

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

Report No. 99900736/81-01

Program No. 51300

Company: NPS Industries  
2750 S.W. Moody Street  
Portland, Oregon 97201

Inspection Conducted: March 9-12, 1981

Inspector: R. E. Oller 4-16-81  
R. E. Oller, Contractor Inspector  
Components Section  
Vendor Inspection Branch  
Date

Approved: I. Barnes 4-16-81  
I. Barnes, Chief  
Reactive Inspection Section  
Vendor Inspection Branch  
Date

Summary

Inspection on March 9-12, 1981, (99900736/81-01)

Areas Inspected: Implementation of 10 CFR Part 50, Appendix B; 10 CFR Part 21 and other NRC requirements including: initial management meeting; QA program review; general review of vendor activities; follow up on Bechtel Part 21 report dated October 8, 1980; follow up on NPSI Part 21 report dated June 16, 1980; and follow up on WPPSS-WNP2 10 CFR Part 50.55(e) report. The inspection involved 26 inspector-hours on site. In the six areas inspected, no nonconformances or noncompliances were found, with the following unresolved item identified in one area:

Unresolved Item: Follow-up Inspection on WPPSS-WNP2 10 CFR Part 50.55(e) Report Pertaining to Nonconforming Welds in Rigid Sway Brace Assemblies - Adequacy of NPS receiving inspection in regard to assuring compliance of rigid sway brace end bracket attachment welds with ASME Section III Code requirements could not be verified (See Details, paragraph H.4.b.).

DETAILS SECTIONA. Persons Contacted

- \*C. Amonson, QC Supervisor
- \*#A. Halamay, Plant Manager
- \*#K. Hanna, Plant QA Manager
  - E. Maggio, Project Manager - Heavy Fabrication
- \*H. Rogalsky, Production Control Manager
- \*#J. Takeuchi, Corporate Manager of QA
- \*K. Ward, Manufacturing Manager

\*Attended the Initial Management Meeting.

#Attended the Exit Meeting.

B. Preinspection Meeting

A preinspection meeting was held on March 9, 1981, with Messrs. Halamay, Hanna and Takeuchi. The NRC inspector discussed the areas to be inspected and the purpose and objectives of the inspection. In addition, a time was set for a post inspection exit interview.

C. Initial Management Interview1. Objectives

The objectives of the Initial Management Meeting were to meet with Plant Management to establish communications, discuss the purpose and intent of the Vendor Inspection Branch (VIB) direct inspection program, and to learn the basic functions of the plant.

2. Method of Accomplishment

The preceding objectives were accomplished by the inspector's presentation and the resulting discussions covering the following:

- a. NRC policies and organization.
- b. VIB program objectives and how these objectives are accomplished.
- c. VIB organization.
- d. Inspection areas to be covered.
- e. Basic inspection techniques of the VIB.

- f. Enforcement procedures applicable to vendors, including Section 206 of the Energy Reorganization Act of 1974 and Part 21 of 10 CFR.
- h. The White Book.
- i. Questions.

### 3. Results

No unusual questions or discussions developed or occurred during the initial management meeting.

## D. QA Program Review

### 1. Objectives

The objectives of this area of the inspection were to verify that the QA program has been documented in writing and provided adequate controls for manufacturing the product. Also, to ascertain whether the program provides for the following:

- a. Management's policy statements concerning QA.
- b. A QA organization structure which has sufficient organizational independence and freedom to:
  - (1) Identify quality problems.
  - (2) Initiate appropriate resolutions.
  - (3) Verify corrective actions.
- c. The QA staff with the authority and access to a level of management, that will ensure effective implementation of the QA program elements and enforcement of positive and timely corrective action.
- d. The duties, responsibilities and the authority of the QA staff are clearly delineated in writing.
- e. Detailed written procedures, properly reviewed and approved, are available to control quality activities.
- f. A training and indoctrination program to provide and maintain the proficiency of:

- (1) Personnel performing quality activities.
- (2) Personnel verifying that quality activities are properly performed.

## 2. Method of Accomplishment

The preceding objectives were accomplished by:

- a. Review of the manual "Corporate Quality Assurance Manual For NPT and Material Supplier, ASME Section III," Revision 5, dated February 2, 1981.
- b. Examination of the NPSI Work Procedures Manual which contained the supporting QA/QC and special process procedures.
- c. Review of the following ASME Certificates of Authorizations for the Portland Plant.
  - (1) No. N-2323-1 for "NPT"
  - (2) No. N-2324-1 for Material Supplier
- d. Observation of the posted copies of 10 CFR Part 21, Section 206 of the Energy Reorganization Act of 1974, and approved procedure NPSI/NRC-01, Revision 1, "Reportable Defects and Non-compliance (Nuclear Project)."
- e. Discussions with responsible personnel.

## 3. Findings

- a. Within this area of the inspection, no nonconformances or unresolved items were identified.
- b. Other Findings - Comments
  - (1) The documented QA Program appeared to comply with the criteria contained in D.1. above.
  - (2) The QA program is structured to provide capabilities consistent with the scope of the ASME Certificates of Authorization listed below, but at the present time the plant is manufacturing mainly component standard supports, pipe whip restraints, and pipe hangers.

- (3) The current ASME Certificates of Authorization for the Portland Plant are as follows:
- (a) No. N-2323-1 is for the use of the "NPT" symbol for Class 1, 2, 3 and MC component supports; Class 1, 2, and 3 piping subassemblies and tubular products welded with filler metal; Class 2 and 3 vessel parts and appurtenances and Class CC concrete containment parts and appurtenances (metal parts only).
  - (b) No. N-2324-1 is an authorization for the supply of carbon, low alloy and high alloy steel and nonferrous bolting, castings, structural shapes, seamless and welded without filler metal tubular products, including qualification of material manufacturers.
- (4) The Portland plant has a resident Authorized Nuclear Inspector who represents HSB I&I Co., the Authorized Inspection Agency.
- (5) Review of the posted procedure NPSI/NRC-01, Revision 1 established that the procedure was adequate to control the reporting of 10 CFR Part 21 items.

E. General Review of Vendor's Activities

1. Objective

The objective of this area of the inspection was to assess the vendor's activities and their impact on future NRC inspections.

2. Methods of Accomplishment

The preceding objectives was accomplished by:

- a. Discussion with responsible personnel.
- b. In-shop observations of work in process on catalog items, component standard supports, pipe whip restraints and pipe hangers.
- c. Review of a list of current contracts for domestic nuclear power generating plants.

### 3. Findings

a. Within this area of the inspection, no nonconformances or unresolved items were identified.

b. Other Findings - Comments

(1) Observations of work in the shop indicated that the work currently consists of manufacture of catalog items, component supports, pipe whip restraints and pipe hangers.

(2) The list of current projects covers work for eight domestic nuclear power plants. Some foreign customer jobs are also in the plant.

### F. Followup on Bechtel 10 CFR Part 21 Report Concerning Disengaged Rod End Bushings in Pipe Supports for Midland and Palisade Units

#### 1. Introduction

Region III of the NRC Office of Inspection and Enforcement was notified on October 8, 1980, by Bechtel Power Corporation pursuant to 10 CFR Part 21, concerning pipe supports that had been furnished to Midland Units 1 and 2 and the Palisades Project, which contained partially or totally disengaged self-aligned rod end bushings. These items were reported to have been furnished by four different companies, one of which was identified to be NPS Industries of Portland, Oregon.

#### 2. Objectives

The objectives of this followup inspection were to ascertain that NPS Industries had:

- a. Been notified of the deficiency.
- b. Performed an evaluation of the condition, including making an assessment of generic considerations related to other nuclear power plant sites.
- c. Assigned responsibility and implemented a plan of corrective action.

## 2. Method of Accomplishment

The preceding objectives were accomplished by:

- a. Review of the Bechtel 10 CFR Part 21 report, dated October 8, 1980, concerning disengaged self aligning bushing in ends of piping supports.
- b. Discussions with responsible NPSI personnel.
- c. Observations in the shop of current NPSI "staking" practices for bushings (bearings) in sway struts and other devices.
- d. Review of Bechtel Specification 722M -366(Q), Revision 2, issued February 16, 1978. "Technical Specification for Field Fabrication of ASME . . . III, Pipe Supports, Hangers, and Restraints for 2½ inch and larger piping . . . Midland Units 1 and 2."
- e. Review of Bechtel P.O. 7220-F-39722Q, dated October 31, 1979, (one of several P.O.s) covering the NPSI supplied struts sizes SRS-06, -14, -20 for Midland 1 and 2.
- f. Review of Bechtel Sales Release No. NPSI-3223/NAP-3003, dated November 2, 1979 (one of several releases covering two sizes (SRS-20 and one SRS-14) of struts, rear brackets and pipe clamps.
- g. Review of NPSI QC Inspection signoff copy of Bechtel Sales Release for final inspection of each support item appearing on the release.
- h. Review of the following NPSI fabrication drawings used for SRS-14 strut parts procurement:
  - 10794A - Assembly Sway Strut
  - 1042A - Right Hand Eye Rod
  - 1043A - Left Hand Eye Rod
- i. Review of NPSI P.O. No. 30-156, dated December 14, 1978 for sizes SRS-06L, -06R, -08L, -08R, -10L, -10R, -14L and -14R forged eye rods with drilled holes for bushings.
- j. Review of Bechtel S.F. Office first notification letter dated October 28, 1980 to NPSI concerning the disengaged bushings.
- k. Review of NPSI response letter, dated November 18, 1980 to Bechtel S.F. Office.
- l. Review of a NPSI letter, dated November 11, 1980, to Bechtel-Midland, with attachments.



- m. Review of NPSI letter, dated March 1, 1981, to Bechtel-Midland concerning restaking of bushings or use of a modification to staking.
- n. Review of an NPSI letter, dated October 24, 1980, to Bechtel-Palisades in response to a telephone call from Bechtel.
- o. Review of the NPSI trip report to Midland, dated September 24, 1980, to review the bushing problem.

### 3. Findings

- a. Within this area of the inspection, no nonconformances or unresolved items were identified.
- b. Other Findings - Discussion and Comments

Review of the above documents and discussions concerning the disengaged bushings in the sway struts at Midland, provided the following information:

- (1) NPSI management indicated that the disengaged bushings in the sway struts at Midland Units 1 and 2 were a result of the bushings having been removed by the Bechtel-Standish fabrication shop for blasting and painting of the struts, followed by improper reinstallation of the bushings and failure to restake the bushings. NPSI has provided Bechtel-Midland with installation, inspection and staking instructions.
- (2) NPSI plant manufactures sway struts in size numbers, SRS-06, -08, -10, -12, -14, and -20.
- (3) The Portland NPSI shop records indicated that: (a) the subject strut eye rods were purchased predrilled in accordance with design drawings; (b) the eye rods were threaded and equipped with nuts, (c) the bushings installed and staked; and (d) the assemblies then inspected and sent to the stock room. However, the shop records did not specifically identify the staking operation. When needed the struts are assembled with a connecting pipe and the lock nuts are fillet welded.
- (4) The P.O.s indicated that the struts furnished to the Bechtel-Standish Midland fabrication shop were ordered with maximum C to C dimension, unpainted and with only one side lock nut welded.
- (5) After notification of the problem by Bechtel, the NPSI Director of Projects visited the Midland site on September 17, 1980. His findings indicated that the bushings were removed in the field for blasting and painting of the struts, after



which they were improperly reinstalled. During this trip, copies of NPSI procedure NPSI-M1#2, Revision 0 covering installation of spherical bushings (bearings) were given to Bechtel and field restaking was also discussed.

- (6) Bechtel SF Office notified NPSI by letter dated October 28, 1980, that the bushing disengagement defect was reportable under 10 CFR Part 50.55(e) and requested information on other Bechtel orders.
- (7) NPSI's response letter dated November 18, 1980 to Bechtel S.F. Office, identified seven Bechtel projects, five of which were domestic, for which struts and snubbers with self aligning bushings (bearings) were furnished.
- (8) Another NPSI letter, dated November 11, 1980, to Bechtel-Midland, identified all types of sway struts furnished to Midland, and provided documents to aid in correcting the field deficiencies.
- (9) On October 24, 1980, NPSI also sent to Bechtel-Palisades, maintenance and inspection procedures for spherical bushings (bearings) in struts in response to a telecon, and identified three P.O.s covering four struts furnished to Palisades.
- (10) It could not be verified that sway struts were furnished by NPSI to Midland or Palisades with the spherical bushings (bearings) in a staked condition or unstaked condition. Observations in Portland shop verified that currently the bushings are being staked in the shop at 4 points on each side of the struts.
- (11) Review of the trip notes and other documents indicate that the occurrence of partially or totally displaced bushings may have been caused external to NPSI and NPSI has cooperated in correcting the problem.
- (12) NPSI Portland management indicated they had not, at the time of the NRC inspection, had any additional written correspondence from Bechtel on the subject problem. They also indicated that the Midland problem is the only one of this nature known to them.

G. Follow-up Inspection on NPS Industries 10 CFR Part 21 Report Concerning Deficiencies in Fasteners Furnished by Southern Bolt and Fastener Corporation for Use at the Bechtel-Midland Project

1. Introduction

On June 13 and 16, 1980, and November 14, the NRC Office of Inspection and Enforcement was notified by NPS Industries, Inc. pursuant to 10 CFR Part 21 concerning a material mixup in fasteners furnished by Southern Bolt and Fastener Corporation, Shreveport, Louisiana for use at the Bechtel-Midland Project.

## 2. Objectives

Objectives of this followup inspection were to ascertain that NPS Industries had:

- a. Performed an evaluation of the condition, including making an assessment of generic considerations relative to other nuclear power plant sites.
- b. Assigned responsibility and implemented a plan of corrective action.
- c. Initiated preventive action within the QA program.

## 3. Method of Accomplishment

The preceding objectives were accomplished by:

- a. Review of the NPSI 10 CFR Part 21 reports to the NRC dated June 18, 1980, and November 14, 1980, with attachments.
- b. Discussions with responsible personnel.
- c. Review of NPSI internal memorandum, dated May 2, 1980, in which the President of NPSI identified the SBF material deficiency and directed the Corporate QA Manager and the Austin and Portland Plant Managers to place a hold on SBF materials and initiate a two phase review of purchase orders to SBF.
- d. Review of an internal NPSI memorandum dated May 14, 1980, to the President NPSI from the Corporate QA Manager, covering review of all direct and indirect purchase orders to SBF.
- e. Review of an internal NPSI memorandum, dated May 6, 1980 assigning the NPSI Contracts Administrator as a Special Project Assistant for the bolting problem.

- f. Examination of a special QA Manual developed and used specifically for the Bechtel-Midland Project.
- g. Review of the Bechtel Purchase Order No. 7220-F-3107Q, dated September 28, 1977, and the Bechtel Specification No. 7220-C-233Q, Revision 12 for the Midland Project.
- h. Review of the five NPSI Purchase Orders Nos. PDX-9198N; -9461N; 9478N, -9541N and 9542N issued to SFC during the period of September through November 1978 for the subject bolting.
- i. Review of the NPSI "Trip Report-Southern Bolt and Fastener Corporation" dated May 15, 1980.
- j. Review of the current and former ASME certificates of Authorization held by SBF.
  - (1) No. 259, QCS-Material Manufacturer and No. 260, QCS-Material Supplier; both expire December 23, 1982.
  - (2) No. 1582, Material Manufacturer and No. 1583, Material Supplier; both expired December 23, 1979.
- k. Review of three NPSI design drawings, Nos. E-54, Revision 4, E-61, Revision 1 and E-104, Revision 3, showing the bolting application in the pipe whip restraints.
- l. Review of the NPSI P.O. 31-146, dated June 27, 1980, to SBF covering the replacement bolting.
- m. Review of the NPSI current Approved Vendor List and the list applicable during the initial bolting purchase from SBF to verify that SBF was an approved material manufacturer.
- n. Review of Bechtel P.O. 7220-F-3107Q, Revision 33, dated June 6, 1980, to NPSI covering the 192 replacement bolts.

#### 4. Findings

- a. Within this area of the inspection, no nonconformances, noncompliance or unresolved items were identified.
- b. Other Findings - Discussions and Comments
  - (1) Discussions and review of the above documents established that the NPSI 10 CFR Part 21 reports dated June 16, 1980, met the notification requirements of 10 CFR Part 21.

- (2) The deficient bolting problem was properly evaluated and reported in a timely manner to the NRC by NPSI.
- (3) The internal memorandums dated May 2, 1980, and May 6, 1980, by NPSI management, indicated awareness of the safety significance of the bolting problem, directed that a "Hold" be placed on SBF material, and initiated an accountability review of all direct and indirect orders to SBF be made. A Special Project Assistant was assigned to the problem.
- (4) The above accountability review of orders to SBF resulted in an internal memorandum to the President of NPSI dated May 14, 1980, which identified that only five P.O.s were placed with SBF for bolts and that all of the material had been shipped to the Bechtel-Midland Project, and there were no generic implications.
- (5) The original Bechtel Specification required that details and fabrication of the steel items (including pipe restraints) were to conform to "AISI Specification for Design, Fabrication and Erection of Structural Steel Buildings," adopted February 2, 1969.
- (6) Review of the three NPSI drawings E-54, E-61, and E-104 indicate that the subject bolts were for use in securing together the structural members of the pipe restraints and for ring clamps.
- (7) Review of the original Bechtel P.O. 7220-F-3107Q dated September 27, 1977, Revision 33, dated June 10, 1980, of the same P.O. for replacement bolts; the original five NPSI P.O.s Nos. PDX-9198N, -9498N, -9461N, -9478N, -9541N, and -9542N to SBF and the NPSI P.O. 31-146, dated June 27, 1980, for replacement bolts, showed that none of the P.O.s included the requirements of 10 CFR Part 21, even though Bechtel had indicated to NPSI that the bolting deficiency was reportable under 10 CFR Part 21.
- (8) The sequence of events was as follows: On May 1, 1980, the NPSI New Jersey office was notified by Bechtel-Midland of failures in bolts furnished by NPSI from SBF. Corrective action was initiated by NPSI sending SBF a letter, dated May 2, 1980, advising them of the problem. This was followed up by an NPSI field trip on May 7, 1980, to observe Bechtel tests on suspect bolts, and by a trip to SBF by the NPSI Corporate QA Manager on May 12, 1980, to determine the cause of the defective bolting. SBF initiated an investigation and reported partial results to NPSI in a letter dated June 11, 1980, and final results in a letter dated July 9, 1980.

On June 10, 1980, Bechtel issued P.O. No. 7220-F-3107Q, Revision 33 to NPSI for 192 replacement bolts. NPSI then issued a P.O. 31-146 dated June 27, 1980 to SBF for the replacement bolts.

- (9) Review verified that SBF was on the NPSI "Approved Vendor List" during the time of the original bolting purchase and during the replacement bolting purchase. The SBF approval by NPSI was based on SBF holding valid ASME Certificates of Authorization for the manufacture and supply of materials.
- (10) Discussion and review verified that the Bechtel-Midland work was performed under a NPSI QA Manual specifically prepared for the Midland Project and not under the NPSI Corporate QA Manual.

H. Follow-up Inspection on WPPSS-WNP2 10 CFR Part 50.55(e) Report Pertaining to Nonconforming Welds in Rigid Sway Brace Assemblies

1. Introduction

On September 19, 1980, November 26, and February 5, 1981, Region V of the NRC Office of Inspection and Enforcement was notified of a 10 CFR Part 50.55(e) construction deficiency at Washington Public Power Supply System Nuclear Project 2 (WPPSS-WNP2), concerning welds in rigid sway brace assemblies, which were not in compliance with Appendix XIII, subparagraph XIII-1742.1 in Section III of the ASME Code. The report also indicated that using ASME Code allowables, an analysis had determined that a design deficiency also exists for HS-142 brackets in the assemblies, when loads are applied at an angle greater than 15° off the perpendicular for sizes 60 and 80. Destructive examination of brackets, in assemblies manufactured by companies including NPS Industries, was reported to have disclosed similar deficiencies of weld quality.

2. Objectives

The objectives of this follow-up inspection were to ascertain whether or not NPS Industries had been notified of this problem and had performed an evaluation of the condition, including making an assessment of generic considerations relative to other nuclear power plant sites.

3. Method of Accomplishment

The preceding objectives were accomplished by:

- a. Review of the WPPSS 10 CFR Part 50.55(e) Reports, dated September 19, 1980, November 14, 1980 and February 5, 1981 to the NRC IE Region V.

- b. Discussions with responsible NPSI management personnel.
- c. Review of Purchase Order No. 215-300 dated December 2, 1974 to NPSI from Bovee and Crail Construction Company and General Energy Resources, Inc. (a Joint Venture) agent for WPPSS.
- d. Review of Sections 52A and 150 of the applicable Burns and Roe Specification 2808-215, referenced in the above P.O. for quality and documentation requirements.
- e. Review of the NPSI P.O. No. 75-2001, dated June 4, 1975, to Power Piping Company, Pittsburgh (PPC) covering furnishing of pipe support hardware, engineered hangers and special pipe clamps for WPPSS Nuclear Project No. 2.
- f. Review of PPC drawing No. SK-502, associated with P.O. No. 75-2001, covering details, sizes and loading of sway struts.
- g. Review of NPSI P.O. Releases No. 75-2001-37 and No. 76-2001-37 to verify the strut sizes which were secured from PPC.
- h. Review of records of survey and audit for approval by NPSI of PPC as a supplier of ASME Code pipe support catalog items.
- i. Review of NPSI Receiving Inspection Checklist No. 259, dated October 11, 1976, covering inspection of sway strut subassemblies A and B for strut sizes 15, 20, 25, and 40, including the subject End Brackets received from PPC on P.O. Release 75-2001-14.
- j. Review of PPC records related to struts in P.O. 75-2001-14, such as the Release for Shipment No. 2270, and the Certificate of Compliance, dated October 8, 1976.
- k. Review of qualification records for two NPSI QC inspectors who performed receiving inspection of the above strut subassemblies.

#### 4. Findings

- a. Within this area of the inspection, no noncompliances or nonconformances were identified.
- b. Unresolved Item

It could not be established during the inspection whether or not welds in purchased HS-142 End Brackets had been subjected to a receiving inspection, that would have verified compliance with ASME Section III, Mandatory Appendix III, subparagraph XIII-1742.1; in that, the available receiving inspection reports were not sufficiently specific with respect to characteristics inspected.



c. Other Findings - Discussions and Comments

Review of the above documents and discussions provided the following information:

- (1) The NPSI Portland management indicated that they were not notified by WPPSS of the end bracket weld problem in sway struts. As a result of this lack of notification, no plan of evaluation, corrective action or generic consideration was initiated.
- (2) The Plant Manager indicated that NPSI had utilized Power Piping Co. (PPC) sizes 15, 20, 25, and 40 sway struts in assemblies furnished to WPPSS-WNP2 during the period of mid 1975 through 1978, but no sizes 60 and 80 were furnished. In addition, no Power Piping struts were supplied to any other of NPSI's customer/clients during the above period.
- (3) The P.O. No. 215-300 to NPSI showed that requirements of ASME Code Section III, Subsection NF, 1971 Edition and Winter 1973 Addenda applied. This requirement was included in the NPSI P.O. No. 75-2001, dated June 4, 1975, to PPC. A certificate of compliance from PPC dated October 8, 1976, for items on NPSI P.O. Release 76-2001-14, certified the manufacture of the strut assemblies to the above Code requirements. NPSI management indicated the items were accepted as meeting Code based on the C of Cs which were received.
- (4) Review of the NPSI Receiving Inspection Checklist No. 259 for strut assemblies, showed only that the items were dimensionally inspected for conformance to the purchase order requirements, and visually examined for required markings.

I. Exit Interview

1. The inspector met with management personnel denoted in paragraph A, at the conclusion of the inspection on March 12, 1981.
2. The following subjects were discussed:
  - a. Areas inspected.
  - b. Inspection findings identified in this report.
  - c. The manner in which the manufacturer's representatives should respond in writing to nonconformances and noncompliances.
3. Managements' questions related to clarification of the above items.