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

REGION V

Report No. 50-397/81-18

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: September 1981

Inspectors: J. D. Toth for
A. D. Toth, Senior Resident Inspector — Nov 12, 1981 Date Signed

_____ Date Signed

Approved by: R. T. Dodds
R. T. Dodds, Chief
Reactor Construction Projects Section 2 — 11/12/81 Date Signed

Summary:

Inspection during September 1981: Report No. 50-397/81-18.

Areas Inspected: Routine, unannounced inspection of licensee and contractor activities to re-evaluate and improve detailed work methods.

The inspection involved 115 inspector hours on-site by the resident inspector.

Results: No items of noncompliance were identified.

1. Persons Contacted:

Washington Public Power Supply System

W. C. Bibb, WNP-2 Project Manager
R. T. Johnson, Project Quality Assurance Manager
*B. A. Holmberg, Deputy Project Manager, Engineering
H. A. Crisp, Deputy Project Manager, Construction
W. G. Keltner, Assistant Deputy Project Manager, Construction
R. T. Grant, Manager, Construction Quality
P. A. Harness, Manager of Field Engineering
J. J. Bufis, Test Group Supervisor
L. D. Kassakatis, Test Group Supervisor
P. D. McBurney, Test Group Engineer
E. Carlson, Preventive Maintenance Program Manager (WBG)
J. J. Graziani, Operational Quality Assurance Supervisor
T. A. Stanley, Project Engineering Management Specialist
S. L. Washington, Reverification Program Supervisor
*C. O. Wright, Quality Engineering Supervisor

Burns and Roe Engineers (B&R)

*A. T. Luksic, Licensing Engineer, Site
R. R. Schlosser, Project Engineer Mechanical/Welding
R. S. Popielarczyk, Lead Mechanical Engineer
K. Hoopingarner, Senior Engineer
H. Theroux, Mechanical Engineer
C. N. Orsborne, Documentation Manager
J. Ketchum, Correspondence Control Clerk

Bechtel Power Corporation (BPC)

D. R. Johnson, Manager of Quality
T. A. Mangelsdorf, Project Manager
*M. J. Jacobson, Project Quality Assurance Engineer
*D. K. Cosgrove, Quality Assurance Engineer
B. K. Cutright, NDE Level II Quality Control Engineer
N. Powell, Project Manager (WBG)
R. Scott, Documentation Manager (WBG)

Wright-Schuchart-Harbor/Boecon Corp./General Energy Resources, Inc. (WBG)

P. Webster, Manager of Quality Assurance
C. Fox, Quality Assurance Audit Manager (Corporate)
S. Y. Young, Assistant to Project Manager
B. Seabury, Manager of Engineering

Fischbach and Lord

W. L. Brown, Quality Assurance Manager
R. L. Golberg, Assistant Project Engineer
T. A. Roselli, Quality Assurance Field Supervisor

Hartford Steam and Boiler Insurance Company

W. Kane, Authorized Nuclear Inspector (WBG)
M. Coates, Authorized Nuclear Inspector (Bechtel)

Other General Contacts and Notes

In addition to the persons identified above, the inspector interviewed personnel from the construction, engineering, and quality control site contractor organizations. He interviewed various craft and supervision who were present in the work areas during the inspector's plant tours.

*Denotes personnel present at the monthly management meeting.

2. Project Personnel

During this period, Mr. R. L. Knawa was assigned to manage the WPPSS Quality Verification Program. The Special Projects staff was also reorganized to reassign the staff to existing line organizations and then matrix them to the reverification group via special assignments.

3. General

The resident inspector was on-site September 1-4, 8-11, 14-18, 21-25, 28-30. During this period, the inspector performed routine examination of the site activities, including plant tours, followup record reviews, and interview of personnel relative to status of engineering and construction efforts.

A team of regional office inspectors also visited the site during the period of September 1-4, to perform an announced inspection of the general quality assurance program establishment and implementation.

The annual meeting to discuss the NRC Systematic Appraisal of Licensee Performance (SALP) was convened with the licensee senior management in the WPPSS Richland offices, on September 17.

The arrival of the NRC independent measurements van was deferred, in view of recent licensee efforts to review radiograph records on file, and investigate discrepancies found during this review.

Construction was reported to be 86% complete.

4. Plant Tours

The inspector toured the safety related areas of the physical plant at various times during the month, and performed followup record reviews as indicated below. Particular observations are noted below:

a. The cement grout was cracked under pressure relief valve supports in the suppression pool. The inspector interviewed Burns & Roe engineers who demonstrated that this matter had been identified by contractor and licensee personnel prior to August 28, 1981 and action had been taken to obtain formal reinspection by inspectors qualified in civil work. The engineers stated that the cracked grout would be replaced.

b. Electrical contractor personnel were pulling large diameter cable through conduit at a HPCS Diesel Generator switchgear cabinet. The inspector questioned the lack of tensioning equipment, and interviewed quality control personnel who were monitoring the work. The cable had originally been installed too short, and was being removed for disposal. Although tension monitoring did not appear to be necessary, for this removal, the contractor had assigned quality control personnel to perform general surveillance of the operation.

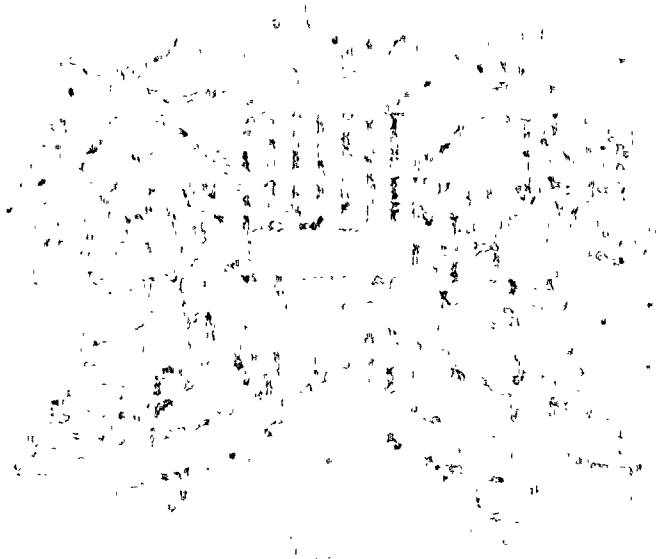
c. WBG field engineers were encountered, who were performing walkdown reviews of the service water system, to determine the presence or absence of components or parts of the piping and supports. This was an inventory effort, to identify the work completed by the contractor and the work which was yet to be done by Bechtel after systems turnover.

Other WBG engineers were performing as-built drawing update work on part of the piping in the diesel generator building. These engineers were supporting Burns & Roe as part of an intensified effort to update construction drawings to actual configurations of installed parts to permit concise working drawings to Bechtel crafts and inspectors for the systems completion effort.

No items of noncompliance or deviations were identified.

5. Bechtel Transition Activities

On August 28, 1981, Bechtel assumed the responsibilities for completion of physical work on all of the mechanical systems previously contracted to WBG. Bechtel has assigned coordinators to work with WBG, and to act in line organization senior management positions within WBG, to facilitate the transition of responsibilities. Commitments to the NRC have been included in the transition team's routine agenda.



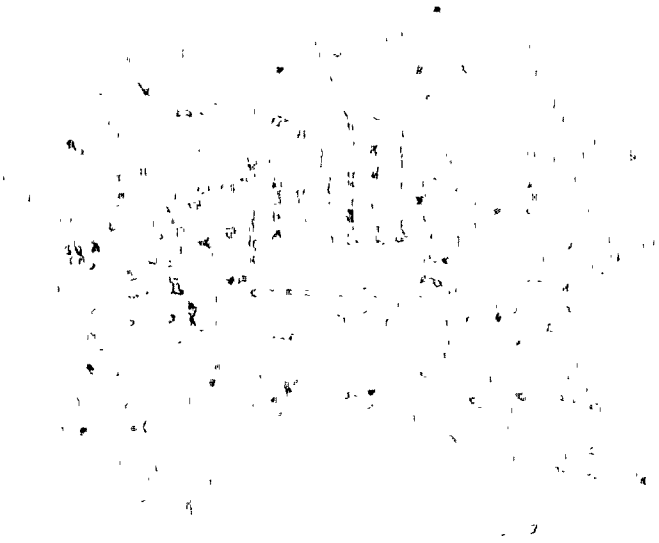
6. Mechanical Contractor (WBG) Activities

On August 28, the mechanical contractor (WBG) terminated all crafts and Quality Control personnel. During the month of September WBG has additionally terminated various support clerical, training, and field engineering personnel. The WBG activities this month have generally been confined to reorganizing and attempting to determine the scope of remaining WBG work and the operating procedures for that work. The remaining WBG prescribed activities involve reviews of existing WBG documentation, including identification of discrepancies, and, where possible, resolutions which can be accomplished without physical rework. The WBG effort is intended to provide the ASME Code data reports for the portions of the systems completed by WBG. These would then be accepted by Bechtel for completion of outstanding or incomplete work activities, and incorporation into the final Code data reports as basis for the system N-Stamp. The details of these activities have been defined by WBG and Bechtel, but the ASME authorized inspectors have not acknowledged acceptability of the tentative scoping plans to date.

When WBG terminated the quality control inspectors, various inspection activities in-progress were reviewed by their supervisors in an attempt to clean-up loose ends and assure that all issues have been included in the applicable records files. The inspector observed preparations in mid-September to discard the QC-inspection working files of about 12 file cabinets. The NRC inspector identified several folders of QC open surveillance reports during a quick survey of the files. There was no indication that these findings had been incorporated into other plant files, and the QC supervisors, who claimed to have reviewed records for loose ends, were not at all familiar with the documents which dated back to 1979. The inspector advised the WBG QA manager, the Bechtel Project QA Engineer, and the licensee QA Manager of this situation. The WBG QA manager decided not to dispose of the files and had them moved to a storage location. He stated that the open surveillance reports and similar data would be incorporated into the applicable corresponding work packages. The inspector stated that this matter would be examined further while work is in-progress. This item is unresolved pending such review. (397/81-18-01)

7. Bechtel Systems Completion Activities

Bechtel has proceeded with fabrication and installation of some parts of safety related mechanical systems. These activities are based upon results of system walkdowns. Bechtel has suspended work on mechanical systems, in order to improve procedures and training of personnel in response to concerns expressed by the Bechtel ASME authorized nuclear inspector.



8. Reverification Program Status

a. Licensee (WPPSS) Reverification Activities

The WPPSS part of the reverification program includes overall administration of the program, including preparation of overall policy and instructions and monitoring of the Bechtel activities, plus the completion of specific tasks. Three tasks had previously been defined, involving review of previous contractor work in the areas of:

(1) Receipt Inspection
(2) Personnel Qualifications
(3) Deficiency Document Dispositions

Only the deficiency document review activity has apparently been worked thus far. This has included selection of a group of NCR's (nonconformance reports) and referral of these to the WPPSS corporate office engineers for evaluation of the technical aspects of the disposition of the questions involved. The RVP personnel stated that a random sampling technique was not used for selection of the NCR's, but rather the selection was weighted by personal evaluation considerations. The RVP Supervisor stated that other deficiency documents were also being evaluated for review of dispositions (e.g., Request For Information, submitted by contractors to the architect-engineer for engineering decision). At this time, the RVP review has not identified any apparent trend or other basis for concluding that inadequate technical dispositions were made on NCR's. The inspector noted that ongoing contractor intensive document reviews also involved reviews of NCR's and similar documentation and that there is currently no provision for drawing adverse-trend information up to the attention of the RVP staff, either in WPPSS or in Bechtel.

The inspector identified the sampling basis, the conclusions reached, and the lack of communication channels to contractor review-functions as areas of suspected weakness in the program. This area will be examined in the future. (397/81-18-02)

b. Bechtel Reverification Activities

Bechtel has assigned an individual in the construction management organization to coordinate the reverification program. Bechtel has held a briefing meeting with each of several contractors to discuss the reverification program. The Supply System and Bechtel intend to have the contractors plan, organize, and conduct the reverification activity under the surveillance of Bechtel. Each contractor has been provided a copy of the QVI-01 procedure

as a basis from which to conduct his planning. At this time, there is neither detailed guidance to the contractors nor details of the Bechtel surveillance functions. Each contractor has been requested to submit his plan to Bechtel for review and approval.

The inspector attended a typical briefing meeting with the fire protection system contractor (#217 Sentry). The WPPSS RVP Supervisor also attended this meeting as his first such participation. The contractor had one engineer on his staff who would be charged with the responsibility for developing the reverification plan. Very little safety related mechanical work has been installed; therefore, the scope of this aspect would be limited. However, the contractor noted that his system was unique in that he had a target of January 1982 to make his system operational and that an evaluation had already been made that the reverification work would occur after system turnover. He indicated that his engineering resources were limited until after system turnover. Bechtel encouraged him to supply his plan within two weeks.

The WPPSS RVP Supervisor stated that initial contractor responses had not been as thorough as had been hoped and that further actions would be necessary. He stated that the WPPSS RVP staff would become more closely involved in the monitoring of this activity.

At this time, no provisions had been made for obtaining RVP related information from contractors already engaged in ongoing review or inspection activities. However, the WPPSS RVP Supervisor has instructed Bechtel to initiate action to evaluate PDM's previous review/reinspection effort (which had been conducted during 1980-1981), to determine how much RVP credit could be given for that activity. This evaluation is to be accomplished in accordance with guidelines established in an approved RVP procedure. The procedure (QVI-05) requires consideration of the scope of the contractor's effort and the degree of participation by licensee representatives. (The inspector had previously expressed concern that the results of the contractor's internal review efforts may be insufficiently monitored by the licensee. IE inspection report 50-397/80-16 paragraph 5 expressed the concern that the licensee determine the extent of such efforts and report these to NRC. Summary reporting commenced with the licensee's bimonthly report to NRC, relative to the 10 CFR 50.54(f) inquiry).

At this time, the reverification program appears to be receiving increasing licensee and Bechtel attention and is in its early mobilization stages. There is insufficient progress to assess conformance with the commitments of the licensee reply to the 10 CFR 50.54(f) inquiry.

9. Service Water System Records

An NRC regional office team inspector identified that two valves (SW-V-4A and SW-V-4B) had some obvious minor discrepancies consisting of missing bolts and a missing hinge on the valve motor operator assembly. The inspector interviewed the preventive maintenance personnel of the electrical and the mechanical contractors (WBG and F&L) and the Bechtel systems-completion engineers and coordinators. He examined the WBG preventive maintenance records for February 1979 to June 1981 and ascertained that the observed discrepancies were identified in this documentation. A record of the conditions was documented on a Package Completion List (PCL), a copy of which should also have been filed in the official work packages for the valves. The PCL did not appear in either the Bechtel copy of the work packages, nor the WBG copy of the work packages. Also, the content of the WBG work packages was not the same as the Bechtel copies. (However, the licensee affirmed that instructions have now been given to return the Bechtel copies to WBG for consolidation and resolution of differences). The conditions identified on the preventive maintenance PCL were included on one of several different PCL's filed in the WBG work packages, and the conditions did appear on the Mechanical systems Master Work List (MWL) for the project. However, it was not evident if identification of the conditions arose from the now lost copy of the preventive maintenance PCL, or rather from a recent system walkdown inspection activity. The inspector could identify no convincing evidence that the preventive maintenance PCL's were being filed into the work packages for eventual resolution. The licensee reviewed and confirmed the condition and identified current plans to provide both the basic work package and the maintenance package to Bechtel for review during systems completion/turnover of WBG work.

The licensee also agreed to review apparent conflicting instructions for handling minor discrepancies found during preventive maintenance actions as documented on WBG internal CAR-206 and Burns & Roe response to a Request For Information RFI-215-M-7577. The WBG position provided for documenting certain conditions only on PCL's, with eventual correction after system completion and walkdown. The B&R position required a nonconformance report. This maintenance activity was assumed by Bechtel in September. Current instructions provide for the use of PCL type documentation with B&R concurrence.

The inspector identified no items of noncompliance regarding this matter.

10. Unistrut Bolting on Emergency Power 24-Volt-Battery Rack Rework

The NRC regional office team inspection leader requested the resident inspector to review the battery rack rework activities. This work was being performed by WPPSS startup/operations personnel, rather than the prime electrical contractor on-site. The system had been

provisionally accepted from the contractor, and documented in package number 50.3-P1. Outstanding deficiencies were documented on reports of nonconformance (NCR's) and related project engineering directives (PED's). Specific items included battery connector damage, rack anchor nut insufficient engagement, and improper torquing of assembly bolts. The battery rack supplier (Exide) installation instructions were available and were used for and referenced in the procedures developed for the rework. Elements of the procedures included torque wrench calibration, witness of torquing values, specific torque values required, and snugness of fit of batteries and spacers in the racks.

The inspector examined the following records relative to the above:

- Provisional Acceptance Package 50.3-P1
- Procedure SLT-S50.3-4 for Racks BO-1A and 1B
- Procedure SLT-S50.3-5 for Racks BO-2A and 2B
- Test Change Notices S-50.3-4/TCN-1 and S-50.3-5/TCN-1
- PED-218-CS-3967
- PED-218-CS-4079
- NCR-206-2328
- NCR-218-4284
- NCR-218-7877
- Exide Installation Instructions for Batteries and Racks (58.01, 58.04, and 58.06), and Installation Instructions for Seismic Resistant Racks

The inspector examined the racks and the adjacent 250-volt-battery racks. The adjacent racks had been previously completed by the prime electrical contractor. They also contained discrepancies which were scheduled for rework by the WPPSS operations staff. There was an anchor-bolt missing from the reworked BO-2A/2B racks and insufficient thread engagement in an anchor bolt nut for the BO-1A/1B racks; however, the NCR/PED records demonstrated that this condition had been evaluated and accepted by the designer (Burns & Roe). One additional case of incomplete anchor-bolt engagement was accepted by the test engineer on the basis of a minimum 4-thread engagement criteria defined by the Burns & Roe engineer thru reference to the electrical contractor's procedure CP/QAP-505.

The inspector observed that one of the spring-nuts for the BO-1A/1B strut assembly had rotated 90-degrees during installation and slipped between the channel runners so as not to hold a load. Another spring-nut had rotated 60-degrees, introducing question as to its load capacity. This condition was corrected in the presence of the inspector. Also, the test engineer issued Test Change Notices and stated that the procedures for additional battery rack rework would incorporate inspection criteria for this item. The inspector had no further question regarding the technical disposition of this item.

The inspector observed this same nut rotation condition on the 250-volt-battery racks in several places. These racks were scheduled for rework which should correct this condition under the inspection criteria addition discussed above. However, the existance of the condition on completed work by the electrical contractor implies a generic weakness in the installation/inspection procedures of this contractor in other applications of the strut/spring-nut configuration. The electrical contractor surveyed the nature of his installations and inspected some further installations in the plant. He stated that the battery racks were not a totally typical installation. However, the contractor stated that a verification of this item would be included in the procedures which are to be used during the retorquing and bolt replacement program currently underway. The inspector found this to be an acceptable preventive/verification action.

The WPPSS quality assurance manager stated that this matter will be referred to one of the task forces involved in resolving anchor bolt evaluations, to assure consideration of piping supports which are supported from embedded or other unistrut type anchor points. This matter is unresolved pending review of verification/evaluation activities described above. (397/81-18-03)

No items of noncompliance or deviations were identified relative to the above.

11. Startup-Work-Request/System-Lineup-Test Procedure Applicability

The battery-rack rework described above was managed by the WPPSS startup organization. The test engineer elected to write a System Lineup Test procedure to govern the work. This procedure was reviewed by the Test Working Group (TWG) prior to the work in accordance with procedure TSP-7. The TWG is a committee which includes the operations QA representative. Upon completion of the test, the procedure (checklist) is signed by the test engineer and reviewed by the Test engineer's supervisor. The completed results are not reviewed by the TWG nor the QA representative.

An alternative administrative approach could have been to issue a Startup-Work-Request (SWR) in accordance with procedure TSP-12. Procedure TSP-12 states that the SWR "shall be used to authorize repair, rework or modifications to systems or components after Provisional Acceptance until Release for Operation;...." It requires QC inspection/coverage in accordance with the procedures of the organization performing the work. It requires review of the work procedure by the test engineer and the operations QA representative, and review of results by either the construction or the operations QA representative, as applicable, and approval by the Startup Manager.

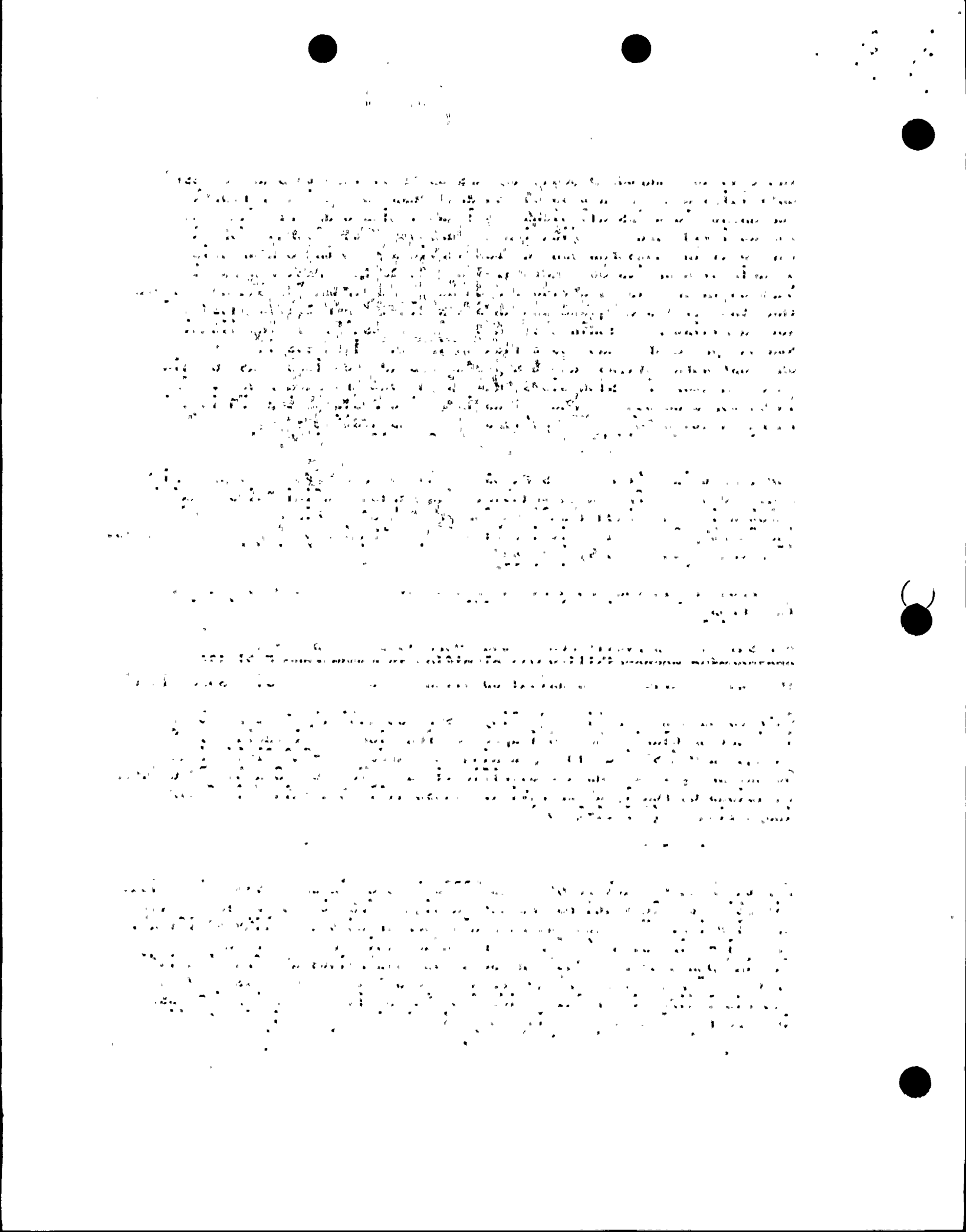
The test and startup program appears to be limited to startup testing activities and does not appear to encompass completion or rework of permanent plant installations, at least in its charter. The mechanism for achieving such modification appears to be the Startup Work Request, for obtaining construction related services from the construction organization or its contractors. For the battery rack rework, the test engineer, his supervisor, and the TWG chairman for the work stated that the SLT was adequate and an SWR would not normally be issued for work administered within the Startup Group itself. The applicable startup procedures each contained their own uniqueness in pre-work and post-work reviews, and the procedures were ambiguous as to which were mandatory for situations such as the battery rack rework. The inspector accepted the records as-is on the basis that an Engineering representative and the Operations QA representative sat on the TWG committee and could have requested an SWR, if considered to be appropriate.

However, this matter demonstrates how the Startup Group may provisionally accept a system from a contractor, with various deficiencies remaining outstanding, and then itself perform rework or repair of the hardware. The Startup Group may omit invoking the contractor's QA program controls. (For the battery racks, the startup engineer demonstrated that he had considered the vendor's installation instructions, the contractor's QC procedure in the preparation of the SLT, and had coordinated with the Burns & Roe engineer). The TWG engineering representative is responsible to assure review of SLT's by appropriate engineers. As a result of a surveillance by the Operations QA, (SR-2-81-6), the engineering responsibility was clarified in memorandum F-81-6281, to include review of technical compliance with WNP-2 design specifications.

Changes to the Operations Quality Assurance activity appeared to be imminent to clarify the QC inspection functions and interfaces. Such changes are described in a planning memorandum OQA-SLG-81-156 (dated September 8, 1981), as are clarifications in Test and Startup Procedures revisions currently under review. These will be examined in future inspections. (397/81-18-04)

12. Organizational Independence of Startup Work Inspection Activity

For the battery-rack rework, the WPPSS test engineer provided technical direction to electricians who were assigned from the operations maintenance organization. The test engineer also performed the quality verification and hold-point sign-off for the procedure which he had prepared. His independence from cost and schedule constraints and from the individuals/group performing the work appeared to be somewhat compromised by the technical direction role. Aside from the spring-nut matter discussed in paragraph 7 above, the inspector identified no particular quality concern with the battery rack work. It was considered to be a very limited work operation. (It is not apparent that more independent QC inspection would have identified the spring problem, as evidenced



by the existance of a similar problem with the original racks). The organizational relationships appear to be subject of a current WPPSS study, as indicated in paragraph 8 above. This matter will be examined during future inspection activities. (397/81-18-05)

13. Licensee Review of Radiographs of Mechanical Contractor

Bechtel had performed a sampling review of about 110 radiographs, which represented those in the permanent files from WBG. The results of the review were documented on June 24, 1981. The reviewers identified questions of weld integrity and film quality, as apparently being contrary to the applicable ASME Code. There were 16 film quality questions including (1) 5 cases of density variation limits, (2) 2 cases of missing views, (3) 1 case of penetrameter omission in one view, and (4) 3 cases of excessive size of penetrameter used. There were 15 cases of weld integrity questions. These were reviewed by NDE level III personnel of WBG, Bechtel and WPPSS, with 7 deemed boarderline acceptable. The remaining 8 were deemed to have weld root indications which could not be justified as obvious geometry related, as opposed to lack-of-fusion type indications. The indications are dark, clear, and linear and appear at the root fusion-line where lack of fusion or similar defects could conceivably be masked.

This matter has been documented by Bechtel on MCAR-1, dated August 4, 1981 (BECWNP2-81-0186). WPPSS responsive instructions were to cut out three welds for physical evaluation (WNP2BEC-81-720, dated August 24, 1981). The following three welds were selected:

a. HV-668-1.5/FW4: This item is a 20-inch carbon steel weld of the heater-vent system, non-safety-related, ANSI-B31.1 Code. It was one of the welds selected by WBG for random radiography, required by the project specification. It showed clearly unacceptable indications, such that it was already scheduled to be repaired by removal. (The inspector noted that this radiography was performed recently by WBG on July 6, 1981, after the WBG restart program reviews discovered that WBG had originally failed to perform in-process 10% random radiography during earlier erection activities).

b. RHR-867-12.16-W14A: This is a 6-inch ASME bi-metallic weld of carbon and stainless steel. It is not typical of most welding in the plant, although it is representative of some. Its radiographs show a dark line along the carbon steel base-metal/weld fusion line corresponding to the root location. The stainless-steel/ weld fusion line does not show such a linear indication.

c. RHR-854-6.11/W4: This is an 18-inch carbon steel weld, typical of many. The radiograph shows dark linear indications along the fusion line of the root.

The initial review conclusions were examined by NDE Level III individuals from WBG, Bechtel, and WPPSS. They concluded that the welds may not be unacceptable, but, objective evidence was not available upon which to base such conclusions. The cut-outs were made in mid-September, with subsequent WPPSS laboratory preparation of polished cross-sections for engineering evaluation. The inspector examined these samples, reviewed the associated radiographs, and interviewed the laboratory personnel and the Bechtel NDE level II personnel responsible for review of radiographs.

This matter is still under review by the licensee, and will be examined further by the NRC. (397/81-18-06)

14. Pipe Support As-Built Drawing Program

The inspector interviewed the WBG as-built program manager regarding the scope and objectives of the ongoing WBG as-built drawing program. Also examined were current as-built files and examples of installation discrepancies being found by the field engineers. Installations contrary to the original design and to approved design changes have been found which support the WBG earlier QA review conclusions that the vaulted as-built drawings warrant verification.

The inspector reviewed the as-built status of the drawings which had been transmitted to Facility Design Engineering (Engineering Technology Engineering Center) by September 9, 1981 WPPSS letter NS-L-02-RMN-81-036. These drawings were part of data which NRC had requested WPPSS to furnish (July 22, 1981 letter) for confirmatory piping analysis for WNP-2 safety relief valve discharge line number 10"MS(18)-2. The request identified the purpose as including verification that WNP-2 has correctly modeled its piping, correctly used its computer codes, and had adequately accounted for the piping's as-built condition.

The inspector found that of the 53 pipe supports listed by Burns & Roe, the as-builts had been prepared for only 15. Of the remaining 38, there were 22 documented as having installation complete, but not as-built. Because of general recognition that the as-built conditions of the mechanical systems may not be accurately reflected in permanent plant records at WNP-2, the inspector examined the newly available as-built drawings for three installed supports. In each case, the as-built condition was not as shown on the design drawing and the design changes which had been submitted to the NRC's consultant as follows:

a. Mark #MS-333:

The original design shows a variable spring support mounted on top of a simple 4x4x3/8 column.

The as-built condition shows that the spring support is mounted on a horizontal 4x4x3/8 x 17.5 cantilever, which is welded to a horizontally braced 4x4x3/8 column.

b. Mark #MS-269:

The original design (and approved change) show a variable spring hanger mounted to a vertically braced, 5x5x3/8 x 20 cantilever.

The as-built condition shows that a 5x5x3/8 x 9-5/8 lateral piece had been added to move the hanger support point horizontally 8-3/4 inches.

c. Mark #MS-279:

The original design showed two M4x15 horizontal beams supported by fillet welds from the web of a W14x184 beam. A #509 variable spring hanger was supported from the end of each M4x15.

The as-built condition shows both M4x15 beams mounted on top of the W14x184 beam, and one of the M4x15 beams reoriented in the horizontal plane and welded with different weld details. A #508 variable spring hanger was provided (has lessor load capability than #509).

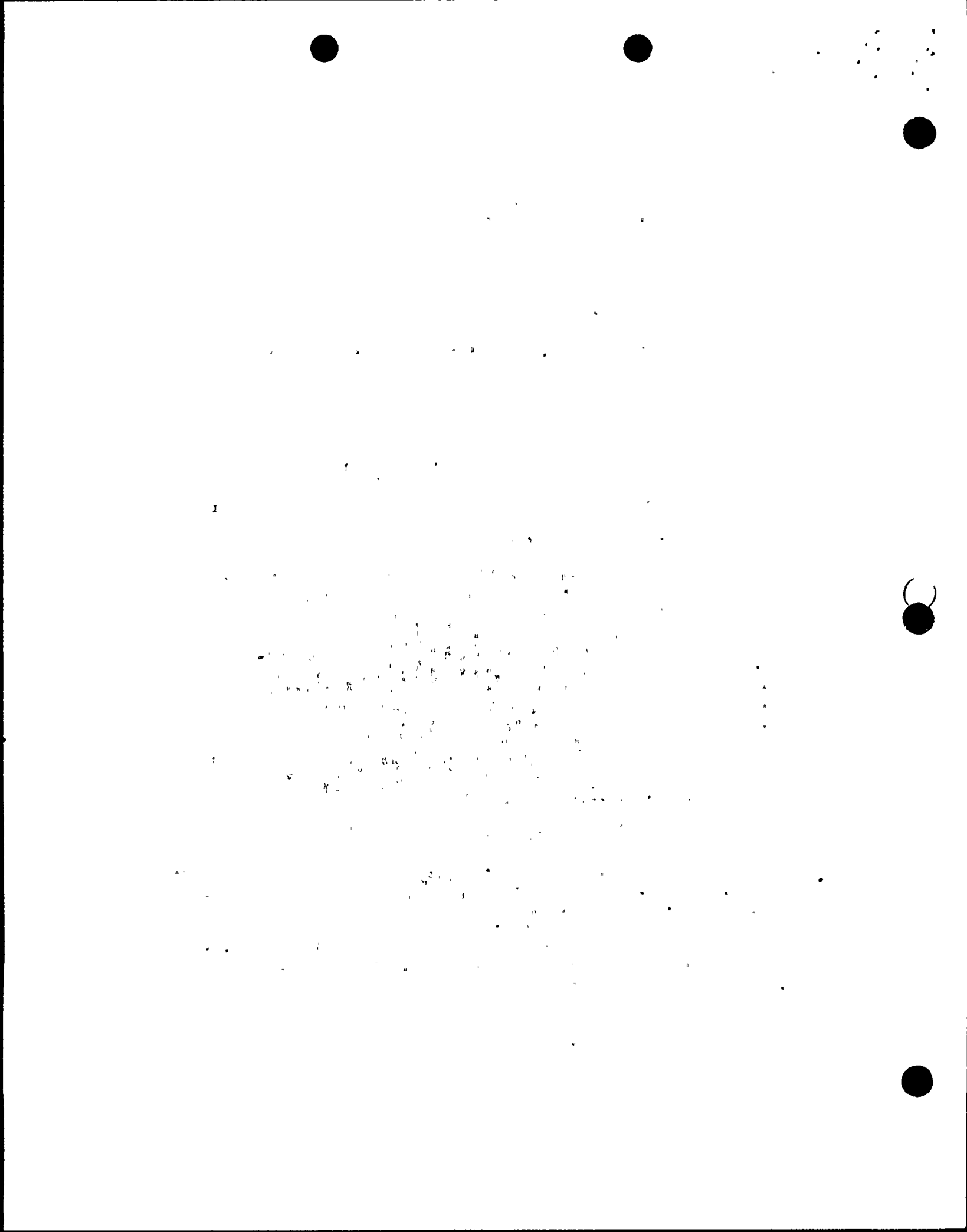
The inspector noted that the licensee correspondence to the NRC contractor (NS-L-02-RMW-81-036) did not alert the contractor to the general discrepancies in the as-built conditions of piping systems. The Burns & Roe representative stated that it was understood that the WNP-2 project would provide whatever information was available at this time.

The inspector advised the NRC licensing project manager of this matter on September 28, 1981. No further inspector action is anticipated and the matter is considered closed.

15. Correspondence Action Item Control

During the NRC team inspection of September 1, the team leader requested the resident inspector to review the WPPSS correspondence control provisions. The inspector reviewed the Project Management Instruction manual to ascertain applicable instructions and selected PMI-12-3, PMI 12.1, PMI-2-12, and PMI-2.2 as being most applicable to control of action items. The clerk who is responsible for tracking correspondence for Burns and Roe was also interviewed.

The inspector interviewed the clerk who is responsible for tracking actions on vendor submittals. She uses a Transmittal Control Log (TCL) as the computerized tracking system. It provides the following two reports where items appear when they are at least 21 days past due:



TCL-G identifies overdue re-submittals of documents previously submitted by contractors, but returned unapproved or approved as noted.

TCL-B identifies submittals which have not yet been acted upon by either Burns & Roe, WPPSS, or Bechtel.

These control documents appear to assure that transmittal type action items will be resolved as a condition of close-out of the applicable contracts. However, a WPPSS Corrective Action Request, outstanding since its February 25, 1981 issuance, identifies that there are items which date as far back as 1973 without further action. As of September 3, 1981 the QA organization has been unable to obtain an acceptable corrective plan from the construction management or document control organizations.

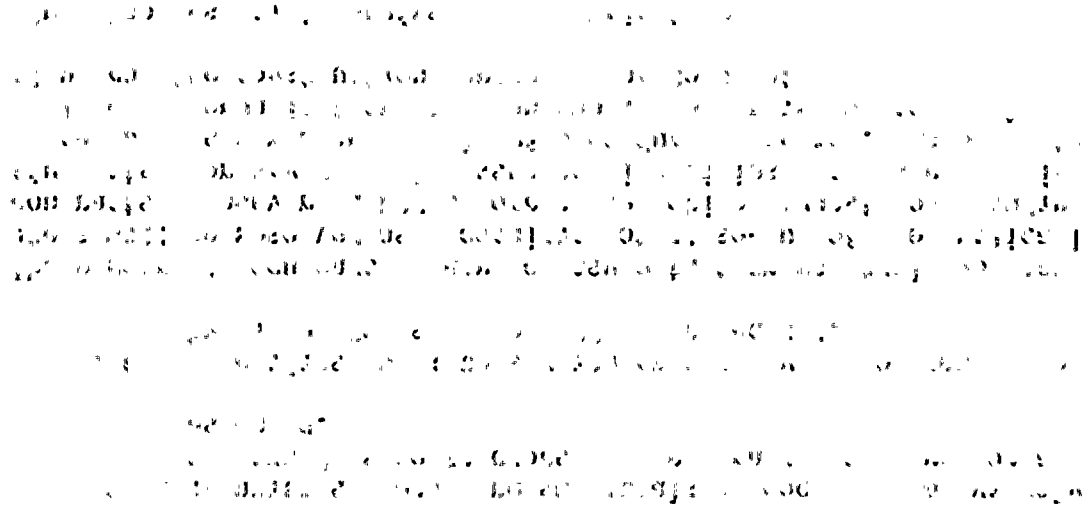
16. Pipe Whip Restraint Repairs and Refabrication

The inspector reviewed records, plans, and procedures, and interviewed personnel relative to corrective actions for questionable pipe whip restraints. He observed nondestructive testing in-progress for one such pipe whip restraint (PWR-3-2), in the Bechtel site shop.

The inspector considered these activities relative to the corrective action plans discussed in the WPPSS letters to NRC dated December 10, 1979 and February 1, 1980, as acknowledged by the NRC work release letter to WPPSS dated February 8, 1980. The inspector also considered the WPPSS July 11, 1980 reply to the NRC Notice of Violation of June 17, 1980.

Several of the replies in the WPPSS July 11 letter referred to a planned WPPSS reply to the NRC annual appraisal, as the source of information for "the corrective actions planned to be taken to correct the underlying cause of the noncompliance" (items II.A.1,2,3, and 4, and IIB.1,2,3 and 4, of the NRC Notice of Violation). The referenced submittal was never provided, (it is noted that NRC did not require a written response to the appraisal). This submittal was stated to be in addition to the required WPPSS reply to the Notice of Violation, and the July 17, 1980 reply to the NRC's 10 CFR 50.54(f) inquiry. Although corrective measures have been taken to repair or refabricate the pipe whip restraints, including quality assurance measures, it is not clear that a specific effort was made to define the underlying cause of the previous noncompliances to prevent recurrences. This matter is unresolved pending the WPPSS clarification of the public record in this regard. (397/81-18-07)

Some pipe whip restraints (those with electroslag welds) will be refabricated by an off-site contractor (Huico), under contract to WBG, using material supplied by WPPSS. The supplier's procedures have been reviewed by WBG and a WBG quality assurance engineer has been assigned to the supplier's shop to assure proper implementation of his fabrication QA program. The contractor will also have his own QC inspectors.



New specification section 5E and 17E have been issued for the work (PED-215-CS-A367, A4545).

The remaining pipe whip restraints will be reinspected by Bechtel and repaired on-site by Bechtel. Each restraint will be subject to a shop receiving inspection, which includes ultrasonic and magnetic particle nondestructive testing. Bechtel and Burns & Roe approved nondestructive examination and welding procedures will be used. NDE personnel and welder qualifications will be monitored by Bechtel. New specification sections 5E, and 17D have been issued for the work (PED-215-CS-A367 and A545).

For the on-site repairs, Bechtel plans to review each outstanding NCR (nonconformance report) for each restraint and include the corrective actions in the repair effort. The responsible Bechtel engineer has compiled a planning matrix which identifies each such outstanding NCR and each new Bechtel NCR generated as a result of the Bechtel shop receiving inspections. The engineer had reviewed each existing NCR and had categorized each as to its topic. Review of this grouping and interview of the engineer revealed an absence of the materials certification related items which appear in the "ITEMS OF CONCERN FOR PWR" tabulation of Section II of the WPPSS February 1, 1980 letter to the NRC. Since the NCRs represent the sole reference point for the Bechtel engineer for previously identified discrepancies, the inspector requested objective evidence that all of the known discrepancies are documented on the existing NCRs. The licensee acknowledged the question, and committed to provide such information. This matter is unresolved pending review of the information. (397/81-18-08)

Item 15 of the "PIPE WHIP RESTRAINT PUNCH LIST", attached to the WPPSS December 10, 1979 letter to NRC, noted a problem in that "spot RT on UT" is suggested by the Code (AWS). Such RT is not required by the new specifications or procedures. This matter is unresolved pending review of the WPPSS position on the Code recommendation. (397/81-18-09)

The WPPSS December 10, 1979 letter to NRC stated that a procedure would be provided to the NRC inspectors for review, describing actions and approvals necessary to release any restraints from the stop work order. Such a procedure has been developed for the Bechtel on-site repairs (SWP/P-P-5), and for the WBG contracted off-site refabrication (WBG-BEC-215-81-0625). For the on-site repairs, the procedure does not identify the sequence of actions necessary to clear the existing NCR's as related to additional repair work needed. Also, the specification change (PED-A545 part 3.4.2.1) requires case-by-case referral to the Engineer (Burns & Roe) of each pipe whip restraint repair for evaluation and recommendations for stress relief heat treatment. These actions and approvals are not addressed in the Bechtel summary control procedure, nor are they included in the informal work flow diagrams presented to the inspector as the Bechtel detailed basis for administering the work. (These diagrams had been prepared by Bechtel at the insistence

of WPPSS). This matter is unresolved pending review of the effectiveness of the work controls and conduct of the work. (397/81-18-10)

The inspector observed the Bestco NDE technicians perform magnetic particle examination of restraint #3-2. He reviewed the applicable procedure and interviewed the technicians relative to the ultrasonic testing. It was ascertained that a straight-beam check for laminations is prescribed and is being performed (this was a previously identified discrepancy in the Leckenby work, per item 13 of the December 10, 1979 "PIPE WHIP RESTRAINT PUNCH LIST"). The inspector did not review the procedures in detail, but ascertained that they had been reviewed and approved by Bechtel.

17. Pipe Whip Support Evaluations

During the licensee review of the pipe whip restraint documentation, the licensee recognized that similar weld deficiencies may exist in similar structures fabricated by the contractor (Leckenby). The licensee initiated a study of 1) pipe whip support brackets, 2) pipe whip support girders and columns, 3) pipe penetration doors and 4) stabilizer trusses and mounts. Problems of unqualified welders, questionable inspector qualifications, and use of unapproved procedures were sought. The licensee has documented the results of this study as a pending addenda to the final engineering evaluation report on the sacrificial shield wall which was previously submitted to NRC.

The inspector reviewed the scope and results of the above study. It included well organized documentation reviews and nondestructive testing of materials. The licensee defined 35 weld maps and corresponding engineering drawings which the Engineer had reviewed and concurred in as the defined scope of work.

The results of the evaluation documented the discrepancies on nonconformance reports which will be evaluated and dispositioned by the Engineer. Of 2414 welds, 1307 had improper traceability, 114 were rejected by visual re-inspection, and 334 were inaccessible. The inspector reviewed the criteria used for classification as inaccessible and did not identify any discrepancies. The inspector noted that the licensee's program associated with the sacrificial shield wall had considered the generic aspect of material from this supplier and had taken the appropriate action to investigate this matter. The inspector identified no items of noncompliance relative to the licensee's effort.

18. Licensee Action on Previous Inspection Findings

The WPPSS Program Director has assigned senior management personnel to assist the Bechtel quality assurance engineer in evaluating past WPPSS commitments made in response to NRC inspection findings. The effort is focused on identifying continuing commitments, i.e. those

that involve changes to work methods or management practices. The intent was to incorporate these into a separate specification to Bechtel, but the current plan involves revising existing contract specifications to incorporate the requirements. Also included in this effort is the re-evaluation of special requirements checklists which were used as the basis for May 1981 NRC closeout of several inspection findings.

During the current report period, the inspector reviewed data which supported the following conclusions relative to licensee action on previous inspection findings:

a. (Closed) Followup Item (397/79-16-01)

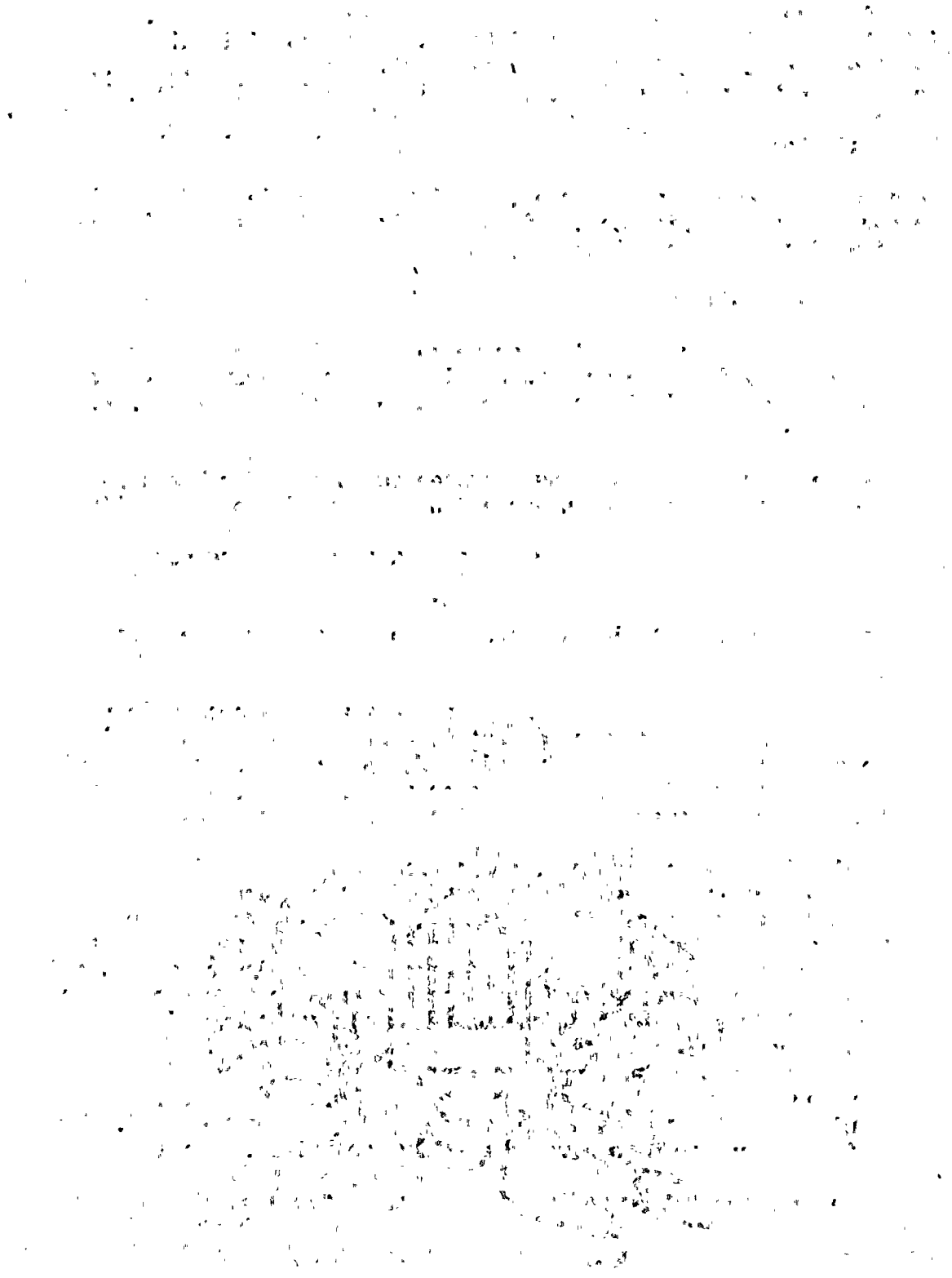
Sacrificial Shield Wall Concrete Void Repair: The matter of concrete void discovery and repair plans were previously reviewed and documented in inspection reports 50-397/78-10, 78-11, 79-08 and 81-03.

The inspector examined the licensee actions to further assess the concrete voids and preparations for filling of the voids. He considered the technique qualification and prototype plans described to NRC in the August 1, 1980 transmittal of the Engineering Evaluation of the Sacrificial Shield Wall (NRC Concern #2). Some minor departures from the plan were reviewed. These appeared reasonable and prudent. The licensee stated that these would be defined to NRC via a planned future update of the above noted report.

The licensee had Muenow Associates perform a microseismic test of the areas in the reactor active core region. These sonic tests were validated by drilling 1/4-inch holes at the prescribed locations, and impacting the concrete through the hole to assure soundness. There were 177 locations examined sonically.

Initial qualification of the process included drilling holes at ten locations each day, representing the approximate 30 holes per day tested sonically. Most of the holes each day were made at locations that the contractor declared were free of voids. The initial tests included some data points which raised questions regarding the accuracy of the process; however, further development of technique showed that care needed only to be exercised to assure that the hammer impulse and the transducer be confined to the same SSW compartment for each test. A slight change in the test procedure appeared to resolve the problem. Appropriately, the initial test data was disregarded, and the areas retested. The licensee appeared to have adequately qualified the process.

The licensee determined that the sonic tests were yielding conservative results, and the licensee assumed the conservative position that drilling will be done at every location that the contractor declared



void existence, even where the sonic data is suspected to be associated with lack of bond between the steel and the concrete.

During the testing activities, the equipment was calibrated twice each day by checking the wall location at plate number A655. The individual performing the sonic tests owned the company and had used the process at several other nuclear plants, although on bare concrete surfaces only. The licensee representatives evaluating and performing mockup work were engineers from Burns and Roe. They demonstrated adequate familiarity were with the report to NRC, the known past concrete placement practices and characteristics, and the structural significance of the work.

No attempt has been made to remove any steel plates to observe surface voids since the licensee believes that the column flanges will mask the access to any voids in the upper corners of each compartment. The licensee has instead relied upon drilled 1/4 inch holes and fibre optics.

For placement of the shield material the licensee has designed mockup tests of compartments with concrete and voids. A technique of drawing a vacuum and filling with NS-1 material is planned that has been tried using a concrete grout mix initially. Further tests are planned. The engineer described appropriate plans to include attempts to inject the NS-1 material through drilled holes to simulated voids at the far-end (back) of the sacrificial shield wall.

No items of noncompliance were identified, and the program changes did not appear to represent any significant departure from the prior plans presented to the NRC.

b. (Closed) Noncompliance (397/80-04-02)

The contractor (Leckenby) failed to provide approved NDE procedures prior to start of work.

See paragraph 16 of this report for the general corrective action program, which includes total reinspection of each pipe whip restraint, including NDE prior to and after repairs or refabrication.

c. (Closed) Noncompliance (397/80-04-08)

The contractor (Leckenby) quality records failed to accurately identify the visual inspection personnel.

See paragraph 16 of this report for the general corrective action program, which includes total reinspection of each pipe whip restraint, both before and after repair, or after refabrication.

d. (Closed) Noncompliance (397/80-04-09)

The contractor (Leckenby) allowed Uncertified personnel to perform NDE of pipe whip restraints.

See paragraph 16 of this report for the general corrective action program, which includes total reinspection of each pipe whip restraint.

e. (Closed) Noncompliance (397/80-04-13)

The contractor (Leckenby) failed to perform straight beam ultrasonic testing for laminations.

See paragraph 16 of this report for the general corrective action program, which includes total reinspection of the pipe whip restraints by ultrasonic testing, using procedures which do specify the straight beam examination.

f. (Closed) Noncompliance (397/80-04-17)

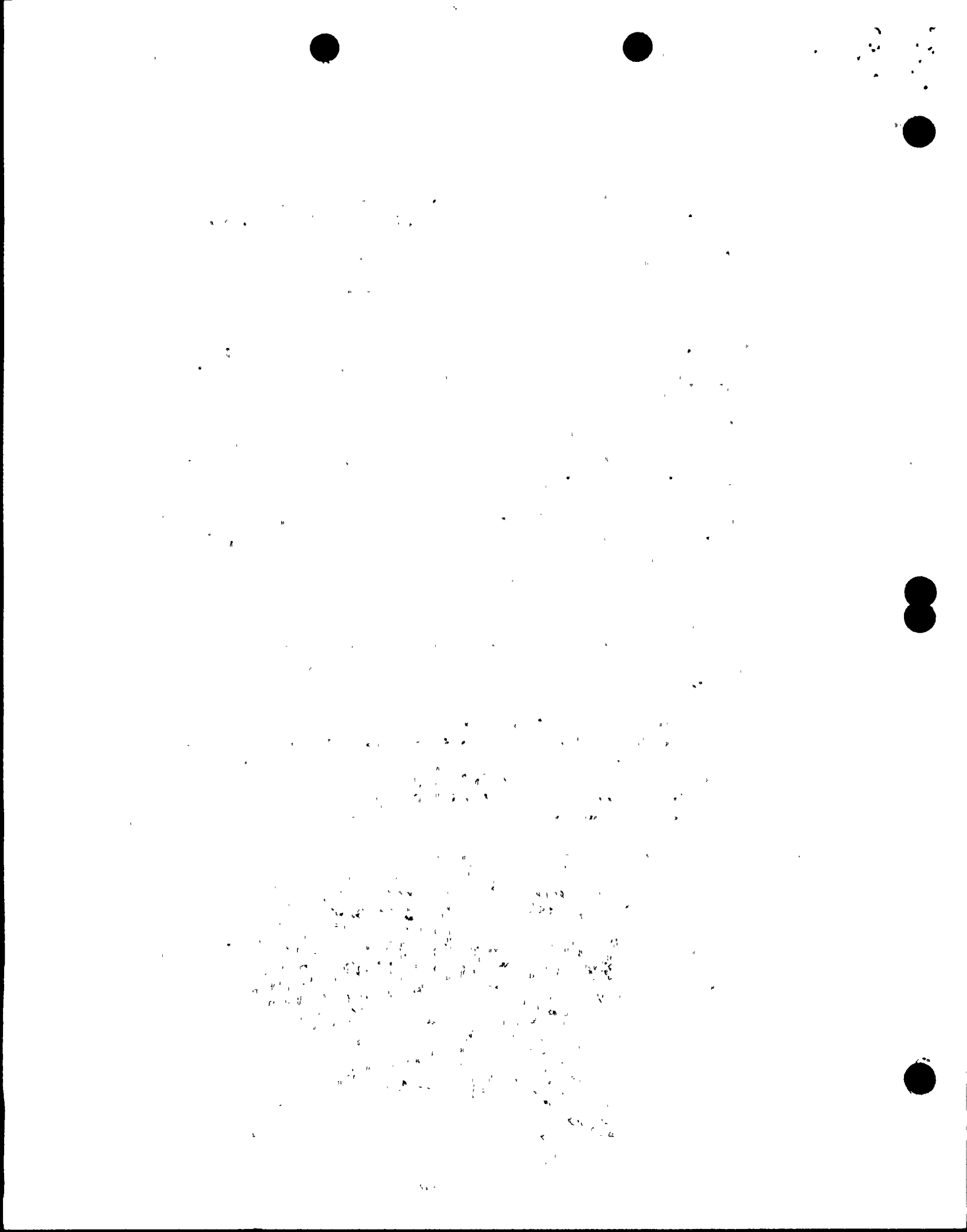
The contractor (Leckenby) pipe whip restraint quality records contain inconsistencies and do not accurately reflect quality activities.

See paragraph 16 of this report for the general corrective action program, which includes total reinspection of each pipe whip restraint. Also, paragraph 16 identifies a new unresolved item regarding translation of materials discrepancies into the current corrective action program. Except for that aspect, which will be addressed separately, this item is closed.

g. (Closed) Noncompliance (397/80-04-18)

The contractor (Leckenby) pipe whip restraint quality records do not correctly identify the NDE inspectors.

See paragraph 16 of this report for the general corrective action program, which includes total reinspection of each pipe whip restraint.



h. (Closed) Noncompliance (397/80-04-19)

A contractor (Leckenby) pipe whip restraint quality record was signed and dated by an individual prior to his employment date.

See paragraph 16 of this report for the general corrective action program, which includes total reinspection of each pipe whip restraint.

i. (Closed) Noncompliance (397/80-04-05)

The contractor (Leckenby) had not generated formal procedures to control heat straightening of pipe whip restraints. Paragraph 16 of this report discusses the general corrective action program, which includes refabrication and repair of pipe whip restraints. The procedures for such repair/refabrication include provisions which prohibit heat straightening. The licensee has submitted a technical analysis of the impact of heat straightening, and an accept-as-is rational, in a letter to NRC dated September 30, 1981. This item has been evaluated by the Region and is considered to be closed.

19. 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 paragraphs 6, 8a, 9, 10, 11, 13, and 16.

20. Management Meetings

The inspector met with licensee management on October 2, 1981 to discuss his inspection findings and summarize his activities during this report period. Attendees at this meeting are identified in paragraph 1 of this report.