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.
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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

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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 Nnonconformance 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 $\leq$ 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 that 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 the 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 reviewed 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 Elsawy, Shop Supervisor

\+ Attended the entrance and preliminary exit meetings
* Attended entrance, preliminary and final exit meetings