CFR 50.55(e)

a. Spray Pond Leakage

The licensee had reported that the spray ponds contained excessive unidentified leakage. Interim reports were issued to NRC March 1 and June 10, 1981; a final report was submitted October 1, 1981 with an updated submittal on June 21, 1982.

The inspector observed in-process repairs, interviewed the responsible Bechtel contract coordinator and quality control surveillance personnel, and reviewed surveillance records and contractor work procedures.

The old sealant material had been removed and new material was being installed at the expansion joints at the floor slabs and at the slab/wall interface. The water-stops had originally been installed improperly at some locations; the work procedures require that, at such locations, the concrete is to be chipped out, the water-stop installations corrected, and the location repaired by grouting. There was evidence that this had been accomplished. The procedures required that cracks in the water-stops be repaired by a hot gas welding technique. The Bechtel contract administrator stated that this had been performed by a specialty sub-contractor experienced in this type work. There was visual evidence that such repairs had been performed.

The procedures required a cork filler, topped with an anti-bonding glass tape over the water-stop at the construction joint. The concrete was to be sand-blasted and coated with a primer to increase bonding of the polysulfide sealant. During this repair work a breakdown in the contractor's receiving/storage/material control system allowed issuance and installation of two cans of incorrect type TH primer (in lieu of type L-102). This resulted in lack of bonding of the polysulfide and need to remove the material; the inspector observed the discarded material.

The inspector observed sandblasting, areas of repaired water-stop, installed cork filler material, installed anti-bonding tape, primed concrete surface areas, and

installed polysulfide sealant. Records and interviews revealed that the final sealant layer was installed on the night shift in order to take advantage of the concrete contraction at lower evening temperatures and to obtain minimum tension on the cured material.

The inspector reviewed the following documentation relative to the above activities:

Peter Kiewit Sons Procedures:

CP-9 Installation of Self Expanding Cork Joint Filler Material and Sealant
CP-33 Repair of Water Stops by Hot Gas Welding

Project Engineering Directives:

PED-210A-CS-0067, 0096, 0273, and 0290

Manufacturer Instruction TT-S-00227E

Bechtel Surveillance Reports:

IR-210A-4-2682, 6-16-82, 6-24-82, 6-25-82, and 7-2-82.

The repair work appeared to be performed with quality assurance program controls, including Bechtel surveillance. However, assurance of the adequacy of the fix will depend upon leakage monitoring at the conclusion of the work, as stated in the licensee's final report. This matter is unresolved pending review of the monitoring results.

b. Weld Radiograph Quality 50.55(e) Report

A Bechtel sampling of pipe-weld radiographs of the mechanical contractor (WBG) revealed a significant number that do not meet ASME Code requirements for film quality, filming technique and weld integrity. The licensee verbally reported this to NRC on November 19, 1981 under 10 CFR 50.55(e), and filed written interim reports December 21, 1981; March 11, 1982; and May 18, 1982.

The inspector interviewed the Bechtel Level II reviewers who have been reviewing the WBG radiographs over the past eight months, in accordance with a special review procedure RT-ASME/WNP-2 Revision 0. The reviewers stated that minor weld quality discrepancies had been identified for 78 of the 2504 previously

approved welds; they displayed the associated nonconformance reports which have been issued and dispositioned as rework/repair. The inspector examined several of the nonconformance reports and during a subsequent plant tour he encountered the repair work in-progress on two of these (Nos. 5007/RHR-899-48-FW10A and 5018/CAC-644-17-FW7). He also met with the construction superintendent and the quality control inspectors to review their planning and scheduling for the repairs.

The inspector met on July 2, 1982, with representatives of the licensee (WPPSS) and construction management (Bechtel) to discuss the results of the review of the WBG radiographs. Persons who attended this meeting are so noted (+) in paragraph 1 of this report. Information conveyed to the inspector at this meeting included the following:

- (1) There are 2999 welds. The Bechtel reviewers checked geometric unsharpness and density of the radiographic file for only 1373 of the welds. For the remainder, the reviewers' general sense of adequacy was relied upon to determine adequacy of the film for proper interpretation, rather than actual measurements for strict compliance with Code limitations. Note: All of the radiographs had previously been accepted by the radiographer, ANI and the fabricator's Level III inspector.
- (2) Management justifies omitting such unsharpness and density measurements based upon the fact that no weld defects were found in 241 welds which were re-radiographed after the original radiographs had been measured and found to have been rejectable because of unsharpness or density variations.
- (3) Management has not compiled and reviewed summary statistics relating to the 241 rejects, such as worst case geometric unsharpness or worst case film density variation and numbers of film in each out-of-limit increment. (e.g. a standard histogram of defects). The licensee stated that the individual review sheets are available should NRC representatives desire to perform more detailed analyses.
- (4) The Bechtel Level III engineer has reviewed each identified reject film, and for 98 of these he compiled some listings which allowed him to estimate some general trends, such as:

- (a) "Most" density rejects were associated with the 15 percent - 30 percent penetrometer variation criteria;
- (b) "Some" rejects were associated with exceeding 2.0-4.0 film-density limits;
- (c) Rejects did not appear to be associated with particular radiographer crews;
- (d) Each geometric unsharpness defect appeared to be associated with heavy-wall, small-diameter (under 3-1/2-inches) piping.

The licensee stated that statistical data will be provided in the final 50.55(e) report to better support acceptance of the radiograph inspection program and to address the inspector's concerns discussed in items (3) and (4) above. This matter remains open.

9. Management Meeting

The inspector met with a representative of the Program Director, the quality assurance manager, and other licensee and construction management representatives to discuss the status of inspection findings and other inspector activities relating to this project. Persons contacted who attended this meeting are so noted (*) in paragraph 1 of this report.

The licensee representatives made no commitments regarding previous unresolved items, other than those described in the paragraphs above.

The Bechtel representative stated that additional data was available relative to the promptness of corrective actions by Bechtel and actions relative to the pipe-bending noncompliance; the inspector agreed to a subsequent follow-up meeting.