TENNESSEE VALLEY AUTHORITY
CHATTANOOGA, TENNESSEE 37401
400 Chestnut Street Tower II

February 2, 1984

U.S. Nuclear Regulatory Commission
Region II
Attn: Mr. James P. O'Reilly, Regional Administrator
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30303

Dear Mr. O'Reilly:

INSPECTION AND ENFORCEMENT BULLETIN 83-06 - NONCONFORMING MATERIALS SUPPLIED BY THE TUBE-LINE CORPORATION FACILITIES AT LONG ISLAND CITY, NEW YORK: HOUSTON, TEXAS; AND CAROL STREAM, ILLINOIS

In response to the subject Bulletin dated July 22, 1983, we submitted on November 22, 1983 a status report for Watts Bar and Bellefonte Nuclear Plants and a final response for Sequoyah Nuclear Plant. Enclosed is our final response for Watts Bar and Bellefonte Nuclear Plants.

If you have any questions, please get in touch with R. H. Shell at FTS 858-2688.

To the best of my knowledge I declare the statements contained herein are complete and true.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

L. M. Mills, Manager
Nuclear Licensing

Enclosure
cc (Enclosure):
Mr. Richard C. DeYoung, Director
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Records Center
Institute of Nuclear Power Operations
1100 Circle 75 Parkway, Suite 1500
Atlanta, Georgia 30339

IE11

ENCLOSURE

WATTS BAR AND BELLEFONTE NUCLEAR PLANTS UNITS 1 AND 2
RESPONSE TO IE BULLETIN 83-06
NONCONFORMING MATERIALS SUPPLIED BY TUBE-LINE CORPORATION FACILITIES
AT LONG ISLAND CITY, NEW YORK; HOUSTON, TEXAS; AND CAROL STREAM, ILLINOS

This report is being provided as required by item 4 of the section entitled "Actions to be Taken by Holders of Operating Licenses or Construction Permits" in IE Bulletin 83-06. TVA has reviewed the lists of purchasing and receiving companies given in tables 1 and 2 of IE Bulletin 83-06, and has, at this time, determined that the only Tube-Line (T-L) supplied ASME Code materials installed in any safety-related system at either Watts Bar (WBN) or Bellefonte (BLN) Nuclear Plants were supplied by Capitol Pipe and Steel Products Company (Capitol), Bala-Cynwyd, Pennsylvania. A listing of those identified materials supplied by Capitol, and the actions taken by TVA in regard to those materials, are given in TVA's final report to the NRC on NCR GEN MEB 8301 (see attachment 1).

Other suppliers, who may have supplied T-L manufactured materials to TVA during the time period involved, have been queried regarding this issue. These companies are shown in attachment 2. Of the 21 companies listed, only 15 had contract performance during the time period of concern. All of these 15 companies have responded to TVA's queries. All, except Capitol Pipe and Steel Products Company, have stated that they have not supplied any of the T-L material in question to either Watts Bar or Bellefonte Nuclear Plants.

Based on this information and the corrective action taken by TVA which was given in the final report to the NRC on NCR GEN MEB 8301, TVA considers this matter completed.

ATTACHMENT 1

WATTS BAR AND BELLEFONTE NUCLEAR PLANTS UNITS 1 AND 2
QA PROGRAM ON TUBELINE MATERIALS SUPPLIED BY CAPITOL PIPE
WBRD-50-390,391/83-23,22, AND BLRD-50-438,439/83-27,22
NCR GEN MEB 8301
10 CFR 50.55(e)
FINAL REPORT

Description of Deficiency

Capitol Pipe and Steel Products Company, Bala-Cynwyd, Pennsylvania, supplied carbon steel (CS) and stainless steel (SS) flanges and butt welding fittings manufactured by Tube-Line (T-L), Incorporated, Long Island, New York, and Carol Stream, Illinois, to TVA during the period February 3, 1982, to January 27, 1983, which Capitol sold as ASME Section III material. However, it has now been determined that the material was not manufactured under a QA program. Recent experience with T-L by other companies has shown that material did not meet the material specification for heat treatment.

Safety Implications

Since the T-L material was not manufactured under a QA program, it could not be assured that the material integrity of the affected components would be maintained under either normal or design basis accident conditions. The unanticipated failure of one or more of the affected fittings, in a safety-related system, could, therefore, adversely affect the safety of operations of the plant.

Introduction

This report covers all of the aspects of this problem from its start through the present time. It incorporates the results of all testing, audits, evaluations, and work done by TVA and Capitol to evaluate and resolve this problem.

TVA Notified of T-L Problem(s)

TVA first became aware that a potential problem existed with T-L material supplied by Capitol through NRC-OIE's Richard DeYoung's January 26, 1983, letter to TVA's H. G. Parris. Upon receipt of this letter, Engineering Design (EN DES) personnel contacted Capitol to determine if TVA had received any defective material. On February 17, 1983, Capitol advised that TVA had received one heat of material which did not meet ASME Section III requirements. Capitol had instructed the receiving site to return the material for replacement and, so far as they knew, TVA had no more defective material. In mid-March 1983, TVA received NRC Information Notice No. 83-07. Upon receipt of Information Notice 83-07, TVA again contacted Capitol and was

informed that on March 16 and March 17, 1983, Capitol had been at T-L's Long Island facility. On March 21, 1983, Capitol furnished a preliminary list of T-L manufactured carbon steel (CS) fittings and flanges which were not made to ASME Section III requirements as required by TVA's contract with Capitol. On March 22, 1983, TVA prepared this generic nonconformance report on the T-L problem. On May 9, 1983, TVA received T-L's 10 CFR 21 notification letter of deficiencies in welded with filler metal stainless steel (SS) fittings furnished by T-L's Carol Stream facility (see Appendix B). In a meeting among Capitol, T-L, and TVA personnel on June 13, 1983, it was determined that the welded without filler metal SS fittings manufactured by T-L were also not in compliance with ASME Section III requirements. This gives a basic chronological history of TVA's notification of the various portions of the T-L problem.

The first steps taken by TVA to resolve this problem were to get definitions of the scope of each portion of the problem (CS and SS) by meeting with the affected T-L offices and Capitol personnel each time TVA was made aware of a new portion of the problem. In every case, TVA was supplied with lists of questionable material by either Capitol or T-L (which were verified by TVA personnel). Once TVA received NRC IE Bulletin No. 83-06, in late July, 1983, we became aware of the other suppliers who potentially had supplied T-L material to TVA. Letters have been sent to each of those other suppliers who had contracts with TVA during the period involved in IEB 83-06 (February 1982 through February 1983 for CS, and June 5, 1981 through February 1983 for SS). To date, TVA has not been notified by any of those contractors that they furnished T-L material to Bellefonte (BLN) or Watts Bar Nuclear Plant (WBN) for use in a safety-related piping system.

It is TVA's feeling that the root cause of this problem was a practice on T-L's part to read and interpret ASME B&PV Code Sections II and III in a very loose manner, such that, they felt that their actions allowed them to represent their material as meeting ASME Section III requirements. TVA's action to prevent the recurrence of this problem will consist of: (1) not accepting T-L as an acceptable manufacturer of CS and SS welded fittings and flanges, (2) evaluating our requirements for certified mill test reports (CMTRs) to ascertain what steps can be taken to prevent this problem from happening again, (3) evaluating the need for and frequency of auditing contractor's subtier suppliers, (4) and increasing our normal audit frequency of suppliers/ manufacturers with ASME Quality Systems Certificates (QSC) to be more in line with our standard audit frequency.

Corrective Action

Detailed Evaluation of T-L Problem

In the evaluation of the T-L problem, TVA has utilized the definitions of "safety-related" systems which are contained in section 3.2 of both the WBN and BLN FSAR's which are in accordance with 10 CFR Part 100, Appendix A, Sections III.(c)(1), III.(c)(2), and III.(c)(3). The search for fittings in safety-related systems was limited to TVA classes A, B, C, and D piping systems at WBN and TVA Classes III 1, III 1S, III 2, III 2S, III 3, and III 3S piping systems at BLN.

Watts Bar Carbon Steel Discussion

When TVA received the lists of material which could be a problem from Capitol (see Appendix A for letters from Capitol to TVA dated (April 15, and September 15, 1983) an evaluation was made of the best approach to take in order to resolve this problem with the least impact on TVA's fuel load date and construction schedule at Watts Bar Nuclear Plant. Subsequently, it was decided to prepare a Program Plan which would delineate the steps TVA intended to take in order to leave as many T-L fittings, that were installed, in place as possible. This Program Plan was prepared utilizing the information available to TVA at the time of its preparation which was in April 1983. It was decided to utilize the Code-Of-Record for installation as a basis for qualification of these fittings. The Program Plan is included in Appendix A to this report. Since, it has previously been submitted, it is not discussed in great detail here. It did serve as a basis, for all work done, to attempt to prove "post facto" that the carbon steel (CS) fittings supplied by T-L were ASME Code equivalent and acceptable to remain in the systems in which they were installed.

As a part of the work done by TVA to meet the requirements of this Program Plan, many fittings were tested for both chemical and physical properties as required by Section III of the Program Plan. The results of the tests made by both Spectrum Laboratories, a subcontractor to Capitol, and by TVA's own Singleton Material Laboratories (SME) are contained in Appendix A to this report. The results of these tests showed that most of the fittings were acceptable and did comply at least with ASTM specifications in a manner which would allow them to be certified to ASTM criteria.

TVA obtained both the base material CMTRs and the T-L CMTRs and, along with Capitol's QA personnel, evaluated them. A direct comparison of these CMTRs for Awaji, the base material manufacturer, showed discrepancies between the CMTRs supplied Awaji and T-L. The results of this comparison are also contained in Appendix A to this report. A study of the results of this comparison led to the determination that there is no reasonable guarantee that the material supplied was really the material represented by the CMTRs supplied with the material. Therefore, TVA was of the opinion that, as a result of the work done under this Program Plan, this material could not readily be certified as ASME Code equivalent. Additional backup for this position is contained in the TVA audit report No. 83V62 prepared by the TVA auditor who participated in the audits of Nippon-Benkan (Benkan), Fuji Acetelyne Industries, and Awaji in Japan during the period of July 19, through 27, 1983. This report is also contained in Appendix A. From this report, it can be readily determined that the Awaji factory does not have an acceptable quality assurance program to allow "post facto" determination that the material is ASME Code equivalent.

As a result of all of the above efforts, TVA made the determination that any carbon steel fitting installed in a high pressure piping system (design pressure greater than 150 lb/in^2a), which was safety-related and which could not be isolated from other portions of the system, should be removed and

replaced with material which definitely met ASME Section III criteria. Therefore, TVA removed 48 carbon steel fittings from the steam generator blowdown system at Watts Bar which were in safety-related portions of the piping system. TVA also determined that fittings of this type are acceptable without further testing for use in a non-safety low pressure (150 lb/in^{2}a design pressure or less) system. Therefore, any fittings meeting this criteria were allowed to remain installed at Watts Bar Nuclear Plant.

As can be seen from the above statements, TVA's endeavors were dedicated solely to justifying (where possible) any fittings which were installed. Any fittings which were not installed at the start of this effort were placed in the warehouse on QA hold and were not allowed to be issued for installation. All T-L fittings which were removed or which were never installed have been returned to Capitol for credit and have been replaced with fittings fully complying with ASME Section III criteria.

In addition to the CS fittings and flanges discussed above, it was determined that six 18-inch slip-on CS flanges had been supplied by Capitol to Metal Bellows Corporation (MBC) who had supplied TVA with ASME Section III expansion joints for use in the component cooling water system (CCW). These expansion joints were removed from service and returned to MBC. MBC removed the T-L flanges from the expansion joints and replaced them with flanges fully meeting ASME Section III criteria. MBC also provided the necessary documentation to reflect the work done to remove the T-L flanges and replace them with acceptable flanges. The expansion joints were then returned to WBN where they were reinstalled in the CCW system.

Watts Bar Stainless Steel Program Work

As previously stated, TVA received a Part 21 notification from T-L regarding certain stainless steel fittings which were supplied welded with filler metal without the necessary NPT stamp being applied to them, and without having the necessary ASME quality assurance program for manufacture, etc., as required to meet ASME Section III criteria. These fittings are listed on Table WBN SS-1 WW, contained in Appendix B to this report. When these fittings were identified, TVA was in the process of preparing to perform the audit mentioned previously in the carbon steel discussion. Therefore, it was decided to include the two manufacturers who had supplied stainless steel material to TVA in the audit. Just before the audit date, it was learned that there was also a problem with welded without filler metal fittings (this problem will be dealt with in more detail later in this report). Therefore, it was decided to audit both the welded with and without filler metal fitting suppliers who had manufactured the fittings for T-L. The results of the audits performed on the stainless steel suppliers is contained in Appendix A to this report. As can be seen from the audit report, the fittings manufactured by Fuji did not have any sort of ASME QA program applied to them during the manufacturing process to meet ASME Section III criteria. However, any fittings manufactured by Benkan did have portions of an ASME Section III program applied to them during manufacture. Therefore, TVA concluded that any fittings manufactured by Benkan could be readily qualified by showing that the material supplied was the same material as represented by the certified material test reports to show "post facto" ASME code equivalence.

TVA was able to determine that the only affected stainless steel fittings installed were in the essential raw cooling water system (ERCW) which is a relatively low pressure (150 lb/in a design) system. Therefore, TVA undertook the various portions of the testing necessary to comply with the Stainless Steel Program Plan. This plan was prepared to give guidance and direction to any work which was done to try to qualify any installed fittings. Although previously submitted, this Program Plan is included herewith in Appendix B to this report.

TVA has performed all the necessary testing, both laboratory and field tests, to comply with the SS Program Plan. The tests performed in the laboratory were done by SME Laboratories and the results are contained in the test report in Appendix B to this report. The work done by SME Laboratories was done in accordance with the criteria contained in the test report. SME tested for the product analysis utilizing either standard laboratory chemical results or the X-ray spectrometer mentioned in their report. They performed hardness tests which were utilized to determine the approximate tensile strength of the material, and they also did ASTM A-262 tests necessary to show that all the stainless steel was in the solution annealed condition as required by the material specification.

In order to "post facto" qualify these fittings, it was determined that it would be necessary to hydrotest these fittings to a pressure much greater than would normally be expected for them to operate under as described in the SS Program Plan. These hydrotests were performed and the results of these tests are contained in Appendix B to this report. The necessary radiography was also performed and has been reviewed by the TVA site ANI.

As requested by the NRC, TVA has performed an inplace analysis, utilizing the sensitivity of the equipment which TVA had available, to determine that the fittings which were installed were indeed those represented by the CMTRs supplied with the fittings. The results of these tests are also included in the previously referenced SME test results in Appendix B. The item numbers shown in the SME test results are the same numbers making up the permanent marking on the fittings which are installed. The list of numbers marked on these fittings is contained in Appendix B on the sheets marked WBNP NCR 4866, R1, which cross-references all pertinent data for these fittings in one place. These fittings are permanently marked and have been indicated on weld history sheets and other documentation necessary to be a permanent part of the plant record throughout the life of the plant. TVA feels that all of the fittings which are installed are acceptable and have been proven to be ASME code equivalent with the exception of NPT stamping and third party inspection during manufacture. Therefore, TVA intends to leave these fittings installed in the ERCW system at WBN and will take the steps defined in number IV of the SS Program Plan. This step will allow the "N" stamping of all portions of the ERCW system at WBN. Any fittings which were not installed have been returned to Capitol for credit and have been replaced by fittings fully complying with ASME Section III criteria.

Regarding the fittings supplied by T-L which were welded <u>without</u> filler metal, these fittings were not identified to TVA until the previously mentioned June 13, 1983, meeting with T-L and Capitol. These fittings are

listed on Table WBN SS-1 WO, contained in Appendix B to this report. All of these fittings were made by Benkan. As referenced in the welded with filler metal discussion above, Benkan did manufacture their fittings to a QA program. Our audit results, contained in Appendix A, state that Benkan's QA program was basically ASME Section III equivalent. Therefore, TVA took the position that the only action necessary, to allow these fittings to remain installed, was to prove that the fittings themselves were the fittings which the CMTRs supplied with them represented. This was done by performing laboratory and inplace testing of the fittings utilizing the equipment described in the SME test report in Appendix B to this report. Results of these tests showed that the fittings were indeed as represented by the CMTRs supplied with them. Therefore, TVA has decided to leave them installed in the ERCW system at WBN. Further information on the disposition and the work done on these fittings is contained in the disposition of TVA NCR WBN 4727R0 and 4866R1 which are in Appendix A of this report. The system in which these fittings are installed is listed in Appendix B on the list headed WBNP NCR 4727, R1. Any fittings which were not installed have been returned to Capitol for credit, and have been replaced with fittings fully complying with ASME Section III criteria.

Bellefonte Nuclear Plant Carbon Steel Program Details

The fittings which were supplied to Bellefonte Nuclear Plant are listed in Table BLN CS-1 contained in Appendix C to this report. These fittings have been identified to Bellefonte Nuclear Plant personnel who have utilized weld history maps, material lists, and other documents to ascertain what safety systems they may be installed in. As a result of the audits performed by TVA and Capitol, which are documented in the previously referenced audit report contained in Appendix A to this report, the decision was made that, since Bellefonte's Code-Of-Record for installation was a much later edition than that for Watts Bar and had much more stringent requirements for quality assurance documentation on material supplied, TVA should remove all carbon steel fittings and flanges installed in safety-related systems at Bellefonte Nuclear Plant. In addition, it was decided that, due to the high number of failures of the flanges tested as a portion of the Watts Bar Program Plan, any flanges installed in any system at Bellefonte should also be removed. The requirement that this be done is documented in a memorandum from R. M. Hodges, Design Project Manager for Bellefonte Project to L. S. Cox, Project Manager of Bellefonte Nuclear Plant CONST, which is contained in Appendix C to this report. Bellefonte is now in the process of removing the fittings from these systems. The removed and non-installed fittings will be returned to Capitol for credit and will be replaced with fittings fully complying with ASME Section III criteria. Therefore, there will not be any T-L fittings left in a safety system at Bellefonte Nuclear Plant. All work will be completed for Bellefonte by December 1, 1984.

APPENDIX A TO FINAL REPORT ON NCR GENMEB8301

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Table WBN CS-1, Revision 0

Tube-Line (T-L) Carbon Steel Fittings and Flanges Shipped to WBN by Capitol Pipe and Steel Products

Description	Quantity Shipped	T-L Heat Code	TVA RD*/Contract No.
1-1/2" 300 lb, s/w Flg	17	EWSE	821602
4" Sch 80, LR 90	235	FBLQ	839443
6" Sch 80, LR 90	84	EZLI	839443
4" Sch 80, 45	123	EXOF and EYHI	839443
6" XH, 45	29	EYHJ	839443
6" XH, 45	5	ESMG	839443
6" x 4" Sch 80, C. Red	10	EUPJ	839443
2" Sch 160, 90	10	FCCC	839443
4" Sch 80, SR 90	20	NGYE	839443
4" Sch 80, Tee	25	NEIC	839443
4" x 2" Sch 80, Red Tee	10	NHFD	839443
4" Sch 80, FR 90	12	FBLQ	839447
4" Sch 80, 45	12	EXOF and EYHI	839447
18" 150 lb, SO Flg	6	EWSA	82KA2-830563**
16" x 14" Std Wt, R. Tee	1 only	FBUA	809113***
6" Std Wt, SR 90	2	EVJG	839444
24" Std Wt, Tee	4	ETGB	839444
4" x 3" XH, C. Red	6	EWTJ	809171
4" XH, Tee	17	EXAA	809171
4" XH, Tee	1 only	FBCC	809171
1/2" 150 lb, Thd Flg	4	DPH	82PK6-332817
6" Sch 40, Tee	1 only	EUFB	82PK6-327922

*All RDs are on contract 80KA3-825673.

**These flanges are on the CCW expansion joints. The expansion joints are to be returned to the contractor who will replace these flanges with flanges fully complying with ASME Section III.

***A representative sample of this same heat has been tested by a TVA approved laboratory and found to meet III of TVA's CS Progam Plan. Therefore, it is acceptable for low-pressure service as defined in I of Disposition to TVA NCR WBN 4727.

Capitol
PIPE & STEEL PRODUCTS CO.
Division of BOWLINE Corporation

301 CITY LINE AVENUE • AREA CODE 215 • TE 9-4300
BALA-CYNWYD, PENNSYLVANIA 19004

CAPITOL PIPE
WORLD-WIDE

25th SILVER
ANNIVERSARY

April 15, 1983

Tennessee Valley Authority
W7C162CK
400 West Summit Hill Drive
Knoxville, TN 37902

Attention: Earl Daugharty
Tom Witmor

Reference: Your Order 80KA3-825673 RD-839364
Our Order GB2163A2
Tube Line # D-26268-00N
Item 1 - 50 pcs. 3" X 1" Std. Conc. Red.
SA234 WPB heat code #EWTE

Your Order 80KA3-825673 RD-839360
Our Order GB2171A2
Tube Line # D-26268-00N
Item 1 - 50 pcs. 6" Std. SR 90
SA234 WPB heat code #EVJF
Item 2 - 20 pcs. 4" X 3" Std. SR 90
SA234 WPB heat code #EGX
Item 4 - 55 pcs. 2 1/2" 150# RFWN Flg.
SA105 heat code #EVGB

Your Order 80KA3-825673 RD-839358
Our Order GB2132A2
Tube Line # D-26268-00N
Item 1 - 4 pcs. 4" X 2" S/80 Conc. Red.
SA234 WPB heat code #EYAI

Your Order 80KA3-825673 RD-831660
Our Order GB2706B3
Tube Line # D-29651-75N
Item 36 - 10 pcs. 4" X 4" X 3" XH Red. Tee
SA234 WPB heat code #NDA

Your Order 80KA3-825673 RD-831687
Our Order GB1902A1
Tube Line # D-24664-00N
Item 1 - 20 pcs. 24" Std. Caps
SA234 WPB heat code #EXSF

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Your Order 80KA3-825673 RD-831660
Our Order GB1662A1
Tube Line # D-26326-00N
Item 5 - 4 pcs. 6" Std. 180° Return Bend
SA23[illegible] WPB heat code #EXOF

Your Order 80KA3-825673 RD-839375
Our Order GB2261A2
Tube Line # D-27175-00N
Item 1 - 19 pcs. 16" X 10" Std. Conc. Red.
SA234 WPB heat code #EXYC

Your Order 80KA3-825673 RD-839350
Our Order GB2122A2
Tube Line # D-24665-00N
Item 2 - 2 pcs. 14" Std. SR 90° Ell
SA23[illegible] WPB heat code #EOX
Item 3 - 6 pcs. 18" ditto
SA234 WPB heat code #EXAC
Item 4 - 1 pc. 14" Std. Tee
SA234 WPB heat code #DEZ
Item 5 - 2 pcs. 18" X 12" Std. Conc. Red.
SA234 WPB heat code #DVA
Item 6 - 2 pcs. 18" X 16" ditto
SA234 WPB heat code #EXON
Item 7 - 2 pcs. 14" Std. Caps
SA234 WPB heat code #DVA
Item 8 - 4 pcs. 16" 300# RFWN Std. Bore
SA105 heat code #EXR

Your Order 80KA3-825673 RD-839349
Our Order GB1992A2
Tube Line # D-24665-00N
Item 1 - 6 pcs. 6" S/160 45° Ell
SA234 WPB heat code #ERFL

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Your Order 80KA3-825673 RD-839362
Our Order GB2193A2
Tube Line # D-27123-00N
Item 11 - 6 pcs. 6" S/160 45°
SA234 WPB heat code #FCBB

Your Order 80KA3-825673 RD-821602
Our Order GW1504A
Tube Line # D-27123-00N
Item 10 - 17 pcs. 1 1/2" 300# RFSW
SA105 heat code #EWSE

Your Order 80KA3-825673 RD-821661
Our Order GP1507A1
Tube Line # D-27123-00N
Item 5 - 3 pcs. 2" X 1 1/2" Std. Red. 90°
SA234 WPL heat code #EGX

Your Order 80KA3-825673 RD-839343
Our Order GB2022A2
Tube Line # D-26269-00N
Item 1 - 4 pcs. 2 1/2" S/80 90°
SA234 WPB heat code #EWKG
Item 2 - 12 pcs. 2 1/2" S/80 45°
SA234 WPB heat code #EUHZ
Item 3 - 4 pcs. 2 1/2" S/80 Tees
SA234 WPB heat code EVX
Item 4 - 2 pcs. 2 1/2" S/80 Caps
SA234 WPB heat code DVA - 1 pc.; EZZC - 1 pc.

Your Order 80KA3-825673 RD-821587
Our Order GS2376A2
Tube Line # D-27782-00N
Item 1 - 1 pc. 24" Std. SR 90 Degree
SA234 WPB heat code #EUTE

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Your Order 80KA3-825673 RD-821620
Our Order GB1473A
Tube Line # D-26271-00N
Item 1 - 50 pcs. 1/2" S/80 Cap
SA234 WPB heat code #NGFB

Your Order 80KA3-825673 RD-839346
Our Order GB2021A2
Tube Line # D-26270-00N
Item 1 - 3 pcs. 2 1/2" Std. Cap
SA234 WPB heat code #EUYB
Item 5 - 4 pcs. 20" Std. Cap
SA234 WPB heat code #EXBG

Your Order 80KA3-825673 RD-831656
Our Order GB1796A1
Tube Line # D-26270-00N
Item 3 - 50 pcs. 2 1/2" Std. Tee
SA234 WPB heat code #EUPA

Your Order 80KA3-825673 RD-831689
Our Order GB1822A1
Tube Line # D-26270-00N
Item 1 - 14 pcs. 12" X 6" Std. Conc. Red.
SA234 WPB heat code #EWH

Your Order 80KA3-825673 RD-831676
Our Order GB1722A1
Tube Line # D-26270-00N
Item 13 - 4 pcs. 3" X 2" Std. Red. Tee
SA234 WPB heat code #EYAC

Your Order 80KA3-825673 RD-831660
Our Order GB1662A1
Tube Line # D-26270-00N
Item 19 - 1 pr. 3" 300# RFWN Orifice
SA105 heat code #CEE

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Your Order 80KA3-825673 RD-839375
Our Order GB2377A2
Tube Line # D-27782-00N
Item 3 - 31 ea. 4" S/160 LR 90
SA234 WPB heat code #EXWL
Item 5 - 10 pcs. 4" S/160 Tee
SA234 WPB heat code #FAYN
Item 6 - 10 pcs. 2" S/160 Cap
SA234 WPB heat code #EWUP
Item 7 - 18 pcs. 6" X 4" S/160 Conc. Red.
SA234 WPB heat code #DWN
Item 8 - 10 pcs. 4" XH SR 90
SA234 WPB heat code #FBLD
Item 10 - 10 pcs. 6" X 6" X 4" Rad. Tee
SA234 WPB heat code #NDLO
Item 11 - 8 pcs. 2" XH Cap
SA234 WPB heat code #EYJG
Item 12 - 8 pcs. 4" XH Cap
SA234 WPB heat code #EZZC
Item 13 - 10 pcs. 6" XH Cap
SA234 WPB heat code #EKD
Item 14 - 10 pcs. 8" X 4" XH Conc. Red.
SA234 WPB heat code #EXYI

Your Order 80KA3-825673 RD-839443
Our Order GW2641A3
Tube Line # D-30238-00N
Item 1 - 235 pcs. 4" XH LR 90
SA234 WPB heat code #FBLQ
Item 2 - 84 pcs. 6" XH LR 90
SA234 WPB heat code #EZLI
Item 3 - 123 pcs. 4" XH 45°
SA234 WPB heat code #EXOF, EYHI
Item 4 - 34 pcs. 6" XH 45°
SA234 WPB heat code #ESMG*
Item 5 - 10 pcs. 6" X 4" XH Conc. Red.
SA234 WPB heat code #EUPI

Cer: Sue MacCart 5/3/83
There is a typo here.
for packing & WPP's packing
Show EUPJ.

*Typo here too, should be:
29 pcs. Heat # EYHJ
5 pcs. Heat # ESMG

Capitol
PIPE & STEEL PRODUCTS CO.
Division of BOWLING Corporation

301 CITY LINE AVENUE • AREA CODE 215 • TE 9-4300
BALA-CYNWYD, PENNSYLVANIA 19004

CAPITOL PIPE WORLD-WIDE

25th SILVER ANNIVERSARY

Your Order 80KA3-825673 RD-839443
Our Order GW2641A3
Tube Line # D-30238-00N
Item 9 - 10 pcs. 2" S/160 LR 90 Deg.
SA234 WPB heat code #PCCC
Item 13 - 20 pcs. 4" XH SR 90
SA234 WPB heat code #NGYE
Item 14 - 25 pcs. 4" XH Tee
SA234 WPB heat code #NEIC
Item 15 - 10 pcs. 4" X 2" Red. Tee
SA234 WPB heat code #NHFD

Your Order 80KA3-825673 RD-839447
Our Order GW2655A3
Tube Line # D-30238-00N
Item 3 - 12 pcs. 4" XH LR 90
SA234 WPB heat code #FBLQ
Item 4 - 12 pcs. 4" XH 45°
SA234 WPB heat code #EXOF, EYHI

Dear Sir:

This letter is being sent to advise you of a problem with material supplied to your company against above referenced order. After careful investigation by Capitol Pipe the following has been determined. Material manufactured by Tube-Line Corporation, Long Island City, New York was not manufactured in compliance with the provisions of NCA3800 or 10 CFR Part 50 Appendix B, it was manufactured to ASTM standards only.

We are asking your help in locating these materials referenced above and if possible for the return of these materials. In an attempt to rectify this problem Capitol Pipe has implemented the following:

1. We are attempting to establish tracibility of materials from starting material to the finished product.

2. We have asked Tube-Line to pull from their stock all heat codes which they have supplied to us so that we can verify that chemical and physical properties are correct. This will be accomplished by performing check analysis and physical testing as required by the material spec on samples from these heats.

Capitol
PIPE & STEEL PRODUCTS CO.
Division of BOWLINE Corporation

301 CITY LINE AVENUE • AREA CODE 215 • TE 9-4300
BALA-CYNWYD, PENNSYLVANIA 19004

CAPITOL PIPE WORLD-WIDE

25th SILVER ANNIVERSARY

Due to the seriousness of this matter your prompt response would be greatly appreciated. Should you require any additional information feel free to contact me.

This letter is written as a follow-up to the information that was previously twx'd.

Sincerely,

Sue MacCart

Sue MacCart
Supervisor, Quality Assurance

SM:lmd

Capitol
PIPE & STEEL PRODUCTS, INC.
Subsidiary of BOWLINE Corporation

381 CITY LINE AVENUE • AREA CODE 215 • TE 9-4300
BALA-CYNWYD, PENNSYLVANIA 19004-1786

CAPITOL PIPE
WORLD-WIDE

September 16, 1983

Tennessee Valley Authority
Contract Engineering Group
Div. of Engineering Design
400 West Summit Hill Drive
W7C158
Knoxville, Tennessee 37902

Attention: Earl L. Daugherty
Section Supervisor

Reference: Additional Tube Line Material Supplied to TVA

Dear Earl,

This will confirm our telecon of September 14, 1983 concerning additional materials supplied to TVA which had not been previously identified:

Nuclear

1) GW2076A2 RD 809113
1 pc. 16" X 14" Std. Red. Tee SA234 WPB
heat code F8UA

2) GB2404A2 RD 839379
6 pcs. 16" 300# RFWN Std. SA105
heat code EGZ

3) GB2377A2 RD 839375
8 pr. 4" 300# RFWN Orifice Std. SA105
heat code CFG

4) P.O. 82PK6-332817 Watts Bar
GN2144A2 (non-contract)
4 pcs. 1/2" 150# RF Thd Flg. SA105
heat code DPH

Capitol
PIPE & STEEL PRODUCTS, INC.
Subsidiary of BOWLINE Corporation

301 CITY LINE AVENUE • AREA CODE 215 • TE 9-4300
BALA-CYNWYD, PENNSYLVANIA 19004-1786

5) P.O. 82PK6-327922-2 Watts Bar
1 pc. 6" S/40 Tee SA234 WPB
heat code EUFB

Commercial (ASTM only)

1) GW2571B2 RD 839444
2 pcs. 6" Std. SR 90 A234 WPB
heat code EVJG
4 pcs. 24" Std. Tee SA234 WPB
heat code ETGB

2) GW2738A3 RD 809171
6 pcs. 4" X 3" XH Conc. Red. A234 WPB
heat code EWTJ
17 pcs. 4" XH Tee A234 WPB
heat code EXAA
1 pc. 4" XH Tee A234 WPB
heat code FBCC

Also have some commercial items on several Sequoyah orders that required C of C's only, there were no heat codes referenced on paperwork.

Enclosed please find a copy of the letter I sent to TVA concerning Tube Line materials supplied. Should you have any questions let me know.

Regards,

Sue

Sue MacCart
Supervisor, Quality Assurance

SM:lmd

Enclosure

PROGRAM FOR RESOLUTION
OF THE CARBON STEEL PORTION OF THE
TUBELINE FITTING AND FLANGE PROBLEM
AT
WATTS BAR NUCLEAR PLANT

I. Capitol Pipe and Steel Products Company will audit two (but not less than 10 percent) of the 14 manufacturers who made the fittings and flange blanks for Tubeline (T-L), which were audited post facto by T-L. The purpose of these audits is to independently verify the results of the T-L audits. The scope of these audits is to verify compliance with the requirements of ASME B&PV Code, Section III, 1971 edition, Summer 1973 Addenda, subarticle NB-2600. In particular, the auditors shall look at the manufacturer's documentation program, their calibration procedures, test coupon preparation control, and shall establish that no weld repair was performed and that no NDE was required so that the criteria of paragraphs 1 through 3 of Code Case N-242-1 can be met by TVA.

The audits shall be performed with checklists which will serve to verify that each of the foreign manufacturers have good material control practices to ensure that heat traceability can be maintained during all facets of the manufacturing process, and that these practices were in effect at the time the material in question was manufactured. The procedures for crating of the fittings and flange blanks and marking of heat numbers on the crates which are shipped to T-L will be reviewed and approved (during the audit), and the manufacturer's capability of implementing these procedures thoroughly evaluated.

Capitol's November, 1982 audit of T-L will be used as the basis for acceptance of T-L's QA program for their portion of the manufacturing of these fittings or flanges.

The name(s) of Capitol's auditor(s) and their qualifications shall be submitted to TVA for review and approval prior to performing the audits. TVA may choose to accompany Capitol on these audits. Capitol will notify TVA when these audits are scheduled and again when they are completed, so that TVA can participate, if desired, and review the results when they are available.

If the audits do not result in approval of T-L's vendor qualification, all material supplied by Capitol from T-L shall be suspect. Additional audits may have to be scheduled and performed while the auditor(s) are overseas to permit acceptance of T-L's qualification of vendors.

II. All steel manufactured for these fittings or flanges must be made to the requirements of TVA's Attachment FS (Special Requirements for Steel Produced in a Foreign Country) except that the third paragraph of the attachment does not apply.

T-L shall transmit to TVA, for each heat involved in this problem a copy of the original mill test report issued by the base material manufacturer from which each of the fittings or flanges were manufactured; and in addition, T-L shall furnish any other MTR's which are applicable to each of these heats (T-L has already furnished their own CMTR's for these items). All original mill test reports shall be on company letterhead, or equivalent. These reports shall be the basis for acceptance of the test(s) performed in accordance with section III below.

III. TVA will either perform, or have T-L perform at a laboratory approved by TVA, a product analysis on one item per size, per product form (ell, tee, reducer, flanges etc.), per heat. If an item of a given product type, size, and heat number which is tested fails to fully meet the product analysis for the original chemistry within ASTM tolerances, two more items of the same product type, size, and heat number shall be tested. If the second and third tests are acceptable, then that product type, size, and heat number is considered to meet the requirements of the Code. For material which is installed and no identical prodict is available with the same heat number, TVA will do an in-place product analysis for all elements determinable by TVA's test equipment and will do a hardness test to determine approximate tensile strengths. For those items for which a noninstalled fitting or flange is available, a full product analysis and hardness test will be done. Acceptance criteria for these tests will be to the appropriate ASTM standards. Any physical or chemical testing required by the material specification which was not documented by the mills or T-L will be done by TVA or T-L during this program.

IV. On the basis of successfull completion of sections I through III above, TVA will then perform the certification required by paragraph 4 of Code Case N-242-1. Certification by TVA to Code Case N-242-1 does not change our licensing commitment nor does it impact WBN's FSAR.

V. All steel manufactured to Japanese Industrial Standards (JIS) is not acceptable at this time. Any fittings or flanges for which JIS steel is the base must be nonconformed by TVA until the JIS material specification can be evaluated by TVA. Noncompliance with the appropriate ASTM standard will be basis for rejection. Rejected material shall be replaced with material manufactured by a manufacturer acceptable to TVA.

VI. All fittings or flanges meeting II above are acceptable for use in ANSI B31.1 systems.

VII. Any fittings or flanges which cannot meet I through VI above for ASME Section III class 2 or 3 systems will be cut out and replaced--if installed--or simply replaced if they have not been installed. All replacement fittings or flanges must be manufactured by a manufacturer approved by TVA.

VIII. Tubeline supplied material is not acceptable for TVA use at Watts Bar Nuclear Plant until their QA program is revised to correct vendor qualification and traceability procedures to meet the ASME Section III code.

Prepared By: _____ Date: 4/29/83

Approved By: _____ Date: 4/29/83

E63112.09

No.

TENNESSEE VALLEY AUTHORITY

ATTACHMENT FS

SPECIAL REQUIREMENTS FOR STEEL PRODUCED IN A FOREIGN COUNTRY

Material meeting the requirements of the specified ASTM/ASME specifications may be produced by steel mills in foreign countries and their location is not restricted by the ASTM/ASME specifications.

Foreign-produced steel is acceptable for meeting the requirements of this specification provided the steel is produced to ASTM/ASME specifications by an established and reputable steel mill. Steel produced to foreign standards which by virtue of overlapping chemical and mechanical properties is considered to be "identical" or "similar" to the ASTM/ASME specification and grade, shall not be supplied. Other requirements applicable to surface conditions, cleanliness, and when required, weldability shall be satisfied.

To ensure that foreign-produced steel meets the ASTM/ASME specifications, the Contractor shall provide, at its cost and for each heat of steel, results of product analyses and tension tests performed by a domestic independent commercial laboratory approved by TVA. Such analyses and tests are to be conducted in the presence of a TVA Inspector unless he waives the right to be present. The Contractor shall be responsible technically and financially for quality assurance audits of the product analyses and tension tests. These results shall be attached to the certified mill test reports submitted by the material manufacturer. The certified mill test reports and the results of the product analyses and tension tests shall be submitted with the material at delivery. Subsequent product analyses and tension tests for the purpose of verification may be performed by TVA at its cost, and shall be a basis for rejection of any and all material if the results prove to be significantly different than the results of the supplier furnished product analyses, or if the requirements of the specification have not been met.

The Contractor shall perform sufficient dimensional checks to verify compliance with the tolerances tabulated in ASTM A 530 for pipe, ANSI B16.9 and B16.11 for fittings, ANSI B16.5 for flanges, and ASTM A 568 for sheet steel. TVA may perform subsequent receiving inspection dimensional checks at its cost. These inspections may be a basis for rejection if the results show that the material supplied does not meet the requirements of the specification.

All documents shall be written in the English language. All markings on the material shall meet the requirements of the applicable ASTM/ASME standard listed in the specifications/schedule of prices and shall be written in the English language.

All steel shall be protected during shipment to prevent damage or deterioration and shall meet the other conditions of this specification.

CAPITOL PIPE AND STEEL PRODUCTS COMPANY SUPPLIER
AUDIT REPORT 83V-62

I. INTRODUCTION

On July 22, 1983, the Nuclear Regulatory Commission officially issued IE Bulletin 83-06: "Nonconforming Materials Supplied by Tube-Line Corporation facilities at Long Island City, New York; Houston, Texas; and Carol Stream, Illinois." This bulletin described conditions under which nonconforming material had been supplied to the nuclear industry and requested actions to be taken by license holders.

These audits were conducted to verify the extent of quality assurance program implementation at various material manufacturers in Japan who supplied carbon and stainless steel pipe fittings to the Tube-Line Corporation who in turn supplied these to Capitol Pipe and Steel Products Company which has various contracts with the Tennessee Valley Authority.

II. SCOPE

During July 18-27, 1983, suppliers (three companies) to Tube-Line were audited jointly by Capitol Pipe and Steel Products Company (Capitol) and the Tennessee Valley Authority to verify compliance with ASME Boiler and Pressure Vessel Code, Section III, 1971 Edition, Summer 1973 Addenda, Subarticle NB-2600 (Watts Bar), and Section III, 1974 Edition, Subarticle NA-3700 (Bellefonte).

The suppliers listed below are material manufacturers supplying the following types of piping materials: 90° ells, 45° ells, tees, reducing tees, and/or concentric reducers:

Nippon Benkan Kogyo Company, Ltd., Yabuzuka Factory (Benkan Yabuzuka) - Stainless steel fittings welded with filler metal; stainless steel fittings welded without filler metal; stainless steel fittings, seamless; and carbon steel fittings.

Nippon Benkan Kogyo Company, Ltd., Kiryu Factory (Benkan Kiryu) - Carbon steel fittings.

Fuji Acetylene Industry Company, Ltd., (Fuji) - Stainless steel fittings welded with filler metal.

Awaji Sangyo K.K. (ASK) - Carbon steel fittings.

The audits consisted of a review of each quality assurance program description; review of documentation to verify compliance with the description; evaluation of material traceability upon receipt, storing during processing, and preparation for shipping; and review of documentation including weld procedures and welder's qualifications and NDE procedures and NDE personnel certifications as required relative to items furnished to TVA by Capitol from Tube-Line.

Z63222.01

From a previous review of procurement practices by Tube-Line, it was determined that the contract ASME requirements were not passed on to these suppliers. TVA ordered ASME material from Capitol who, subsequently, ordered ASME material from Tube-Line (approved by Capitol to manufacture carbon items from its Long Island City, New York, facility and as an ASME certified manufacturer (QSC-434, expires June 1984) of stainless items at its Carol Stream, Illinois, facility). Tube-Line ordered ASTM material from each of its vendors.

III. PARTICIPANTS IN THE AUDIT

Audit Team Members

W. C. Menzel, TVA, Office of Quality Assurance, Design Quality Assurance Branch (Team Leader)
S. MacCart, Capitol Pipe and Steel Products Company

See Attachment A for the list of supplier contacts.

IV. EVALUATIONS

Benkan Yabuzuka - Certified by the ASME in 1977 (QSC-315, expires December 1983) for carbon alloy and austenitic stainless steel pipe fittings and NPT Class 1, 2, and 3 (N-1996, expires January 1984) tubular products welded with filler metal. With the exceptions of amount of internal inspection, third party inspection, and material code stamping, the same quality assurance program is used for all manufacturing regardless of requirements.

The audit verified compliance with the quality assurance manual, both presently and during fabrication of items supplied to TVA. The overall program is the same for carbon and stainless except for the method of marking and depending upon whether or not welded pipe or plate is involved as the base material. For stainless items welded with filler metal, a lot number is assigned and maintained throughout processing to provide traceability. For carbon and stainless fittings made from seamless or welded without filler metal pipe, the internal lot number is stamped on sections of pipe prior to cutting. Finished carbon items are die stamped, and stainless items are etched with standard information including nominal size, wall thickness, symbol materials, and Benkan brand. Special requirements for marking include, optionally, brand, manufacturing number, heat number, country of origin, no coating, no marking, stencil, and/or primary coat. For materials bought to ASTM, an internal lot number, rather than a mill heat number, is used for material marking and this lot number is also required on the Benkan material test report as is the mill heat number. If more than one heat is required, the internal lot number remains the same with a -1 suffix for the second heat. According to previous information from review of the Tube-Line quality assurance program, Tube-Line requested no marking on carbon items. The stainless items were shipped with internal lot numbers, and carbon items were shipped with only "Japan" stamped on each item. Other information was removed by Benkan prior to shipping.

For welded with filler metal stainless, a log book is maintained by the welding material custodian to indicate date, quantity, heat number of weld rod, and shop order number, providing traceability for filler metal. The welder indicates completion of welding on the work instruction report. Weld procedures and welders are qualified in accordance with Section IX of the ASME Code.

Benkan performs 5-percent sample radiography testing (RT) on stock items and 100-percent RT on special items; however, Tube-Line requested no RT on items which were shipped to TVA. Nondestructive examination (NDE) personnel are qualified to ASNT-TC-1A requirements. Dipenatrant testing (PT) was the only NDE requested by Tube-Line, and documentation indicates 100-percent PT was performed by qualified personnel.

Ten of 15 mill starting material test reports for stainless steel do not indicate heat treatment. Benkan performed heat treatment on all finished stainless items; however, no documentation was received by Tube-Line to indicate heat treatment was performed by Bekan. Also, if the starting material was not heat treated, starting material test data would not be valid. Verification of heat treatment on raw material has been requested from Tube-Line. Benkan and Tube-Line stated that all Benkan work was specified, including heat treatment, on an attachment to the purchase order and certified as being done. Tube-Line declined to provide the audit team with a copy of this attachment.

Documentation for all stainless welded with filler material, except weld rod material test reports, was reviewed and obtained from Benkan. A sample of six line items for seamless and welded without filler metal was reviewed. Document packages for these six line items were obtained. The additional documentation packages for pipe without filler metal was requested and is to be submitted. Documentation for all carbon was reviewed and obtained from Benkan.

After returning from these audits, some MTR discrepancies (comparing starting material MTR, Benkan MTR, and Tube-Line MTR) were noted. No material testing was performed after the material was received by Benkan. Benkan and Tube-Line MTRs are only a transfer of results from the original MTRs. Tube-Line has been notified and requested to provide any clarification available.

Benkan Kiryu - Certified by the ASME in 1977 as a material manufacturer (N-1941, expired May 1980) for the manufacture of carbon and low alloy steel seamless pipe fittings (elbows, return bends, tees, and reducers) and butt-welding fittings. This certificate expired and Benkan opted not to apply for renewal. Basically, with decreased emphasis on inspection and no authorized nuclear inspector, Benkan Kiryu manufactures in accordance with the same quality assurance program approved by the ASME.

The audit verified compliance with the quality assurance manual, both presently and during fabrication of items supplied to TVA.

For traceability, an identification number is assigned and painted on all lengths of pipe received, transferred to cut pieces (where the internal lot number is also added to the pieces), and cross-referenced on travelers and crates. A manufacturing number, derived from the material lot number, is stamped on the finished product (unless otherwise specified by customer) and included on Benkan MTR. Again, Tube-Line requested no marking.

Heat treat was only required on one line item (tees) and is indicated on documentation obtained during the audit. Additionally, document packages--including working report, process order report, material test reports (both Benkan's and the mill's)--were obtained for all items manufactured at Kiryu.

Discrepancies with MTRs for materials from Kiryu also were noted (see Benkan Yabuzuka).

Fuji - The quality assurance manual, revision 0, dated May 20, 1982, and revision 1, dated February 2, 1983, was written subsequent to manufacturing of the items (February and March 1981 and January and February 1982) supplied to TVA. The quality assurance manual does not meet the intent of ASME Code in the areas of quality assurance involvement in qualification of vendors, drawing control, document control, and quality assurance records. During the audit, it was determined that the only procedures existing which would be applicable during the manufacture of the items furnished to TVA were weld and welder qualification procedures which were in compliance with Section IX of the ASME Code and a NDE procedure for PT which was prepared internally by the quality assurance manager who was not certified to any NDE level. Although Tube-Line specified no RT was to be performed, Fuji performed 100-percent RT for one lot of material and 30-percent RT for the other three lots. This was performed for internal assurance; however, again, with no qualified Fuji NDE personnel. During manufacture of these items, there were no qualified NDE personnel at Fuji (since that time, Fuji has begun subcontracting level II and level III NDE work to a qualified vendor). Also, since the audit, Tube-Line has stated verbally that Fuji did have quality assurance procedures prior to its manual and that Capitol/TVA will be provided copies of translated procedures in effect at the time of manufacture.

Current practices of traceability are adequate and in compliance with the documented quality assurance program. Each plate is received from the mill marked to denote size and heat number and Fuji color codes to designate grade. The mill heat number on the plate is transferred to individual shapes after cutting, and the item description and Fuji manufacturing numbers are added to the shape. Standard marking on finished items is manufacturer's name, grade and type, size and schedule, manufacturing number, and heat number.

Welding rod is issued to welder, by his chief, who maintains weld filler metal controls. Weld filler metal heat number and person performing welding are included on the job instruction to provide

traceability. Repair welding is not recorded on the job instruction—it is documented with a nonconformance report which is attached to and maintained with the job instruction. During the audit, a review of the document packages did not indicate any repair welds, but assurance was not evident that NCRs had not been written and inadvertently separated from the job instruction.

A copy of each of the three weld filler metal MTRs was requested during the audit. The quality assurance manager stated that Fuji does not desire to provide these. However, since the audit, Fuji has agreed to supply these MTRs (verbal information supplied to Capitol from Tube-Line).

The receipt and process inspection is performed by manufacturing personnel with quality control inspectors becoming involved at final inspection only. This does not present a problem except lack of absolute assurance of proper transfer of heat numbers and heat number control during manufacturing.

All MTRs for these materials have not been made available to TVA/Capitol; therefore, MTR comparisons have not been completed.

Awaji - The quality assurance manual was not written until June 1983. Prior to the manual, Awaji used a one volume specification manual which was not available in an English version. This specification manual was expanded to three volumes in May-June 1983 in conjunction with the writing of the quality assurance manual. This action was necessitated by a review by the Japanese Industrial Standards Committee (JIS) for renewal of Awaji's 1972 JIS approval. This manual does not properly address ASME Code requirements.

All raw materials were purchased to an internal mill specification which was not available to the auditors. Material traceability once raw material begins to be processed could not be verified by the auditors. Unidentified bins of materials/items were noticed throughout the facility, including unidentified items segregated in the nonconformance area and unidentified items in the shipping area. Awaji stated that there was no problem with maintaining traceability because each lot of items was identified on a "production schedule," and anything not identified could be found on this schedule and identified back to original heat numbers. This was not evident to the auditors, especially since more than one heat was used for completing an order. Also, the "production schedule" contained more than one heat of a particular item. This made the traceability system open for question.

Basic discrepancies exist with the quality assurance manual which do not provide quality controls necessary to ensure items are produced to a quality program. These include lack of involvement by quality personnel in inspection activities, document controls, qualification and selection of vendors, and nonconforming materials/items.

Discrepancies with MTRs for materials from Awaji also were noted (see Benkan Yabuzuka).

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V. CONCLUSION

Tube-Line procurement documents did not properly specify ASME Code quality requirements; therefore, adequate controls were not applied for these items. The auditors feel that had these suppliers known the requirements and application, only Benkan would have bid and would ha provided unquestionable material. Tube-Line's method of qualifying their suppliers must be questioned. The Awaji audit by Tube-Line was performed with no translated version of the procedures (no existing quality assurance manual). Some of the material obviously was supplied from stock material either at Tube-Line or at its suppliers (probably Tube-Line stock since it was not evident at any of the manufacturers that they stocked any significant amount of finished parts).

VI. AUDIT FILE

The documents compiled during this audit have been assembled in an audit records folder located in the Design Quality Assurance Branch files. The contents of this folder include memorandums, handwritten notes, quality assurance manuals, material test reports, fabrication and inspection records, company brochures, a copy of this report, and checklists used in conducting the audit.

VII. ATTACHMENTS

A. Supplier Contacts.

Z63222.01

ATTACHMENT A

Supplier Contacts

Nippon Benkan Kogyo Company, Ltd., Yabuzuka Factory

Sueaki Hayashida, Chief, Export Department, Second Section (Tokyo)
Mitsuo Isoda, Division Manager
Kunio Umemura, Chief of Quality Assurance
Masasuke Watanabe, Manager, Overseas Department (Tokyo)

Nippon Benkan Kogyo Company, Ltd., Kiryu Factory

Masao Arai, Quality Assurance Section
Yoshiro Kanoh, Deputy Division Manager
Eiji Miyazu, Division Manager
Kinpei Takakusagi, Assistant Chief, Engineering Section
Iwao Yoshida, Chief, Quality Assurance Section
Masasuke Watanabe, Manager, Overseas Department (Tokyo)

Fuji Acetylene Industry Company, Ltd.

Masatoshi Ashikawa, Quality Assurance Manager
Yasu Ide, Quality Assurance Section
Kazuhito Mochizuki, Assistant Sales Manager
Kenichi Mochizuki, Chief, Sales Department
Tsutomu Suzuki, Manufacturing Manager
Kiyoshi Mochizuki, President
Tsutomu Ohtake, General Manager (Taikyo Sangyo Co., Ltd., Tokyo)
Shinichi Imai, Assistant Manager (Taikyo Sangyo Co., Ltd., Tokyo)

Awaji Sangyo K.K.

Sada Iwakami, Director Sales Department (Tokyo)
Takuichi Katayama, Director Manager, Engineering Department
Eiji Mio, President
Mitsushi Mio, Vice President
Takahiko Mio, Director
Kazuhiko Sakai, Assistant Manager, Manufacturing

SPECTRUM LABORATORIES INC.

524 PELHAM AVE. P. O. BOX 565
PISCATAWAY, NEW JERSEY 08854

MASS SPECTROMETER CHEMICAL ANALYSIS ULTRASONIC INSPECTION NON-DESTRUCTIVE TESTING

PHYSICAL TESTING MECHANICAL TESTING CLAD TESTING X-RAY

REPORT OF CHEMICAL TESTS

CAPITOL PIPE & STEEL PRODUCTS
301 City Line Avenue
Bala Cynwyd, PA 19004

Date June 13, 1983

Laboratory No. 34730

Attention: Ms. Sue McCart

marked P.O. #L32300-00N

Element	Sample EWSE	Sample EWSA	Sample A105 Requirements	Sample
Copper				
Tin				
Lead				
Zinc				
Nickel				
Iron				
Phosphorus	0.004	0.008	0.040 max	
Antimony				
Aluminum				
Magnesium				
Manganese	0.50**	0.55*	0.60 - 1.05	
Titanium				
Silicon	0.22	0.02	0.35 max	
Chromium				
Sulfur	0.007	0.026	0.050 max	
Carbon	0.26	0.27	0.35 max	
Cobalt				
Molybdenum	Service was provided under the Quality Assurance System dated January 23, 1980, Rev #2 audited and approved by Capitol Pipe on 9-22-82.			
Columbium				
Tantalum				
Vanadium				
Tungsten				
Boron				

EWSE - RD821602

EWSA - returned

CAPITOL PIPE APPROVED B-5 9/7/83

Sample Description: A105

1 pc. EWSE ½" 300 RF S/W (Sub), Ht. ~~#E2113~~

1 pc. EWSA 18" 150# RF S/O Flange, ~~Ht. #E2143~~

Test Method

X-Ray Diffraction
X-Ray Fluorescent
Emission Spectro (Vacuum) XXX
Emission Spectro (Air)
Wet Chemistry XXX
Atomic Absorption
Infared
Gas Chromatography

The samples tested in this report were calibrated by use of

National Bureau of Standards No's. 1261/1265

ASTM Test Method: E350, E415

Matrix Method: Wrought

* 1.35% Mc max per Note 1, Table 1
**referee wet checks for % Mn were:-
EWSE - .56% Mn.
EWSA - .58% Mn.

Quality Assurance Inspection System complies with MIL-I-45208A, ASTM E-548, and ASME Sec. III, Par. NCA-4000.

We certify this is a true report of results obtained from our tests of this material.

SPECTRUM LABORATORIES INC.

Harold C. Schanck, Director — Garrett C. Schanck, Metallurgist

Samples returned upon request only. Held for a period of 30 days maximum. The liability of this laboratory relative to this report shall not exceed the amount of the invoice.

CORROSION & METALLURGICAL TESTING
PROFESSIONAL ENGINEERING

SPECTRUM LABORATORIES INC.

524 PELHAM AVE. P. O. BOX 565
PISCATAWAY, NEW JERSEY 08854

201) 752-1400 Phila. No. (215) 923-7882

CORROSION TESTING
PHYSICAL TESTING
MECHANICAL TESTING
CHEMICAL ANALYSIS
ULTRASONIC INSPECTION
X-RAY

METALLURGICAL TESTING
PROFESSIONAL ENGINEER
NON-DESTRUCTIVE TESTING
FIELD TESTING
MASS SPECTROMETER

CAPITOL PIPE & STEEL PRODUCTS
301 City Line Avenue
Bala Cynwyd, PA 19004

Attention: Ms. Sue MacCart

REPORT OF MECHANICAL TESTS

DATE: May 31, 19 83

ORDER No. P.O. #L32300-00N

LABORATORY No. 34730

The following results were obtained from our tests of this material.

Type of sample submitted: One (1) pc. 1/2" 300 RF S/W (Sub), Heat #E2113

Marked as follows: Code - EWSE, ASTM A-105-81

Service was provided under the Quality Assurance System dated January 23, 1980, Rev. #2, audited and approved by Capitol Pipe on 9-22-82.

Sample No.	Area	Yield Load lbs.	Yield Strength psi 2% offset	Tensile Load lbs.	Tensile Strength psi	4XD % ELX	R. A. %
			36,000 min		70,000 min	22.0	30.0
EWSE	.0491	2,150	43,788	3,830	78,004	25.4	57.5

CAPITOL PA B-5 APPROVED 11/2/83

TEST PROCEDURE:-

Sample Size: Fig. 5 ASTM A-370 (.250" dia)

Strain Rate: .0001 in/in. per min.

Stress Strain Diagram Reference: 34730

Test Specification - ASTM E-8

CALIBRATION PROCEDURE:-

Test Instrument: SATEC

Calibration Date: 5-5-83

in accordance with ASTM E-4.

Extensometer: B3M S/N 1322

in accordance with ASTM E-83

Quality Assurance Inspection System complies with MIL-I-45208 A, ASTM E-548, and ASME Sec. III, Par. NCA-4000.

We certify this is a true report of results obtained from our tests of this material.

SPECTRUM LABORATORIES INC.

Harold Schanck

H. C. SCHANCK, DIRECTOR

Samples returned upon request only. Held for a period of 30 days maximum. The liability of this laboratory relative to this report shall not exceed the amount of the invoice.

SPECTRUM LABORATORIES INC.

524 PELHAM AVE.
P. O. BOX 565
PISCATAWAY, NEW JERSEY 08854

MASS SPECTROMETER
CHEMICAL ANALYSIS
ULTRASONIC INSPECTION
NON-DESTRUCTIVE TESTING

PHYSICAL TESTING
MECHANICAL TESTING
FIELD TESTING
X-RAY

REPORT OF CHEMICAL TESTS

CAPITOL PIPE & STEEL PRODUCTS
301 City Line Avenue
Bala Cynwyd, PA 19004

Attention: Ms. Sue McCart

Date June 13, 1983

Laboratory No. 34730

marked P.O. #L32300-00N

Sample Description: A-234 Drillings
1 pc. FBLQ 4" S/80 L/R 90, Ht #25210
1 pc. EZLI 6" S/80 L/R 90, Ht #22212
1 pc. FCCC 2" S/160 L/R 90, Ht #61

Element	Sample FBLQ	Sample EZLI	Sample FCCC	Sample A-234 Rqmts.
Copper				
Tin	RD 839443			
Lead	RD 839447			
Zinc				
Nickel				
Iron				
Phosphorus	0.007	0.004	0.006	0.050 max.
Antimony				
Aluminum				
Magnesium				
Manganese	0.52	0.50	0.66	.29-1.06
Titanium				
Silicon	0.27	0.24	0.21	0.10 min.
Chromium				
Sulfur	0.012	0.008	0.007	0.058 max
Carbon	0.18	0.16	0.25	0.35 max.
Cobalt				
Molybdenum	Service was provided under the			
Columbium	Quality Assurance System dated			
Tantalum	January 23, 1980, Rev #2 audited and approved by Capitol Pipe on 9-22-82.			
Vanadium				
Tungsten				
Boron				

Test Method

- X-Ray Diffraction
- X-Ray Fluorescent
- Emission Spectro (Vacuum) XXX
- Emission Spectro (Air)
- Wet Chemistry XXX
- Atomic Absorption
- Infared
- Gas Chromatography

The samples tested in this report were calibrated by use of

National Bureau of Standards No's. 1261/1265

ASTM Test Method: E350, E415

Matrix Method: Wrought

CAPITOL QA APPROVED 8-5 7/7/83

Quality Assurance Inspection System complies with MIL-I-45208A, ASTM E-548, and ASME Sec. III, Par. NCA-4000.

We certify this is a true report of results obtained from our tests of this material.

SPECTRUM LABORATORIES INC.

Harold C. Schaack
Director

Garrett C. Schaack
Metallurgist

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(201) 752-1400 Phila. No. (215) 923-7882

SPECTRUM LABORATORIES INC.

524 PELHAM AVE. P. O. BOX 565

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FIELD TESTING
MASS SPECTROMETER

CAPITOL PIPE & STEEL PRODUCTS
301 City Line Avenue
Bala Cynwyd, PA 19004

Attention: Ms. Sue MacCart

CAPITOL QA APPROVED B-5 7/1/83

REPORT OF MECHANICAL TESTS

DATE: May 31, 1983

ORDER No. P.O. #L32300-00N

LABORATORY No. 34730

The following results were obtained from our tests of this material.

Type of sample submitted One (1) pc. 4" S/80 L/R 90, Heat #25210, Code - FBLQ ASTM A-234. Sample submitted one (1) rod 3.600" long.

Marked as follows Testing specimen (subsize) Fig. 5 of ASTM A-370 (.250" dia).

Service was provided under the Quality Assurance System dated January 23, 1980, Rev. #2, audited and approved by Capitol Pipe on 9-22-82.

Sample No.	Area	Yield Load lbs.	Yield Strength psi 2% offset	Tensile Load lbs.	Tensile Strength psi	4xd % EL. 2"	R. A. %
			35,000 min		60,000 min	22.0	
FBLQ	.0491	2,200	44,807	3,265	66,497	29.7	

TEST PROCEDURE:-

Sample Size Fig. 5, ASTM A-370 (.250" dia)

Strain Rate .0001 in/in. per min.

Stress Strain Diagram Reference 34730

Test Specification - ASTM E-8

CALIBRATION PROCEDURE:-

Test Instrument SATEC

Calibration Date 5-5-83

in accordance with ASTM E-4.

Extensometer B3M S/N 1322

in accordance with ASTM E-83

Quality Assurance Inspection System complies with MIL-I-45208 A, ASTM E-548, and ASME Sec. III, Par. NCA-4000.

We certify this is a true report of results ob. from our tests of this material.

SPECTRUM LABORATORIES INC.

H. C. SCHANCK, DIRECTOR

Samples returned upon request only. Held for a period of 30 days maximum. The liability of this laboratory relative to this report shall not exceed the amount of the invoice.

SPECTRUM LABORATORIES INC.

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CAPITOL PIPE & STEEL PRODUCTS
301 City Line Avenue
Bala Cynwyd, PA 19004

Attention: Ms. Sue MacCart

REPORT OF MECHANICAL TESTS

DATE: May 31, 1983

ORDER No. P.O. #L32300-00N

LABORATORY No. 34730

The following results were obtained from our tests of this material.

Type of sample submitted One (1) pc. 6" S/80 L/R 90, Heat #22212, Code - EZLI ASTM A-234. Sample submitted one (1) rod 5.500" long

Marked as follows Testing specimen (subsize) Fig. 5 of ASTM A-370 (.350" dia).

Service was provided under the Quality Assurance System dated January 23, 1980, Rev. #2, audited and approved by Capitol Pipe on 9-22-82.

Sample No.	Area	Yield Load lbs.	Yield Strength psi 2% offset 35,000 min	Tensile Load lbs.	Tensile Strength psi 60,000 min	4xd % EL. 22.0	R. A. %
EZLI	.100	3,900	39,000	6,200	62,000	33.5	

CAPITOL QA APPROVED B-5 5/31/83

TEST PROCEDURE:-

Sample Size Fig. 5, ASTM A-370 (.350" dia)
Strain Rate .0001 in/in. per min.
Stress Strain Diagram Reference 34730
Test Specification - ASTM E-8

CALIBRATION PROCEDURE:-

Test Instrument SATEC
Calibration Date 5-5-83
in accordance with ASTM E-4.
Extensometer B3M S/N 1322
in accordance with ASTM E-83

Samples returned upon request only. Held for a period of 30 days maximum. The liability of this laboratory relative to this report shall not exceed the amount of the invoice.

Quality Assurance Inspection System complies with MIL-I-45208 A, ASTM E-548, and ASME Sec. III, Par. NCA-4000.

We certify this is a true report of results obtained from our tests of this material.

SPECTRUM LABORATORIES INC.

Harold Schanck

H. C. SCHANCK, DIRECTOR

SPECTRUM LABORATORIES INC.

524 PELHAM AVE. P. O. BOX 565
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(201) 752-1400 Phila. No. (215) 923-7882

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CAPITOL PIPE & STEEI PRODUCTS
301 City Line Avenue
Bala Cynwyd, PA 19004

Attention: Ms. Sue MacCart

REPORT OF MECHANICAL TESTS

DATE: May 31, 1983

ORDER No. P.O. #L32300-00N

LABORATORY No. 34730

The following results were obtained from our tests of this material.

Type of sample submitted One (1) pc. 2" S/160 L/R 90, Heat #61, Code - FCCC ASTM A-234. Sample submitted one (1) rod 4.440" long.

Marked as follows Testing specimen (subsize) Fig. 5 of ASTM A-370 (.350" dia)

Service was provided under the Quality Assurance System dated January 23, 1980, Rev. #2, audited and approved by Capitol Pipe on 9-22-82.

Sample No.	Area	Yield Load lbs.	Yield Strength psi 2% offset 35,000 min	Tensile Load lbs.	Tensile Strength psi 60,000 min	4xd % El 22.0	R. A. %
FCCC	.100	4,100	41,000	6,565	65,650	27.7	

CAPITOL PIPE R-5 APPROVED 4/11/83

TEST PROCEDURE:-

Sample Size Fig. 5, ASTM A-370 (.350" dia)
Strain Rate .0001 in/in. per min.
Stress Strain Diagram Reference 34730
Test Specification - ASTM E-8

CALIBRATION PROCEDURE:-

Test Instrument SATEC
Calibration Date 5-5-83
in accordance with ASTM E-4.
Extensometer B3M S/N 1322
in accordance with ASTM E-83

Quality Assurance Inspection System complies with MIL-I-45208 A, ASTM E-548, and ASME Sec. III, Par. NCA-4000.

We certify this is a true report of results obtained from our tests of this material.

SPECTRUM LABORATORIES INC.

Harold Schanck

H. C. SCHANCK, DIRECTOR

Samples returned upon request only. Held for a period of 30 days maximum. The liability of this laboratory relative to this report shall not exceed the amount of the invoice.

SPECTRUM LABORATORIES INC.

MASS SPECTROMETER
CHEMICAL ANALYSIS
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524 PELHAM AVE.
PISCATAWAY, NEW JERSEY 08854

P. O. BOX 565

PHYSICAL TESTING
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REPORT OF CHEMICAL TESTS

CAPITOL PIPE & STEEL PRODUCTS
301 City Line Avenue
Bala Cynwyd, PA 19004

Date June 13, 1983

Laboratory No. 34730

Attention: Ms. Sue McCart

marked P.O. #L32300-00N

Element	Sample EXOF	Sample EYHI	Sample NHFD	Sample A234 Rqmts*
Copper				
Tin				
Lead				
Zinc				
Nickel				
Iron				
Phosphorus	0.026	0.004	0.004	0.050 max
Antimony				
Aluminum				
Magnesium				
Manganese	0.52	0.57	0.50	.29 - 1.06
Titanium				
Silicon	0.21	0.31	0.25	0.10 min.
Chromium				
Sulfur	0.021	0.006	0.028	0.058 max
Carbon	0.20	0.14	0.21	0.35 max
Cobalt				
Molybdenum				
Columbium				
Tantalum				
Vanadium				
Tungsten				
Boron				

RO 839443
RO 839447

Service was provided under the Quality Assurance System dated January 23, 1980, Rev #2 audited and approved by Capitol Pipe on 9-22-82.

Sample Description: A-234
1 pc. EXOF 4" S/80 45, Ht. #10996
1 pc. EYHI 4" S/80 45, Ht. #2240
1 pc. NHFD 4" x 2" S/80 Tee, Ht. # 26740 (Drillings)

Test Method

- X-Ray Diffraction
- X-Ray Fluorescent
- Emission Spectro (Vacuum) XXX
- Emission Spectro (Air)
- Wet Chemistry XXX
- Atomic Absorption
- Infared
- Gas Chromatography

*WPC

The samples tested in this report were calibrated by use of

National Bureau of Standards No's. 1261/1265

ASTM Test Method: E350, E415

Matrix Method: Wrought

CAPITOL QA APPROVED B-5 1/7/83

Quality Assurance Inspection System complies with MIL-I-45208A, ASTM E-548, and SME Sec. III, Par. NCA-4000.

We certify this is a true report of results obtained from our tests of this material.

SPECTRUM LABORATORIES INC.

Harold C. Schaack
Director

Garrett C. Schaack
Metallurgist

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CAPITOL PIPE & STEEL PRODUCTS
301 City Line Avenue
Bala Cynwyd, PA 19004

Attention: Ms, Sue MacCart

REPORT OF MECHANICAL TESTS

DATE: May 31, 1983

ORDER No. P.O. #L32300-00N

LABORATORY No. 34730

The following results were obtained from our tests of this material.

Type of sample submitted One (1) pc. 4" S/80 45, Heat #10996, Code- EXOF

Marked as follows ASTM A-234

Service was provided under the Quality Assurance System dated January 23, 1980, Rev. #2, audited and approved by Capitol Pipe on 9-22-82.

Sample No.	Area	Yield Load lbs.	Yield Strength psi 35,000 min (.2% offset)	Tensile Load lbs.	Tensile Strength 60,000 min psi	4Xd % EL. 2" 22.0	R. A. %
EXOF	.0491	2,455	50,000	3,340	68,024	27.3	

CAPITOL QA B-5 APPROVED 7/7/83

TEST PROCEDURE:-

Sample Size Fig. 5, ASTM A-370 (.250" dia)

Strain Rate .0001 in/in. per min.

Stress Strain Diagram Reference 34730

Test Specification - ASTM E-8

CALIBRATION PROCEDURE:-

Test Instrument SATEC

Calibration Date 5-5-83

In accordance with ASTM E-4.

Extensometer B3M S/N 1322

In accordance with ASTM E-83

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Quality Assurance Inspection System complies with MIL-I-45208 A, ASTM E-548, and ASME Sec. III, Par. NCA-4000.

We certify this is a true report of results obtained from our tests of this material.

SPECTRUM LABORATORIES INC.

Harold Schanck

H. C. SCHANCK, DIRECTOR

SPECTRUM LABORATORIES INC.

524 PELHAM AVE. P. O. BOX 565
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CAPITOL PIPE & STEEL PRODUCTS
301 City Line Avenue
Bala Cynwyd, PA 19004

Attention: Ms. Sue MacCart

REPORT OF MECHANICAL TESTS

DATE: May 31, 1983

ORDER No. P.O. #L32300-00N

LABORATORY No. 34730

The following results were obtained from our tests of this material.

Type of sample submitted One (1) pc. 4" x 2" S/80 Tee. Heat #26740. Code - NHFD ASTM A-234. Sample submitted one (1) rod 5.200" long. Testing specimen (subsize) Fig. 5 of ASTM A-370 (.350" dia).

Marked as follows

Service was provided under the Quality Assurance System dated January 23, 1980, Rev. #2, audited and approved by Capitol Pipe on 9-22-82.

Sample No.	Area	Yield Load lbs.	Yield Strength psi 2% offset 35,000 min	Tensile Load lbs.	Tensile Strength psi 60,000 min	4xd % Elong. 22.0	R. A. %
NHFD	.100	4,200	42,000	5,850	58,500	29.2	

CAPITOL OA APPROVED B-5 11/7/83

TEST PROCEDURE:-

Sample Size Fig. 5, ASTM A-370 (.350" dia)
Strain Rate .0001 in/in. per min.
Stress Strain Diagram Reference 34730
Test Specification - ASTM E-8

CALIBRATION PROCEDURE:-

Test Instrument SATEC
Calibration Date 5-5-83
in accordance with ASTM E-4.
Extensometer B3M S/N 1322
in accordance with ASTM E-83

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Quality Assurance Inspection System complies with MIL-I-45208A, ASTM E-548, and ASME Sec. III, Par. NCA-4000.

We certify this is a true report of results obtained from our tests of this material.

SPECTRUM LABORATORIES INC.

Harold C. Schanck

H. C. SCHANCK, DIRECTOR