
LICENSEE CONTRACTOR AND VENDOR INSPECTION STATUS REPORT

QUARTERLY REPORT
JANUARY 1983 - MARCH 1983

UNITED STATES NUCLEAR REGULATORY COMMISSION



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Prepared by: Region IV
U.S. Nuclear Regulatory Commission
Arlington, TX 76011



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PREFACE

A fundamental premise of the Nuclear Regulatory Commission's (NRC) nuclear facility licensing and inspection program is that a licensee is responsible for the proper construction and safe operation of nuclear power plants. The total government-industry system for the inspection of nuclear facilities has been designed to provide for multiple levels of inspection and verification. Licensees, contractors, and vendors each participate in a quality verification process in accordance with requirements prescribed by, or consistent with, NRC rules and regulations. The NRC inspects to determine whether its requirements are being met by a licensee and his contractors, while the great bulk of the inspection activity is performed by the industry within the framework of sequential ongoing quality verification programs.

In implementing this multilayered approach, a licensee is responsible for developing a detailed quality assurance (QA) plan as part of his license application. This plan includes the QA programs of the licensee's contractors and vendors. The NRC reviews the licensee's and contractor's QA plans to determine that implementation of the proposed QA program would be satisfactory and responsive to NRC regulations.

Firms designing nuclear steam supply systems, architect engineering firms doing design work on nuclear power plants, and certain selected vendors are currently inspected on a regular basis by the NRC. NRC inspectors, during periodic inspections, ascertain through direct observation of selected activities (including review of processes and selected hardware, discussions with employees and selected record review) whether a licensee or contractor is satisfactorily implementing their QA program. If nonconformances with QA commitments are found, the inspected organization is requested to take appropriate corrective action and to institute preventive measures to preclude recurrence.

In addition to the QA program inspections, NRC also conducts reactive inspections of the licensee's contractors and vendors. These are special, limited scope inspections to verify that organizations supplying safety-related equipment or services to licensed facilities are exercising appropriate corrective/preventive measures when defects or conditions which could adversely affect the safe operation of such facilities are identified and that these organizations are complying with the NRC requirements which govern the evaluation and reporting of such conditions.

In the case of the principal licensee contractors, such as nuclear steam supply system designers and architect engineering firms, the NRC encourages submittal of a description of corporate-wide QA programs for review and acceptance by the NRC. Upon acceptance by NRC, described QA programs provide written bases for inspection on a generic basis, rather than with respect to specific commitments made by a particular licensee. Once accepted by the NRC, a corporate QA program of a licensee's contractor will be acceptable for all license applications that incorporate the program by reference in a Safety

Analysis Report (SAR). In such cases, a contractor's QA program will not be reviewed by the NRC as part of the licensing review process, provided that the incorporation in the SAR is without change or modification. However, new or revised regulations, Regulatory Guides, or Standard Review Plans affecting QA program controls may be applied by the NRC to previously accepted QA programs.

The NRC Region IV Office in Arlington, Texas, inspects the implementation of QA programs of nuclear steam supply system designers and architect engineering firms which have been submitted to and approved by the NRC in the form of Topical Reports or Standardized Programs. Upon completion of inspections confirming satisfactory implementation of QA programs, NRC will issue a confirming letter to the nuclear steam system supplier or architect engineering firm.

Licensees and applicants that have referenced the NRC approved Topical Report, or Standardized Program, in SARs (or have adopted the total QA program described in the Topical Report or Standardized Program) may, at their option, use the confirming letter to fulfill their obligation under 10 CFR Part 50, Appendix B, Criterion VII, that requires them to perform initial source evaluation audits and subsequent periodic audits to verify QA program implementation. For additional details concerning the NRC letter, refer to "SAMPLE LETTER" included in this report.

Licensees or construction permit holders may choose not to make use of a contractor's NRC accepted program, or such an accepted program may not exist. In such cases, the Region IV inspections of nuclear steam supply^{*} system designers, architect engineering firms, or other licensee contractors, subcontractors, or suppliers, will be based on programs developed to meet the commitments made by the licensee or construction permit holder. These Region IV inspections will not relieve the licensees or applicants from any inspection/verification responsibilities required by Criterion VII.

The NRC currently is continuing their evaluation of a proposed program for NRC acceptance of third-party (ASME) certification of vendor QA programs. Should the proposed program be endorsed by NRC, it is anticipated that, subject to NRC audits of the third-party program, licensees and applicants would be able to use the ASME nuclear certification and inspection system to fulfill that part of their obligation under 10 CFR Part 50, Appendix B, Criterion VII, which required them to perform initial source evaluation/selection audits and subsequent periodic audits to assess the QA program implementation.

A third category of firms consists of organizations whose QA programs or manufacturing processes have not been reviewed and approved by NRC, or by a third party (such as ASME). This category of firms is subject to NRC inspection based on the safety significance and performance of products or services provided by such firms. Since such firms will not receive a third-party review of their QA programs, results of the direct NRC inspections may not be used to fulfill the licensees's obligations under Criterion VII.

The White Book contains information normally used to establish a "qualified suppliers" list; however, the information contained in this document is not adequate nor is it intended to stand by itself as a basis for qualification of suppliers.

Correspondence with contractors and vendors relative to the inspection data contained in the White Book is placed in the USNRC Public Document Room, located in Washington, D.C.

Copies of the White Book may be obtained at a nominal cost by writing to the National Technical Information Service, Springfield, Virginia 22161.

ORGANIZATION: COMPANY, DIVISION
CITY, STATE

REPORT NO.:	Docket/Year Sequence	INSPECTION DATE(S)	INSPECTION ON-SITE HOURS:
CORRESPONDENCE ADDRESS:		Corporate Name Division ATTN: Name/Title Address City/State/Zip Code	SAMPLE PAGE (EXPLANATION OF FORMAT AND TERMINOLOGY)
ORGANIZATIONAL CONTACT:	Name/Title		
TELEPHONE NUMBER:	Telephone Number		
PRINCIPAL PRODUCT: Description of type of components, equipment, or services supplied.			
NUCLEAR INDUSTRY ACTIVITY: Brief statement of scope of activity including percentage of organization effort, if applicable.			
ASSIGNED INSPECTOR:	Signature _____ Name/VPB Section		Date _____
OTHER INSPECTOR(S):	Name/VPB Section		
APPROVED BY:	Signature _____ Name/VPB Section		Date _____
INSPECTION BASES AND SCOPE:			
A. BASES: Pertain to the inspection criteria that are applicable to the activity being inspected; i.e., 10 CFR Part 21, Appendix B to 10 CFR Part 50 and Safety Analysis Report or Topical Report commitments.			
B. SCOPE: Summarizes the specific QA program areas that were reviewed, and/or identifies plant systems, equipment or specific components that were inspected. For reactive (identified problem) inspections, the scope summarizes the problem that caused the inspection to be performed.			
PLANT SITE APPLICABILITY: Lists docket numbers of licensed facilities for which equipment, services, or records were examined during the inspection.			

ORGANIZATION: COMPANY, DIVISION
CITY, STATE

REPORT
NO. :

INSPECTION
RESULTS:

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- A. VIOLATIONS: Shown here are any inspection results determined to be in violation of Federal Regulations (such as 10 CFR Part 21) that are applicable to the organization being inspected.
- B. NONCONFORMANCES: Shown here are any inspection results determined to be in nonconformance with applicable commitments to NRC requirements. In addition to identifying the applicable NRC requirements, the specific industry codes and standards, company QA manual sections, or operating procedures which are used to implement these commitments may be referenced.
- C. UNRESOLVED ITEMS: Shown here are inspection results about which more information is required in order to determine whether they are acceptable items or whether a violation or nonconformance may exist. Such items will be resolved during subsequent inspections.
- D. STATUS OF PREVIOUS INSPECTION FINDINGS: This section is used to identify the status of previously identified violations, items of nonconformance, and/or unresolved items until they are closed by appropriate action. For all such items, and if closed, include a brief statement concerning action which closed the item. If this section is omitted, all previous inspection findings have been closed.
- E. OTHER FINDINGS OR COMMENTS: This section is used to provide significant information concerning the inspection areas identified under "Inspection Scope." Included are such items as mitigating circumstances concerning a violation or nonconformance, or statements concerning the limitations or depth of inspection (sample size, type of review performed and special circumstances or concerns identified for possible followup). For reactive inspections, this section will be used to summarize the disposition or status of the condition or event which caused the inspection to be performed.

SAMPLE PAGE
(EXPLANATION OF FORMAT AND TERMINOLOGY)

CONTRACTORS WITH NRC LETTERS CONFIRMING QA PROGRAM IMPLEMENTATION

(SEE NEXT PAGE FOR EXAMPLE OF CONFIRMING LETTERS)

CONTRACTOR	TOPICAL REPORT	REVISION	DATE OF NRC LETTER
BABCOCK & WILCOX	BAW 10096A	REVISION 1	DECEMBER 30, 1975
STONE & WEBSTER	SWSQAP 1-74	REVISION A	DECEMBER 30, 1975
WESTINGHOUSE NTD	WCAP-8370	REVISION 9A	APRIL 30, 1981
BECHTEL-GAITHERSBURG	BQ-TOP-1	REVISION 3A	NOVEMBER 2, 1981
BECHTEL-SAN FRANCISCO	BQ-TOP-1	REVISION 3A	JUNE 12, 1981
EBASCO SERVICES, INC.	ETR-1001	REVISION 8A	MARCH 31, 1980
COMBUSTION ENGINEERING	CENPD-210-A	REVISION 3	JUNE 2, 1981
GIBBS & HILL, INC.	GIBSAR 17-A	AMENDMENT 6	FEBRUARY 7, 1983
UNITED ENGINEERS & CONSTRUCTORS	UEC-TR-001-3A	AMENDMENT 5	MARCH 31, 1977
GENERAL ELECTRIC Co.	NEDO-11209-04A	N/A	MARCH 30, 1979
SARGENT & LUNDY ENGINEERS	SL-TR-1A	REVISION 5	MAY 17, 1979
BECHTEL-LOS ANGELES	BQ-TOP-1	REVISION 3A	DECEMBER 20, 1982
GILBERT-COMMONWEALTH	GAI-TR-106	REVISION 2A	FEBRUARY 2, 1981
BECHTEL-ANN ARBOR	BQ-TOP-1	REVISION 2A	MAY 7, 1981



UNITED STATES
NUCLEAR REGULATORY COMMISSION

REGION IV
611 RYAN PLAZA DRIVE, SUITE 1000
ARLINGTON, TEXAS 76011

(ADDRESSEE)

Gentlemen:

A series of Nuclear Regulatory Commission (NRC) inspections have been conducted to review your implementation of the quality assurance program applicable to NRC applicants or licensees who have contracted for services from the (applicable corporate entity). These inspections consisted of selective examination of procedures and representative records, interview of personnel, and direct observation by the inspectors. As a result of these inspections, the NRC has concluded that the QA program described in Topical Report _____ is being implemented satisfactorily. Neither this conclusion nor the remainder of this letter applies to manufacturing activities or construction-related activities conducted at reactor sites.

Licensees and applicants that have referenced the above Topical Report in their Safety Analysis Reports (or have adopted the total quality assurance program described in that Topical Report) may, at their option, use this letter to fulfill their obligation under 10 CFR Part 50, Appendix B, Criterion VII, that requires them to perform initial source evaluation/selection audits and subsequent periodic audits to assess the quality assurance program implementation.

The NRC expression of satisfaction with the implementation of your quality assurance program does not assure that a specific product or service offered by you to your customer is of acceptable quality, nor does it relieve the applicant or licensee from the general provision of Criterion VII which requires verification that purchased material, equipment, or services conform to the procurement documents. It is recognized that in some cases this assurance can be made by the applicant or licensee without audits or inspections at your facility.

Continuing acceptability of implementation of your quality assurance program is contingent upon your maintaining a satisfactory level of program implementation, certified through periodic NRC inspection, throughout all corporate organization units and nuclear projects encompassed by your program. Should your program implementation at any time be found unacceptable you will be notified by letter and requested to correct the deficiencies promptly. In the event you fail to correct the deficiencies promptly, or if the record of deficiencies is such as to indicate generally poor program implementation, you and the applicants and licensees who have referenced your quality assurance program will be notified that the generic implementation of your program is no longer

(ADDRESSEE)

-2-

(DATE)

acceptable to the NRC. All of the audit/inspection requirements of Criterion VII, Appendix B, 10 CFR Part 50, must then be implemented by the applicants or licensees. The NRC will reinstate its letter of acceptability of implementation of your quality assurance program only after our inspectors have concluded, based on reinspection, that you have again demonstrated full compliance.

Except as noted above, the conclusions expressed in this letter will be effective for 3 years from the date of issue of the letter. At that time, program performance over the previous 3-year period will be evaluated and this letter reissued, if appropriate.

The results of our inspections are published quarterly in the Licensee Contractor and Vendor Inspection Status Report (NUREG 0040), which is made available to NRC facility applicants, licensees, contractors, and vendors as well as to members of the public, by subscription.

Sincerely,

Regional Administrator

ORGANIZATION: ACTON ENVIRONMENTAL TESTING CORPORATION
ACTON, MASSACHUSETTS

REPORT NO.: 99900912/82-02	INSPECTION DATE(S) 10/18-22/82	INSPECTION ON-SITE HOURS: 78
CORRESPONDENCE ADDRESS: Acton Environmental Testing Corporation ATTN: Mr. R. S. Cowdrey President 533 Main Street Acton, MA 01720		
ORGANIZATIONAL CONTACT: Mr. R. S. Cowdrey, President TELEPHONE NUMBER: (617) 263-2933		
PRINCIPAL PRODUCT: Equipment Testing Services		
NUCLEAR INDUSTRY ACTIVITY: Acton Environmental Testing Corporation (AETC) provides testing services for commercial, military, and nuclear power industry customers. Approximately 45% of their capacity is used for nuclear power industry testing.		
ASSIGNED INSPECTOR:	<u>J. R. Agee</u> J. R. Agee, Equipment Qualification Section (EQS)	<u>12/11/82</u> Date
OTHER INSPECTOR(S):	W. E. Foster, Reactive & Component Program Section L. E. Letz, Sandia National Laboratories	
APPROVED BY:	<u>H. S. Phillips</u> H. S. Phillips, Chief, EQS	<u>12/14/82</u> Date
INSPECTION BASES AND SCOPE:		
A. <u>BASES</u> : 10 CFR Part 50, Appendix B.		
B. <u>SCOPE</u> : The purpose of the inspection was to: (1) follow up on previous inspection findings, and (2) inspect the implemented QA program.		
PLANT SITE APPLICABILITY:		
50-382.		

REPORT NO.: 99900912/82-02	INSPECTION RESULTS:	PAGE 2 of 5
A. <u>VIOLATIONS:</u>		
None		
B. <u>NONCONFORMANCES:</u>		
1. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 1.5 of Section 533-1 of the Quality Assurance (QA) Manual, Revision 26, dated August 9, 1982, personnel responsible for preparing, reviewing, and approving revisions to test procedures had not been designated.		
2. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraphs 2.1, 5.7, 6.1, and 6.1.1 of Section 533-8 of the QA Manual, Revision 26, dated August 9, 1982:		
a. The Monthly Recall Schedule for October and September 1982, respectively, did not designate equipment due for calibration during the month indicated in the schedule for the following: (1) DC Voltmeter, AETC No. ML 521 was due on October 7, 1982, while the label on the unit indicated that it was calibrated August 16, 1982, and due February 16, 1983; (2) Power Supply, AETC No. PD 375 was due on October 5, 1982, while the label on the unit indicated that it was calibrated on August 9, 1982, and due February 9, 1983; (3) Fixed Standard, AETC No. ZI 506 was due on September 1, 1982, while the label on the unit indicated that it was calibrated in October 1981 and due in October 1982.		
b. An AETC Form 533-8-5 had not been completed on the Power Supply, AETC No. 375, which was outside the specification tolerance of five percent for the 300 VDC output. The calibration report for August 9, 1982, indicates the measured output was 3.45 VDC. The unit exhibited a label which indicated that calibration is due February 9, 1983.		
c. The Calibration Report Form, dated July 17, 1982, had not been filled out in its entirety for the Audio Amplifier, AETC No. AM 342; no information had been entered in the "Type of Equipment" section. The equipment displayed a label that indicated calibration was performed on July 17, 1982, and due on January 17, 1983.		

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d. The calibration labels affixed to AETC Equipment Nos. TP 301 and PI 314 did not show the date of calibration, the due date of next calibration, or who performed the calibration.

C. UNRESOLVED ITEMS:

None

D. STATUS OF PREVIOUS INSPECTION ITEMS:

(Closed) Violation (82-01): AETC had failed to assure that each procurement document specified the provisions of 10 CFR Part 21. Subsequent to the last inspection, AETC issued directives to all suppliers imposing the requirements of 10 CFR Part 50, Appendix B and 10 CFR Part 21.

E. OTHER FINDINGS OR COMMENTS:

QA Program Implementation - Prior to the evaluation of program implementation, the NRC inspectors determined that AETC had developed a QA Manual. A review of the manual's table of contents described the subject matter and showed that 16 criteria of 10 CFR Part 50, Appendix B correlated to the subject matter. Two criteria, design control, and control of special processes were not applicable to the AETC QA program.

Since the objective of this inspection was to evaluate the implemented QA program, only parts of 12 sections of the QA Manual were reviewed. This review was accomplished by observing or inspecting the implementation practices and comparing the practice with the written procedure. A formal and more detailed review of the AETC QA Manual and procedures will be completed during a future inspection.

One NRC inspector evaluated the implementation of the following 10 CFR Part 50, Appendix B criteria: Organization; QA Program; Design Control (not applicable); Identification and Control of Materials, Parts, and Components; Control of Special Processes (not applicable); Inspection; Test Control; and Handling, Storage, and Shipping. During the inspection of these areas, the inspector examined the following documents: QA Manual, eight procedures, three purchase orders, and two test plans.

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NO.: 99900912/82-02

INSPECTION
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No nonconformances were identified in the above areas; however, several weaknesses in the manual were identified where a lack of clarity may cause a nonconformance to occur. These weaknesses included the following: (1) weak description of the engineering organization authority, responsibilities, and interface with the quality organization; and (2) weak description of the control of drawings, procedures, and specifications because the controls were described, in part, in "Document Control" Section 533-4 and were contained in forms. The QA manager understood there was no requirement to improve these areas; however, he committed to take appropriate steps to improve these areas.

A second NRC inspector evaluated the implementation of the following 10 CFR Part 50, Appendix B criteria: Procurement Document Control; Instructions, Procedures, and Drawings; Document Control; Control of Purchased Material, Equipment, and Services; and Control of Measuring and Test Equipment. During the inspection of these areas, the inspector examined the following documents: QA Manual; four procedures; six purchase orders; one letter; and other documents which included three purchase requisitions, four job folders, two calibration recall documents, and six calibration reports. Also, activity was observed at 2 test stations, including the visual inspection of 12 pieces of test and measurement equipment.

Nonconformances to Criterion V of Appendix B to 10 CFR Part 50 are described in paragraphs B.1 and B.2.a.-d., above. In conjunction with these nonconformances, the following areas were discussed with AETC management:

1. The inspector observed that revision records of three test procedures exhibited only one set of initials in the approval block. It was determined, in each case, that the initials were those of the project engineer making the revision. This practice was inconsistent with that reflected on the cover sheet of the procedures inasmuch as the cover sheet contained the identities of the preparer/reviser and the reviewer/approver.

The inspector was informed that, in practice, the project engineer makes revisions and the section leader reviews and approves the changes. The inspector was informed, initially, that this practice was not documented.

Subsequently, the inspector's attention was directed to paragraph 1.5 and its subparagraphs of Section 533-1 of the QA Manual which state, in part, "Necessary documents showing compliance shall be signed-off by designated responsible individuals." In response to query, the

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inspector was informed that no document was available to identify responsible individuals designated to prepare, revise, review, and approve test procedures. As a result, nonconformance B.1 was identified.

2. The inspector observed that: (a) the calibration recall system failed to indicate when equipment was due for calibration; (b) a record had not been initiated on a power supply that was not within the allowable limits; (c) a calibration report form had not been completed in its entirety; and (d) calibration labels affixed to two items did not display the required information. As a result, nonconformance B.2 and its subparagraphs a, b, c, and d were identified.

ORGANIZATION: ALLOY RODS, INCORPORATED
HANOVER, PENNSYLVANIA

REPORT NO.:	99900806/83-01	INSPECTION DATE(S)	1/24-28/83	INSPECTION ON-SITE HOURS:	33
CORRESPONDENCE ADDRESS: Alloy Rods, Incorporated ATTN: Mr. D. J. Jacoby Manager of QA & Process Engineering P. O. Box 517 - Wilson Avenue Hanover, PA 17331					
ORGANIZATIONAL CONTACT: Mr. D. J. Jacoby, Manager of QA & Process Engineering TELEPHONE NUMBER: (717) 637-8911					
PRINCIPAL PRODUCT: Welding filler metals.					
NUCLEAR INDUSTRY ACTIVITY: Approximately 12 percent of the 1982 production.					
ASSIGNED INSPECTOR: <u>Wm McNeill for</u> <u>2/17/83</u> J. T. Conway, Reactive and Component Program Section (R&CPS) Date					
OTHER INSPECTOR(S):					
APPROVED BY: <u>I. Barnes, Chief, R&CPS</u> <u>2/17/83</u> Date					
INSPECTION BASES AND SCOPE: A. <u>BASES</u> : 10 CFR Part 50, Appendix B and 10 CFR Part 21. B. <u>SCOPE</u> : This inspection was made as a result of the notification by Gulf States Utilities Company of the furnishing of mixed stainless steel electrodes (E308 and E309) in the same can to the River Bend nuclear site. In addition, the following programmatic areas were inspected: training, (Cont. on next page)					
PLANT SITE APPLICABILITY: Docket No. 50-548/549.					

REPORT NO.: 99900806/83-01	INSPECTION RESULTS:	PAGE 2 of 4
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SCOPE: (Cont.) identification and control of items, manufacturing process control, inspection, NDE, material identification and control, calibration, document control, procurement control, audits (internal/external), and reporting of defects.

A. VIOLATIONS:

Contrary to Section 21.6 of 10 CFR Part 21:

1. A copy of 10 CFR Part 21 that was posted was not the current copy dated September 1, 1982.
2. A copy of Section 206 was not posted.

B. NONCONFORMANCES:

1. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 2.1 and subparagraph 2.2.1 in Section QA-3 of the Quality System Manual (QSM), a review of the training and certification records for two quality technicians and six quality control inspectors revealed: (1) a lack of documentation on examinations for the two technicians, and (2) no evidence of training sessions on Code revisions being given to the technicians and inspectors.
2. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraphs 5.2, 5.3, and 5.4 in Section QA-5 of the QSM, a review of processing procedures manuals revealed the following: (a) the record revision page for Revision 1 of the "Low Hydrogen Coated Electrodes Procedure Manual" was not signed off by the affected departments; (b) revisions to four pages of Section SA-2 of the "Spoolarc Processing Procedures" manual were not made to the manual copy assigned to the Manager, QA; (c) the "Spoolarc Processing Procedures" and the "Stainless Steel Processing Procedures" manuals noted on the cover page that both manuals were totally reviewed and revised on May 1, 1981, but two assigned copies of each of the two procedures manuals were identified to contain numerous pages that were dated as earlier revisions; and (d) the record revision page for Revision 5 of the "Spoolarc Processing Procedures" manual was not signed off by the Manager, QA.

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<p>3. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section 11.0 in Procedure QC-9000, a review of purchase orders for 1981 and 1982 to suppliers of calibration services revealed that purchase orders to Tinius Olsen Testing and Fairbanks Weighing Division did not specify any system requirements.</p> <p>4. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 2.1 in Section QA-11 of the QSM, during observation of a production run of electrodes on line 5, it was noted that a Starrett dial gage used to check concentricity at the front-end inspector's station did not contain a serial number nor a sticker indicating its calibration status.</p> <p>5. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Part 0 in Section SCE-I of processing procedures, during observation of a production run of electrodes on line 5, it was noted that the press operator was taking only one concentricity check on the examined electrodes.</p> <p>6. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraphs 2.1, 2.2, and 4.1 in Section QA-13 of the QSM, a review of internal audit reports for 1981, 1982, and 1983 revealed the following: (1) the Order Analysis Section of the Quality System was not audited in 1982, and (2) the results of an audit conducted in January 1983 of the solid wire, coated electrode, and dual shield areas were not distributed to the Plant Manager nor any General Foreman.</p>		
<p>C. <u>UNRESOLVED ITEMS:</u></p> <p>None</p>		
<p>D. <u>OTHER FINDINGS OR COMMENTS:</u></p> <p>1. <u>Mixed stainless steel electrodes</u> _ Stone & Webster (S&W) notified (ref. Rineaman/Clifford letter dated August 23, 1982) Alloy Rods that two cans of 3/32" diameter E309 electrodes (Heat No. 36611C, Lot No. 051F703L) were found intermixed with E308 electrodes at the River Bend nuclear site. Alloy Rods' response (ref. Clifford/Jacoby letter dated September 13, 1982) indicated that the logic of the manufacturing process for producing 9" long stainless steel electrodes prevented a mixup of a few electrodes of one alloy with another alloy that was designated on the can.</p>		

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Based upon the inspector's direct observation of a production run of stainless steel electrodes on line 5 and a review of the production records from June 1-6, 1977 (Lot No. 051F703L was run on line 5 on June 3, 1977), the NRC inspector was unable to determine how such a mixup could have occurred if the same manufacturing process controls in effect during this inspection were being utilized in June 1977. Following the issuance of Gulf States Utilities Company's final report on this matter, any required corrective action taken by Alloy Rods will be evaluated during the next NRC inspection.

2. QA Program - A detailed review of documentation (e.g., QA manual, procedures, data packages, purchase orders, certifications, audit reports) led to the identification of six nonconformances (B above) and the following observations:
 - (a) Indoctrination/training programs were not being kept current.
 - (b) There was no requirement for management (above or outside the QA organization) to regularly assess the scope, status, and compliance of the QA program to 10 CFR Part 50, Appendix B.
 - (c) The organizational positions with stop-work authority were not identified.

These observations were not considered as sufficiently severe deficiencies in the existing QA program or its implementation to be classified nonconformances, but were brought to the attention of appropriate Alloy Rods management personnel for their evaluation and follow up. These areas will be reexamined during a future inspection.

ORGANIZATION: AMERACE CORPORATION
CONTROL PRODUCTS DIVISION
GRAFTON, WISCONSIN

REPORT NO.: 99900296/82-01	INSPECTION DATE(S) 12/13-16/82	INSPECTION ON-SITE HOURS: 51
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CORRESPONDENCE ADDRESS: Amerace Corporation
Control Products Division
ATTN: Mr. B. Newman, President
2330 Vauxhall Road
Union, NJ 07083

ORGANIZATIONAL CONTACT: Mr. M. Q. Martin, Manager, Quality Assurance
TELEPHONE NUMBER: 414/377-0800

PRINCIPAL PRODUCT: Time delay relays.

NUCLEAR INDUSTRY ACTIVITY: Approximately five percent.

ASSIGNED INSPECTOR: Wm McNeill for 2/16/83
W. E. Foster, Reactive and Component Program Section (R&CPS) Date

OTHER INSPECTOR(S): J. W. Hamilton, R&CPS

APPROVED BY: Wm McNeill for 2/16/83
I. Barnes, Chief, R&CPS Date

INSPECTION BASES AND SCOPE:

- A. BASES: Appendix B to 10 CFR Part 50 and 10 CFR Part 21.
- B. SCOPE: This inspection was made as a result of the issuance of a:
(1) 10 CFR Part 50.55(e) report by Pennsylvania Power and Light Company, and
(2) 10 CFR Part 21 report by the Control Products Division of the Amerace Corporation. The former report pertains to deficient Agastat GP series
(Cont. on next page)

PLANT SITE APPLICABILITY:

Docket Nos.: GP Series - 50-387, 388; 50-382; 50-171, 277, 278. E7000 Series - 50-322; 50-271, others are not readily discernible.

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SCOPE: (Cont.) control relays that have been furnished to Susquehanna Nuclear Generating Station, Units 1 and 2. The second report pertains to deficient Agastat E7000 series time delay relays that have been furnished to numerous customers.

A. VIOLATIONS:

None

B. NONCONFORMANCES:

1. Contrary to the Amerace Corporation, Control Products Division's corrective action response letter dated November 4, 1981, the Internal Quality Assurance Audit Checklist had not been modified by the addition of an item concerning signatures on Engineering Release Notices (ERNs).
2. Contrary to Criterion V of Appendix B to 10 CFR Part 50, paragraphs 1.1, 1.2, 5.2.9, and 6.8.4 of Product Service Procedure No. PS100 (effective date of March 1, 1981) concerning customer returned units that had been repaired/modified by the manufacturing department:
 - a. No documentation was made available which would indicate that Quality Assurance (QA) had provided final inspections or audits of the GP series control relays returned to Bechtel Power Corporation - Berwick, Pennsylvania, on Shipping Manifest Nos. W22473 and W22474, dated December 29, 1981, and January 6, 1982, respectively.

The foregoing also applies to E series time delay relays returned to Beloit Power Systems on Shipping Manifest No. W22803, dated February 15, 1982.
 - b. The Production Manager had not signed CCR Nos. 8799 and 9010, dated March 25 and June 17, 1982, respectively.
3. Contrary to Criterion V of Appendix B to 10 CFR Part 50, paragraph 11.3.3.10 of Section Q1.11.0 (effective date of November 22, 1978) of the Quality Assurance Manual (QAM), Items 1, 2, and 4 of Audit Test Procedure No. ATP-TRE-01, dated October 3, 1979, QA personnel had not documented the results of audits in the Audit Data Sheets, EN153 dated July 1 and September 11, 1981, for Service Order Nos. 1102573 and 2201049, respectively. This is evidenced by the lack of data in the following headings: (1) Visual Exam, (2) Coil Resistance, (3) Pull In Voltage, (4) Drop Out Voltage, (5) Contact Continuity, (6) Repeat Accuracy, (7) Dielectric Strength, and (8) Insulation Resistance.

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4. Contrary to Criterion V of Appendix B to 10 CFR Part 50, paragraph 12.3.3.11 of Section Q1.12.0 (effective date of November 22, 1978) of the QAM and Table I of Test Procedure No. TP-TRE-02E, dated October 14, 1981, QA had not verified the data for completed tests reflected on Test Data Sheets dated February 16, 1982, inasmuch as the repeat accuracy: (a) was identified as $\pm 10\%$, and (b) had not been calculated as evidenced by its omission from the appropriate column. The foregoing was apparent for the following Model/Serial Nos. shipped to Beloit Power Systems on Shipping Manifest No. W22803: E7024PE001/8142291R, E7012PEL001/81242292R, and E7022PE001/81242297R.
5. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 17.3.1.3 of Section Q1.17.0 of the QA Manual, QA personnel had not established tentative dates for completion of corrective action for deficiencies identified in the 1981 audit. Also, QA personnel failed to establish a tentative date for corrective action on Corrective Action Request No. 003, dated June 4, 1980.
6. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 3.1.11 of QA Procedure No. Q2.16.1, QA personnel removed Defective Material Report No. 23709, dated December 14, 1982, from a container of connectors at a work station prior to material rework, inspection, and acceptance.

C. UNRESOLVED ITEMS:

None

D. STATUS OF PREVIOUS INSPECTION FINDINGS:

(Closed) Nonconformance B (81-01): Failure to obtain approval signatures on Advance Engineering Release Notices and ERNs.

The NRC inspector verified that the: (1) Chief Engineer had initiated two memoranda to the Documentation Control Supervisor on September 25, 1981, instructing him to implement Engineering Procedure No. E1200, and (2) Quality Assurance Manager had initiated a memorandum to the Quality Assurance Engineer on November 4, 1981, instructing him to add an item to the Design Control Audit Checklist regarding proper signatures on the aforementioned documents. Further, the NRC inspector reviewed: (1) entries in the ERN Log for the period of October 8, 1981, to December 3, 1982, and (2) ERN Nos. 421, 425, 427, 432, 438, 449, and 456 dated from November 25, 1981, to December 1, 1982, and (3) the Design Control Audit Checklists for 1981 and 1982.

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It was determined that: (1) no Advance ERNs had been issued during the time span identified, (2) the selected ERNs contained approval signatures, and (3) an item had not been added to the Design Control Audit Checklist regarding proper signatures on ERNs (see paragraph B.1).

E. OTHER FINDINGS OR COMMENTS:

1. Followup on Regional Requests -

- a. Pennsylvania Power and Light Company filed a 10 CFR Part 50.55(e) report dated December 23, 1981, with the Nuclear Regulatory Commission, Region I; the final report is dated March 9, 1982. The report pertains to deficient Agastat GP series control relays utilized in safety-related circuits of the emergency diesel generators located at the Susquehanna Nuclear Generating Station, Units 1 and 2. The deficiency was identified as binding of moveable contacts against the web in the relay base. Research by the Nuclear Regulatory Commission, Headquarters, revealed that Agastat GP series control relays of the particular period of manufacture were also employed in safety-related circuits of emergency diesel generators located at the Waterford Nuclear Generating Station, Unit 3.

Corrective action involved return of the affected relays to the fabricator for: (1) replacement of the base with one of newer design, (2) adjustment of core over travel, (3) test for pull in and drop out voltages, and (4) operation for 2,500 cycles. Documents to validate that the bases had been replaced were incomplete regarding task accomplishment or accomplisher. Records to substantiate adjustment, test, operation, and inspection were nonexistent. The NRC inspector was informed that the relays were commercial grade and documentation was not initiated or required. However, Customer Return Procedure No. PS100 "covers all products fabricated at . . . Grafton" and assures that customer returned products "are controlled and processed through the plant and that proper . . . documentation is maintained." Further, it requires that Quality Assurance "provide final inspection and/or audits of items returned to customer as appropriate." Based upon the nonadherence to the cited procedure, adequacy of the corrective action is indeterminate (see paragraph B.2).

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The base is a purchased part, and the manufacturer's drawing dated October 5, 1977, reflects the configuration with cutouts in the web. This change was not incorporated into the drawings of the relay fabricator until January 26, 1982, when Engineering Change Order No. 82-17 was initiated. While the reasons for the cutouts are obscure, it is apparent that clearance is provided between the relay base and the moveable contacts.

Subsequent to the inspection activity at the facility, the NRC inspector requested: (a) a copy of the audit test procedure for GP series control relays, and (b) additional clarification regarding the nonapplicability of Procedure No. PS100 to GP series relays. The vendor restated that the device is a commercial item that is not nuclear safety-related and requires no documentation of test and inspection activities. The audit test procedure (ATP-GP-001, October 19, 1979, "GP Audit Test Procedure") was also provided. Item 1 of the ATP states, "All shipments on Certificate of Compliance are audited," while item 4 requires the use of a data sheet and items 6.A through 6.E identify the characteristics to be checked. Figure 1 of the ATP identifies the special pull-in voltage requirement for the C740 which is the specific device under discussion. During the inspection activity at the facility, the NRC inspector observed that reworked relays had been returned to the user accompanied with certificates of conformance.

- b. The Control Products Division of Amerace Corporation filed a 10 CFR Part 21 report dated February 2, 1982, with the Nuclear Regulatory Commission, Washington, D.C. The report pertains to deficient Agastat E7000 series time delay relays that have been supplied to numerous customers. The deficiency was identified as premature time out resulting from the exuding of a "substance from pneumatic timing diaphragms" manufactured by a specific supplier during a particular time period.

Documentation was available to substantiate that an evaluation had been conducted. Some of the documents are identified as: (1) investigation test reports, (2) letters from independent testing laboratories, (3) trip reports, (4) completed problem evaluation forms, and (4) internal memoranda.

Corrective action involves: (1) recall, (2) inspect and rework as required, (3) test/audit, and (4) return to customer. Preventive measures involves: (1) discontinuance of usage of the problematic

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material, and (2) revising the drawings. The corrective action and preventive measures are considered to be adequate. It was determined that strict adherence to requirements was lacking in some instances (see paragraphs B.3 and 4).

- c. This portion of the inspection was accomplished by evaluating the following documents for requirements and/or implementation of requirements: 5 drawings, 2 specifications, 17 procedures, 4 purchase orders, 14 internal memoranda, 13 letters, and numerous documents identified as: test data sheets, receiving reports, certificates of compliance, shipping manifests, investigation reports, failure analyses, and customer complaint and return worksheets. This activity resulted in the identification of three nonconformances detailed at paragraph B.2, B.3, and B.4.
2. Programmatic Areas - In an effort to assess the effectiveness of the corrective actions and preventive measures, the following areas were evaluated: (a) nonconformances and corrective action, (b) audits, and (c) manufacturing process control.
- a. Control of Nonconformances and Corrective Action - Reports of nonconformances were reviewed to ascertain compliance with written procedures. Many reports were inspected to assure completeness and proper signoff. The most recent five Defective Material Reports (DMR) were reviewed, and the dispositions for DMR Nos. 23704, 23707, and 23709 were verified.
- The Corrective Action Request Log maintained by QA was reviewed to ascertain compliance with the written procedures. Nonconformance B.5 was identified in that tentative dates for completion of corrective action were not established.
- Nonconformance B.6 was identified in that nonconforming material was located at a work station without DMR No. 23709 being attached.
- b. Audits - The 1981 internal audit and associated documentation was reviewed to verify that procedures were being followed. The audit was performed by one of the three qualified auditors and included verification of corrective action resulting from the 1980 audit. The

ORGANIZATION: AMERACE CORPORATION
CONTROL PRODUCTS DIVISION
GRAFTON, WISCONSIN

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results of the 1981 audit were forwarded by interoffice memorandum QA81083 of September 21, 1981, and the response was forwarded by interoffice memorandum QA82109 of July 26, 1982.

External audits for two vendors were reviewed to assure the audits were conducted by qualified personnel and performed in accordance with written procedures or checklists.

No nonconformances or findings were identified.

- c. Manufacturing Process Control - The manufacturing operations for the E7000 series relay timer, which is provided for nuclear power plant use, were inspected. A walkthrough of the assembly and test area was completed. Compliance with procedures for the spindle and coupler assembly, timing head and spindle diaphragm assembly inspection, and final test and calibration were verified. Numerous gages, meters, and tools were inspected for calibration status and all were found to be current.

No nonconformances or findings were identified.

ORGANIZATION: BABCOCK AND WILCOX, A MCDERMOTT COMPANY
UTILITY POWER GENERATION DIVISION
LYNCHBURG, VIRGINIA

REPORT NO : 99900400/82-04	INSPECTION DATE(S) 11/15-19/82	INSPECTION ON-SITE HOURS: 123
CORRESPONDENCE ADDRESS: Babcock and Wilcox, A McDermott Company Utility Power Generation Division ATTN: Mr. D. E. Guilbert, Vice Pres. & Gen. Mgr. P. O. Box 1260 Lynchburg, VA 24505		
ORGANIZATIONAL CONTACT: Mr. E. L. Davis, QA Manager TELEPHONE NUMBER: (804) 385-2895		
PRINCIPAL PRODUCT: Nuclear steam supply systems, fuels, engineering services, and operating plant support.		
NUCLEAR INDUSTRY ACTIVITY: The total effort committed to domestic nuclear activities is approximately 52 percent of the 3,175 employees of the Utility Power Generation Division. Principal activities include the design and procurement of five projects, Bellefonte, Midland, and Washington Public Power Supply System, and providing engineering services under 129 service contracts and 38 fuel reload contracts.		
ASSIGNED INSPECTOR: <u>R. H. Brickley</u> R. H. Brickley, Reactor Systems Section (RSS)		<u>2/2/83</u> Date
OTHER INSPECTOR(S): D. G. Breaux, RSS; P. Sakowski, RSS; and W. Kelley, Reactive & Component Program Section		
APPROVED BY: <u>C. J. Hale</u> C. J. Hale, Chief, RSS		<u>2/3/83</u> Date
INSPECTION BASES AND SCOPE:		
A. <u>BASES</u> : 10 CFR Part 21; 10 CFR Part 50, Appendix B; and Topical Report BAW-10096A.		
B. <u>SCOPE</u> : Design verification, status of previous inspection findings, and regional requests for inspection of the following items: (1) use of the steam generator drain line (nonhigh energy) for blowdown, (2) failure of the auxiliary feedwater header, (3) incorrect pin material in valves, and (4) stress corrosion cracking of anchor belts.		
PLANT SITE APPLICABILITY:		
50-438, 50-439, 50-460 (paragraph E.2); 50-302 (paragraph E.3); 177, 177FA, and 205 plants (paragraph E.4); 50-438, 50-439, 50-460 (paragraph E.5); and 50-438, 50-439 (paragraph E.6).		

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A. VIOLATIONS:

None

B. NONCONFORMANCES:

Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 5.4 of Section 5 of Quality Assurance Manual 19A-N.1, operating instruction OI-1262 had been issued and implemented without the required approval of division QA.

C. UNRESOLVED ITEMS:

1. A Babcock & Wilcox (B&W) 10 CFR Part 21 report to NRC dated August 14, 1982, stated that all licensees of 177FA plants in operation and under construction would be advised of the concern for the potential of stress corrosion cracking in high yield strength low alloy steel bolting. Documents were not available at the time of the inspection for the NRC inspector to verify that all licensees had been notified.
2. Preliminary Safety Concern (PSC) 7-81 expresses a concern regarding the effect of the high crossflow velocity on the function and integrity of the control rod assemblies. The rod drop time may be increased by high crossflow forces. Also, there is a potential for vibration leading to failure of the Mark C control rod assemblies or clad perforation and leaching out of the B_4C neutron absorber.

Satisfactory evidence was not shown to the NRC inspector to substantiate the B&W licensing conclusion that there would not have been a substantial safety hazard in reference to PSC 7-81. See E.2 following for further information concerning this item.

D. STATUS OF PREVIOUS INSPECTION FINDINGS:

1. (Closed) Unresolved Item (82-01): Certain structural analyses may not meet regulatory requirements in that they do not appear to be sufficiently detailed with respect to assumptions, bases, source of inputs, reference to the hardware design drawings, analytical model-to-hardware relationship, and interpretation of results.

The analyses referenced in this item were performed for North Anna, Unit 3 which was cancelled by the licensee. The review of similar analyses (see item E.2 below) did not disclose any similar deficiencies.

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2. (Closed) Unresolved Item (82-01): Procurement controls for flow control valves do not appear to comply with QA program commitments, in that valves were furnished that were not designed to provide the required minimum flow of two gallons per minute in the closed position at a pressure differential of 820 pounds per square inch, and which B&W source surveillance and vendor drawing review failed to detect.

The findings in Report No. 99900400/82-01 were based on preliminary incomplete information; however, the NRC inspector verified by review of additional technical documents, instructions, administrative procedures, purchase orders, design drawings, and certification of vendor inspectors that: (1) B&W Technical Document had been approved, issued, made part of the purchase order requirements, and required the vendor to either document the service experience of identical or similar valves with a report to verify performance or define in their proposal the method for verification of the flow capacity; (2) B&W QC vendor inspectors were certified in accordance with a B&W instruction for qualification and certification and the instruction was approved; (3) a new B&W administrative procedure had been written and implemented that required the B&W equipment engineer, the reviewer of the vendor documents and drawings, to verify compliance with purchase documents to preclude the inadvertent failure of the vendor to meet all contractual requirements including revision to purchase documents; and (4) B&W corrective action, which required the installation of two additional valves in parallel with the existing valve, had been implemented by a system design change.

One nonconformance was identified (see paragraph B).

3. (Closed) Nonconformance (82-02): The Historical Document List (HDL) did not serve as an index to safety-related Procurement Authorization (PA) records in the Records Center as evidenced by the fact that PA's 83-768661-00 through 83-768661-09, related to the design and procurement of MK-B5 fuel assemblies and axial blanket fuel assemblies for the SMUD Rancho Seco Cycle 6 fuel reload, were not identified on the HDL.

The inspector verified the corrective actions and preventive measures committed by B&W in this response to Inspection Report No. 99900400/82-02; i.e., (1) the HDL computer program has been corrected so that it now extracts safety-related PA's from the data base, and (2) QA has conducted an audit of the HDL's.

4. (Closed) Nonconformance (82-02): The first page of calculations 32-1119748-00 and 32-1122317-00 did not have a completely filled out CDS form. The section of the form titled "Summary of Result" did not contain a summary of the results of the calculation.

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The inspector verified the corrective actions and preventive measures committed by B&W in their response to Inspection Report No. 99900400/82-02; i.e., (1) the first page of calculation 32-1119748-00 was revised to reference the "86" document that transmitted the calculation result summary to the various users, (2) the first page of calculation 32-1122317-00 did appropriately reference the "86" documents that transmitted the calculation results, and (3) a review of other calculations for similar deficiencies had been conducted.

5. (Closed) Nonconformance (82-02): PUL's were not used to indicate needed changes/additions known at the time of release or to indicate input requirements unavailable at the time of release for safety-related calculation summaries; e.g., 86-1123144-00. These documents were various types of calculation summaries (e.g., 32-1122317-00), which were known at the time to have a PUL relating to the need for verification of source data/references outstanding against it. Further, these design documents were reviewed, released, and transmitted to users without any indication that changes may be required as a result of clearing PUL's that were outstanding.

The inspector verified the corrective actions and preventive measures committed by B&W in their responses to Inspection Report No. 99900400/82-02; i.e., the PUL's in question were processed for certain new or revised calculations released after September 1, 1980, in order to identify calculations processed prior to September 1, 1980, which were referenced as source data so that the calculations could be reviewed at a later date for proper identification of their source data.

6. (Closed) Nonconformance (82-02): Certain PUL's issued from January 1981 to March 1981 were not: (1) listed on the HDL against the affected calculation; (2) distributed by Release Administration; or (3) associated with the document to be revised and retained in the Records Center.

The inspector verified the corrective actions and preventive measures committed by B&W in their responses to Inspection Report No. 99900400/82-02; i.e., (1) the Calculation Package Source Reference (CPSR) Tracking System is being used to list and track the input sources for each calculation, (2) procedure NPG-0402-1 was revised to eliminate the need for a PUL if the calculation input sources were listed on the CPSR Tracking Report, and (3) verification that PUL omissions related only to source data or references to documents which predate September 1, 1980.

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7. (Closed) Nonconformance (82-02): The Nuclear Steam Core Project Manager for the Rancho Seco project did not originate FCDR 89-1127000-01, enter the applicable information on the Fuel Cycle Design Requirements (FCDR), or sign the FCDR for fuel reload cycle 6.

The inspector verified the corrective actions and preventive measures committed by B&W in their response to Inspection Report No. 99900400/82-02; i.e., (1) FCDR 89-1127000-01 was revised to include the required signatures, (2) results of an internal audit indicated this to be an isolated case, (3) procedure NPG-0310-42 was revised to clarify the preparation and signature requirements, and (4) the format and contents of the FCDR form were revised.

8. (Closed) Nonconformance (82-02): The originator of Document Release Notices (DRN) for released/approved documents did not enter either "Y" or "N" in the appropriate place on the DRN's, thereby making the status of the product indeterminate.

The inspector verified the corrective actions and preventive measures committed by B&W in their response to Inspection Report No. 99900400/82-02; i.e., (1) the results of an internal audit indicated that this item was an isolated case involving one individual, and (2) the DRN's in question have been revised to indicate the proper PUL status.

9. (Open) Nonconformance (82-03): An error identified in the hybrid computer program POWER TRAIN was not processed in accordance with the instructions of Exhibit C of procedure NPG-0903-13.

B&W had not responded to Inspection Report No. 99900400/82-03; therefore, this item was not inspected during this inspection.

E. OTHER FINDINGS OR COMMENTS:

1. Initial Management Meeting, Equipment Qualification Program: A meeting was held with representatives from B&W and Bailey Controls Company to describe the NRC's Equipment Qualification Inspection Program. The discussion included NRC Headquarters and Region IV organizations, basis for inspection, and status of rulemaking in this area. In addition, the format, content, and dissemination of NRC inspection reports, including handling of proprietary data, were discussed in detail.

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B&W representatives described their equipment qualification activities. Typically, B&W prepares the test specification for equipment to be qualified and subcontracts development of test plans/procedures as well as the actual test performance to qualified vendors. Bailey Controls Company is such a subcontractor and is currently conducting one harsh environment test for B&W under such arrangement.

B&W also provides analytical/engineering services related to equipment qualification.

2. Design Verification: To determine the commitments and requirements relative to the B&W scope of activities, the NRC inspector reviewed the B&W Topical Report, the NPGD Quality Assurance Manual, Engineering and Administrative procedures. The NRC inspector reviewed engineering activities to assure that measures are applied to verify the adequacy of design as defined in ANSI N45.2.11.

The B&W application of design review as a method of verification was reviewed by the NRC inspector for proper implementation of procedural commitments. The inception of the B&W design review, the contributing documentation, results of the review, and the ultimate resolution of action items generated from the design review were reviewed by the inspector.

Design calculations were reviewed for proper verification of design inputs and that resultant data generated by the calculation was also verified as committed in B&W procedures.

B&W verification of the adequacy of the design by qualification tests was reviewed by the NRC inspector. The test procedures and results were reviewed to assure that if qualification testing indicates that modifications to the item are necessary to obtain acceptable performance, the modification shall be documented and the item modified and retested or otherwise verified to assure satisfactory performance. No nonconformances were identified in the area of inspection.

With respect to the unresolved item in C.2 above, the loss-of-coolant accident (LOCA) analysis (performed during the design process for the 205FA and 145FA plants in the 1972-1974 period) indicated that an unacceptable overstress condition would exist in the upper plenum cover during blowdown after a hot leg break. The design change conceived and instituted at that time to eliminate this condition was the addition of

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eight 3" diameter holes near the top of each column weldment of the upper plenum assembly. There were previously four 3" holes and eight 8-3/4" slots near the bottom of each column weldment. This additional flow area would decrease the resistance to flow from the upper head region during the hot leg break, the cause of the overstress condition. The impact of crossflow on the rod guide brazements and the control rod assemblies was not adequately considered. An earlier evaluation (PSC 6-80) considered the total brazement vibration under the effects of crossflow. This report for PSC 7-81 addresses individual rod guide tube vibration.

The present concern is that crossflow through the upper 3" diameter holes in the column weldments will impact the rod guide brazements and the control rod assemblies inducing drag on the control rod assemblies that may increase the control rod drop times beyond design limits. Crossflow also can cause vibration of the rod guide tubes of the rod guide brazement. Calculations indicate a significant potential for inducement of critical frequency vibration of the tubes of the brazement during normal operation. This could cause damage to the brazement and, subsequently, slow down or restrict control rod drop. This vibration during normal operation may also cause wear of the control rods and/or the fuel assembly guide tubes.

Alliance Research Center is conducting confirmation tests of the upper guide tube structure design modification. Results of the initial test are unacceptable wear in the test region near the slots at the bottom of the column weldment. Alliance will be retesting the structure allowing more vertical flow through the top of the control rod guide tube structure and lowering crossflow vibration problems at the lower guide tube slots. B&W is also in the process of reanalyzing the LOCA analysis using the design modification of covering the holes at the top of each column weldment of the upper plenum assembly.

B&W Licensing concluded this item was not reportable and that safe shutdown of their plant during an accident condition would not be jeopardized. B&W concludes that if slow control rod drop times are detected in the planned initial startup testing, corrective actions would be taken.

There was no reference to the initial wear concern due to crossflow vibration in the B&W Licensing reportability assessment. There was no evidence that B&W had evaluated analytically that there would have been no potential safety hazard had any of the concerns of PSC 7-81 gone undetected. This matter is considered unresolved and will be inspected further during subsequent inspections.

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3. Use of the Steam Generator Drain Line for Blowdown: This item pertains to a report to the NRC Region II office by Florida Power Corporation (Crystal River 3) that the steam generator drain lines were not designed as high energy lines. Should these lines fail or rupture, they could jeopardize safety-related components and/or systems as the design of the existing system is not presently provided with sufficient pipe whip restraints or jet impingement shields.

The inspector's review of the records available at B&W disclosed that: (1) the drain line was originally designed as a cold drain line (low energy) and is now used by Florida Power Corporation (FPC) for steam generator blowdown (high energy application), (2) this piping was qualified to ANSI B31.1, nonsafety related, seismic Class I, for draining purposes during cold shutdown, (3) FPC personnel had observed excessive pipe movement, estimated to be four feet in some places, upon initiation of blowdown, and (4) Part 10, Section 3 of the B&W water chemistry manual specifies that the blowdown is to be through the sample lines.

Based on the above information, the inspector concluded that this problem was caused by misapplication of the steam generator cold drain line.

There were no violations, nonconformances, or unresolved items identified in this area of the inspection.

4. Design Problem with Steam Generators: B&W notified the licensees of a problem with the 177 and 177FA design steam generator auxiliary feedwater (AFW) header collapsing when cold feedwater is injected into the superheated header. B&W also notified the licensees of a similar problem anticipated with the 205 steam generator AFW headers.

B&W conducted a series of meetings with the NRC and the licensees to identify the problem, its generic implications, and to present repair procedures with design changes to remedy the problem with the 177 and 177FA designs. In addition, B&W is evaluating how to fix the 205 design. B&W did not submit a Part 21 notification to the NRC since the NRC was already fully informed by B&W. The licensees and the NRC are being kept informed of all developments.

B&W has identified the cause of the problem as collapsing steam voids which result in negative pressure transients orders of magnitude larger than predicted by the state-of-the-art design calculations. Examination

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of NUREG-0291, NRC-1, by Creare, Inc., 1976, exonerates B&W of any design deficiencies and, in fact, commends the B&W design for its antiwaterhammer design provisions.

The B&W repair procedure and redesign, which recommends the installation of an external header similar to existing design with many years of proven performance, has been approved by the NRC. No nonconformances or unresolved items were identified in this area of the inspection.

5. Tennessee Valley Authority, Bellefonte Nuclear Plant, Units 1 and 2: Problem reported was disc-to-stem lock pin installed in twelve 10" stainless steel control valves supplied by B&W subcontractor WKM Valve Division, Houston, Texas, exhibited a high degree of magnetism denoting that carbon steel material was used.
 - a. The NRC inspector verified by review of B&W internal memoranda, report of safety concern, inspection reports, vendor drawings, and letters to customers, vendor, and NRC that: (1) B&W construction representative at the Washington Public Power Supply System warehouse identified that the disc-to-stem pin exhibited a high degree of magnetism; (2) B&W verified by metallurgical test that the pin was carbon steel; (3) the WKM drawing specified that the pin material was A 276-TP316 material; (4) B&W notified their customers that had received valves on site of the problem; (5) B&W supplied pins of the correct material with certified material test report to one customer; (6) B&W witnessed the replacement of the pins in the valves in the WKM Houston, Texas, plant with pins of the correct material as verified by certified material test report; and (7) B&W had evaluated the problem as reportable under the requirements of 10 CFR Part 21 and had notified NRC in accordance with the requirements of the regulations and their procedures.
 - b. The substitution of a carbon steel pin for the specified A 276-TP316 stainless steel pin in the twelve 10" stainless steel control valves is not generic to the nuclear industry because: (1) B&W was the sole customer for WKM Valve Division ASME "N" stamped valves; (2) B&W has taken corrective action to assure all 12 valves will be repaired; and (3) WKM has sold the design of this valve to another vendor; therefore, WKM cannot supply this valve to the nuclear industry.
6. Tennessee Valley Authority (TVA) Bellefonte Nuclear Plant, Units 1 and 2: Problem reported was reactor coolant system (RCS) support and restraint anchor bolts specified by B&W and purchased by TVA may fail due to stress corrosion cracking.

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- a. The NRC inspector verified by review of B&W internal memoranda, report of safety concern, customer drawings, and correspondence with licensees that: (1) B&W prepared approximately 30 design drawings on TVA format for Bellefonte Nuclear Plant RCS supports and restraints which were approved and updated by TVA; (2) the preload of the anchor bolts of 4340 material was specified on the drawings to be at least 70 percent of the ultimate strength of material which is in accordance with industry standard practice (turn of the nut method) as specified in the AISC Manual of Steel Construction; (3) Subsection NF-47424 of Section III to the ASME Code specifies the turn of the nut method for prestressing component support bolting; (4) TVA requested B&W review the bolting preload requirement to determine if it could be lowered because construction personnel were having problems in achieving the specified preload; (5) during the review of the bolting preload, in the October 1980 to 1981 period, B&W evaluated currently available information which indicated that 4340 bolting material within the reactor containment building environment could be expected to exhibit stress corrosion cracking if prestressed to 70 percent of the ultimate; (6) B&W issued a Preliminary Report of Safety Concerns on March 23, 1981, which identified and documented their concern of the possibility for stress corrosion cracking of bolting material preload at 70 percent of the ultimate and bolting material lubricated with molybdenum disulphide in all reactor plants; (7) B&W convened a meeting on May 8, 1981, to ensure understanding by their responsible personnel of the safety concern, establish the safety significance, to scope additional evaluation work, and establish responsibilities; (8) B&W issued a report in accordance with the requirement of 10 CFR Part 21 to NRC concerning the potential for stress corrosion cracking of anchor bolts; (9) B&W had reviewed the available stress-corrosion cracking data for alloy 4340 steel and used the most conservative data; (10) B&W performed calculations to provide criteria for evaluation of stress corrosion cracking effects on bolting material at preload conditions; and (11) B&W transmitted to TVA on September 17, 1982, their calculated bolt preloads for the RCS supports and restraints.
- b. The NRC inspector verified that B&W stated in their 10 CFR Part 21 report that they would advise the licensees of the B&W 177FA plants in operation or under construction of their concern of stress corrosion cracking of high yield strength low alloy steel bolting material for the licensees' evaluation. Documentation of the notification was not made available to the NRC inspector during the inspection. This item is considered unresolved pending review of this documentation (see paragraph C.1, above).

ORGANIZATION: BARTON INSTRUMENTS
 A UNIT OF INTERNATIONAL TELEPHONE AND TELEGRAPH CORPORATION
 CITY OF INDUSTRY, CALIFORNIA

REPORT NO.: 99900113/82-04	INSPECTION DATES: 11/15-18/82	INSPECTION ON-SITE HOURS: 78
CORRESPONDENCE ADDRESS: Barton Instruments A Unit of International Telephone and Telegraph Corporation ATTN: Mr. G. R. Welt Director, Quality Assurance 900 South Turnbull Canyon Road City of Industry, California 91749		
ORGANIZATIONAL CONTACT: Mr. G. R. Welt, Director, Quality Assurance TELEPHONE: (213) 961-2546		
PRINCIPAL PRODUCT: Process control instrumentation		
NUCLEAR INDUSTRY ACTIVITY: Approximately 8-10%		
ASSIGNED INSPECTOR:	<u>R. E. Oller</u> R. E. Oller, Reactive and Component Program Section (R&CPS)	<u>2-4-83</u> Date
OTHER INSPECTORS:	W. E. Foster, R&CPS A. L. Smith, Equipment Qualification Section	
APPROVED BY:	<u>I. Barnes</u> I. Barnes, Chief, R&CPS	<u>2-4-83</u> Date
INSPECTION BASES AND SCOPE:		
1. <u>BASES</u> : 10 CFR Part 50, Appendix B and 10 CFR Part 21.		
2. <u>SCOPE</u> : The scope included three phases: (1) a general quality assurance (QA) program implementation review, (2) a reactive followup of reported field deficiencies, and (3) a review of QA program elements related to Barton's IEEE equipment qualification program. The general QA program subjects inspected were measuring and testing equipment calibration, procurement document control, source selection and product acceptance, (Cont. on next page)		
PLANT SITE APPLICABILITY: (1) Reactor Coolant System wide range measurement channel ambiguities - 50-483/486, 50-413/414, 50-412, 50-445/446, 50-423, 50-443/444, 50-395, 50-482, 50-424/425, and 50-390/391; (2) water in capillary turns to steam at elevated temperature - 50-390/391, and 50-327/328; (3) incorrect pressure transmitters - 50-528, and 50-335/389; and (4) failure to survive radiation exposure - 50-373/374, 50-352/353, and 50-410.		

ORGANIZATION: BARTON INSTRUMENTS
A UNIT OF INTERNATIONAL TELEPHONE AND TELEGRAPH CORPORATION
CITY OF INDUSTRY, CALIFORNIA

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SCOPE: (Cont.)

and internal audits. The reactive phase was conducted as a result of the issuance of: (1) two 10 CFR Part 50.55(e) reports by the Tennessee Valley Authority which addressed pressure transmitter deficiencies at the Watts Bar Nuclear Generating Station, (2) a 10 CFR Part 50.55(e) report by the Arizona Public Service Company which addressed the installation of two pressure transmitters that failed to meet technical requirements, and (3) a 10 CFR Part 21 report by Rockwell International which addressed the failure of pressure transmitters to survive radiation exposure. Change control and manufacturing process control were also evaluated during this activity.

The equipment qualification phase included a followup inspection in regard to paragraph D.4 of NRC Report No. 99900113/82-03, and an evaluation of areas of the QA program applicable to equipment qualification such as organization, design control, procurement document control, test control, and audits.

A. VIOLATIONS:

None

B. NONCONFORMANCES:

1. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraphs 3.5.6, 4.1, 4.3, and 5.7 of Engineering Instruction No. 0764.1172.2, Revision 004, dated May 19, 1980:
 - a. The noise level of the transmitter output had not been logged on the initial calibration sheet.
 - b. The zero output (initial or final) had not been recorded on the initial calibration sheet.
 - c. Thermal effects had not been plotted on the data sheet.
2. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and the requirement contained in paragraph 5.0 of Procedure QU-11, Revision 02, dated June 1, 1982, and the previous edition of the QA Manual:
 - a. Documented test results of the "Ohmicity Test" identified in the Data Sheets of Test Procedure 0331.1027.2 had not been evaluated to assure that test requirements had been satisfied for the strain gage beam assemblies identified by the following Data Sheets (Serial Nos./dates): (a) N5589/March 5, 1981; (b) N2274/September 11, 1980; (c) N4431/November 19, 1980; (d) N5254/

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December 29, 1980. The lack of evaluation was evidenced by the recording of compression and tension resistance values that fail to provide the resulting differences indicated in the data sheets.

- b. QA had not reviewed the temperature compensation data sheets (17 of 20 of Engineering Instruction 0764.1172.2) for conformance to requirements prior to final acceptance for inprocess activity related to the assemblies identified above. This lack of review was evidenced by no indication of QA (stamp or initial) in the appropriate block of the data sheets.
3. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and the requirements contained in paragraphs 2.0 and 4.0 of Procedure QU-3, Revision 02, dated June 1, 1982, of the QA Manual, and the previous edition, the review did not assure that Barton drawings or specifications met customer requirements as evidenced by supplying incorrect pressure transmitters for use at the Palo Verde Nuclear Generating Station.
4. Contrary to Criterion V of Appendix B to 10 CFR Part 50, Procedure QU-12 of the QA Manual and QA Instruction No. QAI 12-07, the hydrostatic pressure gage mounted on the test stand in Department 019 had not been recalibrated by its due date of October 22, 1982.
5. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and QA Manual Procedure QU-5, the QA program did not contain documented instructions or procedures to cover the use of the notice of deviation form that was used to document test equipment malfunctions or deviations noted during "in house" qualification testing of the model Nos. 763 and 764 pressure transmitters.
6. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 4.2.2 of QA Instruction No. QAI 04-01, purchase orders issued for testing services were not entered into the purchase order review log.

C. UNRESOLVED ITEMS:

Engineering Instruction No. 0764.1172.2, Revision 004, dated May 19, 1980, requires data recording after 3 hours at various temperatures. There were no apparent requirements to document the initiation and completion of the temperature exposure.

As a result, the NRC inspector was unable to determine adherence to the engineering instruction.

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D. OTHER FINDINGS OR COMMENTS:

1. Equipment Calibration (R. E. Oller): The NRC inspector reviewed Procedure Nos. QU-2 and QU-12 of the QA Manual to verify that written measures are established to control the calibration of measuring and testing equipment (M&TE). The calibration status was checked for 40 items of M&TE which were located in 8 inspection, test, and assembly areas.

To verify that the observed devices are controlled and calibrated on a scheduled basis and the results are documented in accordance with written procedures, a review was made of: 4 Quality Assurance Instruction procedures, a Recall Notice List for M&TE, Certificates of Calibration furnished by 10 subvendors, a Vendor Master Listing, Gage Record cards, and a M&TE Master List.

Within this area, one nonconformance was identified, (see paragraph B.4).

2. Procurement Document Control (R. E. Oller): The NRC inspector reviewed Procedure Nos. QU-2 and No. QU-4 of the QA Manual to verify that written measures are established to control procurement documents.

A review was made of three QA instruction procedures, three traveling requisitions (TRs), seven purchase orders, and the related TRs for critical electronic parts and synthetic materials. This review was conducted to verify that procurement documents are controlled in accordance with written procedures, suitably include or reference necessary quality requirements for materials and services, require subcontractors to provide an appropriate QA program, and are reviewed by QA personnel prior to purchase.

Within this area, no nonconformances were identified.

3. Procurement Source Selection (R. E. Oller): The NRC inspector reviewed Procedure Nos. QU-2 and No. QU-7 of the QA Manual to verify that written measures are established to control the selection of subvendors and to assure they include integrated action by one or more responsible groups such as QA, engineering, and purchasing.

Compliance with QA program commitments was verified by review of four QA instruction procedures, a current Vendor Master Listing, a request from purchasing to QA for survey/approval of a prospective vendor, and audit records for three suppliers of materials and services.

Within this area, no nonconformances were identified.

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4. Procurement Product Acceptance (R. E. Oller): The NRC inspector reviewed Procedure Nos. QU-2 and QU-10 of the QA Manual to verify that written measures are established to control product acceptance activities performed by receiving inspection personnel.

The NRC inspector performed a review of QA program implementation for product acceptance activities including verification that the activities are documented and reviewed for acceptability by responsible personnel. This review was accomplished by examination of: three QA instruction procedures, receiving master copies of purchase orders, part number log sheets, daily logs at inspection stations, rejection reports, a computer list entitled "QA Monthly Rejection Report By Vendor," and an inspector's book of QA Instructions.

Within this area, no nonconformances were identified.

5. Internal Audits (R. E. Oller): The NRC inspector reviewed Procedure Nos. QU-2 and QU-18 of the QA Manual to verify that written measures are available for the control of internal audit activities which provide for: (a) planned periodic audits of all aspects of the QA program, (b) performance in accordance with written procedures or checklists by qualified personnel, (c) documentation of audit results and review by management, and (d) followup action where indicated. Implementation was verified by a review of: a QA instruction procedure, the internal audit schedules for 1981 and 1982, 18 checklist records and transmittal letters for the QA program areas audited during the last 12 months, and current qualification and certification records for 9 auditors.

Within this area, no nonconformances were identified.

6. 10 CFR Part 50.55(e) Construction Deficiency Report (W. E. Foster): Tennessee Valley Authority's 10 CFR Part 50.55(e) report, dated May 13, 1982, for the Watts Bar Nuclear Generating Station was based upon a review conducted by the Westinghouse Electric Corporation (W). Additionally, W reported the condition to NRC Headquarters on April 7, 8, and 21, 1982, by telephone and letter, respectively. Further, Inspection and Enforcement Information Notice No. 82-11 was published on April 9, 1982. The W letter of April 21, 1982, states, in part, ". . . that recent qualification tests in a post accident, high energy line break environment have indicated that RCS (Reactor Coolant System) wide range pressure measurement instrument channels exhibit ambiguities in their accuracy which could result in inappropriate operator actions."

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The inaccuracies are at the system level rather than at the transmitter level. The NRC inspector was informed that pressure transmitters are at the peak of their accuracy capability. A review of records failed to reveal data outside the specified limits at the subassembly and assembly levels; however, two nonconformances and one unresolved item were identified within this area of the inspection (see paragraphs B.1, B.2, and C).

7. 10 CFR Part 50.55(e) Construction Deficiency Report (W. E. Foster): Tennessee Valley Authority's 10 CFR Part 50.55(e) report, dated August 11, 1982, for the Watts Bar Nuclear Generating Station addresses post-accident readings from containment sump level transmitters. It was reported by W that qualification testing of containment pressure transmitters at the severe environment of 320^o F produced extraneous pressure spikes (ringing). This condition resulted when the water in the sealed capillary tubing turned to steam which, in turn, resulted in false indication or nonoperation of the system.

As required by the W specification, the transmitters were supplied empty, with water filling to be accomplished in the field. W developed a solution for the problem by substituting specially processed Dow Corning 702 silicone oil for the water. According to W, this oil "has higher boiling and flash points than water," and its use as the fill medium in the unpressurized sealed system eliminates the "extraneous signals." Personnel at Barton Instruments concurred with the use of the specially processed Dow Corning 702 silicone oil.

8. 10 CFR Part 50.55(e) Construction Deficiency Report (W. E. Foster): Arizona Public Service Company's 10 CFR Part 50.55(e) report, dated September 15, 1982, for the Palo Verde Nuclear Generating Station, Unit 1, addresses the installation of two pressure transmitters that failed to meet technical requirements. It was determined that the manufacturer's review of the customer requirements overlooked the specified pressure conditions. The finding associated with this area of the inspection is detailed in paragraph B.3.

During the corrective action activity, Combustion Engineering, Incorporated, determined that the original specification was incorrect. Negotiations are underway for upgraded transmitters.

9. 10 CFR Part 50.55(e) Construction Deficiency Report (W. E. Foster): Rockwell International's 10 CFR Part 21 report, dated October 21, 1982, to the Nuclear Regulatory Commission, Region IV, indicates that Barton's pressure transducers (Part No. D4R-29098) would not withstand exposure to radiation.

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The NRC inspector was informed that the transmitters were supplied as commercial grade with no requirements to withstand radiation. A drawing of the specified part number was not provided; however, a review of the purchase order and attendant specifications failed to reveal a requirement for radiation exposure. Based upon the available information, corrective action by the manufacturer is not warranted.

10. Change Control and Manufacturing Process Control (W. E. Foster): During the reactive phase of the inspection, change control and manufacturing process control were evaluated by examining the following documents: 10 procedures, 8 purchase orders, 6 specifications, 4 drawings, 2 letters, and miscellaneous documents identified as: 1 each, technical manual, product bulletin, design control checklist; 3 registers; and 5 data packages. No nonconformances or unresolved items were identified.
11. Equipment Qualification (A. L. Smith): Followup Item - Paragraph D.4 of the No. 99900113/82-03 inspection report discussed the failure of three test specimens (specimens 763-412, 763-1001, and 764-363) to respond to input pressure at the conclusion of the 85 day post-LOCA test which was conducted at ITT Barton. During this inspection the NRC inspector examined the three Notice of Deviations (NODs) that were issued by ITT Barton QA Engineering. The NRC inspector determined that these NODs were not issued until 2 weeks after the test deviations/anomalies were noted. The delay in issuing the NODs was questioned in light of the test plan requirement that any anomalies noted at an outside testing laboratory were to be documented on a NOD and forwarded to ITT Barton QA within 48 hours. The NRC inspector determined that there were no documented instructions or procedures to cover the use of the NODs for "in house" testing; hence, the nonconformance documented in paragraph B.5 above was identified as a result of this inspection.

Subsequent investigation of the three NODs revealed that none of the three units had, as of the date of this inspection, been disassembled and no failure analysis had been performed. This item will be further reviewed during a future inspection.

12. QA Program Evaluation (A. L. Smith): QA management personnel stated that ITT Barton is conducting their Class 1E equipment qualification program under its established QA program.

ORGANIZATION: BARTON INSTRUMENTS
A UNIT OF INTERNATIONAL TELEPHONE AND TELEGRAPH CORPORATION
CITY OF INDUSTRY, CALIFORNIA

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<p>The ITT Barton QA Manual and its implementing procedures governing the areas of QA program, organization, design control, procurement document control, test control and audits (as they related to the equipment qualification program) were reviewed to determine that they were consistent with QA requirements imposed by regulation and IEEE standards. Documentation of completed work in these areas was examined for program implementation. The nonconformance documented in paragraph B.6 above was identified.</p>		

ORGANIZATION: BECHTEL POWER CORPORATION
 LOS ANGELES POWER DIVISION
 NORWALK, CALIFORNIA

REPORT NO.:	99900521/82-05	INSPECTION DATE(S)	12/13-16/82	INSPECTION ON-SITE HOURS:	24
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CORRESPONDENCE ADDRESS: Bechtel Power Corporation
 Los Angeles Power Division
 ATTN: Mr. L. G. Hickelman, V.P. and Gen. Mgr.
 P. O. Box 60680, Terminal Annex
 Los Angeles, CA 90060

ORGANIZATIONAL CONTACT: Mr. R. L. Patterson, QA Manager
 TELEPHONE NUMBER: (213) 807-2381

PRINCIPAL PRODUCT: Architect Engineering Services.

NUCLEAR INDUSTRY ACTIVITY: The Los Angeles Power Division of the Bechtel Power Corporation is the architect engineer (AE) for nine domestic reactor units. Fifty percent of the total personnel (approximately 6,700) are assigned to activities in connection with these units and two modification/repair/service type contracts.

ASSIGNED INSPECTOR: W. R. Costello *W. R. Costello* for J. R. Costello, Reactor Systems Section (RSS) 2-12-83
 Date

OTHER INSPECTOR(S):

APPROVED BY: W. R. Costello *W. R. Costello* for C. J. Hale, Chief, RS 2-12-83
 Date

INSPECTION BASES AND SCOPE:

A. BASES: 10 CFR Part 50, Appendix B.

B. SCOPE: Follow up on previous inspection concerns and two potential 10 CFR Part 50.55(e) reports from Arizona Public Service Company which covered the following: (1) condensate storage tank was designed by a scale-down method without new calculations being performed for seismic response and (2) design calculation error in refueling water tank seismic response.

PLANT SITE APPLICABILITY: The contents of this report relate to the following docket: 50-528, 50-529, 50-530, 50-361, 50-362; 50-424, and 50-425.

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A. VIOLATIONS:

None

B. NONCONFORMANCES:

None

C. UNRESOLVED ITEMS:

The adequacy of the design of the condensate storage tank and refueling water tank was not provided by the measures established in that errors were identified in calculations 13-CC-CT-010 and 13-CC-CT-015. Subsequent checkers and reviewers, all of whom reviewed and signed these calculations as being adequate, failed to identify the calculation and assumption errors. Both calculations are being redone to determine the safety significance of these errors and will be completed by February 1983. During the next regular inspection this matter will be reevaluated to determine: (1) the safety significance of the calculation and assumption errors, and (2) if present procedural requirements are adequate to prevent future errors of this type.

D. OTHER FINDINGS OR COMMENTS:

1. Follow Up On Previous Areas of Inspection:

- a. During the 79-02 inspection in the area of audits, a concern was expressed regarding the effectiveness of the new system for identification of deviations. This system was initiated by Revision 13 to QADP 5.1, which required the use of corrective action requests only and deleted the use of quality assurance findings (QAF's).

The elimination of QAF's has simplified procedural requirements and made it easier to control and track required corrective action.

This item is considered closed.

- b. During the 81-02 inspection in the area of design change control, it could not be determined what document provided the current status of design specification changes on the Palo Verde Nuclear project.

CEBUS is the official status document for specifications and it is updated monthly. Purchasing also publishes a working document for

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their own use entitled "Open Bill of Material and Specification Status Report/Heckle Sheet." This is also published monthly and is for the internal use of purchasing and is not considered an official status document.

This item is considered closed.

- c. During the 82-02 inspection in the area of design corrective action, a concern was expressed regarding the practice of allowing more than 10 Specification Change Notices (SCN) to accumulate against a specification before incorporation into the specification.

The Project Administrator is now issuing a weekly SCN status report. This report is being circulated to all of the cognizant engineers. As soon as 10 SCNs become outstanding against a specification, a design review notice (DRN) is initiated for the necessary specification revision.

This item is considered closed.

- d. During the 82-04 inspection in the area of design document control, a concern was expressed that the AE and Nuclear Steam Supply System (NSSS) documents required in the AE/NSSS interface did not have adequate design change accountability and that there was not adequate assurance that both parties had thoroughly reviewed and concurred in them. Bechtel does not issue a single list of all the AE and NSSS documents that require AE/NSSS joint approval prior to a design change. Bechtel has assigned responsibility to the Nuclear/Environmental Chief Engineer to assure that the AE/NSSS interface is adequately defined, coordinated, and recorded. In the Vogtle project this is defined in C2, C4, and C5 of the VNP Project Reference Manual.

This item is considered closed.

2. Condensate Storage Tank Design:

Arizona Public Service Company issued a potential 10 CFR Part 50.55(e) report as a result of the Torrey Pines Technology independent evaluation of Palo Verde Nuclear Generating Station. This evaluation requested that the design of the condensate storage tank (CST) be reevaluated.

The CST design is required to resist stresses resulting from operating, accident, and extreme environmental forces. The CST design was based on the design of the refueling water tank (RWT) which has the same 50 foot

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diameter but has a height of 62 feet versus 50 feet for the CST. The decision to use just one analysis (calculation) for the RWT and scale-down for the CST was an engineering decision of the civil/structural staff. However, the CST is embedded 4.5 feet into the soil while the RWT is embedded 15 feet. The CST foundation will, therefore, be more flexible and have less damping than that indicated for the RWT. No comparison or other justification was presented in the calculation which would demonstrate that the RWT analysis could be reasonably or conservatively applied to the CST.

As a result of the Torrey Pines finding, new calculations will be made and completed in January 1983 to determine if the scaling approach used on the CST is acceptable. At that time an assessment can be made whether the CST design meets the established safety criteria.

3. RWT Calculation Error:

Arizona Public Service issued a potential 10 CFR Part 50.55(e) report as a result of an error found during a Bechtel rereview of the RWT calculation package. The rereview was made in response to the Torrey Pines evaluation of the CST design which was a scaled down version of the RWT. The error was found in the determination of the tank wall moment at the junction of the basement.

The complete RWT design is being reanalyzed by Bechtel and will be finished in February 1983. At that time an assessment can be made whether the RWT meets the established safety criteria.

This error in the RWT calculation in conjunction with the methodology used for the CST design could result in a CST that does not meet established safety criteria. This matter will be inspected further during the next inspection (see the unresolved item in C. above).

ORGANIZATION: BECHTEL POWER CORPORATION
SAN FRANCISCO POWER DIVISION
SAN FRANCISCO, CALIFORNIA

REPORT NO.:	99900522/82-03	INSPECTION DATE(S)	11/29-12/2/82	INSPECTION ON-SITE HOURS:	28
CORRESPONDENCE ADDRESS: Bechtel Power Corporation San Francisco Power Division ATTN: Mr. C. D. Statton, Vice Pres. and Gen. Mgr. P. O. Box 3965 San Francisco, CA 94119					
ORGANIZATIONAL CONTACT: Mr. E. R. Nelson, Manager of Division QA TELEPHONE NUMBER: (415) 768-0777					
PRINCIPAL PRODUCT: Architect engineering services.					
NUCLEAR INDUSTRY ACTIVITY: The total effort committed to domestic nuclear activities is approximately 92 percent of the 7100 person staff of the San Francisco Power Division. The division currently provides the principal architect engineering services for 4 domestic units: Limerick 1 and 2, Susquehanna 2, and Hope Creek 1. In addition, this division has the project management for Diablo Canyon 1 and 2, 12 units under a modification/repair/service-type contract, and an engineering evaluation contract with an NSSS supplier.					
ASSIGNED INSPECTOR:	<u>C. J. Hale</u> J. R. Costello, Reactor Systems Section (RSS)			<u>1/27/83</u> Date	
OTHER INSPECTOR(S):					
APPROVED BY:	<u>C. J. Hale</u> C. J. Hale, Chief, RSS			<u>1/27/83</u> Date	
INSPECTION BASES AND SCOPE:					
A. <u>BASES</u> : 10 CFR Part 50, Appendix B.					
B. <u>SCOPE</u> : Procurement source selection and product acceptance.					
PLANT SITE APPLICABILITY:					
Docket Nos. 50-387, 50-388, and 50-355.					

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A. VIOLATIONS:

None

B. NONCONFORMANCES:

Contrary to the requirements of Criterion V of 10 CFR Part 50, Appendix B, documented procedures and instructions and their implementation, did not provide for the appropriate product quality analysis, inspection, and/or qualification of ITT-Grinnell clamps and Pacific Scientific shock assemblies.

C. UNRESOLVED ITEMS:

None

D. OTHER FINDINGS OR COMMENTS:

Procurement Source Selection/Product Acceptance - Applicable procurement procedures, quality assurance procedures, and project procedures were examined to determine quality program commitments. To verify implementation of these commitments, the following documents were examined: one centralized information dissemination system, one evaluated supplier list, five supplier performance evaluation reports, five supplier evaluation review reports, five supplier quality program evaluation reports, five supplier quality program evaluation checklists, five quality program audits, three supplier quality program audit checklists, three purchase orders, six quality surveillance reports, four specifications, five letters and memos, two management corrective action reports, one quality surveillance plan, and one quality surveillance report.

Relative to the documents examined, one nonconformance was identified (see B above). There were no violations or unresolved items.

In regard to the nonconformance identified in this area of the inspection, the following observations were noted:

1. The clearance between the Pacific Scientific shock body and the ITT-Grinnell pipe clamp would not permit the required lateral movement of five degrees in either direction.
 - a. Restraining the shock from swinging through an arc of \pm five degrees can result in a case where the snubber would bend during thermal movement of the system. This, in turn, can cause overstressing of the pipe and/or loss of operability of the shock.

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- b. Both the shock and pipe clamps were off-the-shelf items and were shipped separately.
 - c. There was no evidence that a complete dimensional analysis had been performed to assure the shocks and clamps could be assembled and meet the requirements for lateral movement of \pm five degrees.
 - d. There was no evidence that the critical dimensions had been identified to inspection personnel or that a complete first article dimensional inspection had been performed.
 - e. There was no evidence that any effort had been made to qualify the equipment for its intended usage.
2. In several cases, the ITT-Grinnell clamps for shock assembly sizes 1, 3, 10, 35, and 100 were not installable as received and required coping of clamp corners and/or ends to facilitate field installation. The trimming of the clamp ears without prior engineering analysis and justification could result in unacceptably large areas of the clamp being removed, thus overstressing the clamp when subjected to the design loads.
3. Friction clamps supplied by ITT-Grinnell for pipe sizes 2" or less called for a gap on either side of the clamp. In some cases, no gap was provided. Due to allowable manufacturing tolerances on the pipe and clamps, and such deviations from drawing requirements, no gap was provided. When installed, this resulted in a lack of friction, thus negating their design functions.

The following items will be reviewed further during subsequent inspections: (1) the control and engineering evaluation associated with the modifications of these shock assemblies made in the field; and (2) the assessment of the generic implications of these product errors and the actions taken relative to other projects that are affected.

ORGANIZATION: BUNKER RAMO CORPORATION
AMPHENOL NORTH AMERICA
CHATSWORTH, CALIFORNIA

REPORT NO.:	99900116/82-01	INSPECTION DATE(S)	5/3-7/82	INSPECTION ON-SITE HOURS:	116
CORRESPONDENCE ADDRESS: Bunker Ramo Corporation Amphenol North America ATTN: Mr. Al Mellotte, Acting Manager 9201 Independence Avenue Chatsworth, CA 91311					
ORGANIZATIONAL CONTACT: Mr. Ed Beaupre, Director, Program Managment TELEPHONE NUMBER: (213) 341-0710					
PRINCIPAL PRODUCT: Electrical Penetration Assemblies					
NUCLEAR INDUSTRY ACTIVITY: Bunker Ramo has supplied electrical penetration assemblies for at least 13 nuclear power generating stations; however, at present, there is no nuclear work being accomplished, and the Chatsworth facility is scheduled to close June 30, 1982.					
ASSIGNED INSPECTOR:		<i>J. R. Agee</i> J. R. Agee, Equipment Qualification Section (EQS)		<u>7/14/82</u> Date	
OTHER INSPECTOR(S):		H. S. Phillips, EQS A. L. Smith, EQS R. Gardner, Region III			
APPROVED BY:		<i>H. S. Phillips</i> H. S. Phillips, Chief, EQS		<u>7/14/82</u> Date	
INSPECTION BASES AND SCOPE:					
A. <u>BASES</u> : 10 CFR Part 50, Appendix B and 10 CFR Part 21.					
B. <u>SCOPE</u> : Status of previous inspection findings, 10 CFR Part 21 and 10 CFR Part 50.55(e) reports pertaining to deficiencies in containment electrical penetration assemblies.					
PLANT SITE APPLICABILITY: LaSalle No. 2, 50-373; Wolf Creek 50-482; Byron No. 2, 50-457; Braidwood No. 2, 50-455; Callaway 50-483; Comanche Peak Nos. 1 and 2, 50-445 and 50-446; Midland Nos. 1 and 2, 50-329 and 50-330.					

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A. VIOLATIONS:

1. Contrary to paragraph 21.21(a) of 10 CFR Part 21, Bunker Ramo failed to:
 - (a) Evaluate deviations identified in electrical penetrations assemblies (EPA's) to determine whether circumferential cracking of conductor insulation in "precrimp" modules and insulation stripped too far back on "postcrimp" type modules (exposing bare copper conductor) furnished LaSalle County Nuclear Site, Unit 2, were reportable under 10 CFR Part 21 requirements.
 - (b) Evaluate deviations identified in EPA's furnished to Midland Nuclear Site, Units 1 and 2, to determine whether defective butt splices, reported by Consumers Power Company to Bunker Ramo on February 24, 1982, were reportable under Part 21 requirements.
 - (c) Evaluate deviations identified in EPA's furnished to Midland Nuclear Site, Units 1 and 2, to determine whether defective conductor insulation (cracking) reported by Consumers Power Company to Bunker Ramo on February 24, 1982, were reportable under Part 21 requirements.
2. Contrary to the requirements of paragraph 21.21(b) of 10 CFR Part 21 Bunker Ramo failed to include in their 10 CFR Part 21 report (FIAR 0002 dated March 26, 1982) on defective butt splices and cracked insulation in EPA's (identified by Consumer Power Company, Midland project personnel) the number and location of all such components in use at, supplied for, or being supplied for sites other than the Midland site.

B. NONCONFORMANCES:

None

C. UNRESOLVED ITEMS:

In March 1980, Bunker Ramo forwarded a copy of Failure Investigation and Analysis Report (FIAR) Number 0001 (concerning loose EPA lugs at the Callaway site) to NRC Region V. By letter dated November 4, 1980, to Region V, Bunker Ramo made a commitment to complete FIAR No. 0001 and forward a copy to Region V. During this inspection the team examined FIAR 0001A; however, to date, Bunker Ramo was unable to provide documented evidence that the revised report was submitted to the NRC.

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D. STATUS OF PREVIOUS INSPECTION FINDINGS:

1. (Closed) Deficiency (80-02-A1): Failure to report per 10 CFR Part 21 the number and location of electrical penetration assemblies (EPA's) containing loose terminal lugs.

During this inspection another example was identified (Violation A.2) relative to Bunker Ramo's failure to report the number and location of EPA's containing defects once they learned of such defects.

This item is closed, but will be tracked as Unresolved Item (paragraph C).

2. (Closed) Deficiency (80-02-A2): Failure to report the time required for corrective action.

Followup inspection identified a similar problem that is described in the Unresolved Items section of this report. That is, Bunker Ramo stated that the final report would describe the evaluation of the problem and corrective action. There was no documentation available to demonstrate that the final report was made.

This item is closed, but will be tracked as a part of the Unresolved Item (paragraph C) described in this report.

3. (Closed) Deficiency (80-02-B): Failure to post copies of 10 CFR Part 21, Section 206 of Energy Reorganization Act of 1974, adopted procedures.

The NRC inspectors reviewed Bunker Ramo's response to this deficiency dated December 18, 1980. Bunker Ramo is no longer required to post the subject reporting requirements. Therefore, no physical determination was made relative to the implementation of posting requirements between the last NRC inspection, September 22-25, 1980, and the completion of nuclear work in March 1981.

This is closed based on the corrective action described in the written response.

The following items are closed on the basis of corrective action described in Bunker Ramo's responses to NRC Region IV, dated December 18, 1980, and April 3, 1981. Since no work was in progress the NRC inspectors could not verify the implementation of corrective action.

4. (Closed) Deviation (80-02-A): Bunker Ramo's failure to take corrective action relative to removing inactive measuring instruments and test equipment from the Active Instrument Cabinet.

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5. (Closed) Deviation (80-02-B): Failure to distribute QAP Revision L, February 1, 1980, to three QA manual holders.
6. (Closed) Deviation (80-02-C): Failure to properly control and calibrate crimper tools.
7. (Closed) Deviation (80-02-D): Failure to submit samples for tensile testing prior to crimping SNUPPS modules, part nos. 50027259-02.
8. (Closed) Deviation (80-02-E.a): Failure to issue revised manufacturing and inspection travelers/manufacturing layouts to the mold area.
9. (Closed) Deviation (80-02-E.b): Failure to inspect part no. 50027259-02 prior to further manufacturing operations.
10. (Closed) Deviation (80-02-F): Failure to require suppliers of insulated wire and cable to provide a QA program.
11. (Closed) Deviation (80-01): Failure to segregate or remove equipment with labels which indicated calibration was past due.

E. OTHER FINDINGS OR COMMENTS:

1. Construction Deficiency Report by Commonwealth Edison (CECO) - The deficiency reported was the result of discovering cracked insulation at the module/conductor interface in the precrimped modules of the EPA's furnished to the LaSalle County Nuclear Power Station, Unit 2 by Bunker Ramo.

a. Background:

On October 2, 1980, Commonwealth Edison submitted a 10 CFR Part 50.55(e) report for the LaSalle County Nuclear Station, Unit 2 identifying cracked insulation (exposing bare copper) on small diameter conductors as they entered/exited the epoxy module portion of the Bunker Ramo electrical penetrations. Subsequent to the identification of the insulation problem, all EPA's from LaSalle, Unit 2, were reworked in accordance with Bunker Ramo rework procedure SK-MA-1170. This rework consisted of adding a second heat shrink sleeve over the original sleeve and adding additional overmold compound.

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b. Findings:

During this inspection, the NRC inspectors determined the following:

- (1) Quality Assurance Records - Inspection data book for eight different EPA's and in-house QA audit findings for a 2-year period were reviewed; however, there was no evidence in these records/findings which correlated with the deficiency identified at the LaSalle site.
- (2) Interview of Bunker Ramo Personnel - The Director of Project Management, Project Engineer for the LaSalle EPA's, and the QA Manager were interviewed by the team to determine if Bunker Ramo's in-house inspection findings indicated that a cracking problem existed during fabrication. The results of these interviews indicated that a design change had been made to eliminate the cracking problem during fabrication.
- (3) Visual Inspection of Bunker Ramo EPA Specimens - EPA specimens used in the Generic J Qualification Test, and a sample fabricated using the double heat shrink sleeve method, were visually examined. Cracks similar to those reported at the LaSalle site were noted on all specimens inspected.
- (4) Use of Heat Shrink Sleeving Material - A review was made of all Bunker Ramo test data with regard to the heat shrink sleeving used on EPA's. This review indicated that the use of the Raychem RFR/RUL heat shrink tubing is acceptable.
- (5) Cracking of the Heat Shrink Sleeving -
 - (a) The NRC inspectors determined that a design change had been made in October 1978 to eliminate the stress concentration which had caused deviations (cracks) at the epoxy module-conductor interface. During the inspection when this matter was first discussed with the Bunker Ramo Project Engineer, he described the condition as "cracks" in the insulation but later described these conditions as "anomalies." Bunker Ramo letter (BJA: 10:0:070), October 2, 1980, responded to questions in Commonwealth Edison letter, September 26, 1980, relative to the failure mechanism; Byron-Braidwood vs. LaSalle EPA design, and why Commonwealth Edison was not notified of the need to change the

ORGANIZATION: BUNKER RAMO CORPORATION
AMPHENOL NORTH AMERICA
CHATSWORTH, CALIFORNIA

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design of LaSalle EPA's to eliminate the problem. In this Bunker Ramo letter (reponse) the terms "anomalies" and "cracks" are used interchangeably. It appears that Bunker Ramo recognized a deviation, the cracking problem, as early as 1978.

The NRC inspector questioned why such cracking was not evaluated for reportability and Bunker Ramo's Director of Project Management replied that Bunker Ramo did not report because Commonwealth Edison reported the deficiency in a Construction Deficiency Report, October 2, 1980, in accordance with 10 CFR Part 50.55(e) requirements. The NRC inspector stated this would not meet Part 21 requirements since the LaSalle report did not contain information relative to EPA's furnished to other nuclear sites. Bunker Ramo made no evaluation relative to reportability under 10 CFR Part 50, and 10 CFR Part 21 requirements. See Violation A.1.

(b) Although Bunker Ramo did not perform an evaluation for 10 CFR Part 21 reportability, their internal documentation recorded that extensive internal and external technical evaluations of the "cracking" problem had been performed.

The manufacturer of the tubing (Raychem Corp.) has conducted a limited test/investigation of one sample utilizing the RFR tubing and an epoxy sample supplied by Bunker Ramo. The conclusions of that test, transmitted to Bunker Ramo via Raychem letter of October 13, 1980, were: (a) cracking at the epoxy/RFR interface occurred because of stress concentrations resulting from cable flexure combined with the excellent adhesion of the epoxy to the tubing surface; (b) there appeared to be no chemical incompatibility between the tubing and the epoxy. This same letter also identified two different methods to solve the stress cracking problem: (1) to use a softer potting compound; or (b) to add a semirigid layer to the wire as it emerges from the epoxy to eliminate the adhesion and cushion the sharp edge of the epoxy.

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The above Raychem evaluation was documented to Bunker Ramo in an October 1980 report. This report confirmed the cause of the cracking problem and recommended adding a semirigid layer at the epoxy module conductor interface which Bunker Ramo had already done in October 1978 by implementing engineering change notice 12051. The NRC inspector questioned why the design change was made, that is, was it to eliminate cracking. The Bunker Ramo Director of Project Management responded that it was simply considered a product improvement. Internal Bunker Ramo documents seem to indicate it was more than just for product improvement, that is, Bunker Ramo letter dated October 2, 1980, to Commonwealth Edison stated, "Design of the Byron/Braidwood penetrations, was changed after anomalies were discovered in the pre-crimp module pigtail assemblies, prior to the production of Byron/Braidwood penetrations, but after the production of LaSalle penetrations." The design change consisted of an additional shrink sleeve introduced concentrically over the primary insulation. The additional outer sleeve was to provide a mechanical stress barrier to compensate for the mechanical stress at the module-wire interface.

- (c) Rework of LaSalle Unit 2 EPA's was well documented in Bunker Ramo correspondence (BJA 10:0:070; 3:1:029) and Draft Rework Procedure S.K.-MA-1170 dated September 19, 1980, which was proposed to Commonwealth Edison (CECO). This prompted CECO to ask (in a letter dated September 26, 1980) Bunker Ramo's President, "Why was CECO not informed of similar need of design used for Byron/Braidwood for the design on LaSalle penetrations?" In other words, why was CECO not informed of the deviation which resulted in an October 1978 design change, in order to allow an evaluation of the deviation which CECO reported as a defect in October 1980. This finding supports Violation A.1.

Since Bunker Ramo did not evaluate the deviations, no report was made to the NRC.

- (6) Noted Conflicts in Information - During the course of this inspection the following conflicts in information concerning the identified EPA deficiencies were noted:

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- (a) After the identification of the EPA heat shrink sleeve cracks at the LaSalle site, Bechtel contacted Bunker Ramo via letter dated February 13, 1981, and questioned the design similarities between the Midland EPA's (Consumers Power Co.) and the LaSalle EPA's and whether this condition (cracks) was in fact a generic problem. Bunker Ramo's letter dated May 26, 1981, stated, "The Midland EPA's have been designed to eliminate the stresses that caused the break of module conductor insulation in the LaSalle penetrations . . . Midland penetration precrimp modules part nos. 50016264-01 through -40 (excluding the coax and triax), have double shrink sleeve concentrically installed" Subsequent inspection by Midland site personnel revealed that this information supplied by Bunker Ramo was erroneous and the only double shrink sleeve EPA's at Midland were the spares. Only after similar problems with cracks surfaced at Midland in February 1982, did Bunker Ramo retract (via letter dated March 9, 1982) the statement made in the earlier letter.

Despite all of the Bunker Ramo-Commonwealth meetings and correspondence on the cracking problems, Bunker Ramo again failed to evaluate Midland deviations when such deviations were questioned on February 13, 1981. See Violation A.1.

- (b) By letter dated September 26, 1980, from CECO to Bunker Ramo, CECO questioned what tests were performed to confirm/assure the double heat shrink design. Bunker Ramo responded to this question in a letter to CECO dated October 2, 1980, stating, "In-house testing by Amphenol of the two shrink sleeve method of relieving the mode of failure (mechanical stress) assures the integrity of the circuits of its intended function." Six days later (October 8, 1981) in a Bunker Ramo interoffice communication from M. Aaron, Project Engineer, to E. Beaupre, Program Manager, it was pointed out that: (1) CECO was questioning the adequacy of the two shrink sleeve concept; (2) a meeting had been set for October 13, 1980, with CECO to discuss this matter; (3) it is necessary to perform a test to verify the adequacy of the second sleeve concept; (4) the test procedure had been written; and (5) the test must be performed before the meetings are to be held.

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AMPHENOL NORTH AMERICA
CHATSWORTH, CALIFORNIA

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(c) By letter dated September 26, 1980, from CECO to Bunker Ramo, CECO questioned the reason for the design change to the Byron/Braidwood penetrations from those used at LaSalle. Bunker Ramo's answer dated October 2, 1980, stated the design of the Byron/Braidwood penetrations were changed after anomalies were discovered in the precrimp module pigtail assemblies. In light of this answer, the NRC inspection team questioned both the Director of Program Management and the Project Engineer as to why a 10 CFR Part 21 evaluation was not made after the discovery of the deficiencies particularly since both the LaSalle and Midland sites had EPA's with single heat shrink sleeving. The Director of Program Management stated that the deficiencies referred to in the October 2, 1980, letter were the deficiencies discovered at LaSalle during August-September 1980, and that the utility had initiated a 50.55(e) report, thus relieving Bunker Ramo from its responsibility to initiate a Part 21 report. When the Project Engineer was questioned concerning the same matter, he first stated that the anomalies referred to in the October 2, 1980, letter were cracks and had surfaced several years before and Engineering Change Number 120518 had been initiated to provide for a new design. Later he changed the word "cracks" to anomalies. He was questioned as to why he did not initiate a Part 21 report of deviation at the time and he stated that "he was the project engineer and was not in the QA organization and Part 21 reporting was QA's job." The NRC inspector determined that Bunker Ramo Procedure No. 10 CFR Part 21 required engineering to report.

2. Construction Deficiency Report by Consumers Power Company (CPC) - The deficiencies reported were the result of discovering cracked insulation at the module/conductor interface and inadequately crimped butt splices in EPA's furnished to the Midland Nuclear Power Plant by Bunker Ramo.

ORGANIZATION: BUNKER RAMO
AMPHENOL NORTH AMERICA
CHATSWORTH, CALIFORNIA

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a. Background

On February 19, 1982, CPC submitted a 10 CFR Part 50.55(e) report for the Midland Plant to Region III identifying cracks in the conductor insulation at the conductor/module interface of EPA's and inadequately crimped EPA butt splices. These deficiencies were observed in installed EPA's still in shipping crates, and spare module assemblies in warehouse storage. CPC reported that these deficiencies were such that failure could occur in Class 1E equipment essential to the safe operation/shutdown of the nuclear facility. In conjunction with, and only after, reported deficiencies at the Midland site, Bunker Ramo advised NRC Region V through a 10 CFR Part 21 report that deficiencies in splices and cracks in conductor insulation had been identified at the Midland site. Since identifying the above, CPC has submitted an interim report to Region III and they are still investigating the cause of the deficiencies. Bunker Ramo has submitted FIAR Report No. 0002 to Region V stating the cause of the cracks was a result of site personnel moving cables to inspect for rodent damage.

b. Findings

- (1) Considering all of the foregoing findings with respect to the cracking problems identified at LaSalle, the Bunker Ramo 10 CFR Part 21 report and the FIAR conclusion that such cracking was the result of moving the cables to inspect for rodent damage appears to ignore the previously identified deviation which both LaSalle and Midland considered a defect.

The evaluation documented in Bunker Ramo FIAR 0002 was shallow and superficial, in that no engineering failure analysis was performed because it was considered "not applicable." The stated cause of cracking was attributed to mishandling by site personnel, but the report failed to address why EPA's (still in shipping crates) also exhibited the cracking problem.

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The corrective action proposed for Midland EPA's was very similar to the "fix" proposed for LaSalle EPA's. See paragraph 1.b.(6)(a) which shows the LaSalle and Midland problems to be similar. Bunker Ramo letter to Bechtel, March 9, 1982, refers to the Engineer Change Notice (ECN) implemented in October 1978, and it stated that Bunker Ramo had erroneously told Midland that their EPA's were adequate as the new design had taken care of the cracking problem. Yet, on March 26, 1982, Bunker Ramo evaluated and reported the problem as mishandling.

This failure to evaluate is described in Violation A.1.

- (2) Since the reported problem of conductor insulation cracks at the Midland site was similar to the deficiency which had previously been reported at LaSalle, the NRC inspection team inspected both the LaSalle and Midland deficiencies concurrently. Section E.1.b(1) through (5) above also apply to the Midland site.
- (3) Inadequately crimped butt splices - One of the deficiencies identified in CPC's report was "inadequately crimped butt splices" (resulting in several No. 2 AWG butt splices being pulled apart when hand force was applied). CPC's interim report concerning this 50.55(e) report, dated April 8, 1982, reported the cause of this deficiency to be: "root cause of the inadequately crimped butt splice has been determined to be a breakdown in the fabrication/design of the module assemblies."

During the NRC team interview with the Director of Program Management for Bunker Ramo, this item was discussed. It was stated that Bunker Ramo did not concur with the reported "root causes" and in fact was of the opinion that these deficiencies were the result of mishandling of EPA's by the site construction crews. It was also stated that although Bunker Ramo personnel had visited the Midland site and witnessed the actual failure of one in-line butt splice, they made no attempt to examine other EPA's and would not evaluate the extent of these deficiencies until they received further proof of defective butt splices from the Midland site.

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AMPHENOL NORTH AMERICA
CHATSWORTH, CALIFORNIA

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The Director of Program Management was informed by the team that NRC inspectors from Region III had also visited Midland and examined like discrepancies in spare EPA's. The team was unable to observe and evaluate actual crimping operations since all EPA product lines had already been closed down.

Review of NRC report nos. 80-01 and 80-02 and Bechtel documents (in Bunker Ramo files) showed that calibration of crimp tools had been a problem during production of EPA's. Bunker Ramo letter dated April 24, 1979, to Bechtel and Bunker Ramo letter dated November 14, 1980, to NRC Region V document continuing inadequate control of the crimping process. Bunker Ramo had initiated reinspection and corrective action programs dating back to 1979.

Despite the previous quality history with respect to crimping problems and despite the reported deficiencies and witnessing of one deficient No. 2 AWC butt splice, Bunker Ramo failed to evaluate the Midland deficiency and include in their 10 CFR Part 21 report, the number and location of all such components supplied to other sites.

- (4) Noted Conflicts in Information - During the course of this inspection, the following conflicting information concerning EPA deficiencies at the Midland site was noted:

10 CFR Part 50.55(e) Report No. 78-12 - In January 1979, Consumer Power Company submitted a 50.55(e) report for the Midland nuclear site deficiencies associated with wire terminations located in Bunker Ramo penetration assemblies inboard terminal boxes. The final report concerning this matter, transmitted to RIII by letter dated May 25, 1979, stated that the supplier (Bunker Ramo) had initiated corrective action consisting of a 100% inspection program of visual inspection, pull testing, and continuity testing for all terminations on all current and future nuclear projects. This program was

ORGANIZATION: BUNKER RAMO
AMPHENOL NORTH AMERICA
CHATSWORTH, CALIFORNIA

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reported to have been initiated as of April 24, 1979. Examination of all Bunker Ramo correspondence concerning this 50.55(e) report revealed that the corrective action reported by Consumer Power Company/Bechtel was in error. In two different letters submitted to Bechtel in April 1979, Bunker Ramo stated that they had initiated 100% inspection for a period of time; however, due to good quality history they were reverting to a MIL-STD-105 sampling plan. This matter will be followed up during a future inspection at Bechtel.

3. Related Comments - NRC report no. 80-02, dated October 24, 1980, documented the findings of an inspection conducted on September 22-25, 1980. This report contained a Notice of Violation that described deficiencies in the Bunker Ramo 10 CFR Part 21 reporting system. That is, Bunker Ramo was not evaluating deviations and reporting the number and locations when components contained defects.

Bunker Ramo letter dated December 18, 1980, and April 3, 1981, described corrective action to assure implementation of 10 CFR Part 21 requirements and Bunker Ramo procedure 10 CFR Part 21, dated March 12, 1978.

The NRC inspectors determined during this time that Bunker Ramo apparently had neither implemented the requirements of 10 CFR Part 21 nor their procedures. See Violations A.1 and A.2.

ORGANIZATION: CHICAGO BRIDGE & IRON COMPANY
BIRMINGHAM, ALABAMA

REPORT NO.:	99900097/82-02	INSPECTION DATE(S)	10/4-7/82	INSPECTION ON-SITE HOURS:	23
CORRESPONDENCE ADDRESS: Chicago Bridge & Iron Company ATTN: Mr. J. G. Tucker District Engineering Manager 1500 North 50th Street Birmingham, Alabama 35201					
ORGANIZATIONAL CONTACT: Mr. R. Bentley, Engineering Coordinator TELEPHONE NUMBER: (205) 595-1191, ext. 360					
PRINCIPAL PRODUCT: Reactor Containment Buildings, Containment Building Liners, and Personnel and Escape Locks					
NUCLEAR INDUSTRY ACTIVITY: Commercial nuclear production of the Birmingham, Alabama, plant represents 20% of its production.					
ASSIGNED INSPECTOR: <u>I. Barnes</u> for W. D. Kelley, Reactive & Component Program Section (R&CPS)				<u>11-3-82</u> Date	
OTHER INSPECTOR(S):					
APPROVED BY: <u>I. Barnes</u> I. Barnes, Chief, R&CPS				<u>11-3-82</u> Date	
INSPECTION BASES AND SCOPE:					
A. <u>BASES</u> : 10 CFR Part 50, Appendix B.					
B. <u>SCOPE</u> : This inspection was made as a result of the identification by the Sacramento Municipal Utility District of the failure of the reactor building personnel lock interlock furnished to the Rancho Seco Nuclear Generating Station, Unit 1.					
PLANT SITE APPLICABILITY:					
50-247, 50-261, 50-272, 50-295, 50-302, 50-305, 50-312, 50-317, 50-318, 50-321, and 50-327.					

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A. VIOLATIONS:

None

B. NONCONFORMANCES:

1. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 6.7.1 of Section 6.0, Division 2, of the Nuclear Quality Assurance Manual, repetitive conditions of bent hinge pins, damaged hinges, and door rebound in personnel locks were not reported via a Corrective Action Request (CAR) to receive Corporate Management attention.

C. UNRESOLVED ITEMS:

None

D. OTHER FINDINGS OR COMMENTS:

1. Sacramento Municipal Utility District (SMUD) - Rancho Seco Nuclear Generating Station, Unit 1 - Problem reported was failure of the reactor building personnel lock interlock.
 - a. Background - The NRC Region V inspector reported on January 30, 1982, that during entry into the reactor building for snubber maintenance inspection, the personnel lock interlock failed by permitting both interior and exterior doors to open simultaneously, thus breaching containment. Chicago Bridge & Iron Company (CB&I) had been contacted by licensees regarding problems with personnel locks, which included bent hinge pins, damaged hinges, and incorrect adjustment of doors and hinges.
 - b. Findings
 - 1) CB&I has completed 56 of 83 contracts for nuclear containment building liners or containment vessels. Fifty-eight of these units have personnel locks similar to the personnel locks installed at the Sacramento Municipal Utility District, Rancho Seco Nuclear Station, Unit 1.
 - 2) The NRC inspector reviewed the CB&I personnel lock instruction manuals for 12 nuclear units fabricated and delivered during the period from 1968 to 1982. The NRC inspector ascertained that the instruction manuals issued prior to 1974 provided

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the licensees with only limited information on how to check the personnel lock doors for proper adjustment, in order to prevent malfunction of the latching mechanism. Instruction manuals issued in 1974 and subsequent years did advise the licensees on how to check the personnel lock doors for proper adjustment. The manuals also cautioned the licensees that the amount of rebound was dependent on how fast the door was closed, and that excessive rebound could prevent the latch from capturing the roller assembly.

- 3) CB&I presented to the NRC inspector a history of reported problems with the personnel locks involving 20 contracts. The NRC inspector ascertained that the reported problems involved: (1) bent hinge pins; (2) damaged hinges; and (3) instances of failure of the latch to capture the door roller assembly. The NRC inspector requested to see copies of the service reports, or other similar documents issued by the CB&I service personnel, which identify their findings when they visited nuclear plant sites. CB&I informed the NRC inspector that they did not formally document their findings. The group leader who had been assigned the responsibility for providing site service of the personnel locks did give; however, an oral presentation of his observations.
- 4) The NRC inspector identified from review of the CB&I service history, that many of the reported door rebound problems were preceded by reported bent hinge pins and damaged hinges. CB&I service personnel additionally stated that overstressing of hinge pins by over adjusting and/or improper adjustment of the door swing rods had also been observed. In some cases, CB&I recommended the installation of an outboard bearing underneath the sprocket, in order to prevent bending of the hinge pin by over adjustment of the door swing rods. These repetitive conditions were not reported via a CAR to assure Corporate Management attention, which has been identified as a nonconformance (see paragraph B).

The NRC inspector reviewed the CB&I shop checklists for the personnel locks shipped to the Georgia Power Company, Alvin W. Vogtle Nuclear Plant, Units 1 and 2, and verified that the gasket interspace test, overload (pneumatic) test, and leak rate test had been performed and signed off by the inspector. The shop checklists did not address checking the personnel lock door

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latch mechanisms for proper adjustment prior to the performance of the aforementioned tests.

2. Implementation of 10 CFR Part 21

The NRC inspector verified that CB&I had issued Standard 8500-6, "Reporting of Defects and Noncompliance - NRC Regulation 10 CFR Part 21," which required the posting of a copy of CB&I form GO 25 in a conspicuous location. Form GO 25 contains Section 206 of the Energy Reorganization Act of 1974 and informs the reader that all deviations are to be reported as outlined in CB&I Red Book Standard No. 8500-6.

ORGANIZATION: COMBUSTION ENGINEERING, INCORPORATED
POWER SYSTEMS GROUP
WINDSOR, CONNECTICUT

REPORT NO.: 99900401/82-03	INSPECTION DATE(S) 9/27-30 and 10/4-8/82	INSPECTION ON-SITE HOURS: 80
CORRESPONDENCE ADDRESS: Combustion Engineering, Incorporated Power Systems Group ATTN: Mr. M. R. Etheridge, Vice President, General Services 1000 Prospect Hill Road Windsor, Connecticut 06095		
ORGANIZATIONAL CONTACT: Mr. C. W. Hoffman, Director, Group QA TELEPHONE NUMBER: (203) 683-6200		
PRINCIPAL PRODUCT: Nuclear Steam Supply System		
NUCLEAR INDUSTRY ACTIVITY: The Power Systems Group, Combustion Engineering (CE) has contracts for 22 domestic reactor units to date, of which 14 are in the design and construction phase. In addition, they have modification/repair/service contracts for 22 reactor units.		
ASSIGNED INSPECTOR:	<u>R. H. Brickley</u> R. H. Brickley, Reactor Systems Section (RSS)	<u>12/7/82</u> Date
OTHER INSPECTORS:	A. L. Smith, Equipment Qualification Section L. E. Ellershaw, Reactive & Component Program Section	
APPROVED BY:	<u>C. J. Hale</u> C. J. Hale, Chief, RSS	<u>12/9/82</u> Date
INSPECTION BASES AND SCOPE:		
A. <u>BASES</u> : 10 CFR Part 50, Appendix B and Topical Report CENPD-210-A.		
B. <u>SCOPE</u> : This inspection was conducted as a result of: (1) a 10 CFR Part 50.55(e) Construction Deficiency Report (CDR) from Louisiana Power & Light Company pertaining to inadequate insulation on excore detectors furnished to Waterford Generating Station, Unit 3; and (2) a CDR from Arizona Public Service Company pertaining to safety injection system valves being supplied to Palo Verde Nuclear Generating Station, Units 1, 2, and 3, in which the motor operators were not qualified for inside containment use. Additional areas inspected included (Cont. on next page)		
PLANT SITE APPLICABILITY: 50-528, 50-529, 50-530, 50-382		

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SCOPE: (Cont.) design inspection, equipment qualification program, and status of previous inspection findings.

A. VIOLATIONS:

Contrary to 10 CFR Part 21.31, CE failed to specify that the provisions of 10 CFR Part 21 applied on Purchase Order No. 9172711-8181 issued to NAMCO Controls on December 30, 1981, for the procurement of safety-related test specimens and testing services.

B. NONCONFORMANCES:

1. Contrary to Criterion V of 10 CFR Part 50, Appendix B; Section 17.5 of Topical Report CENPD-210-A; and Section 5.3.3.2 of Quality Assurance of Design Procedure (QADP) 5.3, Revision 0, nine Document Approval/Distribution sheets transmitted for approval of documents relating to the chemical volume and control system (CVCS) charging pumps did not have all the required approvals.
2. Contrary to Criterion V of 10 CFR Part 50, Appendix B; QADP 5.7; and IEEE Standard 323-1971, a detector insulation modification (materials) was made subsequent to qualification testing without an evaluation being performed to determine its effect on the insulation resistance and capacitance or equipment qualification.
3. Contrary to Criterion V of 10 CFR Part 50, Appendix B; Topical Report CENPD-210-A; and Procedures QADP 5.7 and QAP 16.1, the following conditions were identified with respect to Type 3 FAR's initiated for inside containment safety injection system valves which had been supplied with motor operators not qualified for inside containment service: (1) the cognizant engineering organization conducted a review which resulted in a corrective action requiring the valve manufacturer to replace the motor operators; however, the cause of the deficiency was not established nor was corrective action recommended which would preclude recurrence; and (2) copies of the approved FAR's had been forwarded to GQA; however, no corrective action report forms were issued by GQA to notify cognizant parties (the valve manufacturer) of required corrective action on items containing significant conditions adverse to quality.

C. UNRESOLVED ITEMS:

None

D. STATUS OF PREVIOUS INSPECTION FINDINGS:

(Open) Nonconformance (81-03) - Group Quality Control surveillance or record review has not verified completion or fulfillment of code special process requirements by external suppliers.

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CE has received a response from all applicable vendors; however, additional data is needed from Richmond Engineering Company, C. E. Avery, and Engineers and Fabricators Company for closeout of this item.

E. OTHER FINDINGS OR COMMENTS:

1. Design Inspection - This is the continuation of the inspection of the CVCS initiated during the previous inspection (Inspection Report No. 99900401/82-02, paragraph E.2). In addition to the documents previously identified, 33 request for review and review forms, 19 document distribution/approval forms, and 6 letters between CE and Bechtel were examined to determine whether quality effectiveness of product design activities are consistent with the requirements of Topical Report CENPD-210-A (Quality Assurance Program). The item of nonconformance identified in B.1 above relates to this area of inspection.

2. 10 CFR Part 50.55(e) Construction Deficiency Report - Louisiana Power & Light Company notified NRC Region IV by letter, dated March 6, 1981, of inadequate electrical insulation on excore neutron flux detectors.

CE placed Purchase Order No. 9301567, dated November 5, 1973, with Gulf Oil Corporation, Gulf Energy & Environmental Systems Company, for five neutron flux monitoring systems per CE Specification No. 00000-ICE-3006, Revision 2. Supplement 1 to the purchase order, dated July 22, 1974, changed the name of Gulf Energy & Environmental Systems Company to General Atomic Company and imposed Revision 3 to Specification No. 00000-ICE-3006. Paragraph 2.3.2 of the specification states in part, "Services to be furnished by supplier - Design, fabrication, testing, packing and shipping of the items. . . ."

Data Sheet A of the specification requires General Atomic to provide information regarding the insulation material as it is necessary for proper system design.

IEEE Standard 323-1971, imposed by the specification, requires modifications to equipment be evaluated to determine their effect on the equipment qualification.

CE Interoffice Correspondence No. FMDT-77-506, dated September 20, 1977, addresses an evaluation of the Astro quartz matt-type insulation stability and decomposition characteristics. It was determined that the polyvinyl alcohol binders would decompose under temperature and radiation conditions yielding an explosive mixture of hydrogen and methane gases.

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CE Interoffice Correspondence No. FMDT-77-544, dated October 6, 1977, addressed the suitability of HITCO Refrasil Type C100-48 Woven Glass Cloth for excore detector assemblies. This material was evaluated for decomposition products at different temperature ranges but was not exposed to radiation conditions.

Subsequently, Refrasil was substituted for the Astro quartz material at: Arkansas Power & Light Company's Arkansas Nuclear One, Unit 2, with repairs completed on June 16, 1978; Southern California Edison's San Onofre, Units 2 and 3, with repairs completed on May 11 and 13, 1980; and Louisiana Power & Light Company's Waterford Steam Electric Station, Unit 3, with repairs completed on July 10, 1981. As a result of this review, nonconformance B.2 was identified.

3. Potential 10 CFR Part 50.55(e) - Arizona Public Service notified NRC Region V on August 26, 1982, that six safety injection system valves manufactured by Borg-Warner Corporation Nuclear Valve Division (NVD), for inside containment use, had been supplied with Limitorque motor operators which were qualified for outside containment use only.

A review of the procurement documents was performed. CE placed Purchase Order Nos. 9601231, 2, and 3 with NVD for valves to be supplied to Palo Verde, Units 1, 2, and 3 on May 24, 1976. The purchase orders invoked General Engineering Specification No. 00000-PE-707 and Project Specification For Motor Operated Valves For Arizona Nuclear Power Project, Units 1, 2, and 3, No. 14273-PE-705. The six valves were identified with CE Tag Nos. SI-653 and SI-654 (for each unit).

The procurement documents specifically categorized these valves for use in the containment environment and that the motor operators be qualified to IEEE Standard 382-1972. CE required the submittal of seismic qualifications but not environmental qualifications for the motor operators.

The valves were shipped to the site subsequent to CE's issuance of a Certification of Equipment which was dated December 19, 1977. Field FAR's were issued and approved on May 12, 1982, requesting the removal and subsequent reinstallation after corrective action by the vendor. Purchase Order Supplement No. 15, dated May 17, 1982, was issued to NVD, and it states in part, "For CE Tag Nos. SI-653 and 654, provide corrective work and documentation to the motor operators to meet the specified inside containment environment. . . ."

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A letter was transmitted from CE to Bechtel Power Corporation (Architect Engineer) on September 21, 1982, in which CE concludes that their original recommendation that this deficiency is not reportable appears incorrect and that they now recommend this item be reported.

The NRC inspector expressed concern over the fact that while CE has taken the steps to correct the affected equipment, they have not made an attempt to determine the cause and to obtain corrective actions which will preclude recurrence.

GQA, the group responsible for issuing Corrective Action Reports (CAR), receive FAR's which are the primary vehicles for identifying discrepant conditions in the field. However, their use of FAR's, apparently, is limited to developing an annual trend analysis report which does not appear to be a device for determining the cause or effecting timely corrective action and preventive measures.

As a result of this review, nonconformance B.3 was identified.

4. Equipment Qualification - The NRC inspector held discussions with the cognizant CE personnel to determine the scope and status of the Class 1E electrical equipment qualification test program at CE. From these discussions, it was determined that CE has prepared Topical Report CENPD-255 to describe the methods used to comply with code and regulatory requirements for qualification of Class 1E electrical equipment. This report has been submitted to NRR for review and evaluation; however, at the time of this inspection, it had not been approved by NRR. It was also determined that a number of test programs for Class 1E electrical equipment qualification were in progress. Currently, these test programs, which are being conducted both at CE and at outside laboratories, are specifically for equipment to be used at the Palo Verde site.

The inspector toured the CE test facility. Currently, CE has the capability to conduct thermal aging, loss-of-coolant accident, and seismic testing. All radiation aging testing is being accomplished at outside test facilities.

CE's purchase order No. 91727-11-8181 to NAMCO Controls for test specimens and testing services, the associated PO supplements, test specification, test plan, and CE audit records of NAMCO were all reviewed. As a result of this review, Violation A was identified and is described in paragraph A above.

ORGANIZATION: COMBUSTION ENGINEERING, INCORPORATED
POWER SYSTEMS GROUP
WINDSOR, CONNECTICUT

REPORT NO.:	99900401/82-04	INSPECTION DATES:	10/25-29/82	INSPECTION ON-SITE HOURS:	26
CORRESPONDENCE ADDRESS: Combustion Engineering, Incorporated Power Systems Group ATTN: Mr. M. R. Etheridge, Vice President, General Services 1000 Prospect Hill Road Windsor, Connecticut 06095					
ORGANIZATIONAL CONTACT: Mr. C. W. Hoffman, Group QA Director TELEPHONE NUMBER: (203) 688-1911					
PRINCIPAL PRODUCT: Nuclear Steam Supply Systems					
NUCLEAR INDUSTRY ACTIVITY: The Power Systems Group of Combustion Engineering (CE) has contracts for 22 of the domestic reactor units to date, of which 14 are in the design and construction phase. In addition, they have modification/repair/service contracts for 22 reactor units.					
ASSIGNED INSPECTOR:	<u>W. M. McNeill</u> W. M. McNeill, Reactive & Component Program Section (R&CPS)			<u>12/8/82</u> Date	
OTHER INSPECTORS:					
APPROVED BY:	<u>I. Barnes</u> I. Barnes, Chief, R&CPS			<u>12/8/82</u> Date	
INSPECTION BASES AND SCOPE:					
A. <u>BASES</u> : Topical Report CENPD-210-A, Revision 3 and 10 CFR Part 21.					
B. <u>SCOPE</u> : This inspection was made as a result of the identification at the Arkansas Nuclear One, Unit 2 (ANO-2) facility of insufficient clearance between fuel rods and the upper flow plate in Batch C fuel assemblies. Specific areas reviewed during inspection of this subject included: design process control (ANO-2 shoulder gap and fuel assembly AKC-204); 10 CFR Part 21; statistical screening criteria; zircaloy growth models; and design calculations and their verification.					
PLANT SITE APPLICABILITY: Docket No. 50-368.					

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A. <u>VIOLATIONS:</u> None		
B. <u>NONCONFORMANCES:</u> <p>Contrary to Section 17.5 of the Topical Report and Quality Assurance of Design Procedure (QADP) No. 5.7, Sections 1.4.1.3, 2.4.1, and 2.4.2, the shoulder gap modification of Batch C assemblies for ANO-2 was accomplished without the implementation of the design change procedure as evidenced by:</p> <ol style="list-style-type: none">1. An FAR was not issued to document the problem and its solution.2. No documentation was available which would indicate that a review had been performed in regard to: (a) determination of the cause and corrective action, (b) applicability to other projects, and (c) determination if changes are required to the design process to prevent similar deficiencies.		
C. <u>UNRESOLVED ITEMS:</u> None		
D. <u>OTHER FINDINGS OR COMMENTS:</u> <ol style="list-style-type: none">1. <u>Design Process:</u><ol style="list-style-type: none">a. ANO-2 Shoulder Gap - The mechanical design of the shoulder gap was inspected with respect to the initial core (Batches A, B, and C), reloads D and E, and the Batch C modification. The shoulder gap modification was made to prevent fuel rod contact with the upper flow plate and subsequent bowing. It consisted of the addition of a shim between the bottom of the upper flow plate and the top of the fuel rods. The design review, design calculation log, and lists of qualified design reviewers were inspected. The physics input data, the design criteria, and bases were examined. The computer programs and their verification were also inspected. The design drawings (design output) were examined, and the statistical screening calculations plus models used to identify the Batch C fuel assemblies to be modified were inspected. Shoulder gap measurements at the end of Cycle 2 were also reviewed.		

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b. Fuel Assembly AKC-204 - It was also noted that one fuel assembly, AKC-204, was identified in the manufacturing order as not having its center guide tube to be sleeved. This is contrary to previous information supplied to the NRC which stated that all center guide tubes would be sleeved. The modification of AKC-204 was stated to have encountered a condition which precluded the center guide tube's sleeving.

2. 10 CFR Part 21:

CE personnel stated that the shoulder gap closure problem was not considered to be of a magnitude which would require evaluation with respect to 10 CFR Part 21 requirements. Accordingly, there was no documentation of this problem as having being reviewed in accordance with CE 10 CFR Part 21 Procedure API-17 requirements. In regard to the shoulder gap, CE had reportedly identified a concern in this area to ANO on July 13, 1982. A design calculation (6370-610-04) was begun on July 17, 1982, and completed with its design review on September 17, 1982. This calculation predicted an end of Cycle 3 gap of 0.050 inches and, consequently, concluded there was no shoulder gap closure problem. On July 27, 1982, Manufacturing Order 9030355, Supplement 9 was issued to fabricate the shims in accordance with an engineering sketch. On August 30, 1982, the first special inspection instructions were issued on the ANO-2 Batch C fuel for measurement and evaluation of gap closure. On October 5, 1982, CE informed the NRC in a memorandum of the condition. Based on the above, it was not possible to establish when the shoulder gap question was indeed identified as a problem by CE engineering and management. CE management and engineering monthly reports were not made available to allow establishment of the applicable time frame in regard to identification of the problem.

3. Statistical Screening Criteria:

The statistical screening criteria used to establish which Batch C fuel assemblies were required to be modified has no quantified confidence level. The screening was performed assuming the worst case of shoulder gap closure rate that had been observed at the end of Cycle 2 in two pre-characterized (i.e., premeasured) Batch C assemblies. The prediction of end of Cycle 3 shoulder gaps was then made using end of Cycle 2 shoulder gap measurements of observable rods and utilizing the growth rate identified above with a projected fluence for Cycle 3. It was then simulated (Monte Carlo) what the nonobserved rods' shoulder gap distribution would be with the same identified growth rate, highest range of projected fluences, and a projected worst gap based on a 99.5% distribution of the observed gaps. If less than 5% of the above rod simulations resulted in a gap of less than zero, an assembly was accepted. Hence, accepted assemblies have a 95% probability that no rod will contact.

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However, because of the "worst case" assumptions and the Monte Carlo simulation, no confidence factor is apparent; e.g., 95% confidence that there is a 95% probability that no rod will contact.

4. Zircaloy Growth Models:

The data collected by CE after Cycle 1 and reported under an Electric Power Research Institute (EPRI) project published in July 1982 (Report No. CE NPSD-174) used models which predicted greater fuel rod growth and less guide tube growth than the models used in the original or even the current design. The shoulder gap modification was necessitated because of under prediction of the shoulder gap closure that results from differential growths of the fuel rods and the guide tubes within the fuel assembly. The current constants used by CE in the equations for predicting zircaloy growth under irradiation are referenced in Topical Report CENPD 198-P. These constants are smaller than the constants used with these equations in the EPRI report. The data points for ANO-2 Cycle 1 fuel rod growth fall within 95% confidence limit bands around a line of best fit of the design equation. However, the larger constants as in the EPRI report showed better agreement with the line of best fit. In regard to guide tubes, it was noted that data points lay below the 95% confidence limits of the design model. This has been reported (EPRI report) as being related to fuel assembly hold down spring pressure.

5. Design Calculations and their Verification:

It was observed that some of the design calculations were not controlled, in that:

- a. The statistical screening criteria and the mechanical design of the modified fuel had not been given the required design verification as of the inspection date, although the modification had been completed.
- b. The mechanical design calculation for the modified fuel was not entered into the design log books. Entering the calculation in the logs identifies it as part of the design process for that project.
- c. The historical calculation which established the larger shoulder gap for the Batch D fuel and assumed higher burn-up, could not be found. Because of the larger shoulder gap used for Batch D fuel assemblies, no modification is required.

ORGANIZATION: CONAM INSPECTION
SPERRY SCHOOLS FOR NDT
COLUMBUS, OHIO

REPORT NO. : 99900278/83-01	INSPECTION DATE(S) : 1/10-11/83	INSPECTION ON-SITE HOURS: 14
CORRESPONDENCE ADDRESS: Conam Inspection, Sperry Schools for NDT ATTN: Mr. L. T. Prince Director of Personnel Development 4000 Lockbourne Road Columbus, OH 43207		
ORGANIZATIONAL CONTACT: Mr. L. T. Prince, Director of Personnel Development TELEPHONE NUMBER: (614) 491-3000		
PRINCIPAL PRODUCT: Training and testing services for industry in all methods of nondestructive testing (NDT).		
NUCLEAR INDUSTRY ACTIVITY: N/A		
ASSIGNED INSPECTOR: <u>I. Barnes</u> for H. W. Roberds, Reactive and Component Program Section (R&CPS)		<u>2-3-83</u> Date
OTHER INSPECTOR(S): D. E. Norman, R&CPS		
APPROVED BY: <u>I. Barnes</u> I. Barnes, Chief, R&CPS		<u>2-3-83</u> Date
INSPECTION BASES AND SCOPE: A. <u>BASES</u> : 10 CFR Part 50, Appendix B. B. <u>SCOPE</u> : This inspection was made as a result of an allegation received by an NRC Region IV senior resident inspector. The allegation states that written tests administered to Level III NDT candidates do not meet ASME Code requirements with respect to number and difficulty of questions.		
PLANT SITE APPLICABILITY: N/A		

ORGANIZATION: CONAM INSPECTION
 SPERRY SCHOOLS FOR NDT
 COLUMBUS, OHIO

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A. VIOLATIONS:

None

B. NONCONFORMANCES:

None

C. UNRESOLVED ITEMS:

None

D. OTHER FINDINGS OR COMMENTS:

The NRC inspectors reviewed examinations that were presented by the Sperry School for NDT as being representative of the SNT-TC-1A (June 1975 and June 1980 editions) NDT Level III examinations. It appears that the scope of the examinations meets the requirements and the intent of SNT-TC-1A. The following is a tabulation of the number of questions on the examinations and the requirements of SNT-TC-1A:

1975 Level III Testing Requirements

<u>Testing Method</u>	<u>No. of Questions on Sperry Test</u>			<u>SNT-TC-1A Requirement</u>	
	<u>1/Basic</u>	<u>General</u>	<u>Specific</u>	<u>2/General</u>	<u>3/Specific</u>
Liquid Penetrant	50-60	60	20	60	-
Ultrasonic	50-60	100	71	60	-
Magnetic Particle	50-60	50	30	60	-
Eddy Current	50-60	50	25	60	-
Radiography	50-60	50	21	60	-

1/ Same test given for all methods. (This test was not available for review by the NRC inspectors.)

2/ Thirty questions devised by examiner for appropriate method plus 30 questions from NDT Level II questions for other applicable methods.

3/ Appropriate questions to demonstrate a knowledge of test variables and the employer's procedural requirements.

1980 Level III Testing Requirements

<u>Testing Method</u>	<u>No. of Questions on Sperry Test</u>			<u>SNT-TC-1A Requirement</u>		
	<u>1/Basic</u>	<u>Methods</u>	<u>Specific</u>	<u>2/Basic</u>	<u>Methods</u>	<u>Specific</u>
Liquid Penetrant	60	75	20	50	65	20
Ultrasonic	60	100	20	50	65	20
Magnetic Particle	60	75	20	50	65	20
Eddy Current	60	75	20	50	65	20
Radiography	60	100	20	50	65	20

1/ Same test given for all methods. (20 questions about SNT-TC-1A, 15 questions about materials and fabrications, and 25 questions about other NDT methods)

2/ Required only once when more than one method of examination is taken.

The Sperry School instructors stated that they do not certify or qualify Level III NDT personnel, but they only administer training and give examinations in accordance with the requirements of SNT-TC-1A and recommendations of the National Board.

ORGANIZATION: CONTROL COMPONENTS, INC.
IRVINE, CALIFORNIA

REPORT NO.:	99900262/82-01	INSPECTION DATE(S)	11/3-5/82	INSPECTION ON-SITE HOURS:	16
CORRESPONDENCE ADDRESS: Control Components, Inc. ATTN: Mr. Neil Beaumont President 2567 S. E. Main Street Irvine, CA 92714					
ORGANIZATIONAL CONTACT: Mr. R. Topping, Director of Quality Assurance TELEPHONE NUMBER: (714) 979-6600					
PRINCIPAL PRODUCT: Nuclear valves					
NUCLEAR INDUSTRY ACTIVITY: Control Components, Inc. (CCI) contribution to the nuclear industry represents approximately two percent of its total workload.					
ASSIGNED INSPECTOR:		<u>J. Barnes</u> for W. D. Kelley, Reactive & Component Program Section (R&CPS)		<u>12-28-82</u> Date	
OTHER INSPECTOR(S):					
APPROVED BY:		<u>J. Barnes</u> I. Barnes, Chief, R&CPS		<u>12-28-82</u> Date	
INSPECTION BASES AND SCOPE:					
A. <u>BASES</u> : 10 CFR Part 21 and 10 CFR Part 50, Appendix B.					
B. <u>SCOPE</u> : This inspection was made as a result of a 10 CFR Part 50.55(e) report by Southern California Edison Company concerning the failure of the San Onofre Nuclear Generating Station, Unit 3, main steam dump to atmosphere valves to return consistently to the normal closed position upon loss of (Cont. on next page)					
PLANT SITE APPLICABILITY:					
50-361 and 50-362.					

REPORT NO.: 99900262/82-01	INSPECTION RESULTS:	PAGE 2 of 4
<p><u>SCOPE:</u> (Cont.) control air pressure. Additional areas inspected included: status of previous inspection findings; design and document control; and implementation of 10 CFR Part 21 procedure.</p>		
A. <u>VIOLATIONS:</u>		
None		
B. <u>NONCONFORMANCES:</u>		
1. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph <u>Policy</u> of Procedure No. 1704-01, CCI design calculations for completed modifications of main steam dump valves that had been furnished to the San Onofre Nuclear Generating Station, Units 2 and 3, had not been reviewed/approved and signed off by at least one other person.		
2. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 7.0 in Section 3 of the ASME accepted Quality Assurance Manual, an appropriate review of general design concepts was not performed for main steam dump valves furnished to San Onofre Nuclear Generating Station, Units 2 and 3, as evidenced by the selection of the same model of valve actuator as had been used on a prior contract, without recognizing a greater actuator spring force would be required for San Onofre valve closure as a result of an increase in valve stem diameter and number of packing rings.		
C. <u>UNRESOLVED ITEMS:</u>		
None		
D. <u>STATUS OF PREVIOUS INSPECTION FINDINGS:</u>		
<p>(Closed) Nonconformance (99900262/81-01, Item B): The calibration system did not assure the recall for periodic calibration of all measuring equipment as evidenced by the observation on June 23, 1981, of a Scherr Tumico Optical Comparator (No. 1179) which had an indicated calibration due date of April 23, 1981, on the calibration sticker and had not been recalled or recalibrated.</p> <p>The NRC inspector verified that the Scherr Tumico Optical Comparator (No. 1179) was tagged not to be used for acceptance inspection of parts.</p>		

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E. OTHER FINDINGS OR COMMENTS:

1. Southern California Edison Company (SCE): San Onofre Nuclear Generating Station, Unit 3 - Problem reported was the failure of the main steam dump to atmosphere valves to return to the normal closed position upon loss of control air pressure.
 - a. The NRC inspector was informed by CCI that all communications concerning the failure of the main steam dump to atmosphere valve to close on loss of control air pressure were oral until Bechtel Power Corporation (BPC) was notified by CCI TWX dated April 2, 1982.
 - b. CCI engineering recognized in a review of the design that condensate could collect in the San Onofre valve bonnets as a result of the valves being installed in the upside down position. Condensate collection was determined to possibly affect operability of the valves. A meeting was held with BPC on January 15, 1981, to discuss the type of bonnet modification required for removal of condensate and the necessary piping arrangement. It was agreed that CCI would supply field service instructions and drawings for the modification.
 - c. There were no CCI field service reports available at the CCI Irvine, California, plant which documented the removal of the San Onofre Nuclear Generating Station, Units 2 and 3, main steam dump valve bonnets from the bodies.
 - d. The NRC inspector reviewed the SCE ASME Section XI shop travelers and verified that the addition of a condensate drain to the valve bonnets was accomplished in accordance with CCI procedures and the hold points had been signed off by SCE representatives. No CCI field service reports were available at the CCI Irvine, California, plant which documented either field reassembly of the valve bonnets to the bodies or the subsequent failure of the valve to close properly upon loss of control air pressure.
 - e. The NRC inspector reviewed the CCI valve assembly records and verified that the original valves had passed the hydrostatic, seat leakage, and operability tests specified in the approved test procedure. The CCI test procedure requires that the packing remain unchanged after the seat leakage test. This test was performed prior to the operability test. The CCI test record stated that the valves closed in less time than the 10 second maximum specified in

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the design specification. Neither the valve assembly records nor the test procedure stated how the valve packing was to be installed, or the required torque that was to be applied to the packing nuts.

- f. The NRC inspector reviewed the seismic test records for the valves and verified that a seat leakage test with water and stroking of the valve without a flowing media had been performed.
- g. The NRC inspector reviewed the design of the original valve actuator and ascertained that the actuator selection was based on the use of the same model of actuator in a prior contract for main steam dump to atmosphere valves.

The failure in the CCI review of design concepts to consider effects of an increase in valve stem diameter and number of packing rings was identified as a nonconformance (see paragraph B.2.).

- h. The NRC inspector reviewed the design calculation for the valve actuator modifications and verified that CCI had used: (1) the correct stem size, (2) the correct length of packing, and (3) a higher friction factor. No documentation was made available; however, which would indicate that an independent review had been performed of the design. This was identified as a nonconformance (see paragraph B.1.).
 - i. The NRC inspector verified by review of four CCI service reports for the San Onofre main steam dump to atmosphere valves that an additional spring had been installed in the operators and the spring rate had been verified at the site.
2. Implementation of 10 CFR Part 21 Procedure: The NRC inspector verified that CCI had notified BPC on June 28, 1982, that they had reviewed the main steam dump valve deficiency and determined that it was not reportable under 10 CFR Part 21.21(b)(3)VI. Also, CCI notified Region IV of the NRC on June 28, 1982, that the problem had been reviewed for applicability to other valves supplied, with no additional instances identified.
3. Design and Document Control: The NRC inspector reviewed the applicable sections of the CCI ASME accepted quality assurance manual and two implementing procedures. It was ascertained that the design checklist, velocity control element sheet, engineering calculations, seismic analysis report, and drawings for Project No. 23468 had been reviewed and approved in accordance with QA program commitments.

ORGANIZATION: CUSTOM ALLOY CORPORATION
CALIFON, NEW JERSEY

REPORT NO.:	99900796/82-01	INSPECTION DATE(S)	11/1-5/82	INSPECTION ON-SITE HOURS:	30
CORRESPONDENCE ADDRESS: Custom Alloy Corporation ATTN: Mr. John Ambielli President Route 513 Califon, NJ 07830					
ORGANIZATIONAL CONTACT: Mr. Anthony Palumbo, QA Manager TELEPHONE NUMBER: (201) 832-7111					
PRINCIPAL PRODUCT: Fittings					
NUCLEAR INDUSTRY ACTIVITY: The commercial nuclear product was approximately 10% of the FY 1982 net sales.					
ASSIGNED INSPECTOR: <u>I. Barnes</u> <u>12-10-82</u> Date <i>for</i> J. T. Conway, Reactive & Component Program Section (R&CPS)					
OTHER INSPECTOR(S):					
APPROVED BY: <u>I. Barnes</u> <u>12-10-82</u> Date I. Barnes, Chief, R&CPS					
INSPECTION BASES AND SCOPE:					
A. <u>BASES</u> : 10 CFR Part 50, Appendix B and 10 CFR Part 21.					
B. <u>SCOPE</u> : This inspection was made as a result of the 10 CFR Part 50.55(e) notification by Duke Power Company pertaining to the identification of a linear indication in a 10-inch, Schedule 140, 45° elbow fitting at the Catawba, Unit 2, site. In addition, the following programmatic areas were inspected: (Cont. on next page)					
PLANT SITE APPLICABILITY:					
Docket No. 50-414.					

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SCOPE: (Cont.) training/qualifications, control of special processes
inspection nondestructive examination, audits, corrective action, and
reporting of defects.

A. VIOLATIONS:

Contrary to Section 21.6 of 10 CFR Part 21, Section 206 of the Energy
Reorganization Act of 1974 was not posted in two areas where the Part 21
regulation and the procedure addressing the regulation were posted.

B. NONCONFORMANCES:

1. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and
paragraph 6.1.2 in Section 6 of the Quality System Program Manual, a
review of external audit reports from 1979 through 1982 revealed that
audit reports were missing for three vendors who were on the Approved
Vendor List.
2. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and
paragraph 7.5 in Section 7 of the Quality System Program Manual, a review
of the QA records for 16 nuclear projects revealed the absence of a
traveler for one project.
3. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and
paragraph 8.1.4 in Section 8 of the Quality System Program Manual, it
was noted that a forging for a 10 x 7 reducer tee for a nuclear project
had no visible identification and a traveler was not with the forging.
4. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and
paragraphs 9.1.1 and 9.1.3 in Section 9 of the Quality System Program
Manual, a review of QA records for eight nuclear projects indicated that
inspectors failed to sign off critical operations on four travelers, and
machining operations were not signed off or documented on the reverse
side of three travelers.
5. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and
paragraph 15.1.1 in Section 15 of the Quality System Program Manual, a
review of internal audit reports for 1980, 1981, and 1982 revealed that
two individuals conducted audits in April 1981 and August 1982, and
there was no existing documentation to prove that either individual was
qualified.

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6. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 15.1.2 in Section 15 of the Quality System Program Manual, a review of internal audit reports for 1980, 1981, and 1982 revealed that two areas, "Document Storage and Retention" and "Special Processes," were not audited in 1980, 1981, and 1982.
7. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraphs 15.1.3 and 15.1.4 in Section 15 of the Quality System Program Manual, a review of internal audit reports for 1980, 1981, and 1982 revealed that followup audits were not conducted for two specific deficient areas; i.e., purchasing of materials/services (1981 audit) and inspectors failing to sign off critical operations on travelers (1980, 1981, and 1982 audits).
8. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 15.2.1 in Section 15 of the Quality System Program Manual, a review of internal audit reports for 1980, 1981, and 1982 revealed that the 1981 audit report was not distributed to applicable supervision or Vice President, and the 1980 and 1982 audit reports were not distributed to applicable supervision, Vice President, or the Director of QA/QC.

C. UNRESOLVED ITEMS:

None

D. OTHER FINDINGS OR COMMENTS:

1. Defective Elbow Fitting - Based upon discussions with Custom Alloy's QA personnel and a review of applicable documentation relating to the linear indication in the 10-inch, Schedule 140, 45° elbow fitting, the NRC inspector's findings were as follows: While performing NDE prior to welding a fitting into a pipeline, Duke Power Company noted a defect in a 10-inch, Schedule 140, 45° stainless steel elbow furnished by Custom Alloy Corporation. Following notification by Duke Power Company, Custom Alloy reviewed the QA records and discovered that ultrasonic testing (UT) had not been performed on the fitting. Duke Power Company was notified that the fitting was nonconforming, in that it did not meet the ASME Code requirements for a Section III, Class 1 item.

The cause of the problem was established to be that Custom Alloy's QA department had failed to specify UT on the quality checklist, and subsequently, the inspection requirement was not documented on the traveler. ITT Grinnell, Kernersville, North Carolina, was supplied a

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fitting from the same material, and they were notified of the possibility of a defect. Custom Alloy reviewed the records from January to July 1982 for all Section III, Class 1 items and determined that the failure to specify or perform UT was limited to this one fitting. To prevent errors of this type in the future, all QA and QC personnel were instructed as to the specific NDE requirements for fittings manufactured to Section III of the ASME Code.

2. QA Program - A detailed review of documentation (e.g., QA Manual, procedures, qualification records, calibration records, travelers, audit reports, etc.) led to the identification of eight nonconformances (B. above) and the following additional comments:
 - a. There was no documented evidence that QA personnel and individuals performing quality affecting activities were indoctrinated or trained,
 - b. The organizational positions with stop work authority are not identified, and
 - c. There was no management audit of the quality system program conducted in either 1980 or 1981. The Quality System Program Manual is nonspecific on required frequency for performance of management audits, in that it utilizes the term "periodic" with respect to frequency of program review by the Director of QA/QC (paragraph 15.3.Y).

ORGANIZATION: E-SYSTEMS
MONTEK DIVISION
SALT LAKE CITY, UTAH

REPORT NO.:	99900315/83-01	INSPECTION DATE(S)	2/9-10/83	INSPECTION ON-SITE HOURS:	24
CORRESPONDENCE ADDRESS: E-Systems Montek Division ATTN: Mr. Burnhard, Director of Engineering 2268 South 3270 West Salt Lake City, Utah 84119					
ORGANIZATIONAL CONTACT: Mr. Burnhard, Director of Engineering TELEPHONE NUMBER: (801) 974-7380					
PRINCIPAL PRODUCT: Aerospace products					
NUCLEAR INDUSTRY ACTIVITY: Snubber/pipe clamp assemblies are designed for individual applications for nuclear piping. E-Systems sells the clamp/snubber assemblies to numerous organizations involved in nuclear pipe design.					
ASSIGNED INSPECTOR:		<u>P. Sears</u>		<u>3/22/83</u>	
		P. Sears, Reactor Systems Section (RSS)		Date	
OTHER INSPECTOR(S): D. Terao, Mechanical Engineering Branch, Division of Nuclear Reactor Regulation (NRR)					
APPROVED BY:		<u>C. J. Hale</u>		<u>3/22/83</u>	
		C. J. Hale, Chief, RSS		Date	
INSPECTION BASES AND SCOPE:					
A. <u>BASES</u> : 10 CFR Part 50, Appendix B.					
B. <u>SCOPE</u> : This inspection was made to review the designs and analyses of pipe clamps produced by E-Systems.					
PLANT SITE APPLICABILITY:					
Not identified.					

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A. VIOLATIONS:

None

B. NONCONFORMANCES:

None

C. UNRESOLVED ITEMS:

None

D. OTHER FINDINGS OR COMMENTS:

Pipe Clamp/Snubber Design Activities - This inspection was conducted with participation from NRR (Mechanical Engineering Branch). The areas examined and results are discussed below.

Stress and stiffness design procedures for nuclear piping supports and snubbers produced by E-Systems were reviewed. Those designs are required to be in accordance with American Society of Mechanical Engineers (ASME) Section III, Rules for Construction of Nuclear Power Components.

E-Systems has designed a new pipe clamp which has been used in design for approximately three years. This clamp is different from previously used pipe clamps because it is designed for the following:

1. Its stiffness is to be four times the stiffness of the snubber.
2. At operating pressure and temperature and at emergency operating loadings (seismic and other dynamic operating loads), there is to be no gapping between the pipe and clamp. Due considerations are to be given to differences in materials of pipe and clamp.
3. In order to conform to the above requirements, a preload is calculated for each clamp. Each clamp/snubber application will then have its peculiar preload. These new clamps are necessary to assure no gapping at dynamic loads which are approaching 70,000 lbs. and greater for some large diameter pipe. At installation the new type clamp is fitted to the pipe (accounting for slight oval shapes of the pipe due to manufacturing tolerances) and then the clamp is heavily preloaded.

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The preload is introduced by torquing the nuts on the U bolts of the clamp. The preload is then locked in with lock bolts.

E-Systems requires the following items to be specified by the clamp/snubber assembly purchasers:

1. Pipe material (e.g., SA312, type 304)
2. Pipe outside diameter and wall thickness
3. Operating temperature and pressure
4. Pipe insulation (thickness and type)
5. Spring constant of the clamp/snubber assembly
6. Maximum load for which the clamp/snubber assembly is to be designed
7. Physical dimensions of the support structure in relation to the pipe

Eight documents relating to pipe clamp design were reviewed.

E-Systems keeps on file a load deflection analysis from which the preload for each clamp/snubber assembly is calculated. E-Systems transmits to the designer a drawing of the assembly along with preload values. The clamp/snubber assembly is shipped with installation instructions to the site. E-Systems does not have responsibility for installation.

No deviation from procedures was found and no instance was found where procedures or practice deviated from the requirements of ASME, Section III.

ORGANIZATION: EBASCO SERVICES, INCORPORATED
NEW YORK, NEW YORK

REPORT NO.: 99900505/82-04	INSPECTION DATE(S): 11/15-19/82	INSPECTION ON-SITE HOURS: 64
CORRESPONDENCE ADDRESS: Ebasco Services, Incorporated ATTN: Mr. B. E. Tenzer, Vice President Materials Engineering and Quality Assurance Two World Trade Center New York, New York 10048		
ORGANIZATIONAL CONTACT: Mr. B. R. Mazo, Chief, Quality Assurance Engineer TELEPHONE NUMBER: (212) 839-2830		
PRINCIPAL PRODUCT: Architect Engineering Services		
NUCLEAR INDUSTRY ACTIVITY: The total effort committed to domestic nuclear activities is approximately 50% of a 5,000 person staff. Major projects include Shearon Harris, Units 1 and 2; St. Lucie, Unit 2; Waterford, Unit 3; and WNP, Unit 3. There are also modification/repair service contracts on 10 additional reactor units.		
ASSIGNED INSPECTOR:	<u>C. J. Hale</u> P. H. Harrell, Reactor Systems Section (RSS)	<u>12/15/82</u> Date
OTHER INSPECTOR(S):	J. R. Costello, RSS	
APPROVED BY:	<u>C. J. Hale</u> C. J. Hale, Chief, RSS	<u>12/15/82</u> Date
INSPECTION BASES AND SCOPE:		
A. <u>BASES</u> : Topical Report ETR-1001 and 10 CFR Part 21.		
B. <u>SCOPE</u> : Status of previous inspection findings and implementation of 10 CFR Part 21.		
PLANT SITE APPLICABILITY: Docket Nos. 50-382, 50-389, and 50-508.		

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A. <u>VIOLATIONS:</u> None		
B. <u>NONCONFORMANCES:</u> 1. Contrary to Section 2.1 of QA-II-1, "Instructions, Procedures and Drawings," Revision 2, dated March 4, 1981, of the Nuclear Quality Assurance Program Manual (Ebasco Topical ETR-1001) and Section 7.2.1 of Procedure N-23, "Reporting a Defect/Noncompliance to the NRC," dated September 20, 1979, Form 1352 is not being initiated, in all cases when applicable, for the evaluation of deviations against the requirements of 10 CFR Part 50.55(e) or 10 CFR Part 21. 2. Contrary to Section 2.1 of QA-II-1 (ETR-1001) and Section 7.3.1 of N-23, evidence does not exist in all cases that the project licensing engineer is performing a documented safety evaluation. 3. Contrary to Section 2.1 of QA-II-1 (ETR-1001) and Section 7.3.1 of N-23, no evidence exists that indicates 10 CFR Part 21 defects or noncompliances are being reported to the proper individuals.		
C. <u>UNRESOLVED ITEMS:</u> None		
D. <u>STATUS OF PREVIOUS INSPECTION FINDINGS:</u> 1. (Closed) Nonconformance (82-02): The control of as-built drawing revisions was not handled by the "Waterford No. 3 Drawing Closeout Schedule" as evidenced by the fact that the March 31, 1982, issue of the schedule did not show Design Change Notification DCN-MP-589 as outstanding against design drawing LOU-1564-G-195. Corrective action was accomplished on August 31, 1982, when design drawing LOU-1564-G-195 was revised (Revision 12) incorporating DCN-MP-589. To determine the extent of the problem, a special audit was conducted on April 30, 1982. This audit disclosed similar problems on other design drawings examined and corrective actions were taken. To prevent recurrence of this problem, Quality Assurance is conducting bimonthly audits until full compliance is assured.		

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2. (Closed) Unresolved Item (82-02): Certain safe shutdown analyses may not meet regulatory requirements in that they do not appear to be sufficiently detailed with respect to design assumptions, bases, sources of inputs, reference to plant physical arrangement drawings, analytical models, change control, and interpretation of results.

This unresolved item was written as a result of a design inspection that was begun during the 82-02 inspection covering high energy line ruptures in fluid systems outside containment. This inspection included a continuation of the previous inspection in this area of design.

The Ebasco Topical Report (ETR-1001) and applicable procedures were reviewed to establish quality assurance program commitments. To verify implementation of these commitments, the following documents were examined: Regulatory Guide 1.70; Section 3.6 of WNP-3 FSAR; Pipe Rupture Analysis Manual; Manual on Protection Against Dynamic Effects Associated with the Postulated Rupture of Piping; 12 drawings; 2 letters and internal memos; Jet Impingement Analysis Interaction Tabulation; 1 calculation; and 1 technical directive. Relative to the documents examined, all procedural requirements were being properly implemented.

E. OTHER FINDINGS OR COMMENTS:

Implementation of 10 CFR Part 21 - Documents, procedures, and records were examined to verify that Ebasco had established and implemented a procedure in accordance with 10 CFR Part 21. Twenty-seven potentially reportable incidents for three projects (St. Lucie, Unit 2; Waterford, Unit 3; and WNP, Unit 3) were reviewed to verify that the Ebasco disposition of the incidents was performed in compliance with the procedure implementing the requirements of 10 CFR Part 21. In this area of inspection, three nonconformances were identified (see B.1, B.2, and B.3 above).

ORGANIZATION: EBERLINE
 A DIVISION OF THERMO ELECTRON CORPORATION
 SANTA FE, NEW MEXICO

REPORT NO. : 99900798/82-01	INSPECTION DATE(S) 11/15-19/82	INSPECTION ON-SITE HOURS: 27
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CORRESPONDENCE ADDRESS: Eberline
 A Division of Thermo Electron Corporation
 ATTN: Mr. R. Herd, President
 P. O. Box 2108
 Santa Fe, NM 87501

ORGANIZATIONAL CONTACT: Mr. J. Wells, QA Manager
 TELEPHONE NUMBER: (505) 471-3232

PRINCIPAL PRODUCT: Radiation monitoring systems and portable instruments.

NUCLEAR INDUSTRY ACTIVITY: Radiation monitoring systems and portable instruments supplied to the nuclear industry constitute 65 percent of the total production.

ASSIGNED INSPECTOR: J. Barnes 1-17-83
 for L. B. Parker, Reactive and Component Program Date
 Section (R&CPS)

OTHER INSPECTOR(S):

APPROVED BY: I. Barnes 1-17-83
 I. Barnes, Chief, R&CPS Date

INSPECTION BASES AND SCOPE:

- A. BASES: 10 CFR Part 21 and 10 CFR Part 50, Appendix B.
- B. SCOPE: This inspection was made as a result of: (1) the 10 CFR Part 21 notification by Eberline and Illinois Power Company concerning a CPU III microcomputer printed circuit board design defect; and (2) a request by Region V of the Nuclear Regulatory Commission in regard to sticking of meter pointers in Model PIC-6A portable ionization chambers.

PLANT SITE APPLICABILITY:

CPU III design defect - 50-237, 50-244, 50-245, 50-250, 50-251, 50-254, 50-256, 50-261, 50-263, 50-266, 50-277, 50-278, 50-289, 50-295, 50-301, 50-304, 50-305, 50-315, 50-316, 50-334, 50-335, 50-336, 50-341, 50-358, 50-359, 50-364, 50-368, 50-373, 50-374, 50-387, 50-388, 50-389, 50-409, 50-412, 50-416, 50-417, 50-461, and 50-462.

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A. VIOLATION:

Contrary to Section 21.6(b) of 10 CFR Part 21, Eberline had not posted Section 206 of the Energy Reorganization Act of 1974.

B. NONCONFORMANCES:

1. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 2.3 of Section 2 of the Eberline Quality Assurance Manual (QAM), Revision 3, Eberline's engineering department did not have written instructions or procedures that would assure all activities affecting quality are appropriately documented and controlled; i.e., no instructions or procedures had been prepared with respect to engineering design review, internal engineering document control, and assignment of engineering responsibilities.
2. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and subparagraph 4.4.2 and paragraph 4.9 in Section 4 of the Eberline QAM, Revision 3:
 - a. Timer circuitry was deleted in Revision F of Drawing No. 10889-C01 (as part of a change necessitated by functional test results) without being reviewed and approved by the Design Review Board.
 - b. The timer was not deleted in affected Drawing No. 10889-B05 (Block Diagram CPU III Board).

C. UNRESOLVED ITEMS:

None

D. OTHER FINDINGS OR COMMENTS:

1. 10 CFR Part 21 Report: On May 12, 1982, Illinois Power Company made a 10 CFR Part 21 report to Region III of the Nuclear Regulatory Commission (NRC) concerning a computer printed circuit board (CPU III) design defect. A previous 10 CFR Part 21 notification of the design defect was made by Eberline to Region IV of the NRC on December 21, 1981. The CPU III boards were determined during Eberline testing to contain a design defect in the interrupt structure, such that if two interrupts of increasing priority occurred sequentially with the proper amount of time between them, the interrupt data could have been changing while it was being read by the microprocessor. This was determined to potentially result in erroneous

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data, with the effect that the computer resumes operation as if being powered up for the first time. This would cause total loss of old data and calibration parameters and could potentially result in an undetected release of radioactive effluents. A piggyback board has been designed to correct this problem which contains a latch that prevents interrupt data from changing during reading. This change was determined to have no effect on the operating characteristics of the equipment.

Eberline had identified 34 customer purchase orders for 24 nuclear power plant sites, to which the defective CPU IIIs had been shipped. A piggyback circuit has been supplied for each piece of affected equipment along with directions for installation, and an insert for the equipment description manual.

New designs using this CPU III board have been modified to incorporate the latch circuitry. A review of this redesign effort resulted in nonconformances B.1 and B.2.

2. Region V Request: On June 21, 1982, Region V requested an evaluation of the PIC-6A problem concerning sticking of the meter pointer against the lower stop when the stop is dirty. If this occurs, the meter will give an offscale low reading even in a radiation field.

On February 18, 1982, Eberline had performed a 10 CFR Part 21 evaluation and determined that the sticking meter pointer question did not fall within the scope of 10 CFR Part 21. Eberline set up a program to notify all PIC-6A purchasers: (a) that the recommended maintenance procedure to prevent pointer sticking is to clean the meter stop with alcohol; and (b) of their plans for installing a modification kit. Eberline also decided to install the modification kit in all new PIC-6As. Presently, all purchasers of the PIC-6A have been notified by certified mail of the problem, and that they can have their instruments modified by Eberline or have a modification kit supplied to them for their own installation.

3. 10 CFR Part 21 Implementation: Eberline Quality Control Department Instruction 57-27, "Reporting of Defects and Noncompliance According to 10 CFR 21," Issue I0, dated November 2, 1981, was reviewed and it was determined that the posting requirement for Section 206 was not addressed. Further, Section 206 was not posted (see Violation A). Defect evaluation and licensee or purchaser notification were found satisfactory in the areas examined.

ORGANIZATION: GEORGIA INSTITUTE OF TECHNOLOGY
ATLANTA, GEORGIA

REPORT NO.: 99900903/82-02	INSPECTION DATE(S) 12/13-16/82	INSPECTION ON-SITE HOURS: 41
CORRESPONDENCE ADDRESS: Georgia Institute of Technology Nuclear Research Center ATTN: Mr. J. Russell, Director 900 Atlantic Drive, N.W. Atlanta, GA 30322		
ORGANIZATIONAL CONTACT: Mr. T. F. Craft, Ph.D. TELEPHONE NUMBER: (404) 894-3600		
PRINCIPAL PRODUCT: Radiation aging of test specimens.		
NUCLEAR INDUSTRY ACTIVITY: Georgia Institute of Technology (Georgia Tech) is actively engaged in the radiation aging of components to be qualification tested for nuclear power generating plant applications. The service is provided to both utility and manufacturing companies.		
ASSIGNED INSPECTOR: <u>G. T. Hubbard</u> G. T. Hubbard, Equipment Qualification Section (EQS)		<u>1-31-83</u> Date
OTHER INSPECTOR(S): J. J. Benson, Sandia National Laboratories		
APPROVED BY: <u>H. S. Phillips</u> H. S. Phillips, Chief, EQS		<u>2-2-83</u> Date
INSPECTION BASES AND SCOPE: A. <u>BASES</u> : 10 CFR Part 50, Appendix B. B. <u>SCOPE</u> : This inspection consisted of: (1) review of quality assurance (QA) manual, (2) review of implementation of QA requirements, and (3) witnessing radiation testing of ITT Barton differential pressure indicating switches.		
PLANT SITE APPLICABILITY: Not identified.		

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<p>A. <u>VIOLATIONS:</u></p> <p>None</p> <p>B. <u>NONCONFORMANCES:</u></p> <p>Contrary to Criterion XVII of Appendix B to 10 CFR Part 50, Georgia Tech's test records did not identify the inspector or data recorder.</p> <p>C. <u>UNRESOLVED ITEMS:</u></p> <p>None</p> <p>D. <u>STATUS OF PREVIOUS INSPECTION FINDINGS:</u></p> <p>(Open) Nonconformance (82-01): A QA Program described by documented instructions or procedures was not established or implemented.</p> <p>The NRC inspector reviewed a draft copy of the QA manual during this inspection and provided comments to Georgia Tech concerning areas of the manual which needed improvement prior to manual implementation. Review of the completed manual will be done during a future inspection.</p> <p>E. <u>OTHER FINDINGS OR COMMENTS:</u></p> <p>1. <u>QA Program Review</u> - The NRC inspector reviewed the draft QA manual and provided comments to Georgia Tech relative to the manual's compliance with 10 CFR Part 50, Appendix B. Discussions with Georgia Tech personnel and review of the ongoing activities determined that 16 of the 18 criteria of Appendix B were applicable to Georgia Tech's Class 1E equipment qualification operations. The applicable criteria include: Organization; Quality Assurance Program; Procurement Document Control; Instructions, Procedures, and Drawings; Document Control; Control of Purchased Material, Equipment, and Services; Identification and Control of Materials, Parts, and Components; Inspection; Test Control; Control of Measuring and Test Equipment; Handling, Storage and Shipping; Inspection, Test, and Operating Status; Nonconforming Materials, Parts, or Components; Corrective Action; Quality Assurance Records; and Audits.</p>		

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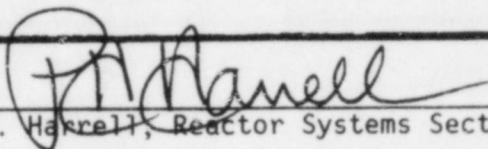
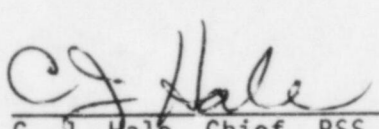
The QA program review included review of the draft manual, a sample job checklist, the "Radiation Safety Manual," the hot cell checklist, a sample gamma irradiation log, two health physics procedures tests, and various drawings relative to the Nuclear Research Center and Hot Cell Facility.

2. QA Implementation Review - The NRC inspector reviewed the control of ongoing equipment qualification operations including the following documents; two gamma irradiation logs, four contract job folders, five purchase orders, two certification of work letters, two Access Permit to Reactor Control Zone Form RS-20 (dated October 1964), one invoice, and one certification for a probe. One nonconformance was identified (see paragraph B).

3. Barton Radiation Aging - The NRC inspector witnessed the start of radiation aging testing on three ITT Barton Differential Pressure Indicating Switches. The switches were being type tested for nuclear environmental qualification according to "Design Qualification Test Plan for ITT Barton Models 580A, 581A, and 583A Switches for Class 1E Service in Nuclear Power Plants," Document No. 9999-3155-2, Revision 2, dated September 23, 1982. The three switches were identified as model No. 580A-2, serial Nos. 190 and 192 and model No. 581A-0, serial No. 352. The gamma radiation exposure was started at approximately 12:00 noon on December 14, 1982, and was continued until a total integrated dose of 200 megarads was received by the switches.

Quality Assurance functions during the testing was provided by ITT Barton personnel since Georgia Tech did not have an implemented QA program. Within the scope of the inspection, the NRC inspector determined that the radiation exposure was started according to the test plan and testing was conducted in compliance with NRC requirements.

ORGANIZATION: GIBBS & HILL, INCORPORATED
NEW YORK, NEW YORK

REPORT NO.: 99900524/82-03	INSPECTION DATE(S) 11/29-12/3/82	INSPECTION ON-SITE HOURS: 59
CORRESPONDENCE ADDRESS: Gibbs & Hill, Incorporated ATTN: Mr. P. P. DeRienzo, Vice President Quality Assurance 11 Penn Plaza New York, NY 10011		
ORGANIZATIONAL CONTACT: Mr. N. N. Keddis, QA Manager TELEPHONE NUMBER: (212) 760-5450		
PRINCIPAL PRODUCT: Architect engineering and consulting services.		
NUCLEAR INDUSTRY ACTIVITY: The total effort committed to domestic nuclear design activities is approximately 25 percent of the 1730 employees of Gibbs & Hill, Incorporated (G&H) at their New York facilities. Major projects include the design of Comanche Peak, Units 1 and 2; Three Mile Island, Unit 1, FSAR update; Beaver Valley, Unit 1, equipment update; and Bellefonte, Unit 1, design studies.		
ASSIGNED INSPECTOR:	 P. H. Hakrell, Reactor Systems Section (RSS)	1/21/83 Date
OTHER INSPECTOR(S): R. H. Brickley, RSS		
APPROVED BY:	 C. J. Hale, Chief, RSS	1/27/83 Date
INSPECTION BASES AND SCOPE:		
A. <u>BASES</u> : 10 CFR Part 50, Appendix B; G&H Topical Report No. GIBSAR-17-A; and the Comanche Peak Steam Electric Station (CPSES) Preliminary Safety Analysis Report (PSAR).		
B. <u>SCOPE</u> : Design change control, design process management, and status of previous inspection findings.		
PLANT SITE APPLICABILITY:		
Docket Nos. 50-445 and 50-446.		

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A. VIOLATIONS:

None

B. NONCONFORMANCES:

1. Contrary to Section 17.1.2.6 of the CPSES PSAR, previous issues of drawings are not being marked superseded nor do G&H project procedures require that superseded drawings be so marked.
2. Contrary to Section 17.1.2.6 of the CPSES PSAR, G&H project procedures do not provide provisions for the distribution of drawings and their revisions.

C. UNRESOLVED ITEMS:

None

D. STATUS OF PREVIOUS INSPECTION FINDINGS:

1. (Closed) Nonconformance (82-02) - The F-736 form, "Request for Data Processing Service or Equipment," was not initiated, reviewed, approved, and distributed: (1) for the development of version 1 of computer programs DLFPW and PDROP, and (2) the revision of PDROP to version 2.

The inspector verified the corrective actions and preventive measures committed in the C&H letter dated September 24, 1982; i.e., (1) F-736 forms were completed for version 1 of DLFPW and PDROP, (2) F-736 form was completed for version 2 of PDROP, (3) a memo had been distributed to the engineering and programming managers reminding them of the need for form F-736, and (4) the librarian administrator, responsible for maintaining verified programs, was instructed not to accept programs for verification unless form F-736 had been previously submitted.

2. (Open) Nonconformance (82-02) - The required "final check" of computer code program descriptions did not assure that they were accurate descriptions of the official copy of the programs CONVERT, CISRS, and DLFPW in that: (1) the required program description did not exist for the computer program CONVERT, and (2) the program descriptions for the computer programs CISRS and DLFPW did not show the methods, assumptions, and equations used to model the physical system.

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The corrective actions committed by G&H in their letter of September 24, 1982, were scheduled for completion by the end of 1982. The corrective actions for the computer program CONVERT had been completed by the time of this inspection. The corrective actions for CONVERT were verified by the inspector. The inspector also verified the preventive measures committed in the September 24, 1982, letter; i.e., (1) a memo was sent to the engineering and programming managers reminding them that when a program is verified, the cognizant engineer must assure that the required program documentation exists; and (2) instructions have been given to the librarian to check for the presence of the full documentation package.

3. (Open) Nonconformance (82-02) - Computer program verification was not documented, acknowledged, nor maintained in a permanent file as evidenced by the nonexistence of Computer Program Verification Forms for the CRRS and CREED programs. G&H's actions were not complete. The G&H letter of September 24, 1982, committed to completion of corrective actions by December 31, 1982, and preventive measures by the end of the first quarter 1983.
4. (Open) Nonconformance (82-02) - Procedures do not exist and, therefore, were not employed for: (1) identifying design inputs in computer code program descriptions; (2) approving, releasing, distributing, and revising program descriptions; (3) identifying, maintaining, and retaining program descriptions, source listings, and computer test problem input and output data with the status of a quality assurance record; (4) controlling changes to computer codes; (5) taking corrective action when a significant deficiency is detected in a computer code; and (6) making computer code experience reports available to cognizant design personnel.

The G&H letter of September 24, 1982, committed to a revision of EDP-10, "Control and Development of Computer Programs," to include the applicable sections of ANSI N45.2.11-1974 by the end of the first quarter of 1983. As of this inspection, a preliminary draft of the revised procedure is under review. G&H anticipates that the procedure will be issued in accordance with their commitment.

E. OTHER FINDINGS OR COMMENTS:

1. Followup inspection of a 10 CFR Part 21 report (initiated during inspection 82-01) to determine the status of actions taken by G&H to correct design defects in the tornado venting systems for Comanche Peak Steam Electric System, Units 1 and 2.

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The inspector verified that all remaining document changes had been made as committed. This item is considered closed.

2. Followup inspection of a design inspection (82-01) to determine the status of actions taken by G&H to mitigate the consequences of environmental conditions exceeding design allowables in the event of a postulated rupture in certain fluid system piping outside containment.

This item will be inspected further during a subsequent inspection.

3. Design Change Control (Field Changes) - Applicable procedures contained in the Project Guide and Project Procedures Manual were reviewed to verify that the procedures prescribe a system for field design change control that is consistent with the commitments of the G&H Quality Assurance Program for the Comanche Peak Steam Electric Station. To determine that the field design change control procedures are being properly and effectively implemented, the inspector examined the records maintained on 24 Design Change Authorizations (DCA), 20 Component Modification Cards (CMC), 44 Change Verification Checklists, the DCA Master Index, and the CMC Master Index.

There were no violations, nonconformances, or unresolved items identified in this area of the inspection.

4. Design Process Management - Procedures were examined to verify that they prescribe a system for design process management which is consistent with the commitments of the G&H Quality Assurance Program. To verify the design process management procedures are being properly and effectively implemented, the inspector reviewed 5 specifications, 2 purchase orders, 25 drawings, 4 DCA's, 5 CMC's, and 4 design engineering change documents. Within this area of inspection, two nonconformances were identified (see B. above).

ORGANIZATION: GREENEVILLE METAL MANUFACTURING, INCORPORATED
GREENEVILLE, TENNESSEE

REPORT NO.:	99900792/82-01	INSPECTION DATE(S)	10/18-22/82	INSPECTION ON-SITE HOURS:	32
CORRESPONDENCE ADDRESS: Greenville Metal Manufacturing, Incorporated Subsidiary of Newport News Shipbuilding & Dry Dock Co. ATTN: Mr. G. W. Harrington, Plant Manager 711 Campbell Drive Greenville, TN 37743					
ORGANIZATIONAL CONTACT: Mr. Gary Griffith, Quality Control Supervisor TELEPHONE NUMBER: (615) 639-6864					
PRINCIPAL PRODUCT: Sheet metal and structural fabrication					
NUCLEAR INDUSTRY ACTIVITY: The Greenville Metal Manufacturing, Incorporated (GMM) contribution to the nuclear industry represents less than one percent of its total workload.					
ASSIGNED INSPECTOR: <u>J. Barnes</u> for W. D. Kelley, Reactive & Component Program Section (R&CPS)				<u>1-4-83</u> Date	
OTHER INSPECTOR(S):					
APPROVED BY: <u>J. Barnes</u> I. Barnes, Chief, R&CPS				<u>1-4-83</u> Date	
INSPECTION BASES AND SCOPE:					
A. <u>BASES</u> : 10 CFR Part 21 and 10 CFR Part 50, Appendix B.					
B. <u>SCOPE</u> : This inspection was made as a result of the issue of a 10 CFR Part 50.55(e) report by the Cleveland Electric Illuminating Company concerning weld defects in the polar crane box girder that was furnished to the Perry Nuclear Power Plant, Unit 2. Additionally, the inspection included quality assurance program and control of special processes-welding.					
PLANT SITE APPLICABILITY:					
50-441 and 50-556.					

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<p>A. <u>VIOLATIONS:</u></p> <p>None</p> <p>B. <u>NONCONFORMANCES:</u></p> <p>Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 4.b.(2)(b) of Newport News Shipbuilding & Dry Dock Company Standing Operating Procedure No. X03-7.241, there was no documented evidence that the GMM subvender, National Inspection & Consultants, performed the ultrasonic examination of welds with an induced shear wave of 40° to 75° inclusive.</p> <p>C. <u>UNRESOLVED ITEMS:</u></p> <p>None</p> <p>D. <u>OTHER FINDINGS OR COMMENTS:</u></p> <p>1. <u>Cleveland Electric Illuminating Company (CEI), Perry Nuclear Power Plant, Unit 2 - Problem reported was weld defects in the polar crane box girder.</u></p> <p>a. <u>Background</u></p> <p>CEI issued a construction deficiency report pursuant to 10 CFR Part 50.55(e) on February 26, 1982, stating that during visual inspection of the polar crane girder prior to erection, a number of surface weld defects such as undercut, porosity, and insufficient leg were identified. During the repair of these weld defects, it was also determined that a number of subsurface linear defects existed in the shop welds.</p> <p>b. <u>Findings</u></p> <p>(1) <u>Quality Requirements</u></p> <p>(a) Newport News Industrial Corporation (NNIC), a subsidiary of Newport News Shipbuilding & Dry Dock Company (NNS&DC), placed a shop order for the fabrication of the polar crane girder with GMM, which is also a subsidiary of NNS&DC.</p>		

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- (b) The NRC inspector verified by review of the design specification, shop order, welder qualifications, welding procedures, drawings, and quality assurance manual that: (i) the part of the polar crane girder which did not form part of the ASME jurisdictional boundary was to conform to the requirements of AWS D1.1; (ii) the vendor was permitted to substitute their ASME qualified welding procedures and welder qualifications in lieu of AWS welder qualification and prequalified welding procedures; and (iii) the NNIC ASME accepted quality assurance program and welding procedures, and GMM welder qualifications were accepted by the licensee's representative for the contract.
- (2) Fabrication and Inspection of the Polar Crane Girder at GMM
- (a) The polar crane girder was fabricated in 10 identical sections. The top and bottom flange for each section were from two plates and butt welded by the submerged arc welding process. The welds were radiographed by NNIC in the GMM Greeneville plant. The NRC inspector requested to see the radiographs and was informed that the film had been shipped to the Perry Nuclear Plant site. The NRC inspector reviewed the NNIC radiographic technique and interpretation reports and verified that all butt welds had been radiographed and accepted in accordance with ASME Section III requirements.
- (b) The beam stem to girder face plate welds were ultrasonically examined by NNIC and National Inspection & Consultants (NI&C) at the GMM plant. The NNIC procedures list contained a NNS&DD standard operating procedure for ultrasonic examination which was ascertained by the NRC inspector to meet ASME Section III requirements. The NRC inspector reviewed the ultrasonic examination reports and ascertained that the NNIC Level II inspector examination reports showed the use of a 70 degree transducer angle, but did not identify the procedure used. The NI&C Level II ultrasonic test inspector used NNIC forms for reporting ultrasonic test

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results per AWS and did not list either the identity of the procedure used or the transducer angle. The NRC inspector could not, therefore, verify that the ultrasonic test was conducted in accordance with ASME requirements or that the transducer was within the required 40 to 75 degree angle specified by the NNS&DD procedure. This was identified as a nonconformance (see paragraph B).

- (c) The welding of the flanges to the face plate and the welding of the web plate to the flange and face plate were performed in the flat position using the gas metal arc process. The NNIC welding procedure specified that the welding was to be performed with the amperage in the 220 to 320 range and a travel speed of 9 to 18 inches per minute. The NRC inspector was informed that in order to minimize weld distortion, the amperage was kept at 240 amperes and the travel speed at 18 inches per minute. The NRC inspector noted that the machine meters for welding amperage and volts were not included in the calibration program. The NRC inspector was informed that welding amperage was monitored during the welding process by a quality control inspector using a calibrated tong meter.

The welds were magnetic particle examined as specified on the NNIC drawing by a qualified GMM Level II inspector using a 110-volt A.C. yoke. The NRC inspector reviewed the magnetic particle examination records, the qualification of the Level II inspector, and the magnetic particle procedure and verified that all records and qualifications were in accordance with the procedure requirements.

- (d) The NRC inspector noted that visual inspection of the welds had been documented on the nondestructive test reports as being performed in accordance with the NNIC welding procedure. No documentation was made available which would indicate GMM awareness that the welds contained rejectable undercut, excessive porosity, or insufficient leg length conditions.

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- (e) The NRC inspector verified by review of records that a NNIC quality control representative was present in the GMM plant when the polar crane was fabricated. This representative was responsible for the verification of the quality of the work and reported directly to NNIC quality assurance. The NRC inspector also verified that the inspection records had been signed off by NNIC quality control and had the inspection stamp of the licensee's representative.

(3) Investigation, Findings, and Repair of Polar Crane Girder

- (a) The polar crane girder was turned over to Newport News Industrial Corporation of Ohio (NNICO) by CEI in mid 1980 without identified significant findings. In the third quarter of 1980, NNICO began a detailed visual inspection of the girder sections prior to erection. As a result of this inspection, a significant number of surface weld defects were identified which included undercut and porosity. NNIC initiated an investigation to determine why these visual defects had not been identified during fabrication and source inspection.

The NNIC investigation determined in November 1980 that the inspection criteria used at GMM were ASME requirements. The inspection criteria used at the Perry Nuclear Power Plant site were, however, AWS D1.1 requirements. NNIC concluded from the investigation that an ultrasonic inspection of all strength welds should be conducted, in order to determine the extent of unacceptable defects.

- (b) The site generated repair records for the polar crane girder had been received at the NNIC, Newport News, Virginia, office, but had not been reviewed and/or accepted. The NNIC representative arranged for the records to be shipped to GMM, Greeneville, Tennessee, so they were available to the NRC inspector.

The NRC inspector reviewed approximately 30 NNICO ultrasonic examination reports for 3 sections of the polar crane girder, and noted that the reports identified discontinuities as "large."

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<p>(c) The CEI final 10 CFR Part 50.55(e) report states that insufficient weld leg was identified and documented on Nonconformance Report 17-36. A review was made by the NRC inspector of the nonconformance report and its revisions which indicated that insufficient weld leg was not documented.</p> <p>The NRC verified by review of NNICO document No. 701-8694 that their welding engineer had evaluated excessive convexity of the welds as not being a concern due to their size and consistent uniformity. The NNICO repair records reviewed by the NRC inspector did not address the repair or disposition of the reported weld undercut.</p> <p>2. <u>Control of Special Processes</u> - A review was performed of four welding procedures and their qualifications, four welder qualifications, one procedure for the qualification of welders and welding operators, and two sections of the ASME accepted quality assurance manual. An inspection was made of the welder guide bend test dies, weld rod ovens, welding material storage area, and welding in progress. No nonconformances with welding quality assurance program requirements were identified. The NRC inspector brought to GMM attention that their welder guide bend test fixture showed evidence of wear. GMM initiated action to include the fixture in their controlled tool program.</p> <p>3. <u>Quality Assurance Program</u> - A review was made of the NNIC ASME accepted Quality Assurance Manual. Implementation could not be verified as a result of the absence of appropriate work.</p>		

ORGANIZATION: HAYWARD TYLER PUMP COMPANY
BURLINGTON, VERMONT

REPORT NO.:	99900345/82-02	INSPECTION DATE(S)	1/25-29/82	INSPECTION ON-SITE HOURS:	90
CORRESPONDENCE ADDRESS: Hayward Tyler Pump Company ATTN: Mr. B. P. Lyons Manager, Process Industry Products P. O. Box 492 Burlington, VT 05401					
ORGANIZATIONAL CONTACT: Mr. R. C. Groeschel, QA Manager TELEPHONE NUMBER: (802) 863-2351					
PRINCIPAL PRODUCT: Pumps.					
NUCLEAR INDUSTRY ACTIVITY: Eight contracts for ASME Section III Code pumps applicable to one foreign and six domestic sites.					
ASSIGNED INSPECTOR: <u><i>L. E. Ellershaw</i></u> <u>2-16-82</u> L. E. Ellershaw, Reactive & Components Section (RCS) Date					
OTHER INSPECTOR(S): I. Barnes, Chief, RCS U. Potapovs, Chief, Vendor Program Branch					
APPROVED BY: <u><i>I. Barnes</i></u> <u>2-16-82</u> I. Barnes, Chief, RCS Date					
INSPECTION BASES AND SCOPE:					
A. <u>BASES</u> : 10 CFR Part 50, Appendix B.					
B. <u>SCOPE</u> : This inspection was made as a result of the receipt by the Nuclear Regulatory Commission of allegations pertaining to implementation and enforcement of the Hayward Tyler Quality Assurance (QA) program. Specific pertinent subject areas included in the inspection were indoctrination and training, design control, nonconformance and corrective action, manufacturing process control, assembly and test, and control of special processes.					
PLANT SITE APPLICABILITY:					
Components/records identified with the following nuclear facilities were examined during this inspection: Docket Nos. 50-498/499, 50-566/567, and 50-354/355.					

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A. <u>VIOLATIONS:</u> None		
B. <u>NONCONFORMANCES:</u> 1. Contrary to Criterion V of Appendix B to 10 CFR Part 50, Section 20 of the QA Manual and Engineering Std. 9.0.5/1-1 dated January 4, 1977, review of current and historical training and indoctrination schedules and records showed the following: a. The current (1982) training schedule and the schedules for the past three years were not consistent with the training requirements identified in Exhibit I of Engineering Std. 9.0.5/1-1. b. Only about one-half of the training specified in the 1981 schedule was actually completed, with none of the scheduled training for manufacturing personnel being performed. c. Performance of training in Process Control and Nonconformities for Methods Technicians, although indicated by the 1980 training schedule as having been completed, could not be verified from review of course attendance records. d. Training records were retained only for QA/QC personnel and not for other employees with quality assurance program responsibilities. 2. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section 6 of the QA Manual, the following was observed with respect to processing of Engineering Change Requests (ECRs): a. ECR 260 was dispositioned by the Project Engineer without his obtaining the required input from the Manufacturing Engineering Supervisor. b. ECR 254 was signed off by the Project Engineer without his indicating an appropriate disposition (e.g. acceptance, requirement for design review, referral to customer, etc.). c. ECR 261 did not identify Quality Level, contract number or disposition. d. ECR 274 (Quality Level I) was closed out by the Project Engineer without his obtaining the required sign off by the QA Systems Engineer.		

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3. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section 16 of the QA Manual, corrective actions were not implemented by appropriate management with responsibility for shop compliance with QA program manufacturing process control provisions, as evidenced by manufacturing process control implementation being identified as discrepant in each of the seven QA manager's biannual reports, for the time period from December 2, 1977, to June 30, 1981.
4. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section 10 of the QA Manual, mandatory sequences of operations were not completed in the order indicated on the Route Sheet, and QC/QA operations were performed out of numerical sequence.

Examples:

- a. Machining operations on Route Sheet 3-0173-8223, B/M Item 1102 and 1110, Top-Bottom Casing, Yellow Creek, were signed off as complete prior to performance of the initial operation on the Route Sheet, a QC inspection point for verification of casing material identity.
 - b. An operation for installation of studs and nuts on the Route Sheet referenced in a. above was signed off as complete prior to an earlier operation for QC verification of stud and nut material identity. It was additionally noted that the Route Sheet sign offs indicated that the stud holes had not been drilled and tapped until after the studs had been installed, and that assignment of studs and nuts had been deferred to a later Route Sheet.
 - c. Pump assembly and tack welding of the impeller retaining screw head to the impeller on Revision B of Route Sheet 3-0173-8049, Pump Serial No. 804901, Hope Creek, were made without performing earlier designated QC inspection operations for verification of cleanliness and welding controls.
5. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section 3 of the QA Manual, each operation listed on Route Sheets was not signed off on completion, as evidenced by:
 - a. Operation Nos. 100, 102, 104 and 106 on Route Sheet 3-0173-8127, B/M Item 0202, Base Plate, South Texas, were unsigned for the completed and shipped item.

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<p>b. Operation Nos. 130 and 140 on the Route Sheet for Casing Assembly D910-001 and 002, Pump Serial No. 804002, South Texas, were unsigned for the completed and shipped item.</p> <p>6. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section 10 of the QA Manual, Route Sheets did not control and document all operations, as evidenced by:</p> <p>a. Manufacture of O-rings by Hayward Tyler was not controlled by Route Sheets.</p> <p>b. A dimensional change was instructed to be made on December 15, 1981, from that specified by the applicable drawing listed by Route Sheet 3-0173-8232, B/M Item 1602, Batch No. 664U-001. The change was not permitted or documented by the Route Sheet and was made without the required prior submittal and approval of an Engineering Change Request for a drawing revision.</p> <p>c. A gland dimension was instructed to be changed on August 21, 1981, from the specified part drawing requirements, as a result of clearance problems during pump assembly on Route Sheet 3-0173-8223, B/M Item 1101, Yellow Creek. This change was not documented by the Route Sheet and was made without either issue of a Non Conformity Report by QC for the assembly operation, or making the required prior submittal and approval of an Engineering Change Request for a drawing revision.</p> <p>7. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section 10 of the QA Manual, inspection operations on certain Route Sheets (applicable to shipped items) had not been signed off to denote satisfactory completion of the operations.</p>		
<p><u>Examples:</u></p>		
<p>a. Operation No. 110 on Route Sheet 3-0173-8127, B/M Item 0202, Base Plate, had not been signed off to denote a QA review had been performed of the Route Sheet for completeness. Operation No. 050, an Authorized Nuclear Inspector hold point, was not signed on this Route Sheet.</p> <p>b. Operation Nos. 120 (Inspect Visual), 150 (Final Inspect Visual) and 160 (QA Review Route Sheet) were unsigned on the Route Sheet for Casing Assembly D 910-001 and 002, Pump Serial No. 804002.</p>		

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<p>8. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph NCA-4134.12 in Section III of the ASME Code, measures were not established in regard to a pump assembly torque wrench (Serial No. HTS 51-029) to assure necessary accuracy and to allow determination of required corrective actions if the tool was found discrepant at calibration; i.e. Purchase Order 21831 (February 26, 1981) to a calibration service vendor required the vendor to calibrate and adjust as required. Neither specific accuracy limits were provided to the vendor, nor was any statement included in regard to the error value on initial calibration check at which the customer must be informed.</p> <p>9. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and QA Manual Section 9.0, the allocation of a batch number to certain welding material and subsequent recording of that batch number when the welding material was issued and used, did not assure its traceability, in that the welding material used was not the same material that the batch number had been allocated to.</p> <p>Batch number Y622 had been assigned to a container of 1/8" type E316L-16 electrodes, for which the Certified Material Test Report and the container identified the electrodes as being from Lot Number 3099003. However, observation of the electrodes in the container revealed that they were identified (stenciled) with Lot Number 2999003.</p> <p>The records show that this batch number was recorded as being used on Emergency Service Water Pumps for Carolina Power and Light Company's Shearon Harris Nuclear Power Plant.</p> <p>10. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and QA Manual Section 12.0, a violation of an ASME Code essential variable (preheat temperature) was allowed by a welding procedure specification (WPS); i.e., a decrease of more than 100°F from the qualified preheat temperature was permitted. WPS 6.3.3/3-1.1, Revision 0, dated July 20, 1981, states, "Preheat 60°F min. (200°F actual)," while the Procedure Qualification Record (PQR) 6.3.3/3-1.1A dated July 20, 1981, states in regard to preheat, "200°F actual."</p> <p>11. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and QA Manual Section 12.0, WPS 6.3.3/3-1.1 permitted the use of welding positions for which HTPC welders had not been qualified.</p>		

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12. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and QA Manual Section 12.0, welding was not performed in accordance with the welding procedure specification (WPS) and the QC Inspector stamped off the operation on the Route Sheet to show that he had verified the acceptability of the welding.

The Route Sheet used for Bill of Material Item No. 1402, Diffuser, Contract 0173-8232, specified the following operations and requirements and included welding material, batch number 731U, as a permissible material:

Operation 050 - Verify filler material identity.

Operation 070 - Weld repair per WPS 6.3.3/3-5.1 or 6.3.3/3-6.1, both Revision 01.

Operation 080 - Verify compliance during performance of operation 070.

The QC inspector verified that welding material batch number 731U and WPS 6.3.3/3-5.1, Revision 01, had been used. However, the WPS specifies the use of 3/32" diameter filler metal, while the filler metal actually used was 1/8" diameter.

C. UNRESOLVED ITEMS:

None

D. OTHER FINDINGS OR COMMENTS:

1. This inspection was performed concurrently with an investigation by members of the Region IV Investigation and Enforcement Staff. Investigative findings are contained in Report No. 99900345/82-01.
2. Indoctrination and Training - Applicable QA Manual (QAM) requirements as well as training and indoctrination schedules and training course attendance records for 1979 through 1982 were reviewed. In addition to the nonconformance identified in paragraph B.1. it appears that not all employees received the applicable training specified in the training schedule before being assigned to code work. At least one welder received no training in the QAM requirements for welding until after 9 months on the job. None of the welders received any training in Process Control during 1981, although this training was designated as applicable in the training schedule.

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<p>3. Design Control - The applicable QA Manual requirements for processing Engineering Change Requests (ECRs) were reviewed and approximately 20 recent (1981) ECRs examined for conformance with the QAM requirements.</p> <p>Nonconformance B.2 was identified.</p> <p>4. Nonconformance and Corrective Action - The applicable QA Manual requirements were reviewed and an inspection performed of current practices used to resolve nonconforming conditions. A review was performed of nonconformance trend information generated by the QA Manager for the time period from 1977 through mid-1981 (last available report) and an inspection made in regard to QA program compliance in the resolution of six Non Conformity Reports (NCRs) pertaining to out of tolerance dimensions. In addition to the nonconformance identified in paragraph B.3, two items requiring additional inspection were identified. During review of NCR A0593 (which pertaining to an impeller undersized diameter dimension on South Texas Route Sheet 3-0173-8040/1, B/M Item 2102) it was noted that a repair build-up disposition had been lined out. The remaining words indicated that manufacture of a special wear ring and drawing revision were the final disposition. No information was available to indicate that this disposition had, in fact, been accomplished. The NCR had, however, been signed off by a QC inspector which programmatically indicates completion and acceptance of the required actions. Examination of the NCR log maintained by QC showed closeout of the item, with no entry made to show voiding of the item and replacement by a NCR with a different disposition. During the inspection a further NCR was produced which indicated that the original repair build-up had been performed. Insufficient time was available, however, to fully evaluate this NCR and determine whether the NCR had been appropriately identified in the manufacturing Route Sheets.</p> <p>During review of current work, an NCR (B2047) was examined which pertained to traceability, excess material and casting defects in five received suction bowls. The initial Route Sheets had been closed out and work was proceeding on machining Route Sheets. Part of the disposition, removal of excess material and defects in the excess material, required the use of the machining Route Sheet to accomplish the action. NCR B2047 was not entered, however, on the machining Route Sheet as being applicable, and was listed only by the NCR log as an open item. The QA Manual, as presently written, would preclude this practice, in that Route Sheet sign off by QA for completeness is only supposed to occur after resolution of all nonconformities.</p>		

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<p>5. Manufacturing Process Control - The applicable QA Manual requirements were reviewed and examinations made for QA program compliance of Route Sheets completed during 1977, 1979, and 1981. In addition to the nonconformances identified in paragraphs B.4, B.5, B.6, and B.7, one item requiring additional inspection was identified. Examination of the sign off dates on Route Sheet 3-0173-8223, B/M Item 1102 and 1110, Top-Bottom Casing, Yellow Creek, showed the following: (a) Studs and nuts were installed on August 13, 1981; (b) Stud holes were not drilled and tapped until August 17, 1981; and (c) Studs and nuts were indicated by QC on August 20, 1981, to have not been assigned to the Route Sheet. NRC personnel were informed, that the probable explanation of the question on stud issue, was manufacturing personnel used temporary studs in order to avoid damage to the studs used in final pump assembly. In regard to insertion of studs prior to drilling and tapping of the stud holes, a possible explanation of the date inconsistencies is that manufacturing personnel were not following the operational sequence specified by an individual Route Sheet, but rather were combining operations from different Route Sheets. This subject will be examined in detail during a future inspection.</p> <p>6. Assembly and Test - A review was made of the applicable QA Manual requirements and an inspection performed of the assembly and test of Pump Serial No. 804901, Route Sheet 1-0173-8049, Hope Creek. Documents examined included final assembly and performance test procedures, performance test data, the procedure and requirements for bolt torquing in assembly, Certified Material Test Reports for compliance with Bill of Materials requirements, and calibration practices in regard to the torque wrench used in pump assembly. One nonconformance was identified which is described in paragraph B.8.</p> <p>7. Control of Special Processes - The applicable QA Manual requirements and implementing procedures were reviewed for QA Program compliance. The areas inspected to verify implementation included: Nondestructive Examination (NDE) personnel qualifications; welding procedure qualifications; welding process control, and weld material control. In process NDE and welding could not be reviewed, in that these activities were not performed on ASME Code pumps/components during this inspection.</p>		

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During inspection of weld material control which consisted of observing weld material holding ovens, electrode identification and review of certified test reports, nonconformance B.9 was identified.

Welding procedure specifications (WPS), identified as having been used on certain nuclear contracts, and their qualifications were reviewed in conjunction with the qualifications of the identified welders. Identification was made by review of Route Sheets associated with South Texas Project and Hope Creek. Nonconformances B.10, B.11, and B.12 were identified.

The NRC inspector expressed concern over the adequacy of the monitoring/inspection of welding. In addition to nonconformance B.12, it was observed on certain Route Sheets that amperages and voltages had been recorded by the QC inspectors during the welding operations. However, the values were incorrect in that they were reversed.

Records pertaining to the qualifications of NDE personnel were reviewed which included written examinations, eye examinations, and training. The two NDE disciplines performed at Hayward Tyler Pump Company are liquid penetrant examination, and visual examination. An area of concern was identified pertaining to visual examinations performed on ASME Code pumps and component supports manufactured prior to December 1979. The personnel qualification records indicated that the earliest certification date for a visual examiner was December 17, 1979.

ORGANIZATION: HAYWARD TYLER PUMP COMPANY
BURLINGTON, VERMONT

REPORT NO.:	99900345/82-03	INSPECTION DATE(S)	3/3-4/82	INSPECTION ON-SITE HOURS:	21
CORRESPONDENCE ADDRESS: Hayward Tyler Pump Company ATTN: Mr. B. P. Lyons Manager, Process Industry Products P. O. Box 492 Burlington, VT 05401					
ORGANIZATIONAL CONTACT: Mr. R. C. Groeschel, QA Manager TELEPHONE NUMBER: (802) 863-2351					
PRINCIPAL PRODUCT: Pumps					
NUCLEAR INDUSTRY ACTIVITY: Eight contracts for ASME Section III Code pumps applicable to one foreign and six domestic nuclear sites.					
ASSIGNED INSPECTOR: <u>H. W. Roberts</u> <u>3/26/82</u> H. W. Roberts, Reactive & Components Program Section Date (R&CPS)					
OTHER INSPECTOR(S):					
APPROVED BY: <u>I. Barnes</u> <u>3/26/82</u> I. Barnes, Chief, R&CPS Date					
INSPECTION BASES AND SCOPE:					
A. <u>BASES</u> : 10 CFR Part 50, Appendix B.					
B. <u>SCOPE</u> : This inspection and the inspection described in Inspection Report No. 99900345/82-02 were conducted as a result of the receipt by the Nuclear Regulatory Commission of allegations pertaining to implementation and enforcement of the Hayward Tyler Quality Assurance (QA) program. Specific pertinent subject areas included in this inspection were material control and manufacturing process control.					
PLANT SITE APPLICABILITY:					
Components/records identified with the following nuclear facilities were examined during this inspection: Docket Nos. 50-354/355; 50-458; and 50-566/567.					

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A. <u>VIOLATIONS:</u> None		
B. <u>NONCONFORMANCES:</u> 1. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section 10.0 of the QA Manual, the Inventory Control Clerk did not mark the batch numbers of studs and nuts (parts) on the applicable Route Sheets for Pump Serial No. 822303, Yellow Creek. 2. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section 10.0 of the QA Manual, QA review of completed Route Sheet 3-0173-8223, Top-Bottom Casing, Pump Serial Nos. 822303 and 822304, Yellow Creek, did not assure that all nonconformities had been resolved; i.e., the disposition for an identified nonconformance pertaining to mislocation of a drain hole, namely drawing revision to reflect the as-built condition, was never accomplished. 3. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section 9.0 of the QA Manual, the recorded As-Built Tabulations for Pump Serial Nos. 822303 and 822304 were not verified with the applicable Route Sheets by the QA Systems Engineer, as evidenced by: a. The batch numbers for Item 7202 were recorded, respectively, by the assembler as 764P-001 and 764P-002 for Pump Serial No. 822303, and 764P-003 and 764P-004 for Pump Serial No. 822304. b. The Route Sheet applicable to Item 7202 manufacture identified the batch numbers used for these pumps as 764P, 765P, 766P, and 391S. 4. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section 10.0 of the QA Manual, certain pump shaft Route Sheets were not controlling documents for designated straightening operations, in that applicable standards had not been specified. Examples: (a) Route Sheet 3-0173-8185, B/M Item 4123, River Bend, Batch Nos. 665E, 672E, 668E, and 669E; (b) Route Sheet 3-0173-8185, B/M Item 4123, Batch No. 658E-002.		

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5. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section 12.0 of the QA Manual, the batch and serial number of welding materials used to weld two circumferential butt joints on Route Sheet 3-0173-8066, B/M Item 1120, Hope Creek, were not recorded on the Route Sheet by either the Inventory Control Clerk or the QC Inspector.

C. UNRESOLVED ITEMS:

A limited inspection of heat treatment controls failed to establish whether Quality Assurance personnel were verifying that sub-contracted heat treatment was being accomplished in accordance with written instructions. A review of heat treatment charts revealed certain charts did not indicate chart speed, or time at which the component reached the required temperature range. Insufficient time was available during this inspection to fully evaluate this subject. Further review will be made during a subsequent inspection.

D. OTHER FINDINGS OR COMMENTS:

1. This inspection and the inspection described in Report No. 99900345/82-02 were performed concurrently with an investigation by the Region IV Investigation and Enforcement Staff. Investigative findings are contained in Report No. 99900345/82-01.
2. Material Control - The applicable QA Manual requirements were reviewed and an examination made of implementation of material control program provisions with respect to Pump Serial Nos. 822303 and 822304. Included in this examination were a review of As-Built Tabulations, six Route Sheets and a purchase order for gland material. Nonconformances B.1 and B.3 were identified.

As a result of the identification of nonconformance B.3 concerning gland identity, a follow up was made by Hayward Tyler personnel at the Yellow Creek site. During this follow up, specific dimensional information was obtained which is relevant to the nonconformance identified in paragraph B.6.c of Report No. 99900345/82-02. Revision A to Drawing No. 01-200-456 dated October 2, 1981, increased the maximum part I.D. to 7.550 inches. This revision was made after the circumstances described in paragraph B.6.c of Report No. 99900345/82-02. The following actual gland I.D. measurements were obtained at site by Hayward Tyler personnel:

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<u>Pump Serial No.</u>	<u>Gland Batch No.</u>	<u>I.D. inches</u>
822303	391S-001	7.575
822303	766P-001	7.566
822304	765P-001	7.568
822304	764P-001	7.567

Each part is therefore still not in compliance with current drawing revision dimensional requirements, despite increase of tolerances subsequent to August 21, 1981.

3. Manufacturing Process Control

- a. The applicable QA Manual requirements were reviewed and examinations made for QA program compliance of current Route Sheets and Route Sheets completed during 1980 and 1981. Nonconformances B.2, B.4 and B.5 were identified.
- b. Route Sheet Sign off Program Ambiguities - Paragraph 3.10 in Section 3.0 of the QA Manual states in part, "The Shop Superintendent reports to the Manufacturing Manager, and is responsible through the Manufacturing Foreman, for carrying out all manufacturing operations listed on the Route Sheet and signing off each operation as it is completed (10.2)" Paragraph 10.2 in Section 10.0 of the QA Manual states in part, ". . . The operator or inspector performing the operation shall stamp or initial and date the appropriate column when the operation is completed satisfactorily." It is apparent from review of Route Sheets and the nature of certain past allegations, that there is not a common understanding of existing QA program requirements with respect to operation sign off on Route Sheets. Paragraph 3.10 has been interpreted by foremen as authorizing their sign off of manufacturing operations, and paragraph 10.2 has been interpreted by others, as requiring the actual operator performing a manufacturing operation to sign off on completion. Review of Route Sheets shows sign offs of manufacturing operations being accomplished by both supervision and hourly operators. Revision of the QA Manual to clarify sign off responsibilities is considered necessary, if personnel are to achieve a common understanding.

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- c. Flame Straightening - Route Sheets were obtained during this inspection which confirmed flame (or torch) straightening had been performed on shafts for River Bend, ASME Section III Code Class 3 pumps. The shaft material was identified on the Route Sheets as ASTM A 276-410 stainless steel. Of the four Route Sheets examined, two provided no criteria with respect to straightening requirements. This has been identified in Nonconformance B.4. The remaining two Route Sheets showed a maximum permissible temperature of 1450°F for straightening operations, with again no referenced standard to be used.

A review of the basis for and adequacy of this temperature limit with respect to shaft mechanical properties and corrosion resistance will be made during a future inspection.

4. Spare Parts

As a result of the identification to the NRC Region IV office during the inspection, that Hayward Tyler Pump Company had furnished a replacement Component Cooling Water Pump shaft to Bellefonte Unit 1 with test yield stress values below the minimum required by the design calculations, the NRC inspector was contacted by telephone for the purpose of requesting a listing of spare parts furnished to the nuclear industry. A tabulation was provided in response to the request which identified parts shipped, but did not include the names of pumps and nuclear facilities. Additional review of this item will be made during the next inspection.

ORGANIZATION: ITT GRINNELL CORPORATION
PIPE HANGER DIVISION
ENGINEERING DEPARTMENT
PROVIDENCE, RHODE ISLAND

REPORT NO.: 99900285/82-02	INSPECTION DATES: 11/15-18/82	INSPECTION ON-SITE HOURS: 21
CORRESPONDENCE ADDRESS: ITT Grinnell Pipe Hanger Division, Engineering Department ATTN: Mr. D. M. Sewell, Vice President & Director of QA 621 Dana Avenue Warren, Ohio 44481		
ORGANIZATIONAL CONTACT: Mr. D. M. Sewell, Vice President & Director of QA TELEPHONE NUMBER: (216) 373-1500		
PRINCIPAL PRODUCT: Component Supports		
NUCLEAR INDUSTRY ACTIVITY: Approximately 70% of ITT Grinnell's (ITT) work is devoted to the commercial nuclear power industry.		
ASSIGNED INSPECTOR:	<u><i>I. Barnes</i></u> for L. E. Ellershaw, Reactive & Component Program Section (R&CPS)	<u>1-20-83</u> Date
OTHER INSPECTOR(S):		
APPROVED BY:	<u><i>I. Barnes</i></u> I. Barnes, Chief, R&CPS	<u>1-20-83</u> Date
INSPECTION BASES AND SCOPE:		
A. <u>BASES</u> : 10 CFR Part 50, Appendix B and 10 CFR Part 21.		
B. <u>SCOPE</u> : This inspection was conducted as a result of receipt of a 10 CFR Part 50.55(e) Construction Deficiency Report (CDR) from Tennessee Valley Authority (TVA) regarding specification of incorrect weld inspection requirements on hanger drawings by ITT for Bellefonte Nuclear Plant, Units 1 and 2. Additional areas inspected included previous inspection findings and follow up (cont. on next page)		
PLANT SITE APPLICABILITY: Construction Deficiency Report: Docket Nos. 50-438 and 439. Violation (Failure to Evaluate and Notify): Docket Nos. 50-456, 50-457, 50-454, 50-455, 50-313, 50-368, 50-438, 50-439, 50-413, 50-414, 50-445, 50-446, 50-364, 50-354, 50-355, 50-373, 50-374, 50-546, 50-547, 50-369, 50-370, 50-329, 50-330, 50-423, 50-410, 50-528, 50-529, 50-530, 50-443, 50-361, 50-362, 50-387, (cont. on next page)		

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SCOPE: (cont.) on an item identified during the inspection at the ITT facility in Providence, Rhode Island, pertaining to the shipment of dimensionally nonconforming parts.

PLANT SITE APPLICABILITY: (cont.) 50-388, 50-508, and 50-509. Other docket numbers may be affected in that ITT has supplied Figure 306/307 snubbers to their Field Service Groups without knowing who the end user is.

A. VIOLATIONS:

Contrary to Section 21.21 of 10 CFR Part 21, ITT was notified by a customer on October 9, 1978, that dimensional conditions existed in certain mechanical shock and sway suppressors which would preclude the ability for the units to achieve the minimum required included angle cone of action.

ITT, after reviewing the identified conditions, revised their drawings and informed the customer as to the necessary actions required to bring the units into compliance. However, as of the date of this inspection, ITT had neither formally evaluated the identified conditions nor notified any other purchaser of similarly affected units in order for the deviation to be evaluated and/or corrected.

B. NONCONFORMANCES:

None

C. UNRESOLVED ITEMS:

None

D. PREVIOUS INSPECTION FINDINGS:

1. (Resolved) Unresolved Item (Inspection Report 99900285/82-01):

This item dealt with the use of a non-ASME approved rivet material and was originally identified and noted during an inspection at ITT, Warren, Ohio, as an item requiring further inspection (Inspection Report 99900282/81-01). Further review at ITT, Providence, Rhode Island, resulted in its being identified as an unresolved item (Inspection Report 99900285/82-01), in which ITT used a rivet material that had not been approved by the ASME Code.

Code Case N-249-2 which was approved by the ASME Code on June 17, 1982, incorporates the identified rivet material for use in the construction of Class 1, 2, 3 and MC component supports.

This item was resolved in Inspection Report 99900282/82-01 and is restated here for continuity purposes.

ORGANIZATION: ITT GRINNELL CORPORATION
PIPE HANGER DIVISION
ENGINEERING DEPARTMENT
PROVIDENCE, RHODE ISLAND

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<p>2. <u>Followup Item Identified at ITT's Engineering Department, Providence, Rhode Island, Inspection Report 99900285/82-01:</u></p> <p>This item dealt with a snubber in which a 6" extension piece had been welded 1/4" off center. At the time of the ITT Providence inspection, the ITT Warren QC Manager committed to a thorough review of the welding/inspection process for this item.</p> <p>The cause of the problem could not be positively established; however, the consensus is that it was fixture-related.</p> <p>During the inspection at ITT, Warren, Ohio, the NRC inspector reviewed the fixture which had been modified to preclude the possibility of welding offcenter attachments and observed the setup, welding, and inspection processes.</p> <p>ITT has implemented their committed actions, and this item was closed in Inspection Report 99900282/82-01 and is restated here for continuity purposes.</p> <p>3. <u>(Closed) Nonconformance (Inspection Report No. 99900285/82-01):</u></p> <p>This item dealt with verification in accordance with the requirements of product drawings not being performed, in that the product drawings specified the use of carbon steel washers in mechanical shock suppressors, Figure 306/307, but brass washers were actually used.</p> <p>During the inspection at ITT, Warren, Ohio, the NRC inspector verified that ITT has implemented their corrective actions. All nonconforming (brass) washers have been removed from the shop floor area and retraining sessions were conducted for QC examiners. Further, review of washer procurement documents showed that the purchasing department was complying with procedures for the purchase of shop manufacturing materials.</p> <p>This item was closed in Inspection Report 99900282/82-01 and is restated here for continuity purposes.</p> <p>4. <u>(Resolved) Unresolved Item (Inspection Report 99900282/82-01):</u></p> <p>TVA made a 10 CFR Part 50.55(e) notification to the NRC on March 1, 1982, that ITT specified incorrect nondestructive examination (NDE) requirements for field welds on hanger sketches provided to Bellefonte Nuclear Plant, Units 1 and 2. TVA initiated nonconforming condition Report No. 1748 on February 17, 1982, which identified four ASME Class 2 hanger sketches with incorrect weld NDE requirements.</p>		

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ITT had conducted a review of sketches for four other systems and provided the NRC inspector with copies of the four identified sketches, but the results of the review and all other hanger sketches were located at ITT, Providence, Rhode Island. The generic aspects of this identified problem could not be examined at that time; therefore, this item was considered unresolved and would require followup during the next scheduled inspection at ITT, Providence, Rhode Island.

During this inspection, the NRC inspector reviewed the results of ITT's analysis and independently reviewed 94 sketches of 6 other piping systems for 2 different nuclear power plants. There were no other anomalies identified.

The previously identified instance where ITT specified a Class 3 weld rather than the required Class 2 weld was considered a drafting error and represented an isolated condition. This sketch is being corrected.

The other three instances related to ITT specifying a more conservative nondestructive examination than was required. A clarification of the rules of the ASME Code occurred in the Summer 1979 Addenda in which Subsection NF-1231 states that welded joints between plate and shell type supports and linear type supports shall meet the rules of either plate and shell type or linear type welded joints.

ITT notified TVA by letter dated November 18, 1982, in which TVA's concurrence was requested.

As a result, this item is considered closed.

E. OTHER FINDINGS OR COMMENTS:

1. Deficiency History

During this inspection, ITT presented the NRC inspector with a preliminary draft letter being prepared for subsequent notification to customers regarding their Figure 306/307 mechanical snubbers, in which it was identified that insufficient clearance between certain mechanical shock arrestors (provided by Pacific Scientific Company) and ITT's manufactured pipe clamps would preclude the ability of the assembled units to achieve a 10^0 included angle cone of action to the pipe clamps axis, as defined in their Load Capacity Data Sheet. It further stated that a similar chance of interference might occur between the pivot mount and the rear bracket, both produced by ITT, due to oversize welds between the lugs of the rear bracket. The pipe clamp and rear bracket are interchangeable with each end of the mechanical shock arrestor.

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On October 9, 1978, Bechtel Power Corporation (BPC), the architect/engineer for Pennsylvania Power and Light Company at the Susquehanna Steam Electric Station, Units 1 and 2, notified ITT that an interference between ITT's pipe clamp and Pacific Scientific Company's mechanical snubber had been identified. ITT responded to BPC on October 17, 1978, by stating that removal or trimming of material within specified limitations to eliminate the interference was approved. At the same time, the applicable ITT drawings were reviewed and revised to eliminate the potential dimensional interference problems. The specific dimensions changed relate to the distance from the center line of the pipe clamp load lug to the edge of the clamp.

The dimensions were changed as follows:

<u>Figure 306/307</u> <u>Size</u>	<u>Changed</u>	
	<u>From</u>	<u>To</u>
1/4 and 1/2	0.75"	0.57"
1	0.88"	0.75"
3	1.31"	1.10"
10	1.50"	1.40"
35	3.00"	2.85"

A subsequent review indicated that additional changes would be required for different sizes; thus, drawings were revised again on April 16, 1980, as follows:

<u>Figure 306/307</u> <u>Size</u>	<u>Changed</u>	
	<u>From</u>	<u>To</u>
1/4 and 1/2	No change	
1	0.75"	0.69"
3	1.10"	1.00"
10	1.40"	1.31"
35	2.85"	2.00"
100	3.12"	3.06"

Still further changes were evidenced on a sketch transmitted to Duke Power Company for the Catawba Nuclear Station on February 28, 1980. The calculated dimensions for the size 1/4 and 1/2 Figure 306/307 show the distance from the center line of the pipe clamp load lug to the edge of the clamp could be between 0.4475" and 0.6785". A handwritten note dated February 26, 1980, states that there are many Figure 306/307 snubbers at Duke Power Company's Wm. B. McGuire Nuclear Station and that field personnel have taken upon themselves to grind the snubbers down. It further states that it is quite possible the snubbers can be installed without achieving a 10° included angle cone of action and that this could be a reportable incident.

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On August 20, 1982, ITT received notice from BPC which stated, "We have become aware of a potentially generic problem with Figure 306/307 snubber assemblies supplied to the Susquehanna project.

"The deficiency is inadequate clearance between the clamp ears and the snubber body. This prevents the plus over minus 5 degrees movement required by the specification.

"Your expeditious response as to the clause (sic) and corrective action is requested."

Subsequent to this notification, ITT drafted the letter identified above. The letter further stated, "Not all Figure 306/307 mechanical snubbers are affected. Based on our engineering evaluation, we have determined that:

- "1. All mechanical snubbers produced and shipped by ITT Grinnell prior to October, 1978 should be reviewed to assure sufficient clearance.
 - "2. All mechanical snubbers produced and shipped by ITT Grinnell after April, 1980 are acceptable, based on design changes incorporated at that time.
 - "3. Mechanical snubbers produced and shipped by ITT Grinnell between October, 1978 and April, 1980 may exhibit a reduction of the included angle cone of action. Particularly:
 - "a. All mechanical snubbers that incorporate welded rear brackets; and
 - "b. Size 3 and 35 pipe clamps."
2. ITT's 10 CFR Part 21 Policy Guide

The ITT policy guide describing the procedures to be followed for complying with Section 206 of the Energy Reorganization Act of 1974 and 10 CFR Part 21 was established and distributed on December 30, 1977.

The policy guide identifies the Vice President and Director of Research, Development and Engineering (RD&E) as the responsible officer of ITT. The guide defines a deviation as "a departure from the technical requirement included in a procurement document" and a defect as "a deviation in a basic component delivered to a purchaser where, on the basis of an evaluation, the deviation could create a substantial safety hazard."

ORGANIZATION: ITT GRINNELL CORPORATION
PIPE HANGER DIVISION
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The Corporate QA Manager is responsible for maintaining a log of all detected deviations and assigning an evaluation group to perform the evaluation for each deviation.

The circumstances would indicate that a deviation existed and was identified in October 1978. The Vice President and Director of RD&E stated that a formal evaluation group had not been assigned. This was confirmed later by the Corporate QA Manager. While it is obvious that a review occurred which resulted in revisions to drawing dimensions, there apparently is no documented evidence of an evaluation having been performed to determine whether the deviation could create a substantial safety hazard.

The NRC inspector expressed concern about the extent and adequacy of ITT's review of the problem and the resultant conclusions which led to their decision to not notify the NRC or their customers.

As a result of the above, a violation was identified and is stated in paragraph A.

An additional concern was expressed regarding the adequacy of ITT's external design interface control program. This area will be reviewed, particularly as it relates to the identified problem, during the next scheduled inspection.

ORGANIZATION: ISOMEDIX, INCORPORATED
WHIPPANY, NEW JERSEY

REPORT NO.:	99900913/82-02	INSPECTION DATE(S)	11/16-19/82	INSPECTION ON-SITE HOURS:	54
CORRESPONDENCE ADDRESS: Isomedix, Incorporated ATTN: Mr. G. R. Dietz President 80 South Jefferson Road Whippany, NJ 07981					
ORGANIZATIONAL CONTACT: Ms. L. Tympanick, QA Manager TELEPHONE NUMBER: (201) 887-4700					
PRINCIPAL PRODUCT: Gamma irradiation services.					
NUCLEAR INDUSTRY ACTIVITY: Five percent of Isomedix's business is for irradiation of Class 1E safety-related equipment for environmental qualification testing.					
ASSIGNED INSPECTOR:		<u>W. R. Johnson for</u> A. R. Johnson, Equipment Qualification Section (EQS)		<u>2-4-83</u> Date	
OTHER INSPECTOR(S): J. Benson, NRC Consultant, Sandia National Laboratories					
APPROVED BY:		<u>H. S. Phillips</u> H. S. Phillips, Chief, EQS		<u>2/4/83</u> Date	
INSPECTION BASES AND SCOPE:					
A. <u>BASES</u> : 10 CFR Part 21 and 10 CFR Part 50, Appendix B.					
B. <u>SCOPE</u> : The purpose of the inspection was: (1) to review the Isomedix Quality Assurance Manual (QAM) and supplemental procedures, and (2) to verify the implementation of the QA program. The 10 CFR Part 50, Appendix B criteria inspected were: Organization; QA Program; Design Control; Instructions, (Cont. on next page)					
PLANT SITE APPLICABILITY:					
Not identified.					

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SCOPE: (Cont.) Procedures, and Drawings; Document Control; Identification and Control of Materials, Parts, and Components; Inspection; Test Control; Control of Measuring and Test Equipment; Handling, Storage, and Shipping; Inspection, Test, and Operating Status; Nonconforming Materials, Parts, or Components; Corrective Action; Quality Assurance Records; and Audits.

A. VIOLATIONS:

None

B. NONCONFORMANCES:

1. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section 3.a of the Isomedix Reactor Component Irradiation Test Procedure, there was no documented objective evidence that the calculation to determine the required radiation time and total integrated dose (TID) was made.
2. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Sections B.1 and B.3 of Appendix B to the Isomedix QA Manual, there was no objective evidence which documented the agreement between Isomedix technical staff and the customer relative to a special request to change irradiation parameters. Also, the irradiation parameters were changed without properly documenting the review and approval of such changes.
3. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section 6.8.3 of the Isomedix Corporation QA Manual, no procedures or instructions existed to govern packaging and shipping of test specimens from Isomedix to preclude damage or deterioration.

C. UNRESOLVED ITEMS:

None

D. STATUS OF PREVIOUS INSPECTION FINDINGS:

1. (Closed) Violation (82-01): Posting of 10 CFR Part 21, Section 206 of the Energy Reorganization Act of 1974, or an appropriate notice which describes the regulations/procedures had not been accomplished.

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Isomedix, Incorporated posted copies of 10 CFR Part 21, Section 206 of the Energy Reorganization Act of 1974, and a procedure adopted pursuant to the 10 CFR Part 21 regulation.

(Closed) Violation (82-01): Procedures had not been adopted to provide for evaluating deviations, informing the purchaser of the deviation, and assuring that a responsible officer was informed of a component which failed to comply or contained a defect.

Isomedix, Incorporated procedure entitled "Nuclear Regulatory Commission - 10 CFR Part 21" dated November 19, 1982, was adopted for purposes of the above.

The above documents were reviewed by the NRC inspector and were posted in their plant at 25 Eastman Road, Parsippany, New Jersey, on November 19, 1982.

E. OTHER FINDINGS OR COMMENTS:

1. QA Manual Review: The Isomedix Quality Assurance Manual, Revision dated October 1, 1982, established the quality assurance program for Isomedix Corporation. The NRC inspector determined that 16 of 18 criteria of 10 CFR Part 50, Appendix B were applicable. Criterion III, "Design Control," and Criterion IX, "Control of Special Processes," are not applicable to work presently done at the Isomedix facility. All other criteria described in the manual were reviewed during this inspection except, Criterion IV, "Procurement Document Control," and Criterion VII, "Control of Purchase of Materials, Equipment, and Services." These criteria will be inspected during a future inspection.

The QAM and the Isomedix Quality Control Manual (QCM), Procedures A through P, prescribe the instructions, procedures, and policy documents used to implement the Isomedix QA program at the Isomedix facility. The NRC inspector reviewed 14 of the 16 applicable criteria, including procedural Appendices B and C, and 13 of the 16 procedures in the Isomedix QCM. No nonconformances were identified in the areas reviewed.

2. QA Program Implementation Review:

- a. The NRC inspector evaluated the implementation of the Isomedix QA program to determine if the applicable 10 CFR 50, Appendix B criteria were properly implemented:

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- (1) Organization: Organizational structures were reviewed including functional responsibilities and authorities. Lines of communication with authority were established. Organizational freedom of the QA function existed. The QA manager had independence and reported directly to the president.
- (2) QA Program: A training program was established and maintained by Isomedix to assure proficiency of personnel whose functions affected quality. The NRC inspector determined that the procedure entitled "Personnel Training Policy," Section F of the QCM, stated (in error) that this basic policy could be amended or added to informally as additional training requirements developed. The NRC inspector will review this area during a future inspection to assure that changes will be controlled.

The QA manager's responsibilities included a regular status review and review of the adequacy of the quality assurance program.
- (3) Design Control: Isomedix does not perform design functions. This criterion is not applicable.
- (4) Procurement Document Control: Isomedix does procure calibration services and radiation sources as described in paragraph (12) below and did perform an audit of the calibration facility (see paragraph E.1 above).
- (5) Instructions, Procedures, and Drawings: The QAM did require instructions and procedures to implement the Isomedix Quality Assurance Program. However, the inspector identified two cases where Isomedix failed to follow procedures and one case where they failed to develop a detailed implementing procedure (see nonconformances B.1 through B.3).
- (6) Document Control: Distribution of issued documents is not covered in the QAM; however, it is controlled by a procedure in the QCM which describes how changes to procedures and specifications are controlled.
- (7) Control of Purchased Material, Equipment, and Services: Isomedix does procure calibration services and the radiation sources as described in paragraph (12) below (see paragraph E.1 above).

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- (8) Identification and Control of Materials, Parts, and Components: Identification and control of specimens for irradiation is being accomplished. Specimens are color tagged by customer order. Receiving and accountability records were completed as required by procedure.
- (9) Control of Special Processes: Isomedix does not perform welding, heat treating, nor nondestructive examination on specimens received for irradiation. This criterion is not applicable.
- (10) Inspection: The production manager is responsible for verifying conformance to instructions and procedures during the irradiation of test specimens. No inspection hold points are required by the applicable procedures. The production manager delegates responsibility to his personnel for receiving inspection activities.
- (11) Test Control: Isomedix did not document calculations used to determine the irradiation time and dose rate applied to specimens (refer to paragraph B.1 of this report for nonconformance).

It was observed by the NRC inspector, that irradiation time applied to specimens are performed to purchase order requirements using a conservative policy in accordance with Isomedix procedure, "Reactor Component Irradiation." Several specimens were irradiated 6 hours longer than required due to a holiday weekend. The certification did state the exposure time accurately.

Written test procedures did govern test activity and test prerequisites. Test results were being documented. Evaluations and limits of acceptance were not considered Isomedix responsibility.

- (12) Control of Measuring and Test Equipment: Measuring and test equipment was calibrated, adjusted, and maintained at prescribed intervals, or prior to use, against certified standards having known valid relationships to nationally recognized standards.

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On a semiannual basis, dosimetry systems are calibrated directly against standards traceable to National Bureau of Standards in accordance with the Isomedix standard dosimetry procedures. Target doses are "air equivalent," and dose rates delivered are to the test item centerline. The Isomedix dosimetry system is based on a radiation induced change in optical density. Readout instrumentation employs spectrophotometers to interpret present dosimeters purchased from a reputable dosimeter manufacturer. Calibration of each batch of dosimeters is based on the exposure of representative dosimeters compared to known doses of radiation traceable to National Bureau of Standards.

The radiation source, cobalt-60, is used to irradiate nuclear components at the Isomedix, Parsippany, New Jersey, plant. The source is (gamma), purchased abroad and is regulated by the Atomic Energy Control Board of Canada.

The Isomedix, Parsippany, New Jersey, plant has a source strength of 2 million micro curies and is periodically inspected by NRC Region I.

- (13) Handling, Storage, and Shipping: No procedures or instructions existed to govern packaging and shipping of irradiated specimens from Isomedix (refer to paragraph B.3 of this report for the nonconformance).

Activities conducted for the control of handling and indoor storage were carried out in accordance with instructions and procedures.

- (14) Inspection, Test, and Operating Status: The test status of each specimen was logged from receipt to shipment in accordance with Isomedix procedures. Both unirradiated and irradiated items were segregated into their respective holding areas and identified by tagging. Nonconforming items were identified by tagging.

- (15) Nonconforming Material, Parts, and Components: Nonconforming items (e.g., items damaged during shipment, items improperly irradiated, etc.) had been identified, documented, segregated, and dispositioned according to the applicable procedure. Only items damaged by shipment, as evidenced by "Product Damage

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Reports," had been identified to date. No improperly irradiated specimens had been identified. The QA manager and product manager are responsible for evaluation of improperly irradiated items (to determine the impact) and notify customers.

- (16) Corrective Action: Correction of conditions adverse to quality requires a determination of cause and corrective action to be taken. The Isomedix customer is notified and a record is placed in the QA record file. Action to correct a discrepancy consists of: scrapping, returning to the customer, retesting, continuing irradiation, or altering the irradiation plan.
- (17) Quality Assurance Records: The QA records in the Isomedix file consisted of the QAM, calibration records, purchase documents, radiation equipment records, radiation reports, certifications, QA review reports, audit reports, letters, and other documents related to quality activities. Requirements for the retention of records require that purchase records be retained for 1 year and audit records for 5 years. The QA manager is responsible for the QA record file and record distribution.
- (18) Audits: The NRC inspector observed that audit reports were in the form of a memorandum describing audit findings. The memorandums were formal but brief and lacked detail. Audit reports did comply with the QAM procedure requiring a formal written report within 30 days and a concluding report within 90 days. Isomedix stated their audit reports, issued in the future, would be more descriptive, formal, and include more detail in the report.

ORGANIZATION: LIMITORQUE CORPORATION
LYNCHBURG, VIRGINIA

REPORT NO.: 99900904/82-02	INSPECTION DATE(S) 11/30-12/8/82	INSPECTION ON-SITE HOURS: 78
CORRESPONDENCE ADDRESS: Limatorque Corporation ATTN: Mr. T. Mignogna President 5114 Woodall Road Lynchburg, VA 24506		
ORGANIZATIONAL CONTACT: Mr. J. B. Drab, Special Projects Engineer TELEPHONE NUMBER: (804) 528-4400		
PRINCIPAL PRODUCT: Electric motor operated valve actuator assemblies. NUCLEAR INDUSTRY ACTIVITY: Limatorque Corporation supplies safety-related electric motor operated valve actuator assemblies for valve operation to the nuclear industry. This represents approximately 5 percent of their total production.		
ASSIGNED INSPECTOR: <u>A. R. Johnson</u> A. R. Johnson, Equipment Qualification Section (EQS)		<u>2/18/83</u> Date
OTHER INSPECTOR(S): W. M. McNeill, Reactive and Component Program Section L. D. Bustard, NRC Consultant (Sandia National Laboratories)		
APPROVED BY: <u>H. S. Phillips</u> H. S. Phillips, Chief, EQS		<u>2/18/83</u> Date
INSPECTION BASES AND SCOPE: A. <u>BASES</u> : 10 CFR Part 50, Appendix B and 10 CFR Part 21. B. <u>SCOPE</u> : The purpose of the inspection was: (1) to review the Limatorque Nuclear Qualification Facility Quality Assurance Manual (QAM) and supplemental procedures, and (2) to verify the implementation of the QA program. All of the 10 CFR Part 50, Appendix B criteria were inspected except control of special processes.		
PLANT SITE APPLICABILITY: Not identified.		

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A. VIOLATIONS:

Contrary to the requirements of Section 21.31 of 10 CFR Part 21, Limitorque failed to assure that purchase orders issued to Isomedix (No. 065294 for irradiation services) and Acton Environmental Testing (No. 065408 for seismic testing) specified that the provisions of 10 CFR Part 21 were applicable.

B. NONCONFORMANCES:

1. Contrary to Criterion II of Appendix B to 10 CFR Part 50, the established quality assurance program as defined by the Nuclear Qualification Facility QAM did not comply with Appendix B to 10 CFR Part 50 in regard to providing necessary controls over applicable activities as evidenced by the following examples:
 - a. The QA program did not address the indoctrination and training of personnel performing test activities in accordance with Criteria II and XVIII. No procedures have been written to provide for training of test personnel nor qualification of auditors.
 - b. The QA program did not establish measures, in accordance with Criterion IV, to assure that design bases such as seismic test conditions were included or referenced in documents for procurement. It was noted that purchase order No. 065408 for seismic testing did not identify the applicable frequencies, durations, axes, etc., that were included in the test plan.
 - c. The QA program did not establish measures, in accordance with Criterion IV, to assure that purchase orders are reviewed and approved for adequacy prior to release. Purchase orders for seismic and irradiation testing had not been reviewed and approved for adequacy.
 - d. The QA program did not establish measures, in accordance with Criterion VII, to include provisions for the furnishing of objective evidence of quality for testing services and for evaluation of the adequacy of calibration services. The purchase order issued for seismic testing did not require furnishing of test reports by the vendor. Calibration services were provided by a vendor who was listed in the approved vendor list; however, no criteria had been established (e.g., source survey, historical evaluation, or other) with respect to the basis for inclusion in this list.

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- e. The QA program did not establish measures, in accordance with Criterion VIII, for the identification and control of parts and components to assure that identification is maintained by part number, serial number, or other identifiers. It was additionally noted that one motor installed on test actuator Serial No. 342835 did not have a unique identification number.
 - f. The QA program did not require, in accordance with Criterion XVI, that the cause be determined if significant conditions adverse to quality were identified and that corrective action be taken to preclude repetition.
2. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section 3.1.2 of IEEE 382 PWR Qualification Test Plan, Project 681063, Revision 3, Limitorque purchase order No. 063274, dated June 29, 1982, issued to the subcontractor for irradiation services did not describe the test plan requirements or the applicability of Section 5.5.6 of IEEE Std 382 requirements in regard to air equivalent dose.
 3. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section 5.1.7 of IEEE 382 PWR Qualification Test Plan, Project 681063, Revision 3, Limitorque did not maintain an auditable file to include summary sheets, raw data, and pertinent data accumulated during the thermal aging of a replacement limit switch to valve actuator No. 342836 which was undergoing testing on June 25, 1982.
 4. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section II, paragraph C.3 of the QAM, purchase orders for irradiation services (No. 063274) and seismic testing (No. 065408) did not invoke applicable 10 CFR Part 50, Appendix B criteria.
 5. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section VII, paragraphs B.2 and C.3 of the QAM, required memoranda had not been written in regard to the several deviations/anomalies which were noted in the test logs for actuator Serial No. 342835. Recorded examples of deviations/anomalies included broken gear teeth, motor failures, as received motor shaft damage, thermal aging oven failure, and duplication of thermal aging cycles. Review of test logs for actuator Serial No. 342836 also identified deviations/anomalies for which memoranda were not issued.

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C. UNRESOLVED ITEMS:

None

D. STATUS OF PREVIOUS INSPECTION FINDINGS:

1. (Closed) Open Item (82-01): Limitorque reviewed the evaluation documented in Reliance Electric Corporation report of September 7, 1982, regarding LOCA/HELB qualification test failure of a Limitorque valve actuator assembly on August 23, 1982, and on a retest on September 14, 1982.

The NRC inspector reviewed a report issued by Limitorque during this inspection. Memorandum to C. M. Cox from J. B. Drab, dated October 1, 1982, entitled "Disposition of Anomaly - Class LR Motors" concluded the following: Limitorque concluded that the integrity of the epoxy/resin system was impaired during the thermal/radiation aging. Arcing occurred during exposure to moist environment. Limitorque will require the motor manufacturer to modify the coil head structure to assure that the insulation integrity is retained.

2. (Closed) Open Item (82-01): The Limitorque evaluation of a limit switch malfunction during a LOCA/HELB environmental qualification test on August 23, 1982, indicated a momentary false indication that the actuator had reached the full open position. The switch malfunction was caused by the loose bolting of the drive cartridge. The Limitorque disposition of this anomaly was that this occurrence was an isolated random failure.

The NRC inspector reviewed a report issued by Limitorque during this inspection. Memorandum to C. M. Cox from J. B. Drab, dated October 20, 1982, entitled "Disposition of Anomaly - Analysis, Limit Switch Anomaly (Random Occurrence) #681063" concluded the following: Two fasteners in the limit switch cartridge were loose permitting the cartridge to shift causing improper gear mesh. It was concluded by Limitorque that the cartridge became loose during handling and/or shipment that occurred between the aging test steps and/or during the accelerated plant vibration testing (in excess of 100 hz). The Limitorque evaluation further concluded that either the excessive handling/shipping (by others) or extreme simulated mechanical wear prestressing testing requirements, or both, created this random problem.

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3. (Closed) Open Item (82-01): The Limitorque QAM was examined by the NRC inspector; however, an indepth review was to be accomplished during a future NRC inspection.

The QAM review was performed during this inspection.

E. OTHER FINDINGS OR COMMENTS:

1. QA Manual Review: The Limitorque Corporation Nuclear Qualification Facility QAM, issued February 28, 1982, Revision 1, did not fully establish the quality assurance program for environmental qualification testing of safety-related electrical equipment at the Lynchburg, Virginia, facility (refer to paragraph B.1 of this report for nonconformances). The QAM addressed 17 applicable criterion, out of a total of 18 (Criterion IX, "Control of Special Processes," was not applicable), to meet the requirements of 10 CFR Part 50, Appendix B. The NRC inspection team reviewed the entire QAM, including the Nuclear Qualification Facility Internal Audit Procedure (dated February 26, 1982); IEEE 382 PWR Qualification Test Plan, Project No. 681063 (Revision 4); and Qualification Test Procedure, IEEE 382-80 Test Parameters, Project No. 681063 (Revision 4).
2. QA Program Implementation Review: The NRC inspection team performed an inspection of the Limitorque QA program implementation of 17 out of 18 applicable criteria of 10 CFR Part 50, Appendix B. During the inspection, 62 documents (listed in Appendix D to this report) were examined by the NRC inspection team.
 - a. The NRC inspectors evaluated the QA program implementation and determined the following:
 - (1) Organization: Organizational structures were reviewed, including functional responsibilities and authorities. Lines of communication with authority and organizational freedom of the QA administrator and special projects engineer existed. Both reported directly to the executive vice president.
 - (2) QA Program: The established quality assurance program did not provide the necessary controls over applicable activities (see B.1.a above). Indoctrination and training of test personnel were given by the chief test engineer. Auditor training had not begun.

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- (3) Design Control: Documented test results as documented were being evaluated by the responsible design organization (Limitorque Corporation, Manufacturing Facility Engineering) to assure that test requirements and design interfaces for Limitorque's prospective customers have been met.
- (4) Procurement Document Control: The QAM failed to address how technical and regulatory requirements are included in purchase orders (see A and B.1.b above). It was also noted that these purchase orders were not subject to a QA review and approval (see B.1.c above).

The two recent purchase orders and requisitions for irradiation services (RD-521/063274) and seismic services (RD-547/065408) were reviewed. Appendix B was identified as a requirement that should have been invoked in purchase orders issued to these subsuppliers of test services; however, the purchase orders reviewed did not invoke Appendix B (see B.4 above).

Limitorque does have on file a memo from the irradiation test subsupplier certifying its implementation of Appendix B. A similar certification was being requested from the seismic subsupplier for test services. To date, there have been no changes to these previously referenced purchase orders.

- (5) Instructions, Procedures, and Drawings: The measures established in the QAM identified that the test plan and test procedures are the documents to control activities in equipment qualification. The test plan and test procedure for a current qualification effort project 681063 were reviewed. Although the QAM did not require plans and procedures to have the prerequisites for a given test, the instrumentation to be used, provisions for data acquisition, acceptance limits, and other test information were addressed in the Limitorque test plans and procedures.

The QAM did establish that the Vice President of Engineering and the Special Projects Engineer were to review and approve test plans and procedures. The implementation of the test plan and procedures was inspected by a review of the test documentation. It was observed that test documentation had a number of areas where "white out" had been used and

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authorization for changes to documentation became unclear. It was also observed that limits and parameters were often stated as absolute values (e.g., 300 hours) rather than tolerances (300 ± 3 hours, 300 hours max). Test documentation identified the insulation of the test actuator on the bill of material to a different type than that used.

- (6) Document Control: Plans, procedures, and changes were found to be reviewed and approved by the Vice President of Engineering and the Special Project Engineer as required by the QAM. The control of current documents was verified by review of the test logs because no testing was in progress.

- (7) Control of Purchased Material, Equipment, and Services: The major procurement is for irradiation and seismic services. Materials, namely grease, and other services, namely calibration, used for equipment qualification testing are obtained from the Limitorque manufacturing facility as are the test actuators.

Limitorque controls the suppliers by performing inspections at the suppliers. Test plans require the supplier of test services to issue a report of their test activities and a certification of compliance to the purchase order requirements. The required inspection by Limitorque and required documentation were not identified in purchase orders. The QAM requires the use of approved vendors and an Approved Vendors List. This list was the basis for supplier selection. The QAM did not address the method of source evaluation used to generate the Approved Vendors List (see B.1.d above).

- (8) Identification and Control of Materials, Parts, and Components: The QAM did not address identification of parts and components to be used in testing (see B.1.e above). The test plan and procedure did identify a particular bill of materials to be used. Traceability was not established for certain items such as motors, limit switches, and gears. A number of motors, switches, and gears were used and replaced during the testing. It was observed that because of the lack of unique identification and sparse documentation, it could not always be established which motor, switch, or gear was in use or replaced at a particular time.

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- (9) Control of Special Processes: Limitorque does not perform welding, heat treating, or nondestructive examination on prototype test actuator assemblies. This criteria is not applicable.
- (10) Inspection: The QAM defined the role of QC/QA as a review of the final test report and to perform internal auditing. The daily or otherwise surveillance of test activities was not a QC/QA function, but was to be performed by the special projects engineer. There was limited documentation of this activity by the special projects engineer.
- (11) Test Control: Test results were adequately documented and evaluated to assure that test requirements had been satisfied. Data sheets, raw data, and data logging printouts were controlled and reduced to meaningful results and retained in the QA record file for preparation of final test reports. Written test plans and procedures governed the test activity; however, Limitorque purchase order No. 063274 issued to a subcontractor did not describe the test plan requirements or the applicability of Section 5.5.6 of IEEE 382 requirements in regard to air equivalent dose (see B.2 above).
- (12) Control of Measuring and Test Equipment: The QAM did address calibration controls. Calibration was performed by an outside laboratory. Internal controls, including calibration tags, schedules, and NBS traceability were found to be implemented. The records of seven instruments used during testing were reviewed. On one occasion, it was documented that a load cell was overdue for calibration but was used on a "risk" basis. The subsequent calibration found that no adjustments were necessary. The QAM does not address what is to be done when subsequent calibration identifies instrumentation that is out of tolerance and requires adjustment; e.g., review of measurements made with the instrumentation in question since the last acceptable calibration.
- (13) Handling, Storage, and Shipping: Limitorque's handling and storage of test items complied with their written procedures addressed in the QAM. The responsibility of shipment to suppliers for test services was handled by the Limitorque Manufacturing Facility Shipping Department supervisor in accordance with the Limitorque Manufacturing QAM (not audited by the NRC inspection team during this inspection).

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- (14) Inspection, Test, and Operating Status: The test status for each test item (valve actuator assembly) was appropriately identified by traveler, invoice, approved bill of material, and associated manufacturing QC documentation. A memorandum, initiated by the Nuclear Qualification Facility, was ordered to a proper bill of material from the Limitorque manufacturing facility. The test unit was then fabricated and assembled by the Limitorque manufacturing facility to the requirements of the Limitorque Manufacturing QAM (not audited by the NRC inspection team during this inspection).
- (15) Nonconforming Materials, Parts, or Components: The QAM establishes that nonconformances are to be identified as deviations or anomalies. There was no distinction between deviations and anomalies. The QAM also establishes that when deviations or anomalies are identified, a memorandum of understanding is written on the disposition of the problem. The QAM was not clear as to what was to be done when a departure from the test process occurred or when test equipment failed or parts and components were found outside of specification/drawing requirements.
- No provisions for tagging and segregation of nonconforming parts were implemented.
- A number of test deviations/anomalies were found to be not documented (see B.5 above).
- (16) Corrective Action: Corrective action is defined in the QAM only in terms of internal audit findings. Corrective action is not addressed in the QAM regarding test failures, malfunctions, and anomalies (see B.1.f above).
- No corrective action reports, in terms of internal audit findings, were maintained in the QA record file.
- (17) Quality Assurance Records: Limitorque did not maintain documented test results nor auditable records, involving the thermal aging of limit switches which had been used as replacement items for a broken switch on an actuator assembly undergoing testing. Discussions with Mr. C. Cox, Assistant Chief Test Engineer, confirmed that the thermal aging data file was not maintained (see B.3 above).

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- (18) Audits: An internal audit procedure was established and was issued in February 1982 as part of the OAM. It stated that auditing will be done annually. The most recent equipment qualification activity began in February 1982 and continued until September 1982. No testing activity has been performed since, and there are no firm plans to resume testing in January 1983 when the annual internal audit is scheduled. No annual internal audit has been performed to date.

ORGANIZATION: METAL BELLOWS CORPORATION
CHATSWORTH, CALIFORNIA

REPORT NO.:	99900394/83-01	INSPECTION DATE(S)	1/10-13/83	INSPECTION ON-SITE HOURS:	26
CORRESPONDENCE ADDRESS: Metal Bellows Corporation ATTN: Mr. J. C. Shafer Quality Assurance Manager 20977 Knapp Street Chatsworth, CA 91311					
ORGANIZATIONAL CONTACT: Mr. J. C. Shafer, Quality Assurance Manager TELEPHONE NUMBER: (213) 341-4900					
PRINCIPAL PRODUCT: Flexible metal hose assemblies, pulsation dampeners, pressure vessels, expansion joints, and penetrations.					
NUCLEAR INDUSTRY ACTIVITY: Approximately 20 percent.					
ASSIGNED INSPECTOR: <u>I. Barnes</u> for R. E. Oller, Reactive & Component Program Section (R&CPS)				<u>2-7-83</u> Date	
OTHER INSPECTOR(S):					
APPROVED BY: <u>I. Barnes</u> I. Barnes, Chief, R&CPS				<u>2-7-83</u> Date	
INSPECTION BASES AND SCOPE:					
A. <u>BASES</u> : 10 CFR Part 50, Appendix B.					
B. <u>SCOPE</u> : This inspection included QA program implementation in the areas of manufacturing process control, internal audits, welding control, and qualification of NDE personnel and procedures.					
PLANT SITE APPLICABILITY:					
Not identified.					

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A. <u>VIOLATIONS:</u> None		
B. <u>NONCONFORMANCES:</u> None		
C. <u>UNRESOLVED ITEMS:</u> None		
D. <u>OTHER FINDINGS OR COMMENTS:</u>		
1. <u>Manufacturing Process Control:</u> The NRC inspector reviewed the sections of the Metal Bellows Corporation (MBC) ASME accepted QA manual which were applicable to manufacturing in order to verify that these activities are controlled by the QA program. Observations were made of inprocess work on metal hose parts consisting of machining, bellows forming, assembly, and dimensional inspection. The NRC inspector also reviewed the following documents: (a) 1 traveler package consisting of manufacturing operation sheets (MOS) travelers, drawings, and procedures for inprocess work; (b) 11 types of records in a data package for completed Nine Mile Point, Unit 2 hose assemblies; (c) the Stone & Webster (S&W) procurement specification for the above Nine Mile Point, Unit 2 purchase; (d) 5 shop routing MOS travelers for parts manufacture; and (e) 5 MBC procedures. This review was made in order to verify that ASME Section III, Classes 2 and 3 metal hose assemblies are manufactured, inspected, and tested, and the results documented in accordance with QA program requirements. Within this area, no nonconformances were identified.		
2. <u>Internal Audits:</u> The NRC inspector reviewed Section 12.0, "Internal Audit," of the MBC QA manual to verify that this activity is controlled by the QA program. The NRC inspector also reviewed audit Procedure No. QSP-005 and internal audit records for the period of November 1981 through November 1982. These records consisted of a log, 22 checklists, and 9 corrective action request reports. In addition, training and certification records for two auditors were reviewed.		

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<p>Within this area, no nonconformances were identified, but one followup item was identified. This matter concerned Procedure No. QSP-005 which had not been revised to reflect the internal audit frequency of 12 months as required by Section 12.0 of the QA manual revised on November 1, 1982. The revised Procedure No. QSP-005 showing a 12-month audit frequency is in draft form, but has not been released for implementation. This item will be reviewed during a subsequent inspection.</p> <p>3. <u>Welding Control</u>: The NRC inspector reviewed Section 5.0, "Welding," of the MBC QA manual to verify that this activity was controlled by the QA program.</p> <p>Observations were made of weld rod storage, the calibration status of welding machine meters, and inprocess ASME Code production tacking and fillet welding operations on metal hose assemblies.</p> <p>The NRC inspector also reviewed the following documents: (a) two shop routing MOS travelers; (b) a welder production history log; (c) performance qualification records for six welders; (d) a general type welding procedure and three welding procedure specifications and the supporting procedure qualification records; and (e) weld material issue cards for four different types of weld rod.</p> <p>Within this area, no nonconformances were identified.</p> <p>4. <u>Qualification of NDE Personnel and Procedures</u>: The NRC inspector reviewed Section 6.0, "Nondestructive Examination (NDE)," of the MBC QA manual in order to verify that this activity was controlled by the QA program.</p> <p>The NRC inspector also reviewed records of SNT-TC-1A qualification and certification for three Level III NDE examiners and four Level II NDE technicians, and four NDE procedures pertaining to radiography, penetrant examination, visual examination, and helium leak testing.</p> <p>Within this area, no nonconformances were identified.</p>		

ORGANIZATION: MIDLAND-ROSS CORPORATION
SUPERSTRUT DIVISION
OAKLAND, CALIFORNIA

REPORT NO.:	99900364/82-01	INSPECTION DATE(S)	12/6-8/82	INSPECTION ON-SITE HOURS:	18
CORRESPONDENCE ADDRESS: Midland-Ross Corporation Superstrut Division ATTN: Mr. A. M. Kridle, QA/QC Coordinator 845 Embarcadero Oakland, CA 94604					
ORGANIZATIONAL CONTACT: Mr. A. M. Kridle, QA/QC Coordinator TELEPHONE NUMBER: (415) 839-9690					
PRINCIPAL PRODUCT: Channel struts, supports, and fittings.					
NUCLEAR INDUSTRY ACTIVITY: No work is currently being performed for the nuclear industry at the Superstrut Division Oakland facility.					
ASSIGNED INSPECTOR:		<u>I. Barnes</u> for L. E. Ellershaw, Reactive and Component Program Section (R&CPS)		<u>1-7-83</u> Date	
OTHER INSPECTOR(S):					
APPROVED BY:		<u>I. Barnes</u> I. Barnes, Chief, R&CPS		<u>1-7-83</u> Date	
INSPECTION BASES AND SCOPE:					
A. <u>BASES</u> : 10 CFR Part 50, Appendix B.					
B. <u>SCOPE</u> : This inspection was conducted as a result of allegations received by the NRC Region V office pertaining to: (1) the use of materials which do not comply with the applicable American Society for Testing and Materials (ASTM) standards, (2) the use of unqualified welders and welding procedure (Cont. on next page)					
PLANT SITE APPLICABILITY:					
50-275, 50-323, 50-528, 50-529, 50-530, 50-460, 50-513, and 50-443.					

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SCOPE: (Cont.) specifications (WPSs), and (3) not performing destructive and nondestructive testing of welds.

A. VIOLATIONS:

Contrary to Section 21.6 of 10 CFR Part 21, Midland-Ross Corporation, Superstrut Division, had not posted: (1) a copy of 10 CFR Part 21, (2) Section 206 of the Energy Reorganization Act of 1974, (3) procedures adopted pursuant to the regulations, or (4) a notice describing the regulations and procedures.

B. NONCONFORMANCES:

None

C. UNRESOLVED ITEMS:

None

D. OTHER FINDINGS OR COMMENTS:

This inspection was conducted as a result of the receipt of the allegations identified in the Scope, above. The allegations were potentially generic in nature; thus, the identities of nuclear power plants to which Superstrut has supplied components were obtained and are as follows: Diablo Canyon Nuclear Power Plant, Units 1 and 2; Palo Verde Nuclear Generating Station, Units 1, 2, and 3; and WPPSS Nuclear Project Nos. 1 and 4. It was further identified that a very small quantity of items was supplied to Public Service Company of New Hampshire's Seabrook Nuclear Station, Unit 1.

1. Allegation - Use of materials which are not in compliance with the requirements of the applicable ASTM standards.

Prior to 1980, Superstrut did not maintain any type of material traceability. During 1980 and after, mill test reports (MTRs) were filed and maintained; however, they cannot be matched with specific end products.

The NRC inspector reviewed 15 MTRs for material used in fabricating struts and fittings. The MTRs were in accordance with Superstrut's purchase order requirements; i.e., they stated the appropriate ASTM designation and included physical and chemical property test results. The test results were in accordance with the applicable ASTM standards.

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Findings - It could not be demonstrated that material traceability requirements were imposed on Superstrut. The only requirement was for Superstrut to provide a certificate of conformance with each shipment. The MTRs were found to be in accordance with the purchase order requirements; thus, this allegation could not be substantiated.

2. Allegation - Use of unqualified welders and WPSs.

a. Superstrut had structural welder certifications for three welders which indicated that they were qualified for the gas metal arc welding (GMAW) process.

(1) Welder No. 1 - The certification showed that he was qualified by radiography to perform fillet and groove GMAW on April 16, 1979. This welder left Superstrut's employment in January 1982.

(2) Welder No. 2 - The certification showed that he was qualified in accordance with American Welding Society (AWS) Code D1.1-79, to perform fillet and groove GMAW on May 25, 1979. The certification further showed that he was qualified by mechanical tests; i.e., satisfactory guided bend tests. An anomaly was identified in that the certification showed two side bend tests were performed whereas AWS D1.1-79 requires one face and one root bend test for 3/8" joint thickness. This welder left Superstrut's employment on November 19, 1982.

(3) Welder No. 3 - The certification showed he was qualified in accordance with AWS D1.1-82 to perform fillet and groove GMAW on July 21, 1982. An anomaly was identified in that the certification showed that 1500 amps was used during the qualification welding. This apparently is a typographical error in that a correct value would be 150 amps. This welder is currently employed at Superstrut.

b. The NRC inspector reviewed a GMAW WPS which was identified as WPS No. WP1, Revision 0, dated November 16, 1982. Superstrut was unable to provide evidence that earlier GMAW WPSs existed.

WPS No. WP1 was identified as a prequalified joint welding procedure which would exempt it from qualification testing; thus, there was no procedure qualification record. However, a review of the procedure revealed it to be short circuiting transfer GMAW. Paragraph 2.6.1.2 of AWS D1.1 states, in part,

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"The joint welding procedure for all joints welded by short circuiting transfer gas metal arc welding shall be qualified by tests. . . ."

As of the date of this inspection, Superstrut did not have a qualified GMAW WPS.

- c. Resistance WPS No. QCP-4, "Spot Welding of Low Carbon Coated And Uncoated Sheet Steel," was reviewed. This WPS was issued as Revision 0, dated January 9, 1980, and is currently Revision 1, dated May 8, 1981. AWS D1.1 does not address resistance welding; thus, there are no qualification testing requirements. The equipment setting parameters contained in the WPS are a function of the resistance welding equipment.

There apparently was no formal resistance WPS prior to 1980.

- d. Findings - There were no available records to indicate that welders were qualified prior to April 1979. The allegation would, therefore, appear to be valid with respect to past use of unqualified welders. However, review of available documentation showed no requirement for Superstrut to formally qualify welding personnel. Inspection of existing WPSs showed that: (1) the GMAW process had not been qualified in accordance with AWS D1.1, and (2) no requirement exists for qualification of the resistance welding process. The inspection findings thus substantiate the allegation of use of unqualified welding procedures. However, no requirement for the use of qualified welding procedures was identified.

3. Allegation - Failure to perform required destructive and nondestructive testing.

- a. Destructive Testing - WPS No. QCP-4 addresses destructive pull tests which are to be performed on test specimens taken from the first piece each day. The test results must meet or exceed 2350 lbs. force per weld. It also requires that test specimens be pull tested whenever the welding tips are changed. Superstrut placed an additional pull test requirement on their catalog number A1262 strut, in that it undergoes a destructive pull test every 500 feet, regardless of weld tip condition.

ORGANIZATION: MIDLAND-ROSS CORPORATION
SUPERSTRUT DIVISION
OAKLAND, CALIFORNIA

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While not addressed in the WPS, destructive shear testing is performed on a sample basis.

Performance of destructive testing was verified by review of approximately 30 spot welding process records. These records are the vehicle used to document destructive testing.

- b. Nondestructive Examination (NDE) - Prior to 1980, visual examination was the only mode of NDE performed. As a result of identified resistance weld failures (August 1979) in strut material supplied to WPPSS Nos. 1 and 4, the site electrical contractor imposed an ultrasonic examination (UT) requirement on Superstrut. The requirement is addressed in WPS No. QCP-4 which references UT procedure No. 42-UT-049. The UT procedure, original issue dated May 6, 1980, through Revision 2, dated December 11, 1980, is a Nuclear Energy Services, Inc. Conam Inspection Division procedure. All UT is performed by Conam personnel at Superstrut's facility. The procedure requires the first 4 welds on each end of the 1st length, 13th length, and last length of each lot of 25 struts to be examined. The UT results are documented either on the spot welding progress record or on a certificate of inspection attached to this record. The shop order/contract number is referenced on the record. This was verified by review of approximately 15 different records.

The UT requirement was originally developed for the WPPSS Nos. 1 and 4 job. Subsequently, Superstrut invoked this requirement on all strut material in about October 1980.

- c. Findings - A very limited number of quality assurance type records was available for manufacturing prior to 1980, and these records cannot be related to a given lot, shipment, or customer. Verification of destructive testing, therefore, could not be performed. UT was not a requirement at that time and currently is the only NDE discipline performed, and then, only on resistance welds in strut material.
4. Review of QA Program and Customer Quality Requirements
- The NRC inspector reviewed Superstrut's QA Manual in terms of compliance with the 18 criteria of Appendix B to 10 CFR Part 50. Revision 2 of the QA Manual dated November 16, 1982, was originally issued in February 1979, and basically addresses inspection system requirements.

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The QA Manual does address some of the 18 criteria, but only in terms of indicating that implementing procedures shall be established and maintained. A review of the implementing procedures showed that they were primarily related to special processes; i.e., rolling, plating, GMAW and resistance welding, and UT. Further, paragraph 4.1 of the QA Manual specification states, "This specification will apply to the procurement of supplies and services specified by the military procurement agencies or nuclear facilities. Standard catalog items are not covered under this specification." Virtually all items fabricated by Superstrut, and destined for nuclear facilities, are standard catalog items. A review of customer purchase orders to Superstrut and a customer equipment specification revealed that 10 CFR Part 50, Appendix B criteria had not been imposed.

A review was made of Bechtel Power Corporation purchase order No. 10407-13-EM-076 and Equipment Specification No. 13-E-037A. These documents pertained to the procurement of items for Arizona Public Service Company's Palo Verde Nuclear Generating Station, Units 1, 2, and 3. The specification states, in part, ". . . The material in this specification will be used for both Class 1E and Non-Class 1E systems. Class 1E systems as indicated in the IEEE standards are those essential to the safe shutdown of a nuclear power generating station." The purchase order states "Quality Class R." Appendix 4D to the specification states, "Quality Class R designates any material, structure, service, or component which, as a result of being defective, could cause a safety hazard to station personnel, or unscheduled reduction or loss of unit output."

The Palo Verde contract is the only contract for which Superstrut received an equipment specification. The purchase order was placed by Bechtel to Superstrut, Inc., through Graybar Electric Company, a distributor for Superstrut. In the case of Diablo Canyon, the typical procurement cycle was as follows: H. P. Foley (site electrical contractor) placed purchase orders with Amfac Electric Supply Company and Electric Supply of Vallejo, who then placed the orders with Lectrowest (Superstrut's agent), who in turn, telephoned the orders in to Superstrut. In many cases, the only documentation available was Superstrut's internally generated order acknowledgements.

Regarding WPPSS Nos. 1 and 4, from 1977 to 1981, Foley-Wismer & Becker (site electrical contractor) placed orders with Amfac Electric Supply Company, who ordered from Superstrut. During 1981 and later, Foley-Wismer & Becker procured directly from Superstrut.

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SUPERSTRUT DIVISION
OAKLAND, CALIFORNIA

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In all cases, the only documentation ever required from Superstrut was a Certificate of Conformance.

The purchase orders pertaining to Diablo Canyon and WPPSS Nos. 1 and 4 did not contain quality requirements, as the items purchased were catalog items.

The only available, documented, customer audits of Superstrut were performed by H. P. Foley-Wismer & Becker (WPPSS No. 1 and 4). The first audit was performed on February 3-5, 1981, and related to UT of spot welds. The second audit was performed on February 3-5, 1982, to assess Superstrut's corrective action on an observation identified during the first audit.

ORGANIZATION: NPS INDUSTRIES, INCORPORATED
PORTLAND, OREGON

REPORT NO.:	99900736/82-01	INSPECTION DATE(S)	11/15-19/82	INSPECTION ON-SITE HOURS:	32
CORRESPONDENCE ADDRESS: NPS Industries, Incorporated ATTN: Mr. J. D. Takeuchi Corporate Manager of Quality Assurance 2750 S. W. Moody Portland, OR 97201					
ORGANIZATIONAL CONTACT: Mr. R. C. Rosentreter, Manager of Quality Assurance TELEPHONE NUMBER: (503) 226-1300					
PRINCIPAL PRODUCT: Component supports.					
NUCLEAR INDUSTRY ACTIVITY: Approximately 15-20 percent of the total work is devoted to the commercial nuclear industry.					
ASSIGNED INSPECTOR: <u>I. Barnes</u> for J. T. Conway, Reactive & Component Program Section (R&CPS)				<u>1-17-83</u> Date	
OTHER INSPECTOR(S):					
APPROVED BY: <u>I. Barnes</u> I. Barnes, Chief, R&CPS				<u>1-17-83</u> Date	
INSPECTION BASES AND SCOPE:					
A. <u>BASES</u> : 10 CFR Part 50, Appendix B and 10 CFR Part 21.					
B. <u>SCOPE</u> : This inspection was made as a result of a potential 10 CFR Part 50.55(e) notification reported by Texas Utilities Generating Company (TUGCO) relating to weld defects in a pipe restraint support structure furnished to the Comanche Peak Steam Electric Station, Unit 1. (Cont. on next page)					
PLANT SITE APPLICABILITY:					
Docket No. 50-445.					

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SCOPE: (Cont.) In addition, the following programmatic areas were inspected: training/qualifications, control of special processes, manufacturing process control, inspection, nondestructive examination, calibration of measuring and test equipment, QA records, and reporting of defects.

A. VIOLATIONS:

None

B. NONCONFORMANCES:

1. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section 4.8 of Work Procedure No. 4.1.1B, "Material Release and Release Document Control (Welded Products)," a review of QA records relating to the shipment of items to TUGCO for the pipe whip restraint support structure identified that the Gibbs & Hill Quality Assurance Release Form for shipment No. 4 was missing.
2. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section 4.3 of Work Procedure No. 9.2.2, a review of qualification test records for welders revealed that the "F No." was not specified on the performance qualification records of four welders (identified by Nos. 78, 51, 87, and 81).
3. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section 9.3 of the Corporate Quality Assurance Manual, a review of weld data sheets (WDS) relating to weldments on the pipe whip restraint support structure indicated that one inspector (No. 47) performing magnetic particle examination did not sign a WDS on five occasions and another inspector (No. 2) performing ultrasonic examination did not sign a WDS on one occasion.
4. Contrary to Criterion V of Appendix B to 10 CFR Part 50, paragraph 12.0.4a of Section 12.0 of the Corporate Quality Assurance Manual, and Sections 3.1 and 3.2.2 of Work Procedure No. 12.0.1, an examination of the weld material storage area revealed that one dial stem thermometer (NPSI 223) on a holding oven had neither a tag with an identifying number nor a color coded marker to indicate the due date for the next calibration, and a second dial stem thermometer (NPSI 257) was missing the color coded marking.
5. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section 4.2 of AWS D1.1-80, a review of weld data sheets for the pipe whip restraint support structure revealed that two weldments (Weld Nos. W-10 and W-22 on the D-140-1-A East assembly) joining 7/8" angle to 1" plate did not specify any preheat or interpass temperatures.

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C. UNRESOLVED ITEMS:

None

D. OTHER FINDINGS OR COMMENTS:

1. Pipe Whip Restraint Support Structure - To date, NPS Industries has not taken any corrective action regarding the suspected defective welds on the subject structure, as NPS Industries has not been formally notified by TUGCO of the problem. An engineering evaluation of the problem is currently being performed by TUGCO, and a report is forthcoming. Following the issuance of TUGCO's final report, the corrective action taken by NPS Industries will be evaluated during the next NRC inspection.

2. QA Program - A detailed review of documentation (e.g., QA Manual, procedures, qualification records, procurement documents, weld data sheets, calibration records, drawings, NDE reports, and certifications) led to the identification of nonconformances B.1 through B.5 and the following observation:

NPSI Dwg. No. D-113, "Welding Drawing," which detailed the overall welding requirements and the NDE requirements for the welds made on the pipe whip restraint support structure was not reviewed and approved by the QA department.

ORGANIZATION: NATIONAL TECHNICAL SYSTEMS
TESTING DIVISION
SAUGUS, CALIFORNIA

REPORT NO.:	99900907/83-01	INSPECTION DATE(S)	1/10-14/83	INSPECTION ON-SITE HOURS:	68
CORRESPONDENCE ADDRESS:	National Technical Systems Testing Division ATTN: Mr. W. L. Traw, Division Vice-President & Facility Manager 20988 W. Golden Triangle Road Saugus, California 91350				
ORGANIZATIONAL CONTACT:	Mr. B. Ely, Manager, Quality Control				
TELEPHONE NUMBER:	(805) 259-8184				
PRINCIPAL PRODUCT:	Equipment Testing				
NUCLEAR INDUSTRY ACTIVITY:	Approximately 15% of the facility capacity and total man-hours are involved in testing of equipment for the nuclear power industry.				
ASSIGNED INSPECTOR:	<u>G. T. Hubbard</u> G. T. Hubbard, Equipment Qualification Section (EQS)			<u>March 4, 1983</u> Date	
OTHER INSPECTOR(S):	A. L. Smith, EQS J. J. Benson, Consultant, Sandia National Laboratories				
APPROVED BY:	<u>H. S. Phillips</u> H. S. Phillips, Chief, EQS			<u>March 4, 1983</u> Date	
INSPECTION BASES AND SCOPE:	A. <u>BASES</u> : 10 CFR Part 50, Appendix B and 10 CFR Part 21. B. <u>SCOPE</u> : The purpose of this inspection was to perform a Quality Assurance (QA) programmatic inspection which included review of National Technical Systems (NTS) QA Manual and verification of the implementation of the QA manual requirements and procedures. The inspection included review of NTS's compliance with 10 CFR Part 21 requirements.				
PLANT SITE APPLICABILITY:	Not identified				

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A. VIOLATIONS:

Contrary to the requirements of Section 21.6 of 10 CFR Part 21, NTS failed to post the current version of 10 CFR Part 21 on their premises.

B. NONCONFORMANCES:

1. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraphs 4.3.2. and 4.3.3.5 of Quality Procedures Manual (QPM), Revision C, dated July 7, 1982, data sheets on Master Job Order (MJO) No. 548-9247 were not signed by the test operator.
2. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 12.5 of QPM, Revision C, dated July 7, 1982, NTS had no documented objective evidence in the file folders that corrective action had been accomplished relative to audit deficiencies identified during audits conducted at NTS Saugus, California, and NTS Hartwood, Virginia, facilities.
3. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 14.4.2 of QPM, Revision C, dated July 7, 1982, NTS had no documented objective evidence that the required annual review of all Standard Operating Procedures (SOP) had been performed.
4. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Element II of the Appendix to QPM, Revision C, dated July 7, 1982, there was no documented objective evidence that:
 - a. The competency tests for each job classification in specialized areas had been administered.
 - b. Any personnel had been certified to perform in any specialized areas even though employees were working in specialized areas.
5. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Element XI of the Appendix to QPM, Revision, C, dated July 7, 1982, the QA Manager was not initialing or stamping the job travelers as required.
6. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Element XVII of the Appendix to QPM, Revision C, dated July 7, 1982, receiving inspection reports were not available for the actuator and multileaf damper being tested in accordance with Test Procedure No. 548-9247-1.

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7. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Element XVII of the Appendix to QPM, Revision C, dated July 7, 1982, test records of closed projects were being maintained in engineering offices and not in the locked storeroom as required.

C. UNRESOLVED ITEMS:

None

D. OTHER FINDINGS OR COMMENTS:

1. QA Manual Review: The QA Manual is a quality procedures manual consisting of 14 sections and an appendix that establishes the procedures necessary to comply with the requirements of the 18 criteria of 10 CFR Part 50, Appendix B. The NRC inspector's review of the QPM consisted of an examination of all 14 sections and the complete appendix to the manual.

The NRC inspector did not identify any nonconformances during the manual review.

2. QA Program Implementation: The NRC inspector verified the implementation of the QPM procedures by an examination of representative records and files, by conducting interviews with test personnel, and by visual inspections and observations.

Comments concerning the implementation review as related to the 18 criteria of 10 CFR Part 50, Appendix B are as follows:

- a. Organization: Organizational structures were reviewed including functional responsibilities and authorities. The QA Manager reports directly to the Division Vice-President and Facility Manager and has the authority to stop testing or other work when he feels it is necessary.
- b. Quality Assurance Program: The NRC inspector evaluated this criterion by verifying that a QA program was established by the QPM and by verifying the implementation of the 18 criteria of 10 CFR Part 50, Appendix B. Review of QA training records identified one nonconformance (see paragraph B.4) under this criterion.

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- c. Design Control: Even though NTS does not design components or safety-related items, this criterion is applicable to the extent that applicable customers and NRC design requirements are translated into test plans, procedures, and/or programs. The NRC inspector verified that NTS was following their QPM procedures and was translating design requirements into test plans and procedures as specified by customer purchase orders and related technical specifications.
- d. Procurement Document Control: The NRC inspector verified that NTS was complying with their procedures by review of outgoing purchase orders (PO). The review of PO's verified QA involvement in PO review and that appropriate QA and technical requirements are being called out in PO's.
- e. Instructions, Procedures, and Drawings: The NRC inspector verified implementation of this criterion by review of representative test procedures developed in accordance with the procedures of the QPM. Additional verification was achieved by evaluating the implementation of the other criteria described in procedures of the QPM.
- f. Document Control: Review of job travelers, standard operating procedures, and "Change of Procedure" forms showed that NTS was following their QPM procedures describing document control with one exception (see the nonconformance described in paragraph B.3). Documents reviewed showed that they were approved and released by appropriate authorities and the appropriate documents and revisions were being used at the proper locations.
- g. Control of Purchased Material, Equipment, and Services: The NRC inspector verified the implementation of QPM procedures for the control of purchases. This verification was accomplished by an NRC evaluation of vendor audits, completed vendor quality questionnaire forms, the approved vendor list, vendor corrective action requests, and records showing QA review of incoming purchases.
- h. Identification and Control of Materials, Parts, and Components: The NRC inspector evaluated the NTS method of test item identification for material control by observing and inspecting several test items and appropriate documentation including job travelers and

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test data sheets. The use of red "Hold" tags for items that deviated from specification requirements was not observed since no instances of specification deviation occurred during the inspection.

- i. Control of Special Processes: Since no special processes are performed by the Saugus Division personnel, this criterion is not applicable.
- j. Inspection: The NRC inspector verified that NTS was following their QPM inspection procedures with one exception (see the nonconformance described in paragraph B.1). The inspector verified that engineering and QA were involved in test planning, test performance, data recording, and data analysis by reviewing test data, test reports, and observing actual test operations.
- k. Test Control: The NRC inspector evaluated the NTS implementation of their QPM test control procedures which include obtaining customer approval of test plans and reports and the use of a job traveler which is subject to engineering and QC approval prior to testing. Review of test plans, test reports, and job travelers verified that NTS was following their QPM procedures with one exception (see the nonconformance described in paragraph B.5).
- l. Control of Measuring and Test Equipment: The NRC inspector evaluated the NTS calibration system by reviewing calibration records, observing test setups, reviewing general data sheets, and verifying calibration of instruments being used in tests. The system was found to comply with the requirements of their QPM and it provided adequate control of instrumentation as well as traceability to the National Bureau of Standards.
- m. Handling, Storage and Shipping: The NRC inspector verified that NTS was following their QPM procedures by examining receiving inspection sheets and observing of items received by them. The items observed were found to be identified and properly stored for future use.
- n. Inspection, Test, and Operating Status: The NRC inspector verified that the use of job travelers was the same method described in the QPM to indicate test item status. The NRC review of the job travelers was accomplished by comparing job travelers with test procedures. The system appeared to be adequate.

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o. Nonconforming Materials, Parts, or Components: NTS uses red "Hold" tags and "Notice of Deviation" (NOD) forms, as described in their QPM, to control nonconforming items. The NRC inspector was able to verify proper and adequate use of a representative NOD during the inspection; however, the actual use of red "Hold" tags was not observed.

p. Corrective Action: The NRC inspector verified the QPM procedures for corrective action were being followed by NTS. This verification was accomplished by examination of the quality control action memo forms folder and vendor calibration folders. Corrective action request forms were found to be adequately completed as required by the QPM.

q. Quality Assurance Records: The NRC inspector's review of open and closed MJO folders determined that NTS was following their QPM procedures in all cases except two (see the nonconformances described in paragraphs B.6 and B.7).

r. Audits: The NRC inspector verified that comprehensive internal audits were being performed by NTS and that management was involved in them. The inspector determined by review of audit reports and checklists that the audits were performed according to the QPM with one exception (see nonconformance described in paragraph B.2).

No nonconformances were identified during the implementation review of the criteria discussed in paragraphs D.2.a, c-e, g, h, and l-p.

3. 10 CFR Part 21 Review: The NRC inspector verified NTS's compliance with the requirements of 10 CFR Part 21 by examining bulletin board postings of 10 CFR Part 21, Section 206 of the Energy Reorganization Act of 1974, and their 10 CFR Part 21 procedures (Element XIX of the Appendix to QPM, Revision C, dated July 7, 1982). The inspector reviewed the NTS 10 CFR Part 21 procedures and verified inclusion of 10 CFR Part 21 in PO's by review of two PO's. One violation was identified, violation discussed in paragraph A).

ORGANIZATION: NATIONAL TECHNICAL SYSTEMS
HARTWOOD, VIRGINIA

REPORT NO.:	99900914/83-01	INSPECTION DATE(S)	1/24-28/83	INSPECTION ON-SITE HOURS:	56
CORRESPONDENCE ADDRESS: National Technical Systems ATTN: Mr. W. Ison, Division Vice President Star Route 748, Box 38, Hartwood, Virginia 22471					
ORGANIZATIONAL CONTACT: Mr. W. Dorgeloh, Quality Assurance Manager TELEPHONE NUMBER: (703) 752-5300					
PRINCIPAL PRODUCT: Testing laboratory					
NUCLEAR INDUSTRY ACTIVITY: Approximately 35% of the National Technical Systems (NTS) total business (dollar value) is a result of testing of equipment for the nuclear power industry.					
ASSIGNED INSPECTOR:		<u>A. L. Smith</u>		<u>3/10/83</u>	
		A. L. Smith, Equipment Qualification Section (EQS)		Date	
OTHER INSPECTOR(S): J. Benson, Sandia National Laboratories					
APPROVED BY:		<u>H. S. Phillips</u>		<u>3/10/83</u>	
		H. S. Phillips, Chief, EQS		Date	
INSPECTION BASES AND SCOPE:					
A. <u>BASES</u> : Appendix B to 10 CFR Part 50.					
B. <u>SCOPE</u> : This inspection consisted of: (1) a review of the 18 criterion of 10 CFR Part 50, Appendix B described in the NTS Quality Control Manual, and (2) verification that the applicable criteria of the QA program had been implemented in compliance with the approved NTS manual.					
PLANT SITE APPLICABILITY:					
Not identified.					

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A. VIOLATIONS:

None

B. NONCONFORMANCES:

1. Contrary to the requirements of Criterion V of Appendix B to 10 CFR Part 50 and Section 8.3 of the NTS Quality Control Manual (QCM), review of critical purchase orders had not been indicated by means of an inspection stamp impression.
2. Contrary to the requirements of Criterion V of Appendix B to 10 CFR Part 50 and Section 12 of the NTS QCM, the audit report for the April 1982 corporate quality internal audit did not request a response date for corrective action and there was no documented evidence to indicate that the required followup had been performed.
3. Contrary to the requirements of Criterion V of Appendix B to 10 CFR Part 50 and Section 12.1.1 of the NTS QCM, there was no documented evidence that indicated that the Quality Control Department had performed interim internal audits as required.

C. UNRESOLVED ITEMS:

During the review and verification of implementation of Criterion 18 of Appendix B to 10 CFR Part 50, the inspector determined that NTS had committed that audit personnel would be qualified as required by Supplement 2S-3 of ANSI/ASME NQA-1. Paragraph 3.3 of Supplement 2S-3 requires a lead auditor to have participated in a minimum of five quality assurance audits within a period of time not to exceed 3 years prior to the date of qualification. The inspector reviewed the auditor qualification record for the lead auditor who conducted the April 1982 corporate quality internal audit and the record indicated that the auditor had participated in only two quality assurance audits prior to certification. This individual is assigned to the NTS facility at Saugus, California, and his personnel records are located there. During this inspection, the inspector was unable to obtain the necessary information from the NTS corporate office to determine if the auditor met the audit experience requirements. This item will be resolved during a subsequent inspection.

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D. OTHER FINDINGS OR COMMENTS:

1. Quality Assurance/Control Manual: The NRC inspection team performed an in-depth review/evaluation of the NTS QCM to assure that the NTS written Quality Assurance/Control procedures are consistent with NRC regulatory requirements. The basic NTS QCM consisting of 12 sections is written to comply with Department of Defense quality assurance requirements. The basic manual is supplemented with an appendix titled "Supplementary Quality Control Procedures for Nuclear Power Industry Contracts." The appendix is organized in 19 sections, 18 sections corresponding to the 18 individual criterion contained in Appendix B to 10 CFR Part 50, plus one section which addresses 10 CFR Part 21 requirements.

The NRC inspection team did not identify any nonconformances during the review of the QCM.

2. Quality Assurance Program Implementation: The NRC inspection team verified the implementation of the NTS QCM by examining representative documents and records, personnel training and certification records, interviewing test personnel, and by visual observations and inspections.

Comments concerning the implementation review, keyed to each individual criterion of Appendix B to 10 CFR Part 50, are as follows:

- a. Organization: The NTS organization structure was reviewed as well as the organizational authorities and responsibilities. The current quality assurance staffing pattern was compared to the organization chart contained in the QCM. It was determined that the Quality Control (QC) manager reports directly to the Division Vice President who is also the facility manager. The QC manager does have the authority to stop work or testing when he deems it to be necessary.
- b. Quality Assurance Program: The inspection team evaluated this criterion by verifying the implementation of the other 17 criteria of Appendix B to 10 CFR Part 50. Training and indoctrination records for 4 individuals were reviewed to establish that the training program had been implemented per program commitments.

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- c. Design Control: The NRC determined that NTS does not design components or safety-related equipment; however, they do design test fixtures and translate applicable design requirements to test plans/procedures. One test procedure was examined to determine that design requirements were translated in accordance with NTS written procedures.
- d. Procurement Document Control: The NRC inspector reviewed nine outgoing purchase orders (related to nuclear equipment) to verify that NTS was processing procurement documents in accordance with their written procedures. One nonconformance (see paragraph B.1) was identified.
- e. Instructions, Procedures, Drawings: The NRC inspector verified implementation of the NTS written procedures, as they relate to this criterion, by reviewing one test plan and three changes to the plan.
- f. Document Control: The NRC inspector reviewed test plans, job orders, and related changes to verify proper review, approval, and issuance. Three work areas were visited to verify that current documents were being used.
- g. Control of Purchased Material Equipment and Services: The NRC inspector verified the implementation of the NTS QCM procedures for this criterion by an evaluation of representative vendor audit records, the approved vendors list, and applicable certificates of conformance.
- h. Identification and Control of Materials, Parts, and Components: The NRC inspector verified implementation of the NTS written procedures relating to this criterion by selecting two specimens from the seismic test laboratory and establishing the identification and traceability of the specimens.
- i. Control of Special Processes: The NTS does not perform any special processes, hence, this criterion is not applicable.
- j. Inspection: The NRC inspector verified that NTS was complying with their written program which contained objective evidence of work functions performed and by verifying that the quality function was being performed by individuals other than those who perform actual equipment testing.

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- k. Test Control: NTS is an independent testing laboratory and does not specify test requirements or acceptance criteria; however, they do prepare test plans/procedures which describe how it intends to conduct a test program. The NRC inspector reviewed one NTS generated test plan/procedure to verify that applicable standards were included. The complete test folder (records) for one test program was reviewed to verify that required test prerequisites such as instrumentation adequacy, current equipment calibration, test personnel qualification, compliance with specified environmental conditions, and review and approval by the appropriate authority were met.
- l. Control of Measuring and Test Equipment: The NRC inspector verified NTS compliance with written procedures as they related to the control of measuring and test equipment. This was accomplished by: (1) selecting a sample of test equipment and verifying current calibration and that calibration had been accomplished in accordance with prescribed procedures, (2) review of records of a sample of secondary and primary standards to assure traceability, (3) review of a representative sample of calibration records for test equipment, and (4) review of three evaluations performed by NTS as a result of the use of equipment for testing that was subsequently found to be out of tolerance.
- m. Handling, Storage, and Shipping: The NRC inspector verified that NTS was following their QCM procedure by examination of two receiving inspection reports and observing that these items were adequately identified and stored.
- n. Inspection, Test, and Operating Status: NTS currently uses a job traveler to indicate the status of test specimens and an attached data sheet to identify nonconforming items. The NRC inspector verified that NTS was following its written commitments in this area by performing actual visual observation in the test and storage areas.
- o. Nonconforming Materials, Parts, or Components: The NRC inspector verified NTS compliance to its QCM commitments by reviewing the general log sheets for two projects and evaluating the associated Notice of Deviations that had been generated. It was also determined that the nonconformances documented were not reportable under 10 CFR Part 21.

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- p. Corrective Action: The NRC inspector verified that NTS was following its QCM procedures for corrective action. This was accomplished by reviewing the "Request for Corrective Action" files and verifying that the stated corrective action had been performed.
- q. Quality Assurance Records: The NRC inspector verified that NTS was complying with the procedures contained in the QCM by performing a review of a sample of closed test projects. It was determined that the records were legible, identifiable, retrievable, and stored per the QCM procedures.
- r. Audits: The NRC inspector examined two audit reports and lead auditor qualification records for three employees to verify compliance to procedures contained in the QCM. Two nonconformances (see paragraphs B.2 and B.3), and one unresolved item (see paragraph C) were identified.

ORGANIZATION: NUCLEAR VALVE DIVISION
BORG WARNER CORPORATION
VAN NUYS, CALIFORNIA

REPORT NO. : 99900289/82-03	INSPECTION DATE(S) 11/15-18/82	INSPECTION ON-SITE HOURS: 28
CORRESPONDENCE ADDRESS: Nuclear Valve Division Borg Warner Corporation ATTN: Mr. R. R. Testwuide, Vice Pres. & Gen. Mgr. 7500 Tyrone Avenue Van Nuys, CA 91409		
ORGANIZATIONAL CONTACT: Mr. P. L. Milinazzo, Manager, Quality Assurance TELEPHONE NUMBER: (213) 781-4000		
PRINCIPAL PRODUCT: Nuclear valves and hydraulic valve operators.		
NUCLEAR INDUSTRY ACTIVITY: Commercial nuclear production totals 40% of company production.		
ASSIGNED INSPECTOR: <u>J. W. Sutton</u> W. Sutton, Reactive & Component Program Section (R&CPS)		<u>1-4-83</u> Date
OTHER INSPECTOR(S):		
APPROVED BY: <u>I. Barnes</u> I. Barnes, Chief, R&CPS		<u>1-12-83</u> Date
INSPECTION BASES AND SCOPE:		
A. <u>BASES</u> : 10 CFR Part 50, Appendix B and 10 CFR Part 21.		
B. <u>SCOPE</u> : Status of previous inspection findings, followup inspection on previous 10 CFR Part 21 reports, calibration, procurement control, and audits.		
PLANT SITE APPLICABILITY:		
Not Identified		

ORGANIZATION: NUCLEAR VALVE DIVISION
BORG WARNER CORPORATION
VAN NUYS, CALIFORNIA

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<p>A. <u>VIOLATIONS:</u></p> <p>None</p> <p>B. <u>NONCONFORMANCES:</u></p> <ol style="list-style-type: none">1. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 3.6.1 in Section 3 of the Nuclear Products Quality Assurance Manual, source control drawings for six 4-inch gate valves were completed and sent to Procurement and Quality Control without being checked by either the Design Engineering Manager or an engineer who was not the original product designer.2. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 4.3.3 in Section 4 of the Nuclear Products Quality Assurance Manual, purchase orders for calibration services were placed with three vendors who were not listed on the Nuclear Products Approved Vendor List. <p>C. <u>UNRESOLVED ITEMS:</u></p> <p>None</p> <p>D. <u>STATUS OF PREVIOUS INSPECTION FINDINGS:</u></p> <ol style="list-style-type: none">1. (Closed) Nonconformance (Report No. 82-01): Failure to incorporate design change requirements on new drawings. The NRC inspector verified by review of documents that the corrective actions taken by the Nuclear Valve Division (NVD) were completed in accordance with their corrective action response letter to the NRC dated September 16, 1982. NVD has generated letters concerning torque values for bolted bonnet type valves, and sent them to all their customers. NVD conducted a review of similar type drawings for a repetition of the error reported. This error was not found in any other drawing. Meetings were held and documented with all concerned NVD personnel. As a result of this review, the NRC inspector determined that NVD had implemented their committed actions.2. (Resolved) Unresolved Item (Report No. 82-01): Engineering Department was performing review of new ASME Code addenda only on a verbal basis and incorporation of torque changes into design criteria could not be verified during the inspection.		

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The NRC inspector reviewed this item to determine if changes to ASME Code torque requirements were being recorded. A revision to the final inspection checkoff sheet has been made which requires all torque values to be checked after the hydrostatic test has been completed. In addition, a review of ASME Code addenda changes is being documented by the Engineering Department and returned to the QA Department for concurrence. The NRC inspector determined that the actions taken by NVD will prevent a recurrence of this type of problem.

E. OTHER FINDINGS OR COMMENTS:

1. Followup Inspection on 10 CFR Part 21 Reports - The NRC inspector reviewed the final disposition documentation concerning the bushing retrofit problem which was reported in NRC Inspection Report No. 99900289/81-01. The affected valves have been either returned to NVD for repair, or repairs have been completed in the field. The valve guide internal binding problem which was documented in NRC Inspection Report Nos. 99900289/81-02 and 99900289/82-01 was reviewed for current status of corrective action. The NRC inspector was informed that corrective actions will be completed by December 31, 1982. NVD engineers are currently reviewing the completed documentation and repairs.
2. Calibration - The NRC inspector reviewed NVD's QA Manual, Section 12.0, Revision N, entitled "Control of Measuring and Test Equipment." In addition, Nuclear Practice Bulletin No. 7-1, Revision Q, entitled "Measurement and Test Equipment Control Procedures," was reviewed for content. Thirty final acceptance gages, meters, welding equipment, and measurement tools (including calibration standards) were examined for compliance to QA program requirements. The NRC inspector also reviewed the calibration recall and control program. Included in the review were the card system, gage checkout cards, log books for inspection, and control of defective gages and tools. During the NRC inspector's review of calibration standards, it was noted that three of the vendors used for calibrating standards had not been surveyed as required by NVD's QA Manual and procedures (see nonconformance in B.2 above).
3. Procurement Control - The NRC inspector reviewed for content NVD's QA Manual Section 3.0, Revision N, entitled "Design Control," and Section 4.0, Revision N, entitled "Procurement Document Control." The NRC inspector also reviewed valve lists, source control drawings, general engineering specifications, purchase orders, valve drawings and engineering change orders for three customers. During the NRC inspector's review of customer valve lists and source control drawings, it was noted

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BORG WARNER CORPORATION
VAN NUYS, CALIFORNIA

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that the engineer performing a review of design criteria for purchase documents for one of the customers had not obtained a separate review and approval from the Design Engineering Manager and an independent engineer. As a result, purchase orders were generated which did not invoke the original design criteria for a valve component. This has been identified as a nonconformance (see nonconformance in B.1 above).

4. Audits - The NRC inspector reviewed NVD's QA Manual Section 18.0, Revision N, and Nuclear Practice Bulletin No. 12.1, Revision J. Seventeen internal audit reports and the results of annual management audits for 1980 and 1981 were examined. The audit schedule for 1981-1982 was reviewed and found to have been completed in accordance with procedure requirements. Corrective actions taken and followup activities were also reviewed, with corrective actions identified as having been accomplished in a timely manner. Audit personnel records and qualifications were examined and found to be in compliance with the requirements of Nuclear Practice Bulletin No. 12.2. As a result of this review of documentation, the NRC inspector determined that NVD's audit program is being performed in accordance with QA program requirements.

ORGANIZATION: PACIFIC SCIENTIFIC COMPANY
KIN-TECH DIVISION
ANAHEIM, CALIFORNIA

REPORT NO. : 99900255/82-02	INSPECTION DATE(S) 12/13-15/82	INSPECTION ON-SITE HOURS: 17
CORRESPONDENCE ADDRESS: Pacific Scientific Company Kin-Tech Division ATTN: Mr. P. A. Hadnagy, Director, Technical Operations 1346 S. State College Blvd. Anaheim, CA 92803		
ORGANIZATIONAL CONTACT: Mr. P. A. Hadnagy, Director, Technical Operations TELEPHONE NUMBER: (714) 774-5217		
PRINCIPAL PRODUCT: Mechanical Shock Arrestors NUCLEAR INDUSTRY ACTIVITY: Approximately 65%.		
ASSIGNED INSPECTOR: <u>J. Barnes</u> for R. E. Oller, Reactive & Component Program Section (R&CPS)		<u>1-26-83</u> Date
OTHER INSPECTOR(S):		
APPROVED BY: <u>J. Barnes</u> I. Barnes, Chief, R&CPS		<u>1-26-83</u> Date
INSPECTION BASES AND SCOPE: 1. <u>BASES</u> : 10 CFR Part 50, Appendix B. 2. <u>SCOPE</u> : This inspection was performed to evaluate QA program implementation in the areas of manufacturing process control and heat treatment. In addition, the inspection included follow up of a report by Pacific Scientific Company (PSCO) that mechanical shock arrestors had been damaged by a customer's testing service and then approved for installation at a nuclear power generating facility.		
PLANT SITE APPLICABILITY: Damaged shock arrestors: Beaver Valley, Unit 2; 50-412		

ORGANIZATION: PACIFIC SCIENTIFIC COMPANY
KIN-TECH DIVISION
ANAHEIM, CALIFORNIA

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A. VIOLATIONS:
None

B. NONCONFORMANCES:
None

C. UNRESOLVED ITEMS:
PSCO performs "Factory Repair" service on damaged snubbers for utilities and other owners of PSCO mechanical shock arrestors. Written procedures are followed, the results are documented, and the snubbers are recertified to the original ASME Code NF-1 Data Report conditions. However, there was no written QA program to control this activity and it is not part of the scope of PSCO's ASME QA program manual. This item is considered unresolved pending review of customer procurement requirements for arrestor repair.

D. OTHER FINDINGS OR COMMENTS:

1. Manufacturing Process Control: The NRC inspector reviewed five sections of the PSCO ASME QA manual which were applicable to this activity.

Observations were made of inprocess assembly, final inspection, and functional testing of several models of mechanical shock arrestors.

To verify compliance with QA program commitments, a review was made of:
(a) the ASME Certificate of Authorization for use of the "NPT" symbol,
(b) final inspection checklists, (c) traceability tabulations,
(d) certificates of conformance, (e) inprocess assembly outline travelers, (f) documentation packages for two orders of shipped snubbers, (g) a PSCO engineering test procedure, and (h) the PSCO standard operating procedure for visual and mechanical inspection of snubbers.

Within this area, no nonconformances or unresolved items were identified.

2. Heat Treatment: The NRC inspector reviewed Section 15 of the QA manual which was applicable to subcontracted heat treatment of materials and parts.

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To verify that heat treatment was being performed in accordance with QA program commitments, a review was made of: (a) PSCO procedures, (b) a military standard, (c) a subcontractor's heat treatment procedure, and (d) two sets of records for the heat treatment of two separate PSCO Material Code Number items.

Within this area, no nonconformances or unresolved items were identified.

3. PSCO Potential 10 CFR Part 21 Report:

a. Introduction

This inspection was made to follow up on a PSCO report dated September 13, 1982, to the NRC concerning damaged mechanical shock arrestors (snubbers) being installed in a nuclear power generating facility.

The report indicated that seven snubbers were tested by others than PSCO and deemed to be "good units." These snubbers were retested by PSCO which resulted in six of the units failing the functional test. Upon disassembly and examination it was ascertained that internal parts were damaged in the six failing units. The damaged snubbers were stated in the PSCO report to have been approved for use by the testing service and to have been installed in a nuclear power generating plant.

b. Findings

During this inspection, the NRC inspector independently verified the following information by review of documents.

The incident involved 11 Model PSA-1 (1500 psi max. design) snubbers manufactured in 1980 by PSCO to ASME Code Section III, 1974 Edition, Winter 1974 Addendum and Code Cases 1644-5 and 1686. These snubbers were sold to Power Piping Company (PPCO), Pittsburgh, Pennsylvania, and installed in Beaver Valley, Unit 2.

In June 1982, representatives of PPCO, Stone and Webster, and Duquesne Light returned four snubbers to PSCO after test failures at Wyle Laboratories. These snubbers were disassembled, examined, and

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found to have damaged internal parts. A metallurgical examination by Mettek Engineering Laboratory identified that the internal damaged parts appeared to have failed due to overload and that the material of which the damaged parts were made was in accordance with the original specifications.

PSCO then requested that the balance of seven snubbers tested at Wyle be returned to PSCO for examination. After return of the snubbers by Schnieder Power Company (representing PPCO), PSCO subjected them to functional tests which resulted in six of the seven units failing the test. Disassembly and examination of the snubbers verified that the six which failed the functional test contained damaged internal parts. The single unit to pass the functional test was established to be undamaged. A review of Wyle test records by PSCO indicated this snubber had not been tested at Wyle. All seven of the snubbers were reassembled without replacement of damaged parts and returned to site as directed by Schnieder Power Company.

The initial four damaged snubbers that were brought to PSCO were still at the PSCO facility as of this inspection. No disposition of these units had been made by PPCO.

To verify the accuracy of the above information, the NRC inspector observed the four snubbers at PSCO and reviewed the following documents: 4 PSCO letters to Stone and Webster; the original specification; PSCO's final inspection/test records for the original purchased 11 subject snubbers; PSCO's Repair Log; PSCO's shipper record No. ANR-9312-01; PSCO's Form 132 record; "Estimate/Repair Order" No. ANR 5-5610-9312 for the 7 returned snubbers, and Form 132 records for each of the 7 returned units, and Form 132 records for the 4 damaged snubbers left at PSCO by PPCO. No documented information was available which would confirm the PSCO report of the 7 snubbers having been installed at Beaver Valley, Unit 2, subsequent to testing at Wyle.

Concurrent with the review of the above PSCO reported problem, a brief review was made of PSCO's "Factory Repair" service provided to utilities and other owners of PSCO snubbers.

Review established that various models of PSCO snubbers are returned to PSCO for repairs. After disassembly and examination, any damaged parts are replaced with new parts. The snubbers are then final inspected,

ORGANIZATION: PACIFIC SCIENTIFIC COMPANY
KIN-TECH DIVISION
ANAHEIM, CALIFORNIA

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functional tested, and returned to the owners with new Certificates of Conformance (C of Cs), Material Test Reports for all new parts, and other documentation as required by the customer. The C of Cs verify the repaired units as being in conformance with the conditions of the original ASME Code NF-1 Data Reports.

The NRC inspector reviewed: PSCO Procedure No. PS-193 pertaining to repair of Model Nos. PSA-1, PSA-3, and PSA-10 snubbers; repair procedure SOP No. 08.116; and the repair log and documentation packages applicable to the repair of snubbers for the V. C. Summer and the LaSalle station facilities.

Within this area of inspection, the NRC inspector established that a documented QA program had not been implemented for the control of this activity. However, the repairs were being performed in accordance with written procedures and the results were being documented. The PSCO ASME QA manual does not include the repair service in its scope. This item is considered unresolved pending review of applicable utility procurement requirements for the repair service. Discussions with PSCO QA management indicated that a documented QA program will be developed and implemented to control the snubber "Factory Repair" service.

ORGANIZATION: PRESRAY CORPORATION
PAWLING, NEW YORK

REPORT NO.:	99900789/82-01	INSPECTION DATE(S)	10/19-20/82	INSPECTION ON-SITE HOURS:	12
CORRESPONDENCE ADDRESS: Presray Corporation ATTN: Mr. T. C. Hollander, Jr. Executive Vice President 159 Charles Colman Rd. Pawling, NY 12564					
ORGANIZATIONAL CONTACT: Mr. W. Gambino, QA Manager TELEPHONE NUMBER: (914) 855-1220					
PRINCIPAL PRODUCT: Personnel Airlock Door Seals					
NUCLEAR INDUSTRY ACTIVITY: Approximately 35%					
ASSIGNED INSPECTOR: <u>R. E. Oller</u>				<u>11-24-82</u>	
R. E. Oller, Reactive & Component Program Section (R&CPS)				Date	
OTHER INSPECTOR(S):					
APPROVED BY: <u>I. Barnes</u>				<u>11-30-82</u>	
for I. Barnes, Chief, R&CPS				Date	
INSPECTION BASES AND SCOPE:					
A. <u>BASES</u> : 10 CFR Part 50, Appendix B and 10 CFR Part 21.					
B. <u>SCOPE</u> : This inspection was made as a result of the issue of a 10 CFR Part 21 report by Presray concerning defective airlock door seals which had been furnished to W. J. Woolley Company for use at Midland, McGuire, Grand Gulf, and River Bend stations. In addition, the areas of manufacturing process control and 10 CFR Part 21 posting were inspected.					
PLANT SITE APPLICABILITY: Midland, Units 1 and 2, 50-329/330; McGuire, Units 1 and 2, 50-369/370; Grand Gulf, Units 1 and 2, 50-416/417; and River Bend, Unit 1, 50-458.					

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A. <u>VIOLATIONS:</u> None		
B. <u>NONCONFORMANCES:</u> None		
C. <u>UNRESOLVED ITEMS:</u> None		
D. <u>OTHER FINDINGS OR COMMENTS:</u> 1. <u>Defective Airlock Door Seals:</u> <p>This inspection was performed as followup to the 10 CFR Part 21 report submitted by Presray to the Nuclear Regulatory Commission (NRC) on June 29 and November 10, 1981, and April 14, 1982.</p> <p>The event which prompted Presray to report was the failure of a Presray inflatable door seal in a W. J. Woolley personnel airlock at the McGuire station. Presray identified the cause of the failure to be cracking in the sharp radii of the wall of the inner tube. The cracking is believed to have occurred during seal fabrication as a result of the formation of folds in the small radii of the uncured inner tube as it was collapsed from a round to the required oval cross section.</p> <p>Presray has redesigned the seal and revised the manufacturing process to eliminate the cause of the cracking. The changes included extruding the inner tube in an oval cross section shape, and curing it prior to encasing it. The outer envelope of the seal was also redesigned to provide more flexibility for sealing at a lower service pressure differential. The newly designed seal was successfully tested at 90 psi in a simulated airlock fixture. Additional tests and inspections were added in the manufacturing process. These requirements were also incorporated in Presray's Commodity Specifications for each size of the newly designed seals. The new seals were then successfully cyclic tested by the W. J. Woolley Company to 100,000 cycles at 90 psi to ensure the seal integrity for the intended service conditions. In addition, Woolley was instructed to select one seal from every 20 produced, and then dissect and examine it for defects.</p>		

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Presray has reviewed with the W. J. Woolley Company a list of all plants which have received the suspect type seals. Only those plants having seals less than 5 years old were investigated, in that all plants having Woolley airlocks have been advised that seals older than 5 years are no longer serviceable. Presray and Woolley determined that affected sites are: Midland, Units 1 and 2; McGuire, Units 1 and 2; Grand Gulf, Units 1 and 2; and River Bend, Unit 1. Woolley has notified the architect-engineers for these stations of the potential safety problem. Presray will furnish the approved newly designed seals as replacements to all the above sites.

2. Manufacturing Process Control:

The NRC inspector reviewed the sections of the Presray QA Manual which were applicable to manufacturing process control.

Observations were made of facilities and of inprocess manufacturing activities applicable to fabrication of the new design of seals.

A review was made of the following documents, in order to verify compliance with QA program commitments with respect to manufacturing, inspection, test, and documentation activities: (a) document packages for completed seals, P/N 4320-6-4321-1&2, and for inprocess seals, P/N 4320-6-4322-1&2; (b) Woolley Purchase Order No. 842-135-355 for the McGuire seals; (c) Presray's Commodity Specification No. PR-4320-6-4321-5 for the new design of seals of 5 7/8" base width; and (d) Presray's receiving inspection documents for rubber materials from Pawling Rubber Corporation.

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

3. 10 CFR Part 21:

The NRC inspector reviewed Presray Procedure No. PS-166, "Reporting Defects and Noncompliance In Accordance with Title 10 CFR Part 21," in order to verify that adequate documented measures are available with respect to the evaluation and reporting requirements of 10 CFR Part 21.

Observations were made of posting compliance with 10 CFR Part 21 requirements.

Within this area, no violations of 10 CFR Part 21 requirements were identified.

ORGANIZATION: PULLMAN POWER PRODUCTS CORPORATION
WILLIAMSPORT, PENNSYLVANIA

REPORT NO.:	99900021/82-01	INSPECTION DATE(S)	11/16-18/82	INSPECTION ON-SITE HOURS:	48
CORRESPONDENCE ADDRESS: Pullman Power Products Corporation ATTN: Mr. R. E. Howard, Vice President and General Manager P. O. Box 3308, Reach Road Williamsport, PA 17701					
ORGANIZATIONAL CONTACT: Mr. T. Daniels, Director, Quality Assurance TELEPHONE NUMBER: (717) 323-9991					
PRINCIPAL PRODUCT: Nuclear piping assemblies					
NUCLEAR INDUSTRY ACTIVITY: Approximately 50% of current production is devoted to the commercial nuclear industry.					
ASSIGNED INSPECTOR: <u>D. E. Norman</u> <u>1-6-83</u> D. E. Norman, Reactive & Component Program Section (R&CPS) Date					
OTHER INSPECTOR(S): I. Barnes, Chief, R&CPS					
APPROVED BY: <u>I. Barnes</u> <u>1-6-83</u> I. Barnes, Chief, R&CPS Date					
INSPECTION BASES AND SCOPE:					
A. <u>BASES</u> : 10 CFR Part 50, Appendix B.					
B. <u>SCOPE</u> : This inspection was made as a result of: (1) the issuance of a 10 CFR Part 21 report by WFI Nuclear Products, Inc., pertaining to the furnishing of potentially incorrect material to Pullman Power Products Corporation (PPP); and (2) the identification of (a) zero axial gap in socket welded control rod drive piping at Perry, Units 1 and 2, and (cont. on next page)					
PLANT SITE APPLICABILITY: Absence of gap in socket welded piping, 50-440/441; unacceptable weld surfaces and defects, 50-424/425; and furnishing of potentially incorrect material by WFI Nuclear Products, Inc., 50-424/425.					

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SCOPE: (cont.) (b) unacceptable weld surfaces and defects in piping furnished to Vogtle, Units 1 and 2. Additional areas included in the inspection were joint fitup and production welding; manufacturing process control; status of previous inspection findings; customer audits; and instructions, procedures, and drawings.

A. VIOLATIONS:

None

B. NONCONFORMANCES:

1. Contrary to Criterion V of Appendix B to 10 CFR Part 50, the PPP corrective action response letter of June 7, 1978, and paragraph NC-4231.2 in Section III of the ASME Code, remnant temporary attachment welds were observed on the Job No. 8087, F-Sheet 10070 assembly (Alvin W. Vogtle, Unit 1, Nuclear Service Cooling Water System, Class 2) for which:
 - a. Welder, welding procedure, and welding material identities had not been documented on the assembly Weld History Report,
 - b. The area around the temporary attachment welds had not been marked, and
 - c. The assembly process sheet made no provisions for required performance of nondestructive examination after removal of the temporary attachment welds.
2. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and subparagraph 14.2.4 in Section XIV of the QA Manual, process sheet instructions for bending operations were not being used by bending area personnel as evidenced by:
 - a. Sequence 3 of the process sheet for the Job No. 8087, F-Sheet 11988 assembly required cold bending to be performed and had been signed off by the bending operator to denote completion. Examination of the 3-inch, Schedule 40, ASME Section III, Code Class 3 assembly showed, however, that hot bending operations had been performed on the austenitic stainless steel material, and

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<p>b. Sequence 3 of the process sheet for the Job No. 8087, F-Sheet 13120 assembly required hot bending to be performed and had been signed off as complete by the bending operator. Examination of the 3-inch, Schedule 160, ASME Section III, Code Class 2 assembly showed, however, that cold bending operations had been performed on the austenitic stainless steel material.</p> <p>3. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 9.17 in Bechtel Specification No. X4AQ01, Revision 9, "Technical Provisions for Shop Fabrication of Nuclear Service Piping for the Georgia Power Company Alvin W. Vogtle Nuclear Plant," circumferential welds were being made in containment spray assemblies (e.g., Job No. 8087, F-Sheet 8454) without the prior concurrence of the purchaser and prior to performance of pipe bending.</p> <p>4. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraphs 7.10 and 10.6.5 in PPP Vogtle Project Procedure IX-3-75, PPP piping assemblies were accepted and furnished to the Alvin W. Vogtle Nuclear Plant which were subsequently identified by PPP site personnel as having unsuitable weld surfaces (coarse ripples and roughness) for proper liquid penetrant interpretation, excessive undercut, and linear penetrant indications.</p> <p>5. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and the requirements of the applicable welding procedure specifications:</p> <p>a. Welding operations were observed being performed on Weld A in Job No. 8087, F-Sheet 12626 with gas tungsten arc argon torch and backing gas purge flow rates below the required 20 CFH minimum, and</p> <p>b. Consumable insert welding operations were observed being performed on Weld A in Job No. 8087, F-Sheet 12609 with an applied amperage of 180 and arc voltage of 18, and not the required 65-100 amperes and 11-15 arc voltage.</p> <p>6. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and subparagraph 5.2.1.A in Section V of the QA Manual, customer requirements in regard to buckles in pipe bends were not indicated either directly on shop drawings or by reference to other documents; i.e., subparagraph 9.1.7.D in Section 9 of Bechtel Specification No. X4AQ01 requires buckles to be limited to three percent in accordance with Pipe Fabrication Institute (PFI) Standard ES-24.</p>		

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7. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and subparagraph 5.5.1 in Section V of the QA Manual, PFI Standard ES-3, which was referenced by the Vogtle Project Procedure Manual as the applicable document for dimensional tolerance requirements, was neither distributed to the inspector performing these measurements nor available at the inspection stations.

C. UNRESOLVED ITEMS:

None

D. STATUS OF PREVIOUS INSPECTION FINDINGS (D. E. Norman):

1. (Closed) Nonconformance (81-01) - Certain design data pertaining to ASME Code requirements was either deficient or nonexistent, and work proceeded with subsequent shipment of completed parts. It was later determined that the parts had not been tested for notch toughness properties.

PPP submitted a formal request to Gilbert Associates requesting a change to specification requirements which were considered to be in error. Gilbert stated that the specification was correct as written in that the anchor plates, although impact tested in accordance with ASME Section III, Subsection NE (Class MC Components), were provided by PPP in accordance with ASME Section III, Subsection NC (Class 2 Components). PPP personnel responsible for reviewing customer design specifications were formally instructed in performing reviews in order to prevent recurrence of similar nonconformances. Compliance with the stated corrective action is monitored under the internal audit program.

2. (Closed) Nonconformance (81-01) - One welding rod oven contained type 309-16 electrodes in which 1/8" and 5/32" sizes were mixed together, and another oven identified as containing only type 8018 electrodes, contained type 7018 electrodes of the same size (5/32") mixed together with the 8018 electrodes.

The shop procedures for controlling welding material was revised to provide more detailed guidelines, and the tool crib attendants received training in the area of electrode control. Additionally, random unannounced audits were performed on welding control for a 6-month period.

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<p>3. (Closed) Nonconformance (81-01) - Changes to nonessential variables (amperage and voltage) were being made during inprocess shielded metal arc welding without the changes being documented.</p> <p>Training was provided to the welders and welding foremen by Welding Engineering. Also, random daily inspections of welding operations were being performed by a welding inspector.</p> <p>A random sample of current welding audit reports revealed that no noncompliances had been documented by the welding inspector; however, the NRC inspector documented additional findings in this area which are documented in paragraph B of this report.</p> <p>4. (Closed) Nonconformance (81-01) - The actual procedures selected for use during fabrication are not always recorded by procedure number and revision date on the appropriate documents.</p> <p>An updated Project Procedures List is being maintained. This list is presented along with the Document Status Record for control of procedure distribution to the Shop Code Engineer responsible for procedure distribution. The list serves as a guide for updating of process sheets which no longer carry a procedure revision date.</p>		
<p>E. <u>OTHER FINDINGS OR COMMENTS:</u></p>		
<p>1. <u>Zero Gap in Socket Welded Control Rod Drive Piping (I. Barnes)</u> - Perry site quality control inspection identified that a significant number (approximately 50%) of socket welds in the control rod drive piping spools furnished to the Perry site did not have an axial gap between the inserted pipe end and the bottom of the mating fitting. The piping sizes in question included 1" and 1¼" diameters.</p> <p>The NRC inspector reviewed WPS No. 29-III-8-0B-1 which had been utilized for performance of the socket welds and established that the WPS required the use of an approximate fitup gap of 1/16" in accordance with Section III of the ASME Code requirements. The inprocess inspection procedure (X-9, Revision Date, September 1, 1976) was examined, and a review made of the fabrication records for four assemblies on which the customer and/or the Authorized Nuclear Inspector had placed hold points at the fitup operation.</p>		

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Each of the assemblies was ascertained by correspondence review to have been subsequently identified as containing zero axial gap between the inserted pipe and the bottom of the mating fitting after welding.

Samples were stated by PPP personnel to have been prepared which demonstrated close up of the fitup gap can occur on gas tungsten arc socket welding. However, the samples were currently at the Perry site and were, thus, unavailable for NRC inspector examination. Review of the ASME Code by the NRC inspector confirmed the PPP position that there are no present requirements with respect to gap after socket welding. As a result of an analysis performed by Teledyne Engineering Services for PPP, it was determined that the "bottomed-out" condition could result in fatigue failure of the withdrawal piping joints due to the operating/design conditions applicable to the system. Cleveland Electric Illuminating Company had accordingly elected to rework the control rod drive piping to assure that a joint gap existed after welding. Discussions with PPP personnel indicated that the Perry contract was the only socket welded control rod drive piping which had been fabricated at the facility.

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

2. Unacceptable Weld Surfaces and Defects (I. Barnes) - An inspection was performed at the request of Region II of the NRC with respect to the identification by the Vogtle Resident Inspector of piping spools being furnished which contained unacceptable weld surfaces (for required liquid penetrant examination) and weld surface defects.

The NRC inspector reviewed 26 Corrective Action Requests from Georgia Power Company and examined the fabrication and inspection records for the identified spools. A review was made of Section Nos. V, IX, X, XV, and XVI of the QA Manual, and an evaluation performed of the liquid penetrant inspection requirements contained in Vogtle Project Procedure Nos. IX-3-S75 and IX-PT-1-S75. The results of this evaluation indicated that the defined liquid penetrant examination requirements were consistent with the requirements of Sections III and V of the ASME Code.

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<p>A visual examination was performed of welds in inprocess piping, and a review made of available documented corrective actions. With the exception of training documentation pertaining to findings resulting from a Bechtel/utility audit performed in June 1982, no other documentation was made available which would indicate either that PPP had fully assessed the validity of and reasons for the reported deficiencies or had fully implemented measures to preclude recurrence.</p> <p>Within this area of inspection, one nonconformance was identified (see paragraph B.4).</p> <p>3. <u>Manufacturing Process Control (I. Barnes)</u> - A review was made of Section Nos. V, X, and XIV of the QA Manual, and an examination and comparison made of six inprocess assemblies with respect to fabrication record status and applicable Vogtle Project Procedure requirements.</p> <p>Within this area of inspection, three nonconformances were identified (see paragraphs B.1, B.2, and B.3).</p> <p>4. <u>Joint Fitup and Production Welding (I. Barnes)</u> - The NRC inspector reviewed Section No. IX of the QA Manual and witnessed production welding operations on three nuclear piping assemblies with respect to the requirements of the applicable WPS and General Welding Standard. Control of welding materials was reviewed with respect to Shop Procedure No. VIII-3W, February 12, 1982, and the qualifications of the welders checked in regard to the operations witnessed.</p> <p>Within this area of inspection, one nonconformance was identified (see paragraph B.5).</p> <p>5. <u>Furnishing of Potentially Incorrect Material by WFI Nuclear Products, Inc. (D. E. Norman)</u> - Pravel, et al. (attorneys at law) notified the Director of Inspection and Enforcement on September 14, 1981, that WFI Nuclear Products, Inc., had been supplied with bar stock which had been misstamped in terms of material type. Part of the material was utilized in the manufacture of vessel connectors which were sold to certain purchasers for use in nuclear power plant facilities. Specifically, 304L and 316L bar stock which was misstamped was used to fabricate "PIPETS" by WFI Nuclear Products, Inc., and shipped to PPP in Williamsport, Pennsylvania, and other contractors.</p>		

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The NRC inspector reviewed correspondence and documented actions related to the misstamped material at PPP. Pullman was notified by Pravel on September 14, 1981, that materials supplied under Purchase Order No. 8087-397 (ASME Section III, Class II Socket Weld PIPETS may have been fabricated from Type 316L instead of 304L due to misstamping by the material supplier (Carpenter Technology Corporation). A total of nine PIPETS were received from WFI on the purchase order. All were destined for use on Georgia Power's Vogtle Station and were required to be Type 304L material. When notified of the problem, PPP determined that one item had been shipped and the others were still in their plant. A chemical check was performed on the remaining items and one piece (Heat No. 495AN) appeared to be Type 316L. The shipped item was also from the suspect heat. Records showed that both suspect items were rejected and replaced with 304L parts.

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

6. Customer Audits (D. E. Norman) - The NRC inspector reviewed the following Bechtel audit reports and stated corrective action to be taken by PPP:

a. July 16, 1982, nonconformances were written as follows:

- (1) Spool pieces were visually inspected and accepted by Pullman after penetrant testing to which weld flux (slag) was present on the weld bead.
- (2) Pipe spools were accepted and shipped without using accepted visual standards for inspection.

b. September 8, 1982, one nonconformance was written for failure to seal all openings 2" and smaller with polyethylene plugs.

Proposed PPP corrective actions were acceptable to Bechtel and there were no repetitive nonconformances for the September 8, 1982, audit; however, nonconformances written during the NRC inspection (see paragraph B) indicate that problems still exist in the process control and inspection areas.

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7. Instructions, Procedures, and Drawings (D. E. Norman) - A review was made of Section Nos. V and X of the QA Manual and of five traveler packages, referenced project specifications, and standards with respect to inclusion of and compliance with code and customer specification requirements and availability of applicable documents to production and inspection personnel.

Within this area of inspection, two nonconformances were identified (see paragraphs B.6, and B.7).

ORGANIZATION: QUADREX CORPORATION
CAMPBELL, CALIFORNIA

REPORT NO.: 99900512/83-01	INSPECTION DATE(S) 1/10-13/83	INSPECTION ON-SITE HOURS: 27
CORRESPONDENCE ADDRESS: Quadrex Corporation ATTN: Dr. L. P. Bupp Senior Vice President, Corporate Services 1700 Dell Avenue Campbell, CA 95008		
ORGANIZATIONAL CONTACT: Mr. C. D. Roady, Manager, Corporate QA TELEPHONE NUMBER: (405) 370-4377		
PRINCIPAL PRODUCT: Engineering Consultants		
NUCLEAR INDUSTRY ACTIVITY: The Quadrex Corporation has approximately 713 employees of which 5% are assigned to safety-related activities.		
ASSIGNED INSPECTOR: <u>R. H. Brickley</u> R. H. Brickley, Reactor Systems Section (RSS)		<u>3/21/83</u> Date
OTHER INSPECTOR(S):		
APPROVED BY: <u>C. J. Hale</u> C. J. Hale, Chief, RSS		<u>3/21/83</u> Date
INSPECTION BASES AND SCOPE:		
A. <u>BASES</u> : 10 CFR Part 50, Appendix B and 10 CFR Part 21.		
B. <u>SCOPE</u> : Status of previous inspection findings and the following: (1) a request from the NRC Office of Inspection and Enforcement concerning a Control Data Corporation report of an error they identified in the computer program PIPERUP, and (2) a report to NRC Region IV by Rockwell International concerning errors they had identified in the computer program NUPIPE.		
PLANT SITE APPLICABILITY:		
Not Identified		

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A. VIOLATIONS:

None

B. NONCONFORMANCES:

Quadrex Corporation failed to meet their commitment date of May 15, 1982, for the completion of an audit of computer program verification activities as stated in their letter to the NRC Region IV office dated March 19, 1982. The actual completion date was October 6, 1982.

C. UNRESOLVED ITEMS:

None

D. STATUS OF PREVIOUS INSPECTION FINDINGS:

1. (Closed) Nonconformance (82-01): Neither the Quadrex Corporation QA program nor its implementing procedures require that the design process and verification procedure be reviewed and modified as necessary when a significant design change is necessary because of incorrect design as required by Section 9 of ANSI N45.2.11.

The inspector verified the corrective actions and preventive measures committed in the Quadrex Corporation letter dated March 9, 1982; i.e., Quality Assurance Procedures QAP-307, "Design Verification and Independent Design Review," and QAP-308, "Design Document Change Control," were revised and issued on March 31, 1982, for implementation on May 1, 1982.

2. (Closed) Nonconformance (82-01): The records of attendance at QA indoctrination sessions did not provide evidence that two members of procurement and one member of engineering had received QA indoctrination.

The inspector verified the corrective actions and preventive measures committed in the Quadrex Corporation letters dated March 19 and April 29, 1982; i.e., QA and project indoctrination sessions were conducted and QAP-201, "Quality Assurance and Project Indoctrination," was revised and issued on March 31, 1982, for implementation on April 5, 1982.

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3. (Closed) Nonconformance (82-01): Annual audits of QA engineering and computer program verification activities were not conducted during 1981.

The inspector verified the corrective actions and preventive measures committed in the Quadrex Corporation letter dated March 19, 1982; i.e., QAP-1001, "Internal Audits," was revised and issued on March 31, 1982, for implementation on May 1, 1982, and the audit of QA engineering was completed by May 15, 1982. However, the audit of computer program verification activities was not completed until October 6, 1982. Since the March 19, 1982, letter committed to a completion date of May 15, 1982, this is considered a nonconformance (see B. above).

4. (Closed) Nonconformance (82-01): The response to a quality audit finding was not submitted by the required date nor was an extension requested as required by Section 4.1.5 of QAP-1003, "Audit Reporting, Followup and Closeout."

The inspector verified the corrective actions and preventive measures committed in the Quadrex Corporation letters dated March 19 and April 29, 1982; i.e., a request for extension of time was received and QAP-1003 was revised and issued on March 31, 1982, for implementation on April 5, 1982.

5. (Closed) Unresolved Item (82-01): Section 4.4 of QAP-309, "Verification and Control of Digital Computer Programs," needed clarification concerning errors detected in a computer program that may have an effect on analyses that have utilized the uncorrected version of the program.

The procedure was revised to require the cognizant Practice Manager(s) or designee(s) to determine the effect on completed work of any errors detected in engineering computer programs and initiate appropriate corrective action.

6. (Closed) Unresolved Item (82-01): Section 4.4 of QAP-902, "Reporting of Defects and Nonconformances (10 CFR Part 21)," does not require that the responsible officer document his reasons for disapproving the decision to report an item to the NRC nor does it require that this documentation be returned to the original evaluators for reconsideration.

Revision 4 of QAP-904 requires the responsible officer to implement the recommendations of the evaluators.

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7. (Closed) Unresolved Item (82-01): Section 3.0 of QAP-906, "Stop Work Action," needs clarification in that it does not specifically state that the Manager, Quality Assurance Engineering, has the authority to issue a stop work order, nor that the President and Senior Vice President, Corporate Services, have override authority.

QAP-906 has been revised to specify that the Manager, Quality Assurance Engineering, has the authority to initiate stop-work action and that the President and Senior Vice President, Corporate Services, have override authority.

E. OTHER FINDINGS OR COMMENTS:

1. Error in the Computer Program PIPERUP - This item concerns a 10 CFR Part 21 report by Control Data Corporation (CDC) to the Office of Inspection and Enforcement (IE) regarding an error in the computer program PIPERUP that may have been used by CDC customers to perform nonlinear analysis on safety-related piping systems subject to postulated ruptures. The error reported was that arrays were not internally initialized resulting in the possibility of starting program execution with nonzero values in memory which would produce erroneous results. The erroneous results can occur only when multiple analyses are executed in the same job stream without initializing the arrays prior to each analysis.

The initial inspection of this problem at CDC (Report No. 99900532/82-01) disclosed that the situation occurred when an analyst ran multiple problems back-to-back without reinitializing the arrays prior to each problem run. Discussions with cognizant Quadrex management personnel disclosed that the running of multiple problems back-to-back is not a normal practice. Reportedly, attendees at Quadrex conducted training sessions are cautioned about this method of operation. No other cases similar to this have been reported to Quadrex on this program or on NUPIPE. However, Quadrex management committed to include a precautionary statement regarding this matter in the next revision of the User Manual for PIPERUP and NUPIPE. (The same condition could occur in running NUPIPE or any other program.)

Based on the results of this and the previous inspection, the inspector concluded that: (1) this was an isolated case, (2) it occurred as a result of an abnormal operating method, and (3) it did not result from an error in the PIPERUP program, but an error in its use.

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2. Errors in the Computer Program NUPIPE - This item concerns a report by Rockwell International to the NRC Region IV office regarding "errors" they had identified in the computer program NUPIPE. The areas wherein "errors" were identified were: (1) NUPIPE assumes there is no weld mismatch for girth-butt weld joints with wall thicknesses greater than 3/16 inch; (2) for Class 2, Class 3, and B31.1 analyses, NUPIPE uses the room temperature Young's modulus for all flexibility calculations; (3) for Class 2 and Class 3 analysis, the "cold" modulus of elasticity is used in the thermal expansion analysis and no adjustment on thermal expansion stresses is used; (4) for Class 1 analysis, the method for adjusting thermal expansion stresses in the Class 1 piping is incorrect; (5) conventional modeling procedures could result in underprediction of stresses in tee and branch connections; and (6) there are no provisions for specifying dynamic subcycles for response spectrum earthquake loadings.

The inspector examined the records maintained on this item consisting of: (1) correspondence between Quadrex and Rockwell International, (2) the NUPIPE User Manual (two revisions), (3) calculations, and (4) NRC/consultant correspondence regarding benchmark verification of NUPIPE.

The examination of Quadrex records, discussions with cognizant personnel, and review of applicable versions of the ASME Code disclosed: (1) NUPIPE provides input features for cases of weld mismatch via cards TEE, AHAND, BHAND, and CHAND (Ref. User Manual pages 2-22 and 2-23); in addition, the indices/factors used are printed out with each run; (2) the Winter 1975 Code Addenda allows calculations for the expansion stress to be based on the modulus of elasticity at room temperature and does not specify a modulus for seismic analysis; (3) the Winter 1975 Code Addenda allows the use of the "cold" modulus in thermal expansion analysis and does not specify that an adjustment be made to thermal expansion stresses; (4) the Code requires that flexibility calculations be based on the hot modulus which NUPIPE uses and that the expansion stress be multiplied by the cold-to-hot modulus ratio without specifying how it is to be applied (NUPIPE multiplies the moment range by the largest value of the ratio); (5) the user of NUPIPE establishes the modeling procedure and is responsible for implementing Article NB3687.4 of the Code; and (6) NUPIPE superimposes earthquake moment effects to obtain the worst moment range in the highest stress cycles which is included with other worst terms in equation 11 of NB3653.2.

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<p>Based on the above information, the inspector concluded that the identified "errors" resulted from: (1) differing opinions (Rockwell versus Quadrex) on Code interpretation and modeling procedures, and (2) between differences in the Rockwell version of NUPIPE (1.4) and the current version (1.6.1). It should be noted that the majority of the identified "errors" related to user techniques while the remaining dealt with Code calculational methods. A comparison between the current version of NUPIPE (1.6.1) and the 1975 edition and the Summer 1979 Addenda of the Code indicated that the NUPIPE methodology followed Code requirements. Additionally, there was no evidence available at Quadrex to indicate that the Rockwell version of NUPIPE (1.4) had been or was updated to reflect subsequent changes in the ASME Code nor that Quadrex was contractually required to notify Rockwell of subsequent revisions of NUPIPE. The Rockwell version of NUPIPE is based on the 1974 edition of the Code through the Winter 1978 Addenda with the exception that the reducer element Class 1 stress indices reflect the Winter 1975 Addenda. The current version of NUPIPE is based on the Summer 1975 edition or Summer 1979 Addenda.</p>		

ORGANIZATION: RAYCHEM CORPORATION
ENERGY DIVISION
MENLO PARK, CALIFORNIA

REPORT NO.: 99900235/82-01	INSPECTION DATE(S) 11/15-18/82	INSPECTION ON-SITE HOURS: 16
CORRESPONDENCE ADDRESS: Raychem Corporation ATTN: Mr. L. J. Frisco, Director of Corporate Product Review 300 Constitution Drive Menlo Park, CA 94025		
ORGANIZATIONAL CONTACT: Mr. L. J. Frisco TELEPHONE NUMBER: (415) 361-3564		
PRINCIPAL PRODUCT: Electrical cable. NUCLEAR INDUSTRY ACTIVITY: Not identified.		
ASSIGNED INSPECTOR: <u>H. W. Roberds</u> H. W. Roberds, Reactive and Component Program Section (R&CPS)		<u>1/13/83</u> Date
OTHER INSPECTOR(S): I. Villalva, Office of Inspection and Enforcement		
APPROVED BY: <u>I. Barnes</u> I. Barnes, Chief, R&CPS		<u>1/13/83</u> Date
INSPECTION BASES AND SCOPE: A. <u>BASES</u> : 10 CFR Part 50, Appendix B. B. <u>SCOPE</u> : This inspection was made to ascertain whether appropriate records had been maintained by Raychem Corporation which would allow verification of information provided to the NRC Office of Inspection and Enforcement with respect to nuclear plant sites that had received electrical cable containing potentially defective insulation.		
PLANT SITE APPLICABILITY: 50-324/325.		

ORGANIZATION: RAYCHEM CORPORATION
ENERGY DIVISION
MENLO PARK, CALIFORNIA

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A. <u>VIOLATIONS:</u> None		
B. <u>NONCONFORMANCES:</u> None		
C. <u>UNRESOLVED ITEMS:</u> None		
D. <u>OTHER FINDINGS OR COMMENTS:</u> <p>The NRC inspector reviewed Raychem's record retrieval system which consisted of a "Customer Master Clean-Up Deletion Report" and the "Quarterly Renegotiation Report by Customer and by Product." Selected items and customers were checked through the record system during the time period of 1969 to 1977, in order to ascertain whether traceability of cable with respect to type and destination could be established. This review verified that the records would identify all cable with insulation thickness of 120 mils and greater that has been shipped to specific nuclear sites. The inspection also provided reasonable assurance that the Raychem Corporation research and record review has identified those nuclear sites which have received suspect electrical cable with insulation thickness 120 mils or greater.</p>		

ORGANIZATION: RELIANCE ELECTRIC COMPANY
SYSTEMS AND CONTROL DIVISION
STONE MOUNTAIN, GEORGIA

REPORT NO.:	99900761/83-01	INSPECTION DATE(S)	1/24-28/83	INSPECTION ON-SITE HOURS:	30
CORRESPONDENCE ADDRESS:	Reliance Electric Company Systems and Control Division ATTN: Mr. R. Morrow, Manager, Quality Assurance 4900 Lewis Road Stone Mountain, Georgia 30083				
ORGANIZATIONAL CONTACT:	Mr. R. Morrow, Manager, Quality Assurance				
TELEPHONE NUMBER:	(404) 938-4888				
PRINCIPAL PRODUCT:	Control board panels				
NUCLEAR INDUSTRY ACTIVITY:	Approximately 15%				
ASSIGNED INSPECTOR:	<u>R. E. Oller</u> R. E. Oller, Reactive and Component Program Section (R&CPS)			<u>2-17-83</u> Date	
OTHER INSPECTOR(S):					
APPROVED BY:	<u>I. Barnes</u> I. Barnes, Chief, R&CPS			<u>2/17/83</u> Date	
INSPECTION BASES AND SCOPE:	A. <u>BASES</u> : 10 CFR Part 50, Appendix B. B. <u>SCOPE</u> : This inspection included status of previous inspection findings and QA program evaluation with respect to manufacturing process control, equipment calibration, and internal audits.				
PLANT SITE APPLICABILITY:	Not identified.				

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A. VIOLATIONS:

None

B. NONCONFORMANCES:

1. Contrary to the corrective action commitment in the Reliance Electric Company (RECO) August 16, 1982, letter that welders had received additional training, review of records indicated the training of welders was not performed until November 30, 1982.
2. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 7.3.1 in Procedure No. QCP-7 of the RECO QA Manual, Issue 3, two suppliers who furnished calibration services had not been evaluated as required.

C. UNRESOLVED ITEMS:

None

D. STATUS OF PREVIOUS INSPECTION FINDINGS:

1. (Closed) Violation (82-01): Failure to post the documents required by paragraph 21.6 of 10 CFR Part 21.

The NRC inspector verified that the posting requirements of 10 CFR Part 21 have been complied with as committed by the RECO corrective action response letter of August 16, 1982.

2. (Closed) Nonconformance A (82-01): Failure by the QA Manager to make written reports concerning review of rejection tickets for the period of March 1976 to January 1982, as required by paragraph 16.4 of Section 16 of the QA Manual.

The NRC inspector verified that in accordance with the RECO corrective action response letter dated August 16, 1982, the required monthly QA status reports (concerning review of rejection tickets) have been written for the period of February 1982 through January 1983. These reports define the problems found, the cause of the conditions, and the corrective action taken. The committed inclusion of this subject in the internal audit program was verified to have been accomplished with respect to the internal audit performed in December 1982.

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3. (Closed) Nonconformance B (82-01): Failure to requalify Welding Procedure Specification (WPS) No. 6, Revision 3, in accordance with paragraph 5.5 in Section 5 of the AWS D1.1 code as a result of changes made to amperage, voltage, and shielding gas flow rate essential variables.

The NRC inspector verified that as indicated in the RECO corrective action response letter dated August 16, 1982, the use of WPS No. 6 had been discontinued in 1978 and replaced with new WPSs (WPS Nos. 7.1, 7.2 and 7.3). These WPSs were verified to have been qualified in accordance with Section IX of the ASME code in September 1978.

4. (Closed) Nonconformance C (82-01): Failure of several welders to follow WPS No. 7 with respect to specified amperage range and shielding gas flow rate. Also, an argon flow meter was incorrectly used for monitoring carbon dioxide gas flow rate.

The NRC inspector verified that the welders were given additional training in regard to adhering to WPS electrical and shielding gas flow parameter requirements as indicated by the RECO corrective action response letter. However, review of records showed that the training was actually performed on November 30, 1982, and not prior to August 16, 1982, as indicated by the letter. This has been identified as a nonconformance (see paragraph B.1 above). The training record consisted of a distribution sheet for Procedure No. QCP 5.1, Revision 1, on which there were the signatures of 13 welders attesting to having received the training with respect to the "Control Panel Gas Metal Arc Welding Procedure."

5. (Closed) Nonconformance D (82-01): Performance of GMAW vertical welds in the downward progression by three welders qualified only for upward progression welding.

The NRC inspector verified that in accordance with the vendor's corrective action response letter dated August 16, 1982, the seven welders performing welding during March 1982 had been qualified for the 3G vertical welding position with downward progression and additional necessary positions to qualify them for all position welding.

6. (Closed) Nonconformance E (82-01): Acceptance by QA/QC of panel welds which contained excessive weld spatter, lack of fusion, and fused protruding weld wire remnants.

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The NRC inspector verified that the subject welds had been ground, cleaned, and inspected with the results documented in a grinding inspection report dated March 15, 1982. The NRC inspector also verified that inspectors, grinding and cleaning personnel, and fabrication personnel were given additional instruction on September 1, 1982, with respect to visual acceptance criteria, cleanup, and repairing of welds.

E. OTHER FINDINGS OR COMMENTS:

1. Manufacturing Process Control: The NRC inspector reviewed the applicable sections of the RECO QA Manual, Issue No. 3, which pertains to contracts awarded prior to November 11, 1982. A similar review was performed of Issue No. 4 which pertains to contracts awarded from November 11, 1982. This review was made to verify that manufacturing process activities are adequately controlled by the QA program.

Observations were made of fabrication welds in a Vogtle, Unit No. 1 feedwater control panel which was in the electrical test phase. The accompanying inspection status indication card was examined for completion of prior inspections. Observations were also made of a Comanche Peak, Unit No. 2 local hot shutdown control panel which was in the process of modification.

The NRC inspector also reviewed the following documents: (a) a general type welding procedure No. QCP 5.1; (b) a document control procedure No. QCP-7.1; (c) 20 welding standards; (d) traveler package documentation consisting of an inspection status indicator card, an electrical test inspection report, a wiring inspection report, and fabrication drawings for an inprocess Vogtle, Unit No. 1 panel; (e) traveler package documents including QA Plan No. 400701 and fabrication drawings for a Comanche Peak control panel undergoing modification; (f) certificates of compliance and inspection reports applicable to fabrication, grinding, painting, wiring, electrical testing, and final inspection of control panels furnished to Comanche Peak.

This review was made in order to verify that the nuclear safety related control panels were being fabricated, inspected, tested, and the results documented in accordance with QA program requirements.

Within this area, no nonconformances were identified.

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2. Equipment Calibration: The NRC inspector reviewed Section QCP-12 of QA Manual, Issue 3, and Section QAM-13 of Issue 4, to verify that equipment calibration activities are effectively controlled by the QA program.

Observations were made of the calibration status and maintenance of meters on eight welding machines, seven dimensional and electrical measuring devices, one set of gage blocks, the deadweight tester and weights, and six crimping tools.

Review also included the following documents: (a) calibration procedure No. QCP-13.1, (b) procedure No. QCP-7 covering control of subcontracted service, (c) subcontractor's certificates of calibration for seven devices and standards, and (d) the approved vendor list.

This review was made in order to verify that devices used in activities which affect quality were identified in the system and were appropriately calibrated by qualified personnel using certified standards with known relationship to national standards, where such standards exist.

Within this area, one nonconformance was identified (see paragraph B.2). This deficiency involved the RECO failure to evaluate two suppliers of calibration services as required by the QA program.

3. Internal Audits: The NRC inspector reviewed Section QCP-18 of the QA Manual, Issue 3, and Section QAM-18 of Issue 4. This review was made to verify that audit activities are defined and controlled by the QA program.

The NRC inspector also reviewed records of the internal audit performed on September 28, 1981, and of the internal audit performed on December 1, 1982. The review also included the qualification and certification records for the lead auditor who performed the December 1982 audit.

This review was made to verify that audit activities were accomplished in accordance with QA program requirements by qualified personnel.

Within this area, no nonconformances were identified.

ORGANIZATION: SANDVIK SPECIAL METALS CORPORATION
KENNEWICK, WASHINGTON

REPORT NO.:	95900764/83-01	INSPECTION DATE(S)	1/25-27/83	INSPECTION ON-SITE HOURS:	24
CORRESPONDENCE ADDRESS: Sandvik Special Metals Corporation ATTN: Mr. J. A. Lindberg President P. O. Box 6027 Kennewick, WA 99336					
ORGANIZATIONAL CONTACT: Mr. K. Bowles, QA Manager TELEPHONE NUMBER: (509) 586-4131					
PRINCIPAL PRODUCT: Nuclear fuel tubing.					
NUCLEAR INDUSTRY ACTIVITY: Nuclear fuel tubing supplier for Combustion Engineering and Babcock & Wilcox designed cores and for reloads supplied by Exxon.					
ASSIGNED INSPECTOR:	<u>W. M. McNeill</u>			<u>2/15/83</u>	Date
	W. M. McNeill, Reactive & Component Program Section (R&CPS)				
OTHER INSPECTOR(S):					
APPROVED BY:	<u>W. M. McNeill for</u>			<u>2/15/83</u>	Date
	I. Barnes, Chief, R&CPS()				
INSPECTION BASES AND SCOPE:					
A. <u>BASES</u> : 10 CFR Part 50, Appendix B.					
B. <u>SCOPE</u> : Status of previous inspection findings.					
PLANT SITE APPLICABILITY:					
Not identified.					

REPORT

NO.: 99900764/83-01

INSPECTION

RESULTS:

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A. VIOLATIONS:

None

B. NONCONFORMANCES:

1. Contrary to the Sandvik letter to the NRC dated December 2, 1982, which contained corrective action commitments in regard to forwarding Job Training Progress Records to the Documentation Coordinator, an inspection of a sample of seven inspectors' files identified one case where the Job Training Progress Records had not been forwarded to the Documentation Coordinator.
2. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 2.4 of Quality Assurance Procedure (QAP) No. QA-GA-7, indexes were not maintained for process specifications as evidenced by changes being made during December 1982 and January 1983 without revision and distribution of the applicable indexes; i.e., the deletion of two specifications, the addition of two specifications, and the revision of one specification.
3. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraphs 3.1 and 3.4 of Quality Control Instructions No. QCI-4, an inspection of a sample of seven Attachment I's, "Job Training Progress Records," for final inspectors established that four such records documented that less than the minimum hours were completed and two such records did not have the hours of training recorded.
4. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 5.1.1 of QAP No. QA-GA-22, checklists used for internal audits failed to assure that the procedures outlined in Attachment 2 were encompassed in that the checklists did not identify elements from all applicable procedures to be checked. For example, the September 1982 audit of the rework area did not address any of the requirements in QAP Nos. QA-GA-8 and QA-GA-13 and Section 15 of the Quality Assurance Manual which were outlined in Attachment 2 to be addressed in the rework area audit.

C. UNRESOLVED ITEMS:

None

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D. STATUS OF PREVIOUS INSPECTION FINDINGS:

1. (Closed) Nonconformance (Item A, 82-01): A number of examples were identified where the control of documents was not in accordance with the requirements of QAP No. QA-GA-7, Revision 1. In addition, QAP No. QA-GA-23 pertaining to establishment of visual standards was not listed in the quality control matrix as required by paragraph 0.0 in Section 1, Revision 3 of the QA Manual.

The documented corrective actions were reviewed and an inspection of document control was made on a sample of three QA procedure manuals, three process specification manuals, and their applicable index pages. The correct revision status was verified for a sample of documents in each manual. A sample of 13 procedures distributed to 10 different work stations was verified to be of the correct revision status and properly distributed as required by the station indexes. The current QA procedure matrix was reviewed and no further problems were identified. A nonconformance was identified in regard to the process specification manuals and their indexes (B.2 above).

2. (Closed) Nonconformance (Item B, 82-01): Certain inspections were not being performed in accordance with written instructions.

In regard to surface measurement, a revised form has been implemented for recording equipment used and it was verified to be implemented. Performance of daily checks of the high temperature tensile tester was verified. It was further established that a procedure for CSR testing has been written and that internal audits have been performed as preventive measures in regard to implementation of procedures.

3. (Closed) Nonconformance (Item C, 83-01): Ingots were used without being identified on the QC 110 form as being acceptable to the customer.

The procedure in question and its associate form have been revised. Inspection of a sample of eight recently shipped ingots established that correct customer identification had been entered on the applicable QC 110 forms.

4. (Closed) Nonconformance (Item D, 83-01): Several failures to control calibration of instruments and standards.

The calibration procedure has been revised to address ultraviolet lamps and ultraviolet light meters. The implementation of this revision was verified. An inspection of 12 standards found in use in the shop

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determined that calibration cards were available for each. An inspection of 10 calibration cards different from the above verified that applicable standards could be found for each.

5. (Closed) Nonconformance (Item E, 83-01): ZR-10 emulsifier was being used during fluorescent penetrant examination rather than the required ZR-1 emulsifier.

Procedure Nos. NDE-PT-1 and NDE-PT-3 have both been revised to permit use of ZR-10 emulsifier. Procedure No. NDE-PT-3 was identified by Sandvik to have the same problem as NDE-PT-1. It was verified that proper materials were being used. An inspection of the materials did identify that there was no manufacturer certification on file for emulsifier lot No. 81E04X.

6. (Closed) Nonconformance (Item F, 82-01): There was no evidence or documentation of some QA training. For example, six out of seven QA files for inspectors did not contain the Job Training Progress Records and there was no evidence that the seven inspectors had received general indoctrination and training of QA activities. In addition, the QA files for six exempt employees in the QA organization contained no evidence of QA indoctrination and training.

An inspection of seven inspectors' files found all "Job Training Progress Records" on file except for one which has been identified as a nonconformance (B.1 above) to Sandvik's corrective action commitments. It was further noted that the Job Training Progress Records documented that less than the minimum hours were completed and that the hours of training were not properly recorded. This was identified as a nonconformance (B.3 above). Exempt employees and inspectors were found to have been given general indoctrination and training.

7. (Closed) Nonconformance (Item G, 82-01): Certain records were not being retained for 10 years as evidenced by the absence of superseded revisions for two laboratory procedures and a process specification in the historical files.

A clerical error, which has been corrected, in the process specification resulted in revisions appearing to be missing. A review of five other process specifications found no further problems in this area. In regard to laboratory procedures, the QA manual does not specifically address laboratory procedures as records nor are laboratory procedures identified with a retention period. However, this appears to conflict with the general requirement of Section 17 of the QA Manual. Section 17

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states that records are maintained so that required tests can be traced to the original material, tests, and manufacturing records. Sandvik maintains that this is accomplished by retention of laboratory notebooks and that the test procedures (e.g., CSR) are not necessary.

8. (Closed) Nonconformance (Item H, 82-01): The audit system was not comprehensive in that internal audits were not scheduled to be performed in all applicable areas. Examples of areas not addressed are control of materials, QA records, nonconforming materials, and indoctrination and training.

The audit procedure was reviewed in detail and it was noted that the audit matrix did not identify all of the QA procedures. Approximately one third were not included in the audit matrix. Also, it was noted that the audit checklists did not document that the QA procedures and specifications identified in the matrix were indeed audited. This was identified as a nonconformance (B.4 above). The NRC inspector did not find evidence that the audits were comprehensive with respect to the Sandvik QA program. It was also noted that customer QA specifications identified that audits were to be comprehensive to verify all aspects of the QA program.

9. (Closed) Nonconformance (Item I, 82-01): A review of nine internal audit reports for 1981 indicated that not all areas were audited, followup audits were not performed, replies to findings were not timely, and the Production Manager was not on distribution for all reports.

A review of the last 8 months of internal audits found audits were performed on schedule and areas duplicated as required. It was noted that required followup audits were performed on 4 of the 13 findings identified. An inspection of 13 "Audit Deficiency Reports" found that responses appeared to be timely. However, response and issue dates were not clearly identified. A review of these audits found them to be distributed as required by the procedure.

E. OTHER FINDINGS OR COMMENTS:

None

ORGANIZATION: SOUTHWEST FABRICATING AND WELDING COMPANY
HOUSTON, TEXAS

REPORT NO. : 99900025/82-01	INSPECTION DATE(S) 11/29-12/2/82	INSPECTION ON-SITE HOURS: 52
CORRESPONDENCE ADDRESS: Southwest Fabricating and Welding Company ATTN: Mr. N. H. Moerke Vice President, Engineering 7525 Sherman Street Houston, Texas 77011		
ORGANIZATIONAL CONTACT: Mr. R. P. Bornes, QA Manager TELEPHONE NUMBER: 713/928-3451		
PRINCIPAL PRODUCT: Nuclear piping assemblies, supports, and vessels. NUCLEAR INDUSTRY ACTIVITY: Nuclear activities represent approximately 20% of total production.		
ASSIGNED INSPECTOR: <u>I Barnes</u> for J. W. Hamilton, Reactive & Component Program Section (R&CPS)		<u>1-19-83</u> Date
OTHER INSPECTOR(S): L. E. Ellershaw, R&CPS I. Barnes, R&CPS		
APPROVED BY: <u>I Barnes</u> I. Barnes, Chief, R&CPS		<u>1-19-83</u> Date
INSPECTION BASES AND SCOPE: A. <u>BASES</u> : 10 CFR Part 50, Appendix B. B. <u>SCOPE</u> : This inspection was made as a result of the identification by Carolina Power and Light Company of incorrect marking practices on chilled water system piping subassemblies with wall thicknesses less than 1/4 inch. Additional programmatic areas included in the inspection were: status of previous inspection findings; welding material control; review of welding controls; material identification and control; and manufacturing process control.		
PLANT SITE APPLICABILITY: Identified marking deficiencies-Docket Nos. 50-400/401.		

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A. VIOLATIONS:

Contrary to Section 21.6 of 10 CFR Part 21, posting was not accomplished in accordance with the requirements of the regulation, in that neither a current copy of 10 CFR Part 21 and a procedure adopted pursuant to the regulations nor a notice describing the procedure was posted.

B. NONCONFORMANCES:

1. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and QA Manual Section 6, 1/8" Inconel electrodes were found mixed in with 1/8" type E-9018 electrodes. The container of these electrodes was identified with the heat number of the E-9018 electrodes only.
2. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Heat Input Guide 10-124, a part of Welding Procedure Specification (WPS) No. 0808905, submerged arc welding (SAW) was observed being performed at 290 amperes on Weld 7 in piping subassembly Sales Order (SO) Q7068-SF, Sheet 5, and a travel speed of 24" per minute and arc voltage of 32. The required travel speed and voltage were, respectively, 12-20" per minute and 28-31.
3. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraphs NB/NC-4231.2 in Section III of the ASME Code, the NRC inspector observed that the immediate area around temporary attachments on two piping subassemblies had not been marked prior to attachment removal, in order to provide for identification until after performance of the required surface nondestructive examination. The applicable subassemblies were SO Q8113-PLA, Sheet 3 (ASME Section III Code Class 1, Westinghouse 31-inch primary piping), and SO Q3301-CA, Sheet 13 (ASME Section III Code Class 2, Service Water System, Shearon Harris, Unit 1).

C. UNRESOLVED ITEMS:

None

D. STATUS OF PREVIOUS INSPECTION FINDINGS (J. W. Hamilton):

1. (Closed) Deviation (Inspection Report No. 99900025/80-04): The NRC inspector verified that the committed revision to the QA Manual had been accomplished. The NRC inspector also verified by inspection of records that committed actions to preclude recurrence had been implemented with respect to verification of material certification and identity by QA personnel prior to material fabrication release.

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E. OTHER FINDINGS OR COMMENTS:

1. Welding Material Control (L. E. Ellershaw) - Section 6 of the QA Manual and Procedure WMC-1 were reviewed to assure that a program for welding material control was in effect. The NRC inspector observed the issuance of welding materials and assured that the materials in the portable heating ovens were the same as what the issue slips indicated. The contents of the ovens in the welding material issue room were observed and the applicable CMTRs were reviewed. As a result of this review, nonconformance B.1 was identified.
2. Review of Welding Controls (J. W. Hamilton) - WPSs for SAW, gas metal arc welding, gas tungsten arc welding, and shielded metal arc welding were reviewed for compliance with the requirements of Section IX of the ASME Code.

It was verified by inspection of the supporting procedure qualification records that each weld procedure had been qualified in accordance with Section IX of the ASME Code.

The NRC inspector observed utilization of the above WPSs in nuclear piping and support fabrication, and identified nonconformance B.2 for the failure to comply with Heat Input Guide 10-124 requirements regarding voltage and travel speed requirements.

An inspection of work being performed on Machine No. 139 the following day (i.e., Sales Order Q7068-SF, Sheet 4) identified a repeated violation of Heat Input Guide 10-124, in that when using the observed 325 amperes operating condition the specified travel speed is 13-22 inches per minute. Welding travel speed was measured, however, to be 26.5 inches per minute.

Prior to the end of the inspection, action was taken with respect to operator compliance with Heat Input Guide No. 10-124, Revision 1.

Qualification records were reviewed for six welders fabricating nuclear piping and support assemblies. The records were consistent with the observed welding being performed.

No additional nonconformances or unresolved items were identified.

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3. Material Identification and Control (J. W. Hamilton) - A sample of stainless steel and carbon steel piping subassemblies was selected for this portion of the inspection. Certificates of eight items of pipe material and five weld filler materials were inspected. Material identity was also compared against the fabrication records for the selected material items. Confirmation of vendor qualification at time of procurement was verified for three items. There were no nonconformances or unresolved items identified.

4. Incorrect Marking Practice on Piping with Wall Thickness Less than 1/4 Inch (J. W. Hamilton) - Carolina Power and Light Company identified a potential construction deficiency to Region II of the NRC concerning chilled water pipe spool pieces (of wall thickness less than 1/4 inch) being marked with pressure marking stamps rather than with the required fiber markings. Southwest Fabricating & Welding Company (SF&W) and Ebasco agreed in 1973 to permit impression marking of wall thicknesses equal to or greater than 3-inch standard weight pipe (0.216 inch nominal wall). Ebasco issued Revision 15 to Part 2 of Specification CAR-SH-M-30 on June 29, 1982, which prohibited use of impression marking (vibratool) on pipe with wall thickness less than 0.120 inch. SF&W accepted this revision on October 5, 1982, and subsequently identified 44 pieces of pipe fabrication not meeting this requirement. Piping subassemblies being fabricated for Millstone, Shearon Harris, and two Westinghouse contracts were inspected to assure compliance with customer marking requirements.

Additionally, purchase orders, certifications, and steel stamps used on nuclear piping were inspected to assure that low stress style stamps were being used. No nonconformances or unresolved items were identified.

5. Manufacturing Process Control (I. Barnes) - The NRC inspector reviewed Section 3.0, "Procurement;" Section 5.0, "Process Control;" Section 6.0, "Welding Quality Assurance;" and Section 9.0, "Inspection, Testing, and Nondestructive Examination;" of the QA Manual, Revision 2. The Manufacturing Record Sheets for four inprocess piping subassemblies were examined with respect to: (a) completeness of operation signoff in terms of observed visual status, (b) compliance with engineering instructions on accompanying Detail Sheets, (c) utilization of approved WPSs and nondestructive examination procedures, (d) compliance with inspection and hold point requirements, (e) performance of welding

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and nondestructive examination by appropriately qualified personnel, (f) use of approved welding materials which were applicable to the selected WPSs, and (g) compliance with ASME Code and customer specification fabrication requirements. In addition, certifications for four base material items and three filler material types which had been used in the piping subassemblies were reviewed for compliance with ASME Code and material specification requirements. Within this area of inspection, nonconformance B.3 was identified.

During review of a socket welded piping subassembly (SO Q4122-CB, Sheet 356, ASME Section III Code Class 1, Reactor Coolant System, Shearon Harris), a similar process control concern to that noted in Inspection Report No. 99900025/79-03 was identified. Review of the Detail Sheet for the subassembly showed no formal requirement relative to size of socket welds in either the engineering notes or in the form of a referenced procedure on the accompanying Manufacturing Record Sheet. The NRC inspector was shown a shop standard which included the applicable ASME Code Section III requirements with respect to socket weld fitup gap and leg length. This standard was; however, not referenced as an applicable fabrication document. The NRC inspector was informed by the area QC inspector that the standard is used to verbally instruct welding personnel in regard to socket fillet weld size requirements. Review of Procedure No. 10-118, Revision 0, which was referenced on the Manufacturing Record Sheet for final inspection showed; however, that the same ASME Code requirements were included for use in weld inspection.

ORGANIZATION: SOUTHWEST RESEARCH INSTITUTE
SAN ANTONIO, TEXAS

REPORT NO.:	99900909/82-03	INSPECTION DATE(S)	10/5-6/82	INSPECTION ON-SITE HOURS:	12
CORRESPONDENCE ADDRESS: Southwest Research Institute ATTN: Mr. R. L. Bessey Group Leader 6220 Culebra Road San Antonio, TX 78284					
ORGANIZATIONAL CONTACT: Mr. R. L. Bessey, Group Leader TELEPHONE NUMBER: (512) 684-5111					
PRINCIPAL PRODUCT: Research and Testing Services					
NUCLEAR INDUSTRY ACTIVITY: Southwest Research Institute (SWRI) is a nonprofit corporation conducting a number of research projects sponsored by both private industry and various government agencies. Their current nuclear work includes research projects for NRC, inspection of equipment at nuclear power generating plant sites, and conducting nuclear equipment qualification tests for a number of manufacturers and/or utilities.					
ASSIGNED INSPECTOR:		<u>G. T. Hubbard</u>		<u>11/16/82</u>	
		G. T. Hubbard, Equipment Qualification Section (EQS)		Date	
OTHER INSPECTOR(S):					
APPROVED BY:		<u>H. S. Phillips</u>		<u>11/16/82</u>	
		H. S. Phillips, Chief, EQS		Date	
INSPECTION BASES AND SCOPE:					
A. <u>BASES</u> : 10 CFR Part 50, Appendix B.					
B. <u>SCOPE</u> : The purposes of this inspection were: (1) to review the NUTECH test specification and the SWRI test plan; (2) to review radiation aging test data; and (3) to witness postradiation aging performance tests.					
PLANT SITE APPLICABILITY:					
Docket Nos. 50-461 and 50-416.					

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A. <u>VIOLATIONS:</u> None		
B. <u>NONCONFORMANCES:</u> None		
C. <u>UNRESOLVED ITEMS:</u> Since radiation test margin data was unavailable during the inspection, the NRC inspector was unable to determine if required test margins of the Qualification Test Plan (QTP) were met during radiation testing. Subsequent to the inspection, SWRI informed the inspector that they had determined that the margin requirements of the QTP had been met. During the next inspection, the inspector will review radiation test data to confirm that the required QTP margins were met.		
D. <u>OTHER FINDINGS OR COMMENTS:</u> 1. Background - SWRI is conducting generic equipment qualification testing for NUTECH Engineers, San Jose, California, on five NAMCO, Model EA-740, Revision K limit switches; five Pyco, Model N145C3224 temperature elements; and two Sietz AG, Model 0-105-562C "safety relief valve solenoid valves." Tests are being performed to SWRI test plan entitled, "Nuclear Qualification Test Plan for the Generic Equipment Qualification for Grand Gulf I and Clinton I Nuclear Power Stations," dated June 1982, and NUTECH test specification entitled, "Generic Equipment Qualification Test specification for Grand Gulf I and Clinton I Nuclear Power Stations," Revision 2, dated June 1, 1982. 2. Radiation Aging Tests - The NRC inspector reviewed the High-Level Radiation Effects Facility Log Sheets; reviewed available preliminary data; and interviewed SWRI personnel. It was determined that radiation levels for the testing met the levels specified in Table 5.2 of the QTP; however, the specified levels did not include the test margins required in paragraphs 5.3 and 5.3.3 of the QTP (referenced unresolved item, paragraph C above). *3. Performance Tests - The NRC inspector witnessed the postradiation performance testing of the previously referenced test items. SWRI documented		

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<p>test failures for the five Pyco temperature elements and one NAMCO limit switch that were outside the acceptable performance limits. Three temperature elements had output levels below the performance limits for temperature points 250°, 300°, and 350° F. One element had low output at 300° and 350° F. The fifth element had low output at 300° and 350° F and low output on the "CD" circuit at 250° F; while the "AB" circuit output was satisfactory at 250° F.</p>			
<p>The NAMCO limit switch that was outside of performance limits had acceptable measured resistance on 3 of 4 contacts. The other set of contacts (GH), which is normally open, operated intermittently upon manual lever actuation. When the contacts did operate, their resistances varied from approximately 18 ohms to 1.8 ohms compared to the required resistance of 0.050 ohms maximum.</p>			
<p>The above test failures were documented on the SWRI log sheets and were to be documented in accordance with their Quality Assurance Manual. These test failures are identified as followup items and they will be reviewed during the next inspection to determine if appropriate action was taken regarding their disposition.</p>			
<p>NOTE: During a subsequent inspection, documented in NRC Report No. 99900909/82-04, Section D, paragraph 2.a., the NRC inspector reviewed the SWRI evaluation of five Pyco temperature elements and one NAMCO limit switch that were outside the acceptable performance limits of the test. The failure to meet the acceptable performance limits was caused by the test apparatus and was not caused by component failure. This item was closed in the subject report.</p>			

ORGANIZATION: SOUTHWEST RESEARCH INSTITUTE
SAN ANTONIO, TEXAS

REPORT NO. : 99900909/82-04	INSPECTION DATE(S) 11/29-12/3/82	INSPECTION ON-SITE HOURS: 89
CORRESPONDENCE ADDRESS: Southwest Research Institute ATTN: Mr. B. Mabrito Quality Assurance Manager 6220 Culebra Road, P. O. Drawer 28510 San Antonio, TX 78284		
ORGANIZATIONAL CONTACT: Mr. M. Gonzales, Senior Research Engineer TELEPHONE NUMBER: (512) 684-5111		
PRINCIPAL PRODUCT: Research and Testing Laboratory		
NUCLEAR INDUSTRY ACTIVITY: Southwest Research Institute (SWRI) is a nonprofit corporation conducting a number of research projects sponsored by both private industry and various government agencies. Their current nuclear work includes research projects for NRC, inspection of equipment at nuclear power generating plant sites, and conducting nuclear equipment qualification tests for a number of manufacturers and/or utilities.		
ASSIGNED INSPECTOR: <u><i>A. L. Smith</i></u> A. L. Smith, Equipment Qualification Section (EQS)		<u>1/28/83</u> Date
OTHER INSPECTOR(S): D. G. Breaux, Reactor Systems Section J. Benson, Sandia National Laboratories		
APPROVED BY: <u><i>H. S. Phillips</i></u> H. S. Phillips, Chief, EQS		<u>1/28/83</u> Date
INSPECTION BASES AND SCOPE: A. <u>BASES</u> : Appendix B to 10 CFR Part 50 B. <u>SCOPE</u> : This inspection consisted of: (1) a review of the 18 criteria of 10 CFR 50, Appendix B described in SWRI's Nuclear Quality Assurance Program; (2) verification that the applicable criteria of the QA program had been implemented in compliance with the SWRI approved QA Manual; and (3) inspection of items identified for followup from previous inspections.		
PLANT SITE APPLICABILITY: Docket Nos. 50-461 and 50-416		

REPORT NO.: 99900909/82-04	INSPECTION RESULTS:	PAGE 2 of 4
<p>A. <u>VIOLATIONS:</u></p> <ol style="list-style-type: none">1. Contrary to Section 21.6 of 10 CFR Part 21, posting of 10 CFR Part 21, Section 206 of the Energy Reorganization Act of 1974, and adopted procedures had not been accomplished in the radiation aging building.2. Contrary to Section 21.31 of 10 CFR Part 21, SWRI procured safety-related testing services from Conax Corporation without specifying in the procurement document that the provisions of 10 CFR Part 21 applied. <p>B. <u>NONCONFORMANCES:</u></p> <ol style="list-style-type: none">1. Contrary to the requirements of Criterion V of Appendix B to 10 CFR Part 50 and the requirements of SWRI test plan for project 02-7124, the required 10% time or temperature margin had not been considered in two Arrhenius aging calculations.2. Contrary to the requirements of Criterion V of Appendix B to 10 CFR Part 50 and Section 14-1 of SWRI's "Quality Assurance Program Manual," the corrective action taken to resolve deviation and nonconformance reports 81-088 and 81-115 did not include correction to prevent or preclude repetition. <p>C. <u>UNRESOLVED ITEMS:</u></p> <p>None</p> <p>D. <u>STATUS OF PREVIOUS INSPECTION FINDINGS:</u></p> <ol style="list-style-type: none">1. (Closed) Unresolved Item C (82-03): Determination that required test margins of the qualification test plan (QTP) had been met during radiation testing. The NRC inspector reviewed the laboratory data log for the project (02-7124-002) and determined that margins specified in the QTP had been met.2. (Closed) Followup Item D.3 (82-03): Deviations from allowable performance limits.		

REPORT NO. 99900909/82-04	INSPECTION RESULTS:	PAGE 3 of 4
<p>a. Pyco Temperature Elements - NRC RIV Report No. 99900909/82-03 reported that five pyco temperature elements exhibited out-of-tolerance output voltage levels (failures) as defined by the limits contained in table 2.2-1 of the QTP when performance tested after radiation aging. Subsequent evaluation by SWRI test engineers revealed that the problem (out-of-tolerance output voltage) was the result of the original test apparatus and <u>not</u> the Pyco temperature elements. The initial test apparatus consisted of an ice bath, dispatch oven, and a volt meter. The temperature elements were retested on October 15, 1982, using a NESLAB EXCAL oil bath (Model EX-250HT S/N 81-66873-1), Omega ice point reference, and the same volt meter. The NRC inspector reviewed the data log book for this test and <u>all</u> output voltages were within the tolerance limits as specified in the QTP.</p> <p>b. NAMCO Limit Switch - NRC RIV Report No. 99900909/82-03 reported that during post radiation aging performance testing one set of contacts on one of the NAMCO limit switches operated intermittently upon manual lever actuation and that the calculated contact resistance in the closed position was not within the limits specified in table 2.2-2 of the QTP. Subsequent to this test, rated current was supplied to all contacts, the switch was cycled, a one amp current was supplied with the voltage drop across the contacts being measured, and the resistance was calculated. The NRC inspector reviewed the data log book for this test and all parameters were within the QTP specified tolerances.</p> <p>E. <u>OTHER FINDINGS OR COMMENTS:</u></p> <p>1. Quality Assurance Program Evaluation - An indepth review/evaluation of the SWRI Nuclear Quality Assurance Program was accomplished during the inspection. This review/evaluation was accomplished in two basic parts; i.e., (1) a review/evaluation to assure that the SWRI written quality assurance is consistent with NRC regulatory requirements, and (2) that the physical program implementation was in accordance with the written program commitments. Each area is discussed below.</p> <p>(a) Quality Assurance Program Requirements - The SWRI Nuclear Quality Assurance Manual, operating procedures, operating instructions, and project plans described a program to meet the following criteria: Organization; Design Control; Procurement Documentation Control; Instructions, Procedures, and Drawings; Document Control; Control of Purchased Material, Equipment, and Services; Identification and</p>		

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and Control of Materials, Parts, and Components; Control of Special Processes; Inspection, Test Control, Control of Measuring and Test Equipment; Handling, Storage and Shipping; Inspection, Test, and Operating Status; Nonconforming Materials, Parts, or Components; Corrective Action; Quality Assurance Records; and Audits. These procedures were reviewed to determine that they were consistent with imposed regulatory requirements. The NRC inspection team determined that the established nuclear quality assurance program (in the above areas) met regulatory requirements.

- (b) Quality Assurance Program Implementation - The NRC inspection team examined various procurement documents, QA inspection records, personnel training and certification records, audit records, deviation and nonconformance reports, and conducted personnel interviews to determine if the SWRI quality program (in the areas listed in paragraph E.1(a)) was being implemented in accordance with the written program commitments. The violations and nonconformances discussed in paragraphs A and B above were identified as a result of this portion of the inspection.
2. Exit Meeting - An exit meeting was held with SWRI management personnel (see attached data sheet for list of attendees). The violations, nonconformances, and status of previous inspection findings as outlined in paragraphs A, B, and D above were discussed in detail and SWRI management acknowledged these findings.

ORGANIZATION: UNIBRAZE CORPORATION
COVINGTON, OHIO

REPORT NO.:	99900793/83-01	INSPECTION DATE(S)	1/10-14/83	INSPECTION ON-SITE HOURS:	31
CORRESPONDENCE ADDRESS: Unibraze Corporation ATTN: Mr. M. B. MacBryde President 7502 W. State, Route 41 Covington, Ohio 45318					
ORGANIZATIONAL CONTACT: Mr. C. R. Miller, QA Manager TELEPHONE NUMBER: (513) 473-2001					
PRINCIPAL PRODUCT: Welding filler metals.					
NUCLEAR INDUSTRY ACTIVITY: Approximately 1 percent of the CY 1982 sales.					
ASSIGNED INSPECTOR:		<u>Wm McNeill for</u> J. T. Conway, Reactive and Component Program Section (R&CPS)		<u>2/17/85</u> Date	
OTHER INSPECTOR(S):					
APPROVED BY:		<u>Wm McNeill for</u> I. Barnes, Chief, R&CPS		<u>2/17/85</u> Date	
INSPECTION BASES AND SCOPE:					
A. <u>BASES</u> : 10 CFR Part 50, Appendix B and 10 CFR Part 21.					
B. <u>SCOPE</u> : This inspection was made as a result of the notification by the Tennessee Valley Authority of the furnishing of mixed diameter electrodes (1/8" and 5/32" in the same canister) to the Hartsville nuclear site. In addition, the following programmatic areas were inspected: training, (Cont. on next page)					
PLANT SITE APPLICABILITY:					
Docket No. 50-518					

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SCOPE: (Cont.) material identification and control, nonconformance, calibration, inspection, QA records, audits (internal/external), handling/storage/shipping, and reporting of defects.

A. VIOLATIONS:

Contrary to Section 21.6 and Section 21.21 of 10 CFR Part 21, a current copy of 10 CFR Part 21 was not posted in the area where Section 206 was posted and required procedures had not been adopted to provide for the evaluation of deviations or for notification of the licensee or purchaser.

B. NONCONFORMANCES:

1. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 5.3.2 and subparagraph 5.3.2.1 in Section 5.0 of the Identification and Verification Manual (IVM), a review of documentation and material for three inprocess nuclear contracts revealed that certain reels of wire were not identified with tags containing a control number, material descriptions, and weight for two of the contracts; i.e., three reels from Contract No. N-202 and three reels from Contract No. N-207 which were held, respectively, in the controlled material and nonconforming hold areas.
2. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 4.4.2 in Section 4.0 of the IVM, a review of the QA record files revealed that two vendors (Ohio Counting Scales and Eli Whitney Metrology Lab) performing testing services had been neither surveyed nor audited by Unibraze.
3. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 7.9 in Section 7.0 of the IVM, a review of the QA record files revealed that a purchase order had not been sent nor had the applicable calibration procedure or standard to be used been otherwise provided to Ohio Counting Scales who had performed calibrations of weighing scales since 1975.
4. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section QCF-8 of procedure QCI-12-76-2, a review of material in the nonconforming material hold area revealed that a reject tag attached to a reel of material for nuclear Contract No. N-207 was not signed by the individual responsible for attaching the tag.
5. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraphs 12.1.3 and 12.1.4 in Section 12.0 of the IVM, a review of internal audit activities for 1981 and 1982 revealed that: (a) an

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internal audit procedure did not exist, and (b) internal audit reports for 1981 and 1982 were not distributed to the applicable manager(s) of the areas being inspected.

C. UNRESOLVED ITEMS:

None

D. OTHER FINDINGS OR COMMENTS:

1. Mixed Diameter Electrodes - In March 1981, Tennessee Valley Authority (TVA) notified Unibraze that they had discovered 5/32" diameter electrodes intermixed with 1/8" diameter electrodes in 10 lb. canisters labeled 1/8" at the Hartsville nuclear site. All the material (approximately 9000 lbs. on Contract No. 76x72-523054-5) was returned to Unibraze for inspection. A 100 percent inspection revealed that approximately 10 percent of the 308L electrodes were intermixed in the canisters. Unibraze determined that the packaging error was due to similar lot numbers on the two different diameter electrodes. Unibraze modified procedures to prevent the packaging of like materials with similar control numbers. Chemical and mechanical tests were performed on the material, and the repackaged electrodes along with the certified material test reports were returned to TVA.
2. QA Program - A detailed review of documentation (e.g., QA manual, procedures, travelers, data packages, nonconformance reports, audit reports) led to the identification of five nonconformances (B above) and the following observations:
 - a. The QCF-16 form, "Specification and Contract Review Sheet," for nuclear Contract No. N-196 completed in 1982 was not signed and dated by a representative from the QA department.
 - b. The QCF-3 form, "Hold for Testing," for nuclear Contracts N-206 and N-207 was not filled in (e.g., invoice number plus date sample was taken) to indicate that the material was in a hold status awaiting test results.
 - c. The procedures manual did not have an index to indicate the revision and date of the applicable procedure in effect.
 - d. Procedures for quality affecting activities lacked sufficient detail for the activity being performed and were not posted at each work station.

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- e. Individuals performing dimensional and visual inspection were not required to satisfactorily pass an eye examination.
- f. The checklist used for internal audits was lacking in specificity to ensure that the QA program in a particular area was effective and properly implemented.

These observations were not considered as sufficiently severe deficiencies in the existing QA program or its implementation to be classified nonconformances, but were brought to the attention of appropriate Unibraze management personnel for their evaluation and follow up. These areas will be reexamined during a future inspection.

ORGANIZATION: VICTOREEN, INCORPORATED
CLEVELAND, OHIO

REPORT NO.:	99900377/82-01	INSPECTION DATE(S)	11/1-5/82	INSPECTION ON-SITE HOURS:	58
CORRESPONDENCE ADDRESS: Victoreen, Incorporated A Sheller-Globe Corporation Subsidiary ATTN: Dr. John Ashe, President 10101 Woodland Avenue Cleveland, Ohio 44104					
ORGANIZATIONAL CONTACT: Mr. Roger Zimmerman, Quality Assurance Manager TELEPHONE NUMBER: (216) 795-8200 Ext. 267					
PRINCIPAL PRODUCT: Radiation monitoring systems					
NUCLEAR INDUSTRY ACTIVITY: Radiation monitoring systems, required for Class 1E applications, representing approximately five percent of total production.					
ASSIGNED INSPECTOR:	<u>L. B. Parker</u> L. B. Parker, Reactive and Component Program Section (R&CPS)			<u>1-6-83</u> Date	
OTHER INSPECTOR(S): J. Hamilton, R&CPS					
APPROVED BY:	<u>I. Barnes</u> I. Barnes, Chief, R&CPS			<u>1-6-83</u> Date	
INSPECTION BASES AND SCOPE:					
A. <u>BASES</u> : 10 CFR Part 21 and 10 CFR Part 50, Appendix B.					
B. <u>SCOPE</u> : This inspection was made as a result of the Consumers Power Company 10 CFR Part 50.55(e) report concerning quality program and manufacturing deficiencies which are applicable to radiation monitoring equipment that has been furnished to the Midland Nuclear Plant. Additionally, the following (Cont. on next page)					
PLANT SITE APPLICABILITY:					
Docket Nos. 50-329 and 50-330.					

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SCOPE: (Cont.) areas were inspected: (1) status of previous inspection findings, (2) implementation of 10 CFR Part 21, (3) equipment calibration, (4) training, and (5) manufacturing process control.

A. VIOLATIONS:

1. Contrary to Section 21.31 of 10 CFR Part 21, Victoreen, Incorporated (VI) failed to assure that each procurement document specified, when applicable, that the provisions of 10 CFR Part 21 apply. Printed circuit boards were supplied in Class 1E modules, yet the purchase orders (Nos. 12276 and 12367) failed to cite 10 CFR Part 21 requirements.
2. Contrary to Section 21.51(b) of 10 CFR Part 21, VI failed to prepare records with respect to evaluation of known workmanship defects in electronic modules that have been furnished for use in safety-related circuits.

B. NONCONFORMANCES:

1. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraphs 3.2 and 3.2.3 of the Nuclear Quality Assurance Manual (NQAM), Section IV, Revision 7, dated February 24, 1982:
 - a. VI issued purchase order (PO) No. 12276 on March 29, 1982, for printed circuit boards (drawing No. 868B-200-11, Revision H) which identified an obsolete manufacturing specification (MS) No. IP-103 on the PO;
 - b. Note 2 of drawing No. 868B-200-11, Revision H, also identified the MS as the obsolete IP-103.
2. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 3.2 of the NQAM, Section XV, Revision 7, dated February 24, 1982, material inspection report (MIR) No. 17532 was improperly dispositioned, in that three discrete dispositions were made for the specific material; i.e., two separate "rework" dispositions and one "use as is" disposition.
3. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 3.7 of the procedure for wave soldering (No. 510.001, Revision 0, dated March 3, 1980), solder bath analysis for contamination was not being conducted on a quarterly basis.

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<p>4. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 3.4 of the procedure for wave soldering (No. 510.001, Revision 0, dated March 3, 1980), a measuring device to assure circuit board preheat temperature reaches 170° to 190°F was not being used.</p>		
<p>C. <u>UNRESOLVED ITEMS:</u></p> <p>None</p>		
<p>D. <u>STATUS OF PREVIOUS INSPECTION FINDINGS:</u></p> <p>1. (Closed) Deviation A (79-01): The NQAM did not describe the functions, responsibilities, and authority of senior management personnel whose activities affect quality.</p> <p>VI issued Revision 6 of the NQAM on March 1, 1980, with an updated organizational chart along with a narrative description of the functions, responsibilities, and authority of senior management personnel whose activities affect quality.</p>		
<p>2. (Closed) Deviation B (79-01): The VI QA manager was not maintaining audit files.</p> <p>VI hired a full-time trained auditor for the QA staff, updated all audits and audit files, and revised the audit procedure requirements to identify the responsibility of the QA auditor and to clarify record requirements.</p>		
<p>E. <u>OTHER FINDINGS OR COMMENTS:</u></p> <p>1. <u>NRC Region III Requests:</u> NRC Region III requested that an inspection be performed at VI as a result of the Consumers Power Company (CPCO) 10 CFR Part 50.55(e) report concerning quality program and manufacturing deficiencies which are applicable to radiation monitoring equipment that had been furnished to the Midland Nuclear Plant.</p> <p>a. <u>Quality Assurance Program Deficiencies:</u> Twelve areas of unsatisfactory compliance to Bechtel procurement specifications and implementation were identified during the September 8-10, 1982, audit of VI by Bechtel and CPCO. The NRC inspection team inspected all of these areas and determined that the findings were valid. Resolutions for QA program deficiencies were agreed to in an October 4 and 5, 1982, meeting between Bechtel and VI.</p>		

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Completion dates of the resolutions started in October 1982 and ran into November 1982. Since the changes to the QA program are very recent and some not completed, the program evaluation will be completed during the next inspection. Nonconformances B.1 and B.2 were identified as a result of this item.

VI has rewritten the NQAM and the SOP procedures and has resubmitted them to Bechtel for approval. The new procedures, where applicable, have begun to be implemented.

b. Radiation Monitoring System Electronic Module Workmanship Deficiencies:

One radiation monitoring system electric module (Class 1E) scheduled for Midland was inspected at VI. This module is a qualification sample selected from the 14 modules manufactured in accordance with Bechtel PO Nos. 7220-J289AC and J244AC. Twelve of the fourteen modules are at Midland and were recently rejected. Workmanship Standard No. 1141 7220-J289-83-2 (VI procedure No. 500.002, Revision 0), as imposed by Bechtel, was used for this inspection. The CPCO interim 50.55(e) report of October 15, 1982, cited 12 conditions of nonconformance on 4 modules at Midland in the area of soldered connections. One module was inspected at VI (S/N 102) for similar nonconformances. A summary of findings is as follows:

Identified Nonconformance	Defects per Total Connections	Item Inspected	Applicable Workmanship Std. Page No.
1. Excess solder	1/1268	Scaler 862S-100-91 (R-111)	7220-J289-83-2 Page 124
2. Cap. body protruding into plated-thru hole	26/33	Memory Extension 862ME-210-90 (C-1 thru C-26)	7220J289-83-2 Page 83
	1/25	Controller 862C-210-90 (C-10)	

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3. Flux not removed	2/1268	Controller 862C-210-90 (F-4, R-128)	7220-J289-83-2 Pages 95, 117, and 123
4. Wire wrap contamination	12/1268	Scaler 862 SF-212-90	7220-J289-83-2 Page (none refer- enced)
5. Insufficient solder (not including plated-thru hole solder plugs)	9/1268 88/1524 0/1012 3/336 32/492 0/1428	Controller Memory Exten- sion Scaler Buss Extender Thumb Wheel Memory Expansion	7220-J289-83-2 Pages 86 and 112

As shown above, 5 of the 13 claimed nonconformances for solder connection were confirmed to varying degrees on the unit inspected at VI. Eight claimed nonconformances could not be confirmed; i.e., (1) cold solder joints, (2) excessive heat, (3) diode bodies partially embedded in solder, (4) circuit board delamination (measling), (5) duplicate serial numbers on like modules, (6) lifted circuit foil, (7) excessive insulation removal from jumper wires, and (8) components not properly attached mechanically.

VI personnel stated Bechtel was including in the category of insufficient solder all plated-through holes not plugged with solder. The contractually imposed workmanship standards are confusing concerning the requirement for solder plugged plated-through holes. On page 86 of the workmanship standard, typical interface connections show plated-through holes without solder plugs; however, page 114 shows plated-through holes with solder plugs and provides acceptance criteria. Plated-through holes on the module inspected at VI (S/N 102) were not solder plugged. Additionally, the following printed wiring board (PWB) assemblies were inspected at VI to the requirements of Workmanship Standards No. 7220-J289-83-2:

- (1) Three PWB assemblies from a nonserialized Model No. 876A-1 High Range Containment Area Monitor Readout module were inspected. Three defects were noted: (1) approximately one-half the epoxy capacitors were inserted into the holes, (2) 12 plated-through holes were not solder plugged, and (3) 5% of the component leads did not show evidence of solder on the top side of the PWB.

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- (2) Three Model No. 846-1 area monitor PWBs (serial Nos. 458, 378, and 379) were inspected without disassembly. These units utilized single sided PWBs. Only one of the defects cited in the 10 CFR Part 50.55(e) report was discovered on the three PWBs; i.e., excess solder on 10 of the connections located on the bottom side. However, these units were manufactured in 1970 prior to the implementation of any workmanship standards.
 - (3) Three PWBs for Model No. 842 area monitors were inspected. These PWB assemblies were replacements or spares for area monitors manufactured prior to 1975 and are single sided. No defects were noted on any of the three PWBs.
 - (4) Five Model No. 876A-1 area monitors were inspected. These units had been inspected by Bechtel personnel and repaired by VI personnel in early September 1982 at VI. Additional solder was added to 85 connections and one panel knob was adjusted. These repairs were initialed-off by Bechtel and the modules were placed on hold at VI.
2. Equipment Calibration: This area of the inspection consisted of a review of: (a) four measuring instruments - Veeco MS 170 leak detector, Veeco sensitivity calibrator Type SC-5, Fluke 8050A, and Fluke 860CA multimeters; (b) two secondary standards - 760A meter calibrator and 7552 Type K-2 potentiometer; and (c) calibration repair records and certifications for the above instruments. Traceability to national standards was satisfactorily demonstrated. There were no nonconformances or unresolved items identified.
 3. Manufacturing Process Control: This area of the inspection consisted of reviewing the wave soldering machine; the applicable shop area; manufacturing procedure No. 510.001, Revision 0 concerning wave soldering; and posted records of analysis of solder bath contamination. Nonconformances B.3 and B.4 were identified.
 4. Training: This area of the inspection was performed by reviewing the training records for eight manufacturing and quality personnel. Four manufacturing persons were interviewed to determine their areas of responsibility and levels of training. Additionally, four quality assurance persons that maintained certified training records of QA and manufacturing personnel were also examined. The following was identified:

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NO : 99900377/82-01	RESULTS:	
<p>Three Quality Assurance persons were certified Level 3 per ANSI/ASME N45.2.6-1978 by a prior QA manager. Records were not available at VI to substantiate his qualifications or capabilities to certify to Level 3. However, the prior QA manager is a 23 year employee of VI and stated he had maintained his QA records with his immediate supervisor, the past president. The prior QA manager stated that he has not been able to locate his records since the past president retired from the company.</p>		
<p>5. <u>10 CFR Part 21 Implementation:</u> Posting of the 10 CFR Part 21 implementing procedure and Section 206 of the Energy Reorganization Act of 1974 were satisfactory. Violations A.1 and A.2 were identified as a result of this item.</p>		

ORGANIZATION: WESTINGHOUSE ELECTRIC CORPORATION
NUCLEAR FUEL DIVISION
BLAIRSVILLE, PENNSYLVANIA

REPORT NO.: 99900005/82-02	INSPECTION DATES 11/16-18/82	INSPECTION ON-SITE HOURS: 22
CORRESPONDENCE ADDRESS: Westinghouse Electric Corporation Nuclear Fuel Division ATTN: Mr. W. M. Jacobi, General Manager P. O. Box 355 Pittsburgh, PA 15230		
ORGANIZATIONAL CONTACT: Mr. R. R. Cost, Operations Product Assurance Manager TELEPHONE NUMBER: (412) 373-5105		
PRINCIPAL PRODUCT: Nuclear fuel and steam generator tubing. NUCLEAR INDUSTRY ACTIVITY: Nuclear fuel and steam generator tubing supplier for Westinghouse designed cores.		
ASSIGNED INSPECTOR:	<u>I. Barnes</u> for W. M. McNeill, Reactive and Component Program Section (R&CPS)	<u>1-13-83</u> Date
OTHER INSPECTORS:		
APPROVED BY:	<u>I. Barnes</u> I. Barnes, Chief, R&CPS	<u>1-13-83</u> Date
INSPECTION BASES AND SCOPE: A. <u>BASES</u> : Westinghouse Topical Report WCAP 7800/5A. B. <u>SCOPE</u> : Manufacturing process control; nonconformance and corrective action; and control of special processes.		
PLANT SITE APPLICABILITY: Not identified.		

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INSPECTION

RESULTS:

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A. VIOLATIONS:

None

B. NONCONFORMANCES:

1. Contrary to Section 5 of the Topical Report and Specification No. NFP 31008, paragraph 3.3.1 and Table 1, there was no evidence of the submittal to and approval by the purchaser of the procedures for the outside surface finish process, inside surface finish process, chemical composition testing, and tensile testing.
2. Contrary to Section 5 of the Topical Report and the Quality Procedure, QC-300, paragraph 2.1, manufacturing at the time of this inspection did not have the latest revision of Customer Specification No. NFP 31008 listed on the QCF-3003 form in reference to Order No. 548H20313.
3. Contrary to Section 5 of the Topical Report and the Specification No. NFP 31008, paragraph 3.2, the identity of some material with respect to ingot melt number and lot number was not maintained at all stages of manufacture as evidenced by:
 - a. Two tubes of lot No. F73 2266 were found to have been mixed with lot No. F73 2257 which is from a different ingot melt number and heat treat lot number. These two tubes had been reworked on traveler card G 13448, and
 - b. In addition to the above, another tube in lot No. F73 2257 could not be accounted for by comparing inspection records with the actual piece count of the lot.
4. Contrary to Section 5 of the Topical Report and the QA Program Manual, paragraph 5.2, the quality procedures did not include the practice and application of "T tags" which are used to make engineering dispositions of nonconforming material.
5. Contrary to Section 5 of the Topical Report and the Quality Procedure, QC-103, paragraph 3.2.1, form QCF-1030 information has not been supplied by inspectors to their supervisors, although above normal reject rates have occurred.

C. UNRESOLVED ITEMS:

None

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D. OTHER FINDINGS OR COMMENTS:

1. Manufacturing Process Control - A review was made of the Westinghouse Nuclear Fuel Division (W-NFD) Topical Report, Specialty Metals Plant QA Program Manual, inspection procedures, General Order Nos. 548H20313 and 548H20321, Specification No. NFP 31008, Drawing No. 1683C8C, and Process Outline No. PEF-3564. It was noted that the Water Reactor Division's Topical Report WCAP-8370, "Quality Assurance Plan," more fully describes the Specialty Metals Plant than the W-NFD Topical Report WCAP-7800. The Specialty Metals Plant recently was incorporated into W-NFD after being a separate Water Reactor Division. It would appear that a revision of WCAP-7800 is needed to reflect the current organizations.

One requirement (paragraph 3.3.4 pertaining to end conditioning of tubes) of Specification No. NFP 31008 was deleted in Revision 16 and then reintroduced in Revision 17 without apparent approval by an Engineering Change Notice. In addition, requirements for cobalt, manganese, and uranium 235 were removed from Revision 17 also without apparent approval by an Engineering Change Notice. This will be further reviewed at the W-NFD Columbia Plant. The purchaser (Columbia Plant) reportedly has begun to revise NFD 31008 to correct these and other errors.

The failure to submit and obtain approval of some procedures was identified as a nonconformance (see B.1 above). The requirement for procedural submittals and approval was initially instituted in regard to inside surface finish and tensile testing in Revision 17 of the specification. Procedure submittal with respect to tensile testing appears to have been an error. It was noted that Revision 17 had been issued October 11, 1982; however, at the time of the inspection, it had not been officially identified on the shop floor. This was identified as a nonconformance (see B.2 above).

The file for lot No. F73 2266 which was recently processed through the last inspection operations was reviewed. The traveler or follower cards, DA tags, and rework tag associated with the lot were inspected. It was noted that 2 of the 176 tubes were mixed into another lot (F73 2257), and review of that lot established that not all of the 431 tubes had supporting inspection records. This was identified as a nonconformance (see B.3 above).

In addition, the ultrasonic (UT) nondestructive examination records were reviewed for lot No. F73 2266, and all tubes were found to be accepted. The use of current procedures, approved visual standards, and calibrated equipment was verified. The documentation of inspection on follower cards, use of proper acceptance criteria, sampling frequencies, and compliance with the process outline were verified.

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2. Nonconformance and Corrective Action - Topical Report WCAP-7800 and the quality procedures were reviewed. The control of nonconforming and reworked materials was observed on the shop floor. The computer reports of trend analysis for the past 3 months were reviewed. It was noted that during early September 1982, end squareness and sonic inspection of the "C" type fuel tube had excessive reject rates, but an above normal reject/scrap investigation report form QCF-1030 was not issued in either case. This was identified as a nonconformance (see B.5 above). The corrective action procedure appears to be in need of revision and clarification, in that corrective action is undertaken when three conditions occur; i.e., quality cost input, reject rate investigation, and returned material. It is not clear how the trend analysis data is used or how inspectors determine above normal reject rates.

"T tags" are used to enable materials to be reinspected and scrapped. Also, "T tags" are used to accept material identified as nonconforming by an inspector. A review of the inspection procedures found that the dispositioning of material by "T tags" was not addressed in procedures except for a procedure for one station. The tags could be used at a number of stations. This was identified as a nonconformance (see B.4 above).

3. Control of Special Processes - The ultrasonic flaw and dimensional inspection was witnessed and conformance to the process specification and procedure verified. The certification of the personnel and standards used was verified.

ORGANIZATION: WESTINGHOUSE ELECTRIC CORPORATION
 ELECTRO-MECHANICAL DIVISION
 CHESWICK, PENNSYLVANIA

REPORT NO.:	99900033/82-02	INSPECTION DATE(S)	12/13-16/82	INSPECTION ON-SITE HOURS:	26
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CORRESPONDENCE ADDRESS: Westinghouse Electric Corporation
 Electro-Mechanical Division
 ATTN: Mr. H. D. Ruppel, General Manager
 Cheswick Avenue
 Cheswick, PA 15204

ORGANIZATIONAL CONTACT: Mr. C. E. Owens, Product Assurance Manager
 TELEPHONE NUMBER: (412) 963-5326

PRINCIPAL PRODUCT: Pumps, control rod drives, and valves.
 NUCLEAR INDUSTRY ACTIVITY: Approximately 40 percent of the sales.

ASSIGNED INSPECTOR: W.M. McNeill 2/1/83
 W. M. McNeill, Reactive & Component Program Date
 Section (R&CPS)

OTHER INSPECTOR(S):

APPROVED BY: I. Barnes 2/3/83
 I. Barnes, Chief, R&CPS Date

INSPECTION BASES AND SCOPE:

- A. BASES: 10 CFR Part 21 and Westinghouse Topical Report WCAP-8370, Revision 9A.
- B. SCOPE: This inspection was made to follow up on reported failures of reactor coolant pump bolts at the North Anna facility of Virginia Electric and Power Company. In addition, followup was performed on the potential failure of valves to close under high differential pressures which has been identified (Cont. on next page)

PLANT SITE APPLICABILITY:

Failed reactor coolant pump bolts: 50-333/339. Potential valve closure problem: 50-454/455, 50-456/457, 50-482, 50-395, 50-400/401, 50-334, 50-424/425, 50-443/444, 50-546/547, 50-390/391, 50-486, 50-445/446, and 50-498/499.

ORGANIZATION: WESTINGHOUSE ELECTRIC CORPORATION
ELECTRO-MECHANICAL DIVISION
CHESWICK, PENNSYLVANIA

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SCOPE: (Cont.) in 10 CFR Part 50.55(e) reports by various sites. The QA programmatic area of manufacturing process controls and status of previous inspection findings were also inspected.

A. VIOLATIONS:

None

B. NONCONFORMANCES:

1. Contrary to Section 17.1.5 of the Topical Report and Section EP 8-0 of the Engineering Procedures Manual, a formal analytical report pertaining to a valve modification program at the Watts Bar, Unit 1, site was not sufficiently detailed with respect to selection of specific "Valve Factors," to allow verification of the adequacy without recourse to the originator.
2. Contrary to Section 17.1.5 of the Topical Report and Section 8.3 of the Quality Assurance Program Manual, material reidentification was not always performed by manufacturing as soon as operations permitted as evidenced by the observation by the NRC inspector of an inprocess flange plate (Drawing No. D99278, Shop Order No. 4Q173, Steam Generator Internal Manifold) which had not been serialized, although several prior operations had been performed that permitted the opportunity.
3. Contrary to Section 17.1.5. of the Topical Report and steam generator routing inspection documentation requirements, manufacturing proceeded after performance of first piece acceptance without all routing being marked "NA," as evidenced by the observation of 6 routings not being marked from a group of 10 center front covers in the same run. This condition was observed on numerous other routings.
4. Contrary to Section 17.1.5 of the Topical Report and paragraph 4.3.3.1 of the Product Assurance Instructions No. PAI 409, the bypassing of operations was not clearly indicated in writing on the work instructions for Shop Order No. 4Q173 (Steam Generator Manifold) for the following operations which had been bypassed:
 - a. An inspection operation (No. 500) on a routing for a flange plate, Serial No. 219.

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- b. Machining operations (Nos. 700 and 750) on a routing for an exit plate TR corner, Serial No. 338.
- c. The inspection function at operation No. 8200 on a rework routing for a manifold assembly, Serial No. 577.

C. UNRESOLVED ITEMS:

None

D. STATUS OF PREVIOUS INSPECTION FINDINGS:

- 1. (Closed) Nonconformance (82-01): Error Correction Tag (ECT) 869076 was observed attached to an end closure, Part 5053D73, Serial No. 1855, one of a lot of three on Shop Order 1S 80402 and not to the applicable Serial No. 1868. It was additionally noted that Serial No. 1844 of this lot had been reworked for removal of an impression stamping without documentation of this nonconforming condition on an ECT or Material Review Report.

The drawing for this part has been revised in regard to the identification of which side of the part to have the stamping. An ECT was issued to document the rework of Serial No. 1844. Work place meetings were held and documented in regard to this finding. A review of nonconforming materials on the shop floor found no further problem.

- 2. (Closed) Nonconformance (82-01): The reactor coolant pump's diffuser adaptor capscrew failures at Carolina Power and Light were reported to the WRD Safety Review Committee but were not documented on Form AEQA-1450.

An AEQA-1460 form has been issued in regard to the failures in question. It was also noted that other failures such as valve motor operator sheared pinion keys and the North Anna, Unit 1, capscrews have been documented on the AEQA-1460 form.

E. OTHER FINDINGS OR COMMENTS:

- 1. Reactor Coolant Pump Bolt Failures:

Seven of the 12 diffuser adaptor capscrews were found to have failed in August 1982 at North Anna, Unit 1. The capscrew heads were separated from the screw shank with the condition being found when the "A" pump was disassembled for removal of the flow splitter plate.

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The capscrews in the North Anna pump are preloaded and are used to bolt the diffuser adapter to the diffuser. Disassembly of pumps "B" and "C" found no evidence of similar cracking or failures. The remaining capscrews from pump "A" all showed evidence of cracking. WEMD investigation identified the failure mode by fractographic analysis of one bolt to be stress corrosion cracking. Analysis of the fractured surfaces found local concentration of chlorides to be present. These capscrews were reported to be Type 303 resulphurized stainless steel believed to have been supplied by Safety Socket Screw Corporation. WEMD has concluded that the capscrew failures did not create a safety problem, in that: (a) the design configuration results in capture of the diffuser adaptor and capscrew heads, (b) coast down would be unaffected, (c) friction drag on the impeller would be small, and (d) the resultant drop in flow rate would be within safety margins. Nine operating pumps of the same and earlier manufacturing vintage have been disassembled in the past (i.e., Surry Power Station, Units 1 and 2 - all six pumps; Prairie Island Nuclear Station, Unit 1 - one pump; Oconee Nuclear Station, Unit 1 - one pump), without evidence of this same problem. WEMD has concluded that the capscrew stress cracking failures are unique to this specific pump which is a similar position to that taken in regard to the capscrew failures at H. B. Robinson. In that the origin of the halides has not been established, verification of the WEMD position could not be made. Replacement SA 453 capscrews have been furnished to the North Anna facility.

2. Potential Failures of Valves to Close Under High Differential Pressure:

- a. Present Status - Currently, all motor operator hardware modifications have been performed except at Catawba, Units 1 and 2. Types of hardware modifications performed on specific motor operators have included one or more of the following: (1) a change to the torque limit switch set points, (2) a change of the switches from torque to limit control type, (3) a change of the spring packing, and (4) replacement of the gearing. Field Change Notices (FCNs) have been issued for all hardware modifications (see Table 1). Software modifications performed involved restricting valve applications to lower differential pressures and changing the nameplate information in this respect. FCNs have been issued for these software changes except for eight sites (see Table 1). WEMD indicated that a Quality Release Supplement will be issued re-releasing each valve at a site upon completion of all site FCNs. WEMD has supplied NSSS valves to 22 domestic nuclear sites. Direct sales of valves are being

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handled by letters to the individual utilities. Three completed FCNs were reviewed and were found to reference repair Procedure Nos. 730RP488 and 730RP495.

- b. Site Reports - WEMD reported that once FCNs have been completed for software and hardware modifications, a site report would be issued which summarized the nature, scope, and justification for changes made to each particular valve operator. Issuance of the last of these site reports is presently scheduled for June 1983. The first site report for the Watts Bar, Unit 1, site has been written. A review of this report resulted in the identification of a nonconformance (see B.1 above). The site report did not reference Engineering Memorandum EM 5672 which is the design source for the "Valve Factor" that was used in the re-evaluation of the sizing of motor operators for the 55 valves supplied to the Watts Bar, Unit 1, site.

EM 5672 is the summarization of the extensive testing program which established that the original assumptions for seat friction and to a lesser extent, differential pressure effects, were under estimated by WEMD in the original design of all nuclear valves. It was noted that the "Valve Factor" used was, in general, that recommended by EM 5672. However, for one model (3GM88) a different less conservative "Valve Factor" was used in the re-evaluation. The justification for this was apparently based on the data in EM 5672. Review of EM 5672 by the NRC inspector found that the same data indicated a more conservative "Valve Factor" was more appropriate for Model 4GM88 than the factor used.

WEMD has tentatively planned to revise the site report to clearly reference EM 5672 as the source of "Valve Factors." A revision of EM 5672 is also being considered in order to clearly identify the "Valve Factors" to be used both in general and for given models and to provide justification when less conservative valves are used.

3. Manufacturing Process Controls:

WEMD has recently established a steam generator internal manifold product line. The manufacturing routings for steam generator internal manifolds were inspected. The routings for seven different parts were reviewed. The approval of the routings, compliance with operation signoffs, inspection signoffs, identification of material, and inspection status were inspected. In this area, three nonconformances were identified. (See B.2, B.3, and B.4 above).

ORGANIZATION: WESTINGHOUSE ELECTRIC CORPORATION
NUCLEAR COMPONENTS DIVISION
PENSACOLA, FLORIDA

REPORT NO.:	99900104/82-03	INSPECTION DATE(S)	11/1-5/82	INSPECTION ON-SITE HOURS:	62
CORRESPONDENCE ADDRESS: Westinghouse Electric Corporation Nuclear Components Division ATTN: Mr. T. D. Miller, Manager, Product Assurance P. O. Box 1313 Pensacola, FL 32596					
ORGANIZATIONAL CONTACT: Mr. T. D. Miller, Manager, Product Assurance TELEPHONE NUMBER: (904) 477-0535					
PRINCIPAL PRODUCT: Nuclear steam generators, pressurizers, fuel racks, and reactor vessel internals.					
NUCLEAR INDUSTRY ACTIVITY: Approximately 65% of the Nuclear Components Division's work is devoted to the commercial nuclear power industry.					
ASSIGNED INSPECTOR:		<u>L. E. Ellershaw</u>		<u>12/13/82</u>	
		L. E. Ellershaw, Reactive & Component Program Section (R&CPS)		Date	
OTHER INSPECTOR(S): D. E. Norman, R&CPS					
APPROVED BY:		<u>I. Barnes</u>		<u>12/14/82</u>	
		I. Barnes, Chief, R&CPS		Date	
INSPECTION BASES AND SCOPE:					
A. <u>BASES</u> : 10 CFR Part 50, Appendix B.					
B. <u>SCOPE</u> : This inspection was made as a result of: (1) a 10 CFR Part 21 report by Tennessee Valley Authority (TVA) regarding damaged tubes in a steam generator supplied to Sequoyah Nuclear Plant, Unit 1; (2) a 10 CFR Part 50.55(e) Construction Deficiency Report (CDR) by TVA regarding (Cont. on next page)					
PLANT SITE APPLICABILITY:					
Docket Nos. 50-327, 50-390, 50-391, 50-438, and 50-439.					

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SCOPE: (Cont.) inadequate fracture toughness properties of steam generator lower support bolting supplied to Watts Bar Nuclear Plant, Units 1 and 2; and (3) a CDR by TVA regarding spent fuel racks provided to Bellefonte Nuclear Plant, Units 1 and 2, which were not fabricated in accordance with the applicable drawings. Additional areas inspected included welding process control, nonconformances and corrective action, and QA records.

A. VIOLATIONS:

None

B. NONCONFORMANCES:

1. Contrary to Criterion V of Appendix B to 10 CFR Part 50, QA Program Manual Section 9, and procedure PQ-04-001, welding materials were not being controlled as shown by the following identified conditions:
 - a. Holding oven No. LP-644 was labeled to show that it contained the following Type 308-15 electrodes - 1/8" lot/heat No. 8533 BQ, 5/32" lot/heat No. 0528 AQ, and 3/16" lot/heat No. DB 13-1503. Observation of the oven contents revealed that additional unlabeled 1/8" electrodes, lot/heat No. 9517, were mixed in with the labeled 1/8" electrodes;
 - b. Holding oven No. LP-01187 was labeled to show that it contained the following Type 309-16 electrodes - 5/32" lot/heat Nos. 0530 and 8550 and 1/8" lot/heat No. 8515. Observation of the oven contents revealed that the two lot/heats of 5/32" electrodes were mixed together.

As a result of these conditions, the filler metal actually used might not be identified on the weld status records, thus the validity of the basis for permanent weld history records may be questionable.

2. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and QA Program Manual Sections 9 and 10, the required visual examination of the first cladding layer on a tube sheet for Carolina Power & Light Company's H. B. Robinson Plant, Unit 2 was not performed as evidenced by lack of inspection signoff (stamp and date) on the route sheet and all passes but one of the second layer having been completed.

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3. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and QA Program Manual Section 9, during the review of a route sheet and observation of welding being performed on a steam generator transition cone being fabricated for Carolina Power & Light Company's H. B. Robinson Plant, Unit 2, the following conditions were identified:
- a. Operation 055 on the Transition Cone Route Sheet states, in part, "Sub-arc approx. half the O.D. of the 'D' seam per DWP 4148-1" DWP 4148-1 is an automatic submerged arc welding procedure;
 - b. While there were no provisions for conducting welding other than submerged arc welding (SAW), a welding supervisor violated the system by obtaining covered electrodes (5/32" E-9018) from the weld material crib attendant;
 - c. The welding supervisor provided the electrodes to a welder who proceeded to use them (a shielded metal arc welding (SMAW) process) for operation 055. The welder did record this information on the weld status sheet dated November 2, 1982; and
 - d. Subsequently, on November 3, 1982, a handwritten addition to operation 055 on the route sheet was made which stated, "Weld Seal Pass Per 4148-2." DWP 4148-2 is a SMAW procedure. However, Quality Assurance Engineering did not review this change to the route sheet.
4. Contrary to Criterion V of Appendix B to 10 CFR Part 50, QA Program Manual Section 9, and ASME Code Section II, Part C, Westinghouse accepted 91 coils of EH-14 Modified, weld wire for which the supplier did not warrant, guarantee, or certify that the product conformed to the specification. As a result and predicated on a chemical analysis review, Westinghouse typed the following statement on the supplier's CMTR: "This material conforms to the requirements of ASME Code Section II - Part C SFA 5.9 and ASME Section III, Subsection NB, Subarticle 2400, 1980 Edition W'80 Addenda." This statement was attested to, with signature, by a Westinghouse welding engineer and a quality assurance engineer.

This welding material does not conform to the requirements of ASME Code Section II, Part C, SFA 5.9 (a specification for corrosion resisting chromium and chromium-nickel electrodes) in that the chemistry was actually in accordance with SFA 5.17 (a specification for ferritic electrodes for SAW).

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C. UNRESOLVED ITEMS:

None

D. OTHER COMMENTS OR FINDINGS:

1. 10 CFR Part 21 Report: TVA notified the NRC with a 10 CFR Part 21 report dated September 1981 that 12 first-row tubes in each steam generator at Sequoyah Nuclear Plant, Unit 1 have surface damage. The damage was identified as being caused by a flow-induced vibration from the tube lane blocking devices.

The tube lane blocking devices were originally installed to improve steam generator performance and were either ordered as an option by the utility companies or were designed and installed by the utility companies. When ordered, the devices were installed by Westinghouse prior to delivery of the steam generator. During normal maintenance operations, the device is removed and reinstalled by the utilities in accordance with Westinghouse Procedure No. S.P. 2.7.2, Revision 4, dated March 11, 1982.

Current steam generators being produced do not have tube lane blocking devices since the performance improvement due to the device has proven to be minimal. Review of installation could not, therefore, be performed during the inspection. No basis was established to indicate that Westinghouse was responsible for the identified problem.

2. Nonconforming Material: Implementation of Quality Assurance Program Manual Section 15, "Nonconforming Material," was evaluated by observing shop practices regarding documentation and identification and segregation of nonconforming material. Ten Material Review Reports (MRRs) were also reviewed for proper approvals and dispositions. Shop routing sheets were reviewed to determine if the MRRs were documented for rework when required. No nonconformances or unresolved items were identified in this area.

3. Corrective Action: The Quality Assurance Program Manual Section 16, 10 MRRs, and 6 Product and Process Review Forms were reviewed in order to evaluate the adequacy of corrective actions taken to correct defective material and to assess generic aspects and the effectiveness of analyses and decisions made to correct causes of defects. No nonconformances or unresolved items were identified in this area.

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4. Quality Assurance Records: The customer data package and other related production and quality assurance records for a steam generator manufactured under Shop Order GBGT 1981 were reviewed. A detailed review was made of the quality release, deviation notices, material certifications, and welder certifications. In addition, the welding material heat lots (test numbers) shown on the welding information chart for the CL seam (upper transition section) were reviewed for compliance with Detail Manufacturing Procedure (DMP) 4148-1/2. The postweld heat treat temperature chart was also evaluated to determine time and soak temperature compliance with requirements of DMP 5524. The QA records were complete and appeared to meet all requirements. There were no non-conformances or unresolved items identified in this area.
5. 10 CFR Part 50.55(e) CDR: TVA notified the NRC with a CDR on March 17, 1981, that Westinghouse fabricated spent fuel storage racks supplied to Bellefonte Nuclear Plant, Units 1 and 2 were not fabricated in accordance with Westinghouse drawings.

The NRC inspector reviewed the rack assembly drawings, route sheets, MRKs, nonconformance reports submitted to TVA, Procedure QIP-3120, "Bellefonte Fuel Rack Verticality Inspection," and the Westinghouse quality releases for five fuel rack assemblies provided to Bellefonte. QIP-3120, Revision 0, dated October 8, 1980, through Revision 2, dated December 23, 1980, is identified on the route sheets as the inspection procedure to be used. Paragraph 1 states, in part, "The purpose of this inspection is to determine whether the individual cells in a rack assembly are vertical within the design requirements"

Paragraph 4 states, in part, "Initiate MRR if all cells are not within drawing tolerance 0.088" . . . Use as many recording sheets as required to document the verticality for entire rack" Pages 3 and 4 give detailed explicit instructions of how to set up, inspect, and calculate verticality.

Westinghouse identified verticality dimensions outside the drawing tolerance of 0.088" and initiated MRRs. After Westinghouse approved the MRR's, nonconformance reports (NCRs) were submitted to TVA for their approval. All of the NCRs contained the same information as the MRRs. The NCRs were approved by TVA and the fuel racks were subsequently shipped to the Bellefonte site after Westinghouse Quality Releases had been generated. The Quality Releases were also signed by a TVA representative.

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The verticality tolerances have been the only dimensional problems identified to Westinghouse by TVA, and these were approved by TVA prior to shipment.

6. 10 CFR 50.55(e) CDR: TVA notified NRC by CDR on June 10, 1982, that steam generator tower support bolts supplied to Watts Bar Nuclear Plant, Units 1 and 2 may not meet ASME bolting requirements for at-temperature conditions, and fracture toughness data indicates that stress requirements may not be met. It was further identified that Sequoyah Nuclear Plant, Units 1 and 2 are affected.

The NRC inspector was informed that Westinghouse, Nuclear Technology Division was responsible for the design and analysis of the steam generator vertical support bolting hardware. Westinghouse Equipment Specification No. G-678883, Revision 0, dated April 28, 1972, "Reactor Coolant System Component Supports," specifically addresses the use of Carpenter "Custom 455" bolts and specifies the required Charpy V-notch impact tests for ductile to brittle transition temperature, including lateral expansion. TVA, Westinghouse's customer, was responsible for the procurement of this bolting hardware in accordance with the equipment specification.

7. Welding Process Control: The NRC inspector reviewed six Welding Procedure Specifications (WPSs) and their Procedure Qualification Records, welding material certified material test reports, weld wire/flux "marriage" test reports, route sheets involving welding operations, and Weld Data Sheets. The weld material holding ovens and their contents were observed, and the method by which welding material is issued to welders and welding operators was reviewed. Automatic SAW, automatic gas metal arc welding, and SMAW operations were observed.

As a result of the observations and review, nonconformances B.1 through B.4 were identified.

Comment: Quality Inspection Procedure 3169, Revision 01, dated May 14, 1982, addresses the verification only of preheat and interpass temperatures by QC inspectors. Page 3 of the procedure consists of a Quality Control Weld Log to record the verification activities. In addition, there are columns for the recording of: the WPS being used; Electrode Type, heat code number, and diameter; flux type and heat code number; the welder's number; and the route sheet operation number. Other columns show verification of volts, amps, and travel speed simply by making a checkmark.

ORGANIZATION: WESTINGHOUSE ELECTRIC CORPORATION
NUCLEAR COMPONENTS DIVISION
PENSACOLA, FLORIDA

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While the procedure, which this log is a part of, only addresses the required preheat and interpass temperature verification, QC inspectors have been recording the other information.

Upon review of several Quality Control Weld Logs, it was observed that QC inspectors had recorded incorrect electrode heat code numbers, diameters, and welder number.

The NRC inspector expressed concern over the validity of the required temperature verification based upon the erroneous entries for the nonrequired information columns.

ORGANIZATION: WESTINGHOUSE ELECTRIC CORPORATION
COMPUTER AND INSTRUMENTATION DIVISION
TEMPE, ARIZONA

REPORT NO.:	99900280/82-01	INSPECTION DATE(S)	12/6-9/82	INSPECTION ON-SITE HOURS:	26
CORRESPONDENCE ADDRESS: Westinghouse Electric Corporation Computer and Instrumentation Division ATTN: Mr. T. R. Fisher, Operations Manager 1441 Alameda Drive Tempe, AZ 85282					
ORGANIZATIONAL CONTACT: Mr. J. Murphy, Quality Assurance Manager TELEPHONE NUMBER: (602) 968-3170					
PRINCIPAL PRODUCT: Electronic pressure transmitters.					
NUCLEAR INDUSTRY ACTIVITY: The current production of nuclear Class 1E equipment represents approximately 40 percent of total annual sales.					
ASSIGNED INSPECTOR:	<u>J. W. Sutton</u> J. W. Sutton, Reactive and Component Program Section (R&CPS)			<u>1-25-83</u> Date	
OTHER INSPECTOR(S):					
APPROVED BY:	<u>I. Barnes</u> I. Barnes, Chief, R&CPS			<u>1-26-83</u> Date	
INSPECTION BASES AND SCOPE:					
A. <u>BASES</u> : 10 CFR Part 50, Appendix B and 10 CFR Part 21.					
B. <u>SCOPE</u> : Management meeting, status of previous inspection findings, 10 CFR Part 21 inspection, nonconformances/corrective action, and audits.					
PLANT SITE APPLICABILITY:					
Not identified.					

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A. VIOLATIONS:

None

B. NONCONFORMANCES:

1. Contrary to Criterion V of Appendix B to 10 CFR Part 50, Section 4.0 and subparagraph 5.2.4 of Computer and Instrumentation Division (C&ID) Quality Assurance Procedures and Standards (QAPS) No. 209, and Section 7.0 of QAPS No. 215:
 - a. Five completed pressure transmitters were observed in the inspection area with Material Disposition Reports attached and identified as scrap material. None of the items had an Error Correction Tag attached.
 - b. A locked panel had not been provided for scrap disposal.
 - c. Fifteen discrepant component parts for pressure transmitters were observed in an inspection area that had not been tagged with manilla tags.
2. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraphs 18.1, 18.2, and 18.3 in Section 18, Revision 2 of the C&ID Quality Control Program:
 - a. C&ID did not have a documented program of planned internal audits to verify compliance with the Quality Control Program.
 - b. Auditors were performing audits of areas in which they had direct responsibility.
 - c. Documentation was not available which would confirm that auditors had either sufficient experience or had received commensurate training.
3. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 7.5 in Section 7, Revision 3, of the C&ID Quality Control Program, C&ID had not established a program for the periodic audit of approved suppliers. This determination was made based on the absence of any documented audit frequency requirements and the identification that 70 percent of Type 1 (Critical) vendors had not been resurveyed in over 5 years.

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C. UNRESOLVED ITEMS:

None

D. STATUS OF PREVIOUS INSPECTION FINDINGS:

(Resolved) Unresolved Item (78-01): Design tests/production tests - Final design/qualification tests are awaiting final evaluation and documentation to verify compliance with criteria for Class 1E products.

The NRC inspector reviewed documentation received by C&ID pertaining to the final qualification tests for the C&ID Level B transmitter, Model 32-Series 2. The documentation consisted of the summary and analysis of the tests made to qualify the transmitter. Review of the documentation indicated that all tests and requirements had been met.

E. OTHER FINDINGS OR COMMENTS:

1. Management Meeting - A management meeting was held with C&ID management personnel to acquaint them with the organizational and program changes that have taken place within the NRC and Vendor Program Branch since the initial inspection performed in 1978. Information was given as to the types of documents generated and processed in implementing the inspection program. C&ID's nuclear production activities were reviewed to aid in determination of future required inspections.
2. 10 CFR Part 21 Inspection - The NRC inspector reviewed C&ID's policy for evaluation and reporting of 10 CFR Part 21 items. Posting was checked with respect to 10 CFR Part 21 requirements and was found to be in compliance with the regulation. The NRC inspector also reviewed two items which had been reviewed and disposed of according to the review procedure.

Within this area, no violations were identified.

3. Nonconformance/Corrective Action - The NRC inspector reviewed Sections 15 and 16 of the C&ID Control Manual. In addition, QA procedures for risk defect reporting were reviewed for content. The NRC inspector reviewed seven nonconformance reports which were applicable to items observed on the assembly floor and inspected areas which had been

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designated for segregating nonconforming materials. One nonconformance was identified with respect to the observation of discrepant parts and assemblies in the test and assembly areas which did not contain the proper nonconformance identification (see paragraph B.1).

4. Audits - The NRC inspector reviewed Section 18 of C&ID's Quality Control Manual and related QA documents for compliance with NRC and C&ID program requirements. The NRC inspector also reviewed the results of available internal and management audits that had been conducted by QA personnel. An examination was made of the corrective actions taken as a result of the above audits. The NRC inspector also reviewed program requirements and results of audits conducted on subvendors. As a result of the review, two nonconformances were identified in this area of the inspection (see paragraphs B.2 and B.3).

ORGANIZATION: WESTINGHOUSE ELECTRIC CORPORATION
NUCLEAR TECHNOLOGY DIVISION
FOREST HILLS, PENNSYLVANIA

REPORT NO.: 99900900/83-01	INSPECTION DATE(S) 1/24-28/83	INSPECTION ON-SITE HOURS: 81
CORRESPONDENCE ADDRESS: Westinghouse Electric Corporation Nuclear Technology Division ATTN: Dr. R. J. Slember, General Manager P. O. Box 355 Pittsburgh, PA 51230		
ORGANIZATIONAL CONTACT: Mr. P. T. McManus, Manager, Product Assurance TELEPHONE NUMBER: (412) 273-7988		
PRINCIPAL PRODUCT: Power plant component testing		
NUCLEAR INDUSTRY ACTIVITY: The Forest Hills test laboratory performs developmental, verification, and qualification testing of both nuclear and nonnuclear power plant components. Equipment qualification testing of nuclear power plant safety-related equipment is approximately 15% of the lab's work.		
ASSIGNED INSPECTOR: <u>G. T. Hubbard</u> G. T. Hubbard, Equipment Qualification Section (EQS)		<u>3/10/83</u> Date
OTHER INSPECTOR(S): D. G. Breaux, Reactor Systems Section L. D. Bustard, Consultant, Sandia National Laboratories		
APPROVED BY: <u>H. S. Phillips</u> H. S. Phillips, Chief, EQS		<u>3/10/83</u> Date
INSPECTION BASES AND SCOPE: A. BASES: 10 CFR Part 21; 10 CFR Part 50, Appendix B; and Topical Report (TR) No. WCAP-8370. B. SCOPE: This inspection consisted of: (1) review of Quality Assurance (QA) Manual (TR No. WCAP-8370) and supplemental procedures, and (2) verification of the implementation of the QA requirements and procedures. The 18 criteria of 10 CFR Part 50, Appendix B were inspected. The inspection included review of Forest Hills' compliance with 10 CFR Part 21 requirements.		
PLANT SITE APPLICABILITY: Not Identified		

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<p>A. <u>VIOLATIONS:</u></p> <p>None</p> <p>B. <u>NONCONFORMANCES:</u></p> <ol style="list-style-type: none">1. Contrary to paragraph 17.1.5 of TR No. WCAP-8370, Revision 9A, Amendment 1, dated February 13, 1981, documented procedures were not established that described the control of route cards used by Westinghouse to control equipment qualification items while in their Forest Hills test laboratory.2. Contrary to paragraph 17.1.5 of TR No. WCAP-8370, Revision 9A, Amendment 1, dated February 13, 1981, and paragraph A of Test Engineering and Operations Material Control Procedure No. S.E. T.E.O MC-1, Revision 2, dated June 14, 1982, the material control attendant did not verify that incoming material accepted by shipping and receiving personnel was in conformance with the purchase order. <p>C. <u>UNRESOLVED ITEMS:</u></p> <p>None</p> <p>D. <u>OTHER FINDINGS OR COMMENTS:</u></p> <ol style="list-style-type: none">1. <u>QA Program Review:</u> The QA program is described in "QA Manual, TR No. WCAP-8370," and three supplemental documents: (1) "Water Reactor Division's Policy and Procedure Manual," WCAP-9550; (2) "Nuclear Technology Division's Design Control Manual, WCAP-9565"; and (3) "Test Engineering and Operations Policies and Procedures (TEO/PP)." These documents establish a QA program in accordance with the 18 criteria of 10 CFR Part 50, Appendix B. The NRC inspectors' review of the QA program consisted of an examination of the four documents. <p>During the program review, the NRC inspector identified one nonconformance (see nonconformance described in paragraph B.1) and one area where procedure clarification was recommended. The procedure needing clarification concerned the documentation required by</p>		

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test personnel in the event that a deviation from approved test procedures occurred during test performance. The NRC inspector's review of QA implementation verified that documentation of deviations was being accomplished; however, Forest Hills' personnel agreed to clarify their procedures so there would be no confusion regarding responsibilities for documenting test procedure deviations. The revision of the procedure will be reviewed during a future inspection.

2. QA Program Implementation Review: The NRC inspectors verified the implementation of the QA program procedures by examining representative records and files, by conducting interviews with personnel, and by visual inspections and observations.

Comments concerning the implementation of the 18 criteria of 10 CFR Part 50, Appendix B as described in TR No. WCAP-8370 and implementing procedures are as follows:

- a. Organization: The NRC inspector verified organizational structures including functional responsibilities and authorities by discussions with the Manager, Test Reliability and reviewing organizational charts, the TR, and other supporting documents. The Manager, Test Reliability reports to the Manager, Test Engineering and Operations and has the authority to stop work pending resolution of quality matters. No nonconformances were identified.
- b. Quality Assurance Program: The NRC inspector evaluated this criterion by verifying that a QA program was established by the TR and by verifying the implementation of the 18 criteria of 10 CFR Part 50, Appendix B. Evaluation of two training record folders verified that established training requirements of the QA program were being accomplished. No nonconformances were identified.
- c. Design Control: The NRC inspector's review of the TEO/PP established that Forest Hills does not develop or approve test procedures. These tasks are the responsibility of Forest Hills' customers, regardless of whether or not the customer is internal or external to the Westinghouse corporate organization. This criterion is not applicable to the lab's present equipment qualification operations.

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- d. Procurement Document Control: The NRC inspector verified that Forest Hills was complying with their procedures by review of four outgoing purchase orders (PO) or purchase requisitions and interviews with QA personnel and a senior buyer. The review of PO's verified QA involvement in PO review and that appropriate QA and technical requirements are being called out in PO's. No nonconformances were identified.
- e. Instructions, Procedures, and Drawings: The NRC inspector reviewed the TR to assure that all critical areas of this criterion were addressed. Ten procedures of the TEO/PP were reviewed to verify implementation of commitments. Additional verification was achieved by evaluating the implementation of the other criteria described in procedures of the TR and other supporting documentation. No nonconformances were identified.
- f. Document Control: The NRC inspector evaluated the implementation of the TR and supplemental procedures to determine if documents were adequately controlled. Four PO's, four Material Rejection Notices (MRNs), and four procedures (and subsequent revisions) were reviewed to determine that changes were reviewed and approved by authorized personnel and revised procedures were available to personnel using the documents. No nonconformances were identified.
- g. Control of Purchased Material, Equipment and Services: The NRC inspectors verified the implementation of QA procedures for the control of purchases. This verification was accomplished by an NRC evaluation of the current vendor audit file, the latest qualified suppliers' list, five receiving inspection reports, and interviews with material control and QA personnel. No nonconformances were identified.
- h. Identification and Control of Materials, Parts, and Components: The NRC inspector evaluated the implementation of the TR and supplemental procedures to assure adequate identification and control of materials, parts, and components. The NRC inspector reviewed five items received and in testing applications to verify procedural implementation. No nonconformances were identified.

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- i. Control of Special Processes: The NRC inspector ascertained that the lab has procedures to control their special processes and the qualification of personnel; however, the laboratory does not perform special processes in connection with equipment qualification.
- j. Inspection: The NRC inspector evaluated the implementation of the TR and supplemental procedures which outlined specific inspection responsibilities and commitments. Five receiving inspections, two in-process inspections, and four final inspections (Quality Control Release) were reviewed to assure implementation. The inspector identified one nonconformance (see nonconformance described in paragraph B.2) in the implementation of this criterion. Prior to the conclusion of this inspection, Westinghouse management had initiated steps to correct this nonconformance.
- k. Test Control: The NRC inspector evaluated Forest Hills' implementation of their TEO/PP test procedures which include obtaining customer approval of routing cards, test setups, and test instrumentation. NRC review of two test reports, one test file, and two routing cards plus discussions with a test engineer and test reliability personnel verified that the implementation of test procedures was being accomplished. No nonconformances were identified.
- l. Control of Measuring and Test Equipment: The NRC inspector evaluated Forest Hills' calibration system by reviewing the TEO/PP, the TR, two calibration procedures, three instrument calibration files, the calibration corrective action file, and the calibration lab purchase requisition file. The evaluation also included observing a test setup and verifying calibration and traceability to the National Bureau of Standards (NBS) of three test instruments. The inspector found the system complied with the requirements of their TR and TEO/PP. No nonconformances were identified.
- m. Handling, Storage, and Shipping: The NRC inspector evaluated the implementation of the TR and supplemental procedures which control handling, storage, and shipping activities. The NRC inspector inspected five items that had been received and stored offsite and found that these items were dispositioned according to procedures. The inspector also inspected four items that were received and stored in assigned areas. No nonconformances were identified.

ORGANIZATION: WESTINGHOUSE ELECTRIC CORPORATION
NUCLEAR TECHNOLOGY DIVISION
FOREST HILLS, PENNSYLVANIA

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- n. Inspection, Test, and Operating Status: The NRC inspector evaluated the implementation of the TR and supplemental procedures which control inspection, test, and operating status activities. Four items were inspected to assure that tags were on these items to identify QC inspection status. No nonconformances were identified.
- o. Nonconforming Materials, Parts, or Components: The Forest Hills lab uses red "Hold" tags, MRN, and Deviation Notices (DN), as described in the TEO/PP, to control nonconforming items. The NRC inspector was able to verify compliance with procedural requirements by review of two daily material control reports, four quality control releases, four DN's, two MRN's, the DN log, and one test file. No nonconformances were identified.
- p. Corrective Action: The NRC inspector verified that the TR and TEO/PP procedures for corrective action were being followed by Forest Hills. This verification was accomplished by examination of four DN's, four quality control releases, the vendor audit file, and the calibration corrective action file. Corrective action activities were found to be appropriate for the situations and in compliance with the requirements of procedures. No nonconformances were identified.
- q. Quality Assurance Records: The NRC inspector evaluated the implementation of the TR and supplemental procedures which control QA records. The Records Flow Schedules were reviewed relative to proper identification and storage of QA records. Based on the review of specific QA records (i.e., inspection reports, audits, personnel qualification) and verification that QA records were properly identified and stored, control of QA records is adequate. No nonconformances were identified.
- r. Audits: The NRC inspector evaluated the implementation of the TR and supplemental procedures which assure the establishment of audit responsibilities. Three internal audits were reviewed and it was found that all responsibilities are being implemented properly. The inspector also reviewed the qualification records of the auditors and found them to be in proper order. No nonconformances were identified.

ORGANIZATION: WESTINGHOUSE ELECTRIC CORPORATION
NUCLEAR TECHNOLOGY DIVISION
FOREST HILLS, PENNSYLVANIA

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<p>3. <u>10 CFR Part 21 Review</u>: The NRC inspector verified Forest Hills' compliance with the requirements of 10 CFR Part 21 by examining the bulletin board postings of 10 CFR Part 21, Section 206 of the Energy Reorganization Act of 1974, and a notice describing their 10 CFR Part 21 procedure (WRD-OPR-19.0, Revision 2, dated December 18, 1980). The notice describes where the procedures can be examined and to whom to report 10 CFR Part 21 findings. The inspector examined the 10 CFR Part 21 procedure and verified inclusion of 10 CFR Part 21 in two outgoing PO's. No violations were identified.</p>		

ORGANIZATION: WOOLLEY MANUFACTURING DIVISION
W. J. WOOLLEY COMPANY
CANTON, OHIO

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CORRESPONDENCE ADDRESS: Woolley Manufacturing Division
W. J. Woolley Company
ATTN: Mr. C. A. O'Deay, QA Manager
1545 Whipple Road
Canton, OH 44710

ORGANIZATIONAL CONTACT: Mr. C. A. O'Deay, QA Manager
TELEPHONE NUMBER: (216) 477-4585

PRINCIPAL PRODUCT: Containment penetrations
NUCLEAR INDUSTRY ACTIVITY: Approximately 90%

ASSIGNED INSPECTOR: R. E. Oller 12-20-82
R. E. Oller, Reactive & Component Program Section (R&CPS) Date

OTHER INSPECTOR(S):

APPROVED BY: I. Barnes 12-20-82
I. Barnes, Chief, R&CPS Date

INSPECTION BASES AND SCOPE:

- A. BASES: 10 CFR Part 50, Appendix B.
- B. SCOPE: This inspection was performed to evaluate the implementation of the vendor's QA program in the areas of: status of previous inspection findings; manufacturing process control; and nonconformances and corrective action. In addition, a followup was made concerning: (1) a 10 CFR Part 50.55(e) report (Cont. on next page)

PLANT SITE APPLICABILITY:

McGuire, Unit 2, 50-370; River Bend, Unit 1, 50-458; Midland, Units 1 and 2, 50-329/330.

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SCOPE: (Cont.) by Duke Power Company concerning defects in airlock doors at McGuire, Unit 2, and (2) a report by Gulf States Utilities concerning unacceptable welds in an airlock at River Bend, Unit 1.

A. VIOLATIONS:

None

B. NONCONFORMANCES:

None

C. UNRESOLVED ITEMS:

None

D. STATUS OF PREVIOUS INSPECTION FINDINGS:

(Closed) Nonconformance (81-01): Failure to provide QA signatures to show approval on drawings, fabrication change notices, inprocess sheets, and shop order supplements for two nuclear contracts as required by Woolley Manufacturing Division (WMD) QA Manual Section 6.0 and Section "Definitions."

The NRC inspector verified that in accordance with the vendor's response letter dated December 12, 1981, the WMD QA Manager issued and implemented Corrective Action Request No. 004 dated December 1, 1981, which requested that all drawings must have a QA approval signature prior to release to the shop, and the other three above types of documents must be revised to include provisions for QA approval signatures.

Review of the above four types of completed documents for current nuclear Shop Order Nos. 12452N and 12453N verified that the required QA approval signatures were provided.

E. OTHER FINDINGS OR COMMENTS:

1. Manufacturing Process Control: The NRC inspector reviewed six sections in the WMD QA Manual which were applicable to manufacturing, inspection, and test of containment airlocks.

Observations were made of the shop facilities and of inprocess retrofit work on airlock doors for Midland, Units 1 and 2.

ORGANIZATION: WOOLLEY MANUFACTURING DIVISION
W. J. WOOLLEY COMPANY
CANTON, OHIO

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A review was made of documents common to the inprocess retrofit work on airlock doors for Midland, Unit 1, in order to verify fabrication was consistent with ASME Code requirements. Documents examined included: weld drawings, a drawing revision level list, inprocess sheet travelers, QA department's welder documentation, three welding procedure specifications and their supporting procedure qualification records, three qualified nondestructive examination (NDE) procedures, NDE personnel qualification records, three NDE reports for completed welds, and four weld cards.

Within this area, no nonconformances or unresolved items were identified.

2. Nonconformances and Corrective Action: The NRC inspector reviewed Sections 16.0 and 17.0 of the WMD QA Manual, and verified implementation of QA program commitments by examination of: 10 "Inspection Reports for Nonconforming Material" applicable to Shop Order Nos. 12452N and 12453N; 6 "Material and Weld Repair Reports" for Shop Order No. 29013N; and 2 "Repair Procedure" inprocess sheet travelers for Shop Order No. 29013N.

Observations were made of the attachment of QA Red Tags for items being held for disposition.

Within this area, no nonconformances or unresolved items were identified.

3. Duke Power Company/McGuire, Unit 2 10 CFR 50.55(e) Report:

- a. Introduction:

The NRC was notified by Duke Power Company (DPC) in a 10 CFR Part 50.55(e) report dated September 14 and October 9, 1981, concerning defects found during dye penetrant (PT) examination of DPC welding alterations to the personnel airlock (PAL) doors at McGuire, Unit 2. These PAL doors were designed by the W. J. Woolley Company (WJW) of River Forest, Illinois; fabricated by Progressive Fabricators of St. Louis, Missouri, and repaired at Irwin Steel Fabricators (ISF) of Canton, Ohio. The ISF plant was subsequently acquired by WJW and is now the Woolley Manufacturing Division (WMD).

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In March and April 1981, during PT examination of alteration welding performed by DPC on the PAL doors for mounting of ASME Class 2 reserve air tanks, several ASME Code rejectable PT indications were found in the adjacent base metal. These indications were located directly behind previously made plug weld repairs of unacceptable inflatable door seal clamp bolt holes. The repairs had been performed in 1979 by ISF.

Each plugged hole location was ground, PT examined, and verified as meeting ASME Code requirements. The PAL doors were then returned to the McGuire Station in 1980.

The above bolt hole deficiencies were identified in NRC Report Nos. 99900389/79-01 and 80-01.

DPC has indicated that the reported unacceptable PT indications in the areas of the plugged bolt holes occurred as a result of flame cutting and welding during their retrofit work. DPC indicated that repairs would be made at the site in accordance with owner's approved procedures and ASME Code requirements. The repair work was to be completed by December 31, 1981.

- b. Findings: During this inspection, the NRC inspector verified that both the WJW and WMD QA Managers were notified of the problem by receipt of a copy of the DPC 10 CFR Part 50.55(e) report. After completion of the repairs, DPC sent copies of DPC's Class 2 modification drawings to WJW for use in future maintenance service.

The NRC inspector reviewed the ISF bolt hole repair records and verified that the repair, inspection, and documentation activities for the McGuire PAL doors were in accordance with the ASME Code requirements, and the Authorized Nuclear Inspector and QC representatives of ISF and DPC had accepted the repairs prior to the doors being returned to the McGuire site. The records which were reviewed consisted of: four repair procedure travelers, an ISF letter concerning DPC's QC representative having reviewed and accepted the repair documentation, an ISF "Acceptance Inspection Report," DPC's QA Department's "Supplier QA Certifications" for the four doors, two ASME Code required "Manufacturer's Report of Welded Repairs or Alterations," three welder qualifications, the qualified PT procedure used, and the resulting PT report of final examination. The information in the DPC 10 CFR Part 50.55(e) report appeared to be correct in regard to the acceptable repair of bolt holes prior to the discovery of PT indications during the Class 2 modification work.

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4. Gulf States Utilities/River Bend, Unit No. 1 Report:

- a. Introduction: Gulf States Utilities (GSU) reported to the NRC on July 2, 1982, a potential reportable construction deficiency. The report identified the deficiency as unacceptable surface indications in the shop weld which attaches the personnel airlock barrel to the containment insert plate. On October 6, 1982, GSU notified the NRC by written report that they had completed their investigation and determined that the imperfections were not reportable under 10 CFR Part 50.55(e).

- b. Findings: The NRC inspector verified by review of WMD fabrication records that the subject weld was completed and then accepted by WMD, the Authorized Nuclear Inspector, the Graver Energy Services QC representative, and the Stone and Webster QA representative. No nonconformances to ASME Code requirements were identified. Discussions with the WMD Plant QA Manager indicated that he had been informally notified of the weld condition by a Graver employee, but he had not been notified about the field disposition. The records reviewed by the NRC inspector consisted of: a weld map drawing, the WMD inprocess sheet traveler, magnetic particle final inspection report No. 17, and the Stone and Webster/Graver Energy Service Certificate of Compliance for the airlock.

ORGANIZATION: THE ZACK COMPANY
CHICAGO, ILLINOIS

REPORT NO.:	99900785/82-01	INSPECTION DATE(S)	8/3-6/82 & 9/10/82	INSPECTION ON-SITE HOURS:	85
CORRESPONDENCE ADDRESS: The Zack Company ATTN: Mrs. Christene Zack DeZutel President 4600 W. 12th Place Chicago, Illinois 60650					
ORGANIZATIONAL CONTACT: Mrs. Christene Zack DeZutel TELEPHONE NUMBER: (312) 242-3434					
PRINCIPAL PRODUCT: Heating, Ventilation, and Air Conditioning (HVAC).					
NUCLEAR INDUSTRY ACTIVITY: Current activity consists of HVAC systems being furnished to the Commonwealth Edison Company's LaSalle County Station, Units 1 and 2; Illinois Power Company's Clinton Power Station, Unit 1; and Consumers Power Company's Midland Plant, Units 1 and 2.					
ASSIGNED INSPECTOR: <u><i>L. E. Ellershaw</i></u> L. E. Ellershaw, Reactive & Component Program Section (R&CPS)				9/29/82 Date	
OTHER INSPECTOR(S): J. T. Conway, R&CPS L. B. Parker, R&CPS					
APPROVED BY: <u><i>I. Barnes</i></u> I. Barnes, Chief, R&CPS				9/29/82 Date	
INSPECTION BASES AND SCOPE:					
A. BASES: Appendix B to 10 CFR Part 50.					
B. SCOPE: This inspection was conducted as a result of the receipt by the Nuclear Regulatory Commission (NRC) of allegations pertaining to implementation and enforcement of The Zack Company quality assurance program, and was performed in conjunction with an investigation by the Chicago Field Office of the NRC Office of Investigation. Specific findings pertaining to the allegations are contained in NRC Report No. 99900785/82-02. The main (cont. on next page)					
PLANT SITE APPLICABILITY:					
50-373; 50-374; 50-329; 50-330; 50-461.					

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SCOPE: Cont. purposes of this inspection were to assist the investigative staff in the evaluation of identified concerns, and to establish whether HVAC system manufacture was consistent with applicable codes, contractual, and regulatory requirements. To make this determination, the primary areas selected for inspection were welding process control, nonconformances and corrective action, audits, indoctrination and training, document control, QA records, procurement document control, welder qualifications, and implementation of 10 CFR Part 21.

A. VIOLATIONS:

None

B. NONCONFORMANCES:

1. Contrary to Criterion V of Appendix B to 10 CFR Part 50, QA Manual Section 10, and AWS D1.1-79, the NRC inspector observed deviations being permitted and changes to essential variables being made without the procedure being requalified during gas metal arc welding (GMAW) of duct rings for the Midland Plant, in which the welder was using 0.035 inch diameter weld wire, 125 amps, and a gas flow rate of 30 CFH. The procedure requires the use of 0.045 inch diameter weld wire, 195 amps, and gas flow rate of 20 CFH. This was the only in-process welding observed by the NRC inspector during this inspection.
2. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Procedure QCP-29, the following conditions were identified:
 - a. Electrodes (bare wire on spools) were not being protected, in that three spools of stainless steel electrodes, each of a different type, were observed under a work bench in an uncovered condition. Further, two spools had been issued on December 17, 1981, and the other on April 16, 1982.
 - b. Traceability of these electrodes would be precluded when used at a time later than the issue date, in that the date of issue as shown on the weld material control sheet would not coincide with the date of actual welding on a specific Zack Company traveler.
3. Contrary to Criterion V of Appendix B to 10 CFR Part 50, QA Manual Section 6, and AWS D1.1-79, full and complete information requiring location, type, size, and extent of welds, weld joints, and material preparation, was not shown on shop travelers/detail drawings provided to shop personnel. The only information provided is the welding procedure specification number, which does not delineate the above information.

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<p>4. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and QA Manual Section 10, instructions, procedures, or drawings did not include appropriate qualitative acceptance criteria for welds. Therefore, without acceptance criteria being stipulated, specific inspection requirements were not set forth in welding procedures.</p> <p>5. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and QA Manual Section 7, shop fabrication tickets were not complete in all respects, in that they did not address certain fabrication methods/operations, and their sequencing; e.g., rolling or forming and galvanizing.</p> <p>6. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and QA Manual Section 8, the following conditions were identified:</p> <ul style="list-style-type: none">a. The Zack Company placed purchase order (PO) Number C-4199 with Central-West Machinery Company in November 1980 for 152 gallons of Hardcast FTA-20. This material was received and accepted. Subsequently, a verbal order for an additional 24 gallons was placed and received in November 1980, and as of the date of this inspection, no written confirmation has been made.b. The Zack Company placed PO number C-874 with Griffiths-McKillen Steel Company on July 5, 1979, for 3000 lbs. of 14 gage ASTM A-240 Type 304-2B stainless steel and 600 feet of 1½ x 1½ x 1/8 stainless angles, ASTM A-276 Type 304, with certifications required. The received and accepted certification, dated July 18, 1979, for the ASMT A-240 material showed the following: tensile strength-66,000 psi, phosphorus-0.38; sulfur-0.06; and nitrogen content was not addressed. The ASTM A-240 standard requires 70,000 psi tensile strength (minimum), 0.045 maximum phosphorus, 0.03 maximum sulfur, and 0.10 maximum nitrogen. (NOTE: This material was ordered as nonsafety-related; however, it does indicate inadequacy of the receiving inspection function.)c. The Zack Company placed PO number C-4458, dated July 30, 1981, with Hobart North for 30 lbs. stainless steel weld rod, 3/32" Type 308. The PO stated "Actual or Typical Chemistry, RT (radio-graphy), mechanicals, Charpy V notch tests."		

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The Certified Material Test Report (CMTR) was received and accepted by Zack Company, but did not address RT or Charpy V notch tests. (NOTE: The material specification does not require RT or Charpy's; however, it is still a PO requirement.)

- d. The Zack Company placed PO Number C-9453, dated August 4, 1976, with Vincent Brass & Aluminum Company for 4000 lbs. of 20 gage and 2000 lbs. of 22 gage stainless coils, Type 316, ASTM A-240, with mill certification required.

The material was received with a certification, dated August 9, 1976. The 20 gage material was returned to Vincent due to damage. However, the 22 gage material was accepted, although the certification did not list a heat number and did not provide the actual chemistry. The chemistry stated on the certification was simply a reiteration of the chemistry requirements stated in ASTM A-240. (NOTE: This material was ordered as nonsafety-related; however, this does not negate the stated requirements.)

- e. The Zack Company placed PO Number C-739, dated September 29, 1978, with US Steel Company for 20 tons of ASTM A-527, A-525 galvanized coils. Certifications were required.

The material and certifications were received and accepted showing the heat numbers as J 74531 and J 74278.

The certifications did not provide physical test reports for heat J 74531. (NOTE: The ASTM material standard does not require physical properties to be reported; however, this material was purchased for use at the Clinton Power Station site and the Clinton specification did require physical properties to be reported.)

7. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 9.1 of Sargent & Lundy Engineers, Chicago, Illinois, Standard Specification J 2590 for HVAC duct work (Form 320), unapproved materials (Hardcast FTA-20 adhesive and DT tape) were used in sealing HVAC systems at LaSalle.
8. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and PQCP-7, "Plant Document Control," there was no documented evidence that a voided document file was maintained up-to-date for the QA Manual for Clinton and welding procedure WPS-1.

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9. Contrary to Criterion V of Appendix B to 10 CFR Part 50, Section 19, "Audits," of the QA Manuals for LaSalle and Clinton, and PQCP-17, "Training, Certification, and Evaluation of Quality Assurance Auditors - Performance of Audits and Vendor/Supplier Surveys," a review of internal audits conducted from 1979 through 1981 showed all sections of the QA manuals were not audited on an annual basis, and 10 audit plans and 3 checklists were missing for the 17 internal audits performed.
10. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section 2, "Quality Assurance Program," of the QA Manuals for LaSalle and Clinton, a review of the QA records files for both the LaSalle and Clinton projects indicated that there were no documented indoctrination and training records maintained for one shop welder and two auditors.
11. Contrary to Criterion V of Appendix B to 10 CFR Part 50; QCP-11, "Training Procedures for Personnel performing Quality Control Inspection;" PQCP-11, "Training, Certification, and Evaluation of Quality Control Inspectors;" and PQCP-16 "On-going Training," a review of the QA files for 13 QC inspectors (LaSalle), 21 QC inspectors (Clinton), and 4 welders revealed a lack of documentation for the following items:
 - a. Annual eye exam - 14 (Clinton) and 6 (LaSalle) inspectors;
 - b. Certification Form - 13 (Clinton) and 1 (LaSalle) inspectors;
 - c. Performance Evaluation - 16 (Clinton) inspectors; and
 - d. On-going Training - 8 (Clinton) inspectors and 4 welders.
12. Contrary to Criterion V of Appendix B to 10 CFR Part 50, and paragraph 4.1 of "The Zack Company Procedure for Compliance with 10 CFR Part 21," written 10 CFR Part 21 evaluation reports had not been prepared or submitted to supervision with respect to identified deviations.
13. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 7.7 of QCP-8, three NCR's (LaSalle) were initialled for the Project Engineer by an unidentified second party and one NCR (LaSalle) was unsigned.
14. Contrary to Criterion V of Appendix B to 10 CFR Part 50, QA Manual Section 10, American Welding Society (AWS) Standards D1.3-1978, D1.1-1979, and Welding Procedure Specifications WPS-7 and WPS-1,

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inspection of records identified that a welder had been improperly certified to make groove and fillet welds using the GMAW process as evidenced by the following unqualified essential variable changes being made to the applicable welding procedure specification (WPS-1) for performance of welder qualification testing:

- a. Welder No. 34 made square groove welds in 10, 12, and 14 gage sheet metal test plates in accordance with the requirements of WPS-1 which are as follows:

Gage	Amperage	Wire Feed (IPM)	Melt Rate (lbs/hr)	Gas Flow (CFH)
10	145	204	3.3	25
12	120	190	3.1	20
14	100	182	2.9	23

On August 27, 1980, the test plates failed the required bend tests.

Subsequently, requalification test plates were made which were not in accordance with WPS-1 as shown by:

Gage	Amperage	Wire Feed (IPM)	Melt Rate (lbs/hr)	Gas Flow (CFH)
10	100	160	2.3	30
12	95	150	2.1	30
14	70	108	1.62	30

These test plates passed the bend tests on October 23, 1980, and the welder was certified as being qualified for GMAW groove welds.

Welder No. 34 made 2 T-joint fillet weld test plates in accordance with WPS-1 as follows:

Gage	Amperage	Wire Feed (IPM)	Melt Rate (lb/hr)	Gas Flow (CFH)
22	90	105	1.73	20

One test plate failed on August 29, 1980. Subsequently, requalification test plates were made which were not in accordance with WPS-1 as shown by:

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Gage	Amperage	Wire Feed (IPM)	Melt Rate (lbs/hr)	Gas Flow (CFH)
22	50	105	1.73	20

The test plates passed the bend tests on September 19, 1980, and the welder was certified as being qualified for GMAW fillet welds.

C. UNRESOLVED ITEMS:

None

D. OTHER FINDINGS OR COMMENTS:

1. Areas Inspected

- a. Welding Process Control - The NRC inspector reviewed the welding material control system including the issuance, documentation (weld material test reports), retrieval, and storage of welding materials. The applicable welding procedure specifications, their procedure qualification records, and shop drawings/travelers were reviewed. In-process gas metal arc welding was observed being performed on duct rings being supplied to the Midland Plant. As a result of this observation and review, nonconformances B.1, B.2, B.3, and B.4 were identified. Additionally, nonconformance B.5 was identified, although not a specific part of this area of the inspection.
- b. Procurement Document Control - A total of 94 procurement document files were reviewed. These files consisted of Zack Company purchase orders and supplements, shipping documentation, material test reports, certificates of conformance, applicable correspondence, receiving inspection reports, and copies of nonconformance reports (if required). As a result of this review, nonconformance B.6 was identified. Further, review of Sargent & Lundy Engineers (S&L) Standard Specification No. J 2590 and S&L's approved material list resulted in nonconformance B.7 being identified. However, on January 14, 1982, The Zack Company requested that S&L approve the materials shown in nonconformance B.7 for use at LaSalle. As of the date of this inspection, S&L had not responded to The Zack Company request.

The NRC inspector expressed concern over the apparent failure of the receiving inspection function to detect the discrepancies/anomalies between the purchase order requirements and the material certifications.

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- c. Document Control - A review of the master file for the QA manuals and quality control and welding procedures, as well as the file on voided documents for the Clinton and LaSalle projects, resulted in the identification of nonconformance B.8.
- d. Audits - A review of reports for 17 internal audits conducted at the Zack, LaSalle, and Clinton sites from 1979 through 1981 and a review of 10 vendor/supplier audit reports conducted from October 1981 through May 1982 resulted in the identification of nonconformance B.9.
- e. QA Records - A review of the QA record file for 13 QC inspectors at LaSalle, 21 QC inspectors at Clinton, 4 welders, and 5 auditors resulted in the identification of nonconformances B.10 and B.11.

A detailed evaluation of the QA program for both the LaSalle and Clinton projects, to determine if activities were being implemented consistent with quality commitments contained in both QA manuals, and discussions with Zack personnel resulted in the following additional comments:

The QA manuals and applicable procedures for both the LaSalle and Clinton projects appear to require updating to satisfy the requirements of Appendix B to 10 CFR Part 50. Examples of observed discrepancies are as follows:

- (1) The organization chart does not identify all the onsite and offsite groups which function under the cognizance of the QA program, and the QA responsibilities of each group are not described;
- (2) The organizational positions with stop work authority and the individual responsible for directing and managing the site QA program are not identified;
- (3) Numerous instances where indoctrination, training, and qualification sessions have not been documented;
- (4) Qualifications and certifications of inspectors and auditors are not being kept current;
- (5) The basis for selection of suppliers is not being documented and filed;

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- (6) There was no documentation to indicate that supplier's certificates of conformance are periodically evaluated by audits, independent inspections, or tests to assure they are valid;
 - (7) There were no requirements for in-process inspection of work by individuals other than those who performed or directly supervised the activity;
 - (8) Qualification records of procedures, equipment and personnel associated with special processes (e.g., welding) had not been fully established, filed, and kept current; and
 - (9) There was no requirement for management (above or outside the QA organization) to regularly assess the scope, status, and compliance of the QA program to 10 CFR Part 50, Appendix B.
- f. Implementation of 10 CFR Part 21 - The NRC inspector reviewed the vendor's procedure "The Zack Company's Procedure for Compliance with 10 CFR Part 21," Revision 0, dated December 19, 1978, to verify that adequate documented measures were available to meet the reporting requirements of 10 CFR Part 21. Two reports were examined for completeness and adherence to notification requirements. These reports were: (1) a 10 CFR Part 21 report to NRC Region III on June 9, 1982, concerning fire dampers; and (2) a potential 10 CFR Part 21 report to NRC Region III on August 2, 1982, concerning weld records. These reports met the notification requirements of the vendor's procedure; however, the required written evaluations had not been prepared. (See Nonconformance B.12.)
- Observations of the employee's bulletin board verified that the above vendor's procedure and Section 206 of the Energy Reorganization Act of 1974 were properly posted.
- g. Nonconformances and Corrective Action - The NRC inspector reviewed the following vendor's procedure and two quality assurance manual sections to determine the QA/QC requirements for the subject area at the LaSalle site: Quality Control Procedure 8, Revision 4,

ORGANIZATION: THE ZACK COMPANY
CHICAGO, ILLINOIS

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<p>dated October 2, 1980, "NCR"; Section 16 of the Quality Assurance Manual (QAM), Revision 2, dated April 1, 1981, "Nonconforming Material, Parts or Components," and Section 17 of the QAM, Revision 2, dated September 16, 1977, "Corrective Action." Three books of completed NCR's (300) were reviewed in the process of determining specific NCR's to be examined. Thirty-five specific NCR's and 20 Corrective Action Reports were examined for completeness and compliance with the above requirements. Management review of NCR corrective action was lacking on four of the NCR's examined. (see Nonconformance B.13).</p>			
<p>h. <u>Welder Qualifications</u> - The NRC inspector reviewed the qualification records of the four currently employed shop welders (nuclear) to verify that they had been qualified in accordance with the requirements of American Welding Society (AWS) Standard, D1.3-1978. As a result of this review, Nonconformance B.14 was identified.</p>			

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