

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

Region I

Report No. 50-354/82-05

Docket No. 50-354

License No. CPPR-120 Priority -- Category A

Licensee: Public Service Electric and Gas Company

80 Park Plaza - 17C

Newark, New Jersey 07101

Facility Name: Hope Creek Generating Station, Unit 1

Inspection at: Hancock's Bridge, New Jersey

Inspection conducted: April 5 - May 2, 1982

Inspectors: W. H. Bateman
W. H. Bateman, Senior Resident Inspector

5/7/82
date signed

date signed

date signed

Approved by: L. E. Tripp
L. E. Tripp, Chief, Projects Section 2A

5/10/82
date signed

Inspection Summary: Unit 1 Inspection of April 5 - May 2, 1982 (Report No. 50-354/82-05):

Areas Inspected: Routine unannounced safety inspection by the resident inspector (85 hours) of work in progress including upper bioshield preplacement preparations and cleanup, reactor pressure vessel (RPV) internals installation, dewatering and concrete preplacement and placement activities within the service water intake structure (SWIS) cofferdam, storage of materials in and around the powerblock, structural steel welding, HVAC ductwork installation, expansion anchor bolt installation, and pipe, hanger, and electrical penetration installation. The inspector also made tours of the site, reviewed NCR's and associated trending activities, and evaluated licensee action on previous inspection findings.

Results: Noncompliances: Two (failure of W-H to implement effective measures to indicate the status of inspections performed on ductwork support bolting as described in paragraph 3 and installation of ductwork supports different from those shown on the approved design drawings as described in paragraph 4).

DETAILS

1. Persons Contacted

Public Service Electric and Gas Company (PSE&G)

A. Barnabei, Site QA Engineer
R. Bravo, Principal Construction Engineer
G. Dalton, Senior Construction Engineer
A. E. Giardino, Project QA Engineer
P. Kudless, Project Construction Manager
G. Stake, Senior Construction Engineer

Bechtel Power Corporation (Bechtel)

B. Bain, Lead Welding Engineer
A. J. Bryan, Assistant Project QC Engineer
E. Cochrane, **Contract** Administration
C. Colletto, Assistant Lead QCE - Civil
W. Dorman, Assistant Project Field Engineer
M. Drucker, Lead Site QA Engineer
J. Feindt, Resident Civil Engineer
J. Gohde, Superintendent Contracts
R. Hanks, Project QC Engineer
M. Henry, Project Field Engineer
W. Hindle, Superintendent of Services
D. Long, Project Superintendent
R. Mackey, Resident Project Engineer
K. Mills, Lead QCE Mechanical
G. Moulton, Project QA Engineer
L. Rosetta, Field Construction Manager
D. Sakers, Assistant Project QC Engineer
J. Serafin, Assistant Project Field Engineer
D. Stover, Project Superintendent, Contract Administration
S. Vezendy, Lead Welding QC Engineer

General Electric Installation and Services Engineering (GEI&SE)

R. Burke, Site Project Manager
M. Hart, Site QC Supervisor

General Electric Nuclear Energy Business Operations (GENEBO)

J. Cockroft, Site Engineer
C. Brinson, Site QA Engineer

J. Rich Steers (Steers)

J. Gagliano, Field Engineer
M. Russell, Site QC Supervisor

W-H Constructors (W-H)

R. Garvey, Site Project Manager
M. Wita, Site QC Manager

2. Site Tour

Routine inspections were made to observe the status of work and construction activities in progress. The inspector noted the presence of and interviewed QC and construction personnel. Inspection personnel were observed performing required inspections and those interviewed were knowledgeable in their work activities. Work items were examined for obvious defects or noncompliance with regulatory requirements or license conditions. Areas inspected included:

Unit 1: Upper bioshield preplacement and cleanup, dewatering and concrete preplacement and placement activities within the SWIS, rebar installation, structural steel bolting and welding, material and equipment storage, and housekeeping and fire protection.

No items of noncompliance were identified.

3. HVAC - Review of Ductwork Support Installation Activities

The inspector reviewed W-H's procedures, procedure implementation, completed work, quality records, and interviewed construction and QC personnel regarding expansion anchor bolt (EAB) installation activities. The inspection was part of a total site inspection discussed in paragraph 9 of this report. As a result of this inspection the inspector determined that effective measures were not being implemented to indicate the status of inspections performed on ductwork support EAB's. In particular EAB torquing operations that were performed by craft personnel were indicated as complete by placing a small amount of quick harden paint on the nut and bolt or on the bolt head and its bearing surface. This paint was placed such that if the bolt or nut was loosened, the paint would crack. The purpose of this paint, as explained to the inspector by W-H personnel, was to indicate that the bolts had been torqued and had not been loosened. The inspector questioned who applied the paint and was informed the crafts who installed the EAB's applied the paint.

The inspector explained that inspection status of a quality activity cannot be controlled by those performing the quality activity, but that it must be performed by other than those who performed the quality activity, and in this case, by quality control personnel. The licensee stated that W-H QC inspection records of EAB installation were the official inspection status, not the dab of paint. In reply to this statement the inspector pointed out:

- (1) W-H personnel, who explained the system to the inspector, understood that application of paint indicated the bolts had been torqued, and
- (2) Review of QC inspection records for EAB installation contained for W-H hanger section H-21 on W-H drawing SM-131 did not support their statement in that EAB installation data sheets existed for supports that were not installed using EAB's; no EAB installation data sheets existed for supports that were installed using EAB's; and EAB data sheets were not specific as to which baseplate of a particular support they applied to.

The failure of W-H to maintain an inspection status of ductwork support EAB torquing either by quality records or by lack of QC involvement in application of paint is contrary to Criterion XIV of Appendix B of 10 CFR 50 and is an item of noncompliance. (354/82-05-01)

4. HVAC - Review of Ductwork Support Installation Activities

As part of the W-H EAB program review, the inspector noted discrepancies between as-built conditions and design requirements specified on Bechtel design drawing P-9131, Rev. 8 and W-H drawing SM-131, Rev. 2. In particular, for hanger section H-21 (which consisted of 8 hangers numbered 1-8), both of the above drawings required that EAB's be used to fasten baseplates onto the concrete wall to facilitate attachment of the load carrying members of several hangers including hangers 1 and 4. Review of as-built conditions indicated that in lieu of the EAB/baseplate design, embedded Unistrut was used as the attachment point for hanger 1 and portions of hanger 4. These as-built conditions were not reflected on the design drawings, nor had they been approved by the designer.

W-H personnel, when questioned by the inspector about this problem, stated that they had the option to use embedded Unistrut if it was available and referred to a note on Bechtel drawing P-9132 which gave them this option based on designer approval of the option used. The inspector pointed out to W-H personnel that Bechtel drawing P-9131 did not offer the option that P-9132 did and that it was not permissible to assume a note on one drawing could be applied to other drawings. It was also pointed out that designer approval of the option used was required.

The failure of W-H to follow their contract specification requirements to obtain design approval prior to deviating from approved design drawings is contrary to Criterion V of Appendix B of 10 CFR 50 and is an item of non-compliance. (354/82-05-02)

5. HVAC - Review of Ductwork Support Installation Activities

As part of the W-H EAB program review, the inspector reviewed qualification records of EAB installers and QC personnel who qualified the EAB installers. This review disclosed that two EAB installers had not signed their qualification forms as required by Appendix A of contract specification C-129(Q), Rev. 5. W-H QC personnel addressed this discrepancy by having the two installers sign their qualification forms.

Review of qualification records of W-H QC personnel involved in EAB installer qualification determined that qualification records were not available on site for one QC inspector. The validity of the qualification of the EAB installers qualified by this inspector is unresolved pending review of the QC inspector's qualification records. (354/82-05-03)

6. Reactor Coolant Pressure Boundary Piping Pipe Whip Restraints - Observation of Work and Work Activities

The inspector observed installation activities of pipe whip restraints (PWR's) inside the drywell. The particular PWR's observed were supplied by GENEBO as part of the NSSS package. The inspector noted that in some cases an excessive gap (up to $\frac{1}{2}$ ") existed between the PWR and the embedded plate surface to which it was being welded. Subsequent followup by the inspector to determine resolution of this fitup problem involved a review of the following documents:

- Bechtel Dwg. C-0943, Rev. 10
- Bechtel Dwg. C-0975-0, Rev. 9
- Bechtel FCR C-3670
- Bechtel FCR C-5791
- Bechtel FCR C-6190
- Bechtel FCR C-6323
- GE FDDR No. KT1-046, Rev. 0

Upon completion of review of these documents, it appeared that a design interface problem existed between Bechtel and GENEBO. In particular, the GE FDDR required that the fitup constraints stated in AWS D1.1 had to be adhered to and that any PWR's not meeting AWS fitup requirements had to be dispositioned by GE prior to welding. (AWS limits the fitup gap to 3/16".)

The interface problem resulted from Bechtel's assumption that the weld joint in question was a Bechtel design and, therefore, only required Bechtel disposition. Based on this assumption, Bechtel initiated three FCR's to address the fitup problem and proceeded to make the attachment welds between the PWR's and the embedded plates.

The inspector met with licensee, Bechtel, and GENEBO personnel to attempt to determine why Bechtel would make the PWR connecting weld with an open GE FDDR requiring a disposition prior to welding. Based on these meetings, it became apparent that the Bechtel disposition was technically acceptable to GENEBO but that confusion existed between Bechtel and GENEBO as to GENEBO's jurisdiction at the NSSS boundaries. The lack of a well defined and understood definition of GENEBO's jurisdiction at the NSSS boundaries is an unresolved item pending establishment of an agreement by both parties to a definition of GENEBO's jurisdiction at the NSSS boundaries. (354/82-05-04)

7. Licensee Action on Previous Inspection Findings

(Closed) Inspector Follow Item (354/79-06-02): Pipe wall thickness less than minimum specified. The original concern resulted from a review of NCR's that indicated a trend of pipe minimum wall thickness problems. At the time of the original inspection, the trend had been identified and the problem was under investigation. Review of the results of the investigation indicated that meetings were held with the pipe spool manufacturer (Dravo) to determine the cause of the minimum wall problem and correct it. The meeting was held in the summer of 1979. A review of pipe minimum wall NCR's issued since the Dravo meeting indicated that the large majority were with spools shipped to the site prior to mid-1979. Based on this improvement, the inspector considers that the corrective action taken was effective and considers this item closed.

(Closed) Unresolved Item (354/81-10-01): As-built condition of reactor building cylinder wall. The original inspection discussed out-of-roundness conditions of the reactor building cylinder wall at elevation 132'. This condition resulted in requiring modification prior to installation of exterior roof slab beams, slab radial beams, and slab intermediate beams all at elevation 132'. The inspector at that time determined from discussions with Bechtel personnel that the cause of the problem at elevation 132' resulted from use of guy wires to support the formwork, the effects of moderate winds during the time of placement on the guy wires and formwork, and failure to adjust the guy wires during the placement to compensate for formwork movement.

The item was left unresolved pending review of actions taken to ensure this problem did not recur, nor had occurred previously at lower elevations. The inspector reviewed survey data of three subsequent 30' lifts above elevation 132' and determined that the out-of-roundness problem at 132' was correctly compensated for and that elevation 162' was within acceptable tolerances. Additionally, elevations 192' and 222' were within tolerance. Survey data was not available for elevations below 132'. However, a lack of NCR's relating to installation of structural steel at elevations below 132' indicated there were no problems prior to elevation 132'.

The corrective action taken above 132' included use of embedded H-beam columns to aid in support of formwork and development of specific procedures requiring periodic monitoring of formwork movement during concrete placement. The inspector had no further questions and considers this item closed.

(Closed) Inspector Follow Item (354/80-02-04): PDM to establish a QC hold point to assure all affected material removed prior to rewelding. Based on subsequent revisions to the material removal procedure, it was determined not necessary to establish a QC hold point prior to rewelding. The inspector considers this item closed.

8. Reactor Vessel Internals - Observation of Work and Work Activities

The inspector observed the continuing efforts to complete the weld of the shroud to shroud support ledge. At the end of this inspection report period, it appeared that adjustments to the welding sequence were successful in providing the desired weld shrinkage. Air carbon arc gouging was used to remove deposited weld metal from the shroud to support weld prior to making the successful weldout. Because paragraph 5.6.9 of GENEBO specification 22A2537 states that copper, among other elements, shall not be used in direct contact with stainless steel and nickel base alloys and because the air carbon arc gouging electrode was copper coated, the inspector questioned the acceptability of air carbon arc gouging based on the inevitable deposits of copper within the stainless steel clad vessel. GENEBO responded that the amount of copper involved was not significant enough to warrant concern.

The inspector observed rain leakage into the vessel through the vessel top cover during a period of heavy rainfall. The inspector expressed concern regarding this inleakage because of the many construction activities in progress above the top of the vessel and the resultant contaminants that could be picked up by the rain water prior to leakage into the vessel.

Action was taken to identify and clean those areas in the vessel that were wet. Investigation of the steel vessel top cover revealed that construction activities outside the vessel had resulted in damaging the sealant between the top cover and hatches provided in the top cover for access into the vessel. The damaged sealant was scheduled to be replaced.

Vessel access was controlled as well as were eating, drinking, and smoking activities.

No items of noncompliance were identified.

9. Review of Expansion Anchor Bolt Installation Program

The inspector reviewed work in progress and completed work, interviewed various site personnel, and reviewed the following documents as part of a total site review of installation of safety related expansion anchor bolts (EAB's):

- Bechtel Specification C-129(Q), Rev. 4, Furnishing and Installation of Expansion-Type Anchors
- W-H Constructors Expansion Anchor Bolt Installation Procedure
- Bechtel QCI C-1.50, Rev. 4, Testing and Inspection of Expansion-Type Anchors
- Bechtel SWP/P-C-4, Rev. 5, Installation of Expansion-Type Concrete Anchors
- Bechtel Specification C-136(Q), Rev. 6, Installation of Expansion-Type Anchors
- Various cut rebar as-built drawings
- Various EAB installation data reports

A review of the Bechtel program indicated that installation, inspection, and records requirements were met or exceeded. For example:

- (1) The program requires a torquing inspection of 10% of all EAB's installed, but Bechtel QC witnesses 100%.
- (2) Cut rebar as-built drawings are maintained.
- (3) A single individual has been designated as the Designated Field Engineer for all site EAB activities.

- (4) Area superintendents control issuance of core drill bits to control inadvertent damage to rebar and embedded pipe and conduit. Core drill bits are issued only after a thorough review of applicable civil drawings to determine locations of embedded items.
- (5) Bechtel EAB test results flow from QC to engineering as required to ensure problems are identified and controlled in their early stages.
- (6) All QC disciplines inspected including civil, electrical, and pipe and hangers have their own method of grouping EAB's to QCIR's that is effective and sufficiently limits EAB grouping to a workable size that facilitates continuous input of test results to engineering.

The inspector interviewed craft personnel who were installing EAB's and QC personnel who were performing required inspection activities. The personnel were knowledgeable as to EAB installation requirements, action to be taken when encountering rebar, requirements for drypacking unused holes, minimum edge distance requirements, and method to determine correct length of EAB to ensure sufficient embedment.

No items of noncompliance were identified.

In addition to Bechtel, W-H Constructors is also installing EAB's. A review of their program resulted in two noncompliances and one unresolved item as discussed in paragraphs 3, 4, and 5 of this report.

10. Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items or items of noncompliance. Unresolved items identified during the inspection are discussed in paragraphs 5 and 6.

11. Exit Interview

The inspector met with licensee and contractor personnel at periodic intervals during this inspection report period. At these times, the inspector summarized the scope and findings of his inspection activities.