Licensee Contractor and Vendor Inspection Status Report

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Quarterly Report
January – March 1996

U.S. Nuclear Regulatory Commission

Office of Nuclear Reactor Regulation

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A year's subscription of this report consists of four quarterly issues.

Licensee Contractor and Vendor Inspection Status Report

Quarterly Report
January – March 1996

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Division of Inspection and Support Programs
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

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ABSTRACT

This periodical covers the results of inspections performed by the NRC's Special Inspection Branch, Vendor Inspection Section, that have been distributed to the inspected organizations during the period from January 1996 through March 1996.

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INTRODUCTION

A fundamental premise of the U. S. Nuclear Regulatory Commission (NRC) licensing and inspection program is that licensees are responsible for the proper construction and safe and efficient operation of their nuclear power plants. The Federal government and nuclear industry have established a system for the inspection of commercial nuclear facilities to provide for multiple levels of inspection and verification. Each licensee, contractor, and vendor participates in a quality verification process in compliance with requirements prescribed by the NRC's rules and regulations (Title 10 of the *Code of Federal Regulations*). The NRC does inspections to oversee the commercial nuclear industry to determine whether its requirements are being met by licensees and their contractors, while the major inspection effort is performed by the industry within the framework of quality verification programs.

The licensee is responsible for developing and maintaining a detailed quality assurance (QA) plan with implementing procedures pursuant to 10 CFR Part 50. Through a system of planned and periodic audits and inspections, the licensee is responsible for ensuring that suppliers, contractors and vendors also have suitable and appropriate quality programs that meet NRC requirements, guides, codes, and standards.

The Vendor Inspection Section (VIS) of the Special Inspection Branch reviews and inspects nuclear steam system suppliers (NSSSs), architect engineering (AE) firms, suppliers of products and services, independent testing laboratories performing equipment qualification tests, and holders of NRC construction permits and operating licenses in vendor-related areas. These inspections are done to ensure that the root causes of reported vendor-related problems are determined and appropriate corrective actions are developed. The inspections also review vendors to verify conformance with applicable NRC and industry quality requirements, to verify oversight of their vendors, and coordination between licensees and vendors.

The VIS does inspections to verify the quality and suitability of vendor products, licensee-vendor interface, environmental qualification of equipment, and review of equipment problems found during operation and their corrective action. When nonconformances with NRC requirements and regulations are found, the inspected organization is required to take appropriate corrective action and to institute preventive measures to preclude recurrence. When generic implications are found, NRC ensures that affected licensees are informed through vendor reporting or by NRC generic correspondence such as information notices and bulletins.

This quarterly report contains copies of all vendor inspection reports issued during the calendar quarter for which it is published. Each vendor inspection report lists the nuclear facilities inspected. This information will also alert affected regional offices to any significant problem areas that may require special attention. Appendices list selected bulletins, generic letters, and information notices, and include copies of other pertinent correspondence involving vendor issues.

INSPECTION REPORTS

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

March 21, 1996

Mr. Ahmad E. Amer, President,
Amer Industrial Technologies, Inc.
1000 south Madison Street
Wilmington, DE 19801

SUBJECT: NRC INSPECTION NO. 99901292/96-01

Dear Mr. Amer:

This letter addresses the U.S. Nuclear Regulatory Commission (NRC) inspection of your facility at Wilmington, Delaware, conducted by Messrs. U. Potapovs, R. McIntyre and S. Matthews of this office on January 29 through February 2, 1996, and the discussions of their findings with you and members of your staff at the conclusion of the inspection. The inspection was conducted to evaluate your quality assurance program and its implementation in selected areas including (1) design control, (2) control of the manufacturing process, procurement and upgrading of stock material, (3) internal and external audits, and (4) indoctrination and training of personnel. Your program for compliance with the requirements of Part 21 of Title 10 of the Code of Federal Regulations (10 CFR Part 21) was also reviewed during this inspection.

The inspection was accomplished through objective evaluation of selected procedures and records, discussions, and observations of ongoing activities by the inspectors. The specific areas examined during the NRC inspection and the findings are discussed in the enclosed inspection report.

Based on the results of this inspection, we determined that certain of your activities appeared to be in violation of NRC requirements. Specifically, (1) the document describing your policy for compliance with 10 CFR Part 21 did not provide for evaluating deviations and reporting defects in accordance with 10 CFR 21.21(a), and (2) the evaluations conducted to determine if a reportable condition existed were inadequate.

You are required to respond to this letter and should follow the instructions specified in the enclosed Notice of Violation when preparing your response. In your response you should document the specific actions taken and any additional actions you plan to prevent recurrence.

Additionally, during this inspection, we identified several instances where the implementation of your quality assurance program failed to assure that the products supplied by your company complied with the applicable technical or quality requirements specified in the applicable procurement documents. The specific findings and references to the pertinent requirements are identified in the enclosures to this letter.

Please provide us within 30 days of this letter a written statement in accordance with the instructions specified in the enclosed Notice of

Nonconformance. We will consider extending the response time if you can show good cause for us to do so.

The response requested by this letter and the enclosed Notices are not subject to the clearance procedures of the Office of Management and Budget as required by the Paperwork Reduction Act of 1980, Public Law No. 96-511. In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and the enclosed inspection report will be placed in the NRC Public Document Room.

If there are any questions concerning this inspection we will be pleased to discuss them with you.

Sincerely,

Gregory C. Cwalina, Acting Chief
Special Inspection Branch
Division of Inspection and Support Programs
Office of Nuclear Reactor Regulation

Docket No.: 99901292

Enclosures: 1. Notice of Violation
2. Notice of Nonconformance
3. Inspection Report 99901292/96-01

NOTICE OF VIOLATION

Amer Industrial Technologies, Inc.
Wilmington, Delaware

Docket No.: 99901292
Report No.: 96-01

During an NRC inspection conducted at your Wilmington, Delaware facility on January 29 through February 2, 1996, a violation of NRC requirements was identified. In accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions," NUREG-1600, the violation is listed below:

10 CFR 21.21(a) requires, in part, that each corporation subject to the regulations shall adopt appropriate procedures to ensure the evaluation of deviations within 60 days of discovery, the submittal to the NRC of an interim report if the evaluation cannot be completed within 60 days, and the reporting to a responsible official of a defect or a failure to comply related to a substantial safety hazard within 5 working days of completing the evaluation.

Contrary to the above, (1) AMER Industrial Technologies, Inc. (AIT) document, "Procedures for Compliance With 10 CFR Part 21," dated April 27, 1993, which described the AIT policy for compliance with 10 CFR Part 21 did not provide for evaluation and reporting in accordance with 10 CFR 21.21(a), and (2) AIT performed inadequate and incomplete evaluations to determine if a defect or failure to comply associated with a substantial safety hazard existed. The evaluations consisted of three Interoffice Memos from the QA Manager to the AIT President that stated that none of the findings from the December 5-7, 1994, and the June 26-28, 1995, ASME surveys contained issues that should have been reported to the NRC per 10 CFR Part 21. (99901219/96-01-01)

This is a Severity Level IV Violation (Supplement VII).

Pursuant to the provisions of 10 CFR 2.201, AMER Industrial Technologies, Inc. is hereby required to submit a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555 with a copy to the Chief, Special Inspection Branch, Division of Technical Support, Office of Nuclear Reactor Regulation, within 30 days of the date of the letter transmitting this Notice of Violation (Notice). This reply should be clearly marked as a "Reply to a Notice of Violation" and should include for each violation: (1) the reason for the violation, or, if contested, the basis for disputing the violation, (2) the corrective steps that have been taken and the results achieved, (3) the corrective steps that will be taken to avoid further violations, and (4) the date when full compliance will be achieved. Your response may reference or include previous docketed correspondence, if the correspondence adequately addresses the required response. Where good cause is shown, consideration will be given to extending the response time.

Under the authority of Section 182 of the Act, 42 U.S.C. 2232, this response shall be submitted under oath or affirmation.

Enclosure 1

Because your response will be placed in the NRC Public Document Room (PDR), to the extent possible, it should not include any personal privacy, proprietary, or safeguards information so that it can be placed in the PDR without redaction. However, if you find it necessary to include such information, you should clearly indicate the specific information that you desire not to be placed in the PDR, and provide the legal basis to support your request for withholding the information from the public.

Dated at Rockville, Maryland
this 21st day of March 1996

NOTICE OF NONCONFORMANCE

AMER Industrial Technologies, Inc.
Wilmington, Delaware

Docket No.: 99901292
Report No.: 96-01

Based on the results of an NRC inspection conducted on January 29 through February 2, 1996, it appears that certain of your activities were not conducted in accordance with NRC requirements.

- A. Criterion III, "Design Control" of Appendix B to Part 50 of Title 10 of Code of Federal Regulations, (10 CFR Part 50) requires that measures shall be established to assure that applicable requirements are correctly translated into specifications, drawings, and instructions. Criterion III also requires the establishment of interfaces between participating design organizations for the review, approval, and revision of design documents as well as for checking the adequacy of design.

Paragraph NCA 3260(a) of Section III of the ASME Code states that the Design Report which the Certificate Holder or Designer provides, shall be reviewed by the Owner or his designee.

Paragraph NCA 3554 of Section III of the ASME Code states that any modification of any document used for construction, from the corresponding document used for the design analysis, shall be reconciled with the design report.

Paragraph ND 3362 of Section III of the ASME Code states that flanges designed to standards other than B 16.5 are acceptable provided they have been designed in accordance with the rules of ASME Code, Section III, Appendix XI.

1. Contrary to the above, the Design Report for Job 392 did not contain documentation of the Owner's review. The report also did not include the latest revisions of the construction drawings and, therefore, did not accurately reconcile the design changes with the design report.
  2. Contrary to the above, Amer Industrial Technologies, Inc. (AIT) dispositioned Nonconformance Report (NCR) 392-1 "use as is" without demonstrating that the design would meet the applicable ASME Code requirements. (99901292/96-01-02)
- B. Criterion VII "Control of Purchased Material, Equipment, and Services" of 10 CFR Part 50, Appendix B states, in part, "Measures shall be established to assure that purchased material, equipment, and services, whether purchased directly or through contractors and subcontractors, conform to the procurement documents."

Enclosure 2

Criterion III "Design Control" of 10 CFR Part 50, Appendix B states, in part, "Measures shall be established for the selection and review for suitability of application of materials, parts, equipment, and processes that are essential to the safety-related functions of the structures, systems, and components."

Paragraph NCA 3867.4 of Section III of the ASME Code states that an ASME Certificate Holder who elects to upgrade unqualified stock material may accept certification of the requirements of the material specification which must be performed during melting and of the heat analysis, providing that the Certificate Holder performs (or subcontracts) all other requirements of the material specification on each piece of the stock material.

1. Contrary to the above, AIT elected to upgrade stock material for Job 392 inlet and outlet pipe nozzles but failed to perform all testing required by the applicable material specification (SA 106, Grade B). Specifically, no documentation was available to indicate that flattening test and hydrostatic test were performed on this material.
2. Contrary to the above, AIT elected to upgrade stock material for SA-249 heat exchanger tubing for Job 442 but failed to provide sufficient documentation to demonstrate that all of the testing required by the material specification was performed on each of the 36 tubes purchased from an unqualified supplier.
3. Contrary to the above, AIT elected to upgrade explosively clad SA 516 Grade 70 heat exchanger tube sheets for Job 331 but failed to demonstrate that this material conformed with the applicable specification requirements. Specifically, laboratory test results showed Charpy v lateral expansion lower than permitted by paragraph NC 2330 of Section III of the ASME Code or by the AIT purchase specification for this material. The file contained no documentation regarding the disposition of the nonconforming condition.
4. Contrary to the above, AIT elected to upgrade SA 516, Grade 70 plate material for Job 331, but failed to provide sufficient documentation to demonstrate that the required testing had been performed on each piece of the stock material. Specifically, three separate pieces of this plate were identified with the same heat code number (M-2501) and documentation in the Job file showed only one sample with this heat code sent for laboratory testing.
5. Contrary to the above, AIT elected to upgrade SA 516, Grade 70 plate material for fuel oil filter body and for inlet and outlet slip-on flanges (both items for Job 392) but failed to perform all testing required by the material specification and to provide sufficient information to the test laboratory to assure that the testing would be performed to the specification requirements. (99901292/96-01-03)

- C. Criterion IX "Control of Special Processes" of 10 CFR Part 50, Appendix B states: "Measures shall be established to assure that special processes, including welding, heat treating, and nondestructive testing, are controlled and accomplished by qualified personnel using qualified procedures in accordance with applicable codes, standards, specifications, criteria, and other special requirements."

Paragraph ND-4622.7 states, in part, that welds in certain materials are exempt from mandatory postweld heat treatment provided that a 200 °F minimum heat is maintained during welding. Paragraph ND-2400 states, in part, that required test shall be conducted for each heat of bare electrodes for use with the gas Tungsten arc welding (GTAW) processes.

Paragraph 3.1 of Section 3.0, "Welding/Brazing and Fabrication Requirements," of Bechtel's design specification required, in part, that all welded joints of category D, as defined in paragraph ND-3351, shall be in accordance with subparagraph ND-3352.4. ND-3352.4(b), "Full Penetration Corner Welded Attachments," required, in part, that nozzles shall meet the fabrication requirements of ND-4244(b), "Corner Welded Nozzles and Branch Piping Connections," that required, in part, that when complete joint penetration cannot be verified by visual examination or other means permitted, backing strips or equivalent shall be used with full penetration welds deposited from only one side.

1. Contrary to the above, a minimum preheat temperature of 200 °F was not specified in either the welding procedure specification (WPS) WT-713 or PQR 713 and may not have been performed since none of AITs records document the actual preheat. Additionally, the weld metal qualification test (required by ND-2400 and performed by Amer's supplier for its PO 20537, dated October 27, 1993) did not qualify the SFA-5.17, EM12K filler metal for use in the GTAW process.
2. Contrary to the above, the 0.0185-inch root gap provided by AIT's nozzle penetration machining dimensions specified on AIT Drawing 392-2, "Body for Oil Filter - Machining Detail - Item 1A11 and 1A12 (2 units)," Revision 1, dated December 16, 1993, did not ensure that a full penetration weld was achieved. The WPSs specified a root gap for groove welds of 1/16-inch to 3/16-inch (0.0625- to 0.1875-inch). However, the hole size for the nozzle penetration was specified on Drawing 392-2 as 3.535-inches diameter (± 0.002 -inch). Given a maximum hole size of 3.537-inches diameter and a 3-inch, schedule 40 pipe with an outside diameter of 3.5-inches, with the pipe nozzle inserted in the hole (forming a category D welded joint), the resulting maximum root gap would be 0.0185-inch, not the 0.0625-inch desired root gap described in the WPS. (99901292/96-01-04)

- D. Criterion VII "Control of Purchased Material, Equipment, and Services" of 10 CFR Part 50, Appendix B states, in part, "Measures shall be established to assure that purchased material, equipment, and services, whether purchased directly or through contractors and subcontractors, conform to the procurement documents. These measures shall include provisions, as appropriate, for source evaluation and selection,

provisions, as appropriate, for source evaluation and selection, objective evidence of quality furnished by the contractor or subcontractor ..."

Criterion IV, "Procurement Document Control" of 10 CFR Part 50, Appendix B states, in part, "To the extent necessary, procurement documents shall require contractors or subcontractors to provide a quality assurance program consistent with the pertinent provisions of this appendix."

Bechtel's PO CCDG0767 for 10 filter cartridges (Job 523) invoked the quality requirements of ASME Code, Section III, NCA 4000 for pressure retaining parts and American National Standards Institute (ANSI) standard N45.2 for other parts determined to be safety related. Bechtel's procurement specification also stated that for safety-related non-Code parts AIT shall either provide a QA supplement to control the step-by-step processing of these items, or provide a QA program supplement which specifies that AIT's ASME Code QA program shall be used to process non-Code parts. The performance requirements for these cartridges were specified in Bechtel specification SP-760.

Contrary to the above, AIT procured the filter cartridges from a supplier which had not been audited or otherwise qualified and did not verify by either inspections, tests, or analyses that the design, material, and performance characteristics of the commercial grade cartridges complied with the specification requirements. AIT, without any basis, certified that the filter cartridges complied with ASME Code Section III. (99901292/96-01-05)

- E. Criterion XVII, "Quality Assurance Records" of 10 CFR Part 50, Appendix B states, in part, "Sufficient records shall be maintained to furnish evidence of activities affecting quality. The records shall include at least the following: ... inspections, tests ... "

Paragraph NCA 3867.2 of ASME Code, Section III states: "All characteristics required to be reported by the material specifications and by this section shall be verified and the results recorded."

Paragraph 7.7 of AIT's Quality Assurance Manual (QAM) states that "The Hydro Test Record will be prepared by the Project Engineer."

Contrary to the above, AIT could not produce a record of hydrostatic testing of 35 tubes for Job 442. AIT did produce a reconstructed Hydrostatic Test Record of the 35 tubes, dated after completion of Job 442, however, the fabrication sequence and signoffs indicated on Job 442 route sheet do not support the basis of this report. (99901292/96-01-06)

- F. Criterion V, "Instructions, Procedures, and Drawings" of 10 CFR Part 50, Appendix B states, in part that "Activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings."

Paragraph 7.3.2 of AIT's QAM states that "Each Route Sheet shall contain the manufacturing, testing, examination and inspections in their proper sequence and ... reference applicable procedure by number and revision level."

Paragraph 7.3.4 of AIT's QAM states that "If work is required as a result of nonconformity, a revised route sheet shall be issued."

1. Contrary to the above, step 14 on the route sheet for Job 442 specified "Roll tubes on LH and RH tubesheets" but failed to identify applicable procedure or any parameters to control the rolling operation. There were no signatures in the sign-off blocks for this operation and no procedure for this operation was in the Job file.
  2. Contrary to the above, step 10 on the route sheet for Job 4102 specified "Clean/Prepare for shipment" but failed to identify applicable cleaning procedure and contained no signatures in the sign-off blocks for this operation. Cleaning procedure was not found in the Job file. The customer specification for this item imposed a maximum Chloride limit for the cleaning solution and required the cleaning procedure to be available upon request.
  3. Contrary to the above, substantial work, including welding, was performed on Job 331 heat exchanger baffle segments to repair a nonconformity without a revised route sheet. The work was apparently performed in accordance with a sketch which was attached to the nonconformance report. This sketch failed to specify the heat code number for material to be used or any nondestructive examination of the repair weld. (99901292/96-01-07)
- G. Criterion VII, "Control of Purchased Material, Equipment, and Services" of Appendix B to 10 CFR Part 50 states, in part, "Measures shall be established to assure that purchased material, equipment, and services, whether purchased directly or through contractors and subcontractors, conform to the procurement documents. These measures shall include provisions, as appropriate, for source evaluation and selection, objective evidence of quality furnished by the contractor or subcontractor, inspection at the contractor or subcontractor source and examination of products upon delivery."

Supplement 18S-1, "Supplementary Requirements For Audits," of ASME NQA-1-1989 requires in Section 4, "Performance," that objective evidence shall be examined to the depth necessary to determine if these elements are being implemented effectively. Audit results shall be documented by auditing personnel and shall be reviewed by management having responsibility for the area audited.

Section 10.0 "Audits," of AIT's QAM states, in part, in Paragraph 10.2.3 that elements that have been selected for audit shall be evaluated

against specified requirements. Objective evidence shall be examined to the depth necessary to determine if these elements are being implemented effectively.

Contrary to the above, the inspection identified that the reports for both internal audits and external vendor evaluations did not provide adequate documented objective evidence for the areas reviewed and the activities conducted during these audits. The audit reports also lacked an adequate definition of the audit scope and contained limited overall depth. (99901292/96-01-08)

- H. Criterion VII, "Control of Purchased Material, Equipment, and Services" of 10 CFR Part 50, Appendix B states, in part, "Measures shall be established to assure that purchased material, equipment, and services, whether purchased directly or through contractors and subcontractors, conform to the procurement documents. It further states that the effectiveness of the control of quality by contractors and subcontractors shall be assessed at intervals consistent with the importance, complexity, and quantity.
1. Contrary to the above, no provisions existed in AIT's QAM requiring that AIT perform implementation audits or conduct some other activity to verify that ASME certificate holders are effectively implementing their QA program prior to supplying material for use in products to be supplied to nuclear plants by AIT as meeting 10 CFR Part 50, Appendix B.
  2. Contrary to the above, the Registered Professional Engineer (RPE) who is currently used by AIT for ASME Code design work was not listed on the current Approved Vendors List as qualified to providing engineering services.
  3. Contrary to the above, AIT procured material and services for Job 331 from a vendor (Trinity Industries, Navasota, TX) without verifying the effectiveness of the control of quality at the location where these services were being performed. (99901292/96-01-09)
- I. Criterion II, "Quality Assurance Program" of 10 CFR Part 50, Appendix B states, in part, "The program shall provide for indoctrination and training of personnel performing activities affecting quality as necessary to assure that suitable proficiency is achieved and maintained."

Criterion XVII, "Quality Assurance Records" of 10 CFR Part 50, Appendix B states, in part, "Sufficient records shall be maintained to furnish evidence of activities affecting quality. The records shall include at least the following: Operating logs ... and material analyses. The records shall also include closely-related data such as qualifications of personnel, procedures, and equipment."

Section 4.0 "Personnel Training," of the AIT QAM, states, in part, in Paragraph 4.3.7 that the QA Manager has the responsibility to maintain the indoctrination and training records for employees.

Contrary to the above, AIT could not provide the indoctrination and training records for current AIT employees. It also appeared that AIT failed to conduct appropriate training activities of certain personnel required as part of the corrective action to several findings from the two most recent ASME Surveys, conducted in December 1994 and June 1995. (99901292/96-01-10)

Please provide a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555, with a copy to the Chief, Special Inspection Branch, Division of Inspection and Support Programs, Office of Nuclear Reactor Regulation, within 30 days of the date of the letter transmitting this Notice of Nonconformance. This reply should be clearly marked as a "Reply to a Notice of Nonconformance" and should include for each nonconformance: (1) the reason for the nonconformance, or if contested, the basis for disputing the nonconformance, (2) the corrective steps that have been taken and the results achieved, (3) the corrective steps that will be taken to avoid further noncompliances, and (4) the date when your corrective action will be completed. Where good cause is shown, consideration will be given to extending the response time.

Dated at Rockville, Maryland
this 21st day of March, 1996

U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
DIVISION OF INSPECTION AND SUPPORT PROGRAMS

REPORT NO.: 99901292/96-01

ORGANIZATION: Amer Industrial Technologies, Inc.
1000 South Madison Street
Wilmington, DE 19801

ORGANIZATIONAL
CONTACT: Ahmad E. Amer, President

NUCLEAR INDUSTRY
ACTIVITY: Amer Industrial technologies, Inc. manufactures and
supplies vessels, components, parts, piping
subassemblies, and component supports to the nuclear
industry.

INSPECTION DATES: January 29, 1996 through February 02, 1996

LEAD INSPECTOR: Uldis Potapovs 3-21-96
Uldis Potapovs Date
Vendor Inspection Section (VIS)
Special Inspection Branch (PSIB)
Division of Inspection and Support Programs
Office of Nuclear Reactor Regulation

OTHER INSPECTORS: Richard P. McIntyre, VIS/PSIB
Steven M. Matthews, VIS/PSIB

REVIEWED BY: GC Cwalina 3/21/96
Gregory C. Cwalina, Chief Date
Vendor Inspection Section
Special Inspection Branch
Division of Inspection and Support Programs
Office of Nuclear Reactor Regulation

APPROVED BY: for GC Cwalina 3/21/96
Robert M. Gallo, Chief Date
Special Inspection Branch
Division of Inspection and Support Programs
Office of Nuclear Reactor Regulation

Enclosure 3

1 SUMMARY OF INSPECTION FINDINGS

During this inspection, the NRC inspectors evaluated the implementation of Amer Industrial Technology Inc.'s (AIT) quality assurance (QA) program by examining records for safety related components manufactured by AIT and shipped to licensed nuclear power plants over the last three years. The inspection focused on procurement and upgrading of stock material, control of manufacturing processes, indoctrination and training of personnel, internal and external audits, and the implementation of Title 10 Code of Federal Regulations, Part 21 (Part 21) requirements.

The inspection basis consisted of the following:

- Appendix B, "Quality assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to Part 50 of Title 10 of the Code of Federal Regulations (10 CFR Part 50).
- 10 CFR Part 21.
- American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code).
- AIT's Quality Assurance Manual (QAM), Rev. 9, dated June 28, 1995.

1.1 Violations

Contrary to 10 CFR 21.21, which states that corporations subject to this regulation must adopt appropriate procedures ensure evaluation of deviations for reportability under this rule, (1) AIT did not include the essential requirements of 10 CFR 21.21 in the AIT document titled "Procedures for Compliance with 10 CFR Part 21," dated April 27, 1993, and (2) AIT performed inadequate and incomplete evaluations to determine if a defect or failure to comply associated with a substantial safety hazard existed. This issue was identified as a Severity Level IV Violation (Supplement VII) and is discussed in Section 2.1 of the report. (99901292/96-01-01)

1.2 Nonconformances

- Nonconformance 99901292/96-01-02 was identified and is discussed in Section 3.4.1.1.1 of this report.
- Nonconformance 99901292/96-01-03 was identified and is discussed in Sections 3.4.1.1.2(3), 3.4.1.3.1, 3.4.1.4.1(1), 3.4.1.4.1(2), and 3.4.1.1.2(2) of this report.
- Nonconformance 99901292/96-01-04 was identified and is discussed in Sections 3.4.1.1.3 and 3.4.1.1.4 of this report.
- Nonconformance 99901292/96-01-05 was identified and is discussed in Section 3.4.1.2 of this report.

- Nonconformance 99901292/96-01-06 was identified and is discussed in Section 3.4.1.3.1 of this report.
- Nonconformance 99901292/96-01-07 was identified and is discussed in sections 3.4.1.3.2, 3.4.1.5, and 3.4.1.4.2 of this report.
- Nonconformance 99901292/96-01-08 was identified and is discussed in Sections 3.4.4.1 and 3.4.4.2 of this report.
- Nonconformance 99901292/96-01-09 was identified and is discussed in Sections 3.4.4.2 and 3.4.1.4.1(3) of this report.
- Nonconformance 99901292/96-01-10 was identified and is discussed in section 3.4.5 of this report.

2 STATUS OF PREVIOUS INSPECTION FINDINGS

This was the first NRC inspection at AIT

3 INSPECTION FINDINGS AND OBSERVATIONS

3.1 Entrance and Exit Meetings

During the entrance meeting on January 29, 1996, the inspectors discussed the inspection scope and logistics and developed general information about AIT's products and activities. A preliminary exit meeting was held on February 2, 1996 to summarize the inspection findings and observations and to identify areas where additional information was needed. AIT provided additional information after the preliminary exit meeting in the areas of tube rolling process qualification, in-process inspection, material subdividing, and design reports. This information was considered by the inspection team and is included in the inspection report. The final exit meeting was conducted on March 15, 1996, at NRC headquarters in Rockville, Maryland to discuss the inspection findings and observations with AIT management.

3.2 Description of Facilities

Up until March 1995, AIT held ASME Certificates of Authorization to manufacture ASME Code Section III, Class 1, 2, and 3 vessels, components, and piping subassemblies and to apply the Code symbol stamp to these items. ASME allowed the Certificates to expire after two unsuccessful resurveys of AIT's manufacturing activities by the ASME survey team. AIT president indicated that they have applied to ASME for re-accreditation and expected a survey to be scheduled by April 1996. AIT holds current ASME U, U2, and PP stamps for the manufacture of ASME Section VIII and B31.1 components.

Manufacturing capability includes material cutting, bending, welding, and limited machining. Nondestructive test capability is limited to liquid penetrant and magnetic particle inspection and hydrostatic testing. Chemical analyses, radiography, ultrasonic testing, mechanical testing, and heat treatment are subcontracted.

At the present time, no work was being done on items destined for domestic licensed nuclear power plants. According to available records, the last of such items was shipped during February 1995.

3.3 10 CFR Part 21 Program Review

The inspectors reviewed the AIT document, "Procedures for Compliance With 10 CFR Part 21," dated April 27, 1993, which describes AIT's policy for compliance with 10 CFR Part 21. This document was in the form of a memo from the company president to all employees requesting them to notify him of any deficiencies as described in the memo so that he or his designee could notify the customer and the NRC. The memo did not contain the essential elements to assure compliance with 10 CFR Part 21.

10 CFR 21.21 requires that corporations subject to the regulations adopt appropriate procedures to: (1) evaluate deviations and failures to comply to identify defects and failures to comply associated with substantial safety hazards as soon as practicable, and, except as provided in (2), in all cases within 60 days of discovery; (2) ensure that if an evaluation of an identified deviation or failure to comply potentially associated with a substantial hazard cannot be completed within 60 days of discovery of the deviation or failure to comply, an interim report is prepared and submitted to the Commission through a director or responsible officer or designated person; and (3) ensure that a director or responsible officer is informed as soon as practicable, and, in all cases, within the 5 working days after completion of the evaluation in (1) or (2) if a defect or failure to comply associated with a substantial safety hazard exists.

To review 10 CFR Part 21 implementation, the inspection team requested documented evaluations for Part 21 reportability that had been performed to date. AIT only had documented records of three instances, in December 1994 where review for Part 21 reportability had been performed. In these three cases, the QA Manager sent a memorandum to the President, at his request, stating that he had reviewed the findings from the December 5-7, 1994, and the June 26-28, 1995, ASME surveys and none of the ASME findings contain issues that should have been reported to the NRC per 10 CFR Part 21. These Interoffice Memos to the President did not contain any documentation of the basis for reaching this conclusion, therefore, the inspectors could not determine the extent of the evaluation performed. The AIT document "Procedures for Compliance With 10 CFR Part 21" does not define the evaluation process or documentation needed to respond to the Part 21 review request by the President.

The failure to proceduralize the requirements specified in 10 CFR 21.21(a) and the failure to perform an adequate and complete review to determine if a defect or failure to comply associated with a substantial safety hazard existed constitutes a violation of more than minor significance and is identified as a Severity Level IV Violation. (99901292/96-01-01)

3.4 Quality Assurance Program Implementation

AIT's quality assurance program is described in their QAM. Revision 9 of the QAM, dated June 28, 1995, was in effect at the time of this inspection. According to the manual policy statement, this manual describes the controlled manufacturing system which has been established by management to effectively maintain the quality of product design, construction, and installation in accordance with the requirements of the ASME Boiler and Pressure Vessel Code, Section III, Division 1, Class 1, 2, 3, MC, and Materials Organization for supplying material. AIT does not have a separate QA program for supplying safety related non-Code items under the rules of 10 CFR Part 50, Appendix B and there are no references in their ASME manual that would indicate its applicability to Appendix B items. Implementation of AIT's QAM was examined by reviewing records for previously shipped orders and observing work in progress.

3.4.1 Review of Fabrication Records

The NRC inspection team reviewed available fabrication records for safety related products shipped to licensed nuclear power plants over the last three years to assess the effectiveness of AIT's QA program implementation in assuring that these products conformed to customer specifications and referenced industry standards. The review was somewhat hampered by AIT's stated policy of shipping all permanent records (Code Data Reports, Design Reports, Certified Material Test Reports, etc.) to the customer after completion of a project. Nonpermanent QA records were maintained in project files.

3.4.1.1 Job 392 - Fuel Oil Filter

Bechtel Power Corporation (Bechtel) issued purchase order (PO) CCDG0065, to AIT for two safety-related fuel oil filters for the Calvert Cliffs Nuclear Power Plant. The filters were for the fuel oil transfer line between the storage tank and the transfer pump installed in the new diesel generator buildings at Calvert Cliffs. According to AIT records the fuel oil filters were completed and shipped to Calvert Cliffs in February 1994.

Bechtel's PO imposed procurement specification DG-80382, "Procurement Specification for Calvert Cliffs Nuclear Power Plant Diesel Generator Project," Revision 1, dated September 21, 1993. The procurement specification identified the safety-related fuel oil filters as "basic components" and imposed the requirements of 10 CFR Part 21. The procurement specification also required that AIT have a QA program that conforms with NCA-4000 of the ASME Code for pressure retaining parts, and American National Standards Institute (ANSI) standard N45.2 for other parts determined to be safety related. The procurement specification stated that for safety-related non-Code parts AIT shall either provide a QA program supplement to control the step-by-step processing of these items, or provide a QA program supplement which specifies that AIT's ASME Code QA program shall be used to process non-code parts.

The PO also imposed the requirements of Bechtel's design specification SP-760, "Safety-related Fuel Oil Filters," Revision 1, dated September 21, 1993. The design specification prescribed that the fuel oil filters be designed, constructed, examined, tested, N-stamped, cleaned, and shipped in accordance with the ASME Code, 1986 edition, Section III, "Rules of Construction of Nuclear Power Plant Components," Division 1. Class 3 Components. The design specification listed the loading conditions to be considered in the design of the fuel oil filters as including, but not limited to, internal pressure and seismic accelerations. The specified design pressure was -14.7 psig (vacuum) to 15 psig at a design temperature of 15°F to 120°F.

3.4.1.1.1 Design

The Design Report for Job 392 was not provided to the team during the course of this inspection. However, with its transmittal letter to the NRC dated February 13, 1996, AIT sent a copy of the Design Report for job 392 for the team's review. The team determined that the Design Report consisted of a document titled "Seismic Analysis of the (2) Fuel Oil Transfer Filter-Item 1A11 and 1A12," originally dated November 1993 (Revision 1, dated April 1994). The chronology of AIT's design activities is summarized below:

- December 10, 1993, the report was signed by AIT's subcontracted registered professional engineer (RPE).
- February 10, 1994, the ASME data report for the two fuel oil transfer filters were signed by AIT and the ASME Code Authorized Nuclear Inspector (ANI).
- May 3, 1994, the RPE, analysis engineer, and project manager resigned the Design Report for Revision 1 to the Design Report to include the drawing revision level of the four drawings used to manufacture the fuel oil filters.
- January 19, 1995, the RPE signed the Design Report Certification statement.
- March 27, 1995, the RPE signed a statement reconciling the revised design requirements for the filter cartridge elements with the seismic analysis.
- June 6, 1995, the RPE signed the Reconciliation Statement for nonconformances reports (NCRs) 392-1, -2, -3, and design change order 392-1.

The team determined that on February 10, 1994 (when the ASME data reports were signed by AIT and the ANI indicating that the fuel oil filters conformed to the rules of construction of the ASME Code), the Design Report for Job 392 did not comply with the following requirements of the ASME Code:

- The Design Report did not include documentation that the Owner's review, required by NCA-3260(a), had been conducted, as required by NCA-3260(b). The Design Report, as submitted to the NRC on February

13, 1996, still did not include documentation that the Owner, or designee, had reviewed the Design Report to determine that all design and service loadings as stated in the design specification had been evaluated and that the acceptance criteria explicitly provided for in the ASME Code had been considered.

- The Design Report did not include the latest revisions of the drawings and therefore did not accurately indicate the reconciliation of design changes with the Design Report, as required by NCA-3250(d)(3) and NCA-3554.
- The Design Report did not include reconciliation 392-1, -2, -3, and design change order 392-1, as required by NCA-3554.

Failure to verify adequacy of the design as required by Criterion III 10 CFR Part 50, Appendix B and the above referenced ASME Code paragraphs was identified as an example of Nonconformance 99901292/96-01-02.

In its transmittal to NRC dated February 7, 1996, AIT supplied additional documentation related to NCR 392-1. NCR 392-1, issued February 8, 1994, identified that the inlet and outlet nozzle flanged end connections were made by AIT from SA-516, Grade 70 plate material. Bechtel's design specification required the flanged end connections to be 150-lb. rated raised face slip-on flanges that comply with ANSI standard B16.5, "Pipe Flanges and Flanged Fittings." This standard does not permit the use of SA-516 plate material. Pipe flanges that comply with ANSI B16.5 for the application specified in Bechtel's design specification are forged carbon steel, normally manufactured to material specification SA-105, "Specification for Forgings, Carbon Steel, for Piping Components."

The NCR was dispositioned "use as is" with a technical justification that "it is not possible to upgrade a forged flange from commercial grade to nuclear grade in the time frame (schedule) available for this fast-track project." The NCR was approved by the QA Manager and the ANI on February 10, 1994.

The team determined that AIT's disposition of NCR 392-1 did not conform with ASME Code requirements because neither the Design Report nor NCR 392-1 addressed the requirements of paragraph ND-3362, "Bolted Flange and Studded Connections," that requires that flanges to other standards (in this case, other than B16.5) are acceptable provided they have been designed in accordance with the rules of ASME Code Section III, Appendix XI, "Rules for Bolted Flange Connections for Class 2 and 3 Components and Class MC Vessels."

This issue was identified as an example of Nonconformance 99901292/96-01-02.

3.4.1.1.2 Materials

The team reviewed the procurement and qualification of the following materials used in the construction of the fuel oil filters:

(1) Fuel Oil Filter Body

According to AIT Drawing 392-2, "Body for Oil Filter - Machining Detail - Item 1A11 and 1A12 (2 units)," Revision 1, dated December 16, 1993, the pressure retaining body of the fuel oil filters was machined from 6-inch thick SA-516, Grade 70 plate. The finished rectangular-body dimensions were 7 1/2-inches high x 6-inches wide x 10-inches long.

In its PO 20548, dated November 11, 1993, to American Alloy Steel (AAS), AIT ordered one piece of SA-516, Grade 70 plate, 6-inches thick x 11-inches wide x 18-inches long. The PO required the supplier to provide a certified material test report (CMTR), perform Charpy v impact tests, certify that no welding was performed, and imposed the reporting requirements of 10 CFR Part 21. The team determined that AIT's PO to AAS did not specify the impact-test requirements (i.e., specimen orientation, testing temperature, and acceptance criteria) in its ordering information as required by ASME Code specification SA-20, as referenced by specification SA-516.

Since AIT had not audited AAS to qualify it as a supplier, the material had to be upgraded for use in ASME Code application. In accordance with ASME Code Subsection NCA-3800, material upgrade in this case is performed by (a) assuring that no welding with filler metal had been performed on the unqualified source material, (b) performing or subcontracting a product analysis to verify the chemical composition of each piece of unqualified source material, and (c) performing or subcontracting all other requirements of the material specification on each piece of unqualified source material.

AIT sent a sample of the plate material to a laboratory (PO 20563, dated November 30, 1993, to Ramball Test Lab, Inc.) and requested that chemical analysis, tensile-test, and impact-test be performed, and imposed the reporting requirements of 10 CFR Part 21. The team determined that AIT's PO to its laboratory did not specify the following parameters necessary to verify all of the requirements of the SA-516 material specification in order to upgrade this material:

- a. the impact-test requirements (i.e., specimen orientation, testing temperature, and acceptance criteria)
- b. the final rolling direction of the plate specimen
- c. verification that the material conformed to the fine austenitic grain size requirements of specification SA-20, as referenced by SA-516

AIT's CMTR for the SA-516 body material supplied to Calvert Cliffs was not in the job records or provided for the team's review. However, the lab report from Ramball TestLab, Inc. did not include the McQuaid-Ehn test to determine the austenitic grain size number, or, alternately, an analysis for aluminum contents to verify that the steel was made to using fine grain practice as required by SA-516. The lab's report also did not

describe the tension-test and impact-test specimen orientation as transverse to the final rolling direction of the plate.

The team also noted that, since AIT had not audited the supplier or performed specific examination for evidence of welding, there was no apparent basis for accepting the supplier's certification that no welding had been performed on this material.

The team concluded that AIT's upgrade of the unqualified source material used for the fuel oil filter bodies supplied to Calvert Cliffs did not meet the requirements of NCA-3800 of the ASME Code. Failure to demonstrate compliance with the applicable technical and quality requirements for this item was identified as an example of Nonconformance 99901292/96-01-03.

(2) Inlet and Outlet Slip-on Flanges

As described above, NCR 392-1, issued February 8, 1994, identified that the inlet and outlet nozzle flanged end connections were made by AIT from SA-516, Grade 70 plate material.

AIT sent a sample of the plate material to a laboratory (PO 20579, to Ramball Test Lab, Inc.) and requested that chemical analysis, tensile-test, and impact test be performed, and imposed the reporting requirements of 10 CFR Part 21. The team determined that AIT's PO to its laboratory did not specify the following parameters necessary to verify all of the requirements of the SA-516 material specification in order to upgrade this material:

- a. Mechanical testing requirements (i.e., specimen orientation with respect to coupon configuration, testing temperature, and acceptance criteria)
- b. Verification that the material conformed to the fine austenitic grain size requirements of specification SA-20, as referenced by SA-516

AIT's CMTR for the SA-516 material supplied to Calvert Cliffs as pipe flanges was not in the job records reviewed at AIT. However, in its February 7, 1996, transmittal to the NRC, AIT's CMTR was provided. AIT attached to the CMTR its lab reports for the test performed.

The team determined that the lab reported impact test values did not comply with the requirements of ND-2331. For the three specimens tested, the lab reported an average lateral expansion of 15 mils, with the lowest of the three specimens at 8 mils. Paragraph ND-2331 requires for plates 1 3/8 inches thick an average lateral expansion of 20 mils, with the lowest of the three specimens at 15 mils. Although it was not clear from the available procurement specification documents that impact testing was required for these flanges, the nonconforming results should have been

recognized and dispositioned as a part of the receiving inspection process. In this case, AIT apparently failed to observe that the reported impact values did not meet ASME Code requirements.

The team also determined that the lab reported chemistry values were significantly different than those reported in the original heat analysis. For instance the lab reported Manganese at 25.4% lower than that reported in the heat analysis and Phosphorus, as reported by AIT's lab, was 25% lower than that reported in the heat analysis.

The team also noted that on the copy of the heat analysis (performed by the material manufacturer and supplied to AIT by its supplier AAS), AAS had applied a stamp and written in its customer (AIT), AIT's PO number, and the date mailed (December 9, 1993). The same copy has a "Reviewed and Accepted" stamp made by AIT with the initials "HM" and was dated October 25, 1993, leaving the appearance that AIT reviewed and accepted the heat analysis before AAS mailed to AIT. The same AIT stamp appeared on all three pages of the heat analysis. The team also noted the AAS's certification that no welding was performed on the plate material was dated February 8, 1994, after the date of AIT's CMTR (February 7, 1994), which, when certified, meant that all ASME Code requirements had been met.

The lab report did not include the McQuaid-Ehn test to determine the austenitic grain size number, or, alternately, an analysis for aluminum contents to verify that the steel was made to fine grain practice as required by SA-516. The lab's report also did not describe the tension-test and impact-test specimen orientation as transverse to the final rolling direction of the plate.

The team also noted that, since AIT had not audited the supplier or performed specific examination for evidence of welding, there was no apparent basis for accepting the supplier's certification that no welding had been performed on this material.

The team concluded that AIT's upgrade of the unqualified source material used for the pipe flanges supplied to Calvert Cliffs did not meet the requirements of NCA-3800 of the ASME Code. Failure to demonstrate conformance with the applicable technical and quality requirements for this item was identified as an example of Nonconformance 99901292/96-01-03.

(3) Inlet and Outlet Pipe Nozzles

In its PO 20568, dated December 1, 1993, to BBL Company, AIT ordered 3-ft. of 3-inch, schedule 40, seamless plain-end carbon steel pipe, to material specification SA-106, Grade B. The PO required that BBL Company provide a CMTR, certify that no welding was performed, and imposed the reporting requirements of 10 CFR Part 21.

Since the material was procured from an unqualified supplier, AIT elected to upgrade this material in accordance with the requirements of NCA 3800.

AIT sent a sample of the pipe material to its laboratory (PO 20604, dated January 28, 1994, to Ramball Test Lab, Inc.) and requested that chemical analysis and tensile-test be performed. The team determined that AIT's PO to its laboratory did not specify the following tests and requirements necessary to meet all the requirements of SA-106, Grade B material specification:

- a. flattening test in accordance with SA-530, as referenced by specification SA-106
- b. hydrostatic test.

Additionally, AIT's PO to the test lab did not impose the reporting requirements of 10 CFR Part 21. AIT's CMTR for the SA-106, Grade B pipe nozzles supplied to Calvert Cliffs was not in the job records provided for the team's review. The lab report from Ramball Test Lab, Inc. did not include the flattening test to determine the ductility and soundness of the pipe; and the lab's report also did not include the hydrostatic test. The team noted that AIT had performed in-house hydrostatic tests for other pipe material upgrades, however, no documentation of a hydrostatic test for this pipe material was in the job records or provided for the team's review. The team concluded that AIT's upgrade of the unqualified source material used for the fuel oil filter pipe nozzles supplied to Calvert Cliffs did not meet the requirements of NCA-3800 of the ASME Code. Failure to demonstrate conformance with the applicable technical and quality requirements for this item was identified as an example of Nonconformance 99901292/96-01-03.

The team noted that the job record NCR log included NCR 392-2, issued December 7, 1994, that addressed discrepancy report 7 from an earlier ASME accreditation survey. The discrepancy report identified certain issues with AIT's upgrading unqualified source material for use in ASME Code applications. The NCR was dispositioned "use as is" and the actions taken were that "all material were checked to comply with Code and QA Manual for upgrading." The NCR was completed and approved by the AIT QA Manager on June 20, 1995. The team concluded that AIT's disposition of NCR 392-2 was not supported by the team's findings described in the preceding paragraphs.

3.4.1.1.3 Welding

From its review of AIT's job records, the team determined that the primary welding procedure specification (WPS) used to fabricate the fuel oil filters was WPS WT-713, Revision 4, dated February 1, 1994, with its supporting procedure qualification record (PQR) 713, Revision 4. This WPS documented a gas tungsten-arc welding (GTAW) process that, according to the PQR, was qualified in the as-welded condition (i.e., no postweld heat treatment) and minimum preheat of 50°F. The WPS identified the filler metal specification as class E70S-3, SFA-5.18, "Specification for Carbon Steel Electrodes and Rods for Gas Shielded Arc Welding."

According to AIT's project engineer and production superintendent, the welding of the fuel oil filter assemblies was performed in the GTAW process. However,

the actual filler metal used in the GTAW process was specification class EM12K, SFA-5.17, "Specification for Carbon Steel Electrodes and Fluxes for Submerged Arc Welding," normally used in the submerged arc welding (SAW) process. AIT did not, during the course of this inspection, produce a WPS that described the use of SFA-5.17, EM12K filler metal in a GTAW process. The team's review of the welding records identified the following concerns:

- a. A minimum preheat temperature of 200°F was not specified in either WPS WT-713 or PQR 713 and may not have been performed, as required by ND-4622.7(b). The job records (traveler) did not document the actual preheat, if any, that was used.
- b. The weld metal qualification test (required by ND-2400 and performed by AIT's supplier for its PO 20537, dated October 27, 1993) did not qualify the SFA-5.17, EM12K filler metal for use in the GTAW process. The suppliers weld metal qualification test addressed qualifying this filler metal for use in combination with a lot of submerged arc flux (F7A2) welded in the SAW process.

Based on the above, the team concluded that, in this instance, AIT's weld metal did not comply with the applicable ASME Code requirements. Failure to demonstrate conformance with the technical and quality requirements for welding material used in this process was identified as an example of Nonconformance 99901292/96-01-04.

3.4.1.1.4 Fabrication

The team's review of the available job records identified several concerns with AIT's fabrication process control for the fuel oil filters. For instance, the production traveler lacked specific detail to identify individual fit-ups, examinations, welding, and inspections.

In one instance, the team determined that the guidance provided to the welder by the WPSs for the fit-up root gap dimension was not possible to achieve given the nozzle penetration machining dimensions specified on AIT Drawing 392-2, "Body for Oil Filter - Machining Detail - Item 1A11 and 1A12 (2 units)," Revision 1, dated December 16, 1993. The job records identified two welding processes used to fabricate the fuel oil filters; WPSs WT-713 (GTAW), described above, and WPS 701, a shielded metal-arc welding (SMAW) process. Both WPSs specified a root gap for groove welds of 1/16-inch to 3/16-inch (0.0625- to 0.1875-inch). However, the hole size for the nozzle penetration was specified on Drawing 392-2 as 3.535-inches diameter (± 0.002 -inch). Given a maximum hole size of 3.537-inches diameter and a 3-inch, schedule 40 pipe with an outside diameter of 3.5-inches, with the pipe nozzle inserted in the hole, the resulting maximum root gap would be 0.0185-inch, not the 0.0625-inch desired root gap described in the WPS.

The team concluded that the 0.0185-inch root gap provided by AIT's design would not ensure that a full penetration weld was achieved, as required by ND-4244(b) of the ASME Code and Bechtel's design specification. Failure to ensure that welding was accomplished in accordance with applicable criteria was identified as an example of Nonconformance 99901292/96-01-04.

3.4.1.2 Job 523 - Filter Cartridges

Bechtel issued PO CCDG0767, dated February 10, 1995, for 10 filter cartridges for the fuel oil filters supplied under its PO CCDG0065 (AIT Job 392 described above). Bechtel's PO imposed procurement specification DG-80382, "Procurement Specification for Calvert Cliffs Nuclear Power Plant Diesel Generator Project," Revision 2, dated December 23, 1994. The procurement specification identified the safety-related filter cartridges as "basic components" and imposed the requirements of 10 CFR Part 21. The procurement specification also required that AIT have a QA program that conforms with NCA-4000 of the ASME Code for pressure retaining parts, and American National Standards Institute (ANSI) standard N45.2 for other parts determined to be safety related. The procurement specification also stated that for safety-related non-Code parts AIT shall either provide a QA program supplement to control the step-by-step processing of these items, or provide a QA program supplement which specifies that AIT's ASME Code QA program shall be used to process non-Code parts.

AIT's job records did not indicate that any QA program supplement was developed for the supply of these filter cartridges.

The PO also imposed the requirements of Bechtel's design specification SP-760, "Safety-related Fuel Oil Filters," Revision 2, dated December 23, 1994. Bechtel's procurement specification and design specification had been revised from requiring 3-5 micron filtration to a replaceable cartridge with 25 micron absolute particle size filtering capability from a fuel flow rate of 35 gallons per minute (gpm). The filtration system was designed to have a maximum differential pressure of ≤ 5 psi across the filters at design flow and clean condition. The maximum differential at dirty condition and design flow shall be 10 psi. The cartridge shall be capable of withstanding a differential pressure greater than 15 psi.

In its PO 20808, dated February 16, 1995, to Norman Ultraporous Filter Division of Bridgeview, Illinois, AIT ordered 10 filter cartridges, model 588F-B2SAN-DOE for diesel fuel oil service. AIT specified that the filters shall be capable of filtering 25 micron absolute particle size from a flow rate of 35 gpm and shall be made of disposable fiberglass. AIT also specified that the filters shall be supplied with a certificate of conformance, the shelf life of the filter, the flow versus pressure drop data, and the center of gravity and weight. AIT's Attachment B, "Specifications," was part of its PO requirements. Paragraph 3 of Attachment B required that all materials shall comply with ASME Code Section II, Part A and Section III, Class 3, 1986 edition; paragraph 9 of Attachment B imposed the reporting requirements of 10 CFR Part 21.

AIT's supplier had not been audited or otherwise qualified as a supplier of safety-related basic components. AIT supplied the filter cartridges to Calvert Cliffs with a certificate of conformance (COC) that stated, in part, that the 10 filter cartridges were furnished in accordance with AIT's QA program and complied with the requirements of Bechtel's PO, ASME Code Section III, Class 3, 1986 edition, and the reporting requirements of 10 CFR Part 21.

AIT, without any basis, certified that the non-ASME Code safety-related filter cartridges complied with ASME Code Section III, Class 3 components. More importantly, AIT did not verify by either inspections, tests, or analyses that the design, material, and performance characteristics of the commercial grade filter cartridges provide reasonable assurance that the filter cartridges, when used as basic components, will perform their intended safety function, as Bechtel specified in its design specification.

As discussed in paragraph 3.4, above, AIT does not have a QA program for manufacturing and supplying safety related non Code items under the rules of 10 CFR Part 50, Appendix B. Likewise, AIT does not have a QA program or procedures for dedicating commercial grade material to achieve compliance with 10 CFR Part 50, Appendix B.

The team concluded that AIT provided an incorrect certification to Calvert Cliffs and that the filter cartridges supplied under this order did not comply with the Bechtel specification requirements. Failure to demonstrate conformance with the applicable technical and quality requirements for this item was identified as Nonconformance 99901292/96-01-05.

3.4.1.3 Job 442 - Heat Exchangers (South Carolina Electric & Gas Co.)

South Carolina Electric & Gas Company (SCEG) issued PO Q650395, dated May 19, 1994 for three charging pump gear oil heat exchangers. These heat exchangers were to be designed and fabricated to the requirements of the 1971 edition of Section III, Class 3, of the ASME Code. The PO also invoked SCEG procurement technical and quality requirements, 10 CFR Part 50, Appendix B, and 10 CFR Part 21.

3.4.1.3.1 Materials

AIT procured the heat exchanger tube material to the requirements of ASME SA 249, "Specification for Welded Austenitic Steel Boiler, Superheater, Heat-Exchanger, and Condenser Tubes", TP 316. The material was purchased from Marmon/Keystone, New Castle, DE, an unqualified supplier. The PO specified 36 pieces, 20+ feet long, .5-inch outside diameter, and .049-inch average wall thickness.

The Job record file contained NCR 442-1 which was related to improper upgrading of this material. The December 1994 ASME survey had identified that, contrary to the requirements of NCA 3800 of the ASME Code, AIT had performed mechanical and hydrostatic tests on only one of the 36 tubes instead of testing each tube as required by the Code. The NCR was dispositioned by noting that mechanical and hydrostatic testing has been performed on the other 35 tubes.

A Certificate of Conformance from Laboratory Testing, Inc., dated April 17, 1995, was on file stating that one tensile test, two flange tests, two flattening tests, one reverse bend test and one hardness test had been performed on each of 35 samples of tube material marked with heat code/piece traceability by AIT. The actual test results were provided and were in conformance with SA 249 requirements.

The files also contained two Hydrostatic Test Records. One of the records was dated July 15, 1994 and indicated that AIT had hydrostatically tested "1" tube for Job 442 at 1000 psi with satisfactory results. The record was signed by the project engineer and by the QA manager. The second Hydrostatic Test Record was dated March 13, 1995 and stated that 35 tubes with heat code markings M 26627-1 through M 26627-35 were hydrostatically tested at 1000 psi.

The inspection team reviewed the available records for the additional tests and identified several concerns regarding the closure of this NCR.

- (1) According to the route sheet for Job 442, after receiving inspection the tubes were cut to size per drawing requirements (four foot lengths). The route sheet signature blocks for receiving inspection and cutting operation were signed by the AIT QA manager on the same date (7/5/94). No steps or instructions for removal of test specimens or for hydrostatic testing of the tubes were included on the route sheet. To complete the fabrication process, each of the 3 heat exchangers would require 56 four foot lengths of tubing for a total of 168 such lengths. Subdividing the 36 tubes received from the supplier would yield a total of 180 four foot segments (5 from each piece). Assuming no scrap, 12 four foot lengths (from no more than 12 of the 36 twenty foot long pieces purchased) would be left over for test specimens.

The NRC inspection team could not determine, from the review of existing records, the source of material for the additional tests on each of the 35 tubes as reported by Laboratory Testing Inc., and discussed above. Based on standard specimen dimensions as specified by SA 450, the applicable test specification, at least 20 inches of material would be required from each of the 36 tubes to perform these tests. As discussed above, there did not appear to be sufficient material available to perform this testing. It was suggested that the supplied tube pieces were longer than 20 feet since they were ordered as 20+ lengths, but no receiving inspection or cutting records were available to support this. It is noted that SA 450 specifies a length tolerance of +1/8 inch, -0 for cut lengths of such tubing.

- (2) With respect to hydrostatic testing, the NRC inspection team questioned when the testing of the 35 tubes reported in the Hydrostatic Test Record dated March 13, 1995 was actually performed since fabrication of the units was completed in 1994. According to AIT staff, all 36 tubes had been hydrostatically tested after delivery from the supplier and the March 13 record was generated based on the recollection of the test engineer and AIT's standard practice to test all tubes. Other than the previously discussed July 15, 1994 test record for 1 tube, no documentation was provided to support the additional tests. It was also noted that, based on the route sheet sign-offs (see previous paragraph), the July 15, 1994 hydrostatic test appears to have been performed after the tubes were cut into four foot segments. This could be explained by assuming that not all of the 36 tubes were cut to size on 7/5/94 since only 34 of the tubes were required for fabrication of the units. However, this would indicate that no more than 2 tubes were available for hydrostatic testing on July 15, 1994.

Based on the above, the NRC inspection team concluded that the documentation presented during the inspection did not provide an adequate basis for the resolution of NCR 442-1 and did not demonstrate that the tube material was upgraded in accordance with the applicable ASME Code requirements. Failure to demonstrate conformance with the applicable technical and quality requirements for this item was identified as an example of Nonconformance 99901292/96-01-03.

The inspection team also concluded that failure to prepare and maintain records of hydrostatic testing of the tubes during the upgrading process violated the requirements of paragraphs 7.5.10 and 7.7 of AIT's QAM and paragraph NCA 3867.2 of Section III of the ASME Code. This issue was identified as Nonconformance 99901292/96-06-06.

3.4.1.3.2 Process Control

The NRC inspection team reviewed the route sheets used to control the fabrication of the heat exchangers and identified several concerns. Specifically, as discussed paragraph 3.4.1.3.1 (1) and (2), above, no instructions for removal of test coupons from the source material to be used for upgrading were included on the route sheet. Hydrostatic testing of the tubes, which is an essential part of the upgrading process, was also not specified on the route sheets. It was noted that Step 14 of the route sheet for Job 442 specified "Roll tubes on LH and RH tubesheets" without specifying what procedure was to be used or identifying specific parameters for the rolling operation. It was also noted that there were no signatures in the sign-off blocks for this operation.

The NRC inspection team determined that inspection and test activities and manufacturing operations for Job 442 were not sufficiently defined on the route sheets or referenced procedures to assure that these activities were performed in accordance with the applicable technical and quality requirements. Failure to provide procedures or instructions for activities affecting quality and to implement measures to assure that these activities are accomplished in accordance with these instructions was identified as Nonconformance 99901292/96-01-07.

3.4.1.4 Job 331 - Heat Exchangers (PECO Energy Co.)

PECO Energy Company (PECO) issued purchase order C ANE 379937, dated February 18, 1992, for two heat exchanger tube bundles and two heat exchanger shells to be used as replacement components in the Limerick, Unit 1 residual heat removal system. This equipment was to be fabricated to the requirements of the 1989 edition of ASME Code, Section III, Division 1, Class 2.

3.4.1.4.1 Materials

(1) Tube Sheets

AIT procured the tube sheets from Explosive Fabricators, Louisville, CO, an unqualified vendor. These items were purchased as clad sheets, 60 7/8 inches diameter and 5 1/2 inches thick. The tube sheets were explosively

clad with 1/2 inch AL6XN material and were to be qualified by ultrasonic testing in accordance with SA 578. AIT's PO to Explosive Fabricators also requested CMTRS for the material and required impact testing at 10°F to be performed in accordance with SA 370. No QA requirements were invoked on this vendor.

AIT apparently upgraded the tube sheets by having chemical, mechanical, and ultrasonic testing performed by laboratories on their approved vendor list. Review of the test results from Ramball Test Labs showed Charpy v lateral expansion values for three tests reported as 46 mils, 36 mils, and 59 mils, respectively, with an average value of 47 mils. The inspection team noted that these results do not meet the requirements of paragraph NC 2330 of the ASME Code or AIT purchase specification for this material which require minimum lateral expansion of 40 mils for each specimen tested. There was no documentation which would indicate re-testing of this material or other basis for disposition of the nonconforming test result.

The NRC inspection team concluded AIT's upgrading of the tube sheet material for Job 331 did not fully comply with the applicable requirements of the ASME Code and that AIT had not demonstrated that the fracture toughness of the tube sheets met the Code requirements. Failure to demonstrate conformance with the applicable technical and quality requirements for this item was identified as an example of Nonconformance 99901292/96-01-03.

(2) Shell and related material

According to the Job records, on September 28, 1993, AIT issued PO 20497 to American Alloy Steel Inc., an unqualified supplier, for various cut sizes of SA 516 Grade 70 steel plate. According to AIT's receiving inspection report, items 3, 4, and 6 of this order were identified with the same material control number (M-2501). Although all of these items were one inch thick, they had different size configurations: 72inch by 174inches, 2 by 240inches, and 60 by 168inches, respectively. According to the available records, only one material sample with this control number was sent to a test laboratory (Ramball) for upgrading tests. AIT issued PO 20550 on November 10, 1993 to Ramball requesting tensile, chemical, and Charpy tests on 1 inch plate, identified with material control number M-2501. The inspection team noted that assigning the same heat code number to several pieces of unqualified source material is contrary to the requirements of Paragraph 7.5.3.1 of AIT's QA Manual which states that "For material purchased as unqualified source material in accordance with Sec. XVII, a Material Control No. shall be assigned to each piece of unqualified source material". The inspection team also noted that to upgrade unqualified source material in accordance with the applicable provisions of NCA 3800 of the ASME Code, each piece of the material would have to be tested. Additionally, the PO to the test laboratory did not identify the temperature for impact tests or indicate the location of the tensile and impact specimens with respect to the plate configuration (rolling direction). Test results were not in the

Job record file. There was also no evidence which would indicate that the upgrading process included verification of conformance to fine austenitic grain size requirements as specified in SA 516.

Failure to demonstrate conformance with the applicable technical and quality requirements for this material was identified as an example of Nonconformance 99901292/96-01-03.

(3) Semi-elliptical heads

AIT issued PO 20494, dated September 28, 1993, to Trinity Industries, Cincinnati, Ohio, for two 52 3/4 inch diameter, 2 inch straight flange heads with 1 1/16 inch minimum thickness after forming, made from seamless 1 1/4 inch nominal thickness SA 516 Grade 70 plate. The heads were to be furnished in hot formed and normalized condition along with CMTRS and corner scrap material. The PO did not invoke any QA requirements but requested authorization to audit Trinity Industries, Navasota, TX shop where the plates were apparently formed.

AIT assigned material control numbers M-2527 and M-2528, respectively, to the two heads and on November 15, 1993, issued PO 20551 to Ramball requesting the performance of chemical analyses, tensile, and impact tests on samples from this material. The PO did not identify test temperature for the impact tests or specify the location of any of the test specimens with respect to material coupons. Test results were not in the Job record file. Also, there was no evidence that the upgrading process included the verification of fine austenitic grain size requirement as specified by SA 516.

Additionally, review of AIT's audit record files indicated that, although AIT had audited Trinity Industries, Cincinnati, Ohio facilities on February 6, 1992, there was no record of any audits having been performed at the Navasota, TX shop, where the heads were apparently fabricated. Contracting with an unqualified organization to supply safety related material and services (forming and heat treatment) without performing audit or surveillance at the location where these services are performed was identified as a nonconformance with Criterion VII of 10 CFR Part 50, Appendix B and Section 12.2.1 of AIT's QAM (Nonconformance 99901292/96-01-09).

3.4.1.4.2 Manufacturing Process Control

The NRC inspection team reviewed the disposition of selected nonconformance reports to assess AIT's control of the corrective action process. Several concerns were identified in this area. Specifically:

- (1) The recommended action for the disposition of NCR 331-4 was to plug holes using procedure APP-331-20 and to liquid penetrant test the seal welds on the plugs (no procedure specified). The "Action Taken" paragraph stated

that tube holes had been plugged per 331-20 and that nondestructive testing had been performed and documented on the route sheet. Examination of the route sheet, however, showed no documentation of the such testing.

- (2) NCR 331-3 was written to address missing tube holes in baffles MK1 and MK3, identified after assembly. The recommended action was to cut off the untubed sections of the baffles per attached sketch and provide replacement segments. The sketch showed overlapping baffle segments (with drilled holes) filet welded to the existing baffles. Although the replacement baffle material was specified as SA 516 Grade 70, the sketch did not identify a material control number or heat number. The sketch also did not identify any nondestructive examination of the weld used to attach the replacement segment. Contrary to the requirements of paragraph 7.3.4 of AIT's QA Manual, which states that "If work is required as a result of nonconformity, a revised Route Sheet shall be issued," a revised route sheet was not found in the job files and there was no record of the repair operation on the original route sheet.

The NRC inspectors identified AIT's failure to control and document repair activities as a nonconformance with paragraph 7.3.4 their QAM and with Criterion V of 10 CFR Part 50, Appendix B (Nonconformance 99901292/96-01-07).

3.4.1.5 Job 4102 - Flow measuring Nozzles

Union Electric Company issued PO 092710 on October 14, 1994, for two flow measuring nozzles for use in the Callaway plant. The nozzles were required to be fabricated to the requirements of Section III, Class 3 of the ASME Code and to Union Electric specification M-1160 (Q) Rev 0. The nozzle material was specified as type 316 stainless steel.

AIT purchased the nozzle material from Sandmeyer Steel Company, an unqualified vendor, to SA 240, TP 316 requirements and upgraded it to ASME Code by subcontracting the required testing. Machining services were contracted to IMT, Inc., a vendor qualified by audit to perform these services.

One of the final operations listed on the route sheet was "Clean/Prepare for shipment." Contrary to Paragraph 7.3.2 of AIT's QA Manual, which states that each route sheet shall reference applicable procedures by number and revision level, the route sheet did not specify a cleaning procedure nor was this step signed off. The inspection team noted that the applicable Union Electric Specification for these nozzles (para. 7.1.1) specified that cleaning agents and rinse water shall contain less than 200 parts per million chlorides and that the cleaning procedures shall be made available to the buyer upon request.

Failure to specify an acceptable cleaning procedure on the route sheet was identified as a nonconformance with Paragraph 7.3.2 of AIT's QAM and Criterion V of 10 CFR Part 50, Appendix B. (Nonconformance 99901292/96-01-07)

3.4.2 Observation of Current Activities (Job 391 - Suction Stabilizer)

During the course of this inspection, AIT had only one job for nuclear application in fabrication; eight suction stabilizers for Korea Electric Power Corporation (KEPCO). AIT's Drawing N-391-1, "Suction Stabilizers," Revision 7, dated January 26, 1996, required the seismic class 1 vessels to be fabricated in accordance with ASME Code Section III, Class 2, 1989 edition. Although these vessels were not intended for use by the U.S. nuclear industry, the team reviewed AIT's fabrication activities to determine the effectiveness of reported recent improvements in AIT's process control and inspections.

The vessel shell sections for Job 391 had been rolled and the long seams butt-welded. All other activities were on hold pending the next ASME accreditation survey, when these items were intended to be used by AIT to demonstrate the adequacy of its QA program and compliance with ASME Code requirements. The team noted that some improvements in documentation on the Job 391 travelers for certain activities that affect quality had been implemented by AIT. However, the team determined that based on the observations identified below, significant improvements would be necessary to meet the quality expectations consistent with 10 CFR Part 50, Appendix B and ASME Code NCA-4000 requirements.

- In general, inspection activities necessary to verify specified requirements for control of the process and quality were not documented and the traveler did not provide an adequate means to document these activities. For instance, the production traveler failed to address the identification, welding, and removal of temporary attachments.
- The inspection documentation did not identify characteristics, methods, acceptance criteria, or provide for recording objective evidence of inspection results. For instance, the production traveler failed to provide any acceptance criteria for any of the QC sign-offs observed. Also, after review of the production travelers, the team determined QC did not inspect all production activities that affect quality. Instead, QC appeared to select certain inspections and therefore, most activities were not inspected.

3.4.3 Interfaces with the Authorized Nuclear Inspector

The authorized inspection agency of record during the fabrication and upgrading of materials for all previous jobs (except job 391) was one of the insurance company's d/b/a Factory Mutual Engineering Association. The authorized nuclear inspector's (ANI's) records were not available for review during the course of this inspection. On the basis of its review of the past job records described in this report, the team identified several concerns with the ANI's activities that resulted in signing data reports for items that apparently did not comply with ASME Code requirements.

In September 1995, AIT changed its authorized inspection agency to Commercial Union Insurance Company. Under this contract, the ANI is providing four hours

per day, five days per week coverage of AIT's ASME Code activities. The team met with the ANI to review several of the past and current issues. The team determined from this inspection and its interviews with the ANI and AIT staff that many changes in process control have taken place in the short time the new ANI has been at AIT. The team found the ANI knowledgeable and effectively monitoring AIT's present ASME Code activities. During this inspection, the AIT staff stated that the ANI's four hours per day, five days per week contract was in place until AIT received its accreditation from ASME. After being accredited, the ANI services may be reduced. The team concluded that, based on the issues identified by reviewing past job records, significant ANI oversight of AIT's ASME Code activities may be necessary to ensure compliance with all technical requirements of the ASME Code.

3.4.4 Audits

3.4.4.1 Internal Audits

The inspectors reviewed QAM Section 10.0, Revision 8, "Audits," dated June 28, 1995, which define the purpose, use and methods of the audits conducted to assure adequate implementation of the controlled manufacturing system. This system covered audit methods, the conducting of audits, and reporting the results to responsible personnel to assure that QA system is functioning in accordance with the AIT QA manual.

The inspectors reviewed the results of the internal audits conducted the last two years and the audit schedule for 1996. Internal audits review the implementation of the various sections of the QA manual utilizing standard AIT check lists. They are performed at a frequency such that all phases of the QA program are audited once every twelve months. The audit reports reviewed by the inspectors included very little documented objective evidence of the areas reviewed. In fact, only one Quality Audit Discrepancy Report was written for all the 1994 and 1995 audits (that represents 24 separate audit reports). The inspectors noted that QAM Section 10.3.1 states that "objective evidence of the area audited shall be noted on the checklist."

The inspectors also reviewed the annual audits of the QA department conducted by the QA manager and submitted to the AIT President going back to 1990 and each was done by a different QA manager. Again, these reports are very limited in documentation and rarely identified any problems with implementation of the QA program. Even the report to the President after the unsuccessful December 1994 ASME Survey did not identify any significant problems with QA program implementation.

During discussions with the AIT QA Manager (who had only been hired into the position six weeks ago) concerning the depth and quality of the internal audits and the lack of documented objective evidence, he stated that he has already communicated to the President the need to conduct and document more meaningful and detailed audits. Failure to document objective evidence of areas reviewed and activities audited was identified as an example of Nonconformance 99901292/96-01-08.

3.4.4.2 External Audits (Vendor Evaluations)

The inspectors reviewed QAM Section 6.0, Revision 9, "Procurement Control," dated June 28, 1995, which describes the system which provides control of vendors of purchased items and services. This includes the preparation and maintenance of the Approved Vendors List (AVL) by the QA Manager. Paragraph 6.3.1.1.1 stated that vendors holding valid ASME certifications are considered qualified without survey and automatically placed on the AVL within the scope of their certificate. There are no QA program provisions requiring AIT to perform audits of ASME certificate holders to verify that they are effectively implementing their QA program prior to purchasing material for use in products to be supplied to nuclear plants as meeting 10 CFR Part 50, Appendix B. NRC Information Notices 86-21, Supplement 1, and 86-21, Supplement 2, "Recognition of ASME Accreditation Program for N Stamp Holders," provide information regarding the purchaser's responsibilities for verifying effective implementation of a supplier's QA program. This issue is identified as an example of Nonconformance (99901292/96-01-09).

Paragraph 6.3.1.1.2 did state that vendors not having ASME Section III certificates are required to have their quality program surveyed, audited and qualified by AIT for placement on the AVL.

The inspectors reviewed AIT's current AVL, as well as many of the previous versions to determine the qualification status of several vendors who have supplied material to AIT in the past for use on specific domestic nuclear jobs. The inspectors also reviewed external audits for several vendors who supplied material and services such as testing for the most recent jobs shipped to domestic nuclear plants including Limerick, V.C. Summer, Calvert Cliffs, and Callaway. During the review of the AVLs the inspectors identified that the Registered Professional Engineer (RPE) who is currently used by AIT for ASME Code design work was last audited by AIT in December 1994 and was not listed on the current AVL as qualified for providing engineering services. This issue is identified as an example of nonconformance (96-01-09).

The inspectors reviewed approximately 12 audits performed by AIT to place vendors on the AVL as required by QAM Section 6.0. These audits were documented in an Audit Report and using a Vendor Quality Evaluation (VQE) document as a checklist. This VQE checklist was not referenced or included as an Exhibit in either Section 6 or 10 of the QAM. The VQE checklist was really a yes/no type of questionnaire and included very little documented objective evidence of the scope of the audit or the review conducted. Of the dozen or so audits reviewed by the inspectors, only one Quality Audit Discrepancy Report was ever issued. This finding appears to be a direct result of the type of review conducted and is reflected in the depth of the objective evidence documented in the VQE. This issue is considered as part of Nonconformance (99901292/96-01-08)

3.4.4.3 Philadelphia Electric Company (PECO) Audit of AIT

The inspectors reviewed the results of an audit performed at AIT by PECO on April 26-30 and May 5, 1993. The audit was conducted utilizing the NUPIC Joint Audit Checklist, Rev. 4. No findings were identified, but the audit

report included the identification and issuance of two recommendations. The Audit Summary stated, in part, "Overall, the AIT quality program relative to the supply of piping subassemblies, pressure vessels as nuclear service components and pipe shop fabrication was identified as adequate and effectively implemented. The audit team was particularly impressed with the AIT operations, even though the relative size of the company is smaller than most nuclear supplier organizations."

The PECO audit appeared to review the implementation of the appropriate areas of the AIT QA program, however, the results of the May 1993 PECO audit disagree considerably with this January 1996 NRC inspection and the December 1994 and June 1995 ASME Surveys of AIT in the following areas:

- Design Control
- Procurement Control
- Fabrication/Assembly/Special Processes
- Test and Inspections
- Material Control
- Audits
- Document Control
- 10 CFR Part 21 Implementation

The inspectors concluded that May 1993 audit performed by PECO does not appear to be reflective of the level of the overall QA program implementation as evidenced by the NRC inspection team in January 1996 and the ASME Survey teams in December 1994 and June 1996. It was also noted that in April 1994 SCE&G used this PECO audit as part of their basis for placing AIT on their approved suppliers list and ultimately procured charging pump gear oil heat exchangers for the V. C. Summer Nuclear Station.

3.4.5 Personnel Qualification and Training

The inspectors reviewed QAM Section 4.0, Revision 9, "Personnel Training," dated June 28, 1995, which describes the system for the qualification indoctrination, training and education for personnel whose activities affect quality and require appropriate knowledge of the technical principles applicable to their duties. This includes auditor, inspection and test, and NDE personnel qualification, training, and certification.

The inspectors attempted to review the indoctrination and training records for several employees currently working for AIT with different job descriptions. The QA Manager was not able to provide any training records going back further than 1995 for any of the current AIT employees. QAM Section 4.3.7 states that the QA Manager has the responsibility to maintain the indoctrination and training records for employees. The QA Manager stated that he has not been able to locate employee training records since he began work for AIT in December 1994. The training records that did exist were inconsistent from employee to employee.

AIT, as part of their corrective action for several of the ASME Survey findings, committed to conduct training in several areas for certain employees. None of these employee's training records included any

documentation that they had received this training. The inspectors did see evidence that some of this training was performed by the fact that the Nonconformance Report (NCR) and corrective action documentation included a copy of the Training Records form for the subject identified on the NCR. However, these forms did not include a signature or initials of the persons who received the training in the Attendees portion of the form. It appeared that one person had completed the form.

Nonconformance 99901292/96-01-10 was identified during this part of the inspection for failure to conduct appropriate indoctrination and training activities of personnel and to maintain quality records of these activities.

4 PERSONS CONTACTED

The persons contacted during this inspection are listed below:

Amer Industrial Technologies, Inc.

- * + Ahmed E. Amer, President
- * + Darrell E. Whitmer, Quality Assurance Manager
  - + Hassan Mageid, Project Engineer
  - + R. Cretella, Administrative Assistant
  - Aziz Elsayy, Shop Supervisor
- + Attended the entrance and preliminary exit meetings
- * Attended entrance, preliminary and final exit meetings

UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

February 28, 1996

Dr. Richard S. Siudek
President, Nuclear Operations
Asea Brown Boveri/Combustion Engineering, Inc.
1000 Prospect Hill Road
Windsor, CT 06095

SUBJECT: NRC INSPECTION REPORT NO. 99900538/95-02 AND NOTICE
OF NONCONFORMANCE

Dear Dr. Siudek:

This letter forwards the results of the inspection of your organization's activities at your Windsor, Connecticut, facility, conducted December 18-19, 1995, by Mr. Stephen Alexander and Mr. James Isom of this office. Their findings have been discussed with some of the members of your staff identified in the enclosed report. The inspection was conducted to assess corrective actions implemented by your organization in response to a previously identified nonconformance regarding commercial grade dedication, to review your actions in response to the identification of deviations in reactor head closure studs supplied in 1990 to the Millstone Nuclear Station Unit 2, and to review your practices and procedures adopted pursuant to Part 21 of Title 10 of the Code of Federal Regulations (10 CFR Part 21). Areas examined during the inspection and our findings are discussed in detail in the enclosed report. Within these areas, the inspection consisted of an examination of procedures and representative records, interviews with personnel, and observations by the inspectors.

During this inspection, we determined that the implementation of your quality assurance program did not meet certain NRC requirements, specifically, Criterion V, "Instructions, Procedures, and Drawings," of Appendix B to 10 CFR Part 50. We found that contrary to the requirements of ABB-CE administrative procedures adopted pursuant to 10 CFR Part 21, ABB-CE did not (with regard to the 1990 Millstone Unit 2 reactor head studs), and does not, as a matter of stated practice or policy, document negative findings in evaluation of deviations in the manner prescribed by your Part 21 procedures when the deviations are obviously not safety significant or appear not to be safety significant upon initial review. However, in the instances which led us to this finding, you had documented technically sound dispositions of the particular deviations in question in accordance with other quality assurance procedures and had informed affected licensees or purchasers. Therefore, in these instances, although your organization was not intentionally following your Part 21 procedures, your actions met Part 21 requirements, and therefore, you were constructively in compliance with 10 CFR Part 21. The specific findings and references to the pertinent requirements are identified in the enclosures to this letter. You are requested to provide us within 30 days from the date of this letter a written statement in accordance with the instructions specified in the enclosed Notice of Nonconformance.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter, its enclosures, and your response will be placed in the NRC Public Document Room (PDR). To the extent possible, your response should not include any personal privacy, proprietary, or safeguards information so that it can be placed in the PDR without redaction. However, if you find it necessary to include such information, you should clearly indicate the specific information that you desire not to be placed in the PDR, and provide the legal basis to support your request for withholding the information from the public.

The responses requested by this letter and the enclosed Notice are not subject to the clearance procedures of the Office of Management and Budget as required by the Paperwork Reduction Act of 1980, Public Law No. 96-511.

The cooperation of your staff in this matter was greatly appreciated. Should you have any questions about the enclosed report, we would be glad to discuss them with you.

Sincerely,

Original signed by:

Michael R. Johnson, Acting Chief
Special Inspection Branch
Division of Inspection and Support Programs
Office of Nuclear Reactor Regulation

Docket No.: 99900538

Enclosures: 1. Notice of Nonconformance
2. Inspection Report 99900538/95-02

NOTICE OF NONCONFORMANCE

ABB-Combustion Engineering, Nuclear Operations
Windsor, Connecticut

Docket No. 99900538
Report No. 95-02

Based on the results of an NRC inspection conducted on December 18-19, 1995, it appears that certain of your activities were not conducted in accordance with NRC requirements.

- A. Criterion V, "Instructions, Procedures, and Drawings," of Appendix B to 10 CFR Part 50 requires in part that activities affecting quality be prescribed by instructions, procedures, and drawings appropriate to the circumstances and that these instructions, procedures, and drawings be followed.

Paragraph D.2 of ABB-CE, Nuclear Operations' "Administrative Procedure for Reporting Defects and Noncompliance," Revision dated September 1994, adopted pursuant to 10 CFR Part 21, defines deviations and failures to comply consistent with the definitions in 10 CFR 21.3. Paragraphs E.3 and E.4 of this procedure require, consistent with 10 CFR 21.21(a), that deviations and failures to comply be evaluated to identify defects or failures to comply associated with substantial safety hazards, and Paragraph E.4.b requires, consistent with 10 CFR 21.51, that such evaluations be documented and the records, using the form provided in the procedure, be retained for five years when no defects or failures to comply associated with substantial safety hazards are identified.

Contrary to the above, ABB-CE did not (with regard to reactor head studs supplied to Millstone Nuclear Station, Unit 2, in 1990) and, as a matter of stated practice or policy, routinely does not document negative findings in evaluation of deviations or failures to comply in the manner prescribed by the procedures when the deviations or failures to comply are obviously not safety significant (i.e., could not create or are not related to a substantial safety hazard) or appear not to be safety significant upon initial review.

Please provide a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555, with a copy to the Chief, Special Inspection Branch, Division of Inspection and Support Programs, Office of Nuclear Reactor Regulation, within 30 days of the date of the letter transmitting this Notice of Nonconformance. This reply should be clearly marked as a "Reply to a Notice of Nonconformance" and should include for each nonconformance (1) the reason for the nonconformance, or if contested, the basis for disputing the nonconformance, (2) the corrective steps that have been taken and the results achieved, (3) the corrective steps that will be taken to avoid further noncompliances, and (4) the date when your corrective action will be completed. Where good cause is shown, consideration will be given to extending the response time.

Dated at Rockville, Maryland
this 28th day of February, 1996

Enclosure 1

U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
DIVISION OF INSPECTION AND SUPPORT PROGRAMS

REPORT NO.: 99900538/95-02

ORGANIZATION INSPECTED: ABB-Combustion Engineering (ABB-CE)
Nuclear Operations
1000 Prospect Hill Road
Windsor, CT 19406

ORGANIZATIONAL CONTACT: Virgil Paggen, Nuclear Licensing
203-688-1911

NUCLEAR INDUSTRY ACTIVITY: Nuclear steam supply system designer and manufacturer,
technical services, spare and replacement parts

INSPECTION CONDUCTED: December 18-19, 1995, at the Millstone Nuclear Station
and the ABB-CE Windsor facility

LEAD INSPECTOR:

2/12/96
Date

Stephen D. Alexander
Vendor Inspection Section
Special Inspection Branch
Division of Inspection and Support Programs
Office of Nuclear Reactor Regulation

OTHER INSPECTORS:

James Isom
Special Inspection Section, PSIB

REVIEWED BY:

2/15/96
Date

Gregory C. Cwalina, Section Chief
Vendor Inspection Section
Special Inspection Branch
Division of Inspection and Support Programs
Office of Nuclear Reactor Regulation

APPROVED BY:

2/28/96
Date

Michael R. Johnson, Acting Chief
Special Inspection Branch
Division of Inspection and Support Programs
Office of Nuclear Reactor Regulation

Enclosure 2

1.0 INSPECTION SUMMARY

1.1 Inspection Basis:

- Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to Part 50 of Title 10 of the Code of Federal Regulations (10 CFR Part 50)
- ABB-Combustion Engineering (ABB-CE), Nuclear Operations Quality Assurance (QA) Program Documents and Procedures
- 10 CFR Part 21, "Reporting of Defects and Noncompliance"
- ABB-CE Nuclear Operations Administrative Procedures for Reporting of Defects and Noncompliance in Accordance with 10 CFR Part 21

1.2 Inspection Scope:

- Evaluation of ABB-CE Nuclear Operations procedures for dedication of commercial grade items (CGIs) for use by ABB-CE in building, supplying spare parts for, or in servicing safety-related equipment, including corrective actions implemented in response to a previously identified nonconformance regarding commercial grade dedication
- Review of ABB-CE actions in response to the identification of deviations in reactor head closure studs supplied in 1990 to Northeast Utilities' (NU's) Millstone Nuclear Station, Unit 2 (Millstone-2)
- Evaluation of ABB-CE's program and procedures and their implementation for reporting of defects and noncompliance adopted pursuant to 10 CFR Part 21, particularly regarding the Millstone reactor head stud issue

1.3 Violations:

None cited.

1.4 Nonconformance:

(99900538/95-02-01) Contrary to the requirements of Criterion V of 10 CFR Part 50, Appendix B, ABB-CE did not (with regard to reactor head studs supplied to Millstone-2, in 1990) and, as a matter of stated practice or policy, routinely does not document negative findings in evaluation of deviations or failures to comply in the manner prescribed by the procedures when the deviations or failures to comply are obviously not safety significant (i.e., could not create or are not related to a substantial safety hazard) or appear not to be safety significant upon initial review. (See Paragraph 3.3 of this report).

2.0 STATUS OF PREVIOUS INSPECTION FINDINGS

Nonconformance 99900538/93-01 (Closed). Part 50 of 10 CFR codifies Section III and Section IX of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (ASME Code). ABB-CE's QA procedures for dedication of commercial grade items for use in nuclear safety-related applications addressed procuring material for applications requiring compliance with the ASME Code. However, the procedures did not indicate a preference for procuring this material from suppliers with quality assurance programs meeting 10 CFR Part 50, Appendix B and holding ASME material supplier certificates of authorization, rather than from commercial suppliers and dedicating the material. Subsequent to that inspection, the NRC established its position that dedication of commercial grade items for use as basic components, if performed properly (i.e., all critical characteristics are identified and verified), was an acceptable equivalent alternative to procurement of basic components, that were designed and manufactured under a quality assurance program meeting the requirements of Appendix B to 10 CFR Part 50. In September 1995, a new version of 10 CFR Part 21 was published reflecting that position. Nevertheless, in the interim, ABB-CE had revised its procedures to reflect preferential procurement from Appendix B- and ASME-qualified suppliers. The inspector reviewed ABB-CE's dedication procedures against the latest applicable requirements of 10 CFR Part 21 and 10 CFR Part 50, Appendix B, and although not regulatory requirements, per se, against the NRC staff positions regarding dedication that were promulgated in NRC Generic Letters 89-02 and 91-05. The procedures were found to be acceptable (See Section 3.1 of this report).

3.0 INSPECTION DETAILS

3.1 Commercial Grade Dedication:

Section 21.3 of 10 CFR Part 21 now defines commercial grade items (CGIs) as items [presumably intended for use as basic components, i.e., in safety-related plant applications] that were not designed and manufactured under a 10 CFR Part 50, Appendix B, QA program. It then defines dedication as the process, involving verification of critical characteristics, through which CGIs are verified to be [or rendered] suitable for use in safety-related applications. Finally it defines critical characteristics as identifiable and measurable attributes which when verified, provide reasonable assurance that a CGI will perform its safety function. In accordance with 10 CFR Part 50, Appendix A and Appendix B, structures, systems, and components are required to perform their safety functions and not fail in a manner adverse to safety under all design basis conditions (i.e., extremes of non-accident service conditions, including ranges of operating parameters, harsh environments from postulated design basis accidents, and seismic conditions). Dedication, being an activity affecting quality, is to be controlled under the applicable requirements of 10 CFR Part 50, Appendix B. It may involve several types of QA controls, but it most directly provides an alternative means for meeting Criterion III, "Design Control," and Criterion VII, "Control of Purchased Material, Equipment and Services."

During this inspection, the inspector reviewed the latest effective revision of "Mechanical Engineering Department Technical Operating Procedure for Commercial Grade Dedication," MISC-MECH-TOP-007, Revision 01, issued October 11, 1993. The procedure was reviewed against the above regulatory requirements and for consistency with NRC staff positions on dedication as promulgated in NRC Generic Letters 89-02 and 91-05. The inspector found the procedure acceptable with the following comments:

3.1.1 The previous nonconformance was cited against ABB-CE's Mechanical Engineering Department dedication procedures for not requiring the purchase of ASME Code material from qualified suppliers when available, rather than performing commercial grade dedication or material upgrades. The inspector noted that although the NRC's current position on commercial grade dedication is that it is considered, if properly performed, an acceptable equivalent alternative to procuring items intended for safety-related applications as basic components from qualified, 10 CFR Part 50, Appendix B, suppliers, Paragraph 4.2.2 of the procedure had nevertheless been revised to require that such items be procured as "safety-related items" unless circumstances (e.g., schedule, availability, cost, etc.) prevent it.

3.1.2 Section 4.1 on design review was, in general, excellent except that it did not explicitly address analysis of failure modes and effects adverse to safety.

3.1.3 Section 4.2 on CGI applicability/suitability was very strong; although it had not yet been revised to reflect the expanded definition of CGIs found in the revision of 10 CFR Part 21 published in September 1995.

3.1.4 Section 4.3 on identification/selection of critical characteristics was excellent, reflecting the NRC definition of critical characteristics first promulgated in Generic Letter 91-05 and now codified in 10 CFR Part 21. In addition, it recognized the relevance of manufacturing process and materials in addition to form, fit, and function, and also recognized the need, where applicable, for conditioning and screening (e.g., for particular performance capabilities).

3.1.5 Section 4.4 on acceptance was noted for a particular strength in that it recognized the appropriate selection of one or more of the four acceptance methods given in Electric Power Research Institute Report NP-5652, "Guideline for the Utilization of Commercial Grade Items in Nuclear Safety Related Applications (NCIG-07)," and conditionally endorsed in NRC Generic Letter 89-02, for acceptance or verification of individual critical characteristics, that is, that a combination of acceptance methods may be employed to accept a given CGI. Table 3 elaborated on the four acceptance methods and was strengthened by the inclusion of the restrictions on the use of Methods 2 and 4 from NRC Generic Letter 89-02.

3.1.6 Paragraph 4.5.2.4 addressed sampling. Although it referred only to purely statistical sampling bases as in MIL-STD-105E (as opposed to, for example EPRI's sampling guideline), it was strengthened by the restriction of only using sampling on lots or batches from the same manufacturer. Batch or lot traceability and homogeneity or consistency among batches or lots were not

mentioned explicitly, but the procedure did require the consideration of complexity, safety function, and vendor history, which may be effective in establishing batch/lot homogeneity and consistency among batches/lots. Paragraph 4.5.2.5 appropriately addressed sample expansion to 100 percent upon finding a defect. Use of the word defect, although possibly consistent with the language of MIL-STD-105E, may introduce unwanted implications in the context of dedication because of its special meaning in 10 CFR Part 21.

3.1.7 Paragraph 4.7.2 appeared to require justification for not verifying critical characteristics that cannot be verified by inspection or test of the finished product. Requiring such justification is within ABB-CE's prerogative and is consistent with regulatory guidance. Then the paragraph addressed (but did not require) QC representative surveillance, presumably referring to source verification, EPRI Method 3. The use of alternate acceptance methods for critical characteristics that are not readily verifiable by Method 1, special tests and inspections, is encouraged and is also consistent with regulatory guidance. However, the paragraph then stated that such a critical characteristic may have to be accepted "solely on the manufacturer's certification..." This allowance is inconsistent with regulatory guidance in that it allows the use of a manufacturer's certification alone as the basis for acceptance of one or more critical characteristics. The NRC has long held that vendor certifications, unless validated by some means such as QA audit or commercial grade survey, are not adequate as the sole basis for acceptance. The inspector recognized that ABB-CE may have compensatory provisions to that effect in its procedures for supplier selection and qualification, but as a stand-alone provision in this procedure with no qualifying constraints stated, the statement in question was inconsistent with regulatory guidance, acceptance requirements in the procedure, and may be inconsistent with other procedures as well.

3.2 Reactor Head Studs:

The inspectors reviewed ABB-CE's disposition of various discrepancies found in 60 reactor head studs (RHSs) supplied by ABB-CE to Northeast Utilities' (NU's) Millstone Nuclear Power Station (Millstone) in September of 1990. The replacement studs were modified with special ring grooves to accommodate a new quick-release hydraulic tensioner. The initial discrepancies were identified during receipt inspection at Millstone, Unit 2, and documented in Nonconformance Report (NCR) 290-566, dated September 17, 1990. The NRC inspectors reviewed this and related subsequent NCRs, their dispositions/resolutions, and related drawings and documents at Millstone on December 18, 1995.

On the basis of the original receipt inspection dimensional discrepancies, engineers from Millstone, ABB-CE, and the RHS manufacturer, PMC Industries (under contract to ABB-CE), performed additional inspections of 100 percent of the RHSs and other ancillary equipment. These reinspections resulted in documenting additional nonconformances in NCRs 290-575, 290-589, 290-235, and 290-239. The NRC resident inspectors documented their review of Millstone's resolutions to these NCRs in Section 7.3 of NRC Inspection Report 50-245/92-25, 50-336/92-27, 50-423/92-24.

During this December 1995 NRC inspection, the NRC inspectors determined through review of the NCRs and their disposition documents and interviews with engineers at Millstone and at ABB-CE headquarters that the nature of the discrepancies identified by the five NCRs would not affect the safety function of the RHSs. The RHSs' safety function is to maintain the integrity of the reactor coolant pressure boundary by fastening the reactor vessel head to the reactor vessel. This function is performed by the top external closure nut threads and bottom external threads. The top external threads accommodate the reactor vessel closure nuts which fasten down the reactor vessel head flange and the bottom external threads are screwed into the reactor vessel flange. The reinspections performed by ABB-CE and PMC on September 24 and 25, 1990, on 100 percent of the RHSs found that there were no RHS external thread dimensional deviations which might lead to thread galling, about which concerns had been raised.

The identified dimensional discrepancies in the external threads of the RHSs had also given rise to a concern about erosion of the parts as a result. The licensee concluded (and the inspectors agreed) that there were no conditions (due to the identified nonconformances or otherwise) under which any of the threads on the studs, nuts, or vessel flange would be expected to undergo erosion of any kind.

The NU Systems Quality Service Department witnessed the 100-percent reinspection mentioned above. ABB-CE documented the results of the inspection in a September 28, 1990, letter to Millstone (NSPT-90-713). The inspection confirmed that all bottom external threads were acceptable using go and no-go thread gage rings. All top external threads also passed inspection using the modified, slow-lead go-ring except for nine pieces (serial numbers (S/Ns) 11, 12, 20, 22, 35, 41, 51, 62, 64) which did not fully accept the go-ring gage.

For those nine RHSs which would not accept the go-ring, ABB-CE recommended that Millstone personnel check the RHS upper external threads with their closure nuts prior to their use to ensure that manufacturing defects were not present. The inability of these nine RHSs to accommodate the go-ring meant that, potentially, the top external threads may be oversized. Millstone personnel wrote work order, AWO M2-90-11495, to run reactor vessel closure nuts over the threads to ensure proper fit of the nuts. The mechanics were able to satisfactorily install the reactor vessel closure nuts over the upper external threads of all nine affected studs. The licensee postulated that the reason some studs would not accommodate the go-gage fully was due to the build-up of manganese phosphate applied to the studs after machining. Manganese phosphate is applied as an anti-galling and corrosion inhibiting coating.

The ABB-CE and PMC engineers also performed inspection of all top and bottom RHS internal threads. The internal threads are machined into each end of a 1.5-inch hole through each stud to accommodate the measuring rods. In the September 28, 1990, letter from ABB-CE to Millstone, ABB-CE stated that most studs required minor removal of residual excess phosphate coating material from their internal threads. After this, all internal threads accepted the specified go-gauge at both ends. However, four studs, (S/Ns 6, 26, 51 and 59) were found to have slightly oversized internal threads (i.e. inside diameter

was slightly too large). ABB-CE recommended that these four studs could be used as is based on the following: The top internal threads are used for the lifting eyes used during installation, removal and other handling of the studs. The top internal threads also hold the top closure screw (to keep out foreign material and prevent corrosion) during plant operation. The bottom internal threads provide for attachment of the bottom closure screw during operation and accept the mounting piece for the measurement rods during tensioning. None of the internal threads perform any plant safety function (except personnel safety during handling).

Millstone station dispositioned the oversized internal threads on the bottom of studs, S/Ns 6 and 26, as use-as-is because in addition to these threads having no safety function, the bottom closing screw is staked in two places to ensure that it does not come loose.

For the two studs that had oversized top internal threads, Millstone station performed a load test at twice the RHS weight for 10 minutes under work order AWO M2-90-11711. Load testing of studs S/Ns 51 and 59 (S/N 59 renumbered as S/N 47 due to its position) was reported as completed satisfactorily on October 10, 1990.

After completing inspections of all RHSs at Millstone-2, ABB-CE concluded that, with the exception of the four studs which were found with oversized internal threads, all 60 of the RHSs supplied to Millstone were functionally acceptable for their intended service. For those studs which were found with oversized internal threads, ABB-CE issued Corrective Action Report No. QP-90-024 to PMC and requested PMC to determine the cause and actions taken to prevent recurrence.

During a telephone conversation with PMC's QA manager subsequent to the inspection, the inspectors learned that PMC was not able to determine why the oversized internal threads for the four studs were not detected by the PMC inspectors. According to the QA manager, although PMC had taken as-built dimensions of various parts of the RHSs and had performed other inspections, PMC inspectors did not detect the oversized internal threads on 4 of the 60 RHSs. PMC postulated that internal thread irregularities (e.g., burrs) may have prevented acceptance of the No-Go plug, thus masking the oversize condition. Then such irregularities would have been removed by special plugs temporarily installed in each end of the studs used for turning them on a magnetic particle inspection machine, but it was not PMC's practice at the time to recheck the internal thread dimensions after this test. PMC's QA manager stated that PMC has advised all its inspectors of the problem and that gaging the internal threads after magnetic particle inspection would become a standard practice.

ABB-CE stated in its response letter to Millstone (CE letter:EXT-90-296) that it planned the following actions to prevent recurrence of similar problems:

1. ABB/CENP [Nuclear Projects] would request customer (utility) participation in final source inspection activities at PMC Industries.

2. The above source inspection is to be performed after completion of phosphate coating operation and will include checking of selected critical and noncritical attributes.
3. ABB/CENP procurement documents shall require submittal of dimensional inspection data for each reactor vessel stud.

The NRC inspectors queried two other utilities who had purchased reactor head studs from ABB-CE around the 1990 time period to determine whether there were discrepancies found at other facilities. The two utilities reported no problem with reactor head studs.

The inspectors determined that the non-dimensional discrepancies identified in NCR 290-566 were also satisfactorily resolved by Millstone in consultation with ABB-CE and PMC. Two of these, Items 1 and 2 were only apparent discrepancies. NCR 290-566, Item 1, stated that the NU purchase order (PO 877539) for the RHSs required the studs to be made in accordance with NU Service Company (NUSCO) Drawing 25203-29139, Sheet 8. However, Item 1 stated that the certification (from PMC) certified to ABB-CE Drawing E-18767-650-001 instead. Closer review of the drawings revealed that the originally specified NUSCO drawing, 25203-29139, had been revised to reflect the new design of the upper part of the RHS. In this revision, Revision 9, Sheet 8 of NUSCO Drawing 25203-29139 no longer showed the details of the RHS, but now referenced a revised Sheet 6 of the same drawing. The new Sheet 6 was simply the NUSCO redesignation of ABB-CE Drawing E-18767-650-001 that ABB-CE had developed and NU had approved for fabricating the new design RHSs.

Item 2 stated that the PMC certification mentioned only "phosphate" coating; whereas, manganese phosphate had been specified by the drawing. Review of the certification revealed that it certified that the studs had been given a "phosphate coating in accordance with ABB-CE M&P Specification 4.4.4.1(A)." Section 2.1 of this specification identified the material to be used as manganese phosphate. Therefore, the licensee had concluded (and the NRC inspectors agreed) that the certification was satisfactory in that it certified to use of the correct coating material by reference to the ABB-CE specification.

In addition, Item 5 of NRC 290-566 identified what appeared to the receipt inspector to be arc strikes on the end of stud S/N 40. The NRC inspectors were concerned that although the arc strikes were located on a non-critical, non-stressed surface, arc strikes are typically associated with welding which should not have been performed as part of fabrication on any part of the studs which are ASME Code, Section III, Class 1 components. Any weld repairs of surface discontinuities should have been documented in the Code Data Report, yet none reportedly were. According to a September 10, 1990, letter from PMC, magnetic particle inspection of the studs was performed using a coil for the longitudinal field shot and direct current application (4200 amperes through the stud, end to end) for the circular field shot. Although the PMC letter claimed that no relevant or non-relevant indications were detected on the surfaces being examined during testing, the licensee and ABB-CE postulated and PMC confirmed (also later in a telephone conversation with the NRC inspector) the likelihood of the arc strikes occurring when the magnetic particle

equipment current probes were removed from (or possibly connected to) the stud ends without their being first deenergized. PMC was not able to offer a satisfactory explanation for why the arc strikes were missed other than their having most probably occurred after the testing was completed and the studs then not being inspected further by PMC. The PMC QA manager told the NRC inspector in the telephone conversation subsequent to the NRC inspection that PMC technicians were aware of this problem as well as others related to inadequate QC at PMC and steps had been taken to correct deficiencies identified by ABB-CE and prevent recurrence, as documented in ABB-CE's audit reports and related correspondence.

While reviewing the various documents for this inspection, the inspectors identified some errors in the original NRC inspection report on this issue (50-245/92-25, 50-336/92-27, 50-423/92-24). First, the RHSs were purchased for Unit 2, not Unit 3, as the inspection report stated. Also, the ABB-CE subcontractor who machined the RHSs (from material provided by ABB-CE) was PMC Industries and not PCI Energy Services. The reports stated that ABB-CE had placed PCI on the ABB-CE approved vendor list based solely on PCI's holding an ASME certificate and that ABB-CE was not verifying that PCI had a quality assurance (QA) program to control characteristics not covered by the ASME Code. However, this past ABB-CE practice was not relevant to the RHS issue because PCI was never involved.

During this December 1995 inspection, ABB-CE stated that PMC Industries did not have an ASME certificate to manufacture the RHSs, but that PMC had always manufactured RHSs under ABB-CE's oversight and using ABB-CE's ASME certification. ABB-CE stated that except for a few studs made by ABB-CE itself at its Chattanooga, Tennessee, shop, PMC had fabricated all the RHSs supplied by ABB-CE for various sites including some other than ABB-CE-designed plants. ABB-CE stated that it had performed a comprehensive QA implementation audit of PMC on October 23-25, 1989 to requalify PMC as a supplier to ABB-CE in preparation for the Millstone job. Also, based on the problems with the RHSs at Millstone, ABB-CE has performed several more annual QA implementation audits of PMC, the last one being completed in May 1995.

The inspectors had no further concerns regarding the quality of reactor head studs provided by ABB-CE to Millstone in 1990, nor other studs provided by ABB-CE for other sites.

3.3 10 CFR Part 21 Program:

3.3.1 Procedural Adequacy

During this inspection at ABB-CE, the inspector reviewed the vendor's procedures adopted pursuant to 10 CFR Part 21. The current revision of "Administrative Procedure for Reporting of Defects and Noncompliance," dated September 1994, was, in general, consistent with the provisions of Part 21 and had been updated to reflect the changes in the version of the regulation that became effective on October 29, 1991, with one exception. Paragraph E.2 which described the ways in which information potentially reportable under Part 21 would be discovered contained a weakness. The inspector was concerned that the language of this section could be interpreted by some employees as

requiring that they report only those problems that they believe could create a substantial safety hazard or lead to exceeding a technical specification safety limit, yet, this section did not address reporting of deviations and failures to comply (FTCs) as defined in the procedure and in Part 21. This language could have the effect of calling upon any employee who may become aware of a nonconforming condition to make judgements about the safety significance of that nonconforming condition, i.e., identifying defects and FTCs associated with substantial safety hazards (SSHs), that only certain employees, managers, and the Nuclear Safety Committee would normally be qualified (and authorized by the procedure) to make. The concern is that with the procedure as written, potentially safety-significant deviations or FTCs might be prematurely dismissed and not be formally evaluated to identify defects or FTCs associated with SSHs as required by §21.21(a). This deficiency in procedures adopted pursuant to 10 CFR Part 21 constituted a minor violation of 10 CFR 21.21(a) as described in NUREG-1600, "General Statement of Policy and Procedures for NRC Enforcement Actions," Enforcement Policy (previously contained in Appendix C to 10 CFR Part 2 of Title 10 of the Code of Federal Regulations), and as such, will not be cited.

3.3.2 Procedural Compliance

Even though the ABB-CE Part 21 procedure defined deviation using the same words as the regulation, it was ABB-CE's position, clearly stated by ABB-CE staff in discussions with the NRC inspectors, that ABB-CE interpreted the regulation (and its procedure) to mean that only those deviations that appear to have potential safety significance (as determined by an undocumented preliminary evaluation) would undergo formal evaluation pursuant to §21.21(a) and Sections E.3, E.4, and E.5 of the procedure to identify defects and FTCs associated with SSHs. Conversely, according to ABB-CE staff, conditions that could be deemed deviations or failures to comply, as defined in §21.3 and in the procedure, would not be evaluated pursuant to §21.21(a) if it was apparent to the preliminary evaluator (said to typically be a department manager, supervisor or cognizant engineer), that the condition, although technically a deviation or FTC, did not have any potential safety significance. Although Part 21 does not specify who must perform the evaluation, this preliminary evaluation is not provided for in the procedures and, contrary to Paragraph E.4.b of the ABB-CE procedure and §21.51, negative findings are not typically documented and retained under these circumstances using the forms provided for this purpose in the procedure.

The inspector reviewed ABB-CE records of all §21.21(a) evaluations completed in the last five years and found that ABB-CE has documented evaluations of several potentially safety significant deviations and FTCs, some of which resulted in the identification of defects or FTCs related to SSHs, and some of which did not. In all cases in the file, the appropriate reports were made. However, during this inspection, the inspectors reviewed a case of apparently safety-insignificant nonconforming conditions, which nevertheless constituted departures from technical procurement specifications in basic components identified after shipment (i.e. deviations, as defined in Part 21 and the procedure), but for which ABB-CE did not document evaluation in accordance with the Part 21 procedure. Instead, ABB-CE documented evaluation and disposition of these issues through other means such as its supplier Deviation from

Contract Request (DCR) procedures or other QA procedures that would otherwise normally be used to correct or disposition only those nonconforming conditions identified **before** the basic components involved were supplied/ offered for use at NRC-licensed facilities. Such nonconforming conditions identified before shipment technically would not be deviations, per se, as defined by Part 21. Being not yet delivered, the presumption in Part 21 is that the problems can be corrected before delivery of the affected basic component(s), and hence, Part 21 is not applicable. However, after shipment, the uncorrected problems become deviations (or FTCs), thus requiring evaluation under §21.21(a).

For example, in the case of the 60 reactor head closure studs supplied by ABB-CE to Millstone-2 in 1990, ABB-CE used its normal QA process (in this case the DCR procedure) to disposition certain nonconforming conditions (as discussed in Section 3.2 above) in several of the studs. Some obviously nonsafety-significant deviations from technical procurement specifications in terms of certain out-of-tolerance, but non-critical dimensions on several of the studs, were discovered by the stud manufacturing facility (PMC). These were dispositioned in a technically appropriate manner in accordance with ABB-CE's DCR procedures as documented in correspondence reviewed by the inspectors. When additional nonconformances apparently missed by PMC (the studs were direct-shipped to Millstone from PMC and not inspected by ABB-CE) were discovered by Millstone's receipt inspectors, ABB-CE, NU and PMC jointly conducted a 100-percent reinspection of all the studs supplied and identified a few more nonconformances in September 1990. ABB-CE documented the disposition of all these similar, but **post-delivery** conditions using the same DCR procedure.

Although the NRC inspectors agreed with the technical conclusions and ultimate dispositions reached by ABB-CE, ABB-CE's use of its QA procedures instead of the Part 21 procedure, while consistent with ABB-CE's practice and stated policy regarding Part 21 evaluations, was not, in the inspectors' judgement, strictly in accordance with the requirements of ABB-CE Part 21 procedures. However, the only deviations identified by the inspectors that were not evaluated and documented strictly in accordance with the Part 21 procedure, were nevertheless documented and retained (in accordance with other, QA procedures), and affected licensees or purchasers had been informed. In these instances, although ABB-CE was not intentionally following its Part 21 procedures, its actions ultimately met Part 21 requirements, and therefore, it was constructively in compliance with 10 CFR Part 21.

Nevertheless, ABB-CE's failure to document the evaluation of deviations, albeit with negative findings, in accordance with procedures governing activities affecting quality (i.e., the Part 21 procedure), coupled with ABB-CE's stated policy or interpretation that evaluation of obviously non-safety-significant deviations need not be documented, constituted a nonconformance with respect to Criterion V, "Instructions, Procedures, and Drawings," of Appendix B to 10 CFR Part 50, and accordingly is cited as Nonconformance 99900538/95-02-01.

Note that the failure in this instance to follow the ABB-CE Part 21 procedure is not considered a violation of 10 CFR Part 21 because even though ABB-CE's

stated policy would be considered contrary to Part 21, the Part 21 procedure in this regard is not. Further, there was evidence that, in the only instance in question, the deviations had been evaluated and the records were still on file, although not in the form or file prescribed by ABB-CE's Part 21 procedure. As an incidental consideration, it was recognized that any question of lack of Part 21 file records of evaluations of the deviations cited was moot because at the time of this inspection, the Part 21-mandated retention period for any records of the evaluation of the deviations (had there been any) in the example cited had already expired. Therefore, at the time of this inspection, ABB-CE would no longer have been required to have records of the evaluation of these particular deviations in its Part 21 files even if they had been documented in accordance with the Part 21 procedure.

Nevertheless, the inspectors cautioned ABB-CE that adherence to its orally stated practice and not to the letter of its written Part 21 procedure could be viewed by the NRC as violation of the regulation. In consultation with the NRC Office of General Counsel, the inspectors confirmed the position that Part 21 was written for general use by licensed facilities and suppliers of basic components. A supplier, regardless of how knowledgeable, does not have the authority to waive the requirement to evaluate an actual deviation or failure to comply (and document and retain the results of that evaluation), regardless of how trivial it may first appear.

4.0 PERSONS CONTACTED:

4.1 ABB-CE:

Gary S. Bloomquist, Manager, Nuclear Quality
James A. Noyes, Manager, Nuclear Spare Parts
Theodore S. Bernard, Program Manager, Nuclear Spare Parts
Ian C. Rickard, Project Director, Engineering Operations
David Sibega, Supervisor, Plant Components
Mark W. Stewart, Supervisor - QA, Nuclear Spare Parts
Charles Molnar, Nuclear Licensing
Virgil Paggen, Nuclear Licensing

4.2 PMC Industries:

Harry Dods, QA Coordinator

4.3 Northeast Utilities/Millstone-2:

Mario Robles, Licensing
Tom A. Moore, System Engineer
Michael J. Haeflich, Procurement
John N. Coleman, Procurement Inspection
Mark A. Surprenant, Supervisor of Procurement Engineering

4.4 NRC:

Russel Arrighi, Resident Inspector, Millstone
Serita Sanders
Edward Baker

UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

February 6, 1996

Mr. Lance Simms
General Manager
Brand Fire Protection Services, Inc.
721 Roguet Club Drive
Addison, IL 60101

SUBJECT: NRC INSPECTION NO. 99901020/95-01

Dear Mr. Simms:

This letter transmits the report of the U.S. Nuclear Regulatory Commission (NRC) inspection of Brand Fire Protection Services (Brand) facilities in Addison, Illinois by this office on November 6-9, 1995.

The inspection was conducted to evaluate Brand's quality assurance program as implemented in the process for providing fire barriers penetration seals to the nuclear industry. Specific areas of review included, product design and design change controls, product testing and installation, procurement of materials, and document controls. In addition, the inspectors reviewed Brand's program for implementing Part 21, "Reporting of Defects and Noncompliance," of Title 10 of the Code of Federal Regulations (10 CFR Part 21).

During the inspection the inspectors examined procedures and representative records, observed relevant activities such as receipt inspections and product dedication, and conducted discussions and interviews with personnel. The inspectors' observations were discussed with the staff at the conclusion of the inspection, on November 9, 1995.

Based upon its observations and evaluation, the team concluded that the silicone-based nuclear power plant fire barrier applications designed, tested, and installed by Brand are commercial grade items, as defined in 10 CFR 21.3. Although the silicone products supplied for nuclear plant fire barrier applications are not subject to the NRC's Part 21 regulation, it appears that Brand established and implemented a system which meets the intent of certain 10 CFR Part 21 requirements, such as 10 CFR 21.21(b). Areas examined during the inspection and our conclusions are discussed in the enclosed inspection report.

R. Woodward

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In accordance with 10 CFR 2.790 of the NRC's "Rules of Practices," a copy of this letter and the enclosed inspection report will be placed in the NRC Public Document Room. If there are any questions concerning this inspection we will be pleased to discuss them with you. No response to this letter is required.

Sincerely,

ORIGINAL SIGNED BY

Michael R. Johnson, Acting Chief
Special Inspection Branch
Division of Inspection and Support Programs
Office of Nuclear Reactor Regulation

Docket No. 99901020

Enclosure: Inspection Report No. 99901020/95-201

U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
DIVISION OF INSPECTION AND SUPPORT PROGRAMS

ORGANIZATION: Brand Fire Protection Services
721 Racquet Club Drive
Addison, IL 60101

REPORT NO: 99901020/95-01

ORGANIZATIONAL CONTACT: Mr. Lance Simms, General Manager

NUCLEAR INDUSTRY ACTIVITY: Designed, tested and installed rated fire barrier penetration seal assemblies in nuclear power electrical generating stations. The assemblies combined commercial grade silicone products and various proprietary additives developed to meet specific fire barriers penetration seal fire test criteria.

INSPECTION CONDUCTED: November 6-9, 1995

LEAD INSPECTOR:

Peter S. Koltay, Team Leader
Special Inspection Section
Special Inspection Branch
Division of Inspection and Support Programs
Office of Nuclear Reactor Regulation

2/6/96
Date

OTHER INSPECTORS:

Armajit Singh, NRR
Christofer Bajwa, NRR
T.L. Tinkel, Brookhaven National Laboratory

REVIEWED:

Gregory C. Cwalina, Chief
Vendor Inspection Section
Special Inspection Branch
Division of Inspection and Support Programs
Office of Nuclear Reactor Regulation

2/6/96
Date

APPROVED:

Michael R. Johnson, Acting Chief
Special Inspection Branch
Division of Inspection and Support Programs
Office of Nuclear Reactor Regulation

2/6/96
Date

Enclosure

1.0 INSPECTION SUMMARY

Based on the scope of this inspection, the team determined that the Brand Fire Protection Services (Brand) does not manufacture and supply any "basic components" as defined in Part 21, "Reporting of Defects and Noncompliance," of Title 10 of the Code of Federal Regulations (10 CFR Part 21). While some customers may contractually impose the requirements of 10 CFR Part 21 on Brand for their fire barrier penetration seal assemblies supplied for use in nuclear power plants, the inspectors verified that the products did not meet the definition of basic components as defined in 10 CFR 21.3. However, the inspectors found that Brand has established and implemented a program which meets the intent of certain sections of 10 CFR Part 21, such as 10 CFR 21.21(b). Brand personnel stated to the team that they will continue to implement the existing program for meeting the intent of 10 CFR Part 21.

2.0 STATUS OF PREVIOUS INSPECTION FINDINGS

This was the first NRC staff inspection of this vendor; thus, there were no previous findings.

3.0 INSPECTION FINDINGS AND OBSERVATIONS

3.1 Entrance Meeting

The entrance meeting was held on Monday, November 6, 1995. At this meeting, Mr. Singh, the acting NRC inspection team leader, discussed the scope of the inspection with the Brand staff.

3.2 Background and Description of Facilities

Following the Browns Ferry nuclear power plant fire, a new line of fire barrier penetration seals, using silicone based foam and elastomer materials, were developed to seal openings in nuclear power plant fire barriers. The openings were required for various penetrations such as piping, cables, and heating, ventilation, and air conditioning (HVAC) ducts.

BISCO Construction, which later became Brand, was a major supplier of fire barrier penetration seal services from the late 1970s until the demand for the work diminished in the late 1980s. According to information provided by the Brand General Manager, the company has provided fire barrier penetration sealing services to approximately 55 nuclear power plants in the United States.

The fire barrier penetration seal technology originally developed by BISCO and currently owned by Brand is based primarily on using silicone materials manufactured by Dow Corning.

3.3 Penetration Seal Configurations and Sealing Materials

Brand (previously BISCO) has tested and qualified different fire barrier penetration seal design configurations since the mid 1970s. A review of the

Brand Fire Test Report index indicates that over 100 tests were performed with the earliest tests completed in mid 1975 and the most recent performed in early 1992.

The penetration seal design configurations vary depending on many factors including the type of fire barrier construction, the type of penetration, and the size of the opening being sealed. Examples of the various kinds of penetration seal configurations include:

- Penetrations for electrical cables
- Penetrations for electrical cable pipe conduits
- Penetrations for electrical cable trays
- Penetrations for piping and ducts

Silicone products used by Brand in their fire barrier penetration design are designated as the SF-20 and SE foam and as SF-60, SF-100L, and SF-150L elastomer.

3.3.1 Material Receipt Inspection

A material receipt inspection was observed by the NRC inspector. The Brand Quality Assurance (QA) manager performed the receipt inspection for packages of SF-60 elastomer that were received at the Brand warehouse. The inspector observed the QA inspection of the incoming packages. The shipment of SF-60 was from a company that packaged the SF-60 ingredients for Brand into plastic tubes (Bisc-Kits) used for mixing and applying the SF-60 to form a seal. The QA inspector examined the boxes in which the SF-60 Bisc-Kits were shipped for any obvious signs of damage and then completed the receiving inspection checklist (RI-1). The material was accepted by the QA inspector. The receipt inspection was performed in accordance with the applicable procedures.

3.3.2 Commercial Grade Dedication (CGD)

The inspector observed the QA manager complete the commercial grade dedication (CGD) procedure (QCP-204) for the SF-60 elastomer, which certifies that the product meets the manufacturer's specifications. This procedure requires taking samples of the material and measuring the density. The samples are allowed to cure for 24 hours and then checked for a complete cure by evaluating the color and structure. The QA manager completed the system verification log (form QCT-2) for the dedication procedure.

The QA manager also completed a CGD for another material, SF-150NH, which is a high density radiation shield/penetration seal material. Both materials met all the applicable criteria for dedication and were certified for safety-related use. The samples were taken according to procedure and controls were adequate. Results were properly recorded.

3.3.3 Material Storage/Shelf Life

Storage of materials was also inspected. Brand follows manufacturer's recommendations for shelf life of materials. Materials are tagged during the receipt inspection process with an expiration date. Brand will normally place

a shelf life on the products they ship of one year from the date that Brand ships them to the customer. Controls in this area were adequate, and no issues were identified.

3.3.4 Procurement Document Control

A sample of Brand customer procurement documents were reviewed. The inspector reviewed some recent customer purchase orders (POs) and discussed with Brand personnel how nuclear customer orders were handled. Some of Brand's customers contractually impose the provisions of 10 CFR Part 21, while others include those provisions on individual POs. Some customers do not invoke 10 CFR Part 21 at all. Brand's policy is to treat all orders from nuclear customers as invoking 10 CFR Part 21 notification requirements, whether it is stated explicitly or not, unless the material is to be used in a non-safety related application. However, the Brand QA manual states that if 10 CFR Part 21 is not explicitly invoked on a customer purchase order, then Brand does not have to comply with 10 CFR Part 21 reporting requirements. The inspectors noted that Brand management's intent to continue to notify all nuclear customers in accordance with 10 CFR Part 21 should be included in the applicable QA procedure.

3.4 Quality Assurance and Design Control

A new quality assurance program was implemented on October 9, 1995. Section C of the QA Manual, Revision A, addresses design control and includes the following requirements:

- a. The adequacy of all designs must have been verified by testing or engineering analysis.
- b. All designs shall be reviewed by a qualified individual other than the originator.
- c. The engineering manager or designate has the responsibility for the design and/or detailing of work necessary to meet the contract specifications.
- d. The reviewing process shall include a qualified individual other than the individual who prepared the work. The process shall consist of spot checking calculations and reviewing the overall Brand design and/or detail work.

3.4.1 Methodology for Qualifying Penetration Seal Configurations

Brand qualifies the design of a penetration seal configuration using one of two methods.

- a. The first method consists of subjecting the penetration seal design configuration to a fire endurance test. The results of successful testing are used to qualify the particular parameters of the design. This method was used extensively during the development of the fire barriers penetration seals. Brand

maintains a library of over 100 fire penetration test results on file.

- b. The second method consists of performing an engineering analysis for the penetration seal design configuration requiring qualification in the field and establishing a correlation between the field penetration and tested penetration configurations on file.

The engineering analysis method for qualifying penetration seal configurations permits Brand to use a combination of engineering judgment and results from multiple prior tests to qualify new or modified design configurations without performing additional testing.

Engineering analysis for qualification consists of but it is not limited to the following:

- a. Analyzing reports of pertinent past tests performed by Brand.
- b. Identifying qualitative and quantitative information for selected design parameters that represent the candidate design configuration and are covered by prior testing.
- c. Documenting a range of test parameters from the test reports on a Testing Matrix Sheet.
- d. Selecting the best results for the particular design and test parameters and documenting this information on the summary line of the Testing Matrix Sheet.
- e. Using the summary line information on the Testing Matrix Sheet as the basis for qualifying the design parameters for the candidate penetration seal design configuration.

The inspectors verified and evaluated the various design parameters identified and used by Brand for qualification using engineering analysis. However, the technical rationale explaining how to properly extrapolate test results was not fully documented for the maximum opening area and maximum free area parameters.

All parameters are limited by tested configurations; however, there is no limitation on the length and width parameters that produce an acceptable range of areas. This appeared to be a weakness in the maximum free area parameter assessment. Brand management agreed to review the issue and establish appropriate limitations as needed.

The inspector noted that another parameter, the total cross sectional area of the penetrants (number of penetrants x cross sectional area of penetrants), is not identified as a design parameter for qualification using engineering analysis. Brand management agreed with the inspector that the cross sectional area of the penetrants may in some instances affect the temperature of the penetrants on the unexposed side and thus the temperature of the seal material

on the unexposed side. Therefore, technical basis would be provided to show when this parameter does or does not have to be considered.

The inspector assessed the quality of completed engineering analyses by reviewing the following resultant Fire Barrier Seal Design Test Reports:

Test report 748-49 dated July 9, 1981. This report was recently used as a basis for qualifying three fire barrier penetration seal design configurations (Details 118, 129, and 149) for a power plant. The test report indicated that the limiting end point temperatures for the unexposed surface defined by ANI were met but the limiting end point temperatures defined by ASTM E-119 and IEEE 634-1978 were reached at 2 hours and 45 minutes into the fire test and slightly exceeded the limiting temperature at 3 hours for both the 8-inch and 9-inch diameter penetration. Further, the 9-inch penetration failed the hose stream test. This matter was discussed with the Brand Engineering Manager who stated that the information in the test report for the 9-inch penetration was not used for the qualification basis. The Brand Engineering Manager also provided a document (Specification C1027, Rev. 6) that indicated the subject plant was committed to ANI and IEEE 634 but not to ASTM E-119. The inspector verified that IEEE-634 does not contain the same temperature limit (250° F plus ambient) as ASTM E-119 for the unexposed surface; thus, the test results satisfied IEEE-634.

Test report 748-78 dated May 23, 1982. This report was used as a basis for qualifying one fire barrier penetration seal design configuration (Detail 109) for a power plant. A review of the test report indicated that the test passed the hose stream test specified by IEEE-634, but failed the hose stream test specified in ASTM E-119. This matter was discussed with the Brand Engineering Manager who provided a document (Specification C1027, Rev. 6) that indicated that power plant was committed to ANI and IEEE 634, but not to ASTM E-119.

In conclusion, the review of actual design configurations did not identify any design issues. However, the implementation of the engineering analyses to qualify tested fire barrier penetration seals on file, for installation into fire barrier penetrations of various configuration, partially relies on informal engineering judgment. This could be improved by formally documenting and controlling such aspects of the engineering analysis methods in a Brand engineering standard or procedure.

3.5 Exit Meeting

The exit meeting was conducted on November 9, 1995 by the NRC team leader prior to the team's departure from the Brand facility.

Mr. Gary L. Stouffer, President
Modumend, Inc.
2640-A Lavery Court
Newbury Park, CA 91320-1589

February 12, 1996

SUBJECT: NRC INSPECTION NO. 99901291/95-01

Dear Mr. Stouffer:

This letter transmits the report of the U.S. Nuclear Regulatory Commission (NRC) inspection of Modumend, Inc. at Newbury Park, California, conducted by Messrs. R.C. Wilson and B.H. Rogers of this office on December 5 through 7, 1995. The purpose of the inspection was to review activities conducted under your 10 CFR Part 50, Appendix B, quality assurance program and 10 CFR Part 21 reporting program. The inspection consisted of an examination of procedures and records, interviews with personnel, and observations by the inspectors.

The NRC inspectors found that the implementation of your quality assurance program failed to meet certain NRC requirements. Specifically, independent verification of final acceptance testing of repaired nuclear safety-related power supplies was not performed. Only one person performed the repair, testing, and inspection activities. The specific findings and reference to the pertinent requirements are identified in the enclosures to this letter.

Please provide us within 30 days from the date of this letter, a written statement in accordance with the instructions specified in the enclosed Notice of Nonconformance.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosures will be placed in the NRC's Public Document Room.

Sincerely,

ORIGINAL SIGNED BY GREGORY C. CWALINA FOR:

Michael R. Johnson, Acting Chief
Special Inspection Branch
Division of Inspection and Support Programs
Office of Nuclear Reactor Regulation

Docket No. 99901291

Enclosures: 1. Notice of Nonconformance
2. Inspection Report 99901291/95-01

NOTICE OF NONCONFORMANCE

Modumend, Incorporated
Newbury Park, California

Docket No.: 99901291

Based on the results of an inspection conducted on December 5 through 7, 1995, it appears that certain of your activities were not conducted in accordance with NRC requirements as described below.

Criterion V of Appendix B to 10 CFR Part 50, "Instructions, Procedures, and Drawings," requires, in part, that activities affecting quality shall be accomplished in accordance with written procedures.

Criterion X of Appendix B to 10 CFR Part 50, "Inspection", requires, in part, that activities affecting quality shall be verified by individuals other than those who performed the activities.

Section 5.7, "Final Inspection and Test," of the Modumend Quality Assurance Manual, Revision A, dated June 27, 1994, states that final inspection and test will be performed by a qualified individual other than the person performing the repair activity.

Contrary to the above, on nuclear safety-related purchase orders including Rochester Gas and Electric Corporation order number NQ-14588-C-JW dated April 18, 1995, covering repair of a Westinghouse power supply, ac/dc model RS15N21, Serial Number AC9005, for the Ginna nuclear power plant, the Modumend president stated that he, alone, performed all of the repair and testing work.

Please provide a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555, with a copy to the Chief, Special Inspection Branch, Division of Inspection and Support Programs, Office of Nuclear Reactor Regulation, within 30 days of the date of the letter transmitting this Notice of Nonconformance. This reply should be clearly marked as a "Reply to a Notice of Nonconformance" and should include for each nonconformance: (1) a description of steps that have been or will be taken to correct these items; (2) a description of steps that have been or will be taken to prevent recurrence; and (3) the dates your corrective actions and preventive measures were or will be completed.

Dated at Rockville, Maryland
this 12th day of February, 1996

Enclosure 1

U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
DIVISION OF INSPECTION AND SUPPORT PROGRAMS

REPORT NO.: 99901291/95-01

ORGANIZATION: Modumend, Inc.
2640-A Lavery Court
Newbury Park, California 91320-1589

ORGANIZATIONAL CONTACT: Stan Zabaglo, Vice President
805-499-6464

NUCLEAR INDUSTRY ACTIVITY: Repair of various instrumentation power supplies

INSPECTION DATES: December 5 through 7, 1995

INSPECTORS: Richard C. Wilson 2/12/96
Richard C. Wilson, Senior Engineer
Vendor Inspection Section
Special Inspection Branch
Division of Inspection and Support Programs
Office of Nuclear Reactor Regulation
Date

OTHER INSPECTORS: Billy H. Rogers, Reactor Engineer

REVIEWED BY: Gregory C. Cwalina 2/14/96
Gregory C. Cwalina, Section Chief
Vendor Inspection Section
Special Inspection Branch
Division of Inspection and Support Programs
Office of Nuclear Reactor Regulation
Date

APPROVED BY: for Gregory C. Cwalina 2/14/96
Michael R. Johnson, Acting Chief,
Special Inspection Branch
Division of Inspection and Support Programs
Office of Nuclear Reactor Regulation
Date

Enclosure 2

1 SCOPE OF INSPECTION:

Modumend, Inc. specializes in repairing and testing power supplies, often from computer and instrumentation systems where original design power supplies can no longer be procured as new components. Refurbishment activities, such as, preventive replacement of aging electrolytic capacitors are also performed. Modumend's business, which is rapidly growing, includes military, government, and commercial customers, as well as, commercial nuclear power plants. The number of employees has grown from seven to nine in the last few years. Modumend has also done business as Uptime Depot Repair, Inc.

The NRC inspectors reviewed the implementation of selected portions of Modumend's quality assurance (QA) program, and reviewed Modumend's 10 CFR Part 21 program. The inspection bases were 10 CFR Part 50, Appendix B, and 10 CFR Part 21.

1.1 Non-Cited Violation

Contrary to 10 CFR 21.21, which states that corporations subject to the regulations must adopt appropriate procedures to include specific reporting requirements, Modumend did not have a procedure in place, which included the requirements of 10 CFR 21.21 (non-cited violation; see Section 3.6 of this inspection report).

1.2 Nonconformance 99901291/95-01-01

Contrary to Criteria V and X of Appendix B to 10 CFR Part 50, which were imposed on Modumend by licensee purchase orders, Modumend did not perform independent verification of final acceptance testing of nuclear safety-related power supplies (see Section 3.3 of this inspection report).

2 STATUS OF PREVIOUS INSPECTION FINDINGS

There were no previous NRC inspections of Modumend.

3 INSPECTION FINDINGS AND OTHER COMMENTS

3.1 Entrance and Exit Meetings

In the entrance meeting on December 5, 1995, the NRC inspectors discussed the scope of the inspection, outlined the areas to be inspected, and established interfaces with Modumend management. In the exit meeting on December 7, 1995, the inspectors discussed their findings and concerns with Modumend management.

3.2 Quality Assurance Program and Organization

The inspectors selectively reviewed the Modumend Quality Control Manual (QAM), Revision A, dated June 27, 1994, and its implementation. The QAM stated that Modumend's quality assurance (QA) program was intended to meet the requirements of 10 CFR Part 50 Appendix B as it applied to the repair of power

supplies. Modumend management stated that they applied the QAM requirements and customer purchase order (PO) requirements to all work performed.

The Modumend QAM included an organization chart which identified the management functional responsibilities. Due to the small size of Modumend, the two company owners/officers performed several functions. The president also served as the chief engineer and the quality manager, and the vice president also served as the general manager. The inspectors discussed the division of responsibilities with the Modumend officers, reviewed documentation, and observed examples of work activities, and concluded that the organizational structure and its implementation were satisfactory, with the exception of the lack of independent verification of final acceptance testing discussed in Section 3.3 of this report.

Document control was specified by Modumend's QAM Section 3.9, "Documents," which stated that the document control program applied to the QAM, procurement documents, operating procedures, inspection and test procedures, and equipment calibration procedures. Controlled documents were reviewed and approved prior to issue, and distributed to employees with associated responsibilities; obsolete copies were removed from circulation or marked as inactive. The inspectors reviewed several documents and their revisions including the QAM and "Equipment Calibration Procedure," Revision A, dated June 27, 1994, and determined that they were appropriately marked with revision, date, author signature, and reviewer signature.

Modumend contracted with an outside calibration service to calibrate the equipment used to measure power supply performance during final acceptance testing. Modumend dedicated the calibration services for safety-related use based on annual audits of the supplier by the president/chief engineer. The inspectors reviewed the audit reports and purchase orders, and determined that the dedication of commercial grade calibration services was adequate.

Modumend QAM Section 5.0, "Procedure," established the requirements for identifying and controlling received power supplies. Section 5.1.5 required that a work order and unit tag be prepared for each received power supply. An equipment tag was attached to each item, or kept with it if attachment was not feasible. The tag identified the Modumend work order number, equipment status, due date, customer, customer purchase order number, location, quantity, part number, and serial number. The work order included all information listed on the equipment tag, and also listed the tasks to be performed such as assembly, repair, and test, the times and dates the tasks were accomplished, the technician performing the tasks, the parts replaced, and comments. Modumend assigned an in-house identifier to all power supplies received that did not have serial numbers (e.g, 1 of 6). The inspectors reviewed various work orders, and verified that the power supplies were tagged as required and stored in the designated locations.

Modumend performed no design activities. Work typically consisted of testing the as-received power supplies; replacing defective components and/or aged electrolytic capacitors with components equivalent in function and tolerance to the originally installed capacitors; burning in the repaired power supply; and performing final functional performance tests to verify that the

manufacturer's performance specifications were met. Replacement parts were purchased as commercial grade items. Modumend verified the quality of the replacement components as part of the burn in and testing of the repaired power supply. The type of repair and identification of replacement parts were documented on the Modumend Trouble and Failure Report supplied to the customer. The inspectors concluded that the Modumend activity most closely related to design--selecting replacement components--was adequately controlled.

Modumend maintained an inspection system to determine the performance of the received power supplies and the quality of the work performed during various points in the repair or refurbishment process. Incoming inspection by the technician performing the repair verified the as-received condition of the equipment and the existence of any customer-identified conditions. In-process inspections and tests were conducted informally by the technician as required to verify the work activities. Any non-conforming replacement parts identified during the in-process inspection and tests were replaced by the technician. A pre-test was performed on each power supply, prior to reassembly, to verify operability (formal in-process inspection and pre-tests were also performed if contractually required). To assist the technicians in the repairs, inspections, and tests, Modumend maintained a large library (several file cabinets) of technical information related to the power supplies which they repaired. The library included catalog information, technical manuals and bulletins, and schematics.

The inspectors observed the Modumend process for packing refurbished power supplies after completion of the final inspection and test. Modumend had recently installed a new system using quick setting foam formed in the carton to provide protection for the shipped power supplies. Double boxing with additional packaging material was also used. No concerns were noted.

3.3 Final Inspection and Testing

Modumend procedures covered final inspection and testing performed to verify operability of the power supply, under load, to the manufacturer's specifications and to any customer requirements. The results of the final inspection and test were documented on a Power Supply Data Sheet which included nominal voltages, currents, load regulation, line regulation, ripple, and noise. In addition, the Power Supply Data Sheet listed the power supply part and serial numbers, technician, date, and instruments used.

Modumend's president told the inspectors that he personally performed all repair and testing of nuclear safety-related power supplies. The inspectors noted that this practice was not in conformance with Section 5.7, "Final Inspection and Test," of the Modumend QAM, which specified that final inspection and test must be performed by a qualified individual other than the person performing the repair activity. It further conflicts with Criterion V of Appendix B, "Instructions, Procedures, and Drawings," which requires that activities affecting quality shall be accomplished in accordance with written procedures, and Criterion X, "Inspection", which requires that activities affecting quality shall be verified by individuals other than those who

performed the activities. Modumend's failure to perform independent verification of final acceptance testing constitutes Nonconformance No. 99901291/95-01-01.

Modumend's president, who also served as quality manager and chief engineer, had over 30 years experience in electrical engineering. He explained to the inspectors that he performed all of the nuclear safety-related work because his experience and expertise exceeded the capabilities of the technicians. He felt that the most important work should be performed by him personally. There was no evident intention to conceal this nonconformance. The inspectors noted that during a mandatory hold point on safety-related repair PO No. 565449 from Wolf Creek Nuclear Operating Corporation, a licensee auditor observed testing performed by the president and discussed it with him.

The inspectors discussed this concern with Modumend's management. The inspectors indicated that observation of the final acceptance testing by a qualified Modumend or licensee individual, or independent testing by a second individual, would appear to resolve the concern.

The inspectors observed a demonstration of final acceptance testing of a power supply for a non-nuclear customer, using calibrated test equipment, to confirm that this operation did adequately verify that the power supply met the manufacturer's performance specifications. The test procedure used was ATP110 dated June 15, 1995. The same procedure was used on June 23, 1995, for testing a Westinghouse Model 1686E16H10, ac/dc Model RS15N21, Serial No. AC9005, power supply under Rochester Gas & Electric Corporation PO No. NQ-14588-C-JW for the Ginna nuclear power plant. The demonstration power supply was a 12 amp Lambda supply, rather than the 21 amp unit; the testing was otherwise the same. The demonstration took about 15 minutes including brief questions and answers. The president commented that for multiple-output power supplies, testing could require as long as two hours. The inspectors had no concerns with the demonstration of final acceptance testing.

3.4 Review of Safety-Related Purchase Orders

Modumend maintained a separate file cabinet for all POs from NRC licensees. Modumend provided the inspectors with a list of the 18 licensees included. The inspectors scanned each file to divide the included POs into three groups: (1) those that invoked requirements such as Appendix B to 10 CFR Part 50 or 10 CFR Part 21 that appeared to make them nuclear safety-related; (2) those that were clearly not safety-related, such as those for fossil plants; and (3) commercial grade POs for nuclear plants covering work that may or may not have been intended for subsequent dedication for safety-related use. The first group is addressed in this section of the inspection report. The second group was not reviewed beyond the determination that the work had no nuclear safety connection. Most of the POs in the third group, including all that gave indication of possible subsequent dedication activity, were reviewed as reported in Section 3.5 of this inspection report.

The following licensees had listed Modumend as an approved Appendix B supplier and placed safety-related POs with Modumend:

- Alabama Power Company Farley Nuclear Plant, based on an October 1992 audit by Southern Nuclear Operating Company.
- Rochester Gas & Electric Corporation (RG&E) Ginna Station, based on a November 1993 audit of Modumend by RG&E.
- Virginia Power Surry Power Station, based on review of the RG&E audit report per June 1994 Virginia Power letter to Modumend.

In addition, the Wolf Creek Nuclear Operating Corporation placed two safety-related POs for the Wolf Creek Generating Station with mandatory hold points to permit evaluation of Modumend's activities.

Farley: The Southern Nuclear Operating Company, as agent for Alabama Power Company, performed a commercial grade survey of Modumend on November 30, 1992. The inspector's review of the survey report showed that no deficiencies were identified and no conditions were placed on procurement of services from Modumend. The report also stated that a commercial grade item checklist prepared by a licensee group was used, but the completed checklist was not available at Modumend. The Modumend files did not contain any basis for subsequent 1995 Alabama Power Company safety-related POs for the Farley Nuclear Plant (FNP), nor were they required to.

Alabama Power PO No. QP950244 dated February 16, 1995, covered repair of a high voltage power supply, FNP stock number 38258, serial number A211011. Although not reviewed in detail by the inspector, the PO invoked 10 CFR Part 21 and Appendix B to 10 CFR Part 50, and stated that the items were safety-related. The inspector did review Alabama Power PO No. QP950810 dated September 27, 1995, which was also safety-related and invoked Part 21 and Appendix B. It covered repair of two power supplies, Westinghouse part number 2374A07G01, FNP stock number 236, serial numbers 171 and 236, and substitution of new capacitors supplied by the licensee. The PO required Modumend to supply a repair report listing any parts or material repaired or replaced, and a certificate of conformance to the requirements of the PO. No submittals for review or approval, and no inspection hold points, were specified. The PO stated that Revision A of Modumend's QA Program dated June 27, 1994 (still current during the NRC inspection) had been reviewed and accepted by the purchaser, and required submittal of all subsequent revisions.

As was typical of all POs reviewed by the inspectors, Modumend provided the following documentation for each power supply: a Trouble and Failure Report, detailing part changes; a Certificate of Conformance, including a description of work performed; and a Test Data Sheet, showing acceptable and actual values for all properties tested and identifying the test equipment used (with the signature and QA stamp of Modumend's president). The file did not contain any evidence of licensee surveillances.

Ginna: RG&E listed Modumend as a safety-grade supplier based on an RG&E audit performed on November 2-4 1993, and an internal audit of Modumend on June 27-28, 1994. The NRC inspector reviewed the reports of these audits and related correspondence. The RG&E audit report identified one finding, that Modumend had not conducted internal audits. Modumend subsequently contracted

with the RG&E auditor to lead their internal audit, with the Modumend vice president as a team member. The internal audit produced no findings, and its performance closed the only finding from the RG&E audit.

Neither the RG&E audit nor the internal audit identified the Nonconformance identified in Section 3.3 of this inspection report. With regard to that concern, the RG&E audit report stated on page 4 that if the Modumend president "... performs the actual testing, he delegates the quality function of data review to one of the two technicians." A filled out industry group audit checklist that supported the audit report stated on page 31 that "If the president performs the test, a technician reviews the data for completeness and accuracy." The internal audit report, on page 7, stated that "After a unit is repaired, either the other technician, or Quality Manager perform [sic] the final test on the power supply."

The inspectors observed that page 31 of the checklist also stated that Modumend had not yet accepted any safety-related POs. Nevertheless, no provision was identified for surveillance of safety-related work, and the Modumend files for subsequent safety-related POs from RG&E showed no evidence of licensee surveillance.

RG&E PO No. NQ-14588-C-JW dated April 18, 1995, covered repair of a Westinghouse power supply, Model 1686E16H10, ac/dc Model RS15N21, Serial No. AC9005, for the Ginna Station. The PO invoked 10 CFR Part 21 and Appendix B to 10 CFR Part 50. Four points identified during the 1993 RG&E audit of Modumend were also specified, relating to identification of replacement parts, use of a documented test procedure, and QA approval of test data sheets containing acceptance criteria. Additional requirements covered an appropriate certificate of conformance, submittal of documentation, and packaging. The PO did not, however, require submittal of the test procedure to RG&E. The documentation submitted by Modumend appeared to satisfy the PO requirements.

Surry: Virginia Power's letter to Modumend (known at that time as Uptime Depot Repair, Inc.) dated June 20, 1994, stated that they were approved to repair power supplies for the utility's nuclear power plants based on review of the RG&E audit. The letter also expressed appreciation for Modumend's cooperation with members of a licensee group. A Virginia Power letter dated September 29, 1994, documented review and approval of four Modumend test procedures.

Virginia Power PO No. BNT 504467 dated July 7, 1995, was a blanket order for the Surry Power Station patterned after PO No. BNT 473149 dated August 3, 1994. The inspector reviewed the files for the blanket order, which stated that the materials and services are nuclear safety related, and invoked 10 CFR Part 21 and Appendix B to 10 CFR Part 50. The PO required notification and detailed information to permit evaluation of all substitute parts, and defined unit prices for repair of several named power supply types. The Modumend Failure Analysis Report, Test Data Sheet, and Certificate of Conformance were required. The blanket order provided for oral authorization of work under the blanket order, with no written confirmation. The inspector reviewed documents dated October 28-30, 1995, for repair of an ac/dc power

supply, part number RT 151, serial number AD 0201, tracked by Modumend Return Authorization No. 2272-02. This power supply type is not one of the examples listed in the blanket order, but the September 1994 letter listed the test procedure (RT151-118) as reviewed and approved.

Wolf Creek: Wolf Creek placed two safety-related POs with mandatory hold points intended to provide the opportunity for QA surveillance of Modumend's safety-related activities. The inspector concentrated on the PO under which the first work was performed: PO No. 565449 dated August 22, 1995, covering repair of one compensating voltage power supply, Westinghouse part number 6051D35G01, serial number 0192. The PO invoked 10 CFR Part 21, Modumend's QA Manual, and Wolf Creek Quality Program Requirements No. NPRDS-MC80, Revision 0; Appendix B to 10 CFR Part 50 was not specifically called out, but the PO was labeled safety-related. The PO required a Repair Report and a Certificate of Conformance, and specified that the test procedure should be submitted and approved prior to starting work.

A Wolf Creek representative performed a surveillance on October 3-4, 1995, for the initial testing, repair, and final acceptance testing of the power supply on PO 565449. The repaired supply did not meet the manufacturer's specifications. The Modumend president told the NRC inspector that he had advised the Wolf Creek representative to contact Westinghouse regarding the applicability of the performance specifications they had provided to Wolf Creek; he stated that the specifications covered a tightly regulated supply and were inappropriate for the supply being repaired. In late October, Modumend repeated the acceptance testing using newly received specifications, and the unit passed.

The Wolf Creek surveillance report identified a noncompliance concerning Modumend's lack of an Appendix B program to dedicate the commercial grade parts used for repairing power supplies, and suggested that Modumend consider providing their repair services as commercial grade rather than safety-grade. In view of Modumend's stated intention to resolve the Nonconformance identified in Section 3.3 of this inspection report, the NRC inspectors advised Modumend that they believed that the parts need not be individually dedicated. Within the framework of Modumend's QA program and work scope, the inspectors considered that independently performed or verified final acceptance testing would be sufficient to assure the quality of the repaired power supplies.

Conclusion: Based on review of the Alabama Power, RG&E, and Virginia Power files for safety-related work at Modumend, the NRC inspectors concluded that these licensees did not observe performance of any safety-related work at Modumend. Thus they failed to identify that no independent verification of activities affecting safety was performed, as described in the Nonconformance in Section 3.3 of this inspection report. Wolf Creek appeared to be proceeding cautiously, and was close to establishing Modumend as an approved supplier. Except for the NRC-identified Nonconformance, the inspectors found no other evidence that Modumend failed to meet the requirements of POs from these licensees.

3.5 Review of Commercial Grade Purchase Orders

The inspectors selected and reviewed several commercial grade purchase orders from NRC licensees for the repair or refurbishment of power supplies. Some commercial grade POs stated that the power supplies were to be dedicated for safety-related application by the licensee, while others did not state an intended use; the latter POs generally contained fewer requirements for documentation, inspection hold points, and the like. None of these POs invoked 10 CFR Part 21 or Appendix B to 10 CFR Part 50.

Calvert Cliffs: Baltimore Gas and Electric Company (BG&E) commercial grade PO No. L01522NP, dated April 23, 1993, covered the repair of three Lambda LMEE-48 power supplies and specified the completion of a BG&E Vendor Report form for each power supply. Modumend completed the repairs on April 30, 1993, and identified on the Vendor Reports the repairs that had been accomplished--replacement of a drive transistor and the associated power resistor and all electrolytic capacitors. This was an example of a commercial grade PO where the inspectors found no evidence of special requirements intended to support any subsequent dedication efforts.

Crystal River: Florida Power Corporation (FPC) Crystal River Unit 3, commercial grade PO No. R873830K, dated March 7, 1995, covered the repair of one Lambda LXS-E-15R power supply. The PO required Modumend to perform the work in accordance with the June 27, 1994, revision of the QAM, prepare a test procedure and submit it to FPC prior to performance of the test, and to provide a supplier's deviation report to document the basis for equivalency of replacement parts. Modumend completed the repair on May 26, 1995, and provided FPC a Trouble and Failure Report/Certificate of Compliance which documented that Modumend had replaced all electrolytic capacitors (listing the original as-found parts and the final installed parts), a Test Data sheet which documented the Final Test performance of the power supply, and a Supplier Deviation Request which adequately justified all parts replacements. The PO also required use of a customer-approved test procedure, and listed several performance characteristics to be tested. The inspectors concluded that the information required and provided could support a dedication effort by the licensee or a third party, if sufficient additional activities were performed.

Hope Creek: Public Service Electric & Gas (PSE&G) commercial grade PO No. P1-429109, dated June 10, 1993, covered the repair of five Lambda LGS-G-24 OV-R-8018 power supplies. The PO required that Modumend provide PSE&G with the repair records. It defined mandatory hold points at final inspection, final documentation review prior to shipment, and electrical test, for commercial grade verifications in accordance with EPRI NP-5652 method 3 (indicating intended dedication by PSE&G). In addition, the PO indicated that PSE&G would verify critical characteristics including part number, dimensions, weight, output voltage, ripple, and noise. Modumend completed the repairs on June 24, 1993, and provided PSE&G a Trouble and Failure Report/Certificate of Compliance which documented that Modumend had replaced defective capacitors. Again the inspectors concluded that subsequent dedication could be performed with sufficient supporting activities.

Comanche Peak: Texas Utilities Electric (TUE) performed a commercial grade survey of Modumend on August 2-3, 1993, for the Comanche Peak Steam Electric Station. The NRC inspectors reviewed the survey report and correspondence related to it. Four deficiencies were identified and resolved. TUE concluded that Modumend's QA program adequately controlled the critical characteristics identified by TUE for purposes of dedication by TUE for safety-related applications at CPSES, subject to certain PO requirements summarized below.

TUE commercial grade PO No. S 0144232 6S4, dated December 8, 1994, covered the repair of one Westinghouse UPM-44KW power supply. The PO specified the required testing parameters including input and output voltages, ripple, and overvoltage protection setting, and required submittal for approval of a test procedure specifying acceptance limits. The PO also required that Modumend perform the work under the most recent revision of the Modumend QAM and provide any subsequent revisions to TUE, provided requirements on the selection of replacement components, and specified the Modumend Final Test and Inspection procedure to be used. Modumend completed the repair on February 21, 1995, and provided TUE a Trouble and Failure Report/Certificate of Compliance covering replacement of all electrolytic capacitors and testing of the power supply in accordance with the specified test procedure. In addition, Modumend provided TUE a list of replaced parts and the applicable test data sheet. Again the inspectors concluded that subsequent dedication could be performed with sufficient supporting activities.

Conclusion: The inspectors concluded that Modumend had met the requirements of the reviewed commercial grade POs, including requirements intended to support dedication activities by the licensee or a third party, with one exception. The Nonconformance described in Section 3.3 of this inspection report would prevent taking credit for Modumend's activities in subsequent dedication activities unless the licensee performed direct surveillance of appropriate activities.

3.6 10 CFR Part 21 Program

10 CFR Part 21 requires entities subject to the regulation to post copies of Section 206 of the Energy Reorganization Act, 10 CFR Part 21, and procedures adopted pursuant to 10 CFR Part 21 (or specify where the procedures can be found). The inspectors determined that, instead of a procedure, Modumend had posted an internal memorandum, "Nuclear Regulatory Commission 10 CFR Part 21 Requirements," dated November 3, 1993. The memorandum discussed Modumend employee responsibilities to identify potential unsafe conditions to management; it further stated that Modumend management was responsible for notifying the NRC or the customer, and that a Modumend employee could contact the NRC if the employee believed that the requirements of 10 CFR Part 21 were not being implemented. Modumend personnel stated that the internal memorandum was the Modumend document used to address and disseminate the information and requirements of 10 CFR Part 21. However, the inspectors noted that the memorandum did not satisfy 10 CFR 21.21, which requires that corporations subject to the regulation adopt appropriate procedures to evaluate and report deviations and failures to comply within prescribed time limits.

Discussion with the Modumend president, who also served as quality manager, confirmed that Modumend did not have a procedure for the items required to be proceduralized by 10 CFR Part 21. Further discussion showed that, although no 10 CFR Part 21 implementing procedure was in place, the president and vice president were familiar with the regulations and their responsibilities. The inspectors also discussed potential deviations related to Modumend's work scope and determined that no deviation requiring an evaluation had ever been identified by Modumend. Thus, Modumend had not failed to follow any of the 10 CFR 21.21 requirements required to be proceduralized.

During the course of the inspection, Modumend prepared and issued Operating Procedure OP100, "Operating Procedure for Notification and Evaluation 10 CFR Part 21," dated December 6, 1995. OP100 contained the items required to be covered by procedure in 10 CFR 21.21 and, in addition, included definitions and specific actions for Modumend employees to follow regarding the requirements of 10 CFR Part 21. The failure to proceduralize the requirements specified in 10 CFR 21.21 is a violation of minor significance and is being treated as a non-cited violation.

4 PERSONNEL CONTACTED

+	*	G.L. Stouffer, President
+	*	S. Zabaglo, Vice President
		S. Weizer, Sales/Customer Service

+ Attended the entrance meeting on December 5, 1995

* Attended the exit meeting on December 7, 1995

UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

March 1, 1996

Dr. Robert C. Mecredy
Vice President - Nuclear Operations
Rochester Gas & Electric Corporation
89 East Avenue
Rochester, NY 14649

Dear Dr. Mecredy:

SUBJECT: INSPECTION OF ROCHESTER GAS AND ELECTRIC'S MONITORING OF ITS
VENDORS' QUALITY CONTROL FOR SAFETY-RELATED PRODUCTS FOR THE GINNA
NUCLEAR POWER PLANT (50-244/96-201)

We are forwarding the report of the subject inspection performed January 22-26, 1996, involving activities authorized by Operating License Nos. DPR-18 for the Ginna Nuclear Power Plant. The Nuclear Regulatory Commission (NRC) staff from the Special Inspection Branch of the Office of Nuclear Reactor Regulation conducted the inspection. An exit meeting was held on January 26, 1996, during which we discussed our findings with Mr. Richard Watts and other members of your staff.

The inspection was performed to assess the adequacy and effectiveness of your vendor oversight program for monitoring the quality control by vendors supplying safety-related products to Ginna, consistent with the importance, complexity, and quantity of the purchased products or services. The two inspectors focused on the adequacy of your qualification and monitoring of nine selected vendors supplying safety-related products to Ginna.

We assessed the attributes and implementation of your vendor oversight program against: 1) the criteria of 10 CFR Part 50, Appendix B, Criterion VII, "Control of Purchased Material, Equipment, and Services," and 2) Regulatory Guide 1.144, "Auditing of Quality Assurance Programs for Nuclear Power Plants." Details of the inspection are discussed in the enclosed copy of our inspection report.

In general, an effective vendor oversight program was implemented. Program attributes included appropriate QA organization, monitoring of vendors, maintenance of a qualified suppliers list, and qualification and training of QA staff. The basis for qualification of selected vendors appeared to be adequate and appropriately documented.

One concern was identified regarding your assessment of the vendor Modumend Incorporated (Modumend). In November 1993, your procurement QA team leader found that Modumend had not done an internal audit required by Appendix B, Criterion XVIII. During that time, QA management encouraged their staff to generate revenue for RG&E. In June 1994, with his immediate manager's approval, the QA team leader did the internal audit for the vendor for a fee, independently of RG&E. As a result, RG&E's QA team leader performed

Modumend's quality function, instead of assessing Modumend's performance of the function. It is our understanding that, in the future, current management will avoid any perception of a conflict of interest with a vendor, will not suggest to their engineers to perform such an audit, and have instructed QA engineers not to perform work for a company that QA was responsible to assess, either as independent consultants or as RG&E employees.

In accordance with Section 2.790 of Title 10 of the Code of Federal Regulations (10 CFR 2.790), a copy of this letter and its enclosures will be placed in the NRC Public Document Room.

No response is required to this letter. If you have any questions concerning this inspection, we will be pleased to discuss them with you.

Sincerely,

A handwritten signature in dark ink, appearing to read "Michael R. Johnson", with a stylized flourish at the end.

Michael R. Johnson, Acting Chief
Special Inspection Branch
Division of Inspection and Support Programs
Office of Nuclear Reactor Regulation

Docket No.: 50-244

Enclosure: Inspection Report 50-244/96-201

U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
DIVISION OF TECHNICAL SUPPORT

REPORT NO.: 50-244/96-201

ORGANIZATION: Rochester Gas & Electric Corporation (RG&E)
89 East Avenue
Rochester, NY 14649

ORGANIZATIONAL CONTACT: Dr. Robert C. Mecredy
Vice President - Nuclear Operations

INSPECTION DATES: January 22 through 26, 1996

LEAD INSPECTOR:

2/27/96

Anil S. Gautam
Vendor Inspection Section
Special Inspection Branch
Division of Inspection and Support Programs
Office of Nuclear Reactor Regulation (NRR)

Date

OTHER INSPECTORS:

Joseph J. Petrosino, NRR

REVIEWED BY:

2/29/96

Gregory C. Cwalina, Section Chief
Vendor Inspection Section
Special Inspection Branch
Division of Inspection and Support Programs
Office of Nuclear Reactor Regulation

Date

APPROVED BY:

3/1/96

Michael R. Johnson, Acting Chief
Special Inspection Branch
Division of Inspection and Support Programs
Office of Nuclear Reactor Regulation

Date

Enclosure

1.0 INTRODUCTION

A vendor oversight program is a licensee's process for monitoring the vendors' quality control, consistent with the importance, complexity, and quantity of the purchased products or services. Evaluation of the process falls, in part, under 10 CFR Part 50, Appendix B, Criterion VII, "Control of Purchased Material, Equipment, and Services," which requires licensees to establish specific measures to assure that purchased material equipment and services conform to the procurement documents; and under Regulatory Guide 1.144, "Auditing of Quality Assurance Programs for Nuclear Power Plants," which sets forth NRC requirements for auditing quality assurance programs.

A special inspection to assess the adequacy and effectiveness of RG&E's vendor oversight program for monitoring the vendors' quality control for safety-related equipment was conducted by staff from the Special Inspection Branch of the Office of Nuclear Reactor Regulation, from January 22 through 26, 1996.

Details of the licensee's vendor oversight program are provided in Section 2.0. The personnel attending the entrance and exit meetings are listed in Appendix A.

2.0 MONITORING OF VENDORS

In general, RG&E had implemented an effective vendor oversight program to monitor vendor's quality control for safety-related products. The inspection focused on assessing RG&E's monitoring of nine vendors supplying safety-related products to Ginna.

Vendor oversight program attributes examined included QA organization for monitoring vendors; qualification, audits and surveillance (hereafter referred to as audits) of Appendix B vendors; evaluation of audit findings and feedback of corrective actions to appropriate staff; maintenance of a qualified suppliers list; and qualification and training of appropriate staff. QA documents and procedures were reviewed in the following areas: control of purchased material, equipment and services; quality review of procurement documents; evaluation and control of vendor performance; reporting and followup of audits results; tracking of abnormal conditions during procurement; and qualification and certification of personnel performing audits.

2.1 Vendor Oversight Program

In general, an effective vendor oversight program was implemented. The inspectors assessed the attributes and implementation of the vendor oversight program run by a QA manager and 10 procurement QA representatives. The manager reported to the department manager of Nuclear Assessment, who reported to the Vice President of Nuclear Operations. The QA manager had the authority to conduct appropriate vendor audits.

QA evaluated vendors in accordance with RG&E procedures, industry information and audits pertinent to the vendor. Vendors' use of outside organizations was typically identified in the vendor's proposal or bid and assessed by RG&E as

part of the vendors' control of procurement activities. RG&E's quality control (QC) procedures provided guidance on detecting fraudulent material during receipt inspection and testing.

RG&E Nuclear Assurance issued purchase orders (POs) to vendors from the Ginna site. The Quality Procurement Coordinator performed the quality function for safety related POs. Procurement documents included, as applicable, the scope of work or material description, technical and quality requirements, QA program requirements, right of access to vendor and sub-tier vendor facilities, and requirements for documenting, reporting, and dispositioning nonconforming conditions and 10 CFR Part 21 deviations. The licensee stated that QA engineers typically did not review POs but received and reviewed copies of those POs which imposed source audits on the vendor (e.g., if a restriction was placed on a vendor).

QA staff ensured that qualification and annual, triennial, and other interim audits, were performed by RG&E or outside organizations to monitor vendors supplying Appendix B products and services. QA audits were performed in accordance with written procedures and checklists. Audits included monitoring, witnessing and observing activities, such as inspections, examinations, and performance tests.

The licensee stated that procedure A-1404, Section 3.5.1 addressed distribution of industry events reports on an information-only basis by the Operating Experience department (Nuclear Operations) to affected departments. NUREG-0040, "Licensee Contractor and Vendor Inspection Status Report," was routed through the procurement QA group. The inspectors questioned why NRC Information Notice 88-81, "Failure of Amp Window Indent Kynar Splices and Thomas and Betts Nylon Wire Caps during Environmental Qualification Testing," was not reviewed by QA procurement engineers when qualifying Amp (Appendix B vendor). The licensee stated that the notice was reviewed by its electrical engineering staff in 1988 but not forwarded to QA because no changes to the design basis for 10 CFR 50.49 environmentally qualified electrical equipment were applicable. The licensee determined that NRC information notices and bulletins pertinent to QA evaluations of vendors were currently received by procurement QA engineers and agreed to review this area to determine if enhancements were needed.

QA tracked defects in materials identified at the vendor facility through the vendor's corrective action process. For significant programmatic deficiencies, restrictions were imposed on the vendor or stop-work orders issued. Restrictions on a vendor were noted by QA on the qualified suppliers list and updated every month or as changes occurred. Nonconformances for which the vendor had recommended a disposition of "use-as-is" or "repair" at the vendor's facility were normally reviewed and dispositioned by the RG&E procuring organization. The inspectors had no concerns in this area.

2.2 Evaluation of Appendix B Vendors

The inspectors assessed RG&E's qualification and monitoring of nine vendors supplying safety-related products to Ginna. The vendors included Modumend (refurbished power supplies), Amp Products Inc. (terminals and splices),

Fisher Service Company (valve parts), Amerace Electronic Components (Agastat relays), Reliance (electric motors), Rosemount Nuclear Instruments (pressure and temperature devices), Babcock & Wilcox Canada (steam generators), Automatic Switch Company (solenoid operated valves), and Limitorque Corporation (valve operators). The vendors were selected based on the safety significance of their products and the history of product deficiencies or failures. Histories were obtained from electrical and instrumentation corrective maintenance work orders, reports of nuclear assessment activities regarding component failures, vendor restrictions noted in the QSL, licensee action reports of abnormal conditions and events, nuclear plant reliability data system equipment failure reports, 10 CFR Part 21 reports, licensee event reports, and NRC inspection reports and information notices.

The NRC inspectors reviewed documentation on the qualification and evaluation of the nine selected vendors, including RG&E's performance-based annual and triennial quality audits of vendors; RG&E's followup of audit findings and corrective actions; and its feedback of appropriate findings and corrective actions to management and procurement staff. Documents indicated that qualification, annual audits, triennial audits were performed on time; audit findings were evaluated; and feedback provided to appropriate staff, including Nuclear Assurance (site), QC, purchasing, procurement, and engineering document control. RG&E's qualification and performance evaluation of Appendix B vendors considered the vendor's design and manufacturing capabilities; the QA program and its capability to provide the required items or services; audits of the vendor's QA program status and performance history; and maintenance of vendor data on the qualified suppliers list (QSL).

Initial qualification and annual and triennial audits for qualifying and monitoring the nine selected Appendix B vendors were primarily conducted by outside organizations, including the Nuclear Procurement Issues Committee (NUPIC) and utilities. The NUPIC sent questionnaires to pertinent licensees to determine areas the licensees preferred inspected, and communicated its audit results to the licensees. The annual vendor evaluation required vendors to identify any changes to products, services, facilities, personnel or quality involvement which could impact qualifications. POs required vendors to identify and disposition all nonconforming conditions in accordance with the vendor's quality requirements. Nonconformances to the technical and quality requirements of the POs dispositioned as "use as is" or "repair" were required to be submitted to the licensee. QA expected vendors to identify any problems; however, audit evaluation checklists did not require procurement QA engineers to actually question a vendor whether any deficiency or nonconformance had been identified pertinent to products in process at vendor facilities. The licensee agreed to review this area to determine if enhancements were needed.

Use of outside organizations for auditing vendors was based on 10 CFR Part 50, Appendix B, and Regulatory Guide 1.144, which allow use of outside organizations to reduce the number of external audits as an alternative method for qualifying and monitoring vendors as long as all pertinent information is adequately evaluated. For example, the initial and ongoing qualification and performance evaluation of Amp Products, Inc. (Amp), were completely based on audits performed by NUPIC and other organizations, and evaluated by RG&E's QA.

Amp supplied electrical terminals and splices for safety-related applications at the Ginna station and was qualified by QA in 1985 to 10 CFR 50 Appendix B requirements. The last QA annual review was performed on August 10, 1993, and the last performance audit was performed by NUPIC on June 9, 1995. QA's annual review had noted that Amp had made a revision to its QA manual but not provided it to RG&E. QA requested the vendor to provide the manual for review. Pertinent audit results were provided to appropriate staff. The licensee provided evidence that its electrical engineering staff had evaluated Amp splice failures and that no restrictions were placed on the vendor because RG&E decided to install Raychem splices on the Amp nylon splices installed in harsh environments (RG&E EEQ-1 Form Package 39). All purchase orders to Amp were completed and closed.

The basis for qualification of the selected vendors, including those performed by outside organizations, appeared to be adequate and appropriately documented. However, one concern was identified regarding RG&E's assessment of the vendor Modumend. Modumend was audited on November 2, 1993, by RG&E procurement QA to determine if the vendor could be placed on the RG&E QSL. The procurement QA team leader identified one finding, that the vendor had not conducted internal audits (required by Appendix B Criterion XVIII). During this time (1993-1994), the Quality Performance Department Manager (currently reassigned) and QA Manager (retired) encouraged their staff to generate revenue for RG&E. With the QA manager's approval, the QA team leader approached Modumend and suggested RG&E be hired as an independent contractor to perform the internal audit that RG&E had earlier found not to have been done. The vendor agreed but RG&E later decided not to perform the audit. However, with his immediate manager's approval, in June 1994, the QA team leader did the internal audit for the vendor for a fee, independently of RG&E. The QA team leader (with the Modumend vice president as a team member) closed the RG&E's earlier finding and identified no new findings. As a result, RG&E's QA team leader performed Modumend's quality function, instead of assessing Modumend's performance of the function.

The inspectors noted that RG&E's policy statement, "Principles of Business Conduct," dated September 1992, issued by the Chairman, President and Chief Executive Officer of RG&E, stated that without the specific written approval of the Chairman of the Board, no employee should serve as a director, officer, consultant or employee of any business organization which was a competitor or supplier of RG&E where there was the risk or appearance that preferential treatment may be given or received. Encouraging QA engineers to raise revenues from and serve as a consultant of Modumend appears to be in conflict with this policy.

The licensee stated that current management would avoid any perception of a conflict of interest with a vendor and would not suggest to their engineers to perform such an audit. During the NRC inspection, the licensee instructed QA engineers not to perform work for a company that QA was responsible to assess, either as independent consultants or as RG&E employees. The inspectors had no further concerns in this area.

2.3 Qualified Suppliers List

QA maintained the QSL on an electronic database and was responsible for making changes to existing vendor information. The QSL included vendor contact information, details of vendor capability, dates of vendor qualification, and any vendor restrictions (e.g., RG&E quality checks to be performed during manufacture and/or prior to shipment). The inspectors determined that pertinent information for the nine selected vendors was maintained on the QSL.

QA used a password to restrict access to the QSL database and protect it from inappropriate changes or deletions (e.g., removal of vendor restrictions). The accounts payable staff could only access the data base to enter information about new vendors. Other RG&E groups had "read only" access. The inspectors had no concerns in this area.

2.4 Training and Self-Assessment

Qualification records indicated that individuals assigned to perform procurement activities were properly trained and qualified. Qualification records documented the knowledge and training of procurement QA engineers, including their performance of quality activities (e.g., assisting in audits) before their qualification as auditors or lead auditors. Records indicated satisfactory completion of an oral examination on the QA program and procedures, NRC regulations, regulatory guides, NUPIC and Electric Power Research Institute (EPRI) guidelines, and industry standards; attendance of appropriate training classes; and completion of required reading on qualifying and auditing vendors. The procurement QA engineers were certified as audit team leaders to American National Standard Institute (ANSI) N45.2.23, and as quality system Lead Assessors to the American Registration Assessment Board of the International Organization for Standardization (ISO) 9000. The inspectors had no concerns in this area.

The last independent assessment of RG&E's QA program, including its vendor oversight program, was performed on December 22, 1994. An October 16, 1995, internal assessment was performed by a technical specialist from EPRI and other RG&E team members. The internal assessment team concluded that RG&E's overall procurement engineering program was technically sound and significantly better than at most nuclear facilities reviewed. However, the assessment noted road blocks in two-way communication between procurement engineering and QA procurement. The assessment recommended refresher training for staff and managers. The licensee stated that actions in response to a self-assessment of the procurement process were planned with a completion date of July 1996, and that QA would assess if any remedial training was necessary to correct the lack of communication identified by the independent audit. The inspectors had no concerns in this area.

3.0 EXIT INTERVIEW

The inspectors conducted an exit meeting on January 26, 1996 at the RG&E corporate office in Rochester, New York, to discuss the major areas reviewed during the inspection. Licensee representatives who attended this meeting are identified with an asterisk in Appendix B of this report. The licensee did not identify any documents or processes as proprietary.

APPENDIX A

Persons Contacted at Entrance and Exit Meetings

Rochester Gas & Electric

*	Richard J. Watts	Manager Nuclear Assessment
*	Michael P. Lilley	Manager Quality Assurance
*	Mark Shaw	Manager Materials and Procurement
*	George Wrobel	Manager NS&L
*	Raymond M. Bozarth	SA Team Leader
*	Paul Hutner	QA Engineer
*	Gregory R. Amsden	QA Engineer
*	Al Pitts	QA Engineer
*	Jon Bergstrom	QA Engineer
*	Michelle L. Preik	QA Engineer
*	Terry Kirkpatrick	Quality Procurement Coordinator

Nuclear Regulatory Commission

*	Anil S. Gautam	Team Leader, NRR
*	Joseph J. Petrosino	Reactor Inspector, NRR
*	Peter D. Drysdale	Senior Resident Inspector, Ginna

* Denotes those attending the exit interview on January 26, 1996, at the conclusion of the inspection

Selected Generic Correspondence on the Adequacy of
Vendor Audits and the Quality of Vendor Products

<u>Identifier</u>	<u>Title</u>
Information Notice 96-02	Inoperability of Power Operated Relief Valves Masked by Downstream Indication During Testing
Information Notice 96-06	Design and Testing Deficiencies of Tornado Damper at Nuclear Power Plants
Information Notice 96-07	Slow Five Percent Scram Insertion Times Caused by Viton Diaphragms in Scram Solenoid Pilot Valves

BIBLIOGRAPHIC DATA SHEET

(See instructions on the reverse)

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Status Report
Quarterly Report
January-March 1996

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May	1996

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Division of Inspection and Support Programs
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

9. SPONSORING ORGANIZATION - NAME AND ADDRESS (If NRC, type "Same as above"; if contractor, provide NRC Division, Office or Region, U.S. Nuclear Regulatory Commission, and mailing address.)

Same as above.

10. SUPPLEMENTARY NOTES

11. ABSTRACT (200 words or less)

This periodical covers the results of inspections performed by the NRC's Special Inspection Branch, Vendor Inspection Section, that have been distributed to the inspected organizations during the period from January through March 1996.

12. KEY WORDS/DESCRIPTORS (List words or phrases that will assist researchers in locating the report.)

Vendor Inspection

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