

U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 50-354/85-20

Docket No. 50-354

License No. CPPR-120

Priority --

Category A

Licensee: Public Service Electric & Gas Company
80 Park Plaza - 17C
Newark, New Jersey 07101

Facility Name: Hope Creek Generating Station - Unit 1

Inspection At: Hancocks Bridge, New Jersey

Inspection Conducted: April 22-26, 1985

Inspectors:

Paul W. Reynolds

S. D. Reynolds, Jr., Lead Reactor Engineer
M&PS, EB, DRS

5/28/85

date

A. Kortas

A. Kortas, Reactor Engineer
M&PS, EB, DRS

5/28/85

date

Approved by:

J. Wiggins

J. Wiggins, Chief, Materials & Processes, EB
DRS

5/31/85

date

Inspection Summary:

Inspection on April 22-26, 1985 (Report No. 50-354/85-20)

Areas Inspected: Routine, unannounced inspection of activities related to the design, fabrication and inspection of Class 1 small pipe and pipe support attachments. The inspection involved 71 hours onsite and 8 hours at the regional office by two region based inspectors.

Results: No violations were identified.

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DETAILS

1. Persons Contacted

Public Service Electric and Gas (PSE&G)

- *A. Giardino, Manager, QA Engineering and Construction
- *R. Griffith, Principle Staff QA Engineer
- *R. Donges, QA Engineer
- *A. Barnabei, Principle QA Engineer
- *U. Metcalf, QA Startup Engineer
- S. LaBruna, AGM-HCO
- E. Logan, Site Manager
- *J. Duffy, SE-Systems Analysis
- *F. Omohumpro, Manager, Corporate QA
- *A. Meyer, Senior Staff Construction Engineer
- *C. Jaffee, Startup Engineer
- *N. Griffin, Project Field Engineer
- *M. Drucker, QA Engineer
- *D. Long, Field Construction Manager

Bechtel Power Corporation (Bechtel)

- *W. Cole, Head QA Engineer
- *S. Vezendy, Assistant Project Construction QC Engineer
- *W. Goebel, QC Engineer
- E. Steiner, QC Supervisor
- O. Sidhu, Plant Design Engineer
- J. Fuller, QC Inspector
- P. Wiggins, QC Engineer
- W. Goebel, QA Engineer
- D. Yensan, Lead Piping Engineer
- L. Cerullo, Assistant Lead Piping Engineer
- G. Drexel, Lead Small Pipe Engineer
- J. Birdsall, QC Supervisor

U. S. Nuclear Regulatory Commission

- A. Blough, Senior Resident Inspector
- S. Chaudhary, Senior Resident Inspector

*Indicates those present at the exit interview.

2.0 Inspection of Attachment Welds

The inspector conducted a visual inspection of the following Class 1 small bore (SP) pipe full penetration attachment welds.

1-AB-253-H04
 1-AB-035-H04
 1-AB-034-H04
 1-AB-047-H04
 1-AB-046-H04
 1-AB-038-H05
 1-AB-039-H05
 1-AB-042-H05

1-BB-061-H02
 1-BB-073-H02
 1-BB-061-H03
 1-BB-073-H03

These welds exhibited good visual inspection quality criteria, were examples of good GTAW technique, and showed minimal heat effects on the pipe as evidenced by negligible "suck in" on the pipe at the lug attachment point. The inspector observed welder stencil numbers associated with the attachment welds and verified the qualification records of those welders selected. Typical weld history records of carbon steel and stainless steel pipe attachment welds were reviewed to obtain listings of the applicable WPS documents. WPS P1-T and P1-AT-LH were reviewed along with applicable PQR's #18, 29, 30, 667, 675, 695, and 696. WPS P8-T-AG was reviewed along with applicable PQR's 623 and 624. The welding parameter ranges specified met AWS Welding Handbook recommended ranges.

No violations were identified.

3.0 Review of Quality Control Inspection Reports (QCIR's) Related to Pipe Attachments

The inspector reviewed the following QCIR's:

1-AB-047-H08-1-P-2.10
 1-AB-034-H07-1-P-2.10
 1-AB-276-H05-1-P-2.10
 1-BB-314-H02-1-P-2.10
 1-BB-061-H03-1-P-2.10
 1-AB-046-H06-1-P-2.10
 1-BE-003-H08-1-P-2.10
 1-BB-003-H07-1-P-2.10

The QCIR'S indicated use of acceptable welding procedures, visual inspection by Bechtel QC, review of Branch PT results, final surface inspection and final QC sign off of records.

The inspector noted that there were some attachment welds (e.g. ISO's 1P-BE-003-H07 and -H08, welds W-1 and W-2) where WPS P1-A-Lh was changed to P1-T for the welding of lugs. The change of WPS is fully acceptable. The final surface NDE (PT) was noted as were the final QC and ANI sign offs.

No violations were noted.

4.0 Review of Applicable Welding Procedures and NDE Surface Inspection Procedures for Small Pipe Attachments

The inspector discussed the selection of welding procedures and surface inspection procedures with cognizant Bechtel Welding Engineering personnel. Specifically, the limiting of the welding procedure utilized for welding attachments to small pipe to the gas tungsten arc welding (GTAW) process was questioned. Bechtel indicated the selection was made based on the ability of the GTAW process to minimize interpass grinding and post weld preparation for surface inspection on full penetration 1/4" and 3/8" thick attachment welds. The selection of the red dye liquid penetrant surface inspection method over the fluorescent penetrant method was also discussed. This method is fully acceptable to the code, is the standard of the light water reactor industry and is more practical for field fabrication. The inspector fully concurred with the position on these two questions.

No violations were identified.

5.0 Review of Licensee Activities in Reviewing Material Classification Problems in Small Pipe and Small Pipe Attachments

The Class 1 small pipe at Hope Creek is for the most part limited to the branch lines on the main steam (AB) or recirc (BB) systems. The large bore pipe on these systems was supplied by GE.

In the process of inspection of small pipe and pipe supports the inspector reviewed the licensee document QAR F-279 dated 10/26/84 which references NCR 5288 dated 10/25/84 and discusses material identification problems related to the Bechtel "Heat identification" log system. The responses to QAR F-279 point out two problems discovered by the licensee.

The first problem was caused by a material supplier (not a basic material manufacturer) who stocked small pipe as Section III (SCIII) - Class 2, then took some of this pipe and performed volumetric inspection to upgrade it to Class 1. Material of the same basic heat was supplied to the site as both Class 1 and Class 2 pipe.

The second problem involved pipe support lugs used for SCIII NF, Class 1 supports. The lugs which are structurally a part of a pipe support are attachments to the NB (Class 1) pipe and must meet NB requirements rather than NF Class 1 requirements.

The inspector reviewed the documents related to QAR F279. Discussion of the materials problem contained in QAR F279, is abstracted as noted:

- Bechtel FE-1243 (11/07/84) - Identifies receipt of Class 1 and Class 2 pipe with same heat number. Indicates walkdown inspection of 100% of Class 1 small pipe systems. Indicates establishment of unique identifier system for Class 1 pipe with volumetric inspection to provide method of isolating this pipe from Class 2 pipe of same

heat. Requires generation of necessary NCR's based on walkdown. Calls for a training program to explain color code and unique identifier system.

- Bechtel FQC 1492 (11/19/84) - Identifies submission of NCR's - 5420 to 5428 on the material identification problem.
- Bechtel FE-1259 (11/15-84) - States that during investigation of Class 1/Class 2 pipe problem it was discovered that certain attachments (lugs, expansion joint plate, and anchor plate) ordered for NB (Class 1) pipe attachments were found to meet NF Class 1, but not the volumetric inspection requirements of NB 2121(a).
- Bechtel FE-1238 (11/21/84) Revises certain portions of "cause" and "corrective action" of FE-1259 to incorporate problems identified with Class 1 small pipe attachments. This states that attachments "must possess the same material qualifications (NDE, impact testing, etc.) as the Class 1 pressure boundary materials". This document indicates the NB material should have a nonpermanent color code of "dark blue" whereas NF Class 1 pipe support material should be color coded "orange". It identifies the sequence of occurrences as follows:
 - "1. All pipe support materials were procured to the minimum requirements of ASME NF and as such, did not address a situation where the attachment material would be subjected to the more stringent requirements of ASME Class I NB.
 2. Three types of items, (lugs, expansion joint plate, and anchor plate) were found to be welded to various sections of ASME Class I NB pipe with full penetration welds.
 3. As required by code, any welded attachments to the ASME Class I NB pressure boundary material will be required to possess additional qualifications to bring that material up to the standard of the ASME Class I NB pipe it is attached to.
 4. Therefore, certain items (identified in #3), attached to ASME Class I NB pipe do not possess all the required NDE."

Identifies issuance of NCR's 5363 to 5367 and 5349 to address specific materials problems.

- Bechtel F138703 (Burrowes to Turnbow) (dated 11/29/84) Recommends initiation of FCR requesting adoption of NB 2510 1983 Summer 83 edition (in lieu of applicable 1974 NB 2510) which does not require volumetric inspection of 1 inch and smaller pipe and fittings. Indicates that small pipe fittings greater than 1" can be given surface inspection to upgrade to NB (meets NB requirements). Recommends scrapping of pipe which can not be upgraded. Indicates requirements for ANI concurrence.

- Bechtel FQC 1535 (01/02/85) indicates final response to QAR F-279. Indicates activities completed and indicates list of NCR's generated.

The inspector reviewed the documentation which is being processed by the licensee requesting adoption of the 1983 NB 2510 paragraphs in the FSAR. This includes Bechtel request for FSAR change #816 dated 11/13/84 and Bechtel RPE #1111 dated 11/12/84 with Licensee Site Engineering Manager concurrence dated 11/19/84.

The inspector reviewed the ASME Code basis for the requirements for volumetric inspection of plate used for attachments to pipe. This interpretation of the Code by the licensee formed the basis for their actions taken in the use of NF Class 1 material for attachments to NB small pipe. Pipe support lugs (plate) and anchor plates can not be directly equated to "plate used for piping, pumps and valves" in NB-2531. Therefore, NB-2531 is not a requirement for lugs and the actions taken by the licensee show conservatism based on minimum code requirements.

The inspector reviewed the ASME Code basis for the "impact requirements" referenced in Bechtel FE-1238. Impact requirements are not applicable in this case because the Code exempts impact requirements for material less than 5/8" in thickness.

Where impact requirements are not required there is no requirement for CMTR's to indicate specific times and temperatures for heat treatments.

The inspector reviewed the following NCR's related to the QAR F-279 activities.

<u>NCR #</u>	<u>REPORT DATE</u>	<u>DATE OF QC ACCEPTANCE</u>
5349	11/01/84	01/25/85
5363	11/01/84	02/07/85
5364	11/01/84	02/21/85
5365	11/01/84	03/05/85
5366	11/01/84	01/24/85
5367	11/01/84	01/09/85
5420	11/07/84	02/22/85
5421	11/06/84	02/15/85
5422	11/06/84	01/08/85
5423	11/06/84	01/16/85
5426	11/06/84	01/24/85
5427	11/06/84	01/15/85
5428	11/06/84	02/21/85
5436	11/07/84	11/21/84
5449	11/07/84	03/22/85
5617	11/21/84	01/06/85

The inspector noted that the ANI signed off all of these NCR's. The dispositions were: upgrade by additional NDE, utilize 1983 NB 2510 waiver of volumetric inspection on 1" and small pipe, or scrap and replace.

The inspector reviewed the various walkdown inspection activities related to the small pipe attachment welds. This included a 100% walkdown by cognizant Field Engineers (FE) and FQC inspectors, a second walkdown with FE, FQC, and 30 ANI's, and a final pre-hydro walk down as part of the startup and test procedure.

Review of the subject material related activities by the licensee and Bechtel indicates a thorough and conservative approach to the subject problems.

No violations were identified.

6.0 Review of Documents Related to Class 1 Pipe Attachments

The inspector reviewed the following:

- The heat number/material log for the offsite fabrication shop (Paulsboro) materials which are designated as "FS-XXX" materials. This list included a variety of material forms and classes of materials (e.g., P1 carbon steels and P8 austenitic stainless steels). The list was verified with the computer stored information and by review of random applicable CMTR's.
- The internal heat code system which was instituted to provide a distinction between Class 1 materials with volumetric inspection and Class 2 materials without volumetric inspection that have the same basic melter heat numbers.
- Typical Branch Radiographic Laboratories Ultrasonic Examination (UT) results of volumetric inspection of material to upgrade it from Class 2 to Class 1, both in SITU and on stock material.
- Bechtel system which equates NF Class 1 materials with NC (SCIII Class 2) materials.
- Typical weld history records (QCIR-PQCI W1.00B Rev. 17) for welding and NDE of Socket, Partial Penetration and Attachment Welds for P1 and P8 attachments.
- Applicable WPS documents for P1 to P1 and P8 to P8 GTAW attachment welds and PQR's which form basis for WPS acceptability.
- Bechtel Standard lug attachment details for Class 1 and Non-Class 1 applications HPS-905D, SPS-905C, and SPS-905D. The full penetration requirement for Class 1 small pipe attachment welds was noted.

- Procurement specification FSK-P-255Q Rev 9 for 2" and smaller piping materials. It was noted in paragraph 4A(1) that the small pipe and pipe fitting exemption from volumetric inspection of NB2510 "shall not apply".

The documents reviewed met applicable code and standards requirements.

No violations were identified.

7.0 Review of Documents Related to P205

The inspector questioned the licensee on the engineering justification for the modification of the cold spring requirements of P205 permitted by Revision 8. Revisions 7 (11/26/82) and 8 (7/5/84) were reviewed and compared as well as all applicable FCR's. Paragraph 4.2.1(b) in Rev. 8 deletes the cold spring requirements of 0-1" for 2" and smaller piping in the drywell. The inspector noted the basis of relaxation was based on piping configuration and flexibility of the small pipe systems. Reviewed were FCR's P-7925, P-8051, P-6829, P-7093, P-8984, P-11086, P-9995, P-12286, P-12346, P-13998, and P-14040. These FCR's indicate relaxations permitted following engineering review. Included is documentation of B31.1 piping, method of making closure welds, fit up for closure welds, termination of erection sequence at a flanged connection, acceptance of a specific closure weld on segment 50.6 made without documentation, change in permissible maximum misalignment for CRD insert and withdrawal piping, and changes in final closure of socket welded systems using a pre-fitted closure spool. The FCR's were properly authorized by the Resident Project Engineer and reflect permissible engineering solutions to expedite piping fabrication.

No violations were identified.

8.0 Material Heat Traceability

The inspector selected the following sample of Class 1 carbon steel small bore pipe supports:

<u>Pipe Support</u>	<u>Drawing No.</u>
• RHR Bypass and Instrument Lines	1-P-BC-117-H06(Q) Rev. 3
• Instrument Line from FE N035 to Pen. J-19(E) Inside Drywell	1-P-BG-128-H02(Q) Rev. 2
• Instrument Line from FE N035 to Pen. J-19(D) Inside Drywell	1-P-BG-126-H02(Q) Rev. 3

The piping attachments were visually examined for quality of attachment welds and heat code number. The attachment heat code number and the heat code log were utilized to trace the material certification records. The material records were reviewed for material composition, examination and testing requirements and found to be acceptable.

No violations were identified.

9.0 Training

The inspector reviewed the unique identifier system training program as identified by Bechtel FE-1243 (11/7/84). The program was established to instruct all applicable field engineers, Quality Control Engineers (QCE) and craft foremen on use of the heat log, ASME Code Section III material usage, and respective color coding. Licensee QAR F-279 initially identified a heat traceability problem on October 26, 1984. A heat log training session was conducted by Bechtel QCE personnel on November 3, 1984 with additional sessions being held as necessary. Heat log training attendants are recorded in individual personnel records file.

No violations were identified.

10.0 Additional Inspection Related To Pipe Fabrication

Inspection Report 50-354/85-08 reports an additional quality related inspection in small and large bore piping conducted in the same general time period as this report.

11.0 Exit Meeting

The inspector met with licensee and Architect-Engineer/Constructor representatives (see paragraph 1) at the end of the inspection on April 26, 1985. The information reported in Paragraphs 8.0 and 9.0 was summarized in the exit interview for 50-354/85-08. In addition, Messrs. Blough and Chaudhary, the NRC Senior Resident Inspectors, were present. The inspector summarized the scope of the inspection and indicated the inspection findings. At no time during this inspection was written material provided to the licensee by the inspector.