



October 11, 1996

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D. C. 20555

Subject: **Reply to a Notice of Nonconformance** - NRC INSPECTION NO.
99901292/96-01

Reference: Letter dated March 21, 1996 from Gregory C. Cwalina to Ahmad E. Amer

Gentlemen:

In response to the above referenced letter, Amer Industrial Technologies, Inc. is submitting herewith its response to the subject *Notice of Nonconformance*.

Regrettably, some of the records which would have aided the NRC's Inspection were unavailable in Amer Industrial Technologies' offices at the time of the Inspection because they had been submitted to the customer at the time of hardware shipment, as a part of the Lifetime Records which are retained by the Owner. AIT has since obtained copies of these records from the Owners, and is now keeping them on file.

During the recent (September 1996) ASME investigation of AIT's prior Code work, these records were reviewed in detail. All items from the NRC Inspection Report, together with AIT's planned responses, were reviewed by the ASME Survey Team.

Please feel free to contact me directly if you have any questions or comments.

Sincerely,

Amer Industrial Technologies, Inc.

Ahmad E. Amer
Chairman

Enclosure: Reply to a Notice of Nonconformance - NRC INSPECTION NO. 99901292/96-01

cc: Chief, Special Inspection Branch
Division of Inspection and Support Programs
Office of Nuclear Reactor Regulation

9610220104 961011
PDR GA999 EEC*****
99901292 PDR

11
1009

Reply to a Notice of Nonconformance

October 11, 1996

Amer Industrial Technologies, Inc.
1000 South Madison Street
Wilmington, Delaware 19801
(302) 652-3900
Fax: (302) 652-6400

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

The NRC's *Notice of Nonconformance*, dated March 21, 1996, states that: "Based on the results of an NRC inspection conducted on January 29 through February 2, 1996, it appears that certain of Amer Industrial Technologies' activities were not conducted in accordance with NRC requirements." This *Reply to a Notice of Nonconformance* presents AIT's response to each item cited in the NRC's *Notice of Nonconformance*.

For clarity of presentation, each item listed in the NRC *Notice of Nonconformance* is presented in its entirety, followed by Amer Industrial Technologies' explanation ("AIT Reply") of (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 AIT's corrective action will be completed. Where more than one item is cited within a particular area of nonconformance, each statement in the *AIT Reply* is numbered alphanumerically to correspond with the appropriate item cited in the NRC's *Notice of Nonconformance*; i.e., *AIT Reply* item "A-1" responds to the NRC's *Notice of Nonconformance* item A-1, A-2 responds to A-2, B-1 responds to B-1, etc.

Each nonconformance is thus listed below, followed by AIT's reply:

NRC Notice of Nonconformance Item A (99901292/96-01-02): 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.

...Reply to a Notice of Nonconformance

Amer Industrial Technologies, Inc.

NRC Docket No. 99901292

October 11, 1996

Page 2 of 25

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)

AIT Reply:

1. Reason for the nonconformance or, if contested, the basis for disputing the nonconformance:

A-1. The Design Report for AIT Job 392, dated November 1993, was approved as "Status 1 - Work May Proceed" by Bechtel Power Corporation on December 21, 1993. Documentation of this approval was not available in AIT's files at the time of the NRC Inspection, because it was included in the Lifetime Records which had been delivered to the customer for retention in the Owner's permanent files. A copy of this approval has since been obtained from the Owner, and is now included in the Job 392 project records on file in AIT's offices.

The Design Report was revised in April 1994 (Revision 1) to reflect the latest revisions of the construction drawings. Revision 1 was reviewed and approved by AIT on May 3, 1994.

A-2. Following the issuance of AIT Nonconformance Report (NCR) 392-1, AIT reviewed its design records, and confirmed that the subject plate flange had been designed in accordance with the rules of ASME Code, Section III, Appendix XI. As a result of the NRC Inspection, AIT confirmed this design by developing calculations and a separate design report, which has now been submitted to the customer.

2. Corrective steps that have been taken and the results achieved: AIT's project files have been better organized to allow for faster retrieval of information.
3. Corrective steps that will be taken to avoid further noncompliances: Continue improved file record management practices.
4. Date when AIT's corrective action will be completed: Ongoing.

NRC Notice of Nonconformance Item B (99901292/96-01-03): 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."

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)

AIT Reply:

1. Reason for the nonconformance or, if contested, the basis for disputing the nonconformance:

B-1. A more thorough review of AIT manufacturing records of the inlet and outlet pipe nozzles for Bechtel Power P.O. CCDG0065 (AIT Job 392) confirmed that the flattening test was performed by qualified AIT shop personnel. Further, AIT records (CMTR 392-2, dated 2/10/94) also document the performance of the hydrostatic test by shop personnel and the fact that the hydrostatic test was witnessed by AIT's Authorized Nuclear Inspector (ANI).

B-2. South Carolina Electric & Gas Company Purchase Order No. Q65 0395 for three charging pump gear oil heat exchangers (AIT Job 442) specified compliance with 1971 ASME Boiler & Pressure Vessel Code requirements. Accordingly, the 36 pieces of 0.5 inch O.D., TP316, SA 249 tubes were procured from Marmon/Keystone Corporation located in New Castle, Delaware, with the intent to upgrade to the requirements outlined in ASME Code, Section III, Class 3, 1971 Edition.

Previously, on March 9, 1992, the AIT QA Manager had issued a memo to AIT's president, with a copy to AIT's Authorized Nuclear Inspection Supervisor, which established upgrading requirements for pressure-retaining material purchased in the absence of audited verification of the vendor's QA/QC program, consistent with the 1971 ASME Code requirements. This memo specified one chemical verification test, and one physical verification test per heat lot/CMTR, and one chemical verification test per tube. This was the method chosen by AIT for upgrading of the 36 tubes procured from Marmon/Keystone.

The AIT Traceability No. M-2627 was assigned after completion of receiving inspection, review of material certifications on July 17-20, 1994, and hydrostatic testing of one tube.

Paragraph NA-3711(b) of the 1971 ASME Code, Section III, applicable to this order, states that "...the material supplier shall have his Identification and Verification Program or Quality System Program surveyed and qualified by the Manufacturer..." Accordingly, AIT conducted a Vendor Qualification Survey of Marmon/Keystone Corporation on May 2, 1994 before issuing P.O. 20681 dated May 17, 1994. This survey checked Marmon/Keystone's material identification and traceability program's compliance with ASME Code and accepted it.

Accordingly, Marmon/Keystone was added to the AIT Approved Vendor's List for the supply of tubing.

AIT conducted the upgrading process in accordance with AIT QA Manual Rev 9, paragraph 17.2.7.1 which required testing of a sample from each heat lot provided that (a) a CMTR from the manufacturer, and traceability from the material to the CMTR, is maintained, (b) AIT procurement documents address the supplier's traceability procedure, (c) AIT reviews and accepts the supplier's identification and traceability procedures, (d) AIT performs or subcontracts a product analysis to verify the chemical composition of each piece of unqualified source material, and (e) no welding is permitted on the material. Although it was established at the time of the vendor survey that Marmon/Keystone's QC Manual was to be invoked on P.O. 20681, it was not specifically addressed in the P.O. AIT Corrective Action Report (CAR) 96-30 was issued to address this concern.

In conclusion, upgrading of the heat exchanger tubes in question required (1) hydrostatic testing of one tube, which was performed, (2) verification of physical testing on one sample, which was performed, and (3) chemical analyses on samples from each of the 36 pieces of tubing, which were performed. The applicable hydrostatic test records were, in fact, available as required by the ASME Code and 10 CFR 50, Appendix B - thus negating Nonconformance 99901292/96-01-06 of the NRC's Notice of Nonconformance dated March 21, 1996. It should be noted also that both tube-side and shell-side hydrostatic tests of the completed heat exchangers were performed at 1.5 times the maximum design pressure before shipment.

NCR 442-1 was written during the December 5-7, 1994 ASME Survey to resolve a survey team finding. AIT did not at that time, nor does it now, believe that upgrading of the heat exchanger tubes was performed incorrectly. Testing performed during the upgrade of this material demonstrates conclusively that the material satisfies 1971 ASME Boiler & Pressure Vessel Code requirements.

Even though AIT felt that additional testing was not required for proper upgrading, additional testing was later performed on samples taken from the 35 tubes which had not been hydrostatically tested individually for AIT Job 442. This additional testing was done in order to address a question raised by the survey team during the December 1994 ASME Survey. Not all tests were performed on each piece, however, because some of the available test samples weren't large enough.

- B-3. Relative to AIT's purchase of tube sheets for Job 331 from Explosive Fabricators, of Louisville CO, paragraph 3.4.1.4.1.(1) of NRC Report 99901292/96-01 states that "No QA requirements were invoked on this vendor." In fact, AIT P.O. 20336, dated 4/23/93, issued to Explosive Fabricators, contained two pages of QA requirements. These covered samples for weld procedure qualification, specific instructions for impact testing, ultrasonic testing - including acceptance criteria and pre-test material conditions, documentation requirements, AIT's "right of access" and more.

A review of Ramball Testlab, Inc.'s Charpy v lateral expansion values vs. ASME Code, Section III, 1989 Edition, established that the test results meet ASME Code requirements. The actual ASME Code requirements are stated in Section III, Table NC-2332.1.1 Note (3) (C) which states that the Charpy values shall be based on the smaller of the maximum shell thicknesses associated with the tubesheets. Since the maximum shell thickness associated with the tubesheet is 1 1/4 inches, the minimum single test Charpy value is 20 mils, not 40 mils as stated in the NRC Inspection Report. Accordingly, the tubesheet material used in AIT Job 331 (PECO Energy's LGS Unit 1 RHR Heat Exchangers) meets ASME Code requirements.

Regarding the concern expressed in paragraph 3.4.1.4.1.(2) of NRC Report 99901292/96-01 that "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," review of the ASME Code indicates that verification of prior austenitic grain size is not necessary provided the aluminum content indicated in the original heat analysis is over 0.02%, per ASME Section II, SA 516. Review of the CitiSteel USA Material Test Report supplied by American Alloy Steel for plate no. 5022302, heat F731, ASME A516 Gr. 70, used in supplying the 1" x 72" x 174" plate, established aluminum content at 0.031%.

- B-4. For Job 331, AIT issued P.O 20497 to American Alloy Steel (an unqualified supplier) on September 28, 1993, for various sizes of SA 516 Grade 70 steel plate. Items 3, 4, and 6 were for 1-inch thick plate of the following sizes:

<u>Qty</u>	<u>Size</u>	<u>Heat No.</u>	<u>Slab No.</u>	<u>AIT No.</u>
1	72" x 174"	F731	147514	M-2501
3	2" x 240"	F731	147514	M-2501
1	60" x 168"	F731	147514	M-2501

...Reply to a Notice of Nonconformance

Amer Industrial Technologies, Inc.

NRC Docket No. 99901292

October 11, 1996

Page 7 of 25

A review of AIT Drawing 331-7, Rev. 3 indicates that a plate size of 70" x 168" would be required to provide the course necessary to construct the RHR Heat Exchanger B. Cutting this from the above 72" x 174" plate left a 6" x 70" strip from which a sample was cut and sent to Ramball Testlab per AIT P.O. 20550 issued November 10, 1993. This P.O. requested tensile, chemical and Charpy tests on the 1-inch thick sample which was identified with AIT Material Control No. M-2501. The test results received from Ramball Testlab verified the test results reported on the CitiSteel Material Test Report dated June 23, 1993.

American Alloy Steel has confirmed that traceability was controlled as specified in their Quality System Program Manual QSM-1, Rev. 0, dated 2/15/88, and they have reissued their Certificate of Conformance to document this. A copy of QSM-1 was reviewed by AIT's QA Manager, who concluded that it satisfactorily defines American Alloy Steel's traceability control.

In a cover letter, dated October 3, 1996, which accompanied the reissued Certificate of Conformance, American Alloy Steel, Inc.'s Quality Assurance Manager states that the the plates listed above were cut from American Alloy Steel's plate number 5022302 which corresponds to CitiSteel USA's 1" x 96" x 480" SA 516 Grade 70 plate with heat number F731 and serial number 147514. He goes on to state that "...this unique plate number (5022302) was assigned to the plate at the time it was purchased and will to the best of our knowledge never be duplicated again. Upon completion of receiving inspection and documentation review, the plate was marked with our plate number and the heat and serial from the plate was cross referenced to our plate number. This is our standard material traceability system for all of our pressure vessel quality steel plates. ...All of the above plates were identified with 'SA 516 70 F731 147514 CITI' to indicate the material specification, grade, heat number, serial number, and manufacturer."

AIT QA Manual paragraph 7.5.3 requires a Material Control Number to be assigned to each heat of material by the receiving inspector. This was done by assigning M-2501 to each of the five pieces of steel plate received from American Alloy Steel. As only one piece was intended for upgrading (1" x 72" x 174"), only one sample from this plate was sent to the lab, per requirements of Section XVII, with M-2501 marking. The fact that the sample was taken from the 1" x 72" x 174" plate has been confirmed by both the Project Engineer and the Production Manager. Only the 1" x 72" x 174" plate was used in a pressure boundary application. CAR 96-42 was written to address the marking issue.

As reported by the NRC inspection team, AIT P.O. 20550 to Ramball Testlab did not identify the temperature for impact test or indicate the location of the tensile and impact specimens with regard to rolling direction. It had been a long-standing practice between AIT and Ramball, however, to supply this type of information by fax or telephone. Ramball Test Report A17865 clearly indicates testing temperature at +10°F. This is consistent with all test temperatures for Job 331 for reports received from Ramball Testlab, Inc.

B-5. AIT issued P.O. 20579 to the AIT-audited and approved Ramball Testlab, Inc. stating: "Perform and certify mechanical test per the material spec. (SA 516-70)." When testing is requested in accordance with a referenced material specification, it is understood between AIT and Ramball Testlab that all specified tests must meet any additional requirements (i.e. any other referenced specification). The practice is that if the lab has any questions they contact AIT QA/Project Engineering who respond by telephone and/or fax. This is substantiated by a notation made by Ramball Testlab on their copy of P.O. 20579. Test results are available in AIT's file for Job 392.

2. Corrective steps that have been taken and the results achieved:

Regarding item B-2 above, AIT Corrective Action Report (CAR) 96-30 was issued to address the fact that Marmon/Keystone's QC Manual had not been specifically addressed in P.O. 20681.

Further, it was recognized by AIT prior to the NRC Inspection that additional material testing controls should be put in place as part of AIT's upgrading process. A "Material Upgrade Checklist (Test Sample Method)" was developed to guide the process. In addition, AIT Manufacturing Instruction No. 3, "Obtaining Laboratory Metallurgical Samples," was also developed. These documents provide additional directions to ensure correct sample preparation and marking prior to sending them to test laboratories.

3. Corrective steps that will be taken to avoid further noncompliances: All corrective steps have been taken.

4. Date when AIT's corrective action will be completed: Corrective action has been completed.

NRC Notice of Nonconformance Item C (99901292/96-01-04): 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 AIT's 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 WPS's 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)

AIT Reply:

1. Reason for the nonconformance or, if contested, the basis for disputing the nonconformance:

C-1. AIT has reviewed the joint in question as described in the NRC report, and has found it to be acceptable "as is." AIT's interpretation of ND 4622.7 (b) is that welds less than 3/4" (as defined in ND 4622.3) are

exempt from any postweld heat treat requirement if no preheat was applied. The joint as shown on drawing 392-1 Rev. 5 is a 7/32" groove with a 7/32" fillet.

- C-2. The condition described is acceptable. The joint in question is a "socket type" partial penetration weld, not a full penetration category D weld as reported. The 3.535 ± 0.002-inch diameter dimension is there to provide radial clearance between the outside diameter of the pipe and the inside diameter of the socket. The joint is as shown on AIT Drawing 392-1 Rev. 5. No further action is required.

2. Corrective steps that have been taken and the results achieved:

- C-1. AIT generated CAR 96-31 on September 17, 1996 to review all carbon steel weld procedures for minimum preheat requirements per ASME Code.

As stated in the NRC Inspection Report, AIT purchased a nuclear certified bare weld wire for use in the submerged arc process, and used it for Gas Tungsten Arc welding. The discovery of this situation prompted the regualification of GTAW Welding Procedure Specification (WPS) WT-713 using the submerged arc wire. WPS WT-713 is now regualified using filler metal SFA-5.17, specifically EM12K. In addition, the recommendations (non-mandatory) of ASME Code Section III Class 2, Table NC 4622(b)-1 regarding preheat have been incorporated into WPS WT-713 and all carbon steel welding procedures.

Additional training regarding WPS requirements has been given to AIT's production manager, who is responsible for issuing weld wires and assigning welders to perform welding operations as dictated by route sheets.

- C-2. Not applicable.

3. Corrective steps that will be taken to avoid further noncompliances: All corrective steps have been taken.

4. Date when AIT's corrective action will be completed: Corrective action has been completed.

NRC Notice of Nonconformance Item D (99901292/96-01-05): 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, 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)

AIT Reply:

1. Reason for the nonconformance or, if contested, the basis for disputing the nonconformance: Bechtel's P.O. imposed Procurement Specification DG-80382, "Procurement Specification for Calvert Cliffs Nuclear Power Plant Diesel Generator Project," Rev. 2, dated December 23, 1994. This specification identified the safety-related fuel oil filters as "basic components" and imposed 10 CFR 21. It did not, however, impose the requirements of 10 CFR 50, Appendix B.

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.

Upon reviewing the above, AIT concluded that certain components of the oil filters supplied to Bechtel had been purchased commercially, and had not been dedicated as Safety-Related due to these items not being covered by ASME Code.

2. Corrective steps that have been taken and the results achieved: On February 21, 1996, AIT sent letters to Bechtel Power Corporation, Baltimore Gas & Electric Company (BG&E), and the U.S. Nuclear Regulatory Commission (NRC) notifying them of the suspected 10 CFR 21 concern. Correspondence between AIT and Bechtel resulted in BG&E and Bechtel electing to perform the dedication activities. AIT was notified that the dedications of the oil filter o-rings, filter element, and filter holder were completed in April, 1996. AIT notified the U.S. Nuclear Regulatory Commission on May 29, 1996 that the 10 CFR 21 concern reported by AIT on February 21, 1996 was closed.

AIT also reviewed past jobs for any other material used in the construction of AIT-supplied items and found that no clear distinction had been made as to whether gasket material used to form sealing between bolted connections was safety related or not. An analysis was performed on the failure mode associated with gasket material in general. This analysis concluded that a failed gasket would leak at an increasing rate, but would not prevent the operation of any of the components which had been supplied by AIT. Letters were sent to AIT customers who had been supplied gasketed items, for their information, review and comment.

3. Corrective steps that will be taken to avoid further noncompliances: All corrective steps have been taken.
4. Date when AIT's corrective action will be completed: Full compliance has been achieved.

NRC Notice of Nonconformance Item E (99901292/96-01-06): 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 the 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)

AIT Reply:

1. Reason for the nonconformance or, if contested, the basis for disputing the nonconformance: AIT Nonconformance Report (NCR) 442-1, dated 12/7/94, cited mechanical tests which had not been performed for 35 of the 36 tubes used in the construction of the heat exchanger.

South Carolina Electric & Gas Company Purchase Order No. Q65 0395 for three charging pump gear oil heat exchangers (AIT Job 442) specified compliance with 1971 ASME Boiler & Pressure Vessel Code requirements. Accordingly, the 36 pieces of 0.5 inch O.D., TP316, SA 249 tubes were procured from Marmon/Keystone Corporation located in New Castle, Delaware, with the intent to upgrade to the requirements outlined in ASME Code, Section III, Class 3, 1971 Edition.

Previously, on March 9, 1992, the AIT QA Manager had issued a memo to AIT's president, with a copy to AIT's Authorized Nuclear Inspection Supervisor, Bill Rogers, which established upgrading requirements for pressure-retaining material purchased in the absence of audited verification of the vendor's QA/QC program, consistent with the 1971 ASME Code requirements. This memo specified one chemical verification test, and one physical verification test per heat lot/CMTR, and one chemical verification test per tube. This was the method chosen by AIT for upgrading of the 36 tubes procured from Marmon/Keystone.

The AIT Traceability No. M-2627 was assigned after completion of receiving inspection, review of material certifications on July 17-20, 1994, and hydrostatic testing of one tube.

Paragraph NA-3711(b) of the 1971 ASME Code, Section III, applicable to this order, states that "...the material supplier shall have his Identification and Verification Program or Quality System Program surveyed and qualified by the Manufacturer..." Accordingly, AIT conducted a Vendor Qualification Survey of Marmon/Keystone Corporation on May 2, 1994 before issuing P.O. 20681 dated May 17, 1994. This survey checked Marmon/Keystone's material identification and traceability program's compliance with ASME Code and accepted it. Accordingly, Marmon/Keystone was added to the AIT Approved Vendor's List for the supply of tubing. AIT conducted the upgrading process in accordance with AIT QA Manual Rev 9, paragraph 17.2.7.1 which allowed testing of each heat lot provided that (a) a CMTR from the manufacturer, and traceability from the material to the CMTR, is maintained, (b) AIT procurement documents address the supplier's traceability procedure, (c) AIT reviews and accepts the supplier's identification and traceability procedures, (d) AIT performs or subcontracts a product analysis to verify the chemical composition of each piece of unqualified source material, and (e) no welding is permitted on the material. Although it was established at the time of the vendor survey that Marmon/Keystone's QC Manual was to be invoked on P.O. 20681, it was not specifically addressed in the P.O. AIT Corrective Action Report (CAR) 96-30 was issued to address this concern.

In conclusion, upgrading of the heat exchanger tubes in question required (1) hydrostatic testing of one tube, which was performed, (2) verification of physical testing on one sample, which was performed, and (3) chemical analysis on samples from each of the 36 pieces of tubing, which was performed. The applicable hydrostatic test records were, in fact, available as required by the ASME Code and 10 CFR 50, Appendix B -- thus negating Nonconformance 99901292/96-01-06 of the NRC's Notice of Nonconformance dated March 21, 1996. It should be noted also that both tube-side and shell-side hydrostatic testing of the completed heat exchangers was performed at 1.5 times the maximum design pressure.

NCR 442-1 was written during the December 5-7, 1994 ASME Survey to resolve a survey team finding. AIT did not at that time, nor does it now, believe that upgrading of the heat exchanger tubes was performed incorrectly. Testing performed during the upgrade of this material demonstrates conclusively that the material satisfies 1971 ASME Boiler & Pressure Vessel Code requirements.

2. Corrective steps that have been taken and the results achieved: Not Applicable.
3. Corrective steps that will be taken to avoid further noncompliances: Not Applicable.

...Reply to a Notice of Nonconformance

Amer Industrial Technologies, Inc.

NRC Docket No. 99901292

October 11, 1996

Page 15 of 25

4. Date when AIT's corrective action will be completed: Not Applicable.

NRC Notice of Nonconformance Item F (99901292/96-01-07): 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)

AIT Reply:

1. Reason for the nonconformance or, if contested, the basis for disputing the nonconformance:

F-1. AIT has several tube rolling procedures and has performed this type of operation a number of times. Since there was no requirement for customer approval of the specific tube rolling procedure to be used, instructions were communicated verbally to the production manager. These instructions included limits of wall reduction and methods of determining wall reduction.

Another concern regarding process control, which was expressed in the NRC report, was that no instructions for removal of test coupons from

the source material to be used for upgrading were included on the route sheet, and hydrostatic testing of the tubes was also not specified on the route sheet. Cutting test coupon and hydrostatic testing for upgrading material for Job 442 were performed in strict accordance with AIT's QA Manual in use at that time which was in conformance with the ASME Code Section III. The QA Manual did not then require that these tasks be included in the route sheet. The Manual did require that they be performed. These tasks were performed in accordance with AIT's approved QA Manual.

- F-2. No specific request from Union Electric was made for cleaning of the equipment as referenced in Spec. M-1160 (Q) Rev. 0 Para 7.1.1. Para 9.23 of spec M-1160 (Q) Rev 0 asks for cleaning instructions for in-service applications. These instructions were provided as requested.

Since no request was made for cleaning procedures prior to shipment, a general cleaning procedure suitable for the material was used. This was AIT Procedure CL-89 "Cleaning Procedure for Stainless Steel Materials," Rev. 1, dated 6/15/90. A letter (dated 2/3/95) from Union Electric, Senior Engineer, Supplier Quality is contained in the Job 4102 document package, stating in part "Cleanliness requirements are satisfied."

- F-3. As a result of NRC Nonconformance 99901292/96-01-07, a review was made of the route sheet for AIT Job 331 (PECO Energy Company P.O. ANE 379937) for two heat exchanger tube bundles and two heat exchanger shells for the Limerick Unit 1 RHR system. This review revealed that NCR 331-4 had been issued during manufacture to authorize the plugging of holes in the tube sheet which had been incorrectly drilled. The route sheets for Units A and B had been revised to reflect the hole plugging operation and requirements listed in NCR 331-4. AIT NDE Inspection Report No. 18 was issued on 11/5/93 which documented Liquid Penetrant Testing, and the ANI signed the route sheet for Unit A. The specified welding procedure for welding the tube sheet was WS-956, Rev. 0. This was the weld procedure approved for use on the project, and there was no need to list it again for the repair activity. The route sheets were signed by the AIT inspector to reflect the 11/5/93 date noted on NDE Report No. 18.

Another issue identified in 96-01-07 concerned NCR 331-3 which was issued to address missing tube holes in baffles MK1 and MK3 identified during assembly. The concern was that the route sheet was not revised to indicate those actions taken to bring the baffles into compliance. AIT initiated Corrective Action Request 96-28 dated 8/28/96 to address this issue. Attachment A (Baffle MK1 & MK3 Repair) was added to the route sheet for RHR Replacement Tube Bundle A which stated the

following: "Cut out MK1 and MK3 Baffle Sections as shown on NCR 331-3 Sketch (Attach A&B) from existing MK1 and MK3. Ensure M No. (AIT traceability No.) is marked on cut section removed." Both the Production Supervisor and Quality Engineer involved signed the applicable steps to indicate completion as shown on NCR No. 331-3.

Both AIT NCR's were submitted to PECO Energy Co. via PECO's Vendor Deviation Request (VDR). Both were approved by PECO.

2. Corrective steps that have been taken and the results achieved:

F-1. A general Tube Rolling Procedure No. TE-920, Rev. 0, dated April 25, 1987, was utilized for this operation. The Procedure No. TE-920, Rev. 0 was added to the route sheets for Job 442 along with initials and sign-offs (9/5/96) to complete that operation. A note was added referencing AIT's response to NRC Report 96-01. TE-920 was also added to the AIT Non-Permanent Records for Job 442.

F-2. Procedure CL-89 Rev. 1 was added to the AIT Job 4102 route sheet and added to the Non-Permanent Records for Job 4102. Sign-offs were documented on the route sheet for completion of the cleaning operation. A note was added referencing AIT response to NRC Report 96-01.

AIT's current route sheets contain sign-offs for all activities, and all procedures, including their revision level, are identified.

F-3. Training was conducted for AIT Engineering, Quality, Production and Management personnel regarding requirements associated with route sheet and CAR 96-28.

3. Corrective steps that will be taken to avoid further noncompliances:

F-1. Not applicable.

F-2. AIT's route sheets have been revised to identify all procedures used in completing work. This action is being monitored by the ANI as part of his review of AIT route sheets.

F-3. Not applicable.

4. Date when AIT's corrective action will be completed: Corrective action has been completed.

NRC Notice of Nonconformance Item G (99901292/96-01-08): 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)

AIT Reply:

1. Reason for the nonconformance or, if contested, the basis for disputing the nonconformance: AIT's review of its internal and external audits, and questioning of personnel who performed the audits, indicates that they have, in fact, performed good audits in accordance with the check list provided for this purpose. The objective evidence documented, however, may not have contained enough detail to indicate this.
2. Corrective steps that have been taken and the results achieved: AIT has strengthened its audit procedures to provide increased objective evidence of items reviewed during the audit activity. Where possible, AIT auditors select an ample number of records for auditing. If the population of records is large, a sample percentage of the total are audited. Small record populations are audited in their entirety. In all cases, the number of items audited will be identified.

In addition, vendor audit records now indicate the scope of the activity that AIT utilizes the vendor for. They also indicate the quality program requirements for which the vendor has been approved (e.g. ASME Boiler and Pressure Vessel Code, Section III, 10 CFR 50, Appendix B, etc.)

...Reply to a Notice of Nonconformance

Amer Industrial Technologies, Inc.

NRC Docket No. 99901292

October 11, 1996

Page 20 of 25

So far this year six vendor audits have been performed:

<u>Vendor</u>	<u>Location</u>	<u>Audit Date</u>
Laboratory Testing, Inc.	Dublin, PA	2/20/96
Branch Radiographic Laboratories, Inc.	Carney's Point, NJ	4/9/96
Edmonton Exchanger & Manufacturing	Edmonton, Alberta, Canada	5/17/96
LAI	Westminster, MD	7/8/96
W. B. George Co., Inc.	Atlanta, GA	7/23/96
Hanner Industries	Bristol, PA	8/8/96

A total of twelve internal audits have been completed in 1996 to date. Each of these contains documented objective evidence, employee contacts, audit work sheets and reports. Internal and external audit reports are routed to the ANI (Commercial Union Insurance Company) for review and comment.

These external audits have resulted in the issuance of six Corrective Action Reports (CAR's), and the internal audit program has resulted in four CAR's. Additional CAR's have been issued as a result of ongoing review activities not associated with either internal or external audit programs.

3. Corrective steps that will be taken to avoid further noncompliances:
Continue adherence to strengthened audit procedures.
4. Date when AIT's corrective action will be completed: Ongoing.

NRC Notice of Nonconformance Item H (99901292/96-01-09): 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)

AIT Reply:

1. Reason for the nonconformance or, if contested, the basis for disputing the nonconformance:

H-1. The NRC-issued RG 1.28 "Quality Assurance Program Requirements (Design and Construction), Rev. 3" allows for not performing an external verification of quality program implementation if it can be determined that the items being procured are relatively simple and standard in design, manufacturing, and testing while also adaptable to standard inspections or testing to verify quality characteristics after delivery.

AIT currently has a total of eight (8) QSC suppliers on the Approved Vendor List dated 4/15/96. Three (3) are for welding material and the other five (5) supply a mix of castings, forgings, plates, fasteners, shapes, and piping material. These items would seem to satisfy the "...relatively simple and standard in design, manufacturing, and testing while also adaptable to standard inspections or testing to verify quality characteristics..." as addressed in RG 1.28.

In all cases these QSC suppliers have supplied material to AIT over many years with quality characteristics being checked during receiving inspection as prescribed by the AIT QA Manual. No examples of non-

conforming material were noted during our review of this area for items supplied by these suppliers.

H-2. At the time of the NRC inspection, the status of the Registered Professional Engineer (RPE) performing ASME Code design work was considered to be that of a part-time employee, with training records supporting his participation in training activities. However, his status was actually that of a subcontractor - based upon AIT accounting records.

H-3. The AIT-issued P.O. 20494, dated September 28, 1993, to Trinity Industries of Cincinnati, Ohio for two 52 3/4 inch diameter SA 516, Grade 70 heads. The P.O. also specified the following quality requirements:

- AIT has the right to audit Trinity Industries, Inc. at Navasota, Texas.
- 10 CFR 21 applies.
- Heads shall have no welds or weld repair.
- Heat Number marking requirements and details.
- Quality documentation requirements.

Trinity Industries (Navasota, Texas) has ASME-issued "U," "U-2," and "S" stamps, however, AIT's P.O. 20494 was for unqualified source material, which was upgraded per AIT's QA Manual requirements which led to issuance of a P.O. 20551 to Ramball Testlab, Inc. for chemical analyses, tensile and impact testing. Ramball Testlab, which is an AIT-qualified testing lab, performed tests required for the upgrading of heads supplied by Trinity (Navasota) and all test results were acceptable. This confirms the effectiveness of the control of quality of these particular items on the part of Trinity. Both Trinity and Ramball test results were included on AIT Certified Material Test Reports 331-13 and 331-14.

AIT P.O. 20551 did not address the temperature or location of the test specimens with respect to material coupons, however, it has been the practice to supply this data by telephone or fax as necessary. The Ramball Testlab, Inc. results did contain the PECO Specification NE-189 and SP-1 requirement of +10°F on their Report No. A17946.

AIT purchased from Trinity not as an approved supplier, but as a supplier requiring verification of product. This verification was accomplished by checking the material during receiving inspection for compliance with the purchase order requirements, and by the performance of other checks to verify that the material met all requirements of the material specification and AIT's QA Program for upgrading of material. This product was considered to meet RG 1.28 requirements and no other actions were required.

A review of the original material test reports for the elliptical heads procured from Trinity shows that the material meets the ASME Code specifications and the aluminum content from the heat analysis was sufficient to produce the required fine austenitic grain size. Accordingly, the elliptical heads used in the PECO Energy's LGS Unit 1 RHR Heat Exchangers meet ASME Code requirements.

2. Corrective steps that have been taken and the results achieved:

H-1. A Vendor Performance Tracking System was initiated in June 1996 to track vendor performance problems such as CMTR and Certificate of Compliance discrepancies, piece count, marking and dimensional concerns along with other performance indicators. This activity will monitor AIT approved suppliers and the most frequently used non-approved suppliers.

H-2. AIT's RPE was added to the AIT Approved Vendor List on February 6, 1996. The December 1994 audit reported was the Code required triennial review of the RPE by the manufacturing organization. Further, the RPE review was added to the annual AIT internal audit schedule to ensure compliance to Code requirements.

H-3. Not applicable.

3. Corrective steps that will be taken to avoid further noncompliances: Al. corrective steps have been taken.

4. Date when AIT's corrective action will be completed: Corrective action has been completed.

NRC Notice of Nonconformance Item I (99901292/96-01-10): 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)

AIT Reply:

1. Reason for the nonconformance or, if contested, the basis for disputing the nonconformance: AIT maintains indoctrination and training records for all employees performing activities affecting quality. These records cover current and former employees, and are on file in AIT's offices. Such records were on file in AIT's offices at the time of the NRC inspection in January/February 1996, but had apparently not yet been found by AIT's QA Manager, who had been with the Company for only a few weeks at the time of the inspection. (AIT's QA Manager joined the Company in December 1995, not December 1994 as noted in Section 3.4.5 of NRC Inspection Report 99901292/96-01.) The presence of these records at the time of the NRC inspection is substantiated by the fact that training records currently on file for previous employees, who had departed prior to the NRC inspection, carry the handwriting and signatures of these employees.
2. Corrective steps that have been taken and the results achieved: AIT's indoctrination and training records were reviewed during ASME surveys conducted in December 1994 and June 1995, and certain improvements have been implemented as a result of these reviews. All records have been updated, and a matrix has been added to indicate the specific individuals participating in training sessions. Also, the storage and retrievability of AIT's indoctrination and training records have been improved. These records were reviewed again during the April 1996 and September 1996 ASME surveys, and no deficiencies were noted. Easily accessible indoctrination and training

...Reply to a Notice of Nonconformance

Amer Industrial Technologies, Inc.

NRC Docket No. 99901292

October 11, 1996

Page 25 of 25

records are now available for all employees performing activities affecting quality.

3. Corrective steps that will be taken to avoid further noncompliances: AIT will continue to maintain its indoctrination and training program for all employees performing activities affecting quality. Up-to-date records will be maintained for all such indoctrination and training activities.
4. Date when AIT's corrective action will be completed: Corrective action now completed.