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

Region I

Report No. 50-354/82-03
50-355/82-02

Docket No. 50-354
50-355

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

Licensee: Public Service Electric and Gas Company

80 Park Plaza - 17C

Newark, New Jersey 07101

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

Inspection at: Hancock's Bridge, New Jersey

Inspection conducted: February 1 - 28, 1982

Inspectors: W. H. Bateman 3/5/82
W. H. Bateman, Senior Resident Inspector date signed

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date signed

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date signed

Approved by: Edward J. Greenman 3/12/82
E. G. Greenman, Chief, Projects Section 2A date signed

Inspection Summary:

Unit 1 Inspection of February 1 - 28, 1982 (Report No. 50-354/82-03):
Areas Inspected: Routine unannounced safety inspection by the resident inspector (73 hours) of work in progress including Service Water Intake Structure (SWIS) foundation cleanup operations, equipment maintenance and storage, structural steel erection inside the drywell, reactor pressure vessel (RPV) internals installation, bioshield welding and internal cleanliness, fire protection and housekeeping, rebar installation, and pipe, hanger, and valve handling, fitup, and welding. The inspector also made tours of the site, reviewed licensee action on previous inspection findings, and evaluated the system for material traceability of safety related pipe supports.

Results: Noncompliances - none.

Unit 2 Inspection of February 1 - 28, 1982 (Report No. 50-355/82-02):

No safety inspection conducted - unit construction terminated.

Region I Form 12
(Rev. April 77)

DETAILS

1. Persons Contacted

Public Service Electric and Gas Company (PSE&G)

A. Barnabei, Site QA Engineer
R. Bravo, Principal Construction Engineer
A. E. Giardino, Project QA Engineer
P. Kudless, Project Construction Manager
K. McJunkin, Senior Construction Engineer

Bechtel Power Corporation (Bechtel)

B. Bain, Lead Welding Engineer
A. J. Bryan, Assistant Project QC Engineer
C. Colletto, Assistant Lead QCE - Civil
W. Dorman, Assistant Project Field Engineer
M. Drucker, Lead Site QA Engineer
R. Hanks, Project QC Engineer
M. Henry, Project Field Engineer
W. Hindle, Superintendent of Services
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
R. Tringale, Resident Project Engineer
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 Division (GENED)

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

J. Rich Steers (Steers)

M. Russell, Site QC Supervisor

Reactor Controls, Inc. (RCI)

K. Aspinwall, Site Manager
J. Benedetti, Site QA Supervisor

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 inspection 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: Structural steel erection in the drywell, SWIS cleanup operations, bioshield welding, rebar installation, and housekeeping and fire protection.

Unit 2: No site tours made - unit construction terminated.

3. Safety Related Pipe Support and Restraint Systems

The licensee is committed by PSAR to meet the requirements of the 1974 Edition of ASME III, Division 1-Subsection NF Code for component supports. Article NF-5000 of Subsection NF discusses NDE requirements and paragraph NF-5212 describes the particular NDE requirements for Class 1 linear type support welds. NF-5212 states in part:

> All full penetration butt welded joints, full penetration tee joints. corner joints, and full fillet welds... shall be radiographed. When radiography does not yield meaningful examination results, ultrasonic examination shall be performed. In addition, the weld... joint shall be examined by either the magnetic particle or liquid penetrant method.

This paragraph further states that if volumetric examination cannot be performed then it is acceptable to examine the welds by either the magnetic particle or liquid penetrant methods.

The inspector performed a survey of several Class 1 supports and their specified NDE requirements and determined that volumetric examination of full fillet welds was not planned. The inspector questioned the rationale for not performing the Code required volumetric examination of full fillet welds and was informed that geometric considerations precluded obtaining meaningful results. The inspector agreed with this rationale in most cases, but stated that volumetric examinations of certain geometries were needed to demonstrate that meaningful results could not be obtained. Susbsequent discussions on this subject between the inspector, the licensee, Bechtel, and other NRC personnel resulted in the determination that the Winter 1978 Addenda to the 1977 Edition of ASME III Subsection NF Code changed the NDE requirements for Class 1 support welds. Paragraph NF-5211 states:

(a) All full penetration butt welded joints in primary members shall be examined by the radiographic method.

(b) All other welded joints in primary members shall be examined by the liquid penetrant or magnetic particle method.

The change in Code required NDE for Class 1 supports from 1972 to 1978 to perform volumetric examination of all full penetration butt welded joints, full penetration tee joints, corner joints, and full fillet welds, to radiography of all full penetration butt welded joints indicates that ASME determined the 1974 NF Class 1 NDE requirements were not practical.

(One point mentioned during discussions was the definition of a full fillet weld and whether or not Class 1 supports were designed using full fillets. This subject was not pursued because the licensee intended to take a conservative approach and assume all fillets were full for the purpose of determining NDE requirements.)

The licensee is presently committed to the Class 1 NDE requirements as stated in Subsection NF of the 1974 ASME III Code. As described above a later edition of Subsection NF changed the NDE requirements for Class 1 supports. This later edition has received NRC endorsement. The NDE requirements in the later edition appear to be consistent with those planned at this site. This is an unresolved item pending a licensee decision to either follow their original PSAR commitment, i.e., to perform NDE of Class 1 supports per 1974 Subsection NF requirements, or to modify the PSAR to commit to perform NDE of Class 1 supports per the 1977 Code, Winter of 1978 Addenda, Subsection NF requirements. (354/82-03-01)

4. Licensee Action on Previous Inspection Findings

(Closed) Noncompliance (354/80-14-02): Failure to establish a code, standard, or procedure as a basis for installation and inspection and failure to properly qualify a welding procedure prior to starting welding of the CRDM housing support brackets. The licensee responses to this noncompliance stated the following:

(1) AWS was the code basis for the subject welds as stated on GENEBG Drawing No. 761E724, Rev. 6.

(2) Welding to ASME welding requirements was acceptable provided that a mockup was conducted to determine and compensate for lack of penetration caused by the skewed tee joint configuration.

The inspector reviewed the following documentation as part of the closeout action for this item:

(1) GENEBG Field Deviation Disposition Request (FDDR) KT1-042, Rev. 0 and Rev. 1

(2) GENEBG Drawing No. 761E724, Rev. 6, "CRD Housing Support"

(3) GENEBG letter to Bechtel GB-80-198 dated 8/28/30 from Larrew to Morris

(4) GEI&SE Detail Weld Procedure HC79-1000D, Rev. 2

(5) GEI&SE Procedure Qualification ISE-PQ-102, Rev. 1

Item (3) above contained the designer's (GENEBG) statement that CRD support beam seats, beams, rods, and CRD restraint beams were to be installed in accordance with AWS D1.1 except welding procedures could be in accordance with ASME Section IX. Items (4) and (5) above together formed a properly qualified ASME welding procedure to make the welds. Item (2) above clearly stated that field welds and shop welds were to AWS D1.1 requirements. Revision 1 to Item (1) above deleted the requirement for a mockup to determine lack of penetration. Instead it required that the distance from the vee-groove root to the centerline of a welding electrode wedged into the vee-groove be assumed the amount of lack of penetration. This distance was then added to the design weld size and resulted in the final acceptable weld size. The diameter of the electrode used in the determination was the maximum size used. The vee-groove geometry was formed by a skewed tee joint.

Based on satisfactory review of action taken on this issue and licensee performance since its original identification, this item is closed.

(Closed) Unresolved Item (354/81-04-03): Licensee to determine cause of thread damage to skewed bolts used in assembly of drywell structural steel, how these bolts became skewed, and the apparent relaxation of bolt tension after final tensioning operation. Investigations by the licensee determined that four connections contained bolts skewed in excess of AISC criteria and that these connections were made prior to identification of the hydraulic jacking problem discussed in NRC Inspection Report 80-19. It was, therefore, the licensee's contention that the thread damage and skewing were caused by improper bolting practices that have since been corrected. The licensee removed all the A490 bolts in the four affected connections and reassembled them where possible using new bolts and beveled washers. Where this was not possible the connections were welded. NCR's were generated as necessary to address damage sustained by the base metal. All misalignments since the hydraulic jacking problem have been resolved by either:

(1) Reaming the holes up to a maximum of 3/16" increase in diameter and using oversized bolts, or

(2) Welding the connection.

The licensee consulted with Lehigh University on the damaged 1½" A490 bolt threads that were identified on site. These particular bolts were sent to the Fritz Engineering Laboratory at Lehigh University. The results of the Lehigh analysis indicated that "... the damaged threads should not adversely influence the behavior of these bolts in shear provided they can be installed in the joint." The report also stated that establishment of bolt pretension by torquing is in reality not a requirement for bearing type connections to function properly. (The connections involved are bearing type connections.)

The inspector reviewed the various documents associated with this item and inspected the physical condition of the bolted connections. As a result of this inspection, the inspector had no further questions and this item is closed.

(Closed) Noncompliance (354/81-18-01): Recurrent failure of GEI&SE to control issuance of weld filler metal in accordance with procedure requirements. GEI&SE, as a result of this item, elected to modify their filler metal issue procedure. The inspector reviewed the new procedure and its implementation

and determined both to be satisfactory. The inspector also reviewed personnel training records documenting that affected personnel were trained in the workings of the new procedure. GEI&SE also implemented a procedure to indoctrinate all supervisory and QA personnel in a review of all site GEI&SE applicable NCR's, Corrective Action Requests (CAR's), and NRC Violations.

Based on the effective corrective action taken, which in large part has resulted from the recent appointment of a more experienced and effective GEI&SE QC supervisor, this item is closed.

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

During this inspection report period, the shroud and core support plate were installed inside the RPV. Just prior to this activity, flow instrumentation lines were leak and drop tested. After shroud set an optical measuring device was set up to use for final shroud alignment prior to making the connecting weld between the shroud and shroud support ledge. The optical measuring device was also used to monitor movement of the shroud during welding. The inspector witnessed setup, alignment, and use of the optical measuring device and welding of portions of the root pass of the shroud to shroud support ledge. Additionally, the inspector questioned GEI&SE production and QA personnel to determine understanding of their assigned tasks. The inspector also witnessed correct implementation of the filler metal control procedure, adequate RPV access control, and satisfactory cleanliness control.

As part of a documentation review the inspector reviewed the following items associated with the welding of the shroud to shroud support ledge:

(1) GEI&SE Weld Procedure Specification HC4001D, Rev. 4

(2) GEI&SE Procedure Qualification Record ISE-PQ-407

(3) GEI&SE welder qualifications for two of the five welders welding the joint

(4) GEI&SE Travelers HC1-11-T-1 and HC1-11-T-1R1

(5) GEI&SE Joint Process Control Sheet HC1-11-J-1

The inspector found the above documents satisfactory as regards conformance to ASME IX Code and GEI&SE QA Manual requirements.

No items of noncompliance were identified.

6. Safety Related Pipe, Hanger, Valve, and Pump Installation - Observation of Work and Work Activities

The inspector observed handling, fitup, in-process welding, and completed welding of safety related piping, hangers, valves, and pumps. QCIR's and weld filler metal issue slips were examined for correct signoff, consistent dates, completeness, and proper posting. When accessibility permitted observation, pipe internal cleanliness was verified. In most cases it was evident that preventive maintenance activities were continuing after installation of valves and pumps in the power block. The inspector notified the licensee in those cases he identified where preventive maintenance was lacking or nearby construction activity had caused a problem. Prompt corrective action was taken to correct these discrepancies. Finished welds were visually examined and areas adjacent to finished welds were observed for arc strikes. The finished welds were found visually acceptable and no arc strikes were found. A sampling of as-built hanger configurations were compared to design drawing requirements and found acceptable. Check valves were verified to be installed in the correct direction of flow.

The inspector questioned crafts as to cold pulling limitations and instructions they have received on this and other pipe fitting practices. The crafts questioned were knowledgeable of the jobsite requirements. Because many of the inspection steps on QCIR's are on a surveillance basis, the inspector questioned QC inspectors and reviewed QCIR's to determine if a reasonable amount of surveillance inspection was being performed. The inspector determined that a high percentage of surveillance inspections were being witnessed.

The inspector questioned the attachment of ASME III NF Class 2 supports supporting CRDM hydraulic piping to the non-safety related steel reactor vessel pedestal liner. Based on program requirements, it is not permissable to attach a safety related support to a non-safety related structure. The licensee informed the inspector that Bechtel had previously identified this problem and was pursuing a resolution.

No items of noncompliance were identified.

7. Safety-Related Structures - Observation of Work and Work Activities

The inspector observed welding activities in progress on the upper biological shield (bioshield). The majority of the welding required to completely assemble this structure has been completed. The inspector visually examined a sampling

of completed welds and determined that AWS D1.1 criteria were met for weld quality. He also observed in-process welding of a penetration into its design position in the upper bioshield. During this inspection activity, the inspector noted accumulations of trash in various areas in the annular space bounded by the bioshield inner and outer walls. The inspector also noted that as each penetration was welded into place, access for observation of cleanliness and cleanup, if required, became increasingly difficult. The upper bioshield annular space is designed to be filled with high density concrete for radiation shielding. Based on this consideration, the inspector informed the licensee of his concern over the accumulation of trash and eventual difficulty performing effective cleanup of the space prior to concrete placement. The licensee shared the inspector's concern and commited to thorough cleanup prior to concrete placement.

No items of noncompliance were identified.

8. Material Traceability of Component Supports

The inspector reviewed onsite storage of component supports and bulk materials used as part of component supports. The requirements for material traceability are contained in Subsection NF of the 1974 ASME III Code. Various Bechtel site documents explain how the Code requirements are implemented. The following is a simplified summary of the Hope Creek system:

(1) Component standard supports for use inside the drywell are purchased as NF Class 1 and are color coded. Certified Material Test Reports (CMTR's) are required.

(2) Component supports for use inside the drywell are purchased or site fabricated to the rules of NF Class 1. CMTR's are required.

(3) Component standard supports for use outside the drywell are purchased as NF Class 2 whether for use on Class 2 or Class 3 pipe. A Certificate of Compliance (C of C) is required for material. They are color coded by vendor.

(4) Bulk items such as U-bolts, nuts, clevises, and rods are purchased as NF Class 2. C of C is required.

(5) Class 2 material is required to have an identifying symbol to enable, through use of the C of C and referenced documents, material identification.

(6) No bulk Class 1 material is kept onsite except for rods. C of C's are required for sizes up to 1" diameter and CMTR's are required for sizes 1" and greater in diameter.

The inspector discussed implementation of this system with responsible site personnel. Although the system is complex, responsible individuals appeared to understand it. The inspector also observed proper implementation of the system for Class 2 supports as evidenced by unique markings on bulk items as well as on clamps, spring cans, snubbers, etc. that permitted material traceability through use of the applicable C of C. CMTR's for certain Class 1 supports are being pursued in NRC Unresolved Item 81-18-04.

No items of noncompliance were identified.

9. 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. An unresolved item identified during the inspection is identified in paragraph 3.

10. 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.