U. S. NUCLEAR REGULATORY COMMISSION

REGION V

Report No. 50-397/82-24

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: October 1-31, 1982

Inspectors: R T Dodds for
A. D. Toth, Senior Resident Inspector — 11/19/82 Date Signed

R T Dodds for
R. A. Feil, Senior Resident Inspector — 11/19/82 Date Signed

Date Signed

Approved by: R T Dodds
R. T. Dodds, Chief, Reactor Projects Section 1 — 11/19/82 Date Signed

Date Signed

Summary:

Inspection October 1-31, 1982 (Report No. 50-397/82-24)

Areas Inspected: Routine, unannounced inspection of the mechanical contractor's records review program and correction activities, work reverification program activities, reactor coolant pressure boundary piping piping, as-built configuration, safety related structures welding, employee concerns, and NRC inspection findings. The inspection involved 67 inspection hours on-site by two resident inspectors.

Results: No items of noncompliance were identified.

RV Form 219 (2)

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1. Persons Contacted:

Washington Public Power Supply System

G. Baker, Quality Assurance Engineer Lead
C. Carlisle, Deputy Program Director
*C. Dickenson, Senior Engineer, Construction
*L. Floyd, Senior Quality Assurance Engineer
R. Glasscock, Licensing and Assurance Director
G. Hansen, Senior Civil Engineer
R. Johnson, Project Quality Assurance Manager
R. Knawa, Quality Verification Program Manager
R. Krolicki, Level III Nondestructive Examination
R. Matlock, Program Director
*P. Powell, Licensing Engineer
*T. Standley, Project Engineer
J. Tellefson, Project Engineer
W. Willier, Project Quality Assurance Manager

Burns and Roe Engineers (B&R)

D. Hetzel, Lead Welding Engineer
S. Kent, Lead Mechanical Engineer
*A. Luksic, Licensing Engineer
F. Schell, Mechanical Engineer
*H. Tuthill, Quality Assurance Manager

Bechtel Power Corporation (BPC)

H. Boarder, Quality Assurance Engineer
M. Bohn, Senior Field Engineer
C. Brewer, Field Welding Engineer
D. Cooke, Quality Control Group Leader
*D. Cosgrove, Quality Assurance Engineer
L. Daughtery, Field Welding Engineer
D. Donat, Field Welding Engineer
T. Fallon, Quality Control Supervisor
*J. Gatewood, Project Quality Assurance Engineer
C. Headrick, Project Quality Control Engineer
*D. Johnson, Manager of Quality
J. Kitzener, System Quality Control Supervisor (7.1)
P. Lindstrom, Project Field Engineer
*T. Mangelsdorf, Project Manager
J. Pierce, Field Welding Engineer
W. Phillips, Lead Field Welding Engineer
P. Rothenberger, System Engineer (7.1)
M. Starkey, System Quality Control Engineer (7.1)
G. Stohl, Level III Nondestructive Testing
B. Young, Level II Technician Nondestructive Testing

Gilbert Commonwealth Company (G/C)

S. Lalomia Jr., Project Manager

Peter Kiewit Son's Incorporated (PKS)

P. Petty, Quality Control Inspector

Pacific Testing Laboratories

M. Calaway, Quality Control Inspector - Level II

Brand Examination Services and Testing Company (BESTCO)

L. Morris, Site Supervisor
D. Richey, Foreman

Bonneville Power Administration (BPA)

*P. Grady, Representative
W. Chin, Representative

Other General Contacts and Notes

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

*Denotes personnel present at the exit management meeting.

2. General

One or more resident inspectors were on-site October 1, 4-8, 12-15, 18-22, and 25-29. On the evening of October 13, a resident inspector performed second shift ultrasonic wall-thickness examination of a piping base-metal repair area.

One regional office inspector (A. D'Angelo) was on-site October 19-22. His activities are documented in a separate inspection report.

3. Reverification Program

In response to the June 17, 1980 NRC inquiry under 10 CFR 50.54(f), the Supply System, Bechtel, and site contractors have been engaged in a reverification program which includes review of records and re-inspections of hardware installed prior to July 1980.

At the request of the WNP-2 Program Director, a comprehensive assessment of the reverification program was performed by the corporate quality assurance staff during April 1982.

The assessment was made to provide management with information on whether the reverification program will satisfy the commitments made to the NRC in the response of July 1980 to the 10 CFR 50.54(f) letter, as well as the programs ability to complete the reverification program on schedule.

The assessment team looked at documents relating to commitments, reports to NRC procedures, and related correspondence. The team interviewed personnel involved in the program, including persons only peripherally involved. Observed reverification activities included meetings, inspections, and verification of results.

Since this assessment was made before all the tools for implementing the reverification program were in place, a number of instances were found that needed clarification or correction to assure that commitments made to the NRC were met.

The assessment team's report has been reviewed by the quality verification program group. The WNP-2 Program Director has been appraised of the perceived weaknesses in the reverification program and what is being done to correct these perceived weaknesses.

4. Safety Related Structures Welding

The inspector examined the controls for fit-up and alignment and welding of structural steel, as relate to weld sequence to minimize distortion and shrinkage stresses. Criteria of AWS-D.1.1 Part 3.4 and associated project specification 215-17D were considered.

The inspection included an interview of two Bechtel quality control inspectors and six welding engineers, and the Burns and Roe welding field engineering supervisor. This also involved review of specifications (215-17D), procedures (SWP/P-W-3), meeting minutes (March 10, 1982 Highly Restrained Steel Welding Problems), engineering directives (PED-215-W-B535, W-B536, CS-A-716, and CS-0458), field sketches (FSK-series weld identification and sequence drawings), and an engineer sketch (sequence for weld P2-C1, D. Donat).

The Burns and Roe welding field engineering supervisor stated that Bechtel submitted procedure SWP/P-W-3 for information, in response to specification 215-17D requirements to submit welding sequences to the Engineer for information. His review comments note that the general welding requirements of SWP/P-W-3 may not be adequate for some cases. He stated that Bechtel had not submitted more specific welding sequences for Burns and Roe review. Subsequent investigation showed that the specification requirements for submittals to the Engineer have been achieved by informal means, such as making

the field sketches available to the Burns and Roe welding field engineers at the work locations. This approach had been discussed, and apparently agreed to, in a documented Burns and Roe/Supply System/Bechtel meeting of March 10, 1982.

The welding sequences defined by Bechtel appear on drawings (FSK series) and sketches which, apparently, will not become a part of the permanent plant records. The Bechtel welding engineers stated that the FSK drawing welding sequences are defined by Bechtel structural engineers as recommendations only, and that they are not binding. Although the FSK drawings are provided to the work locations, the welding engineers feel free to deviate from the weld sequencing shown, as field conditions may warrant. They do not amend the FSK drawings to reflect any such changes. The AWS-D1.1 Code Section 3.4.3 requires that "These welding sequences and any revisions necessary in the course of the work shall be sent for information and comment to the Engineer". The information and comment aspect for field changes of sequence is apparently achieved through the Burns and Roe field welding engineer surveillance involvement. Burns and Roe has not issued instructions contrary to this and has apparently accepted the arrangement via the above noted meeting.

A quality control inspector commented on the apparent lack of welding sequences for work in the main steam tunnel area. The Bechtel welding engineers responded that they did not consider the area to involve severely restrained steel welding, and specific welding sequences were not considered necessary, beyond those preheat and welding recommendations discussed in the general structural welding procedure (SWP/P-W-3). The inspector did not find cause to dispute the field welding engineers' analysis.

The documents show that weld sequencing has been considered by Bechtel, both gnerally and specifically. In some cases the architect engineer issued specific directions for sequencing. Welding sequences have, in some cases, been originated by the Bechtel welding engineers, who then performed the field monitoring of the welding activities to assure compliance. Although some individuals in the organizations have expressed desire for more detailed involvement in the review and monitoring of welding sequences, the organizations of Bechtel and Burns and Roe appear to have addressed the matter commensurate with the AWS-D1.1 requirements.

No items of noncompliance were identified.

5. Reactor Coolant Pressure Boundary Piping Installation

The inspector selected three isometric drawings of piping installation of the high pressure core spray system (HPCS-630-26.28, 29.30, and 31.33), and compared the actual installation to the design. This included consideration of pipe support locations, general piping configuration, approximate dimensions of bends and legs, absence of extraneous branches or connections or non-documented supports or attachments, weld surface appearance, locations of valves, and general protection from construction activities. Piping supports were also examined as discussed in paragraph 6, below. No discrepancies were identified.

The final certification document (Isometric Revision Request - IRR) for each isometric did not list the latest issued drawing revision nor latest Drawing Interim Revision (DIR) applicable to each. The working drawing files of the Bechtel review group contained the latest documents, and revealed that the revisions had been issued to or received by Bechtel after the IRR had been issued. The Burns and Roe stress engineer group leader stated that as yet, no IRRs had been submitted for action. Bechtel engineering management stated that the issued IRR does represent the design to which Bechtel is certifying construction; however, since all subsequent changes must eventually be responded to, a procedure change has also been developed and is undergoing review to call for re-reviews and updating of any IRR affected by any new drawing revision or DIR. The inspector identified no deficiency in this regard.

No items of noncompliance were identified.

6. Safety Related Pipe-Support and Restraint Systems

a. Dynamic Pipe Supports

The inspector examined the installed snubbers on the high pressure core spray line shown on isometric drawings HPCS-630-26.28 and 31.33. These included:

HPCS-910N PSA-3 load classification
HPCS-911N PSA-10 load classification
HPCS-918N PSA-10 load classification

The snubbers were of the mechanical type. There was no evidence of deterioration or corrosion, bending of rods and joints, or loose bolts or other parts. The ball-joints were movable, end brackets pins were secured, and welding was consistent with design details. The snubbers were wrapped with a tough material and taped, offering good protection from dust and welding sparks.

Snubbers ready for installation were stored carefully on temporary staging racks in the reactor building at elevation 501. They were clean and the mechanisms rotated smoothly when the inspector pull-tested them.

b. As-Built Configuration

The inspector examined the as-built configuration of four installed pipe supports (HPCS-908N, HPCS-911N, HPCS-918N, and HPCS-919N) which had received final review by the Bechtel system completion team, as indicated on the completion document (PRR). These were selected from those included on the high pressure core spray line shown on isometric drawings HPCS-630-26.28, 29.30 and 31.33. The inspector also examined the configuration of supports HPCS-904N, HPCS-907N, and HPCS-910N which were ready for system completion final review, pending completion of minor material replacements.

The inspector examined the principal dimensions and location of the supports along the piping line, as designated on the isometric drawing, the weld sizes and surface appearance, sizes of principal members, and orientation of snubbers or springs. No deviations from detail drawings were identified for supports where the final engineering reviews had been completed. Where such reviews were not complete, the last approved configuration details, coupled with the in-progress engineering exceptions documents, appeared consistent with the as-installed configuration.

The inspector identified one minor discrepancy on the quality control inspected-accepted support HPCS-907N. The required fillet weld size of 3/8-inch was not achieved (1/16 undersize) over a length of 2-1/2 inches of a 7-inch fillet weld (number A2) on a stiffener plate. The discrepancy was attributable principally to lack of full weld throat in areas of weld face surface roughness.

A Bechtel September 1982 corporate audit finding AF/AS-17 documented a similar finding of weld undersize where the auditors had inspected two Bechtel pipe supports. The Bechtel Manager of Quality stated that the Engineer has evaluated the matter and accepted the weld as-is, via PED-215-HE-168. Bechtel has defined addtional corrective actions to include further scoping of the matter by reinspection of one fillet weld on each of sixty supports, and full configuration and dimensional check of five small-bore and five large-bore piping supports. The Bechtel quality assurance engineer stated that the selection of 60 as a sample was based upon a zero-defect criteria "Hyper-geometric Sample Table" for

evaluations of large population with small sample sizes. Bechtel representatives stated that further actions would be dependent upon the resulsts of that activity. The audit finding action schedule establishes a November 15 completion date for the reinspection activities and decision point for further action. The inspector suggested that some prompt training may be warranted for at least the quaity control inspectors involved in the identified discrepant conditions, to clarify the use of fillet weld measuring gages for current work in-progress.

Since this matter was identified by the established quality assurance program (audit aspect), and corrective actions and reasonable schedules were defined, this matter is not considered to be an item of noncompliance or deviation. The matter is unresolved pending completion of Bechtel preliminary actions and evaluation of subsequent corrective action plans. Unresolved item 397/82-24-01.

7. Allegations

On October 8 the resident inspector office received an anonymous typewritten note which inferred improper disposition of documented nonconformance reports. Two of these matters were considered during this report period.

a. The first item alleged that Bechtel senior quality assurance and quality control management had "knowingly, willfully signed off an NCR which was a direct ASME code violation", contrary to the adivce of their staff and the ASME authorized inspector "who crossed his name out --signed in err--". This matter was NOT substantiated.

The allegation cited Bechtel nonconformance report NCR-2086, and referenced NCR-250-10565, as an example. These documents discuss and reference repeated base-metal repairs of piping shown on isometric drawing RCIC-662-1 (welds BMR-1 and BMR-R1), and raise a question as to whether final radiography was required for repair BMR1-R1. This repair was a final weld-metal addition over a previous build-up area to improve pipe wall thinning which had occurred during pipe lug removal operations. Weld metal had been added by Bechtel, under control of a weld inspection record which called for final radiography of the area. However, the radiography specified on the Bechtel weld record was not performed. This error was identified upon the Bechtel document review cycle and the NCR-2086 was generated. At this time Bechtel management recognized that the wall thinning did not constitute a defect which would normally be ground-out, the wall-thinning had apparently not

encroached upon the minimum thickness called for by ASME NB-3000, and the addition of metal was not necessary in the first place. Bechtel proposed that the metal addition was akin to weld-metal build-up otherwise allowed by the ASME Code (without radiography required). The architect-engineer and the ASME authorized inspector agreed, and the nonconformance report was voided and no additional radiography was performed.

The matter of the ASME authorized inspector signature is factual, in that the inspector had signed the nonconformance report disposition while Bechtel in-house disagreements persisted. He temporarily withdrew his approval pending his further examination of the ASME Code section involved and Bechtel resolution of its in-house position. He did concur with the final disposition, and stated that he had also discussed this position with his supervision.

Under the applicable ASME Code Section III NB-4214 rules, the material did not require additional weld metal since the design wall section had not been compromised. Radiography was not a requirement of the ASME Code. The departure from the internal Bechtel procedures was reviewed by senior quality assurance management and an acceptable disposition reached, within management's prerogatives.

No items of noncompliance were identified.

b. The second allegation simply stated "Look at B NCR-1967 and admin. instruction 1B".

This is a matter of lost Bechtel weld records, which Bechtel had identified and had discussed with the licensee quality assurance department and the NRC resident inspector. The matter is discussed in NRC inspection report 50-397/82-18 paragraph 8, and will be subject of routine follow-up.

No items of noncompliance were identified.

c. The third allegation is under review.

8. NRC Independent Nondestructive Testing

The inspector accompanied the BPC Level III and Level II NDE Technicians in visually examining two welds which were in question during the radiographic verification by the NRC NDE Van.

The NRC and the licensee differed in interpretation of weld MSLC 0840-7.10 (FW 3 R1). The radiographic film contained an indication which the licensee identified as a change in density caused by acceptable concavity in the root pass. The NRC identified the indication as an elongated indication which exceed ASME Code allowances.

BPC re-radiographed area 4 of the weld in question. The new radiographs showed the same indication. The adjacent shop weld was cut out to provide internal access to FW 3 R1 to confirm the status of the indication. The inspector did not observe any cracking in the root pass wled in area 4 when viewed with a 7 power magnifying glass. There was evidence of abrupt transition in the weld and one depression appeared to have a greater depth then the remaining indication in the weld.

The NRC and the licensee differed in interpretation of Weld RRC 566-1 (FW-2). The licensee identified the indication as acceptable concavity in the root pass while the NRC identified the indication as an unacceptable elongated indication.

BPC removed Valve RWCC-V-100 to obtain internal access to the weld. Fiber optics were used to examine and photograph the internal surface of the weld. The inspector viewed area 7 and area 1 of the internal surface of the weld with Fiber optics. A small concavity indication was evident at area 7 and a smaller concavity indication was evident in area 1. Neither indication was below the level of the internal surface of the pipe.

The inspector had no further questions at this time.

9. Plant Tours

The inspectors toured the safety related areas of the physical plant at various times between October 1-31, and performed follow-up record reviews as indicated. They attended construction and quality management meetings relative to the work planning and problem resolutions.

10. Licensee Actions On Previous NRC Findings

The inspectors reviewed the licensee actions relative to the following items:

a. (Closed) Follow-up Item (397/81-01-04)

Part 3.6.2 of the Supply System management system plan (letter to NRC dated November 12, 1980) stated that document review criteria would be clarified for contractors. The commitment did not appear to have been implemented. The NRC inspection report 50-397/81-10 described subsequent progress which had been made in implementing this commitment for some, but not all of the site contractors during the work restart review activities.

Bechtel has now identified that work restart review teams had eventually affirmed adequate implementation of document review criteria for the instrumentation, heating and ventilation, and fire protection contractors prior to their work restart. Weaknesses originally identified for the mechanical contractor at that time (memorandum RCSW-81-425 and 534) have subsequently been resolved through the fully developed review program that was implemented for that contractor over the past year. The management system commitment thus appears to have been implemented. This matter is closed.

b. (Closed) Follow-up Item (397/81-01-06)

Part 3.6.4 of the Supply System management system plan (letter to NRC dated November 12, 1980) indicated that contractors' quality control supervisors would perform overchecks of quality control inspectors. The commitment did not appear to have been implemented. The NRC inspection report 50-397/81-10 described subsequent progress which had been made for the mechanical contractor (who was shortly thereafter replaced by Bechtel construction/quality control forces). The commitment appears to have never been implemented for the other contractors, and has not been imposed upon the Bechtel program.

The Supply System project quality assurance manager has advised the Bechtel commitment tracking group (Quality Assurance Manager) via October 13 letter (QA-82-238) that overchecks had not been specifically imposed upon the contractors other than the mechanical contractors, although the contractors were requested to provide for "evaluating all inspectors". The letter states that, for both the instrumentation contractor and the electrical contractor, a training program is in effect and the QA/QC manager reviews inspection reports and walks through the building and observes inspectors at work. The project quality assurance manager "considers that this meets the intent of the inspection overcheck commitment".

In additon to the above project position, the quality assurance manager pointed out that Bechtel has quality control engineers performing daily surveillance of each contractor's activities, including performance of quality control inspectors. Also, in September Bechtel reorganized the quality control organization to provide much closer supervision of its quality control inspectors, with the inspection supervisor spending time in the field at the work stations allocating work and interfacing more directly with the union inspectors. Inspection overchecks are not a mandate to these supervisors.

Although performance evaluation is an element of the mandated quality assurance program, there is no NRC regulatory requirement which requires inspector overchecks as an element of such evaluation. The particular commitment involved was not one mandated by NRC. Based upon the above and the licensee position this matter is closed.

c. (Closed) Follow-up Item (397/82-15-04)

The Bechtel quality assurance group had prepared a matrix of prior NRC findings which had been resolved primarily by procedure related commitments to NRC. Some of the items involved licensee oriented commitments, but Bechtel had not ascertained that the licensee had followed through with the required procedure changes.

A Supply System letter dated October 8, 1982 (QA2-82-246) now defines the status of the procedure change related commitments, and the Bechtel quality assurance department has completed its effort on this matter. This matter is closed.

d. (Open) Follow-up Item (397/82-23-01)

The Bechtel quality control inspection program did not incorporate performance standards and management monitoring to assure sufficient in-process surveillance activities were being performed by the quality control inspection personnel.

Bechtel completed a reorganization of the quality assurance department in October. This was in response to increasing backlogs and other process control issues identified through internal and external audits and other program assessment activities. Bechtel presented a description and status of the reorganization to the Supply System and the NRC resident inspectors on October 20. The Bechtel Manager of Quality stated that the Bechtel Nuclear Quality Assurance Manual (NQAM) was not changed, but the detailed site implementation procedures and organization was modified. (This highlights that program implementation effectiveness may vary considerably between construction projects.)

The Bechtel WNP-2 site actions included reducing the number of inspectors reporting to each supervisor, establishing several routine reports of inspection activities and status, shifting the administrative loads from the inspectors to the inspection supervisors, moving quality control inspectors work stations to gang-box stations near the work areas, increasing the inspection supervisor presence in the work areas for issuing work assignments and documents and statusing work, and accounting

more currently for nondestructive testing backlogs, (with goals for 24-hour action). Bechtel has also established a team oriented organization with field engineer, construction superintendent, quality control system engineer, and quality control inspection supervisor assigned to each system for construction completion activities.

The reorganization and associated work controls appear promising for improving process control The Supply System quality assurance manager stated that additional consideration is also being given to defining performance standards for the Bechtel activities. This matter is still open, as a focal point for continued evaluation of the adequacy of Bechtel process controls and effectiveness of corrective actions.

e. (Closed) Unresolved Item (397/82-09-01), Lack of Control of Special Processes.

Overheating occurred on the sacrificial shield wall after a thermocouple became dislodged. The inspector had expressed concern regarding control of special processes and that qualified personnel using qualified procedures perform the special processes. The licensee had issued a Management Corrective Action Report to BPC concerning the expressive preheat temperature on the sacrificial shield wall.

Corrective action to resolve the problem consisted of: 1) installing strip charts to monitor preheat operations. In addition, Tempstiks are used by the welding engineers when they randomly check the progress of the work; 2) instruction sessions with appropriate personnel have been held to strengthen surveillance in this area, and 3) the specific overheating areas of the sacraficial shield wall were magnetic particle inspected. One weld indicated a crack. A NCR was prepared and the crack was repaired using approved repair procedures. The inspector verified that recorder charts had been installed and were being monitored. The inspector observed field engineers and welders using Tempstiks to monitor welding in process. The inspector verified that MT was performed and that the crack found in weld 86 on the sacrificial shield wall was ground out and repaired using approved repair procedures.

The amount of NS-1 material which was extended from the sacrificial shield wall during the overheating was evaluated by the AE. it was estimated that 2.5 percent of the original quantity of NS-1 material installed in compartment No. 16 was lost. The AE determined that the loss would not be dettrimental to the shielding capability of the sacraficial shield wall.

f. (Closed) Unresolved Item (50-397/80-18-03)

Absence of reverification sampling and action level instructions. The WPPSS Quality Verification Program is governed by Volume III, Reverification of Completed Safety Related Work (RCSW) dated June 1981. This was prepared as part of the response to the NRC 10 CFR 50.54(f) letter dated July 17, 1980.

Bechtel Power Corporation (BPC) has prepared a reverification plan. The plan was transmitted to WPSS on November 17, 1981. The BPC reverification plan outlines the program BPC utilizes to implement reverification as stated in RCSW-Quality Verification Instruction QVI-01. The BPC plan defines responsibilities of BPC and contractor personnel for reverification and special tasks. BPC performs reverification on piping and mechanical system for contract 215 (WSH/Boccon/GERI). Other systems and areas are being accomplished with contractor personnel. BPC reviews and approves the contractors reverification procedures and plans. BPC performs QC surveillance on contractor and on BPC reverification activities.

BPC reverification inspection instructions are provided in Quality Control Instructions. BPC surveillance inspections on contractor reverification activities are documented on a Construction Quality Control Contractor Sueveillance Inspection Record.

The BPC procedure SWP/P-G-15, Reverification of Selected Hardware and Documentation, delineates the reverification sampling required and QCIs provide the action level instructions for performing reverification inspections by BPC. The BPC plan provides instructions for contractors to provide procedures and plans for implementing the reverification activities in their specific contract areas in accordance with BPC Procedure SWP/P-G-14, Reverification Coordination. This item is considered closed.

11. Licensee Actions on Construction Deficiency Reports

The inspectors examined licensee actions relative to the following construction deficiency reports which were submitted to NRC under the requirements of 10 CFR 50.55(d):

50-397/79-06A - Deficiencies in Concrete Exapnsion Anchor Installations and Structural Grout Program.

The inspector observed placement of flow grout on hanger nos. HPCS-28 and HPCS-33 and flow grout on hanger no. MS-137. The inspector verified the the placements were done with proper procedures and that the procedures were adhered to during the grouting process. The inspector observed the making of the test cubes and the flow measurements for grout consistency. The inspector verified that a QC inspector was present during the grouting process and that the parameters were recorded as required by the procedure. The placement for grouting of hangers HPCS-28 and HPCS-33 using Masterflow 814 was done in accordance with PKS Procedure CP-34, Grouting with Masterflow 814 Cable Grout dated November 30, 1981. The placement of the flow grouting for Hanger No. MS-137 using EMBECO 636 was done in accordance with PKS Procedure CP-3 Ram Pack, Damp Pack and EMBECO 636 Grouting dated May 14, 1982.

The testing of the grout was done in accordance with PTL procedure QAP-101, Procedures for Testing Non Shrink Grout, dated May 18, 1982, and U.S. Corp of Engineers Specification CRD-19, Specifications for Non Shrink Grout. The results of the tests observed by the inspector were documented on PTL forms 101A and 101D. The procedure requires a flow rate of 20-30 seconds. The first flow rate for hanger HPCS-28 was 18 seconds; retest was 20 seconds. The first flow rate for hanger HPCS-33 was 18 seconds; retest was 22 seconds. The maximum placement time for the grout allowed by the procedure was 10 minutes. Grout samples were being taken each day and strength tested at 3, 7 and 28 day intervals. The results of these tests show that the grout met the required strength of 4000 psi for the 28 day test.

Break Test Results (in psi)

Hanger No.	3 day	7 day	28 day*
HPCS-28 and 33	6075	7525	
(Actually taken prior	6100	7300	
to placement at MS-167)	6075	7475	
(Masterflow 814)			
MS-137	3425	5400	
(EMBECO 636)	3450	5425	
	3575	5525	

The inspector also witnessed the placement of grout on support HV 119. The method of placement was ram pack. The inspector verified that the placement was accomplished in accordance with the procedure and that the inspection and testing were accomplished as required by the procedures. The pack grout was made from EMBECO 636 using PKS Procedure CP-3, Ram Pack, Damp Pack and EMBECO 636 Grouting, dated May 14, 1982. Test specimans for compressive strength,

*Note: Data from 28 day tests not available at time of inspection.

consisting of nine two inch cube samples were taken from the grout for that day. The 3 day test results for the three samples were 6775, 6800, and 6775 psi. The required speciman test strength is 4000 psi. The inspector verified that testing was done in accordance with PTL Procedure QAP 101 Procedures for Testing Nonshrink Grout.

No items of noncompliance or deviations were identified.

12. 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. An unresolved item identified during this inspection is discussed in paragraph 6.b.

13. Management Meeting

At the end of this report period, on October 29, Mr. Feil met with the acting Project 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.