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

REGION V

Report No. 50-460/80-07
50-513/80-07

Docket No. 50-460, 50-513 License No. CPPR-134, CPPR-174 Safeguards Group

Licensee: Washington Public Power Supply System

P. O. Box 968

Richland, Washington 99352

Facility Name: Washington Nuclear Projects Nos. 1 and 4 (WNP 1& 4)

Inspection at: WNP 1 & 4 Site, Benton County, Washington

Inspection conducted: April 1-30, 1980

Inspectors: for A. D. Toth, Resident Reactor Inspector — June 25, 1980 Date Signed

Date Signed

Date Signed

Approved By: for R. T. Dodds, Chief, Engineering Support Section — June 25, 80 Date Signed

Summary: Inspection on April 1-30, 1980 (Report No. 50-460/80-07)

Areas Inspected: Routine, unannounced inspection by the resident inspector of construction activities relating to: electrical raceway supports, electrical component installation, reactor coolant pipe welding, containment concrete batch plant, containment concrete materials, containment concrete testing, containment concrete materials, containment concrete placement, foundations settlement monitoring, safety-related piping work, stainless steel welding, and licensee action on previous findings. The inspection involved 87 inspector-hours onsite by one NRC inspector.

Results: Of the 10 areas inspected, one item of noncompliance was identified in the area of electrical cable tray support welding (Para. 4).

Inspection on April 1-30, 1980 (Report No. 50-513/80-07)

Areas Inspected: Routine, unannounced inspection by the resident inspector of construction activities relating to: containment concrete forms and embeds, containment concrete batch plant, containment concrete materials, containment concrete testing, containment concrete placement, spray pond compacted backfill, and licensee action on previous inspection findings. The inspection involved 19 inspector-hours onsite by one NRC inspector.

No items of noncompliance or deviations were identified.

DETAILS

1. Persons Contacted

Washington Public Power Supply System

*M. C. Carrigan, Construction Manager
*T. J. Houchins, Project QA Manager
*G. D. Dyekman, Engineering Manager
*J. P. Thomas, Deputy Project Manager
A. D. Edmondson, Field Engineering Supervisor

United Engineers and Constructors

*E. C. Haren, Deputy Project QA Manager
*G. E. McIntosh, Assistant Deputy Project Manager
*R. H. Bryans, Field Project Engineering Manager
*W. J. Taylor, Deputy Construction Manager
B. F. Brockett, Senior Quality Assurance Engineer

J. A. Jones Construction Company

W. Roe, Quality Assurance Manager
R. Pope, Engineering Manager
D. Higgenbotham, Quality Control Supervisor

G. F. Atkinson, Wright, Shuchart/Harbor (AWSH)

M. Latch, Quality Assurance Manager
T. Canning, Assistant Quality Assurance Manager
B. Field, Assistant Quality Control Supervisor

Foley, Wismer and Becker

J. Collins, Quality Control Supervisor
L. Lint, Quality Inspection Supervisor

Gapco

J. Schumaker, Superintendent

Acme Central Concrete Company

J. Englend, Site Quality Assurance Manager
C. Bell, Quality Assurance Inspector

Pacific Testing Laboratory

K. Johnson, Senior Inspector

The inspection also included discussions with craft, quality control, supervision, and middle management personnel.

*Principal licensee and architect-engineer staff representatives to whom inspection findings were presented at exit interviews.

2. General Construction Activities - Units 1 and 4

The inspector was on-site April 1-4, 7-11, 14-18, 21-25, and 28-30. During this period, plant tours were made during the day shift at various times each week. Craft personnel, supervision and quality control inspectors were interviewed as they were encountered in the various work areas. The inspector examined in-process records, such as work control forms, inspection logs, calibration tags, quality release tags and equipment identification tags.

The tours included observation of facility and equipment relative to compliance with general codes and standards, regulatory guides and requirements, and implementation of quality assurance program requirements. General housekeeping and fire prevention, equipment protection, presence of quality control inspectors for each work area, and work quality were considered.

While observing concrete placement around the fuel pool (placements #2720-2 and #2720-6) the inspector observed dropping of concrete through reinforcing steel and bridging of spaces between close rebar with hardening concrete. The AWSH QC inspector and foreman took prompt action to effect cleaning of the rebar, once the condition was brought to their attention.

No items of noncompliance or deviations were identified during the plant tours.

3. Licensee Action on Previous Inspection Findings

a. (Closed) Unresolved Item (50-460/513-79-12-01): Cable tray quality class 2 vendor furnished items.

The inspector interviewed FWB engineering and quality control personnel to ascertain that all Mark AP-263 material has been inspected and defective material returned to the vendor. Document 1-CNCR-218-509-RI describes this action. Other items supplied by strut vendors, to requirements of UEC detailed designs, have been inspected on-site on a sampling basis relative to proper weld size. Both QC and Engineering personnel have been involved in this inspection. The inspector had no further question on this specific item.

b (Open) Deviation (513/79-10-02 renumbered 513/79-11-02): Spray pond concrete construction joint treatment.

The inspector examined Appendix B of the licensee's January 3, 1980 letter to NRC and assured that the promised corrective action was being implemented. The quantity of water trapped and determination of its effect on the wall was still under consideration. Relative to standing water on horizontal joints, the inspector examined records of the licensee actions and made observations of provisions for removal of water at various spray pond concrete placements encountered during routine plant tours December 1979 through April 1980. Interview of WPPSS/UE&C QA surveillance personnel and review of associated records indicated that this matter has been adequately resolved. This was further confirmed by examination of UE&C QA surveillance

reports of October 1979 thru March 1980 (4SR/CNR-252-71, 72, 75, 85, 92, 104, 110, 116, 125, 131, 132, 134 and 1-SR/CNR-252-225, 226, 227) which document licensee verifications that removal of standing water from construction joints is routinely accomplished by the G. Grant contractor.

c. (Closed) Deviation (513/79-13-01): Access controls for level C storage.

The inspector reviewed actions described in the licensee letters to NRC dated February 19, 1980 and March 18, 1980. The described access control signs were observed on the enclosures at Unit 4 storage areas. Project Materials Management Instruction PMMI-9.1.9 describes access controls, and a list of categories of personnel who are authorized access was published March 19, 1980. Contractor personnel responsible for routine activities in site enclosures, such as preventive maintenance, have been issued special identification. Access controls for level B warehouses have also been improved. Routine inspection activities during January-April, 1980, disclosed that door closures for the temporary enclosures had been improved and the doors were being maintained closed. This item is resolved.

d. (Open) Unresolved Item (460/80-03/01): Unidentified surface contamination on stainless steel pipe spools.

The inspector interviewed the WPPSS Field Engineering Supervisor relative to the basis for a 5 microgram/square-inch acceptance criteria used for disposition of contractor concerns relative to halogen surface contamination of stainless steel piping (reference IE Inspection Report 50/460/80-04). This information was not readily available. The inspector advised that if NRC elected to make measurements of surface contaminations the criteria applied by the licensee would be relevant.

The NSSS contractor's procedure for performing swipe tests (B&W, FS-II-2 Attachment No. 3) and the procedure used by the licensee's test laboratory (HEDL, RDT-F-11-3T) apparently involve differences in obtaining or analyzing samples, which have not yet been resolved. Pending resolution of these differences, performance and evaluation of swipe tests on site have apparently been deferred.

4. Electrical Raceway Supports - Unit 1

The inspector examined work activities for installation of support structures for safety related cable trays. This involved inspection of wall anchorage for supports #1T7-3404-402/403/404/406 and #1T6-3404/399, selected welds of #1T6-3413-2910 and #1T4-3404-300A, and in process QC activities for torquing of bolts and checking welds and dimensions of support #1T6-3404-302. Also included was inspection of the general services building tool room calibrated tools control (7 torque wrenches, 3 meggers, 2 crimping tools, two welding amp-probes and several contact thermometers), the calibration room status and staffing, and warehouse material control. The inspector held discussions with FWB QC, engineering and craft personnel and UE&C surveillance personnel. The inspector also interviewed two UE&C personnel

who were auditing all drawings at each work station for FWB electrical work, with emphasis on assurance of adequate document control of field change notices.

Applicable codes, standards and quality requirements are described in PSAR Section 17; job specification #218; contractor procedures numbered QCP-5A, 5B, 8 and 9; and drawing details T40C, T40D, and T30; and specific drawings for each support number.

Cable tray support structure welds appeared uniform and of sufficient length and well cleaned of slag. However, three of the welds examined were of unequal-leg fillet welds, with one leg not meeting the minimum size criteria of the applicable design and drawings and specifications. The diagonal brace connection to the lower gusset plate of support #1T6-3413-2910 contained two fillet welds which had one leg size of 1/4-inch over the full length; the size specified on detail T40D was 5/16-inch. The horizontal beam to building-steel connection of support #1T4-3404-300A contained one fillet weld which had one leg size of 3/16-inch over the full length; the size specified on detail T30 was 1/4-inch. The FWB procedure 5A part 9.3 permits fillet welds to be 1/16-inch undersize over 10% of the weld length. The observed welds had been accepted by FWB quality control inspectors in spite of the undersize exceeding 10% of the weld length. This appears to be an item of noncompliance. (460/80-07-01)

When notified of this discrepancy, the licensee initiated a prompt survey of other welds on tray supports. One hundred welds were examined with six undersize welds identified. The discrepancies identified by the NRC inspector were documented in nonconformance reports numbered 1-CNCR-218-555 and 586.

The inspector found that the weld material control procedure was not available in the weld material distribution room of the general services building. Contractor QC took prompt action to assure that this procedure #5B is placed in the distribution rooms at WNP-1 and 4. The licensee verified this. The FWB material distribution room attendant loads welders' portable ovens Fridays, for use Mondays. The portable ovens are maintained heated in locked wire enclosures over weekends. The material issuance papers are filled out Fridays, signed, and dated for the following Mondays. The date thus represents the date the weld material is given to the welder, rather than the date of signature. The portable ovens are checked every six months to assure temperatures of 150^{o}F-325^{o}F and at the beginning of each shift to assure proper functioning. Resultant temperature control appears to be only slightly less than provided for the stationary ovens, for which actual oven temperature checks are made at the beginning of each shift, per procedure 5B item 4.3.2.4. The licensee rperesentative stated that the procedure would be amended to clarify the acceptability of this approach.

No items of noncompliance or deviations were identified.

The inspector examined nuts installed in unistrut embeds in concrete walls, where cable tray supports were anchored. Using a small inspection mirror, one nut in each of four channels was identified, which had rotated 90-degrees during installation such that the nut-bolt combination was not supporting any load. (Supports #1T7-3404-402, 404, 406 and 512). The supports had each been green-tagged with FWB quality control inspection tags. Nut rotation was not a specific inspection attribute in the inspection procedure FWB QCP-9, and the required bolt torque verification would not reveal the condition. The inside width of the embedded channel is 1 5/8 inches, whereas the nuts in use were designed to lock into place in proper position in 1 1/4 inch width channel. A similar condition, involving incomplete seating of nuts in strut-channels was identified in UE&C surveillance report #SR/CNR-56 and nonconformance reports #1-CNCR-218-503 and 504. The licensee stated that resolution of the nonconformance reports will incorporate consideration of total nut rotation and the need for rework and/or reinspection of completed anchorages to wall inserts. This matter does not relate to unistrut nut-bolt installations in non-embedded cable tray support components. Since this matter had also been identified by the licensee and is under evaluation, the immediate red-tagging of the identified defective installations appeared to be an acceptable interim action by the FWB quality control staff. The inspector had no further questions at this time.

5. Electrical Components Installation - Unit 1

The inspector examined work activities for protection of installed safety-related electrical equipment. This involved accompanying the FWB QC inspector in his checkout of switchgear cabinets 1-APM-MCC-EA-34A/34B and inspection of RCS-Monitor enclosures #1-RCS-MON-01/02/03/04. Applicable codes, standards and quality requirements are described in PSAR Sections 17 and 3.12 (Reg. Guide 1.38), job specification number 218, and contractor procedures numbered FWB-QCP-4, 15, 17 and 7.

Space heater indicating lights are parallel wired to indicate power to the heaters, but not heater wire continuity. The contractor engineering personnel indicated that some electrical current checks are verified by FWB maintenance. No items of noncompliance or deviations were identified.

6. Reactor Coolant Pressure Boundary Welding - Unit 1

The inspector examined work activities for welding of pipe to the reactor coolant pump suction (P1A1 - weld FW-6) and the steam generator discharge (SG1A - weld FW4). The inspector also observed machine welding of a coupon for weld procedure qualification for P3 material. Applicable codes, standards and quality requirements are described in PSAR Sections 17 and 5.2, job specifications numbered 211, contractor procedures numbered (JAJ) WP-P8-1, WP-P1/P3-RI, and draft WP-P3/P3-2A.

The JAJ quality verification inspector used a calibrated digital amp-probe to measure electrical current about six feet from the electrode holders of two welders while they welded on primary coolant piping joint FW6 at the pump suction. One welder adjusted his controller just prior to the first reading; this was 127 amps. Upon request by the QV inspector, the welding controller was adjusted by the welder; the resultant current was 115 amps. The QV inspector requested the current to be reduced to 110 amps. The welder again adjusted the controller; a reading of 110 amps was achieved. The NRC inspector noted the position of the controller, and about 30 minutes later returned to this controller and noted that it had been turned back up to its initial setting. In the interim period, the QV inspector checked the welding current of the other welder; the first reading was 110 amps. Four days later, on April 18, 1980, the NRC inspector examined the QV inspector's pocket log, noting no irregularities documented relative to the April 14, 1980 checks of amperage for the two welders. Subsequently, the NRC inspector ascertained that the applicable welding procedure for weld FW-6 (JAJ-WP-P8-1) specifies 85-110 amperage range for 1/8-inch electrodes. The electrode material slips and process traveler weld record log indicate that 1/8-inch electrodes were in use on this joint on April 14, 1980.

Relative to the above, welders and QV personnel indicated that electrical system fluctuations during the day led to fluctuations in calibration of local controllers such that fixed settings could not be used and frequent adjustments were necessary. Although the QV checks of amperage may be used to maintain limits in the face of system fluctuations, such checks are only made every few days. The contractor QV supervisor subsequently advised that reactor coolant pressure boundary pipe welding had been suspended April 23, 1980 to permit further assessment of welding controls; he stated that quality verification daily inspection of electrical parameters (amperage) would be instituted by his staff when welding resumed on these systems. This item will be examined further during future inspections (460/80-07-02).

The inspector examined the certificates of conformance submitted by Stack Steel and Coeur D'Alene Company for steel to be used for weld procedure qualification tests (SA-302 Grade B, SA-516 Grade 70, SA-240 Type 304). The certificates were signed by sales office personnel of the two companies. No deviations were identified.

The inspector witnessed welding of several passes of 61 passes made by tungsten-inert gas welding machines on a test coupon. A draft procedure JAJ-WP-P3/P3-2A was in use, for the SA-302 Grade B (P3) material. Welding electrical parameters, travel width and frequency, dwell time, and interpass temperature were varied during welding of the various passes. Interpass temperature was measured with a digital probe placed in the weld groove about 1-inch in front of the point of last deposited weld metal. A double-V joint configuration was used, with a welding machine on each side once the root pass was made on one side and the reverse side ground and liquid penetrant tested and repaired to assure no root defects.

The first two or three complete weld passes were air-blast cooled to facilitate reduction of back-side weld groove temperature to within limits required for the liquid penetrant testing. The inspector referred the licensee to ASME Section IX paragraphs QW-212, QW-492, QW-406.3, QW-409.1 and QW-410.7 and PSAR Section 1.50-II and specification No. 211 part 3.7.3 as relevant to the observed practices. The licensee stated that the observed welding was not necessarily welding for procedure qualification, but was an equipment demonstration which may or may not have resulted in weld coupons acceptable for qualifying the procedure. This matter is unresolved pending review of subsequent actions relative to the coupon. (460/80-07-03)

7. Containment Structural Concrete Forms and Embeds - Unit 4

The inspector examined work activities for installation of forms, embedments and reinforcing steel. This involved inspection of preparations for concrete placement No. C101, and general cadweld inspection, including interview of a cadwelding QC inspector. Applicable codes, standards and quality requirements are described in PSAR Sections 17 and 3.8.1, job specification number 253, and contractor procedures numbered (AWSH) QCCP-19, 20 and 21. The inspector interviewed a second-shift cadweld inspector on April 25, 1980 and examined qualification splice destructive-test specimens for two cadweld crews.

No items of noncompliance or deviations were identified.

8. Containment Structural Concrete Batch Plant Operations - Units 1 & 4

The inspector examined work activities for the on-site concrete batch plant operations. This involved observations of equipment condition and performance, examination of test records and personnel qualifications, and observation of a UE&C surveillance/audit. Applicable codes, standards and quality requirements are described in PSAR Sections 17 and 3.8.1, job specifications numbered 253 and 36, and contractor procedure numbered (UEC) FQS-10-6.

No items of noncompliance or deviations were identified.

9. Containment Structural Concrete Materials - Units 1 & 4

The inspector examined work activities for aggregate and cement storage. Applicable codes, standards and quality requirements are described in PSAR Sections 17 and 3.8.1, job specifications numbered 253 and 36, and contractor procedures numbered (A/C) QAP-4.2 and (UE&C) FQS-10-6.

The inspector observed unloading of cement from a trailer delivered from a manufacturer's sealed silo, observing temperature measurement by ACME QA and watertight closures on the trailer. Also examined were aggregate stockpiles, receiving-hold tanks, transfer tanks for admixtures, (including tagging on each tank and batch plant control room measuring cylinders) and manufacturer and user test records for the admixtures, including comparing data to the acceptance criteria in the Protex Company, June 15, 1978 letter of recommended tolerances (prescribed by ASTM-C494 and C-260). For the Protex AEA and WRA (PDA-25DP) admixtures shipments examined, no discrepancies were noted. For one shipment, infrared spectroscopy peaks were verified to fall within the manufacturer's baseline recommendations.

No items of noncompliance or deviations were identified.

10. Containment Structural Concrete Testing Laboratory - Units 1 & 4

The inspector examined work activities for testing of concrete and reinforcing steel at the on-site test laboratory. Storage of test cylinders set #10953, for concrete placement C1101C, was specifically noted. Applicable codes, standards and quality requirements are described in PSAR Sections 17 and 3.8.1 and job specifications numbered 221 and 253.

No items of noncompliance or deviations were observed.

11. Containment Structural Concrete Placement - Units 1 & 4

The inspector examined work activities for preparations to place concrete at Unit 1 containment wall pour #C1101C (under fuel transfer tube) and Unit 4 containment wall pour #C101 (first 360° 5 foot lift above the base mat). Applicable codes, standards and quality requirements are described in PSAR Sections 17 and 3.8.1, job specification numbered 253, and contractor procedures numbered QCCP-11 and QCCP-13.

Prior to one placement, AWSH QC management advised the NRC inspector of the congested conditions for this placement and inquired as to the inspector's view regarding performance of QC inspection activities by QC inspectors positioned outside the forms. The inspector referenced ACI-309-72 part 7.2, which is imposed by the ASME Code Section III-CC-4226 and is incorporated in the AWSH procedure QCCP-13 part 10.4, and indicated that the rebar congestion appeared to obstruct the required observations regarding consolidation. Subsequently, the contractor found it necessary to have six QC inspectors work within the formwork, between the inner and the outer groups of reinforcing steel, in addition to several inspectors positioned outside of the forms (6-1/2 feet from construction joint to top of forms). The NRC inspector observed placement of the first layer of concrete and subsequently interviewed QC inspectors who expressed their confidence that the adequate consolidation had been achieved near the containment liner plate and elsewhere in this placement.

No items of noncompliance or deviations were identified.

12. Spray Pond Compacted Backfill - Unit 4

The inspector examined work activities for placement of compacted backfill adjacent to the Unit 4 spray pond. Applicable codes, standards and quality requirements are described in PSAR Sections 17 and 2.5 Appendix 2P, and job specification number 255.

Observations, examination of records, and interviews of personnel were conducted relative to: selection of fill materials as Type A or Type B, specified relative compaction of 97%, checking of compaction density for each foot of fill, size of test area and location of test point, calibration of field test equipment, maintenance of test records, and familiarity of responsible supervision with applicable criteria of the PSAR.

No items of noncompliance or deviations were identified.

13. Foundations Monitoring - Unit 1

The inspector examined work activities for monitoring settlement monuments on key structures. Applicable codes, standards and quality requirements are described in PSAR Sections 17 and Appendix 2P (7.2.4) and UE&C engineering memoranda #AS62345 and #PM-79-1827. Observations, examination of records, and interviews of personnel were conducted relative to: selection of structures to be monitored, number of monitoring points, collection and reduction of data, and data evaluation.

Settlement markers have been established and are being monitored monthly. Data is plotted routinely and is provided to responsible field engineers for evaluation by the Shannon and Wilson consultant and UE&C home office about every six months. Where settlement markers have been damaged, steps have been taken to replace them. No unusually large settlements had been identified to the field engineer.

The inspector observed that the settlement markers did not correspond to the Plan of Estimated Settlement Locations of the PSAR Appendix 2P Figure 2P-15. The new locations of the settlement markers appeared in general as triangular patterns so as to permit bi-axial determinations of differential settlement. The WPPSS licensing engineer was aware of the changes. Confirmation of the predicted probable settlement values, per PSAR Section 7.2.4 of Appendix 2P, will involve baseline predictions in addition to that in the PSAR, but such data was not available on-site. The licensee site QA representative contacted the appropriate UE&C engineers and affirmed that home office data analysts had available the necessary baseline settlement predictions for the locations actually being monitored in the field. The inspector had no further questions.

No items of noncompliance were identified.

14. Safety-Related Piping Work - Unit 1

The inspector reviewed work activities for piping activities. This involved review of site fabrication shop activities, review of as-built surveys of steam line restraint embeds, examination of containment building tool-room materials, observation of piping temporary supports and protection of piping. Applicable codes, standards and quality requirements are described in PSAR Section 17 and job specification numbered 257.

Pipe spools in the JAJ fabrication shop contained metal tags which had a painting code included (CSS-414810-56-Rev-0-9B-2, DHR-42029-2-Rev-6-9A-2, and BRS-414291-56-Rev-0-9B-1). The spools were of stainless steel material, which is excepted from painting; this was confirmed by UE&C field engineering and JAJ site QA staff. The JAJ site QA engineer stated that this matter had been referred to the fabrication shop supervisor for assurance that stainless steel is not painted. No pipe spools have been painted yet to date, and the JAJ paint shop is not yet functional.

Main steam system pipe restraint embeds were surveyed by the A. D. Stanley and Associates site surveyors for internal as-built dimensions. The inspector ascertained that discrepant conditions were properly documented (1-CMR-253-1086, CWR-253-807, CWR-253-817) and engineering evaluations effected to assure a basis for conditional release for concrete placement.

Tool room materials appeared to be adequately controlled. No piping protection (relative to end caps) discrepancies were observed.

No items of noncompliance or deviations were observed.

15. Stainless Steel Welding Considerations - Unit 1

The inspector inquired into the controls for site welding of stainless steel piping, as related to recent data and analyses regarding intergranular stress corrosion cracking prevention. Since welding of Unit 1 stainless steel piping for stagnant systems (such as DHE system) has been in progress in February and March of this year, the inspector inquired as to the schedule for acting on welding recommendations such as those in an April 14, 1980 letter from the NSSS supplier to the licensee. The inspector met with the WPPSS Field Engineering Manager who advised that the NSSS recommendations have been already considered in conjunction with a joint effort relating to evaluation of TMI-1 experiences, and that, as a result of a WPPSS February 26, 1980 engineering recommendation a task force study has been initiated to evaluate possible actions and recommend implementation for the WNP-1/4 facilities. Completion of the study is scheduled for June 1, 1980.

The inspector was advised that most of the stainless steel piping for stagnant systems (such as Decay Heat Removal and Spent Fuel Cooling) has been installed in Unit 1, and procurement of pipe spools is nearly complete for Unit 1 stainless steel. Because of this, the licensee did not plan to suspend welding until the task force analysis was completed, recognizing that this decision may entail some rework.

No items of noncompliance or deviations were identified.

16. 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. Unresolved items identified during this inspection are discussed in paragraph 7.

17. Exit Interviews

The resident inspector met with licensee management representatives, and others invited by the licensee representatives approximately weekly to discuss the inspector's findings (April 7, 14, 21 and 28, 1980). Attendees at these sessions are so designated in Paragraph 1 of this report. The scope and findings of inspections as noted in this report were discussed.