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

Region I

Report No. 50-354/80-07
50-355/80-07

Docket No. 50-354
50-355

License No. CPPR-120
CPPR-121 Priority -- Category A

Licensee: Public Service Electric & Gas Company
80 Park Place
Newark, New Jersey 07101

Facility Name: Hope Creek Generating Station, Units 1 and 2

Inspection at: Hancocks Bridge, New Jersey

Inspection conducted: May 5-30. 1980

Inspectors: B. W. McDonald for W. H. Bateman, Resident Reactor Inspector — July 1, 1980 date signed

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Approved by: B. W. McDonald R. W. McGaughy, Chief Projects Section — July 1, 1980 date signed

Inspection Summary:
Unit 1 Inspection on May 5-30, 1980 (Report No. 50-354/80-07):
Areas Inspected: Routine, announced inspection by resident inspector of work in progress and completed work including nozzle modifications to the reactor pressure vessel (RPV), PDM vent line bellows repair, maintenance of equipment stored in place and in warehouses, structural steel welding, piping erection and storage; backfill operations, cadweld identification, lower biological shield welding and NDE records, service water intake structure demobilization efforts, and certified material test reports on containment piping penetration extension. The inspector also made tours of the site on a regular basis, started preliminary investigation into a painting allegation, and reviewed licensee action on previous inspection findings. The inspection involved 58 hours on site by the resident inspector.
Results: Of the ten areas inspected, no items of noncompliance were identified in seven areas and one item of noncompliance was identified in each of three areas (Infractions - failure to store RHR and Core Spary pumps in accordance with technical manual instructions - para. 3; failure to make structural welds with qualified weld procedures - para. 4; and failure to identify and correct welding defects and missing NDE records as regards the lower biological shield - para. 5.

Un.. 2 Inspection on May 5-30, 1980 (Report No. 50-355/80-07):
Areas Inspected: Routine, announced inspection by resident inspector of work in progress and completed work including nozzle modifications to the RPV, containment erection, maintenance of equipment stored in place and in warehouses, service water intake structure demobilizaton efforts, and RPV defect removal work. The inspector also made tours of the site on a regular basis and reviewed licensee action on previous inspection findings. The inspection involved 28 hours on site by the resident inspector.
Results: Of the five areas inspected, no items of noncompliance were identified in four areas and one item of noncompliance was identified in one area. (Infraction - failure to make structural welds with qualified weld procedures - para. 4.)

DETAILS

1. Persons Contacted

Public Service Electric and Gas Company

*A. Barnabei, Site QA Engineer
*A. E. Giardino, Project QA Engineer
*M. Lavecchia, QA Coordinator
P. T. Liv, Site QA Engineer
*P. Kudless, Principal Construction Engineer
R. Robinson, Site QA Engineer
*D. Skibinski, Site QA Engineer

Bechtel Power Corporation (Bechtel)

G. Applegate, QC Engineer
B. Bain, Lead Field Welding Engineer
L. Bond, Welding Engineer
*A. J. Bryan, QC Engineer
W. Cole, QA Engineer
J. Fiendt, Lead Civil Engineer
*J. Gatewocd, Lead Site QA Engineer
S. Graham, Lead Civil Engineer
*W. Hindle, Project Field Engineer
*R. Hanks, Project QC Engineer
P. Hudson, QA Engineer
*C. Kasch, Assistant Project QC Engineer
W. Langdon, Mechanical Field Engineer
*D. Long, Project Superintendent
*M. Macondray, Assistant Project Field Engineer
D. Reel, QC Engineer
C. Rodgers, Lead Mechanical Field Engineer
D. Sakers, Lead Civil QC Engineer
J. Serafin, Mechanical Field Engineer
R. Seraiva, Field Superintendent
*P. Schuetz, Resident Engineer
*S. Vezendy, Lead Welding QC Engineer

Pittsburgh-Des Moines Steel Company (PDM)

J. Benedetti, QC Engineer
R. Langer, Assistant Field Superintendent
M. Stiger, QA Manager

General Electric Installation and Services Engineering (GE I&SE)

D. Burke, Project Manager
C. Clark, Field Engineer
*F. Eaton, QA Manager
D. George, Welding Engineer
V. Kenney, Site QC Supervisor
*R. Waters, QA Specialist

General Electric Nuclear Engineering Division (GE NED)

*C. Brinson, QA Engineer
*J. Crockroft, Lead Mechanical Engineer

Liberty-Westcon

R. Johnson, QA Manager

Peabody Testing

H. Dody, Site Test Engineer

J. Rich Steers

M. Russell, Site QC Supervisor

The inspector also talked with other site personnel.

*Denotes those present at at least one of the weekly exit interviews.

2. Site Tour

Routine tours of the site were made to observe the status of work and construction activities in progress. Because of a strike by local pipefitters and subsequent large scale layoffs of other craftsmen by the licensee, the amount of activity was limited. The inspector noted the presence of and interviewed QC and construction personnel. Work items were examined for obvious defects or noncompliances with regulatory requirements or license conditions. Areas observed included:

Unit 1: Work on RPV pedestal, PDM vent line bellows repair, structural steel installation in containment, backfill operations and testing, storage of equipment and material, and RPV nozzle modification activities.

Unit 2: Drywell and suppression chamber erection, storage of equipment and material, RPV defect investigation, service water intake structure activities, and RPV nozzle modification work.

No items of noncompliance were identified.

3. Safety Related Components - Observation of Work and Work Activities - Units 1 and 2

The inspector toured onsite warehousing and the power block to observe storage conditions of safety related equipment. Special emphasis was placed on provisions for long term storage as the licensee had announced delays in the commercial operation dates of both units. The majority of the equipment observed appeared to be stored in conformance to technical manual requirements and evidence existed of performance of scheduled maintenance activities.

There were, however, three areas of concern raised by the inspector. The first involved a question to the licensee as to plans they envisioned to cope with rust during the slowdown. The licensee stated that they are considering plans in this area, but those plans are not yet available for review.

The second area involved exhaustion of dessicant as indicated by humidity indicator cards on many valves in warehouse TB-2. The inspector was informed that this concern had been identified earlier by the Bechtel QC program and that provisions were being made to change the dessicant - the only holdup being the lack of pipefitters to accomplish the task as they were out on strike. The inspector had no further questions at this time.

The third area of concern involved failure to store the Unit 1 RHR and Core Spray pumps in accordance with technical manual requirements. Specifically, Ingersoll-Rand procedure number CQCP-1088, Revision 2, "Long and Short Term Storage Procedure" requires for long term storage that the following provisions be made:

(1) Discharge head and pumping element be bolted together and placed on a skid in the horizontal position;

(2) An energized Chromalox heating element be wrapped around the pumping element (which is inside the shell) and all openings between the pumping element and the discharge shell be sealed;

(3) External machined surfaces and internals of the pump be recoated with preservatives if required;

(4) The free end of pump shift be "blocked and supported so as to prevent lateral movement with the rotor resting in the casing bowls or channel rings"; and

(5) The entire assembly be encased in polyethylene at least 6 mils thick.

The inspector observed that:

a. None of the pumps were stored inside their discharge shells;

b. Not all pumps were wrapped with an energized heating element. This may not be that significant because the pumps were not installed in their discharge shells thus the heaters were ineffective for the purpose they were designed to serve;

c. There was no evidence of external machined surfaces and pump internals being examined to determine if recoating with preservative was required;

d. The pump shafts were not supported at the free ends but were supported where the shafts leave the pump housing;

e. The pump assemblies were not covered.

The failure to store the RHR and core spray pumps in accordance with technical manual instructions is an item of noncompliance relative to Criterion V of Appendix B of 10 CFR 50. (50-354/80-07-01)

4. Safety Related Structures (Welding) - Units 1 and 2 Beam Seats

Bechtel drawing C-849-0, Revision 13, which illustrates details of structural beam seats, shows welding details for connecting beam seats to embedded plates. There are two conditions described:

(1) If the angle between the embedded plate and the beam seat support bracket is between 60^{o} and 90^{o}, then fillet welding is called for;

(2) If the angle between the embedded plate and the beam seat support bracket is less than 60^{o}, then a partial penetration weld is called for with a groove angle of 60^{o}.

AWS D1.1-75, "Structural Welding Code", states in Section 2, Part C, Details of Welded Joints, that joints meeting the specified requirements of the Code may be used without performing welding procedure qualification tests. These types of joints are considered prequalified. Bechtel has elected up to this point in time to limit structural welding covered by AWS D1.1 to that which can be accomplished by using the prequalified procedures. The use of a groove angle of 60^{o} as described above precludes this from being considered as a prequalified partial penetration weld in accordance with the Code. Therefore, a procedure qualification prior to its use is required. Bechtel has, however, used this procedure without qualification when welding beam seat support brackets to embedded plates. The failure to use a qualified weld procedure to weld beam seat support brackets to embedded plates when the included angle is less than 60^{o} is an item of noncompliance relative to Criterion IX of Appendix B of 10 CFR 50. (50-354/80-07-02; 50-355/80-07-01)

5. Safety Related Structures (Welding) - Unit 1 Lower Biological Shield

The biological shield consists of two concentric cylinders held together by bolts and welded vertical and horizontal stiffeners. It is located inside the drywell and surrounds the reactor pressure vessel. The empty volume between the two concentric cylinders gets filled with concrete which will act as a radiation shield during plant operation. At present the lower portion of the biological shield for Unit 1 is in place.

The lower biological shield was fabricated by PX Engineering (PX) using Bechtel approved PX fabrication drawings that were derived from Bechtel design drawings. The basis for the Bechtel design was AISC Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings, 1969 edition including Supplements 1, 2, and 3. The technical specification for the lower biological shield is Bechtel specification C-139(Q), Revision 5, "Technical Specification for Furnishing, Detailing, Fabricating, and Delivering of Biological Shield, Transfer Girders, and Lateral Truss."

Specification C-139(Q), in paragraph 7.7.1, specifies the inspection requirements for completed welds. The inspector inspected the completed welds that were accessible from the top of the lower section of the bioshield for compliance to these requirements and found several deficiencies. The deficiencies noted included undercut, incomplete penetration, lack of reinforcement and undersized fillet welds. Investigation of the PX documentation package also revealed that ultrasonic test (UT) records were missing for several weld joints. (A representative sample of joints requiring UT were compared against the UT records and no records were available for PX joints 324, 708, 709, and 735.) The weld defects and missing UT records constitute an item of noncompliance relative to Criterion X of Appendix B of 10 CFR 50. (50-354/80-07-03)

6. Safety Related Structures (Welding) - Units 1 and 2 Biological Shield

In paragraph 5 above it was stated that the technical specification for the biological shield is C-139(Q). Paragraph 7.1.1 of this specification states, in part, that: "Welding and other criteria covered by this specification shall meet the requirements of ASME Boiler and Pressure Vessel Code, Section III, Subsection ND, Article ND-4000...". Paragraph ND-4433, "Types of Permanent Attachment Welds", states, in part: "Lugs, brackets, stiffeners, and other permanent attachments shall conform reasonably to the curvature of the surface to which they are to be attached and shall be attached by full penetration welds...". The inspector reviewed the Bechtel design drawings, PX fabrication drawings, and completed welding of the Unit 1 lower biological shield section and determined that full penetration welds were not consistently specified nor did they physically exist for the welded joint between several horizontal and vertical stiffeners and the

outer shell of the bioshield. What was specified and existed in these incidences was partial penetration welds. The inspector raised a question regarding this apparent noncompliance and was informed that the specific requirement of paragraph ND-4433 was not intended to be applicable to the bioshield welding design and that there probably existed other requirements in ND-4000 that were also not intended to apply. The inspector stated that the wording in the specification should reflect the actual welding requirements. The biological shield welding requirements are considered unresolved pending clarification of C-139(Q) to specifically state the applicable paragraphs in Article ND-4000 that apply. (50-354/80-07-04; 50-355/80-07-02)

7. Safety Related Piping (Welding) - Unit 1

The inspector observed crack patterns in the protective paint applied to the large bore pipe spools fabricated by Dravo. These patterns appeared to be limited to the circumferential area bounded by the shop welds. Three of the spools where this is apparent are:

1-BC-049-S02
1-FD-006-S04 (This list is not all inclusive.)
1-BE-009-S08

These indications are unresolved pending paint removal and nondestructive examination to determine their validity. (50-354/80-07-05)

8. Safety Related Structures (Welding) - AWS D1.1 Prequalified Procedures - Units 1 and 2

Prequalified joints may be used without performing the joint welding procedure qualification tests prescribed by the AWS D1.1 Code. Paragraphs 2.10, 2.12, and 2.14 of AWS D1.1 discuss partial penetration groove welds made by various welding processes and discuss in particular butt, T, and corner joints, but do not discuss details which may be applicable to skewed T-joints. Partial penetration skewed T-joint welds have been made on this project without joint welding procedure qualification based on the premise that if the groove geometry for a pre-qualified T-joint is maintained, then skewing the joint does not affect pre-qualification requirements. An apparent item of noncompliance in this area is discussed in paragraph 4 above. In addition, the inspector questioned what additional requirements the licensee is observing regarding partial penetration skewed T-joints, particularly with regard to dihedral angle between the welded members.

This matter is unresolved pending review of the licensee's requirements and the rationale for those requirements regarding partial penetration skewed T-joints. (50-354/80-07-06; 50-355/80-07-03)

9. Containment (Structural Steel Welding) - Unit 1

Box girders being installed inside the drywell of Unit 1 are fabricated by Levinson Steel Company. Two angle clips are welded to box girder G311 as shown on Levinson Steel Company drawing 361-1, Revision 3 (Bechtel drawing 10855-C(5)03344). The two angle clips are welded onto the box girder parallel to each other with approximately one inch separating them at an angle of 42.5° from the box girder surface. One of the clips is welded on using AWS D1.1 prequalified procedure BTC-P4-GF (partial penetration weld) and the other is welded on using AWS D1.1 prequalified procedure TC-U4b-GF (full penetration weld). The inspector questioned the full penetration weld because the prequalified procedure that was used appears to impose an angular constraint of 45° to 90° on the amount of skewing permitted. At the end of this inspection report period, it was not clear if Levinson Steel welded this joint with a qualified procedure that allowed them to weld at skewed angles less than 45°. The use of the full penetration weld made at an angle less than 45° is unresolved pending a determination by the licensee as to whether or not Levinson Steel Company had a properly qualified welding procedure to perform this weld. (50-354/80-07-07)

10. Licensee Action on Previous Inspection Findings

(Closed) Noncompliance (50-354/79-09-01; 50-355/79-08-01): Failure of Bechtel Field Engineering to comply with requirements of SWP/PC-1. The inspector reviewed the following actions taken by Bechtel Field Engineering:

a. Revision to SWP/PC-1 to provide a time limit for completion of Field Engineer Reports on concrete repairs.

b. Initiation of the "Concrete Repair Log Reactor and Auxiliary Building".

c. Added requirement for Field Engineering to write a Field Engineer's Report (FER) for every pour when assessing for repairs.

d. Issuance by QC of open post placement records to Field Engineering.

e. Notification of Concrete Superintendent on a biweekly basis of contents of Concrete Repair Log.

f. Attempts to close pour card and post placement inspection report simultaneously.

The action taken appears appropriate and sufficient to prevent recurrence of this problem.

(Closed) Noncompliance (50-355/80-02-01): Failure to bend test Nelson studs on 6" and 8" embedded channel prior to concrete placement as required per Bechtel QCI C-1.20.

As was pointed out in Inspection Report 80-02, the studs that were visible and required bend testing were tested. Bechtel also retrained the civil QC inspectors as regards the specific requirements of QCI C1.20 and QA continued periodic audits of QC performance of QCI C-1.20. Additionally, QCI C-1.20 was revised to delete the requirement for bend testing of Nelson studs.

(Closed) Noncompliance (50-354/80-02-02): Failure to control welding material in accordance with procedure requirements. Schneider, Inc. cleaned up the affected areas and retrained their welders regarding control of unusued electrodes and electrode stubs. Additionally, Schneider hired a second QC inspector who will make a weekly surveillance of work areas for proper electrode control.

(Closed) Unresolved Item (50-354/80-04-03): Lack of engineering disposition to accept Unit 1 Reactor Pressure Vessel (RPV) stub tube grindouts "as is". The licensee provided GE DDR 4868 which, based on Hitachi Streis Reports RS-9143. Revision 3 and RS-9144, Revision 3. accepted the control rod drive stub tube grindouts "as is".

11. Review of Nonroutine Events Reported by the Licensee

a. By letter dated November 22, 1978, the licensee reported, as a significant deficiency in accordance with 10 CFR 50.55(e), that certain ½" Nelson studs attached to embedments had exhibited a higher than normal failure rate when subjected to bend testing. In Inspection Report 79-03 it was reported that NCR's 368 and 369 had been issued to identify and resolve the problems and that this issue would remain unresolved pending review of NCR's 368 and 369 after closeout of NCR 369. With the recent closing out of NCR 369, the inspector reviewed the complete documentation package including the Bechtel home office engineering dispositions. NCR 368 was issued to identify the defective studs in storage. The disposition of this NCR resulted in the majority of the affected channel being sent back to the manufacturer for rework of the studs and a small amount being reworked at the site. NCR 369 was issued to identify the studs on embedments which had been concreted in place. Each situation involved with these embedments was investigated by Bechtel SFHO engineering to determine adequacy to meet specific design requirements. In those cases requiring corrective action, new design drawings were issued to the field to effect the changes. The changes basically involved the installation of expansion type anchors to substitute for the Nelson studs which were assumed to be non-existent.

Based on the action taken, the inspector had no further questions on this issue and considers the issue closed. (78-00-03)

b. By letter dated January 21, 1980, the licensee reported a potential significant deficiency in accordance with the requirements of 10 CFR 50.55(e) involving a surface indication on the Unit 2 reactor pressure vessel (RPV). On May 5, 1980 the inspector witnessed etching (ammonium peroxydisulfate per GE I&SE procedure 160A71207), liquid penetrant testing, and grinding operations being performed to investigate the extent of the surface defect. Material was removed in .020" increments with etching performed in between to check size of defect. This operation was repeated several times until at a depth of approximately 5/32", all traces of the defect were removed as evidenced by both etching and liquid penetrant testing. It was felt by GE NED site personnel that the defect was actually an inclusion of some impurity that took place during the vessel forming operation. The sides of the defective area were contoured by grinding to remove any strers risers. This issue will remain open pending GE NED home office evaluation of the RPV grindout. (50-355/79-00-02)

12. Reactor Pressure Vessel Nozzle Modification - Units 1 and 2

The inspector witnessed various steps performed by GE I&SE during the modification work to the RPV's. In particular liquid penetrant testing, etching, and radiographs were observed for conformance to procedures as well as machining and welding operations. Removal of the old safe ends from the Unit 2 RPV and weld prep of the nozzles was completed during this inspection report period. Because of the announced delay in commercial operation of Unit 2, the installation of the new safe ends will not take place as originally scheduled but is delayed to some yet unannounced date. The work on the Unit 1 RPV nozzles is continuing uneffected by the announced delays. At the end of this inspection report period, all but one of the new safe ends was at least partially welded in place.

No items of noncompliance were identified.

13. Containment (Penetrations) - Observation of Work and Work Activities - Unit 1

The inspector observed activities related to the lengthening of several drywell penetrations. The particular emphasis of this inspection was to ensure that the material being used to lengthen the penetrations met the ASME B&PV Code, Section III, Subsection NE requirements. The heat numbers for this piping were noted to be 69573 for the 12" diameter schedule 80 pipe and 65957 for the 8" diameter schedule 80 pipe. The inspector noted that these heat numbers had been transferred to each length of pipe, thus enabling traceability to material records. The inspector reviewed the following records associated with the above heat numbers that were available at PDM:

-- PDM Field Receiving Inspection Report No. 5.

-- Material Specification, MS-9.11, "Seamless or Welded Pipe for Low Temperature Service ASME SA333 Grade 1 or 6 for ASME code Section III".

-- Capital Pipe Certificate of Compliance for 12" Schedule 80 SA333 Grade 6.

-- Phoenix Steel Corporation Certificate of Inspection and Test.

-- Charpy V-notch test results.

The records were observed for conformance to Code requirements.

No items of noncompliance were identified.

14. Unresolved Items

Unresolved items are matters about which more information is required to ascertain whether they are acceptable items, items of noncompliance, or deviations. Unresolved items disclosed during this inspection are discussed in paragraph 6. 7, 8, and 9.

15. Exit Interview

The inspector met with licensee and contractor personnel (denoted by an asterisk in paragraph 1) on each Friday of this inspection report period. At these times the inspector summarized the scope and findings of that week's inspection activities.