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LICENSEE CONTRACTOR AND VENDOR INSPECTION STATUS REPORT

QUARTERLY REPORT
OCTOBER 1983 - DECEMBER 1983

UNITED STATES NUCLEAR REGULATORY COMMISSION

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

CONTENTS

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, subtier contractors, 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:	PAGE 2 of 2

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 4	DECEMBER 30, 1983
STONE & WEBSTER	SWSQAP 1-74A	REVISION C	MAY 20, 1983
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	MAY 24, 1983
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

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.: 99900912/83-01	INSPECTION DATE(S) 6/27-30/83	INSPECTION ON-SITE HOURS: 64

CORRESPONDENCE ADDRESS: Acton Environmental Testing Corporation
ATTN: Mr. R. S. Cowdrey
President
533 Main Street
Acton, Massachusetts 01720

ORGANIZATIONAL CONTACT: Mr. R. S. Cowdrey, President
TELEPHONE NUMBER: (617) 263-2933

PRINCIPAL PRODUCT: Environmental testing services.

NUCLEAR INDUSTRY ACTIVITY: Acton Environmental Testing Corporation (AETC) provides equipment qualification testing services for the military, and for conventional power and commercial nuclear power industry. Approximately 15 percent of the services are for the commercial nuclear power industry.

ASSIGNED INSPECTOR: J R Agee 10/14/83
J. R. Agee, Equipment Qualification Section (EQS) Date

OTHER INSPECTOR(S): F. V. Thome, Sandia National Laboratories

APPROVED BY: H. S. Phillips 10/14/83
H. S. Phillips, Chief, EQS Date

INSPECTION:

A. BASES: Appendix B to 10 CFR Part 50 and 10 CFR Part 21.

B. SCOPE: The inspection included: (1) inspection of previous inspection findings; (2) review of QA manual and implementating procedures; (3) LOCA test facility; (4) test documentation review; and (5) management exit meeting.

PLANT SITE APPLICABILITY:

50-382

ORGANIZATION: ACTON ENVIRONMENTAL TESTING CORPORATION
ACTON, MASSACHUSETTS

REPORT NO.: 99900912/83-01	INSPECTION RESULTS:	PAGE 2 of 4

A. VIOLATIONS:

None

B. NONCONFORMANCES:

None

C. UNRESOLVED ITEMS:

None

D. STATUS OF PREVIOUS INSPECTION FINDINGS:

1. (Closed) Nonconformance (82-02): Personnel responsible for preparing, reviewing, and approving revisions to test procedures had not been designated.

   The inspector reviewed the revised QA Manual, Rev. 28, dated March 25, 1983, Section 533-11, "In-Process Criteria," which states, in part, "Project Assignment. The Vice President of Operations shall assign the job to a Project Manager. . . Prior to Quality Assurance test verification, the Quality Assurance Manager. . . shall assure that the procedure. . . has been approved. . ." The inspector also reviewed Test Procedure No. 18577-83N, June 1983 and Test Report No. 17344-82H-B and verified that each had been approved by the designated project managers.

2. (Closed) Nonconformance (82-02): In the calibration area: (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; (b) AETC Form No. 533-8-5 had not been completed for power supply, AETC No. 375; (c) the Calibration Report Form, dated July 17, 1982, had not been filled out in its entirety for audio amplifier, AETC No. AM-342; no information had been entered in the type of equipment section; (d) the calibration labels affixed to units AETC Nos. IP-301 and PI-314 did not indicate the date calibrated, by whom, and the due date of the next calibration.

   The inspector reviewed and verified that the computer read-out, Monthly Recall Schedule (MRS), had been revised and maintains current calibration and recall data. The following were also verified: AETC Form No. 533-8-5 had been completed for power supply, AETC No. 375; Calibration Report Form, dated July 17, 1982,

for AETC No.AM-342 had been completed; calibration labels had been corrected and affixed to AETC Nos. TP-301 and PI-314.

E. OTHER FINDINGS OR COMMENTS:

1. QA Manual/Program and Implementing Procedures - The NRC inspector reviewed the QA manual and determined that many revisions had been made to the manual to improve descriptions and clarity of the manual and the QA program. Improvements include the implementation of additional QA forms and a cross-reference index in the QA manual which indexs the QA manual sections to the related criteria of 10 CFR Part 50, Appendix B.

   Approximately 25 additional standing operation procedures, which are implementing procedures, had been approved and implemented. These improve the quality of the QA documentation and the effectiveness of the QA program.

   The inspector examined the equipment calibration record retention system including the computer readout and equipment calibration recall system. Several instruments from the calibration shop, the LOCA test facility and the seismic test area were examined and found to be within the required calibration cycles.

2. LOCA Test Facility - The inspector witnessed test personnel performing activities during the checkout of the LOCA test facility in preparation for conducting a LOCA test. A detailed checklist was used to checkout the facility. Pre-test data pertinent to the test facility, test parameters, and data acquisition equipment, including approval of the test procedure were recorded in the "Laboratory Research Note Book" and were witnessed and signed off by the QA department. All resources and schedules were evaluated in preparation for the startup and assured continuation of the test excluding unpredictable problems. No nonconformances were identified.

3. Test Documentation Review - The inspector reviewed test reports, test procedures, and other documentation during the inspection. A summary of those reviews include the following:

   a. Test Report (Item E.2.f. Inspection Report 99900912/82-03) - The final test report for the Magnetrol test of level controls, Micro Switches, O-rings, Static-O-Ring (SOR) pressure switches,

phenolic terminal blocks and switchboard cable had not been completed. The report will be available for review during a subsequent inspection.

b. Test Procedure No. 18577-83N - The inspector reviewed this procedure which describes qualification of a pressure switch in a HELB simulated environment outside the containment at end of life conditions. The internal components of this switch had been independently aged and reassembled into the switch housing for this test. A review of the Arrhenius and aging calculations verified that the parts including O-rings, O-ring cover gasket, and O-ring body seal had been conservatively aged including the appropriate margin. Specified temperature and pressure parameters were reached, although it required approximately 30 seconds to attain the maximum temperature profile. Justification for and/or the analysis for acceptance of this temperature ramp will be examined in the final report during a subsequent inspection.

c. Test Reports 17344-82N-C/-E/-F - These reports documented LOCA tests which were conducted on a SOR pressure switch, a Magnetrol liquid level control, and a Magnetrol level switch. Each component failed in one of the following categories: acceptance criteria, post thermal aging functional test, or post LOCA functional test. These test reports and failures will be reviewed further during a subsequent inspection. No nonconformances were identified relative to test activities described in paragraphs 3.a and 3.b, above, and in this paragraph.

F. MANAGEMENT MEETING - The inspector met with members of AETC management at the end of the inspection on June 30, 1983, and discussed details of the inspection. Management was advised that there were no QA programmatic findings; however, in the area of equipment qualification data, several test reports identified equipment problems or failures. The final test reports describing these problems or failures will be reviewed in a subsequent inspection. Management acknowledged the inspectors' findings.

ORGANIZATION: BAILEY CONTROLS COMPANY
WICKLIFFE, OHIO

REPORT NO.: 99900224/83-02	INSPECTION DATE(S) 9/12-16/83	INSPECTION ON-SITE HOURS: 28

CORRESPONDENCE ADDRESS: Bailey Controls Company
ATTN: Mr. M. A. Keyes
President
29801 Euclid Avenue
Wickliffe, Ohio 44092

ORGANIZATIONAL CONTACT: Mr. G. M. Kohl, Director of Quality Assurance
TELEPHONE NUMBER: (216) 585-5800

PRINCIPAL PRODUCT: Recording and indicating devices, sensor and control systems.

NUCLEAR INDUSTRY ACTIVITY: The total effort committed to domestic nuclear activities by Bailey Controls Company (BCCo) is approximately 5 percent at all facilities. Major purchase order agreements are with Bechtel Corporation for Hope Creek Nuclear Generating Plant and Babcock and Wilcox (B&W) for Bellefonte. These orders presently extend through the first quarter of 1986.

ASSIGNED INSPECTOR: J. W. Hamilton — 11/29/83
J. W. Hamilton, Reactive and Component Program Section (R&CPS) — Date

OTHER INSPECTOR(S):

APPROVED BY: I. Barnes — 11/29/83
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) a 10 CFR Part 50.55(e) report by the Tennessee Valley Authority (TVA) concerning stress cracked and glued connectors and support brackets used for printed circuit (PC) cards in the plug in modules of the Reactor Protection System (RPS) and the Engineered Safety Features Actuation System (ESFAS); (cont. on next page)

PLANT SITE APPLICABILITY:

Stress cracked and glued connectors, 50-438/439; blown fuse alarm circuits, 50-328; inadequate markings and documentation, 50-438/439; undersized spot welds, 50-354.

SCOPE: (cont.)
(2) a 10 CFR Part 50.55(e) report by TVA concerning blown fuse alarms in auxiliary control circuits at Sequoyah Nuclear Plant, Unit 2, and Watts Bar Nuclear Plant, Units 1 and 2; (3) a 10 CFR Part 50.55(e) report by TVA concerning inadequate marking and documentation on PC cards to distinguish between safety and nonsafety-related cards at Bellefonte, Units 1 and 2; and (4) a notification by B&W concerning undersized spot welds on Class 1E Style QN equipment cabinets fabricated for BCCO by Systems Control.

A. VIOLATIONS:

None

B. NONCONFORMANCES:

1. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 2.0 of BCCO Instruction No. 1766-03-02, (a) a Preliminary Report of Safety Concerns (PROSC) form was not prepared for PROSC File No. 032, (b) Section 6 of the closed out PROSC No. 034 was not filled out, and (c) an obsolete form was used for PROSC No. 036.

2. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 2.0 of BCCO Administrative Procedure No. 1766-03, the safety concern classification was not identified on PROSC Nos. 031, 033, 034, 035, and 037; thus, inhibiting the decision making process of the QA Director with respect to notification of the NRC within 48 hours.

C. UNRESOLVED ITEMS:

None

D. STATUS OF PREVIOUS INSPECTION FINDINGS:

None

E. OTHER FINDINGS OR COMMENTS:

1. Stress Cracked and Glued Connectors: TVA-Bellefonte identified that connectors on the terminal block assemblies located in the RPS, ESFAS, Protection Auxiliary Cabinets (PACs), and Emergency Core Injection (ECI) systems were cracked near the mounting rivets and in

some cases the clear plastic connectors were glued as a repair method. B&W provided a site problem report of April 16, 1982, to BCCo and requested onsite technical support.

Documentation reviewed by the NRC inspector revealed that several letters were forwarded by BCCo to B&W stating that the cracking was not a new occurrence and, in fact, was evident on qualification test samples used for the TVA program. These test samples successfully went through the qualification process, including the seismic effects, with no specific impact on operability or structural integrity of the units in question. Although aesthetically not attractive, BCCo stated that the internal cracking or crazing did not impair the proper functioning of the units.

BCCo personnel visited the TVA-Bellefonte site in Hollywood, Alabama, on June 15-16, 1983, to perform a survey of the PC terminal block assemblies identified as having cracks or glue repairs. The NRC inspector reviewed the resulting recommendations to BCCo project management that connector blocks with surface cracks and glue repairs be replaced. The report of the survey also noted that in regard to the glue repaired blocks, the glue did not overrun on the PC board indicating the glue appeared to have been applied prior to assembly. However, the report stated that BCCo could not confirm gluing had ever being used as a repair process.

BCCo acknowledged that an evaluation had been completed and determined as "not reportable" with the issuance of PROSC No. 038 on August 11, 1983, which states:

> Investigation of the crazing of the clear polycarbonate connector blocks indicates that structural integrity is in no way reduced or compromised. Although cracks may exist in the blocks, the PC Boarads (sic) are securely retained by other features of the modules. This has been borne out by seismic testing.
>
> The cracks are cosmetic flaws and are considered acceptable. This issue is closed.

Subsequent to the initial crazing problem, TVA-Bellefonte identified additional problems with approximately 150 modules that contained some of the following defects: (1) built-in indicators with cracked housings, (2) loose terminals, (3) damaged terminal studs, (4) improper size terminals used on 24 AWG wire, and (5) generally poor quality crimps. This was conveyed to BCCo by a B&W site problem report of February 25, 1983, which recommended that TVA repair the defects except the 21 cracked indicator housings which B&W determined to be acceptable.

The NRC inspector reviewed a BCCo letter to B&W which provided the results of an onsite inspection of the equipment which stated:

a. The 21 indicator housings were verified to have hairline cracks which appeared to start at the terminal connector and radiate outward. Indicator housing hairline cracks have not been experienced at BCCo and these are not believed to be a significant problem.

b. Examples of the 65 loose indicator terminals were verified; however, testing the terminals for tightness can actually cause the terminals to loosen as considerable torque can be applied to the nut by using the terminal wire lug as a lever. Recommend site personnel retighten any loose terminals.

c. The five damaged terminal studs looked like they had been held by a pair of pliers when tightening the connection. This type damage has not been experienced by BCCo. The damage could affect the ease but not prohibit indicator replacement or repair.

d. The complaint was that one crimp type terminal lug identified as for 22-gauge wire was used on what appeared to be 24-gauge wire. BCCo drawings identified all wire to be 22-gauge and the crimp appeared to be satisfactory,; however, the one wire looked smaller than 22-gauge but was not verified. The module is satisfactory for use as-is.

e. A small dust plug, approximately 1/4-inch diameter was missing from one meter and it was suggested that TVA use the dust plug from an out-of-service meter to replace it.

f. One crimp stye terminal lug was verified to have been soldered. Standard practice at BCCO is not to solder crimped terminals but to replace defective crimps or terminals. BCCO does not believe this to be a significant problem and only affects appearance.

g. One indicator terminal stud was loose on the rear of the mounting case. The stud was installed from the inside of the indicator case and secured by a nut on the outside of the case. BCCO proposed that TVA tighten this one and any others that did not meet their tightness criteria.

h. The complaint alludes to the crimped terminals being of poor quality in general with no specific listing of examples. A survey of crimped terminals did not uncover any wires that were not secure or any defects in those examined and; therefore, consider this comment subjective and without substance.

The NRC inspector was shown modules like those found to be defective by TVA-Bellefonte. Upon examination of 13 of the scaler difference amplifiers, one module (Part No. 66288 73A 0005 2, No. 490523, and 180629 with inspection stamps F1-31, MT-31, MT-36) had an indicator terminal screw that was loose as attached to the indicator (Defect g. above). No other defects noted by TVA-Bellefonte were evident.

This item will remain open in that the NRC inspector was unable to determine what contributions the manufacturing processes may have had to cause the reported defects, since fabrication of modules is at a BCCO facility in Williamsport, Pennsylvania.

2. Blown Fuse Alarms: TVA Watts Bar and Sequoyah reported by a 10 CFR Part 50.55(e) report that blown fuses in equipment supplied by BCCO were inadvertently actuating equipment. BCCO has no knowledge of this problem. This subject will be reviewed at BCCO during a future inspection.

3. Inadequate Printed Circuit Card Marking and Documentation: On April 22, 1983, TVA made a potential 10 CFR Part 50.55(e) report to Region II of the NRC concerning inadequate marking and documentation to distinguish between safety and nonsafety-related meter circuit cards manufactured by BCCO.

ORGANIZATION: BAILEY CONTROLS COMPANY
WICKLIFFE, OHIO

REPORT NO.: 99900224/83-02	INSPECTION RESULTS:	PAGE 6 of 8

The NRC inspector reviewed contractual documentation and detailed part drawings which revealed BCCo under B&W Order Nos. 023032LJ and 023033LJ for TVA-Bellefonte, Units 1 and 2, was to provide a mix of 373 nonnuclear and essential control instrumentation systems. Change Order No. 407 requested 373 No. ES342 Vertical Indicator Gauges and 373 No. 6626747G1 Voltage Output Converter PC Cards. The gauges, which are remotely located, and PC cards are to be retrofitted into the existing panels and buffer modules and will convert from a 1-10 volt to a 1-5 volt system. Change Order No. 407 also imposed 10 CFR Part 21 on the indicators and PC cards.

BCCo Letter No. 5198P-82-412 of September 14, 1982, took exception to the application of 10 CFR Part 21 to the PC cards and Change Order No. 453 was issued by B&W to remove 10 CFR Part 21 from the PC cards. BCCo personnel stated that PC cards are a commercial grade item and must be dedicated by the user if used in safety-related equipment.

BCCo Drawing No. B6626747L requirements for marking include a stamped date code, a company logo, and cites Engineering Standard A 162301-10B for definition of how to mark the PC card identification, which states:

1. A part label is to be applied to the circuit board after all soldering and cleaning has been completed.

   a. Locate over the circuit board number.
   b. The number shall contain the abbreviation "ASSY". Example: ASSY 6616728A1
   c. Size of numbers and letters shall be approximately 3/32 inch high.
   d. This label is made by Engraving Dept. by request of Printed Circuit Assembly Dept.

With respect to the TVA construction deficiency report, BCCo personnel stated that the PC cards are interchangeable for safety and nonsafety-related applications. BCCo personnel stated that if BCCo provides buffer modules (which are commercial grade items) for safety-related applications, the entire module will be dedicated by BCCo, but that replacement parts are not dedicated by BCCo and; thus, the user must dedicate the PC cards if used in safety-related equipment.

4. Undersized Spot Welds on Class 1E Equipment Cabinets: On June 23, 1983, B&W-Utility Power Generation Division provided a notification to the NRC concerning undersized spot welds on Class 1E Style QN equipment cabinets fabricated for BCCO by Systems Control, Iron Mountain, Michigan. The NRC inspector determined by review of documentation and interviews of BCC personnel that an internal PROSC No. 034 was issued on January 12, 1983, for evaluation as a part of BCCO procedures for complying with the requirements of 10 CFR Part 21. This evaluation was initiated after undersized spot welds were identified during source inspection at Systems Control on Midland Plant equipment cabinets and after samples of spot welds from Systems Control yielded a pull test as low as 20 percent of the requirement.

Records at BCCO identified that four Class 1E QN equipment cabinets with the undersized spot welds were at Hope Creek Nuclear Generating Station, but had been shipped with Hold Tag Nos. 872-875 attached and marked "Need Seismic Loading - and L.O.P." The equipment was shipped to accomodate the customer schedules and the red tags indicated that the engineering analysis to evaluate the seismic effects on the specific equipment loading had not been accepted by the customer and; thus, the Letter of Promulgation, which certifies the equipment to be equivalent to that originally qualified, had not been forwarded. All other cabinets were shown to be at BCCO.

BCCO Telex No. 340555 on January 19, 1983, to Bechtel, San Francisco office, confirmed a January 18, 1983, telephone conversation which identified cabinet assemblies 1 AC 657, 1 BC 657, 1 CC 657, and 1 DC 657 having been shipped to Hope Creek Nuclear Generating Station on September 10, 1982, and containing undersized spot welds. The telex also confirmed the Bechtel representatives' statements that the cabinets had not been welded in, no terminations had been made, and that a quality hold had been placed on the cabinets.

BCCO audit records addressed the issue of adequacy of manufacturing equipment at Systems Control and noted that System Controls had purchased tapered spot weld electrodes which as supplied were .190 inches diameter at the electrode tip and were to be machined to the proper size to assure a .280 inch diameter final spot weld nugget. However, BCCO personnel stated an investigation after the undersized spot welds were discovered revealed that the electrodes were used in the as-purchased size which resulted in the undersized spot weld nuggets.

As noted in the B&W notification, source inspection was normally performed after the paint primer is applied which precluded detection of the undersized spot welds. For those cabinets for Consumer Power Company's Midland Plant, a Bechtel inspection hold point was specified prior to paint primer application which allowed detection of the undersized spot welds.

Since the spot welds are structurally significant to the qualification levels of the cabinet design, sample spot welded coupons from Systems Control and spot welds removed from cabinets still at BCCO were tested for compliance with the minimum tension shear of 4300 pounds specified by Mil-W-6858A. Records at BCCO showed the tension shear test results obtained to be between 880 and 1800 pounds.

The NRC inspector reviewed the instructions for repair, detailed repair drawings, repair procedures, welder certification records, and the requalification test report to verify the structural repairs accomplished on the Systems Control cabinets.

The NRC inspector reviewed a BCCO interoffice memorandum closing out the PROSC No. 034 for the following stated reasons:

> . . . All cabinets . . . manufactured by Systems Control . . . have been repaired using . . . repair procedures . . . . the adequacy of the repairs has been verified by seismic testing of a sample unit modified by the most critical method and with worst case mass loading . . . . All hardware has been placed in a safe condition.

Within this area of inspection, no nonconformances were identified.

ORGANIZATION: BECHTEL POWER CORPORATION
SAN FRANCISCO, CALIFORNIA

REPORT NO.: 99900500/83-01	INSPECTION DATE(S) 8/8-12/83	INSPECTION ON-SITE HOURS: 112

CORRESPONDENCE ADDRESS: Bechtel Power Corporation
ATTN: Mr. H. O. Reinsch, President
P. O. Box 3965
San Francisco, CA 94119

ORGANIZATIONAL CONTACT: Mr. J. M. Amaral, Manager of QA
TELEPHONE NUMBER: (415) 768-0777

PRINCIPAL PRODUCT: Architect engineering services.

NUCLEAR INDUSTRY ACTIVITY: The Bechtel Power Corporation currently provides the principal architect engineering services for 16 domestic reactor units. Approximately 13,201 persons are assigned to activities in connection with these units and numerous modification/repair/service type contracts.

ASSIGNED INSPECTOR: C. J. Hale for 9/26/83
D. G. Breaux, Reactor Systems Section (RSS) Date

OTHER INSPECTOR(S): J. T. Conway, Reactive and Component Program Section (R&CPS)
J. W. Hamilton, R&CPS
G. T. Hubbard, Equipment Qualification Section

APPROVED BY: C. J. Hale 9/26/83
C. J. Hale, Chief, RSS Date

INSPECTION BASES AND SCOPE:

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

B. SCOPE: Assessment of the Bechtel Procurement Supplier Quality Department (PSQD) program.

PLANT SITE APPLICABILITY:

Docket Nos.: All Bechtel projects.

ORGANIZATION: BECHTEL POWER CORPORATION
SAN FRANCISCO, CALIFORNIA

REPORT NO.: 99900500/83-01	INSPECTION RESULTS:	PAGE 2 of 9

A. VIOLATIONS:

None

B. NONCONFORMANCES:

1. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section 2.2 of PS 9.9 of the PSQD Procedure Manual, a review of the PSQD central files for six suppliers revealed that Procurement Supplier Quality Forms (PSQ-223s) were missing in the following cases:

   a. Reliance Electric Company, located in Stone Mountain, Georgia, for March and September 1982.

   b. Comsip Customline Corporation, located in Linden, New Jersey, for September 1981.

2. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section 4.6 of TS-1.5 of the PSQD Procedure Manual, a review of the "Quarterly List of PSQD Forms" from March 1980 thru April 1983 revealed that two active forms, "Supplier Evaluation Review Report" (SER) and "Supplier Historical Quality Record" (SHQR), were not on the list; and the listing was not issued between June 30, 1982, and April 1983.

3. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section 4.5 of TS-1.5 and Section 4.1.3 of TS-6.2 of the PSQD Procedure Manual, a review of PSQD central files for eight suppliers indicated that revisions of the SER form dated December 12, 1980, and January 20, 1983, were used to evaluate these suppliers, and there was no documented evidence that the Manager, Supplier Quality, had approved the revised forms.

   Forms dated December 12, 1980, were used for Transamerica Delaval (December 1980 and February 1981); Comsip, Whitter, California (August and September 1081); Reliance Electric, Stone Mountain, Georgia (November 1982); Limitorque (August 1981); Rockbestos (October 1981); Bergen Paterson (January 1982); and Reliance Electric, Cleveland, Ohio (March 1982).

   Forms dated January 20, 1983, were used for Comsip, Linden, New Jersey (May 1983); Rockbestos (March and July 1983); and Limitorque (June 1983).

4. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section 2.1 of TS-1-1 of the PSQD Procedure Manual, a review of PSQD central files for eight suppliers indicated that the SHQR form was being used for each supplier, but there was no documented evidence of a procedure addressing the specific information required by the form or the individual responsible for completing the form.

5. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section 5.5 of TS-4.1 of the PSQD Procedure Manual, there was no evidence of the Technical Services Administrator's input to the Evaluated Supplier List (ESL) documenting audit waivers.

6. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section 3.5 of TS-2.5 of the PSQD Procedure Manual, there was no Supplier Quality Program Evaluation Report (SQPER) in central files on Aptech Engineering Services, Inc.

7. Contray to Criterion V of Appendix B to 10 CFR Part 50 and Attachment A of TS-6.2 of the PSQD Procedure Manual, a Quality Designation (QD) was assigned to a supplier without proper basis and description in the comments section as to what the supplier must do to improve his QD.

8. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section 16.1 of Bechtel Power Corporation Quality Program Policy, no instructions were provided to document how the central office would implement the Problem Investigation Request (PIR) system.

C. UNRESOLVED ITEMS:

None

D. STATUS OF PREVIOUS INSPECTION FINDINGS:

None

E. OTHER FINDINGS OR COMMENTS:

1. Bechtel Procurement Supplier Quality Program - In order to determine the commitments and requirements relative to Bechtel's supplier quality activities, the NRC inspector reviewed the Procurement Supplier Quality Manual and the implementing department procedures.

The functions of the PSQD are divided into two categories, supplier evaluation and quality surveillance.

The first major function of PSQD is supplier evaluation. The functions associated with supplier evaluation are supplier surveys, supplier quality program evaluation, supplier quality program audits, and supplier performance evaluation. The quality planning activities are those accomplished prior to, as well as subsequent to the award of a purchase order or subcontract. The quality planning activities performed by Project Supplier Quality Representatives include:

a. Reviewing technical specifications and establishing the Quality Plan.

b. Assisting engineering in the establishment of quality surveillance levels required for each procured item.

c. Assisting in the development of the final bid list.

d. Determining the need and requirements for quality program verification activities.

e. Participation in preaward conferences.

The second major function of PSQD is quality surveillance activities. Quality surveillance assignments are accomplished by supplier quality representatives (SQRs) responsible for specific suppliers. Quality surveillance assignments are considered complete after the SQR has granted a supplier permission to "release for shipment" the last item on a purchase order, contract, or subcontract. The quality surveillance assignment activities include surveillance inspections of supplier furnished material and equipment and the conduct of Quality Program Verficiations (QPVs). QPVs are modifed supplier quality program audits. The SQRs assess, on a continuing and progressive basis, the effectiveness of the implementation of quality program elements of assigned suppliers.

To assure that proper implementation of procedural commitments were occurring, the NRC inspector reviewed the ESL, supplier quality audit schedule, five SQPER, five supplier performance evaluation reports (SPER), and five supplier evaluation review reports. The inspector also reviewed three supplier program audits with documented audit

findings. The documentation for closeout of these audit findings was reviewed for proper commitment implementation. In this area of the inspection, three nonconformances were identified (see B.5, B.6 and B.7 above).

Certain observations made by the inspector have a potential for concern over program effectiveness. The ESL was found to contain only information that was initiated and executed by PSQD. All activities involving supplier quality that is initiated and completed by division or project personnel are not reflected on the ESL; however, the information contained in the ESL is intended to be utilized by individuals/organizations in the execution of their procurement activities.

The NRC inspector also noted that there are examples of annual supplier audits being waived with no justification given by division or project personnel. The PSQD audit and scheduling group only process audit waivers and do not analyze waiver justification. For example, Portland Engineering Company was audited in 1981 and three audit findings were identified in the implementation of quality elements imposed on the vendor. The only Bechtel project involved with this vendor waived the scheduled 1982 audit. During 1982, the supplier had numerous quality problems and was not recommended for future work by the SQR's SPER dated April 4, 1983.

2. Inspection Plans and Technique Sheets - The corporate use of upgraded basic inspection plans and technique sheets was implemented in July 1982 for a wide range of major commodities.

   a. The Inspection Plan included, based on specification requirements, the important activities unique to each commodity and identifies them as witness points, hold points, or in-process inspection points including acceptance criteria. It directs the SQRs on ways to implement these activities. Each major commodity has its own generic inspection plan. As an example, the inspection plan for bridge cranes includes 17 specific activities including nondestructive examination of materials and welds, welding, hook and rope testing, inspection and testing of control cabinets and the completed crane, a final inspection, and the review of quality documentation.

b. Technique Sheets describe activities to be performed at selected verification points. The sheet entitled "Fit-up, Welding, and Weld Repair," for example, contains 18 typical verification points including welder qualification, fit-up tolerances, preheat, and completed weld workmanship.

The NRC inspector ascertained by interviews with PDQD and San Francisco Division supplier personnel and by review of applicable memoranda, that 85 percent of the planned upgraded Inspection Plans and Technique Sheets (IP/TS) were distributed and available throughout the Bechtel Power Corporation; however, only three projects had, to varying extents, incorporated them into procurement activities. The NRC inspector was informed that Hope Creek Nuclear Generating Station, South Texas Project, and Grand Gulf Nuclear Station projects had incorporated the upgraded IP/TS to some extent, while it was reported that Grand Gulf project had used the IP/TS to upgrade the existing IP/TS.

The NRC inspector was advised that the PSQC does not audit the divisions or projects to determine implementation of the upgraded IP/TS and therefore, the exact extent of implementation is unknown.

The use of the upgraded IP/TS by the nuclear projects is voluntary and is only promoted by the PSQD as evidenced by:

a. January 1982 Supervisor Training Seminar Minutes - ". . . the division office managers are instructed to utilize the new program in any reasonable manner by either adding to or deleting from any of the requirements . . . . "

b. July 1982 distribution letter of the initial IP/TS - ". . . Projects should try to use these Inspection Plans and Technique Sheets whenever they are developing new assignment packages . . . . "

c. May 1983 Regional Supervisors Quarterly Meeting Minutes - ". . . Goal No. 3 - Promote increased usage of standardized Inspection Plans and Technique Sheets with divisions and individual projects . . . ."

The NRC inspector selected the Hope Creek project to assess the effectiveness of the upgraded IP/TS in strengthening the Bechtel supplier quality. Hope Creek procurement personnel stated that job site monitors were used to evaluate the need for upgraded IP/TS

by interviews with Bechtel resident inspectors and subsequently, the initial upgraded and customized IP/TS were implemented in January 1982. However, neither PSQD nor project procurement personnel have instituted a program to evaluate the effects of the upgraded IP/TS on product quality, and thus, the impact of this action to strengthen supplier quality is unknown.

3. Improvements in Existing Corporate Systems - PSQD has begun to utilize a corporate computer system for disseminating significant Supplier Quality problems to all Bechtel Power Divisions. The use of computer terminals in various division and corporate locations provides a uniform system for a broad and timely distribution of quality problems. It allows all Bechtel divisions to be cognizant of problems and to evaluate the impact on their projects.

   This replaces the previous action request system managed solely by PSQD and integrates supplier problem information with other significant problems input by Division QA Managers and other departments. The data bank is coded to allow printouts by supplier, commodity, or problem type. The PSQD summarizes the individual evaluations and issues a final report.

   The NRC inspector ascertained by interviews with San Francisco Power Division Quality Assurance and PSQD personnel and by review of applicable procedures that the corporate computer system (Centralized Information Dissemination Systems) has an incorporated program Problem Investigation Request (PIR) that is currently being used to disseminate significant problems within the corporate and Division Quality Assurance organizations in accordance with Bechtel Power Corporation QA program policy on corrective action programs. By review of SQRs, it was determined that PSQD personnel have been directed to use the PIR system and discontinue use of the previous action request system effective March 28, 1983. The NRC inspector was unable to assess if the supplier quality program was working or measure the effectiveness of the program as no supplier quality PIRs had been issued or acted upon at the time of this inspection; however, the NRC inspector randomly selected two PIRs from the QA data base and reviewed the printout received from the San Francisco Power Division PIR Coordinator with respect to the applicable procedure. One nonconformance (B.8 above) was identified in that no instructions were provided to document how PSQD personnel would implement the PIR system.

The NRC ascertained by review of applicable procedures and interviews with QA and supplier quality personnel that the PIR system is an existing system used throughout the Bechtel Power Corporation to initiate investigations and followup actions while the discarded system was a system that had little force in causing action to be taken by the projects and divisions. Future inspections will ascertain the effectiveness of the PIR system in the Power Divisions.

4. The NRC inspector evaluated PSQD's procurement quality program by review of Bechtel's topical report, 2 QA manuals, 6 organization charts, and 18 procedures to determine if the procedures met the requirements of the appropriate criteria of Appendix B to 10 CFR Part 50. The NRC inspector evaluated the implementation of PSQD's program by examination of four supplier central files, six supplier audit files, four supplier warning bulletins and their revisions, one supplier warning log, one evaluated supplier list, nine personnel training files, and the personnel status roster. Additionally, the NRC inspector held discussions with five Bechtel personnel concerning the program and its implementation.

   The NRC inspector observed during the examination of supplier central files that critical data concerning supplier QD ratings were not always entered on the SHQR located in each file. In two cases, the supplier's QD had been reduced to a lower rating due to poor quality performance, but the SHQR did not reflect the lowered rating or the subsequent raising of the QD to a more favorable level. Since the SHQR presents a summary of a supplier's quality history, the lack of procedures describing the data to be recorded on the SHQR (see nonconformance B.2 above) provides the opportunity for the omission of critical data and a subsequent wrong assessment of a supplier's quality history for someone reviewing the file.

5. The NRC inspector evaluated PSQD's activities relating to the control of purchased material, equipment, and services which included the selection of suppliers, source evaluation, and objective evidence of quality furnished by the supplier.

   The NRC inspector reviewed a number of documents relating to the activities performed by PQSD including: (a) the Procurement Supplier Quality Manual; (b) 8 procedures from the PSQD Procedure

Manual; (c) training/certification records for several auditors and 13 supplier quality representatives; and (d) the central files for 5 vendors - Comsip Corporation located in both Linden, New Jersey, and Witter, California, Reliance Electric, located in both Stone Mountain, Georgia, and Cleveland, Ohio, Limitorque, located in Lynchburg, Virginia, and Bergen-Paterson, located in Laconia, New Hampshire.

Quality assurance records contained in the central files included an SHQR and reports pertaining to QA manual reviews and supplier evaluations, surveys, and audits. Nonconformances B.1, B.2, B.3, and B.4 were identified in this area of the inspection.

During the inspection, it was noted that PSQD has limited responsibility in the control of purchased material, equipment, and services associated with a nuclear power plant. Most of this control rests with Division Procurement and Project Engineering who do not report to the PSQD. It would appear that PSQD's responsibilities in determining supplier compliance with contractual quality requirements should be expanded as evidenced by the following examples:

a. Surveillance inspection and audits of a supplier are performed by PQSD representatives and auditors only when Division Procurement or Project Engineering initiates a request for the inspection and/or audit.

b. Orders are placed with suppliers by divisions or projects that have not been approved by PSQD (i.e., not on the ESL) as noted by an order placed on May 15, 1981, with Reliance Electric, Cleveland, Ohio, whose QA manual review by Project Engineering was not performed until August 27, 1982.

c. The ESL does not document manual reviews and/or surveys performed by any organization outside of PSQD.

d. Procurement related activities performed by Division Procurement or Project Engineering are not audited by the PSQD.

e. PSQD has no control over the training and certification of individuals from Procurement or Engineering who perform QA Manual reviews and/or surveys of suppliers.

ORGANIZATION: BECHTEL POWER CORPORATION
ANN ARBOR POWER DIVISION
ANN ARBOR, MICHIGAN

REPORT NO.: 99900501/83-03	INSPECTION DATE(S) 9/26-30/83	INSPECTION ON-SITE HOURS: 46

CORRESPONDENCE ADDRESS: Bechtel Power Corporation
Ann Arbor Power Division
ATTN: Mr. W. H. Wahl
Vice President and General Manager
P. O. Box 1000
Ann Arbor, MI 48106
ORGANIZATIONAL CONTACT: Mr. W. D. Greenwell, QA Manager
TELEPHONE NUMBER: (313)994-7223

PRINCIPAL PRODUCT: Architect engineering services.

NUCLEAR INDUSTRY ACTIVITY: The total effort committed to domestic nuclear activities is approximately 67 percent of the 2300 person staff at the Bechtel Ann Arbor Power Division (AAPD). The division currently provides the principal architect engineering services for two domestic units, Midland 1 and 2, and has modification/repair/service contracts on 11 additional reactor units.

ASSIGNED INSPECTOR: D. G. Breaux — 11/8/83
D. G. Breaux, Reactor Systems Section (RSS) — Date

OTHER INSPECTOR(S): C. J. Hale, RSS

APPROVED BY: C. J. Hale for — 11/8/83
C. J. Hale, Chief, RSS — Date

INSPECTION BASES AND SCOPE:

A. BASES: Topical Report No. BQ-TOP-1 and 10 CFR Part 50, Appendix B.

B. SCOPE: Status of previous inspection findings, procurement document control, 10 CFR Part 50.55(e) report by the licensee (Midland 1 and 2) to the NRC Region III office that the auxiliary feedwater system design does not provide for operation for 2 hours following station blackout as required by FSAR; and a request from NRC Region III concerning allegations of drawing control problems in the geotechnical group relative to the Midland project.

PLANT SITE APPLICABILITY:

50-329 and 50-330.

ORGANIZATION: BECHTEL POWER CORPORATION
ANN ARBOR POWER DIVISION
ANN ARBOR, MICHIGAN

REPORT NO.: 99900501/83-03	INSPECTION RESULTS:	PAGE 2 of 6

A. VIOLATIONS:

None

B. NONCONFORMANCES:

Contrary to Criterion V of 10 CFR Part 50, Appendix B and Bechtel Topical Report, actions taken by Bechtel in their Management Corrective Action Request (MCAR) lacked effectiveness in assuring no implication or effect on other work was involved.

C. UNRESOLVED ITEMS:

None

D. STATUS OF PREVIOUS INSPECTION FINDINGS:

1. (Open) Nonconformance (83-01): Documented instructions and procedures and their implementation did not assure implementation of the requirements of Criterion VII of 10 CFR Part 50, Appendix B, 'Control of Purchased Material, Equipment, and Services." The inspector initiated the review of the extensive corrective actions and preventive measures outlined in Bechtel's letter of response dated May 25, 1983. This effort will be completed during the next NRC inspection.

2. (Closed) Nonconformance (83-02): Project Engineering Procedure was not revised in the time required to implement changes to Engineering Design Procedure Instructions and Management Engineering Directives.

   The inspector verified the committed corrective and preventive measures had been taken by Bechtel AAPD to assure this will not generate a problem in the future. The inspector also reviewed the Bechtel procedure manuals and found no other examples of this failure to incorporate revisions.

3. (Closed) Nonconformance (83-03): The Mechanical Design Group Interface Coordination Log contained examples where comment confirmation and resolution blocks 8 and 9 were not completed as required.

   The inspector verified the committed corrective action and preventive measures had been taken by Bechtel. Bechtel reviewed the civil structural and nuclear design disciplines interface coordination logs. The result of this review revealed there were examples where these logs were not completed. The design routing slips, which are documentation of comment confirmation, were located for the incompleted

log entrys. All review routing slips were noted as containing no comments by the reviewing organization. The log entries had been completed and the inspector verified action taken by the design disciplines involved to emphasize timely log coordinator review to assure entries are complete.

E. OTHER FINDINGS OR COMMENTS:

1. Auxiliary Feedwater System Operability During Station Blackout - A 10 CFR Part 50.55(e) report dated June 22, 1983, was submitted to NRC Region III by Consumers Power Company concerning the design provision for operation of the auxiliary feedwater system for 2 hours following station blackout as required by the Midland project FSAR.

   During an independent design review conducted by Tera Corporation, contracted by Consumers Power, it was revealed that the Feed Only Good Generator (FOGG) interlock relays were powered from Class 1E AC power supplies that were not DC backed, and, therefore, are lost during station blackout. The deenergizing of the FOGG relays will cause the Auxiliary Feedwater Turbine steam admission valves to shut, cutting off the steam supply to the turbine. This condition would result in loss-of-feedwater to the steam generators and the inability to safely cool down the reactor coolant system during a station blackout.

   This concern resulted in Bechtel issuing an MCAR in order to assess the magnitude of the concern and initiate corrective and preventive measures. Actions taken by Bechtel to correct this concern included:

   a. Revision of schematic diagrams and associated connection and panel drawings to provide the FOGG interlock relay circuit with Class 1E DC backed 120 V AC power.

   b. Engineering review of all safety-related systems to assure that interlocks for valves and prime movers requiring Class 1E DC backed power are supplied from the appropriate power supplies in accordance with the FSAR and system requirements.

   c. Instructions to engineers preparing schematic diagrams to include in their checklist verification that appropriate power supplies are used in accordance with FSAR and system design requirements.

   The NRC inspector reviewed all corrective and preventive measures taken by Bechtel in regard to this concern and found them to be satisfactorily completed. However, in reviewing previous MCARs

generated by Bechtel concerning design deficiencies, the NRC inspector noted some similar problems. On March 9, 1982, Consumers Power Corporation notified NRC Region III that during a licensee test group review of the Midland project auxiliary feedwater system, it was discovered that the power supplies for the auxiliary feedwater level control valves were not operated by Class 1E DC backed 120 V AC power as required by the FSAR. Corrective action taken by project engineering was to verify that all commitments to feed components or systems from any Class 1E DC backed 120 V AC power were met.

The inspector also noted that on April 14, 1982, Consumers Power notified NRC Region III that the existing Bechtel design of the auxiliary feedwater system (AFW) pump turbine steam admission valve interlock system would block steam from both steam generators to the AFW turbine and prevent operation of the AFW system. Corrective action taken by engineering was to review all Class 1E schematics against logic diagrams associated with the AFW. Approximately 100 out of 600 drawings of Class 1E schematics were reviewed with no further deficiencies.

Both of these reported items concerned the AFW design and actions taken by Engineering to assure adequacy of the overall AFW design. Both of these concerns were determined by Bechtel to be isolated, yet nearly a year later an independent design review organization, Tera Corporation (contracted by the licensee) identified another concern with AFW design. These examples raise the question of effectiveness of action taken by Bechtel Engineering to review a design and assure no other similar deficiencies exist. There is also the question of what criteria are given to the personnel responsible for verifying that corrective action is of a sufficient level as to assure that a deficiency is isolated and no other deficiencies exist. In this area of the inspection one nonconformance was identified (see B. above).

2. Procurement Document Control - The inspector reviewed Bechtel's procurement document control system to assure that: (1) procurement documents include scope of work, technical requirements, material and equipment specifications, procedures and instructions, and all applicable quality requirements; (2) procurement documents require that the supplier have a documented QA program; (3) procurement documents are reviewed by the QA organization and these reviews documented; and (4) changes to procurement documents undergo the same review and controls as the original documents.

The inspector reviewed the Bechtel Topical report to assure that it addressed the need to establish procurement document control measures. The Midland Project QA Manual was reviewed to assure that these procurement document control elements listed addressed by organizational procedures for those involved in the execution of procurement activities. To assure proper implementation of procedural commitments the inspector reviewed five material requistion packages, and two purchase order packages and all of their associated documents. In this area of the inspection no nonconformances were identified.

3. Drawing Control (Allegation) - NRC Region III requested an inspection of drawing control in the Bechtel Ann Arbor geotechnical group based on an allegation pertaining to the Midland project.

Procedures and instructions, 25 drawings and sketches, and other documents relative to drawings and their control were reviewed.

The geotechnical group is a service organization within Bechtel. They issue no final design documents, but provide personnel and input information to Bechtel's licensing and engineering groups.

The geotechnical group is part of Bechtel's Hydro and Community Facilities organization whose headquarters is located in San Francisco. As such, the Ann Arbor office treats the geotechnical group similar to an outside service organization.

The geotechnical group provides engineering (principally civil) with calculations and sketches that are used in various designs and analyses. Licensing is provided various tables and figures of geologic and soils characteristics for the SAR. The review of numerous geotechnical documents disclosed no nonconformances relative to safety-related activities; however, three sketches (drawings) were identified that were not being processed properly, substantiating the allegation. The three sketches, two of which were preliminary revisions, were not designated as safety-related.

Three QA management audits (conducted in 1982-1983) of the geotechnical group were reviewed. These audits concentrated on calculations primarily and their control. Drawings were not included in any of these audits. As a result of our findings, QA management committed to immediately initiate an audit of the geotechnical group's

document control activities with specific emphasis on drawing control. The results of this audit will be examined during our next inspection and further inspection in the geotechnical group will be conducted if the Bechtel audit results indicate.

Numerous civil engineering drawings utilizing geotechnical inputs were reviewed for proper processing. All documents reviewed were processed in complete accord with project and division procedures.

No nonconformances or unresolved items were identified in this area of the inspection. As stated previously, the results of Bechtel's audit of the geotechnical group will dictate the need for further inspection in this area.

ORGANIZATION: BERGEN PATERSON PIPESUPPORT CORPORATION
LACONIA, NEW HAMPSHIRE

REPORT NO.: 99900209/83-03	INSPECTION DATE(S) 8/22-26/83	INSPECTION ON-SITE HOURS: 69

CORRESPONDENCE ADDRESS: Bergen Paterson Pipesupport Corporation
ATTN: Mr. H. Noreen, Jr.
Vice President, Director, Quality Assurance
34 Moulton Street
Laconia, NH 03246

ORGANIZATIONAL CONTACT: Mr. R. Stephens, Manager, QA
TELEPHONE NUMBER: (603) 524-1990

PRINCIPAL PRODUCT: Component supports.

NUCLEAR INDUSTRY ACTIVITY: Approximately 50 percent.

ASSIGNED INSPECTOR: R. E. Oller — 10-3-83
R. E. Oller, Reactive and Component Program Section (R&CPS) — Date

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

APPROVED BY: I. Barnes — 10-3-83
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: The scope of this inspection included status of previous inspection findings, manufacturing process control, procurement control, welding control, welding material control, and main steam restraint frame procurement.

PLANT SITE APPLICABILITY:

Incorrect U-bolt spacing and unidentified material, 50-400; incomplete magnetic particle examination, 50-412; and PO to P.X. Engineering, Inc. did not require use of an appropriate QA program, 50-400.

ORGANIZATION: BERGEN PATERSON PIPESUPPORT CORPORATION
LACONIA, NEW HAMPSHIRE

REPORT NO.: 99900209/83-03	INSPECTION RESULTS:	PAGE 2 of 6

A. VIOLATIONS:

None

B. NONCONFORMANCES:

1. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 10.3.2.5 of B-PPC QA Directive N-12:

   a. Manufacturing operation No. 6 checkpoint on the NDE/Fabrication Record for Lot No. 96735 clamps was not signed off and dated.

   b. Assembly operation No. 7 checkpoint on the NDE/Fabrication Record for Lot No. 97109 clamps was crossed out and not signed off.

   c. The Production Card for Lot No. 39324DA pins (fabricated for NF stock) was missing a checkpoint signoff and date for machine shop operation No. 3 which was completed prior to a press operation that had been signed, dated, and inspected by QC.

2. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 11.3.1.3 of the B-PPC QA manual, the results of liquid penetrant examination of the 1-C layer of weld buildup on the laminated strap of Hanger 2MSS-PRR-001, Job Order No. 4015, was incorrectly entered on the NDE/Fabrication Report as being acceptable, and the 2-C weld layer was incorrectly entered as being rejected.

3. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and the B-PPC Procedure No. BP-4-1, Revision 7, Purchase Order Nos. C-49706, C-50119, and C-52221 issued to U. S. Steel Supply for SA-36 steel material, B-PPC Category B, did not specify that 10 CFR Part 21 was applicable.

4. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 8.4.2 of the QA NPT manual, the following observations were made by the NRC inspector:

   a. Three pieces of hanger material were in the weld shop without a traveler package, stamped heat number, job number identification, or temporary marking. The material (Mark No. WS-236-1-4-AS-4-493) was for the Shearon Harris Nuclear Power Plant.

b. Work in progress at welder work station No. 242 was a pipe clamp (Mark No. A7-236-2-PF-H-2313) for Shearon Harris, but the work package in the possession of the welder was for material identified as Mark No. CI-236-1-SP-H-418.

5. Contrary to Criterion V of Appendix B to 10 CFR Part 50, paragraph 8.2a of the QA NPT manual and paragraph 14.4.1 of QA Directive N-4, the NRC inspector observed material for the Shearon Harris steam generator blow-down being inspected by welding supervisory personnel after fit-up for welding. The inspection revealed that the U-bolt hole spacing did not meet the drawing (5G-177R547-G-1162) requirement. Subsequently, new material was obtained by shop personnel without the use of a Material Requisition and shop welding and supervisory personnel did not report the nonconformance to QC personnel.

6. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 5.2 of Supplement B of Procedure No. BP-9-5 and Drawing 72008, details B and C, hanger plates (Mark No. 2F WSPRR 824) for Beaver Valley Power Station were documented on Non-Destructive Test Report No. 0265 as being magnetic particle examined, but one surface of two 5/8-inch plates had heavy rust and scale. There was no evidence of surface preparation by mechanical abrasion or of prod contact. During questioning, the Level II examiner indicated that the surfaces had probably not been examined by magnetic particle.

7. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 4.0.4 in Ebasco Specification No. CAR-SH-ME-12, Bergen Paterson Purchase Order No. C-47235, which was placed with P.X. Engineering Company, Inc. for the fabrication of Shearon Harris main steam system restraint frame assemblies, did not include provisions for the use of an appropriate quality assurance program.

8. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraphs 3.1.7 and 3.1.10 in Procedure No. BP-8-2, Revision 6:

a. Three sizes of austenitic stainless steel gas tungsten arc filler were observed in the welding material storage area which did not carry a heat or batch number identification. Two of the sizes (i.e., 3/16-inch and 1/16-inch) were untagged and the third (1/8-inch) was identified only by material type.

Similarly, one bundle of E308-16 coated electrodes in a production area holding oven was observed to be not tagged with a heat or batch number identification.

b. One welding material storage area holding oven was not marked with respect to 5/32-inch, E308.16 electrodes that were in the oven.

D. STATUS OF PREVIOUS INSPECTION FINDINGS (BY R. E. OLLER):

Sixteen devices for B-P Job No. 8578-0011-01 (Beaver Valley, Unit 2) contained nonconforming welds and were on hold for disposition during the prior NRC inspection. During this inspection the NRC inspector verified that the disposition of these items has not been closed and this item remains open.

E. OTHER FINDINGS OR COMMENTS:

1. Manufacturing Process Control (By R. E. Oller): The NRC inspector reviewed the Bergen Paterson Pipesupport Corporation (B-PPC) QA manual, Revision 2, dated July 24, 1981, and QA Directive Nos. 1 through 13, to verify that this activity was controlled by the QA program.

Observations were made in the shop of inprocess traveler record packages and the related work on ASME Code Section III, Subsection NF component supports in various shop areas.

The NRC inspector also reviewed the following documents: (a) Stone and Webster specification No. 228.310; (b) a Code data record package for the River Bend project component supports; (c) a fabrication traveler record package in the spring department for the River Bend project; (d) traveler record packages for work in the cut and burn department and weld shop; and (e) 16 fabrication traveler record packages for NF work in various stages located in other shop areas.

Nonconformances B.1.a, B.1.b, and B.2 were identified in this area of the inspection.

3. Procurement Control (By R. E. Oller): The NRC inspector reviewed Section 7 of the B-PPC QA manual to verify that this activity was controlled by the QA program.

A review was also made of the following documents: (a) Procedure No. BP-4-1 which controlled material procurement; (b) the current Approved Vendor Listing; (c) three purchase orders and other related records for services; and (d) four purchase orders and other related records for Code materials.

Nonconformance B.3 was identified in this area of the inspection.

4. Welding Control (By J. W. Hamilton): The NRC inspector reviewed Section 9 of the QA NPT manual and witnessed joint fitup and production welding on nuclear pipe supports with respect to the requirements of the applicable WPS.

   With respect to the essential variables, the inspector observed GMAW operations being performed at four different work stations and noted the working voltage was marginal or slightly below the minimum specified in the applicable WPS.

   With respect to gap and alignment tolerances, the NRC inspector observed the fit-up of steam generator blow-down material and subsequent inspection. Nonconformances B.1.c, B.4, B.5, and B.6 were identified in this area of the inspection.

5. Welding Material Control (By I. Barnes): The NRC inspector reviewed Section 7, "Procurement Control," Section 8, "Identification And Control Of Materials," and Section 9, "Control Of Special Processes" of the QA manual. Also examined were Procedure No. BP-8-2, Revision 6, "Weld Filler Material Control" and Quality Assurance Directive No. N-10, "Special Processes." Observations were made of the welding material storage area and the electrode holding ovens in one production area with respect to maintenance of identity of welding materials and storage of coated electrodes within the prescribed temperature range. The use of correct welding material was verified on one welding operation. The procurement documents and vendor certified material test reports which were applicable to E7018 and E308-16 coated electrodes observed in the welding material storage area were examined for compliance with the requirements of Section II C and Section III of the ASME Code. A similar review was performed of certification applicable to in-house ER 308 gas tungsten arc filler materials. Within this area of the inspection, one nonconformance was identified (see paragraph B.8).

6. Procurement of Main Steam System Restraint Frame Assemblies (By I. Barnes): An examination was made of procurement documents and specifications pertaining to Shearon Harris main steam system restraint frame assemblies which had been fabricated for Bergen-Paterson by P.X. Engineering Company, Inc. The examination was made as a result of the receipt of allegations by Ebasco and subsequent verification that welds had been "slugged" in the Main Steam Tunnel Vent Stack Restraint Frame (Drawing No. C-1-188).

Review of Purchase Order No. C-47235, which was applicable to the C-1-188 assembly, showed that fabrication was required to be performed in accordance with ANSI B31.7, welders were required to be qualified in accordance with Section IX of the ASME Code, and weld acceptance criteria were to be as defined in Bergen-Paterson Procedure No. BP-9-5, Supplement G, "Visual Inspection Of Non-NF-Welds." 10 CFR Part 21 was also listed in the purchase order as being applicable. The purchase order did not, however, reference use of a quality assurance program that complied with the requirements of 10 CFR Part 50, Appendix B. Similarly, the P.X. Engineering Company, Inc. ASME accepted quality assurance program which was the basis utilized by Bergen-Paterson for listing the fabricator on their Approved Vendor List was also not invoked on the purchase order. One nonconformance was identified with respect to this subject (see paragraph B.7).

ORGANIZATION: BRISTOL STEEL AND IRON WORKS, INC.
BRISTOL, VIRGINIA

REPORT NO.: 99900371/83-01	INSPECTION DATE(S) 9/12-15/83	INSPECTION ON-SITE HOURS: 24

CORRESPONDENCE ADDRESS: Bristol Steel and Iron Works, Incorporated
ATTN: Mr. W. J. Tilley, Jr.
President
P. O. Box 471
Bristol, Virginia 24203

ORGANIZATIONAL CONTACT: Mr. L. E. Collins, Quality Assurance Manager
TELEPHONE NUMBER: (703) 466-2241

PRINCIPAL PRODUCT: Structural steel fabrication.

NUCLEAR INDUSTRY ACTIVITY: Presently, there are no active nuclear contracts in any of the Bristol Steel and Iron Works, Incorporated (BSIW) facilities.

ASSIGNED INSPECTOR: for I. Barnes 11-4-83
Wm. D. Kelley, Reactive and Component Program Section (R&CPS) Date

OTHER INSPECTOR(S):

APPROVED BY: I. Barnes 11-4-83
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 a 10 CFR Part 50.55(e) report by Illinois Power Company (IPC) concerning undersized fillet welds and inadequate assurance of sufficient thread engagement of bolted connections in structural steel that had been furnished to the Clinton Power Station, Unit 1.

PLANT SITE APPLICABILITY:

Inadequate thread engagement and undersized fillet welds: 50-461.

ORGANIZATION: BRISTOL STEEL AND IRON WORKS, INC.
BRISTOL, VIRGINIA

REPORT NO.: 99900371/83-01	INSPECTION RESULTS:	PAGE 2 of 6

A. VIOLATIONS:

None

B. NONCONFORMANCES:

1. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 9.2 of the Quality Assurance (QA) manual, 2016 connection angles were attached to beams with fillet welds that were less than those specified on the fabrication drawings, without the nonconforming conditions being identified by BSIW personnel.

2. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 5.1.3 of the QA manual:

   a. The checker failed to identify that the dimensions used for coping beams did not leave sufficient web material, for the size of connection angles used, to allow welding of the drawing specified fillet weld size for 2016 connection angles.

   b. In a sample of 12 Erector's Lists of Field Bolts for Contract No. F-0271A, only one list had been signed and dated as having been checked.

C. UNRESOLVED ITEMS:

None

D. PREVIOUSLY IDENTIFIED ITEMS:

1. (Closed) Nonconformance (Report No. 99900371/80-02, Item A): Contrary to Criterion V of Appendix B to 10 CFR Part 50, paragraph 10.6 of both the ASME accepted QA manual and the QA manual for Appendix B to 10 CFR Part 50 items and Welding Procedure Specification (WPS) SMA-1.1-59, the AWS joint was not detailed on approved shop drawings.

   The NRC inspector was informed that all QA/QC records including "as built" drawings had been turned over to their customer, Tennessee Valley Authority (TVA). The NRC inspector reviewed WPS SMA-1.1-59 and verified that it had been revised to include the weld joint detail with provisions for backgouging when required.

ORGANIZATION: BRISTOL STEEL AND IRON WORKS, INC.
BRISTOL, VIRGINIA

REPORT NO.: 99900371/83-01	INSPECTION RESULTS:	PAGE 3 of 6

2. (Closed) Nonconformance (Report No. 99900371/80-02, Item B): Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 7.6.12 of TVA design specification YCP-DS-1705-3506-01, neither the applicable drawings nor WPS SMA-1.1-59 required arc-gouging or back-chipping to sound and clean metal.

   The NRC inspector reviewed WPS SMA-1.1-59 and verified that it had been revised to include the weld joint detail with provisions for backgouging when required.

3. (Closed) Unresolved Item (Report No. 99900371/80-02): Identification of welds susceptible to lamellar tearing and development of ultrasonic procedure to detect lamellar tears.

   The NRC inspector reviewed an ultrasonic testing procedure, TVA design drawings, and BSIW shop and fabrication drawings and verified that an ultrasonic procedure had been developed for the detection of lamellar tearing. It was established; however, that the lamellar tearing problem had been eliminated by a TVA design change from a fabrication to a forging. The fabrication was performed at Chattanooga Boiler and Tank Company, and all QA/QC records had been shipped to TVA, Knoxville, Tennessee.

4. (Closed) Unresolved Item (Report No. 99900371/80-02): Needed demonstration that the magnetic particle yoke was capable of lifting 40 pounds when used in the same configuration as in the actual test.

   The NRC inspector reviewed an Authorized Nuclear Inspector's memorandum which identified that the magnetic particle yoke was capable of lifting 40 pounds when used in the same configuration as in the actual test.

5. (Closed) Unresolved Item (Report No. 99900371/80-02): Training and indoctrination records of the Quality Assurance Representative.

   The NRC inspector reviewed an internal memorandum which stated that the QA Manager had reviewed all Standard Operating Procedures with the Quality Assurance Representative and had verified that he fully understood the requirements.

E. OTHER FINDINGS OR COMMENTS:

1. Status of ASME Certificates and Nuclear Contracts:

a. BSIW had returned their N, NPT, U, and QSC certificates to the ASME before their expiration date and had phased out all of their nuclear QA programs in all three Bristol shops.

b. BSIW has two nuclear contracts in an indefinite hold status and does not have any nuclear orders in manufacturing. The final items of the last active order were awaiting shipment at the time of this inspection.

c. BSIW has returned invitations to bid for nuclear work with a "no bid" response and currently is not bidding on nuclear work.

2. 10 CFR Part 50.55(e) Report From IPC, Clinton Power Station, Unit 1:

a. Adequacy of Thread Engagement of Bolted Connections:

(1) The NRC inspector reviewed the Baldwin Associates (BA) purchase order, Sargent and Lundy Engineers (SLE) specifications, and BSIW QA Manual and verified that the BSIW QA Manual had been accepted by SLE. The QA manual requires, as a minimum, that all fabrications be checked for bolting and dimensional compliance. The only required QC record was a check-off, initial and date on the Quality Control Check List.

(2) The NRC inspector reviewed the IPC 10 CFR Part 50.55(e) report, selected BSIW erector's lists of field bolts, and BSIW and BA correspondence and ascertained that: (a) very few of the BSIW erector's lists had been signed-off as having been checked, (b) BSIW could not substantiate the BA statement that there were two fabrication connections which did not meet the thread engagement requirements, (c) the use of bolts with jam nuts were for bolting pieces to larger fabrications for shipment and were not intended for installation during erection, and (d) BSIW had concurred with BA that certain bolts were listed longer than required.

The failure to check the erector's lists of field bolts was identified as a nonconformance (see paragraph B.2).

(3) The NRC inspector was informed by the QA manager that all QA/QC records had been shipped to the customer; therefore, the NRC inspector could not review the Quality Control Check List for the Clinton Power Plant, Unit 1, fabrication. The NRC inspector established by interviews of the assistant QA manager and the chief inspector that: (a) BA did not require the submittal of a detailed inspection plan as specified in the SLE specification, (b) the counter-bore depth of the holes and the tapped threads were checked by screwing in the specified size bolt of the proper length, and (c) no shop inspection was performed by BA or SLE.

(4) The NRC inspector reviewed BSIW Drawing Nos. 2-G32 and 2-G33 on Contract No. F-0271A and verified that the counterbore diameter and depth was given for the bolt holes. A review of drawings and correspondence established that a detail had been added to Drawing No. GN-1 for the counterbored and threaded holes as requested by BA.

b. Undersized Fillet Welds in Structural Steel Fabrication:

(1) The NRC inspector reviewed the BSIW drawings and the American Institute of Steel Construction (AISC) Manual of Steel Construction and established that tolerances for copes in beams were not specified on either the BSIW drawings or in the AISC manual.

The NRC inspector was informed by the Director of Engineering that the failure to provide sufficient material on the beam web to permit the fillet weld size specified on the BSIW drawings was the result of the detailer using the dimensions given in the Manual of Steel Construction for cope sizes for beams and bolt spacing for the connection angles. There are no recognized commercial tolerances for cope dimensions or length of connection angles. The checker who verified the detail drawings used the same manual and neither the detailer nor the checker verified that there was enough beam web material to accomodate the specified size of fillet welds for the connection angles. This was identified as a nonconformance (see paragraph B.2).

(2) It was verified by the NRC inspector that the BSIW drawings did specify the fillet weld sizes for the welding of connection angles to the coped beams. Connection angles were welded to coped beams with fillet weld sizes less than those specified on the drawings as evidenced by the 10 CFR Part 50.55(e) report by IPC. The failure of BSIW personnel to detect and report this nonconforming condition to their supervisors has been identified as a nonconformance (see paragraph B.1).

(3) The NRC inspector reviewed the BSIW design calculations for the justification of using "as is" coped beams with the undersized connection angle fillet welds. It was verified that they had been checked and SLE had accepted 1996 of the 2016 connection angle welds. Of the 20 that required field verification, 17 were found to have the specified horizontal fillet welds. One of the three remaining beams was removed for testing and the other two beams were determined to be inadequate. The SLE letter of May 19, 1983, stated that the two inadequate beams had been redesigned and the revised drawing issued on May 19, 1983.

ORGANIZATION: BROWN BOVERI ELECTRIC, INC.
SWITCHGEAR PRODUCTS DIVISION
SPRING HOUSE, PENNSYLVANIA

REPORT NO.: 99900740/83-01	INSPECTION DATE(S): 10/24-28/83	INSPECTION ON-SITE HOURS: 13

CORRESPONDENCE ADDRESS: Brown Boveri Electric, Incorporated
Switchgear Products Division
ATTN: Mr. D. D. Duvall
Vice President-Brown Boveri Electric, Inc.
Norristown Road and Route 309
Spring House, PA 19477

ORGANIZATIONAL CONTACT: Mr. E. W. Rhoads, Manager, Quality Assurance
TELEPHONE NUMBER: 215/628-7400

PRINCIPAL PRODUCT: Switchgear.

NUCLEAR INDUSTRY ACTIVITY: This information was not obtained during this inspection.

ASSIGNED INSPECTOR: I. Barnes for W. E. Foster, Reactive Inspection Section (RIS) 11-29-83 Date

OTHER INSPECTORS:

APPROVED BY: I. Barnes I. Barnes, Chief, RIS 11-29-83 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 10 CFR Parts 21 and 50.55(e) and licensee event reports. The latter report pertained to the failure of a circuit breaker charging motor that had been furnished to the Brunswick Steam Electric Plant, Units 1 and 2. The former reports pertained to: (1) potential deficiency of secondary disconnects in 480 volt switchgear that had been furnished to the
(continue on next page)

PLANT SITE APPLICABILITY:

(a) Secondary disconnect deficiency, 50-400; (b) Sheared circuit breaker charging motor failure, 50-324; (c) Deficient welds, 50-546, 50-547, 50-440, 50-441, 50-400, 50-401, and (d) Prop latch failure, 50-322.

ORGANIZATION: BROWN BOVERI ELECTRIC, INC.
SWITCHGEAR PRODUCTS DIVISION
SPRING HOUSE, PENNSYLVANIA

REPORT NO.: 99900740/83-01	INSPECTION RESULTS:	PAGE 2 of 5

SCOPE: (cont.) Shearon Harris Nuclear Power Plant, Units 1 and 2; (2) deficient welds in hardware that had been furnished to the (a) Marble Hill Nuclear Station, Units 1 and 2, (b) Perry Nuclear Power Plant, Units 1 and 2, and (c) Shearon Harris Nuclear Power Plant, Units 1 and 2; and (3) failure of a prop latch in a circuit breaker that had been furnished to the Shoreham Nuclear Power Station, Unit 1.

A. VIOLATIONS:

None

B. NONCONFORMANCES:

None

C. UNRESOLVED ITEMS:

Lack of adequate supporting documentation regarding evaluation of nonconforming conditions, notification to customers, and corrective actions.

D. STATUS OF PREVIOUS INSPECTION FINDINGS:

Previous inspection findings were not evaluated; consequently, the status is unchanged.

E. OTHER FINDINGS OR COMMENTS:

1. Followup on Regional Requests:

a. Carolina Power and Light Company (CP&L) filed a final 10 CFR Part 21/50.55(e) report on April 29, 1983, with the Nuclear Regulatory Commission, Region II (NRC, RII). The report indicated that a design deficiency existed in the secondary disconnects of 480 volt switchgear that had been furnished to the Shearon Harris Nuclear Power Plant, Unit 1 (SHNPP) from April 1982 to November 1982. Also, the report states, in part, "A Brown-Boveri service representative has completed the change-out of all the old style stationary secondary disconnects . . . to the new style stationary disconnects. . . ."

The NRC inspector requested documentation that reflected the installation and inspection of secondary disconnects; however, the documents presented failed to reflect these activities. The NRC inspector was informed that production documentation is not

normally maintained. The documents indicate that assembly of the cradles (in which the disconnects are installed) was completed in 1979-1980. The NRC inspector was unable to determine where the cradles were assembled; that is, Chalfont, Pennsylvania, or Columbia, South Carolina. The latest configuration of the secondary disconnects occurred, and was identified in a September 23, 1982, revision to a bill of material; the NRC inspector was unable to determine the effectivity point.

The NRC inspector was informed that the modification was identified as a product improvement. Notification to the customer was not available for the NRC inspector's verification of this statement. Also, the NRC inspector was informed that the only domestic nuclear generating station in receipt of this hardware was SHNPP. Based upon that information, it appears that generic implications may not be a consideration. Corrective action appears adequate. The reason for the modification could not be verified and preventive measures could not be assessed; consequently, this item will remain open until such assessment has been accomplished.

b. CP&L filed a licensee event report on November 9, 1982, with the NRC, RII. The report indicated that a "sheared breaker charging spring motor actuator," resulted in the failure of a circuit breaker to close automatically, as required at the Brunswick Steam Electric Plant, Unit 2. The NRC inspector was informed that this information had not been conveyed to Brown Boveri Electric, Incorporated (BBE). Subsequent to the inspection, the NRC inspector determined that the manufacturer was identified as I-T-E Circuit Breaker Canada. This item will remain open.

c. BBE filed a 10 CFR Part 21 report on December 22, 1982, with the NRC, Headquarters. The report indicated that required spot or equivalent arc welds had not been added at the corners of the rear vertical and horizontal channels of low voltage switchgear enclosures that had been furnished to the Marble Hill Nuclear Station. The report identified Perry Nuclear Power Plant (PNPP) as suspect regarding this deficiency and included a commitment by BBE to "arrange for and conduct an inspection of the low voltage switchgear at this location." While the suspected deficiency was not identified, the inspection did reveal "nonconforming spotwelds along the top corner braces of several of the low voltage frames." The nonconforming spotwelds were actually missing spotwelds (one of two) in top corner braces with cutouts which precluded placement of the missing spotwelds. An

interoffice memorandum states that (a) the "condition can remain as is with no possibility of adverse effects", and (b) "absence of a weld on several frames will have no effect on the seismic capability of the equipment." The document also identifies individuals responsible for conducting the evaluation. The NRC inspector was informed that one of them is the Manager-Product Analysis and Qualification. The document reflected only one signature and no other documents were presented to support the aforementioned statements.

The NRC inspector determined that the corner braces were of an incorrect configuration - there should have been no cutout. The cause for installation of incorrect parts or the exact location of manufacture was not established nor was implementation of preventive measures evaluated. However, it does appear that manufacturing took place at the Chalfont, Pennsylvania, and Tulsa, Oklahoma, facilities.

d. The Cleveland Electric Illuminating Company filed a 10 CFR Part 50.55(e) report on April 27, 1983, with the NRC, RIII. The report indicated that one low voltage switchgear enclosure was without the required spot or equivalent arc weld at the corner of the rear vertical and horizontal channels of equipment that had been furnished to PNPP. The report stated that BBE had elected to submit a rework/repair procedure rather than perform an evaluation to justify its usage. There was no clear indication that this deficiency had been addressed by BBE.

e. CP&L filed a 10 CFR Part 50.55(e) report on June 3, 1983, with the NRC, RII. The report indicated that welding deficiencies (undersize, undercut, incomplete fusion, etc) had been detected in: (a) air terminal chambers, (b) transformers, and (c) a current limiting reactor of 480 volt switchgear that had been furnished to SHNPP, Unit 1. The report stated that: (a) BBE had repaired major defects, (b) minor defects would be modeled in an impending seismic test, and (c) welding deficiencies had not been completely addressed by BBE.

The NRC inspector determined that the status of the situation had not changed. It was also determined that this hardware was initially welded at the Bland, Virginia, facility. Division procedures had been initiated to inspect and document the inspection of welds and the NRC inspector was informed that the procedures applied to all manufacturing facilities. Corrective action was being taken, excluding the vertical/horizontal

channel weld at PNPP which was determined to be acceptable by BBE. As a result of the incompleteness of the corrective action and the inadequacy of the reviewed documentation for taking no action at PNPP and the widely separated manufacturing facilities, this item will remain open pending an evaluation of the adequacy of the corrective actions (or lack there of) and preventive measures.

f. Long Island Lighting Company filed a 10 CFR Part 50.55(e) report on May 18, 1983, with the NRC, RI. The report stated that a prop latch failed on a 480 volt circuit breaker that had been furnished to the Shoreham Nuclear Power Station, Unit 1. This item was not evaluated during this inspection and, therefore, will remain open.

2. Methodology:

In an effort to assess the effectiveness of the corrective actions and preventive measures, the following areas were evaluated: (a) change control, (b) manufacturing process control, (c) nonconformances and corrective action, and (d) records.

The inspection was accomplished by evaluating the following documents for requirements and/or implementation of requirements: 12 drawings, 4 procedures, 10 internal memoranda, 6 letters, 2 design document transmittals, 1 service report, 1 field service trip report, and 1 certificate of conformance. During this inspection, no violations or nonconformances were identified. The failure to present supporting documentation of nonconformance evaluations, notification to customers and corrective actions was identified as an unresolved item and will be reviewed further during a future inspection (see paragrpah 6.).

ORGANIZATION: BROWN BOVERI ELECTRIC, INC.
PROTECTIVE RELAY OPERATIONS
HORSHAM, PENNSYLVANIA

REPORT NO.: 99900743/83-01	INSPECTION DATE(S): 10/24-28/83	INSPECTION ON-SITE HOURS: 13

CORRESPONDENCE ADDRESS: Brown Boveri Electric, Incorporated
Switchgear Products Division
ATTN: Mr. D. D. Duvall, Vice President-BBE, Inc.
Norristown Road & Route 309
Spring House, PA 19477

ORGANIZATIONAL CONTACT: Mr. R. R. Conrad, Manager - Quality Assurance
TELEPHONE NUMBER: 215/674-5990

PRINCIPAL PRODUCT: Protective relays.

NUCLEAR INDUSTRY ACTIVITY: Details were not obtained during this inspection; however, supplying spares and reworking delivered hardware are ongoing.

ASSIGNED INSPECTOR: J Barnes for W. E. Foster, Reactive Inspection Section (RIS) 11-30-83 Date

APPROVED BY: J Barnes I. Parnes, Chief, RIS 11-30-83 Date

INSPECTION BASES AND SCOPE:

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

B. SCOPE: This inspection was made as a result of the issuance of 10 CFR Part 21 and 50.55(e) reports, and a licensee event report. The latter report pertained to degraded setpoints of "Gould-Brown Boveri Type ITE 27/59H" voltage relays that had been furnished to the Browns Ferry Nuclear Power Station, Unit 1. The former reports pertained to: (1) faulty relays that had been furnished to the Bellefonte Nuclear Plant, Unit 2; and (2) a potentially defective capacitor in solid state trip units that had been furnished to numerous nuclear generating stations.

PLANT SITE APPLICABILITY:

(a) Degraded voltage relays setpoints, 50-259; (b) Faulty relays, 50-439; and (c) Potentially defective capacitor, 50-361; 50-362; 50-322; 50-387; 50-388; 50-358; 50-359; 50-341; 50-315; 50-316; 50-416; 50-352; 50-353; 50-369; 50-370.

ORGANIZATION: BROWN BOVERI ELECTRIC, INC.
PROTECTIVE RELAY OPERATIONS
HORSHAM, PENNSYLVANIA

REPORT NO.: 99900743/83-01	INSPECTION RESULTS:	PAGE 2 of 4

A. VIOLATIONS:

None

B. NONCONFORMANCES:

1. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 2 of Engineering Standard Practices No. 203 dated April 15, 1982, Drawing No. 605143 Revision 9, had not been signed and dated by the engineer requesting the work to indicate acceptance.

2. Contrary to Criterion XI of Appendix B to 10 CFR Part 50, the quality assurance (QA) manual did not establish measures for evaluation of retained documented test results by responsible authority to assure that test requirements had been satisfied.

C. UNRESOLVED ITEMS:

None

D. STATUS OF PREVIOUS INSPECTION FINDINGS:

Previous inspection findings were not evaluated; consequently, the status is unchanged.

E. OTHER FINDINGS OR COMMENTS:

1. Followup on Regional Requests:

a. The Tennessee Valley Authority (TVA) filed a final 10 CFR Part 50.55(e) report on May 2, 1983, with the Nuclear Regulatory Commission, Region II (NRC, RII). The report indicated that: (a) two I-T-E Type 27 undervoltage relays and two I-T-E Type 59 overvoltage relays failed to function during construction testing; and (b) all four relays had been returned for repair and reinstalled at the Bellefonte Nuclear Plant, Unit 2. Further, the report states, in part, "One type 59 relay was found to have a failed transistor. . . . The second type 59 relay was found to have no operational problems. . . . The two type 27 relays were modified and repaired under a related nonconformance report . . . to prevent drop out on loss of dc voltage."

Corrective actions and preventive measures associated with the Type 27 relays were evaluated with the loss and restoration of direct current control power deficiency. This activity is

documented in Report No. 99900743/82-01. At the time of that inspection, there was no awareness that these particular items had been identified as having a separate problem.

The NRC inspector reviewed documents that indicated: (a) the solder joints were "touched up" on one item, (b) a transistor was replaced on the other item, and (c) both items had been subjected to an energized condition for 90 hours which included a weekend. The NRC inspector was informed that the energized condition had not been monitored automatically or manually.

The cause of the problems had not been identified; therefore, preventive measures were not taken. In the judgement of the NRC inspector, this omission is inconsequential and corrective measures are adequate.

b. TVA filed licensee event reports on October 7 and November 5, 1982, with the NRC, RII. The reports indicated that Type 27/59H voltage relays at Browns Ferry Nuclear Plant, Unit 1, had degraded as evidenced by setpoint drift.

The NRC inspector was informed that the supplier had not been notified regarding these particular items. However, setpoint drift had been a recurring condition and had resulted in the development of a new Type 27 (27N). Twenty-six of these were ordered by TVA for Browns Ferry on August 2, 1983, and were shipped on September 28, 1983. The NRC inspector was also informed that design activity is underway to develop a Type 59N. Preventive measures are considered adequate.

c. Mississippi Power and Light Company filed a 10 CFR Part 21 report on October 10, 1983, with the NRC, RII. The report indicated that a potentially defective capacitor had been incorporated in solid state trip units of low voltage circuit breakers that had been furnished to Grand Gulf Nuclear Station, Unit 1. This condition had been reported previously by Brown Boveri Electric, Incorporated (BBE) to the NRC, Headquarters in a 10 CFR Part 21 report dated December 10, 1982.

The NRC inspector was informed that the NRC notification is sent to each BBE District Office which, in turn, notifies customers. The NRC inspector reviewed the document transmitting the notification as well as some letters that went to customers. Replacement of the potentially defective capacitor is underway.

The NRC inspector verified that the Type 137D replaced the Type 40D in 1976. During the exit meeting the NRC inspector was informed that there may be occasions where other than the Type 137D is used; however, it will always be a hermetically sealed device. The corrective actions and preventive measures are considered adequate.

During this area of the inspection, the NRC inspector observed: (a) a drawing that failed to indicate initials or date in the latest revision block, and (b) documented quantitative test results had not been evaluated by responsible authority. These findings are detailed in paragraph B.

It was noted that the data sheets contained provisions for an approval signature. The NRC inspector was informed that certified copies submitted to customers are approved (which is in keeping with QA requirements) but filed copies are not. The documented program was silent regarding responsible authority evaluation of documented test results which are retained.

2. Methodology:

In an effort to assess the effectiveness of the corrective actions and preventive measures, the following areas were evaluated: (a) change control, (b) manufacturing process control, (c) nonconformances and corrective actions, and (d) records.

The inspection was accomplished by evaluating the following documents for requirements and/or implementation of requirements: 6 drawings, 8 procedures, 1 quality assurance manual, 3 purchase orders, 14 internal memoranda, 11 letters, and numerous other documents identified as (a) instructions, (b) data sheets, (c) certificates of conformance, (d) shippers, and (e) returned goods authority.

ORGANIZATION: BURNS AND ROE, INC.
ORADELL, NEW JERSEY

REPORT NO.: 99900503/83-03	INSPECTION DATE(S) 9/26-29/83	INSPECTION ON-SITE HOURS: 32

CORRESPONDENCE ADDRESS: Burns and Roe, Inc.
ATTN: Mr. K. Keith Roe
Executive Vice President
550 Kinderkamack Road
Oradell, New Jersey 07649

ORGANIZATIONAL CONTACT: Mr. John DeLooper, Manager of Quality Audit
TELEPHONE NUMBER: (201) 265-2000

PRINCIPAL PRODUCT: Architect engineering and consulting services.

NUCLEAR INDUSTRY ACTIVITY: The total effort committed to domestic nuclear activities is approximately 30 percent of the 1700 employee staff.

ASSIGNED INSPECTOR: P. M. Sears — 11/11/83
P. M. Sears, Reactor System Section (RSS) — Dates

OTHER INSPECTOR(S):

APPROVED BY: G S Madison for — 11/10/83
C. J. Hale, Chief, RSS — Dates

INSPECTION BASES AND SCOPE:

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

B. SCOPE: Status of previous inspection findings and review of the following items reported by Burns & Roe (B&R) under the guidelines of 10 CFR Part 21: (1) improperly sized overcurrent devices, (2) improperly sized starting resistors for D.C. motors, (3) inadequate flow in Standby Service Water System, (4) nonsafety-related cables routed with safety-related cables; and (cont. on next page)

PLANT SITE APPLICABILITY:

WNP-2, Docket No. 50-397.

ORGANIZATION: BURNS AND ROE, INC.
ORADELL, NEW JERSEY

REPORT NO.: 99900503/83-03	INSPECTION RESULTS:	PAGE 2 of 6

SCOPE: (cont.) 10 CFR Part 50.55(e) reports by Washington Public Power Supply System (WPPSS): (1) reversed wiring for Neutron Monitor Channels and (2) incorrect seismic classification and quality classification of flow indicators.

A. VIOLATIONS:

None

B. NONCONFORMANCES:

Contrary to Criterion V of Appendix B to 10 CFR Part 50 and B&R WNP-2 QA Plan, Chapter III, Section 4.8, the internal design review process failed to assure the acceptability of the design in that it did not identify a neutron monitor channel wiring reversal on design drawings or assure that the requirements for standby service water and standby liquid control flow indicators were correctly translated into engineering documents.

C. UNRESOLVED ITEMS:

Starting resistors for Class 1E D.C. motors used in valve operators and to drive pumps were not properly set. B&R stated that in accordance with industry practice at the time (approximately 1974), starting resistors were not specified nor were the resistor sizes shown on the D.C. motor control center vendor drawings. B&R purchase orders and audit reports of the motor control center vendor were not available for review in the B&R, Richland, Washington, office. This item will be reviewed during the next inspection at B&R, Oradell, New Jersey.

D. STATUS OF PREVIOUS INSPECTION FINDINGS:

1. (Closed) Nonconformance (82-01): The B&R Richland, Washington, office-controlled set of WNP-2 project instructions contained a superseded Revision 4 of WMP-3-ED-010.

   This set of WNP-2 project instructions was examined and found to be completely up-to-date.

2. (Closed) Nonconformance (82-01): A certain subanalysis of design calculation 5.51.053 was not identified as to status, not checked, nor verified as required by procedure WNP-2-ED-010.

   This analysis was examined and it was found to have been checked and verified. It was found to have been subsequently voided because the overall analysis was contracted to another firm. Their analysis covered the justification for interim operation and is being reviewed by WPPSS.

3. (Open) Nonconformance (82-02): Procedures were not available or were not employed to require independent verification/validation of computer programs.

   Procedures are now in place to independently verify/validate computer programs; however, the procedures in place have not been completely implemented because not enough time has been available.

   This item will be reviewed during the next inspection at B&R, Oradell, New Jersey.

4. (Open) Nonconformance (83-02): No approved plan exists for source surveillance, quality assurance auditing, or performance verification of computer programs supplied by vendors of computer codes.

   The B&R response to this nonconformance is currently under NRC review.

5. (Open) Nonconformance (83-02): A design error involving the remote shutdown panel went undetected through the design process, including design verification.

   The B&R response to this nonconformance is currently under NRC review.

E. OTHER FINDINGS OR COMMENTS:

1. Improperly Sized Overcurrent Devices - Overcurrent devices (fuses) were found to be improperly sized in the feeders for D.C. motors. The sizing was not in accordance with the National Electric Code to allow for starting and/or plugging currents. These currents might cause the fuses to begin melting and eventually fail after several

cycles. B&R was advised of the potential problem in a WPPSS letter dated December 1, 1982. The design of the overcurrent devices (fuse sizing) had been contracted to Fischbach/Lord Electric Company by WPPSS. The fuses were subsequently redesigned by B&R as follows:

Pump: Provide jogging pump motors with fuses sized at 225 percent of full load current.

Valve Operators: Provide throttling valve operator motors with fuses sized for 225 percent full load current. Provide across-the-line starting valve operator motors with fuses sized for 175 percent minimum of full load current; and increase fuse size to 200 percent of full load current for RCIC-V-22.

No violations or nonconformances were identified in this area of the inspection.

2. Class 1E D.C. Motors Starting Resistors Improperly Sized: Starting resistors for Class 1E D.C. motors used in valve operators and pumps were not properly set. Too small a starting motor resistor would result in too large a current flowing to a D.C. motor causing possible damage. Too large a resistor would cause insufficient starting currents to meet the starting torque requirements of the driven equipment.

   In accordance with industry practice at the time (approximately 1974), starting resistors were not specified nor were the resistor sizes shown on the D.C. motor control center vendor's (Gould) drawings.

   The ohmic rating of in-place resistor settings has been determined in the field. New required values have been calculated for the resistors and any necessary field adjustments have been made. Functional testing of these motors has been performed to verify the operating times and starting currents under design conditions.

   B&R purchase orders and audit reports of the motor control center vendor were not available in the B&R, Richland, Washington, office, so this item will be reviewed during the next inspection at B&R, Oradell, New Jersey.

3. Standby Service Water System Flow Was Insufficient to Several Heat Exchanges: Insufficient flow to several heat exchanges in Standby Service Water Loops, A and B, was discovered on July 28, 1983, when startup testing was in progress. B&R had done preliminary calculations, but for the piping system in question, as-built drawings were not yet available. This system is small bore piping and is field run, so the exact geometry is not known until as-built drawings are finalized. Because the field measured flow rates were unexpectedly low, causes other than inexact calculations were suspected. It was determined that the primary cause of the deficiency was corrosion product buildup on the inside surface of the pipe. The pressure drop calculations have been revised using as-built conditions and additional cleanup is in progress.

   No violations or nonconformances were identified in this area of the inspection. This item will be reviewed further during a subsequent inspection.

4. Neutron Monitor Channel Wiring Reversed on Design Drawings: Intermediate range neutron monitor channels E and H were reversed on B&R design drawings. When installation of the neutron monitors was attempted, it was found that the wiring was reversed and it was not possible to install the neutron monitors. The error occurred during the transfer of information from General Electric documents to B&R documents. The drawings have been corrected and correct installation has been completed (see B. above).

5. Nonsafety-Related Cables Were Being Routed From Non-1E System to a 1E System Without the Necessary Isolation Device: NUREG 0588 caused certain systems and pieces of equipment to be redefined as Class 1E. B&R received a new list of such equipment in January 1982. Subsequent checks of cable routing discovered the cables of three 1E systems routed with the cables of non-1E systems. Failure of such non-1E cables could result in the loss of 1E systems with serious consequences. The 1E cables have been rerouted in proper routings.

   No violations or nonconformances were identified in this part of the inspection.

6. Project Engineering Incorrectly Classified Flow Indicator as Seismic Class II: The flow indicator for the Standby Service Water System was designated as Seismic Category II (SC-II)/Quality Class II (QC-II) on certain drawings. The design requirements were that the flow indication be designated as SC-I/QC-I per Regulatory Guide 1.97

ORGANIZATION: BURNS AND ROE, INC.
ORADELL, NEW JERSEY

REPORT NO.: 99900503/83-03	INSPECTION RESULTS:	PAGE 6 of 6

committment. This deficiency was identified in a WPPSS audit dated September 30, 1982. The flow indicator has been replaced with SC-I/QC-I equipment and cables rerun as appropriate (see B. above).

ORGANIZATION: COFFER CORPORATION
FLANGE DIVISION
HOUSTON, TEXAS

REPORT NO.: 99900822/83-01	INSPECTION DATE(S) 10/3-7/83	INSPECTION ON-SITE HOURS: 41

CORRESPONDENCE ADDRESS: Coffer Corporation
Flange Division
ATTN: Mr. J. R. Alton, Quality Assurance Manager
4444 Center Street
Houston, Texas 77007

ORGANIZATIONAL CONTACT: Mr. J. R. Alton, Quality Assurance Manager
TELEPHONE NUMBER: (713)868-4421

PRINCIPAL PRODUCT: Nuclear flanges.

NUCLEAR INDUSTRY ACTIVITY: Approximately 5 percent of the 1982 production.

ASSIGNED INSPECTOR: J. T. Conway — 11-10-83
J. T. Conway, Reactive Inspection Section (RIS) — Dates

OTHER INSPECTOR(S):

APPROVED BY: I. Barnes — 11-10-83
I. Barnes, Chief, RIS — Dates

INSPECTION BASES AND SCOPE:

A. BASES: 10 CFR Part 50, Appendix B and 10 CFR Part 21.

B. SCOPE: This inspection was made to assess the implementation of the QA program particularly in the areas of control of purchased material and material identification and control.

PLANT SITE APPLICABILITY:

Not identified during the inspection.

ORGANIZATION: COFFER CORPORATION
FLANGE DIVISION
HOUSTON, TEXAS

REPORT NO.: 99900822/83-01	INSPECTION RESULTS:	PAGE 2 of 5

A. VIOLATIONS:

1. Contrary to Sections 21.6 and 21.21 of 10 CFR Part 21:

   a. A current copy dated August 31, 1983, of 10 CFR Part 21 was not posted in a conspicuous area where Section 206 was posted.

   b. Appropriate procedures to evaluate deviations or inform the licensee or purchaser of the deviation did not exist.

2. Contrary to Section 21.31 of 10 CFR Part 21, a review of 27 procurement/documentation packages for nuclear flanges revealed that 22 customer purchase orders (POs) to Coffer specified 10 CFR Part 21 as an applicable requirement but 21 Coffer POs to material manufacturers (Dallas Forge-1, Gulf Coast-8, and Texas Metal Works-4) did not specify that 10 CFR Part 21 would apply.

B. NONCONFORMANCES:

1. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph V-A of Section 8 of the Quality Assurance Manual (QAM), during an evaluation of the fabrication areas it was noted that approximately 60 forgings for SA105 Section III, Class 2 flanges (PO D33290-75N) were in an unmarked receiving/storage area with other forgings for commercial flanges.

2. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraphs III-B and III-C of Section 10 of the QAM, a review of 44 Manufacturing Orders (MOs) for nuclear flanges revealed the following:

   a. Two MOs were not signed by the QA Manager for release to manufacturing for POs E-2938-114 and 9407-V.

   b. Twenty-nine MOs were not approved by Quality Assurance for material for POs D-31862-75N(4), A-57747-N(2), D-27972-00N, D-31029-00N, D-30722-00N, E-2936-348, 3303N-43, 9407-V, A-58664-N, D-33544-00N, D-32789-00N, D-32883-00N, E-2938-114, D-32601-75N, A-67251-LAN(2), A-59884-LAN(4), D-32580-75N, and 3418N-00(4).

3. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph III-E of Section II of the QAM, a review of 44 MOs and 44 drawings for nuclear flanges revealed the following:

a. Forty-four drawings were not initialed or dated by the QA inspectors for POs D-32883-00N, E-2938-114, A-60344-LAN, D-32601-75N, A-67251-LAN, D-33544-00N, A-58151N, D-30853-00N, D-32789-00N, A-59884-LAN, D-32580-75N, D-31029-00N, D-30722-00N, D-33290-75N, D-31862-75N, E-2936-348, 3418N-99, 3303N-43, 1-99512-NJC, 1-99484-NJC, 9407-V, 6058N-28, A-58664-N, 8011506, D-27972-00N, A-61054-NC, and A-57747-N.

b. Four MOs were not initialed or dated by the QA inspector for POs E-2938-114, A-60344-LAN, A-67251-LAN, 1-99484-NJC, and 8011506.

4. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph V-B of Section 9 of the QAM, a review of 25 POs for forgings and 3 POs for NDE services revealed that the QA Manager did not sign and approve PO 19565 dated May 2, 1983, to Gulf Coast and PO 18000 dated September 3, 1982, to Coffer Laboratories.

5. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph II-A of Section 15 of the QAM, there was no documented evidence that the QA Manager had reviewed and approved Coffer Laboratory Procedures DMP-1-79 for magnetic particle examination and LP-1-79 for liquid penetrant examination.

6. Contrary to Criterion V of Appendix B to 10 CFR Part 50, paragraph I-A of Section 15 of the QAM and paragraphs 9.6, 9.6.1, and 8.2.a of SNT-TC-1A, a review of certification records for two nondestructive examination personnel revealed the following:

   a. Copies of current examinations for both the Level III and Level II examiners were missing.

   b. The Level III was certified in January 1980, but the only eye examination on record was dated April 1982. The Level II was certified in September 1979, but eye examination records were missing for 1981 and 1983 (due in June 1983).

7. Contrary to Criterion V of Appendix B to 10 CFR Part 50, paragraphs 1 of Section 1 and II-A of Section 6 of the QAM and subsection NCA-3866.2 of the ASME Code, during an evaluation of the production and inspection areas it was noted that procedures were not located at the receiving and final inspection work stations.

8. Contrary to Criterion V of Appendix B to 10 CFR Part 50, subsection NCA-3867.4 of the ASME Code and paragraph L of Section 10 of the QAM, a review of Certified Material Test Reports (CMTRs) in 27 documentation packages revealed the following:

   a. There was no documented evidence that the QA Manager reviewed any of the 27 CMTRs.

   b. PO 3418N-99 - Coffer's CMTR dated September 23, 1982, to Southwest Fabricators recorded charpy impact values for Heat No. 6011441 which were different to those on the applicable Coffer Laboratory report dated September 16, 1982.

   c. PO 1-99512-NJC - Coffer's CMTR dated July 27, 1982, to Tyler-Dawson specified that the material (Heat No. 6024616) was "heat treated at 1650°F, held 1 hr/in. of thickness and air cooled," but Republic's certification to Coffer did not specify a heat treatment.

   d. PO D32883-00N - Coffer's CMTR dated August 11, 1983, to Capitol Pipe specified that the material (Heat no. 30469) was "heat treated at 1650°F, held 1 hr/in. of thickness and air cooled," but Roebling's certification to Coffer did not specify a heat treatment.

C. UNRESOLVED ITEMS:

None

D. OTHER FINDINGS OR COMMENTS:

1. Training/Qualifications - The training/qualification records for two inspectors and two NDE personnel were reviewed to assure that personnel performing and verifying activities affecting quality were trained and qualified. It was noted that records did not exist to indicate that the two inspectors had received required eye examinations. Nonconformance B.6 was identified in this area of the inspection.

2. Calibration of Measuring and Test Equipment (M&TE) - A review of 1 procedure, calibration records for 16 M&TE and certifications for 3 reference standards was performed to assure that the devices were properly identified, controlled, and calibrated at specified intervals.

3. Reporting of Defects - The implementation of the reporting of defects and failures and compliance with 10 CFR Part 21 posting requirements were assessed by inspecting the shop fabrication area. Violation A.1 was identified in this area of the inspection.

4. Control of Purchased Material, Equipment, and Services - The Approved Vendor List dated September 22, 1983, 27 purchase orders to 4 material manufacturers, CMTRs in 27 documentation packages, 3 POs for NDE services, and 17 vendor audits were reviewed to assure that material equipment and services were purchased from qualified vendors. It was noted that the 4 material manufacturers (i.e., Dallas Forge, Gulf Coast, Texas Metal Works, and Liberty Forge) were all surveyed and approved by Coffer, who is not a certificate holder, as meeting the requirements of ASME Section III, NCA 3800. Violation A.2 and Nonconformances B.4 and B.8 were identified in this area of the inspection.

5. Procedures and Drawings - Two NDE procedures, one calibration procedure and 44 drawings for nuclear flanges were reviewed and the inspection and production areas evaluated to assure that activities affecting quality are prescribed by and accomplished in accordance with documented procedures and drawings. Nonconformances B.1, B.3, B.5, and B.7 were identified in this area of the inspection.

6. Identification and Control of Materials - Forty-four MOs were reviewed and the production and storage areas were evaluated to assure that incorrect or defective items are not used. Nonconformance B.2 was identified in this area of the inspection.

ORGANIZATION: CLOW CORPORATION
CLOW ENGINEERED PRODUCTS DIVISION
WESTMONT, ILLINOIS

REPORT NO. 99900837/83-01	INSPECTION DATE(S) 8/15-19/83	INSPECTION ON-SITE HOURS: 32

CORRESPONDENCE ADDRESS: Clow Corporation
Clow Engineered Product Division (CEP)
ATTN: Mr. M. L. Seshagiri, Quality Assurance Manager
40 Chestnut Avenue
Westmont, Illinois 60559

ORGANIZATIONAL CONTACT: Mr. M. L. Seshasiri, Quality Assurance Manager
TELEPHONE NUMBER: (312) 325-6000

PRINCIPAL PRODUCT: High pressure butterfly and check valves.

NUCLEAR INDUSTRY ACTIVITY: Commercial nuclear valve production represents 60 percent of current production. Sixteen contracts are presently in-house.

ASSIGNED INSPECTOR: J W Sutton — 10-6-83
J. W. Sutton, Reactive and Component Program Section (R&CPS) — DATES

OTHER INSPECTOR(S):

APPROVED BY: I. Barnes — 10-6-83
I. Barnes, Chief, R&CPS — DATES

INSPECTION BASES AND SCOPE:

A. BASES: 10 CFR Part 50, Appendix B and 10 CFR Part 21.

B. SCOPE: Status of previous inspection findings, implementation of 10 CFR Part 21, review and organization, welding control, inspection and test, QA records, and audits.

PLANT SITE APPLICABILITY:

Nine Mile Point, Unit 2: 50-410.

ORGANIZATION: CLOW CORPORATION
CLOW ENGINEERED PRODUCTS DIVISION
WESTMONT, ILLINOIS

REPORT NO.: 99900837/83-01	INSPECTION RESULTS:	PAGE 2 of 4

A. VIOLATIONS:

Contrary to Section 21.21(b)(2) of 10 CFR Part 21, Clow Corporation failed to submit a written report of a defect found in valves within the 5-day reporting period.

B. NONCONFORMANCES:

1. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and subparagraph 4.2.4 of QC Procedure EPS 30-49-722, hydrostatic shell tests of valves were conducted for only 3 minutes and not the required minimum of 10 minutes.

2. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 6.2.G of the QA manual, Revision G, the NRC inspector observed the following:

   a. The use of an unissued welding procedure specification rather than the specification required for the welding being performed.

   b. Performance of welding using 95 amps rather than the 40-50 ampere range required by the applicable procedure.

C. UNRESOLVED ITEMS:

None

D. STATUS OF PREVIOUS INSPECTION FINDINGS:

(Closed) Nonconformance (82-01): Measuring equipment calibration was overdue. The NRC inspector verified that the measuring equipment in question had been recalibrated. In addition, the NRC inspector reviewed QC procedure EPS-30-49-675, Revision L, and examined measuring equipment in use for compliance with the calibration due date. Also reviewed was the monthly log of equipment and test gauges. The historical Record Cards examined were found to comply with the current QC procedure.

E. OTHER FINDINGS OR COMMENTS:

1. Implementation of 10 CFR Part 21 - The NRC inspector reviewed CEP's procedure EPS-30-19-694, Revision A, dated 7-14-82 for content. In addition, an initial telephone report to the NRC Region III office

on September 9, 1982, indicated that CEP had determined that 16 valves (24" to 30" sizes) which had been shipped to Niagara Mohawk Power Corporation, Nine Mile Point, Unit 2, had not been heat treated after rolling in accordance with Section III of the ASME code (1974 edition) subparagraphs NC 4651(b) and ND 4651(b). The NRC inspector reviewed the circumstances surrounding this deficiency and determined that a breakdown in QC checks, reviews, and inspections by CEP personnel, customer representatives, and the authorized Nuclear Inspector (ANI) had occurred. The condition was uncovered during the ASME Certificate of Authorization Recertification Audit conducted during September 1982. All 16 valves will be returned to Clow for rework and retest. The NRC inspector reviewed the rework procedure and requirements to be performed to recertify the valves. Clow has taken actions to prevent recurrence including redesign of specification packages and performance of additional QA and technical reviews. It was established from record review that other contracts were not affected by this deficiency.

One violation (see paragraph A) was identified in this area of the inspection.

2. QA Program Review/Organization - The NRC inspector reviewed Section i, Introduction, and 1 General of CEP's QA manual, Revision G, dated September 27, 1982, which describes the responsibilities and authorities of CEP management pertaining to the nuclear quality program. Procedures and samples of forms were reviewed for content. Clow corporate and divisional statements of policy were reviewed. The NRC inspector discussed with management the fact that the manual did not apply to non-code-stamped valves or manufacturing activities under 10 CFR Part 50, Appendix B requirements. The inspector was informed that a statement applying the QA manual to Appendix B work would be added to the policy statement during the next revision. Within this area, no nonconformances or unresolved items were identified.

3. Welding Control - The NRC inspector reviewed Section 6.0, "Welding Quality Control" of CEP QA manual to verify that this activity was controlled by the QA Program. Observations were made of weld rod storage, rod oven control, control of electrical characteristics by calibrated instrumentation, and inprocess work on ASME code valves. It was noted that an unissued revision of a welding procedure was being used and not the revision documented on the work traveler. The electrical characteristics (amperage) being used were over the maximum specified range of the required welding procedure specification as a result of this practice.

The NRC inspector also reviewed the following documents. (a) two shop routing travelers, (b) list of qualified welders, (c) weld material issue cards, (d) two welding procedures, (e) qualification records for two welders. Nonconformance B.2 was identified in this area of the inspection.

4. Inspection and Test - The NRC inspector reviewed Section 5 of the CEP QA manual to verify that this activity was controlled by the QA program. The following documents/equipment were reviewed: (1) hydrostatic procedure, (2) two drawings, (3) calibrated test equipment, (4) two test records and (5) test of two 10" valves. Nonconformance B.1 was identified in this area of the inspection.

5. QA Records - The NRC inspector reviewed Section 14 of the CEP QA manual to verify that this activity was controlled by the QA program. Three completed data packages with supplemental documents were examined for content. In addition, controlling procedures and forms were examined. The data packages reviewed were found to contain all required documents, properly executed and signed. Records were stored in an area that was protected and controlled. Within this area of the inspection, no nonconformances were identified.

6. Audits - The NRC inspector reviewed Sections 11 and 4 of CEP QA manual and related QA documents and examined the results of available internal and management audits for the years 1980-1983. The audit schedule for 1982-1983 was reviewed for compliance with QA program requirements and 10 internal audits were examined to determine if required corrective actions had been taken as a result of audit findings. CEP lead auditor training procedure was reviewed. In addition, a review of the current auditors files was conducted.

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

ORGANIZATION: COMBUSTION ENGINEERING, INC.
C-E NEWINGTON
NEWINGTON, NEW HAMPSHIRE

REPORT NO.: 99900259/83-01	INSPECTION DATE(S) 9/12-16/83	INSPECTION ON-SITE HOURS: 28

CORRESPONDENCE ADDRESS: Combustion Engineering, Inc.
C-E Newington
ATTN: Mr. W. R. Poteet, Manager, Quality Assurance
Old Dover Road
Newington, New Hampshire 03801

ORGANIZATIONAL CONTACT: Mr. W. R. Poteet, Manager, Quality Assurance
TELEPHONE NUMBER: (603) 431-8100

PRINCIPAL PRODUCT: Reactor vessel internals, fuel racks, and reactor coolant pumps.

NUCLEAR INDUSTRY ACTIVITY: Not obtained during this inspection.

ASSIGNED INSPECTOR: P C Ellershaw 10-28-83
Lt E. Ellershaw, Reactive and Component Program Section (R&CPS) Date

OTHER INSPECTOR(S):

APPROVED BY: I Barnes 10-31-83
I. Barnes, Chief, R&CPS Date

INSPECTION BASES AND SCOPE:

A. BASES: 10 CFR Part 21 and Appendix B to 10 CFR Part 50.

B. SCOPE: This inspection was made as a result of the receipt by NRC of two potential 10 CFR Part 50.55(e) reports pertaining to: (1) failure of reactor coolant pump (RCP) diffuser ring capscrews, and (2) identification of linear indications in the circumferential weld of a RCP casing, that have been furnished, respectively, to: (1) Arizona Public Service Company's

(cont. on next page)

PLANT SITE APPLICABILITY:

Capscrew failure - 50-528, 50-529, 50-530, 50-566, 50-508; linear indications in weld - 50-528, and indications in forging - 50-508.

ORGANIZATION: COMBUSTION ENGINEERING, INC.
C-E NEWINGTON
NEWINGTON, NEW HAMPSHIRE

REPORT NO.: 99900259/83-01	INSPECTION RESULTS:	PAGE 2 of 8

SCOPE: (cont.) Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3; Tennessee Valley Authority's Yellow Creek Nuclear Plant, Unit 1; Washington Public Power Supply System's (WPPSS) Nuclear Project (WNP) No. 3; and (2) Arizona's PVNGS, Unit 1. In addition, the NRC was notified on December 29, 1982, of a potentially generic issue pertaining to indications being identified in the base metal of the core support barrel lower flange forging provided to WPPSS's WNP No. 3.

A. VIOLATIONS:

None

B. NONCONFORMANCES:

None

C. UNRESOLVED ITEMS:

None

D. OTHER FINDINGS OR COMMENTS:

1. Potential 10 CFR Part 50.55(e) Report - On July 15, 1983, NRC received notification from Arizona Public Service Company that failed diffuser ring capscrews had been discovered in RCP 1A during disassembly after hot functional testing. In addition, it was noted that the diffuser and the suction pipe had been damaged.

   a. Introduction - All Combustion Engineering, Inc. Nuclear Steam Supply Systems designated as System 80 use the CE-KSB Pump Company, Incorporated's RCPs. CE-KSB was licensed by KSB of Germany to manufacture KSB designed RCPs. The design is identical with the four KSB supplied RCPs at the Power Authority of the State of New York's (PASNY) Greene County Nuclear Power Station, which was subsequently canceled. The four RCPs supplied to PASNY had been successfully tested; one for 500 hours and the other three for 100 hours each, with satisfactory results reported.

   A total of 24 RCPs were built by CE-KSB with 20 having been provided to nonoperating sites: 12 to Arizona's PVNGS, Units 1, 2, and 3; 4 to WPPSS's WNP No. 3, and 4 to TVA's Yellow Creek Nuclear Plant, Unit 1.

b. Background - In late 1978, a post-test inspection on RCP No. 1 was conducted after performance testing in the CE-KSB test facility. Failure and/or damage was identified in five diffuser cap screws, all made from ASTM A-193 Grade B6 material. The failures were related to improper mechanical assembly procedures. However, two of the broken bolts were sent to the University of New Hampshire's Center for Industrial and Institutional Development for analysis. The resultant report dated April 18, 1979, concluded that the fractures were brittle and that hydrogen embrittlement was definitely present in one bolt and probably present in the other. The report further concluded that the fundamental cause was the eccentric loading of the cap at high stress conditions. As a result, engineering redesigned the bolts and made a material change to Unbrako KS-17, a Type 410 martensitic stainless steel. There were no additional bolt failures noted until post-test inspection of RCP No. 17, which was performance tested on July 14, 1981. One diffuser ring bolt was found broken. Based on the successful testing of the preceding 15 RCPs after design changes, the cause was attributed to a defective bolt. However, post-test inspection on RCP No. 20 which was performance tested on January 26 and February 17, 1982, revealed two more broken bolts. After the bolt failure in RCP No. 20, a review of all bolt failures was performed. The following facts were established:

(i) The bolt failures occurred within a specific sector related to the discharge nozzle center.

(ii) The bolt failures occurred with diffusers supplied from two different vendors.

(iii) Failures occurred with virgin bolts.

(iv) There were no bolt failures on 17 out of 20 pumps tested.

(v) Bolt failures reported on RCP Nos. 1, 17, and 20 occurred with the six vane diffuser half positioned on the right side of the nozzle centerline (the six vane diffuser half and the five vane diffuser half are interchangeable).

(vi) Metallurgical investigations of the failed bolts indicated that the failure mechanism was characteristic of hydrogen-induced stress corrosion cracking. There were no reported indications of fatigue failure from the metallurgical examinations.

The next three RCPs (Nos. 20A, 20B, and 20C) were performance tested with the specific objective of attempting to make the bolts fail in order to identify the failure mechanism. RCPs 20A and 20C were tested with the six vane diffuser half positioned on the right-hand side of the discharge nozzle centerline. Post-test inspection revealed diffuser bolt damage in both tests. RCP No. 20B was performance tested with the six vane diffuser positioned on the left-hand side of the discharge nozzle centerline. Post-test inspection revealed no bolt damage.

The metallurgical examination of the broken bolts indicated that the failures were related to hydrogen-induced stress corrosion. However, the location of the reported bolt failures did not show the randomness expected if failure was initiated by hydrogen-induced stress corrosion in combination with the normal loadings. In addition, it was determined that the hardness of the bolts was such (>Rc40) that a material modification would be required. This led to further investigation.

It was noted on several RCPs that the pre and post-test as-built dimensions of the diffuser half and the mating inside diameter of the pump casing showed that the diffuser halves had moved during testing. Subsequent calculations confirmed that this movement was possible.

A more detailed review of the hydraulic loadings on the diffuser halves was undertaken. The conclusion of this review was that it was possible, under a certain combination of dynamic loading conditions and as-built dimensions combined with the assembly procedure, to cause a significant increase in the diffuser bolt stresses. Calculations verified that positioning the six vane diffuser half on the right-hand side of the pump casing discharge nozzle created higher bolt stresses than with the five vane diffuser on the right-hand side.

C-E concluded that the combination of the hydrogen-induced stress corrosion cracking and the movement of the diffuser half causing higher stress levels on certain bolts was responsible for the failure locations identified during the post-test inspection.

The recommended changes developed from the conclusions included:

(i) Continue to use Type 410 bolting material, but to specification A-193, Grade B6, with a modified heat treatment.

(ii) Position the five vane diffuser half on the right-hand side of the pump casing to minimize the induced stress levels in the bolts.

(iii) Install diffuser wedges to limit the movement of each diffuser half.

The three recommendations were incorporated into the performance test RCP No. 20D. Post-test inspection showed no evidence of bolt failure.

The above changes were incorporated into all of the RCPs still located at CE-KSB. During November and December 1982, CE-KSB went to Arizona to replace the KS-17 Type 410 bolts with the A-193, Grade B6, Type 410 bolts with modified heat treatment. Upon disassembly of the Unit 2 RCPs, it was discovered that eight bolts, brand new and never used during performance tests, had either broken or were cracked. Subsequent metallographic examination revealed that the initial cracking of all eight bolts occurred by hydrogen-induced stress corrosion cracking.

Following cool down from hot functional testing of Arizona's Unit 1 during July 1983, the RCPs were disassembled and inspected. Several broken bolts were discovered. These were the A-193 Grade B6, Type 410 with modified heat treatment bolts, that CE-KSB had installed during their November-December 1982 visit. Evaluation of these bolts revealed that the cracking/breaking was not material-related, but was caused by excessive stress. CE/Windsor has characterized the failures as a pure overload situation; i.e., the tensile strength of the bolt material was exceeded.

Concurrent with the bolting problem has been a situation where the leading edges of the diffuser vanes are cavitating and, in some instances, actual failure of vane sections has occurred. This is not considered to be a material problem but a design problem.

c. Findings - C-E, in conjunction with KSB, is considering the following as the most likely solution: A modification involving opening up the gap between the trailing edge of the impeller blade and the leading edge of the diffuser vane between 2 and 6 percent of the existing gap by trimming the diffuser. This change will reduce the pulsating forces by approximately 3 to 3 1/2 times. In addition, the forces acting on the bolts will be reduced.

Still under consideration is the possible addition of more bolts and increasing the length of the bolts.

C-E is performing the modification noted above in parallel with a test verification program. The testing will be completed before all RCPs are modified. C-E has committed to keep NRC informed as the modifications and testing program progress.

2. Potential 10 CFR Part 50.55(e) Report - On July 1, 1983, NRC was notified of a potential 10 CFR Part 50.55(e) report pertaining to rejectable linear indications in the circumferential girth weld in RCP No. 1A supplied to Arizona's PVNGS, Unit 1.

a. Introduction - During an examination and comparison between the preservice examination ultrasonic (UT) data and the fabrication radiographs (RT), two linear indications were identified. The two indications measure 3" and 3/4" long. Both exist within a length of 6 inches. These linear indications are acceptable to the ASME Section III UT acceptance criteria but not to the ASME Section III RT criteria. The indications are located approximately 3.2" in from the outside diameter. The wall of the casing is 5.625" thick.

b. Background - The following information was derived from review of the manufacturing process sheets. The circumferential girth weld was completed on May 27, 1977. RT, for information only, was performed and the results accepted on June 14, 1977. Back cladding of this weld joint was completed June 16, 1977. The required ASME Section III UT was performed with acceptable results on January 28, 1978.

Postweld heat treatment (PWHT) was completed on February 6, 1978. The required ASME Section III RT was performed with acceptable results on February 8, 1978. ASME Section XI UT, for inservice inspection (ISI), was performed on July 26, 1978. Recordable indications were identified; however, they met the ASME acceptance criteria.

During February 1983, Arizona's nondestructive examination (NDE) engineering group requested C-E to review certain weld seam radiographs of RCP No. 1A. The request was related to the ISI Section XI UT data that had been submitted to Arizona. On March 2, 1983, C-E reviewed all circumferential girth seam radiographs of RCP No. 1A. This included the "before" and "after" PWHT sets. During this review, rejectable linear indications were identified in the "after" set of film at film stations 5-6 and 6-7. As a result of this finding, a complete RT film review of girth welds was performed on the remaining 15, 2-piece RCPs, with acceptable results.

Arizona personnel were notified and arrangements were made for C-E's ISI group to perform an onsite, UT examination of the indications to determine size and location. This was accomplished on April 26 and 27, 1983. On May 6, 1983, Arizona's NDE Level III examiner reviewed the "before" PWHT RT film and established that the same linear indications existed in that film also. After establishing location, the linear indications were removed by grinding from the inside of the casing, resulting in an excavation approximately 16" long and 7 1/2" wide. Ultrasonics established that the remaining wall thickness is 2.95". RT was performed with C-E's review and approval of the film on July 26, 1983. The Hartford Steam Boiler Inspection and Insurance Company's (HSB) Authorized Nuclear Inspector (ANI) and Arizona's NDE Level III examiner reviewed and accepted the film on July 28, 1983. There is one slag indication of approximately 3/8" long remaining. This is an acceptable indication in accordance with ASME Section III acceptance criteria.

c. Findings - The NRC inspector reviewed both the "before" and "after" PWHT RT film which contained the linear indications. The indications, while nearly indiscernible, are readable. It could not be determined why C-E's NDE personnel, CE-KSB's NDE personnel, and HSB's ANI did not identify the rejectable indications during their review of the "after" PWHT RT film.

C-E has committed to inform NRC as to the status of repair.

3. Potentially Generic Issue - The NRC was notified on December 29, 1982, of a potentially generic issue pertaining to indications being identified in the base metal of a lower flange forging of the core support barrel provided to WPPSS's WNP No. 3.

Liquid penetrant (PT) examination was being performed on the first one-third layer of weld metal deposited in the flexure weld joint at WPPSS's WNP No. 3. The PT routinely included up to 2" of the base metal adjacent to the weld joint. It was at this time the indications were discovered.

There were a total of 82 surface indications of which just one exceeded 3/8" depth (13/32"). All areas were ground, PT'd, and where required, weld repaired. After all repairs were completed the entire surface was PT'd and a volumetric UT was performed. No other indications were identified. The position of the indications indicated that they were the result of nonmetallic inclusions and/or cold laps.

This forging was one of nine supplied to C-E by Standard Steel, with each one being from a different heat. C-E performed PT on a Standard Steel forging still in their possession which was destined for TVA, and found no similar conditions. The NRC inspector reviewed the UT report supplied by Standard Steel for the WPPSS's WNP No. 3 forging. There were no rejectable indications identified. The only required NDE to be performed by C-E was PT on the weld prep. The PT report showed no rejectable indications.

None of the other eight forgings were identified as having rejectable indications.

It would appear that this was an isolated condition and is, therefore, not considered to be a generic issue.

ORGANIZATION: COMBUSTION ENGINEERING, INC.
POWER SYSTEMS GROUP
WINDSOR, CONNECTICUT

REPORT NO.: 99900401/83-03	INSPECTION DATE(S) 9/19-22/83	INSPECTION ON-SITE HOURS: 25.5

CORRESPONDENCE ADDRESS: Combustion Engineering, Inc.
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) 285-9200

PRINCIPAL PRODUCT: Nuclear steam supply system.

NUCLEAR INDUSTRY ACTIVITY: The Power Systems Group, Combustion Engineering (CE), had contracts for 16 domestic reactor units to date, of which 8 are in the design and construction phase. In addition, they have modification/repair/service contracts for 16 reactor units.

ASSIGNED INSPECTOR: R. H. Brickley — 10/24/83
R. H. Brickley, Reactor Systems Section (RSS) — Date

OTHER INSPECTOR(S):

APPROVED BY: C. J. Hale — 11/1/83
C. J. Hale, Chief, RSS — Date

INSPECTION BASES AND SCOPE:

A. BASES: 10 CFR Part 50, Appendix B and Topical Report No. CENPD-210-A.

B. SCOPE: Status of previous inspection findings and special inspection in response to a report to the NRC, Region IV office concerning the potential for inadvertent actuation of engineered safety features at Waterford-3.

PLANT SITE APPLICABILITY:

Docket Nos. 50-368, 50-528, 50-529, 50-530, 50-361, 50-362, 50-382, 50-508, and 50-509.

ORGANIZATION: COMBUSTION ENGINEERING, INC.
POWER SYSTEMS GROUP
WINDSOR, CONNECTICUT

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A. VIOLATIONS:

None

B. NONCONFORMANCES:

Contrary to the requirements of Section 17.6 of CE Topical Report No. CENPD-210-A, CE reviewed and accepted supplier drawings for the plant protection system which indicated a wiring configuration whereby initiation of all engineered safety features (ESF) functions will occur if continuity is interrupted in either of two connectors, and which could result in high pressure safety injection (HPSI) pump damage.

C. UNRESOLVED ITEMS:

None

D. STATUS OF PREVIOUS INSPECTION FINDINGS:

1. (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.

   CE has transmitted additional data regarding this item to the Region IV office where it is currently under review.

2. (Closed) Violation (82-03): CE failed to specify that the provisions of 10 CFR Part 21 applied to Purchase Order No. 9172711-8181, issued to NAMCO Controls on December 30, 1981, for the procurement of safety-related test specimens and testing services.

   inspector had reviewed the status of commitments made by CE in their letter dated January 20, 1983, in response to this item (Inspection Report No. 99900401/83-02, paragraph D.2). This review disclosed additional corrective actions and preventive measures required by CE which resulted in an additional nonconformance relating to this item. The closure of the additional nonconformance also closes this item (see paragraph D.5 below).

3. (Closed) Nonconformance (82-03): 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 of equipment qualification.

The inspector verified commitments made by CE in their letters dated January 20 and March 1, 1983; i.e., an evaluation of the new insulation has been completed. The evaluation concluded that the environmental and seismic qualification was not compromised by the new material and that requalification of the ex-core detector assembly was not required.

4. (Open) Nonconformance (82-03): The following conditions were identified with respect to Type 3 field action requests (FARs) 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 FARs had been forwarded to group quality assurance (GQA); however, no corrective action report forms were issued by GQA to notify the cognizant parties (the valve manufacturer) of required corrective action on items containing significant conditions adverse to quality.

   The response to this nonconformance is under review by the Region IV office.

5. (Closed) Nonconformance (83-02): A review of all other environmental qualification purchase orders was not initiated nor were supplements issued invoking 10 CFR Part 21, where applicable, as committed by CE in their letter dated January 20, 1983.

   The inspector verified the implementation of commitments made by CE in their letter dated September 6, 1983; i.e., (1) all active purchase and manufacturing orders had been reviewed for 10 CFR Part 21 applicability, (2) supplements to these orders had been issued invoking 10 CFR Part 21 as needed, (3) supplementary training on 10 CFR Part 21 was accomplished and is reflected in the training records, and (4) the purchase requisition form (CE-0012247A) has been revised to include a block for 10 CFR Part 21 applicability.

6. (Closed) Nonconformance (83-02): CE reviewed and approved design calculations which were later determined to contain technical data that was neither correct nor satisfactory.

   The inspector verified implementation of the commitments made by CE in their letter dated September 6, 1983; i.e., (1) the calculations

had been revised to correct the voltage settings, (2) the group responsible for performing plant protection system (PPS) setpoint calculations conducted a review of all setpoint calculations to assure that no other errors exist, (3) instructions were provided to independent reviewers to assure that similar errors do not occur, and (4) these instructions were documented on individual training records.

7. (Open) Nonconformance (83-02): A supplier submitted document, reviewed and accepted by CE, was found to contain information not acceptable for its intended use.

   The CE letter of September 6, 1983, did not adequately address the measures to be taken to prevent recurrence of this type of item. Additional information has been requested by the Region IV office.

E. OTHER FINDINGS OR COMMENTS:

Inadvertent Engineered Safety Features Actuation: This item concerns a report to the NRC Region IV office from Louisiana Power and Light Company (Waterford, Unit 3) regarding a potential for spurious ESF actuation. An inadvertent ESF actuation occurred at San Onofre, Unit 3, on December 17, 1982, when the unit was in cold shutdown with the reactor coolant system (RCS) at 180°F and 360 psia and the HPSI pumps and containment spray pumps secured. During the event, a simultaneous recirculation actuation signal (RAS) and safety injection actuation signal (SIAS) was generated. At San Onofre, the RAS shuts the safety injection system mini-flow valves, opens the containment sump valves, and secures the low pressure safety injection (LPSI) pumps. If the HPSI pumps had been operable with RCS pressure above the shutoff head, a simultaneous RAS and SIAS would have energized the HPSI pumps with no discharge flow path available, creating the potential for HPSI pump damage. In some of the other CE plants, the RAS shuts the valves in the supply lines from the refueling water tank to the safety injection pumps and the containment spray pumps creating the potential for HPSI pump damage from the loss of suction water.

Parallel investigations of this event were conducted by the licensee (Southern California Edison) and CE. The licensee investigation disclosed two equipment problems, which together may have caused this event. An overheated circuit breaker was found in the "A" vital bus power supply feed to the PPS and two loose screws were found on the output lead connectors of the channel "D" matrix power supply. The CE investigation, which consisted of an in-depth design review of the PPS,

disclosed that disconnection of either connector AP3109 or DP3109 would result in full reactor protection system (RPS) and ESFAS actuations through the de-energization of all PPS trip paths. However, the licensee's examination of the connector indicated a firm connection secured by two screws. The licensee's attempts at repeating the actuation signals by manipulation of the connector were unsuccessful. Therefore, the licensee and CE concluded that the power supply problems were the most probable cause of this event.

The inspector reviewed records relating to this event consisting of specifications, drawings, NRC/licensee letters, CE/licensee letters, internal memos, requests for review or approval (RAR), FARs, and the availability data program Infobulletin.

The inspector's review of the CE records disclosed the following:

1. The power supply problems identified by the licensee are the most probable cause of this event. The licensee corrected both of these problems.

2. CE modified the design at San Onofre to eliminate automatic closure of the mini-flow valves on RAS.

3. The PPS was designed by Electro-Mechanics, Inc. (a subsidiary of CE) per CE specifications 00000-ICE-3001 and 1370-ICE-3001.

4. Specification 00000-ICE-3001 requires the supplier (Electro-Mechanics) to submit all wire runs, physical layout, and types of wire to be used to CE for approval prior to use (Section 4.2.23). Additionally, Section 7.3.5 requires that the supplier furnish wiring diagrams and circuit board layouts for all components. These drawings shall include all wires, connections, jacks, and terminal boards within the system or its subsystem.

5. Electro-Mechanics submitted the required documents via RARs 9401456-25 (May 16, 1978) and 9401456-25A (August 31, 1978) which were reviewed and approved by CE. The wiring configuration that could have produced the inadvertent ESF actuation was shown on these drawings.

ORGANIZATION: COMBUSTION ENGINEERING, INC.
POWER SYSTEMS GROUP
WINDSOR, CONNECTICUT

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6. FARs specifying the wiring changes necessary to prevent all four RPS and ESFAS trip paths from being de-energized upon disconnection of either connector have been transmitted to ANO-2, Palo Verde-1, San Onofre-2 and 3, and Waterford-3. The systems for Palo Verde-3 and WNP-5 will be changed prior to shipment. The systems for Palo Verde-2 and WNP-3 will be changed prior to installation.

The failure of CE to identify the wiring configuration problem during their review of the Electro-Mechanics PPS design documents is considered a nonconformance from topical report commitments (see paragraph B above).

ORGANIZATION: COMBUSTION ENGINEERING, INC.
CONSTRUCTION SERVICES
WINDSOR, CONNECTICUT

REPORT NO.: 99900538/83-01	INSPECTION DATE(S) 9/19-22/83	INSPECTION ON-SITE HOURS: 25.5

CORRESPONDENCE ADDRESS: Combustion Engineering, Inc.
ATTN: Mr. F. P. Fagan, Vice Pres., Construction Services
1000 Prospect Hill Road
Windsor, Connecticut 06095

ORGANIZATIONAL CONTACT: Mr. R. J. Cepluch, Director, Welding Engineering and Quality Assurance
TELEPHONE NUMBER: (203) 285-9520

PRINCIPAL PRODUCT: Nuclear steam supply systems services.

NUCLEAR INDUSTRY ACTIVITY: Construction Services is a part of the Power System Services Division of Combustion Engineering, Inc. (CE). CE has contracts for 22 domestic reactor units to date, of which 14 are in the design and construction phase. Construction Services Group has contracts for modification/repair/service for two reactor units.

ASSIGNED INSPECTOR: Richard P. Nguyen 11-3-83
R. P. Nguyen, Reactor Systems Section (RSS) Date

OTHER INSPECTOR(S):

APPROVED BY: C. J. Hale 11/3/83
C. J. Hale, Chief, RSS Date

INSPECTION BASES AND SCOPE:

A. BASES: 10 CFR Part 50, Appendix B and Topical Report CENPD-210-A.

B. SCOPE: This inspection was made in response to a request from NRC, Region I for an evaluation of the effectiveness of the CE Construction Services QA program.

PLANT SITE APPLICABILITY:

50-336.

ORGANIZATION: COMBUSTION ENGINEERING, INC.
CONSTRUCTION SERVICES
WINDSOR, CONNECTICUT

REPORT NO.: 99900538/83-01	INSPECTION RESULTS:	PAGE 2 of 4

A. VIOLATIONS:

None

B. NONCONFORMANCES:

Contrary to Criterion XVII of Appendix B to 10 CFR Part 50 and Section 3.7 of QAI 17.1, one of four training and experience records reviewed for nondestructive testing personnel did not contain the supporting documentation for the information entered in the personnel qualification index.

C. UNRESOLVED ITEMS:

None

D. OTHER FINDINGS OR COMMENTS:

1. QA Program Evaluation: The Power Systems Services (PSS) Nuclear Quality Assurance Manual, implementing procedures, and instructions were reviewed by the NRC inspector to assure that they address and are consistent with all applicable codes, standards, and regulatory requirements.

   The basic PSS Nuclear Quality Assurance Manual, consisting of 18 sections, is written to meet the requirements of 10 CFR Part 50, Appendix B. This manual is supplemented by a number of Construction Services operating procedures and QA instructions that relate to nuclear work. There were no nonconformances or unresolved items identified in this area of the inspection.

2. QA Program Implementation: The NRC inspector verified the implementation of the PSS Nuclear Quality Assurance Manual and supplemental procedures and instructions by examining representative documents and records and interviewing personnel. The following is a summary of the results of the QA program implementation review which included each of the principal functions of the Construction Se vices Group's activities. Except as noted, no nonconformances or unresolved items were identified.

a. Organization: The CE Construction Services organization was reviewed by the NRC inspector on the basis of program responsibility, delegation, functional responsibilities, and independence and authority. It was noted that the director of Welding Engineering and Quality Assurance (WEQA) reports directly to the Vice President of the PSS division and has sufficient authority and organization freedom to identify quality problems; to initiate, recommend, or provide solutions; and to verify implementation of solutions. The WEQA director also has the authority to stop all nonconforming work.

b. Procurement Document Control: The NRC inspector verified implementation of Construction Services' operating procedures and instructions by examining five purchase orders, all related to nuclear equipment.

c. Inspection, Procedures, and Drawings: The NRC inspector reviewed five documented instructions to verify that they included appropriate acceptance criteria to assure that quality-related activities have been satisfactorily accomplished.

d. Document Control: The NRC inspector reviewed job orders and related changes to verify that document control measures such as proper review, approval, and issuance have been implemented. Two work activities were examined to verify that current documents were being used.

e. Control of Purchased Material, Equipment, and Services: The NRC inspector reviewed the approved vendor list (AVL) and the approved product list (APL) to verify that the procedures concerning the control of purchased material, equipment, and services have been implemented.

f. Nonconforming Material, Parts, or Components: The NRC inspector verified that CE Construction Services Group was following their written procedures by review of two nonconformances and determining that they had been reviewed, approved, and dispositioned in accordance with established procedures.

g. Corrective Action: The NRC inspector reviewed three nonconformances that were identified by PSS and required corrective action. The inspector also verified that applicable procedures were followed.

h. Quality Assurance Records: The NRC inspector examined training and indoctrination records and the records of four NDE personnel to verify that the Construction Services Group was complying with their written procedures.

Within this area of the inspection, one nonconformance was identified (see paragraph B above).

i. Audits: The NRC inspector verified that Construction Services Group was following their written procedures by examining four internal audits and two lead auditor qualification records.

ORGANIZATION: EBASCO SERVICES, INCORPORATED
NEW YORK, NEW YORK

REPORT NO.: 99900505/83-02	INSPECTION DATE(S): 10/24-28/83	INSPECTION ON-SITE HOURS: 58

CORRESPONDENCE ADDRESS: Ebasco Services, Incorporated
ATTN: Mr. B. E. Tenzer
Vice President, Materials Engineering and QA
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 percent of a 5,000 person staff. Major projects include Shearon Harris, Units 1 and 2; St. Lucie, Unit 2; Waterford, Unit 3; WNP, Unit 3; South Texas Project, Units 1 and 2; and Comanche Peak, Unit 2. There are also modification/repair service contracts on 10 additional reactor units.

ASSIGNED INSPECTOR: C J Hale for 11/18/83
P. H. Harrell, Reactor Systems Section (RSS) Date

OTHER INSPECTOR(S): R. Nguyen, RSS

APPROVED BY: C J Hale for 11/18/83
G. L. Madsen, Chief, RSS Date

INSPECTION BASES AND SCOPE:

A. BASES: Topical Report ETR-1001 and 10 CFR Part 21.

B. SCOPE: Status of previous inspection findings and the following: (1) Louisiana Power and Light (LP&L) 10 CFR Part 50.55(e) report stating that General Electric Company (GE) 480-volt trip coils supplied for the Waterford project do not drop out after tripping; (2) Carolina Power and Light (CP&L) 10 CFR Part 50.55(e) report stating that valves made of the wrong material were shipped to the Shearon Harris project; (3) CP&L
(cont. on next page)

PLANT SITE APPLICABILITY:

Waterford, Unit 3 (50-389) and Shearon Harris, Units 1 and 2 (50-400/401).

ORGANIZATION: EBASCO SERVICES, INCORPORATED
NEW YORK, NEW YORK

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SCOPE: (cont.)
10 CFR Part 50.55(e) report stating that sequencer panels were received at the Shearon Harris project with numerous deficiencies; and (4) LP&L 10 CFR Part 50.55(e) report stating that errors were found in the vendor stress report for the holdup and boric acid makeup tank seismic supports for the Waterford project.

A. VIOLATIONS:

None

B. NONCONFORMANCES:

1. Contrary to Section 3.8 of QA-II-5, "Supplier Surveillance," Revision 2, dated March 4, 1981, of the Nuclear Quality Assurance Program Manual (Ebasco Topical Report ETR-1001), the Ebasco Services, Incorporated (Ebasco) Vendor Quality Assurance Representative released Class 1E sequencer panels for shipment prior to engineering review of the applicable seismic report.

2. Contrary to Section 2.1 of QA-II-1, "Instructions, Procedures and Drawings," Revision 2, dated March 4, 1981, of the ETR-1001 and Section 4 2 of QA-P.5, "Requirements for Preparation, Implementation and Control of QA Plans," dated August 8, 1975, of the Ebasco Company Procedures Manual, Ebasco failed to incorporate the welding requirements from Specification CAR-SH-IN-13 into the QA plan for the auxiliary relay cabinets.

3. Contrary to Section 2.1 of QA-II-1, "Instructions, Procedures and Drawings," Revision 2, dated March 4, 1981, of ETR-1001 and Section 14 of Specification CAR-SH-IN-13, "Auxiliary Relay Cabinets," Revision 7, dated May 25, 1983, Ebasco authorized Systems Control Corporation to fabricate the auxiliary relay cabinets prior to review and acceptance of the welding procedure.

4. Contrary to Section 5 of QC-4, "Design and Engineering," dated July 1, 1971, of the Ebasco Quality Program Quality Assurance Manual (Topical Report for the Waterford Project), Ebasco failed to identify and document the direction of seismic forces supplied by Combustion Engineering (the nuclear steam system supplier) which were used in calculating the design of the seismic supports for the holdup and boric acid makeup tanks.

C. UNRESOLVED ITEMS:

None

D. STATUS OF PREVIOUS INSPECTION FINDINGS:

1. (Open) Nonconformance (83-01): Ebasco reviewed and approved vendor-submitted drawings that specified flanges that did not conform to the applicable specification or to the applicable code.

   A review was performed to verify that Ebasco had taken the corrective actions and preventive measures as committed in their response letters dated June 22, 1983, and August 3, 1983. Verification included: (1) a review of revised Engineering Procedure E-1 to verify the requirements for review of vendor-submitted drawings have been clarified and (2) a spot check to verify that the proper reviews have been performed on other vendor-sumitted drawings. Ebasco has yet to complete the training committed in their response letters. The training is not scheduled to be completed until January 1, 1984.

2. (Closed) Nonconformance (83-01): Defect/noncompliance reports issued by Ebasco do not contain the number and location of all such components in use at, supplied for, or being supplied for other nuclear power plant facilities.

   A review was performed to verify that the corrective actions and preventive measures stated in Ebasco response letters dated June 22, 1983, and August 3, 1983, had been performed.

   Verification included a review of Procedure N-23 to verify that the following requirements had been added: (1) review of plant-specific deficiency applicability on other Ebasco projects and (2) final reports include the location and number of any safety-related items which contains a defect or failure to comply. Verification also included a review of meeting minutes to verify that specific plant problems were being discussed between personnel on different Ebasco projects. The meeting minutes indicate that there has been discussions as stated in the Ebasco response.

E. OTHER FINDINGS OR COMMENTS:

1. LP&L 10 CFR Part 50.55(e) Report, Design Error in GE 480-Volt Switchgear Circuitry - The report stated that a design error keeps the trip coil energized on a trip signal.

During testing of switchgear at the Waterford project it was noted that the trip coils on the GE 480-volt switchgear do not drop out after tripping. This condition causes the breakers to fail to reclose after a trip condition. Investigation by Ebasco revealed that the indicating light circuitry used to monitor trip coil continuity was allowing excessive current to flow through the coils after tripping.

Ebasco takes an ultraconservative approach in designing indication circuitry for switchgear by placing two indicating lights in series with the trip coil. This design preference provides an indication of coil continuity at a remote and local location. Usually, only remote indication is provided. This design approach has been used in the past and has not produced any problems until the design was used in GE switchgear. The physical and electrical characteristics of the coil used by GE, in conjunction with the two light configurations used by Ebasco, causes current to flow through the coil after tripping and prevents the coil from performing its intended function.

Ebasco has redesigned the indication circuit to prevent current flow through the coil. The new design has been transmitted to the field for modification of the switchgear. The new design meets all requirements for switchgear.

A review was made of the other Ebasco project (Shearon Harris) to determine whether the design problem has been considered. The review determined that the indication circuitry was designed the same as the circuitry at Waterford that had caused the problem. Electrical designers were aware of the problem and did not believe that it would affect the Siemens-Allis switchgear installed at Shearon Harris.

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

2. CP&L 10 CFR Part 50.55(e) Report, Error in Engineering Review Resulted in Carbon Steel Valves Being Specified in a Stainless Steel Application - The report states that carbon steel valves were supplied for a stainless steel application.

The Yarway Corporation, an Ebasco vendor, supplied carbon steel and stainless steel valves to the Shearon Harris project for a specific system installation. Yarway produced one drawing depicting the carbon steel valves and another depicting the stainless steel valves. On each of these drawings, the valves are designated for specific usage by listing the valve tag numbers. These drawings are then submitted to Ebasco for review and acceptance.

After manufacturing started, Yarway received an order from Ebasco for additional stainless steel valves. Yarway made a drawing revision to add the newly ordered valve tag numbers; however, Yarway added the valve tag numbers to the carbon steel valve drawing instead of the stainless steel valve drawing. In addition, Yarway failed to submit this particular drawing revision to Ebasco for review and acceptance. Yarway did submit the next drawing revision to Ebasco, and received review and acceptance. When Ebasco reviewed the next drawing revision, they failed to note that the valve tag numbers were added to the wrong drawings and that Ebasco had not reviewed and accepted the previous drawing revision. To prevent recurrence of this type of a problem, Ebasco held training sessions to remind all affected personnel of the requirments for review and acceptance of vendor-supplied drawings.

After the valves were manufactured, the Ebasco vendor quality assurance representative (VQAR) checked the valves against the drawing and released the valves for shipment. However, the VQAR failed to note that the revision of the drawing used for release of the shipment had not been reviewed and accepted by Ebasco. The CP&L receipt inspection program at the site noted the discrepancy between the valve material and the purchase order.

Ebasco performed an in-depth review of the problem which was reviewed by the inspector and took the following corrective actions and preventive measures: (1) reviewed all inspections performed at Yarway and found no similar instances where material was released against drawings not approved by Ebasco; (2) reviewed all similar releases made at other vendors by the individual VQAR and found no similar problems; (3) performed a sample review on releases made by other VQARs at other vendors and found no similar problems; and (4) issued a memo to all VQARs notifying them of the problem and alerting them to avoid making the same type error.

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

3. CP&L 10 CFR Part 50.55(e) Report, Class 1E Sequencer Panels Received at Site with Numerous Problems - The report states that Class 1E sequencer panels were received at the Shearon Harris project with numerous wiring problems.

The sequencer panels were fabricated by Systems Control Corporation and shipped to the site after a release for shipment was authorized by the Ebasco VQAR. When the panels arrived at the site, they were inspected by the CP&L receipt inspection personnel. During the receipt inspection, numerous wiring errors were found such as wires reversed, wires missing, and separation criteria not being met.

The Ebasco specification required that the vendor perform a megger, continuity, and operational test on the panels. The vendor submitted the procedure for the operational test to Ebasco for review and acceptance. Ebasco reviewed and accepted the operational test procedure. The vendor was also required to submit a certificate of conformance and seismic qualification report.

The Ebasco VQAR performed an inspection of the panels after the equipment had been manufactured. The inspection included: (1) witnessing portions of the megger, continiuty, and operational tests; (2) a spot check of the equipment against the current revision of the drawings; (3) verification of an Ebasco review of the seismic and equipment qualification reports; and (4) completion of a certificate of conformance by the vendor. During the VQAR's inspection, problems were noted in the cabinets where the final product did not meet the requirements of the drawing. Corrective action was taken by the vendor to correct these problems. The VQAR also noted that the seismic and equipment qualification reports had not been reviewed by Ebasco. The VQAR obtained permission from the Ebasco New York office to ship the panels before completion of the review of the seismic and equipment qualification reports. The VQAR verified that all other specification requirements (i.e., megger, continuity, and operational tests and certificate of conformance) had been met and released the panels for shipment.

Within this area of the inspection, one nonconformance was identified (see B.1 above).

4. CP&L 10 CFR Part 50.55(e) Report, Defective Welds in Class 1E Auxiliary Relay Cabinets - This is a followup item from NRC Inspection Report No. 99900505/83-01 concerning welding deficiencies in the auxiliary relay cabinets supplied by Systems Control Corporation. During this inspection, the NRC inspector reviewed the contract, specification, and quality assurance plan for the auxiliary relay cabinets. The seismic analysis for the cabinets provided by Action Environmental Testing Corporation was also examined to verify that Ebasco had reviewed and approved the results of the analysis.

   It was noted during the inspection that Ebasco had taken some measures to correct the weld deficencies, such as: (1) reviewed the QA plan and (2) performed a structural seismic analysis; however, Ebasco has not taken appropriate corrective action to determine the cause and to prevent similar types of deficiencies from recurring.

   Within this area of the inspection, two nonconformances were identified (see B.2 and B.3 above).

5. LP&L 10 CFR Part 50.55(e) Report, Errors Found in Vendor Stress Reports for the Holdup and Boric Acid Makeup Tanks Seismic Supports - In February 1982, CE discovered an error in the vendor stress report relative to the upper seismic restraints of the holdup and boric acid makeup tanks for the Waterford project. Subsequently, CE studied this problem and informed Ebasco of the following results: (1) neither of the as-built tanks can accommodate the present Ebasco support structure which imposes radial loads on the seismic ring; (2) the boric acid makeup tank can only accommodate tangentially applied loads from the Ebasco support structures; and (3) the holdup tank, which presently consists of three seismic lugs, is not structually adequate.

   A further examination of the original design calculations and drawings revealed that Ebasco designed the tank supports on the assumption that the seismic forces provided by CE were in radial direction; however, according to CE, these forces should be in tangential direction. This design discrepancy resulted from an inadequate flow of documentation between CE and Ebasco regarding the load transfer from the tanks to the seismic supports.

Ebasco has taken the following steps to correct the problem: (1) revised the restraint design to accommodate the tangential load; (2) made field modification of restraints; and (3) issued a design change notice and drawings to reflect the design modification. The NRC inspector reviewed the new design calculations and drawings to verify Ebasco had corrected this deficiency.

Within this area of the inspection, one nonconformance was identified (see B.4 above).

ORGANIZATION: FARWELL AND HENDRICKS, INC.
MILFORD, OHIO

REPORT NO.: 99900918/83-01	INSPECTION DATE(S) 6/13-16/83	INSPECTION ON-SITE HOURS: 60

CORRESPONDENCE ADDRESS: Farwell and Hendricks, Inc.
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P. O. Box 209
Milford, Ohio 45150

ORGANIZATIONAL CONTACT: Ms. J. A. Douglas, Manager, Quality Assurance
TELEPHONE NUMBER: (513) 831-9390

PRINCIPAL PRODUCT: Environmental qualification testing.

NUCLEAR INDUSTRY ACTIVITY: Farwell and Hendricks, Inc. (F&H) provides consulting engineering and testing services for commercial nuclear, military, and domestic equipment and systems. The facility has thermal aging and seismic testing facilities with approximately 95 percent of its business being in environmental qualification testing for the commercial nuclear industry.

ASSIGNED INSPECTOR: J. R. Agee — 9/23/83
J. R. Agee, Equipment Qualification Section (EQS) — Date

OTHER INSPECTOR(S): B. E. Bader, Sandia National Laboratories

APPROVED BY: H. S. Phillips — 9/26/83
H. S. Phillips, Chief, EQS — Date

INSPECTION BASES AND SCOPE:

A. BASES: 10 CFR Part 50, Appendix B and 10 CFR Part 21.

B. SCOPE: This inspection consisted of: (1) inspection of test facility, (2) QA manual review, (3) QA program implementation, (4) 10 CFR Part 21 requirement, (5) technical inspection of seismic testing, and (6) exit management meeting.

PLANT SITE APPLICABILITY:

50-424/425, 50-358, 50/440/441.

ORGANIZATION: FARWELL AND HENDRICKS, INC.
MILFORD, OHIO

REPORT NO.: 99900918/83-01	INSPECTION RESULTS:	PAGE 2 of 9

A. VIOLATIONS:

None

B. NONCONFORMANCES:

1. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and implementing procedure TP4-001, issued purchase orders did not contain suitable instructions that Appendix B to 10 CFR Part 50 and 10 CFR Part 21 requirements were imposed on suppliers who provide safety-related equipment and/or services.

2. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and QA manual Procedure 18, "Audits", the QA manager had audited areas for which the QA manager was responsible.

C. UNRESOLVED ITEMS:

None

D. OTHER FINDINGS OR COMMENTS:

1. Test Facility - The NRC inspector (hereinafter referred to as the inspector) inspected the site facilities and discussed with F&H management details of their test facilities and capabilities. F&H has, within its facility, the capability for completing thermal aging and seismic testing of safety-related electrical equipment. This includes adequate high-speed data acquisition systems and calibration capabilities traceable to the National Bureau of Standards (NBS). LOCA/HELB and radiation aging facilities are nearby and under contract to F&H. Thus, F&H is able to provide full environmental qualification test programs, including expertise and capability to develop and provide required customer approved test plans and procedures.

2. QA Manual Review - The inspector reviewed the QAM and determined that it consisted of 18 sections that describe in these procedures the actions necessary to comply with the requirements of the 18 criteria of Appendix B to 10 CFR Part 50.

3. QA Program Implementation - The inspector evaluated the implementation of the QA program procedures by examining representative records and files, conducting interviews with personnel, and making visual inspections and observations.

Comments concerning the implementation of procedures relating to the 18 criteria of Appendix B to 10 CFR Part 50 are as follows:

a. Organization - The inspector reviewed F&H's organizational structure including functional responsibilities and authorities. The inspector determined from the review that management authorities and responsibilities are delineated in writing and that the QA manager reports directly to the chairman of the corporation and has authority to stop work pending resolution of quality matters. No nonconformances were identified.

b. Quality Assurance Program - The inspector evaluated this criterion by verifying that a QA program was implemented in accordance with the QAM and the 18 criteria of Appendix B to 10 CFR Part 50. The evaluation of training which is a part of this criterion included an examination of technical procedure (TP) 2-001, "Training of Personnel," and review of two personnel files containing training records. No nonconformances were identified.

c. Design Control - The inspector verified the implementation of the QAM design control procedure by examination of the TP 3-001, "Interface Control," two test plans prepared by F&H, and calculations and analyses relating to the test plans reviewed. Each of these documents had been reviewed, verified, and approved in compliance with design control criteria. No nonconformances were identified.

d. Procurement Document Control - The inspector verified the implementation of the QAM procurement document control procedures by reviewing TP 4-001, "Procurement, Quality Level 1 Purchase Order Attachment (QA-001)," TP 5-001, "Project Flow Procedure," five POs, and discussions with QA management concerning procurement documents.

The "Quality Level 1, Purchase Order Attachment (QA-001)" document contains contract data that imposes 10 CFR Part 50, Appendix B and 10 CFR Part 21 requirements on the suppliers.

The PO file folder containing the five POs contained one copy of QA-001 but contained no instructions as to whether the QA-001 document pertained to one, none, or all POs in the PO

file folder. None of the POs contained instructions that 10 CFR Part 50, Appendix B or 10 CFR Part 21 applied or that the QA-001 document was an attachment to each Level 1 PO. Subsequent to the identification of this finding, the QA department revised the procurement document control procedure to require that the QA-001 document be attached to each Level 1 PO. In an effort to assure the NRC that they had submitted a QA-001 document with each Level 1 PO, the F&H QA manager contacted two suppliers by telephone and asked them to relate, over the telephone, to the inspector, whether F&H had imposed 10 CFR Part 50, Appendix B and 10 CFR Part 21 on them by way of the QA-001 document. Each supplier confirmed that the criteria of 10 CFR Part 50, Appendix B and regulations of 10 CFR Part 21 had been imposed on them. These PO Nos. 172810, 172812, and 173155 were checked for compliance to the requirement for imposing Appendix B to 10 CFR Part 50 and 10 CFR Part 21 criteria and regulations on the suppliers. (See paragraph D.3.d. for identification of nonconformance B.1.)

e. Instructions, Procedures, and Drawings - The inspector verified implementation of the TP 3-001, "Interface Control," TP 5-001, "Project Flow Procedure," and TP 6-001, "Document Control," procedures as they relate to this criterion. Two test plans, five POs, and five material receipt forms were processed in compliance with the instructions and their technical procedures. No nonconformances were identified.

f. Document Control - The inspector verified implementation of TP 6-001 "Document Control," by tracking the progress of test plans, test procedures, POs, and materials receipt. The inspector verified that test plan Nos. 10036 and 10087 and PO Nos. 172810, 172812, and 173155 had been reviewed, approved, issued, and distributed in accordance with this technical procedure. No nonconformances were identified.

g. Control of Purchased Material, Equipment, and Services - The inspector verified implementation of the QAM procedure by review of the TP 7-001, "Control of Purchased Material, Equipment and Services", the implementing procedure, and by tracking the progress of several POs pertinent to this criterion. Each had been reviewed and approved for issue to suppliers on the approved subcontractors list. No nonconformances were identified.

h. Identification and Control of Materials Parts and Components - The inspector verified the implementation of the QAM procedure by review of the TP 8-001, "Identification and Control of Materials, Parts, and Components," implementing procedure and inspecting the identity, receipt, inspection, and storage of materials purchased for the EQ test program. No nonconformances were identified.

i. Control of Special Processes - The inspector verified that the QAM Section 9.0 explains that F&H does not normally engage in activities that require special processes; therefore, no implementing procedures have been compiled. Conversely, the QAM provides a summary or format of procedural activities F&H would pursue if they were required to provide special processes in such areas as cleaning, welding, brazing, soldering, heat treating, radiography, and magnetic particle, ultrasonic, and liquid penetrant testing. No nonconformances were identified.

j. Inspection - The inspector verified the implementation of the QAM procedure by review of the implementing procedure TP 10-001 and that the qualification procedure Report No. 20001 had been completed for inspection in compliance with the technical procedure. No nonconformances were identified.

k. Test Control - The inspector evaluated the QAM procedure by review of applicable sections of the implementing technical procedures TP 10-001, "Inspection," TP 10-002, "Experimental Modal Analysis," and related data forms including: (1) Table 5.2.2, "Minimum Recommended Test Monitor Observations," (2) QA-009-1/2/3/4, Revision 2, "Seismic Simulation," (3) QA-010, "NEQ Simulation," and (4) QA-029-1/2/3/4, Revision 2, "Experimental Modal Analysis." The test program 20001 was reviewed to verify application of the technical procedures referenced above. No nonconformances were identified.

l. Control of Measuring and Test Equipment - The inspector evaluated the QAM procedure by review of the TP 12-001 implementing procedure, the computer controlled Equipment (monthly) Recall System, the calibration record cards, and instrumentation equipment in use in the test control room. Several instruments were randomly selected for comparison of the instrument calibration table with the calibration record card. No nonconformances were identified.

m. Handling, Storage, and Shipping - The inspector verified the QAM procedure had been implemented by review of the implementing procedure TP 13-001 and the Form No. TF-002 "Project Material Receipt, Inspection, Disposition, and Log." The inspector reviewed incoming materials and vouchers and verified the materials were inspected, compared with procurement specifications, and stored in a protected storage area. No nonconformances were identified.

n. Inspection, Test, and Operating Status - The inspector verified the QAM procedure had been implemented by review of the implementing procedure TP 10-001, "Inspection," Table 5.2.2, "Minimum Recommended Test Monitor Observations," and TP 10-002, "Experimental Modal Analysis." No nonconformances were identified.

o. Nonconforming Materials, Parts, or Components - The inspector verified the QAM procedure had been implemented by review of the implementing procedure TP 15-001, "Control of Nonconformance or Anomaly," which requires that Form TF-001, "Record of Anomaly," be completed when a nonconformance is identified. No nonconformances were identified.

p. Corrective Action - The inspector verified the QAM procedure had been implemented by review of the implementing procedure TP 16-001, "Correction of Adverse Quality Conditions," which had made provisions for the use of six forms for the prompt identification, reporting, and correction of conditions adverse to quality. To date, none of the forms have needed to be used; e. g., Form No. QA-015, "Non-Conformance Report and Corrective Action Request (CAR)." No nonconformances were identified.

q. Quality Assurance Records - The inspector verified the QAM procedure had been implemented by review of the implementing procedure TP 17-001, "Retention of Records," which provides records of the following types: master files, QA file, project file(s), computer output, and reports established as a result of F&H activity. No nonconformances were identified.

r. Audits - The inspector verified the QAM procedure had been implemented by review of the implementing procedure TP 18-001, "Internal and External Audits." Within this area, a nonconformance was identified (see nonconformance B.2).

4. 10 CFR Part 21 - The inspector determined that F&H complies with the regulations of 10 CFR Part 21 by examining the posting of 10 CFR Part 21, Section 206 of the Energy Reorganization Act of 1974, and the notice describing where the procedures can be examined and to whom to report 10 CFR Part 21 deviations or defects.

Although paragraph B.1 (nonconformance B.1) states that F&H procurement document files did not contain evidence that 10 CFR Part 50, Appendix B and 10 CFR Part 21 requirements were imposed on each specific purchase. F&H had imposed the requirements but had not plainly described the methods of including such requirements in the procurement documents as described in the implementing procedures, specifically, TP 4-001 and TP 5-001.

5. Technical Inspection of Seismic Testing - The inspector witnessed the seismic testing of a Square D switchgear and reviewed one qualification procedure. Those activities are summarized below.

a. Seismic Test - The inspector witnessed the seismic testing of a Square D switchgear cabinet containing circuit breaker and panel mounted electrical instruments including indicators, relays, switches, lights, and alarms. The test, a seismic simulation of an operating basis earthquake (OBE), was conducted in a formal, personnel-access, and air-conditioned test area on a triaxial "shake" table and lasted thirty seconds. No equipment failures were detected during the initial post-test examination and before the post-test functional testing was started.

Since the test was not specifically scheduled for witnessing by the inspector, the inspector did not review the related test plan. Also, since the primary objective of this inspection was to examine the implemented QA program, the post-test functional tests were not witnessed. The test data for this test, F&H Project No. 10062, will be examined in a subsequent inspection.

No nonconformances were identified.

b. Qualification Procedure - A qualification procedure, report No. P20001, Revision 1, dated May 31, 1983, was reviewed. This procedure for a containment compressor and associated equipment had been reviewed and approved by F&H management and the architectural engineer. The qualification of this equipment includes testing to simulate aging and to place the equipment in an end-of-life condition. The format and contents of the procedure satisfies the criteria of IEEE Standards 323-1974 and 344-1975, respectively.

Test requirements established by report No. P 20001, Revision 1, indicate the thermal aging time required to simulate the test sample qualified life plus a 10 percent margin (minimum) shall be based upon the lowest activiation energy of the age sensitive, nonmetallic materials that affect the safety-related function of the test samples.

The report No. P 20001, Revision 1, also indicates the actual total integrated dose of 1.42×10^5 rads provides a margin of 20.4 percent.

Other conditions to which the equipment samples will be tested will include the following:

(1) Wear aging - the test samples will be cycled to simulate the number of operating cycles during its qualified life plus 10 percent.

(2) Seismic testing - the natural frequencies of the specimen will be determined by a resonance search followed by five OBEs and one Safe Shutdown Earthquake in compliance with the test procedure for the plant in which the equipment will be installed.

Whereas the test specimen (excluding the compressor) will be thermally aged (unenergized) preceding the radiation and wear aging and seismic testing, the test specimen will be energized during thermal aging following the post design basis event (PDBE) to simulate the test sample qualified life plus a 10 percent margin (minimum). Following this thermal aging, a 24 hour humidity test will be conducted followed by

additional functional testing to conclude the qualification testing. All data will be recorded on applicable data sheets.

No nonconformances were identified.

5. Exit Management Meeting - The inspector met with members of management on June 16, 1983, at the conclusion of the inspection and discussed details of the inspection findings. Management displayed documentation that contained responses to the findings which would be implemented immediately. Those responses will be reviewed in a subsequent inspection.

ORGANIZATION: FARWELL AND HENDRICKS, INC.
MILFORD, OHIO

REPORT NO.: 99900918/83-02	INSPECTION DATE(S): 8/24-26/83	INSPECTION ON-SITE HOURS: 42

CORRESPONDENCE ADDRESS: Farwell and Hendricks, Inc.
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Milford, Ohio 45150

ORGANIZATIONAL CONTACT: Ms. J. A. Douglas, QA Manager
TELEPHONE NUMBER: (513) 831-9390

PRINCIPAL PRODUCT: Environmental qualification testing.

NUCLEAR INDUSTRY ACTIVITY: Farwell and Hendricks, Inc. (F&H) provides consulting, engineering, and testing services for commercial-nuclear, military, and domestic equipment and systems. The facility has thermal aging and seismic testing facilities. Approximately 95 percent of its business is dedicated to environmental qualification testing for the commercial-nuclear industry.

ASSIGNED INSPECTOR: for J. R. Agee, Equipment Qualification Section (EQS) 11-3-83 Date

OTHER INSPECTOR(S): B. E. Bader, Consultant, Sandia National Laboratories

APPROVED BY: for H. S. Phillips, Chief, EQS 11-3-83 Date

INSPECTION BASES AND SCOPE:

A. BASES: 10 CFR Part 50, Appendix B and 10 CFR Part 21.

B. SCOPE: The inspection was conducted to: (1) review previous inspection findings; (2) review QA programmatic criteria; (3) conduct technical inspection; and (4) witness tests.

PLANT SITE APPLICABILITY:

50-255, 50-424/425, 50-358, 50-312, 50-268, 50-423.

ORGANIZATION: FARWELL AND HENDRICKS, INC.
MILFORD, OHIO

REPORT NO.: 99900918/83-02	INSPECTION RESULTS:	PAGE 2 of 5

A. VIOLATIONS:

None

B. NONCONFORMANCES:

None

C. STATUS OF PREVIOUS INSPECTION FINDINGS:

1. (Open) Nonconformance A (83-01): Procurement document files did not contain evidence that Appendix B to 10 CFR Part 50 and 10 CFR Part 21 requirements were imposed on suppliers.

   The NRC inspector (hereafter referred to as inspector) verified that each supplier to whom purchase orders (POs) had been submitted had received a F&H supplemental document (QA-001) with each PO which imposed 10 CFR Part 50, Appendix B criteria and 10 CFR Part 21 regulations. The inspector verified that the QA manual and QA technical procedures had been revised to require that the QA-001 document be attached to each PO issued and copies of the PO in the document control files. Document control, QA, and procurement personnel had been apprised of the document revisions to preclude recurrences.

2. (Open) Nonconformance B (83-01): The QA manager had audited areas for which the QA manager was responsible.

   The inspector verified that the QA manual and related implementing procedures had been revised to state that the F&H president will audit areas for which the QA manager is responsible.

   Comment: During this inspection, the inspector verified that F&H had implemented corrections for the findings, items C.1 and C.2, above; however, the items will remain open until the F&H correspondence containing the corrective descriptive material is received and these items will be closed during the next inspection.

D. UNRESOLVED ITEMS:

None

E. OTHER FINDINGS OR COMMENTS:

1. QA Programmatic Review - The inspector evaluated the QA programmatic implementation of the following criteria:

   a. Identification and Control of Materials, Parts, or Components - The inspector verified that the receipt, physical inspection, tagging, and storage of equipment received for a forthcoming test had been adequately recorded on the QA Data Form No. TF-002. The form had been placed in the project notebook which is maintained in the document control files in accordance with implementing procedure TP 8-001. No nonconformances were identified.

   b. Audits - The inspector reviewed three F&H internal audit reports which documented audits that had been conducted since the last NRC inspection. These reports were: (1) Audit Report, IA No. 3, QA Program and Department, dated August 5, 1983; (2) Audit Report No. 3, Document Control Department, dated August 2, 1983; and (3) Audit Report No. 3, Procurement Document Control, dated August 1, 1983. These audits were conducted by the F&H president in accordance with the QA manual revision that states, "These procedures are audited by the president for compliance to the QA program." See item C.2, "Status of Previous Inspection Findings," of this report. No nonconformances were identified.

2. Technical Inspection - The inspector reviewed qualification procedures and test documents and witnessed preliminary test activities for a forthcoming seismic test. A summary of those activites include the following:

   a. Qualification Procedure - The inspector completed the review of the Nuclear Environmental Qualification procedure, Project P-20001, which was started during the inspection conducted June 13-16, 1983, and reported in Inspection Report No. 99900918/83-01, page 7 of 9, paragraph 5.b. The procedure had been revised to incorporate minor changes but retained its original objective to meet the requirements of IEEE Standard 344-1975 and the recommended margins of NUREG-0588.

b. Test Status of Compressor and Valve - Test activities that have been completed to date include:

(1) Radiation aging completed at 10 percent greater level than specified (F&H will provide a report of anomaly of this condition),

(2) postradiation functional testing,

(3) thermal aging and postthermal functional testing, and

(4) wear aging and postwear aging functional testing.

The compressor and requalified valves and control components are currently and tentatively scheduled for final seismic testing during the fourth quarter of 1983. The test and/or final test data will be witnessed and/or examined during a subsequent inspection. No nonconformances were identified.

c. Test Reports Reviewed - The inspector reviewed several final test reports to verify that the tests had been conducted in accordance with the test criteria of IEEE Standard 323-1974 and NUREG-0588. The reports include:

(1) "P-10007 Seismic Qualification Report On a Filter Unit,"

(2) "P-10105 Seismic Qualification Report on 15 Electrical Components,"

(3) "Report No. 10055, Seismic Qualification Report on An Auxiliary Feedwater Actuation System," and

(4) "Report No. 10036, Seismic Qualification of a 2-Cell Metal-Clad Switchgear."

No nonconformances were identified.

d. Observation of Preliminary Testing - The inspector observed a vibration test performed on two horizontal fans mounted on a horizontal frame secured to the shake table. The purpose of the test was to search for and establish the baseline resonant frequencies for the motor/fans/frame assembly for the F&H Project No. 10063. The baseline resonant frequency will occur within the seismic spectra based on the calculated spectra for a

specific building in a specific nuclear plant. The inspector observed the test to verify pass/failure of the specimen (motor/fans/frame). No failures occurred.

The specimen is typical for HVAC equipment used inside the containment building of PWR plants. The resonant frequencies identified in this test will be used to establish conditions for the final seismic qualification test. No nonconformances were identified.

F. MANAGEMENT EXIT MEETING:

The inspector met with members of F&H management on August 26, 1983, at the close of the meeting at the F&H facility. The inspector discussed details of the inspection and F&H management acknowledged the findings.

ORGANIZATION: FLUOROCARBON
COMPONENTS DIVISION
COLUMBIA, SOUTH CAROLINA

REPORT NO.: 99900820/83-01	INSPECTION DATE(S) 8/22-26/83	INSPECTION ON-SITE HOURS: 33

CORRESPONDENCE ADDRESS: Fluorocarbon
Components Division
ATTN: Mr. Jim McCrone
General Manager
2620 The Boulevard, Columbia Industrial Park
Columbia, South Carolina 29209
ORGANIZATIONAL CONTACT: Mr. Earl Shisler, Manager, QA
TELEPHONE NUMBER: (803) 783-1880

PRINCIPAL PRODUCT: Metallic O-rings, C-rings, and rotary lip seals.

NUCLEAR INDUSTRY ACTIVITY: Approximately 50 percent of the production from February 1, 1982, through January 31, 1983.

ASSIGNED INSPECTOR: I. Barnes for J. T. Conway, Reactive and Component Program Section (R&CPS) — 10-4-83 Date

OTHER INSPECTOR(S):

APPROVED BY: I. Barnes — 10-4-83 Date
I. Barnes, Chief, R&CPS

INSPECTION BASES AND SCOPE:

A. BASES: 10 CFR Part 50, Appendix B and 10 CFR Part 21.

B. SCOPE: This inspection was made as a result of allegations (i.e., (1) reheating of weld joints to achieve proper penetration, (2) accelerated cool-down rates following post weld heat treatment, (3) "hammering" silver into the slots to achieve the correct dimension, and (4) unsafe radiological practices used during x-raying) pertaining to the fabrication of reactor pressure vessel metallic O-ring seals.
(cont. on next page)

PLANT SITE APPLICABILITY:

Not identified during the inspection.

SCOPE: (cont.)
In addition, the following programmatic areas were inspected: training/qualifications, manufacturing process control, control of purchased material and services, calibration of measuring and test equipment, audits, and reporting of defects.

A. VIOLATIONS:

Contrary to Sections 21.6 and 21.21 of 10 CFR Part 21:

1. A current copy dated December 30, 1982, of 10 CFR Part 21 was not posted in a conspicuous area where Section 206 was posted.

2. Appropriate procedures to evaluate deviations or inform the licensee or purchaser of the deviation did not exist.

B. NONCONFORMANCES:

1. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraphs 5.2 and 5.4 of the Quality Assurance Manual (QAM), a review of vendor purchase orders for nuclear material and services revealed the following:

   a. A purchase order did not exist for J. H. Carr and Associates who has performed chemical analysis for Fluorocarbon (FCD) on a routine basis since January 1982.

   b. Quality Assurance did not approve purchase order to Eli Whitney (No. 3142 dated January 10, 1982), Pittsburg Testing (No. 3301 dated May 3, 1982), and National Welders (No. 4154 dated May 20, 1983).

2. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraphs 3.2 and 12.1.2 of the QAM, a review of process travelers for 72 nuclear O-rings and training records for personnel performing quality activities revealed that 11 personnel received no training for the following activities: plating (employee No. 4396) tube bending (4245), calibration (4259), heat treatment (4251), inspection (4260, 4453, 4269, and 4376), liquid penetrant testing (4260 and 4453), and radiographic testing (4260, 4453, 4376, 4253, 10179, and 10227).

3. Contrary to Criterion V of Appendix B to 10 CFR Part 50, Section III of CQCP-005, and paragraphs 17.4.3 and 17.4.4 of the QAM, a review of the calibration controls for measuring and test equipment in the production and inspection areas revealed the following:

   Radiography - The "Victoreen 440" survey meter was not identified with a serial number and did not have a calibration sticker.

   Plating - There were no calibration records for the D.C. power supply (S/N 1079324) for the large tank or the D.C. power supply for the small tanks. The D.C. power supply for the small tanks was not identified with a serial number.

   Welding - There were no calibration records for two "Tek Tran" welders (S/N 2201 and S/N 5912), two gas flow meters ("Linde" and "Air Products"). The gas flow meters were not identified with a serial number.

   Heat Treating - There were no calibration records for the flow meter, and the flow meter was not identified with a serial number.

   Receipt Inspection - There were no calibration records for a set of plug gages (QC No. 38).

   Testing - There was no calibration sticker for a set of gage blocks (Starrett model 84B).

4. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section 8.0 of CMP-026, a review of nine Quality Data Packages, which included a copy of all documents sent to the customer, revealed the absence of certifications for nondestructive examination personnel who conducted ultrasonic testing on the Inconel 718 tubing supplied by Superior Tube.

5. Contrary to Criterion V of Appendix B to 10 CFR Part 50, Subsection NCA-3866.4(b) of the Code, and the Forward (sic) and paragraphs 14.2.2 and 14.2.4.1 of the QAM, a review of procedures and specifications revealed the absence of procedures for the following activities:

   a. Tube forming on the Wallace Bender

b. Qualification and recertification of the welder and x-ray technicians

c. Removal and rewelding of nonconforming welds

6. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraphs 8.2 and 8.3 of the QAM, a review of the Approved Vendors List dated June 1982, February 1983, and July 1983 and vendor surveys conducted from 1979 to the present, revealed the following:

a. Nuclear order No. 2008 was placed with Superior Tube on October 2, 1979, but a survey was not performed until January 9, 1980, and the next survey was not performed until April 5, 1982.

b. Nuclear orders were placed with vendors, i.e., National Welders, Omega Engineering, Pittsburg Testing, and J. H. Carr and Associates, who had never been surveyed and subsequently were not on the Approved Vendors List.

7. Contrary to Criterion V of Appendix B to 10 CFR Part 50, paragraph 17.2 of the QAM, and Section III of CQCP-005, a review of the calibration records for measuring and test equipment revealed the following:

a. Records were not available for micrometers (QC Nos. 2, 15, and 45) and calipers (QC Nos. 31 and 48) to support the August 1, 1983, calibration dates indicated by their calibration stickers.

b. Gage Blocks (Starrett model 84B) were calibrated on January 1978 and 4 years later on February 8, 1982.

c. Digital Thermometer (S/N 898561-35382) was calibrated on April 23, 1980, and 31 months later on October 25, 1982.

d. Radiation Survey Meter ("Victoreen 440") was calibrated on July 30, 1980, and 34 months later on May 20, 1983).

8. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraphs 6.2 and 10.2 of the QAM, a review of the Manufacturing Process Sheet (i.e., traveler) for 72 nuclear O-rings revealed the following:

a. Job F.O. 6643-Operation P320 "Marking" for four rings and Operations Q330/Q350 for one ring were not signed off.

b. Job F.O. 6356-Operation P320 for one ring was not signed off.

c. Job F.O. 6379-Operation P320 for 11 rings was not filled in or signed off, and Operation PL230 for two rings and Operation Q350 for one ring were not signed off.

9. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraphs 5.7 and 20.1.1 of the QAM, a review of internal audit reports for 1982 and 1983 and purchase orders for nuclear material and services revealed the following:

a. There was no documented evidence that purchase orders were audited by Quality Assurance.

b. The Records section of the QAM was not audited either year.

c. Design Control; Purchase Order Control; Instructions, Procedures, and Drawings; Document Control; Vendor Control of Purchased Material and Services; Raw Material Control; Inspection; Test Control; and Packaging and Shipping sections of the QAM were not audited in 1982.

10. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 8.2.3 of the QAM, Purchase Order No. 2008 for Inconel 718 tubing was placed with Superior Tube, but the purchase order did not invoke 10 CFR Part 50, Appendix B, ANSI N45.2, or ASME Section III, NCA 3800.

11. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 11.1.1 of the QAM, a review of records for NDE personnel revealed the following:

a. Employee No. 4269 was initially certified as a Level I radiographic examiner (RT) in March 1981 and as a Level II liquid penetrant examiner (PT) in May 1981, but there were no records of eye examinations in 1981 or 1982.

b. The QA Manager was initially certified a Level II RT in December 1976 and a Level II PT in September 1977, but there were no records of eye examinations in 1976, 1978, 1980, or 1983 (recent examination given on May 18, 1982).

c. Following initial certification to a Level II RT in December 1976, there was no evidence that the QA Manager was recertified to RT in 1979.

12. Contrary to Criterion V of Appendix B to 10 CFR Part 50, paragraph 11.1.1 of the QAM, and Sections 9.1 and 9.5 of SNT-TC-1A, a review of records for NDT personnel revealed the following:

a. Outside certification services were provided in June 1983 by Automation Industries (AI), but FCD did not audit AI.

b. There was no certification document from FCD that the QA Manager was certified to a Level III RT.

13. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Sections 9.2, 9.6, and 9.6.1 of SNT-TC-1A, a review of records for NDE personnel revealed the following:

a. Personnel records for two NDT individuals (No. 4269 and QA Manager) did not contain the educational background and experience of the individual or a statement indicating satisfactory completion of training in accordance with an FCD procedure.

b. Copies of current examination taken in June 1983 were missing for the QA Manager.

c. FCD did not establish written practices covering all phases of certification.

14. Contrary to Criterion V of Appendix B to 10 CFR Part 50, paragraph 1.1 of the QAM, and Subsection NCA-3866.2 of the ASME Code, during an evaluation of the production and inspection areas it was noted that procedures and/or specifications were not located at the following work stations: Drill/Tap/Slotting, Welding, Heat Treating, Liquid Penetrant Testing, and Radiographic Testing. Two procedures were at the Plating Station, but procedure No. CPS-002 was Revision 0, whereas Revision 1 had been issued on March 23, 1983.

C. UNRESOLVED ITEMS:

None

D. OTHER FINDINGS OR COMMENTS:

1. Allegations - In February 1983, a former employee at FCD made allegations pertaining to the fabrication of metallic O-rings for the reactor pressure vessel. The following concerns were identified:

   a. Weldments of the second joint which did not pass RT acceptance criteria were reheated or an "overpass" was made to achieve proper penetration.

   b. Cool-down rate of post weld heat treatment (PWHT) was accelerated by removing the packing.

   c. Following the plating operation, silver was "hammered" into the machined slots to obtain the correct dimension.

   d. Radiographic practices were unsafe.

   Since the NRC inspector did not witness any welding, PWHT, or dimensional inspection of slots being performed on O-rings for commercial nuclear reactors, the validation for the first three allegations was limited to a review of QA records, i.e., travelers heat treat reports, inspection reports, and radiographic reports for O-rings fabricated in 1981, 1982, and 1983. Based on this review, the NRC inspector could not substantiate the first three allegations.

   The NRC inspector did witness RT being performed and has the following comments regarding the unsafe radiographic practices:

   - facility was not completely enclosed (i.e., gap between the door and floor)
   - no warning light
   - no interlocks on the door
   - no procedure/instruction addressing safety practices or controlling personnel access in the area

2. Training/Qualifications - The training records for three inspectors and two NDE personnel were reviewed to assure that personnel performing and verifying activities affecting quality were trained and qualified. Nonconformances B.2, B.10, B.11, B.12, and B.13 were identified in this area of the inspection.

3. Manufacturing Process Control - The Manufacturing Process Sheet (i.e., traveler) for 72 nuclear O-rings and applicable procedures specifications and drawings were reviewed to assure that activities affecting quality are prescribed and accomplished with approved documents. Nonconformances B.5 and B.8 were identified in this area of the inspection.

4. Control of Purchased Material and Services - The Approved Vendors List dated June 1982, February and July 1983; purchase orders with six vendors since 1979; and nine Quality Data Packages were reviewed to assure that material and services were purchased from qualified vendors. Nonconformances B.1, B.4, B.6, and B.10 were identified in this area of the inspection.

5. Calibration of Measuring and Test Equipment - A review of two procedures and calibration records for measuring and test equipment in the production and inspection areas was performed to assure that the devices are properly identified, controlled, and calibrated at specified intervals. Nonconformances B.3 and B.7 were identified in this area of the inspection.

6. Audits - Internal audit reports for 1982 and 1983 were reviewed to assure that all elements of the QA program were audited on an annual basis. Nonconformance B.9 was identified in this area of the inspection.

7. Reporting of Defects - The implementation of the reporting of defects and failures in regard to posting requirements was assessed by inspecting the shop fabrication area. Violation A.1 was identified in this area of the inspection.

ORGANIZATION: THE FOXBORO COMPANY
FOXBORO, MASSACHUSETTS

REPORT NO.: 99900788/83-01	INSPECTION DATE(S) 9/26-30/83	INSPECTION ON-SITE HOURS: 32

CORRESPONDENCE ADDRESS: The Foxboro Company
ATTN: Mr. C. A. McKay
Executive Vice President
38 Neponset Avenue
Foxboro, Massachusetts 02035

ORGANIZATIONAL CONTACT: Mr. R. G. Shaw, Program Manager
TELEPHONE NUMBER: (617)543-8750

PRINCIPAL PRODUCT: Differential pressure transmitters, recorders, and indicating instruments

NUCLEAR INDUSTRY ACTIVITY: Commercial nuclear production of the Foxboro, Massachusetts, plants represents < 1/2% of their production and consists of replacement parts.

ASSIGNED INSPECTOR: J Barnes for Wm. D. Kelley, Reactive Inspection Section (RIS) 11-16-83 DATE

OTHER INSPECTOR(S):

APPROVED BY: J Barnes I. Barnes, Chief, RIS 11-16-83 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 issuance of a potential 10 CFR Part 50.55(e) report by Florida Power and Light Company (FP&L) concerning the grounding of wire shields in instrument cabinets that had been furnished to the St. Lucie Plant, Unit 2; and (2) the issuance of 10 CFR Part 50.55(e) reports by Kansas Gas and Electric Company (KG&E) concerning potentially damaged fuse pins and suspect potentiometer leads that had been furnished to the Wolf Creek Generating Station.

PLANT SITE APPLICABILITY:

Grounding of wire shields, 50-389; damaged fuse pins and suspect potentiometer leads, 50-482.

ORGANIZATION: THE FOXBORO COMPANY
FOXBORO, MASSACHUSETTS

REPORT NO.: 99900788/83-01	INSPECTION RESULTS:	PAGE 2 of 6

A. VIOLATIONS:

None

B. NONCONFORMANCES:

None

C. UNRESOLVED ITEMS:

None

D. STATUS OF PREVIOUS INSPECTION FINDINGS:

(Closed) Nonconformance (99900297/81-01) - Failure by Foxboro-Jordan, Incorporated (FJI), a subsidiary of the Foxboro Company (FC), to report to the Foxboro Nuclear Safety Subcommittee as required by the FC Corporate Quality Assurance (QA) Procedure 3.1.8.2, Revision A, a problem concerning heat damage to geared limit switch housings in Electrodyne valve motor operators which had been installed in Tennessee Valley Authority (TVA) Sequoyah Nuclear Plant, Unit 2.

1. TVA letter of January 14, 1981, states that the valve operators were originally ordered on TVA Contract Number 72C53-92795-2 which was issued in 1972. FC bought Jordan Controls, Milwaukee, Wisconsin, in December 1978 and renamed it Foxboro-Jordan Incorporated. In early 1981 the Electrodyne electric motor valve actuator (operator) line was purchased from Raymond Controls (RC) by FC; however, these rights to manufacture did not include the nuclear qualified version of the Electrodyne actuator.

2. The NRC inspector reviewed a FC internal memorandum that identified RC as the company that performed rework on the Electrodyne actuator in 1977.

3. The FC letter of February 3, 1982, states the actuators were supplied to TVA on Henry Pratt Company nuclear MKII valves (Drawing No. E-2305) which were installed at the Sequoyah Nuclear Plant under their Contract No. 92615.

4. As a result of the above, this item has been closed with respect to FC.

ORGANIZATION: THE FOXBORO COMPANY
FOXBORO, MASSACHUSETTS

REPORT NO.: 99900788/83-01	INSPECTION RESULTS:	PAGE 3 of 6

E. OTHER FINDINGS OR COMMENTS:

1. Potential 10 CFR Part 50.55(e) Report:

a. Problem reported by KGE was the potential failure of the FC Model No. N-2AC electronic modules manufactured between May 1981 and July 1982 due to damage that may have occurred during manufacturing. The damage related to fuse pins which are an integral part of the module plastic molding whose failure could result in a condition similar to a blown fuse.

b. The NRC inspector reviewed the QA Manual, two procedures for the evaluation and reporting of defects, minutes of the nuclear safety subcommittee, and letters to eight utilities and verified that FC had evaluated the potential failure of the electronic modules in accordance with the approved procedures and had notified the utilities that had received the modules manufactured during the identified time frame.

c. The FC letter informed the utilities that the fracture or separation of the upper portion of the female jack pins was not a field repairable fault and they had to verify if their modules contained jack pins with the date codes 21B8118 to 21B8226 and determine the number of replacement modules required.

The letter also informed the utilities that the FC was not in a position to evaluate the potential deficiency.

d. None of the electronic modules retained by KG&E were found on test at FC to exhibit a failure similar to a blown fuse.

e. The FC action to prevent recurrence was to discontinue the use of C0154BS module molding and change the design effective July 7, 1982.

2. 10 CFR Part 50.55(e) Report:

a. Problem reported by KGE was the potential failure of the 1K ohm potentiometer (FC Part No. E0285VX) used in Spec 200 circuitry for alarm set points. The potential failure was determined by FC to be due to the design which was susceptible to damage during the assembly operation.

b. The NRC inspector reviewed the QA Manual, two procedures for the evaluation and reporting of defects, minutes of the nuclear safety subcommittee, and letters to customers and utilities and verified that FC had evaluated the potential failure of the 1K ohm potentiometer lead in accordance with the approved procedures and had notified customers and the identified utilities of the potential failure.

c. The FC letter informed their customers and the utilities that the potential failure was due to possible mechanical stress induced in the leads to resistive element connections during the assembly operation from December 1980 (date code 8048) to December 1981 (date code 8152). Also, the condition could, with subsequent stress due to temperature variations, vibration, or additional mechanical stress due to setting adjustments, cause an intermittent operation or short to occur.

The letter informed the utilities that in the absence of any reported field failures FC did not consider the potential failure reportable under the provisions of 10 CFR Part 21.

d. The NRC inspector reviewed correspondence and test data and verified that FC had requested their customers and the utilities to return all potential defective 1K ohm potentiometers to them. Tests had been performed on the returned potentiometers with no defective potentiometers being identified.

e. FC action to prevent recurrence was to work with their supplier of potentiometers in the redesign of the leads and increase their receiving inspection of this product.

3. 10 CFR Part 50.55(e) Report:

   a. Problem reported by FP&L was FC instrument cabinet shields were grounded to the power supply common, whereas the RPS has a floating ground.

   b. The NRC inspector was informed by FC that they had not received any notification from their customer or the utility concerning this problem.

4. Potential Deficiency Reported by FC to Customers:

   a. Problem reported by FC was the potential failure of transmitter Model Numbers N-E11.N-E13 or E11.E13 with suffix codes /MCA, /MCA/RRW, or /MCA/RR due to: (1) incorrect insulating sleeving on transistor and zener diode lead wires in the amplifier, and (2) the use of a specific vendor's capacitor which was not hermetically sealed as claimed by the vendor.

   b. The NRC inspector reviewed the QA Manual, 2 procedures for the evaluation and reporting of defects, minutes of the nuclear safety subcommittee, and letters to 14 utilities and other customers.

   c. The NRC inspector reviewed correspondence, internal memoranda, and electronic servicing instructions and verified that FC had notified all the identified end users of the: (1) possible substitution of teflon insulating sleeving for the specified silicone rubber coated glass fiber braided sleeving, and (2) the degradation of the capacitor in the transmitters.

   d. A FC memorandum stated that the incorrect insulating sleeving had been identified at their Highland (East Bridgewater, Massachusetts) plant, which as a minimum questioned the integrity of amplifier assemblies manufactured at the Highland plant in 1980. A teflon insulating sleeving (Part No. R120AZ) used for commercial products had been inadvertently used in place of the silicone rubber coated glass fiber braided insulating sleeving (Part No. C3317FN) specified for insulating the two wires between

the diode and the printed wiring board. The nuclear safety subcommittee reviewed the identified problem and directed that all end users who had received transmitters in which incorrect insulating sleeving could have been installed be notified. FC letter of March 12, 1981, informed the end users how to identify the improper insulating sleeving and advised them the corrective action was to replace the amplifier with FC Part No. N0148PW.

The capacitor degradation was identified by FC by tracking reported failures. The degradation of the capacitor was a function of time and service condition with heat being the primary contributor. FC advised the end user to replace the potential defective amplifier with FC Part No. N0148PW.

The FC letter informed the end users that due to lack of knowledge of the specific application of the transmitter and the redundancy requirements they could not determine if the reporting requirements of 10 CFR Part 21 were applicable; therefore, the determination of the reportability was the responsibility of the end user.

e. FC informed the NRC inspector that the actions at the Highland plant to prevent recurrence were to revise the inspection criteria for the installation of the insulating sleeving of the amplifier in the transmitter, retraining of assembly personnel and inspectors, and purging of all remaining capacitors in stock from the vendor who supplied the defective capacitors. Documentation of these actions was not available at the Neponset (Foxboro, Massachusetts) plant for review by the NRC inspector.

f. The manufacture of the FC transmitter Model Nos. N-E11.N-E13 or E11.E13 was transferred from the Highland plant to the Montreal, Quebec, Canada plant in 1982.

ORGANIZATION: FRANKLIN RESEARCH CENTER
PHILADELPHIA, PENNSYLVANIA

REPORT NO.: 99900921/83-02	INSPECTION DATE(S) 8/8-12/83	INSPECTION ON-SITE HOURS: 64

CORRESPONDENCE ADDRESS: Franklin Research Center
ATTN: Mr. A. J. Saggiomo
Manager, Quality Assurance
20th and Race Streets
Philadelphia, Pennsylvania 19103

ORGANIZATIONAL CONTACT: Mr. A. J. Saggiomo
TELEPHONE NUMBER: (215) 448-1195

PRINCIPAL PRODUCT: Research, analysis, and testing.

NUCLEAR INDUSTRY ACTIVITY: Franklin Research Center (FRC) is a research, analysis, and testing organization. Nuclear engineering is approximately 20 percent of their total business. Nuclear qualification testing is approximately 2 percent of their total business.

ASSIGNED INSPECTOR: Larry B Parker 12-1-83
Alva L. Smith, Equipment Qualification Section (EQS) Date

OTHER INSPECTOR(S): H. S. Phillips, EQS

APPROVED BY: H. S. Phillips 12-1-83
H. S. Phillips, Chief, EQS Date

INSPECTION BASES AND SCOPE:

A. BASES: 10 CFR Part 50, Appendix B and 10 CFR Part 21.

B. SCOPE: This inspection consisted of a technical review and evaluation of test reports and associated data packages related to testing accomplished at FRC for various nuclear cable manufacturers.

PLANT SITE APPLICABILITY:

Specific plant sites were not identified; however, the cables tested were offered to the whole nuclear industry. Therefore, the products are used at many sites.

ORGANIZATION: FRANKLIN RESEARCH CENTER
PHILADELPHIA, PENNSYLVANIA

REPORT NO.: 99900921/83-02	INSPECTION RESULTS.	PAGE 2 of 5

A. VIOLATIONS:

None

B. NONCONFORMANCES:

None

C. UNRESOLVED ITEMS:

None

D. STATUS OF PREVIOUS INSPECTION FINDINGS:

(Open) NRC Inspection Report No. 99900921/83-01 outlined one violation and seven nonconformances that were identified during the inspection which was conducted April 25-29, 1983. FRC has responded to this report and NRC has concurred with the proposed corrective action; however, since this inspection (August 8-12, 1983) was conducted prior to the date that FRC had proposed to complete corrective action (for the 83-01 report), the NRC inspection team did not evaluate FRC's corrective action. This item will remain open and will be evaluated/verified during the next inspection.

E. OTHER FINDINGS OR COMMENTS:

The NRC inspection team performed an in-depth technical review and evaluation of tests performed by FRC for two clients who manufacture electrical cable for the nuclear power industry. The results of the evaluation, keyed to the specific manufacturer, are discussed in the paragraphs below.

1. Testing for CERRO (Rockbestos) - The NRC inspectors reviewed 11 test reports for tests conducted for Rockbestos by FRC. Each individual test is discussed below.

   a. FRC Technical Report F-C3860 dated April 1974 - This test was conducted to determine the radiation resistance of one specific jacketing material; hence, it was not a comprehensive qualification test.

   b. FRC Technical Report F-C2857 dated September 1970 - Eight types of Rockbestos cables were tested under simulated post-accident reactor containment conditions and all eight passed.

c. FRC Technical Report F-C2750 dated March 1970 - Four different types of Rockbestos cables were tested under simulated post-accident reactor containment conditions and all passed.

d. FRC Technical Report F-C2927 dated October 1970 - Two types of Rockbestos cables were tested under simulated post-accident reactor containment conditions and both passed.

e. FRC Technical Report F-C3050 dated May 1971 - Seven different types of Rockbestos cables were tested under simulated post-accident reactor containment conditions and all seven passed.

f. FRC Technical Report F-C2404-01 dated June 1969 - Four specimens of Rockbestos Pyrotrol III cable were tested under simulated post-accident reactor containment conditions and all four passed.

g. FRC Technical Report F-C3332-01 dated May 1972 - Two types of Rockbestos cable were tested under simulated reactor containment service conditions and both passed.

h. FRC Technical Report F-C3192 dated December 1971 - Three types of Rockbestos cable were tested under simulated reactor containment service conditions and two out of three passed.

i. FRC Technical Report F-C3402 dated November 1972 - Five types of Rockbestos cables consisting of ten samples (total) were tested under simulated reactor containment service conditions. Three samples failed during testing and one was not energized.

j. FRC Technical Report F-C3798 dated March 1974 - FRC conducted qualification tests of four electrical cables manufactured by CERRO. Page 4-1 of this report states, "Four types of electrical cables manufactured and thermally aged by CERRO Wire and Cable Company were electrically energized and subjected to conditions designed to simulate a 40-year accumulated radiation exposure and a LOCA design basis event. The 30-day steam/chemical-spray exposure was conducted in accordance with IEEE Standard-383, 'Standard for Type Test of Class 1E Electric Cables for Nuclear Power Generating Stations.' All four samples maintained the specified electrical loading throughout the LOCA exposure."

The inspection team was also provided an unsigned report also numbered F-C3798. The report had a penciled written note on the cover sheet stating, "Note: there is also a final report F-3798 which is an abbreviated version." Section 1 of this report states, in part, "Qualification tests of nine electrical cables were conducted to determine their ability to function under environmental conditions simulating . . . ." Section 4, "Test Results," states, in part, "Except for Cables B, E, and I, all cables were reenergized prior to resumption of the steam/chemical-spray exposure, beginning with the second transient . . . . The remaining Cables A, C, F, and G continued to perform satisfactorily throughout the remainder of the 30-day exposure maintaining their required current and voltage loading."

In summary, the unsigned report indicates that five of the nine samples tested failed while the final report reflects that four samples were tested and four passed. The test failures were not evaluated. In addition, the NRC inspection team requested the "raw data" for this test and was told that FRC maintained raw data for 5 years only and then either shipped it to the test sponsor or disposed of it if the sponsor did not want it. In either case, the raw data was not available for review at FRC during this inspection.

k. FRC Technical Report F-C3859-2 dated September 1974 - Eleven types of Rockbestos cables were tested under simultaneous exposure to gamma radiation and steam and chemical spray while electrically energized. Of the 11 cables tested, 10 cables failed during the test. The inspector determined that FRC did not perform a failure analysis for the failed cables and the raw data for this test was not at FRC.

The eleven test reports discussed above represent the qualification tests which were performed by FRC for Rockbestos. The purchase orders from Rockbestos to FRC did not impose 10 CFR Part 50, Appendix B; 10 CFR Part 21; IEEE 323-1971/1974; or IEEE 383-1974 requirements on FRC testing. FRC stated that it was implicitly understood that FRC would apply their highly regarded professional ethics, experience, and skills in the performance of the testing. Since this information was obtained by telephone after the inspection, this item will be further evaluated during the next inspection.

The test reports discussed in 1.a-k above do not state that the qualification of Rockbestos cable is in accordance with IEEE-323-1971/1974 or IEEE 383-1974 requirements and/or criteria, except in two cases, and these qualification reports documented test failures for 5 of 9 cables tested (F-C3798 and draft report) and 10 of 11 failed in the other test (F-C3859-2). No failure analysis was performed concerning these test failures. There was no evidence that FRC was required to perform an analysis. This matter will be reviewed at Rockbestos, during a subsequent inspection, to determine if they evaluated these test failures to determine what impact it may have on cables sold to the industry.

No nonconformances were identified.

2. Testing for American Insulated Wire (AIW) - The NRC inspectors reviewed four test reports for testing conducted for AIW by FRC. Each individual test is discussed below.

   a. FRC Technical Report F-C4997-1 dated December 1978 - Eighteen specimens were tested under a simulated steam-line-break and LOCA environment and all eighteen passed.

   b. FRC Technical Report F-C4997-2 dated December 1978 - Nine samples of cables manufactured by AIW were tested under a simulated steam-line-break and LOCA environment. Eight samples passed and one failed.

   c. FRC Technical Report F-C4997-3 dated December 1978 - Nine samples of cables manufactured by AIW were tested under a simulated steam-line-break and LOCA environment. Six of the nine samples passed the test. All three samples that failed had been thermally aged for 600 hours at 150°C. All nine samples had been exposed to a radiation dose of 200 megarads; however, they were exposed to only one transient.

   d. FRC Technical Report FRC-C5115 dated April 1979 - Twelve samples of cable manufactured by AIW were tested under a simulated LOCA environment and all twelve passed. The NRC inspector determined that six specimens were aged at 121°C for 7 days and six samples were unaged. All samples irradiated had received a total radiation dose of 206 megarads; however, they were exposed to only one transient.

No nonconformances were identified, however, these items will be evaluated during a subsequent inspection to be scheduled at AIW.

ORGANIZATION: GENERAL ELECTRIC COMPANY
NUCLEAR ENERGY BUSINESS OPERATIONS
SAN JOSE, CALIFORNIA

REPORT NO.: 99900403/83-03	INSPECTION DATE(S) 8/29-9/2/83	INSPECTION ON-SITE HOURS: 135

CORRESPONDENCE ADDRESS: General Electric Company
Nuclear Energy Business Operations
ATTN: W. H. Bruggeman,
Vice President and General Manager
175 Curtner Avenue
San Jose, California 95125
ORGANIZATIONAL CONTACT: Mr. J. J. Fox, Senior Program Manager
TELEPHONE NUMBER: (408) 925-6538

PRINCIPAL PRODUCT: Nuclear steam system supplier.

NUCLEAR INDUSTRY ACTIVITY: General Electric Company (GE), Nuclear Energy Business Operations (NEBO), has a work force of approximately 7000 people with approximately 98 percent of that work force devoted to domestic nuclear activity. NEBO currently has 26 reactor units under construction and 2 reactor units under contract. NEBO also has approximately 125 service contracts with various clients.

ASSIGNED INSPECTOR: D. D. Chamberlain — 10-14-83
D. D. Chamberlain, Reactor Systems Section (RSS) — Date

OTHER INSPECTOR(S): D. G. Breaux, RSS
R. H. Brickley, RSS
R. Nguyen, RSS
P. Sears, RSS

APPROVED BY: C. J. Hale — 10/18/83
C. J. Hale, Chief, RSS — Date

INSPECTION BASES AND SCOPE:

A. BASES: GE Topical Report No. NEDO-11209-04A and 10 CFR Part 21.

B. SCOPE: Status of previous inspection findings, design verification, and followup on the following items/requests: (1) 10 CFR Part 50.55(e) report (River Bend project) stating that the heat loads provided by GE to Stone and Webster (S&W) for sizing the heating and ventilating (HVAC)
(cont. on next page)

PLANT SITE APPLICABILITY:

Plant docket Nos. 50-259, 50-260, 50-296, 50-322, 50-410, 50-416, 50-417 and 50-548.

SCOPE: (cont.) system in the high pressure coolant injection (HPCI) system diesel generator room were about 1/3 of the expected value; (2) licensee event report (Browns Ferry) regarding a common mode failure of HPCI high steam flow differential pressure switches; (3) 10 CFR Part 21 report (GE) stating that safety relief valves failed to comply with IEEE-323-1974 environmental qualification test requirements; (4) request to determine the basis for GE qualification of Rosemount 1152 transmitters to IEEE-323-1974 when the transmitters were qualified by the manufacturer to IEEE-323-1971; (5) 10 CFR Part 21 report (Grand Gulf) regarding internal and external corrosion in Dikkers' safety relief valve actuators; (6) 10 CFR Part 50.55(e) report (Nine Mile Point) stating that shipping clamps were used erroneously for piping clamps in the control rod drive (CRD) system; (7) 10 CFR Part 50.55(e) report (Shoreham) regarding error in data supplied by S&W to GE affecting rotational area response spectra and rotational time history of reactor vessel and associated components; and (8) request to review GE design process controls for verification of two computer programs (SAFER and GESTR).

A. VIOLATIONS:

None

B. NONCONFORMANCES:

1. Contrary to Section 5 of Topical Report No. NEDO-11209-04A and Sections 4.1.2 and 4.4 of Engineering Operating Procedure (EOP) 42-6.00, "Independent Design Verification," design verifications of Nuclear Control and Instrumentation Division design documents are being deferred without controlling procedural requirements being implemented.

2. Contrary to Section 5 of Topical Report No. NEDO-11209-04A, Section 5.7.1 of NEDE-20586 and implementing procedure MP 5.07, GE did not request that Rosemount, Inc. issue a deviation disposition request (DDR) when Rosemount notified GE that they could not meet the IEEE 323-1974 environmental requirements imposed by a purchase order for Rosemount 1152 transmitters. This resulted in GE receiving and accepting purchased equipment that did not conform to the procurement document.

3. Contrary to Section 5 of Topical Report No. NEDO-11209-04A and Section A1.1 of Appendix A to GE EOP 65-2.10, the CRD clamps supplied by GE on all the BWR-6 plants were classified as nonessential components without assurance that failure would not cause a loss of the integrity of the reactor coolant pressure boundary.

4. Contrary to Section 5 of Topical Report No. NEDO-11209-04A and Section 2.3.7.1 of GE BWR Quality Assurance Manual, GE did not communicate needed design information to S&W that the CRD clamps supplied by GE were nonessential components and could not be used as ASME qualified items in the analysis of the CRD piping system.

5. Contrary to the requirements of Section 5 of Topical Report No. NEDO-11209-04A and paragraph 4.2.c.3 of EOP 42-10.00, "Design Record Files" (DRF), dated June 23, 1980, a DRF index (Form SD-006) or equivalent was not established and/or maintained for DRF Nos. A00-1160 (SAFER01) and A1002 (GESTR08) as follows:

   a. A00-1160, the date entered and author's name were missing.

   b. A1002, the date entered was missing.

6. Contrary to the requirements of Section 5 of Topical Report No. NEDO-11209-04A and paragraph 3.3.2 of Supplement A dated August 1, 1979, to EOP 42-1.00, "Introduction-Technology and Design Control," mathematical analysis contained in Section 8 of DRF No. A00-1160 was not prepared and documented so that a technically qualified person could review and evaluate its accuracy without recourse to the originator; e.g., the identification of the purpose, references, originator, reviewer, date, etc., were missing.

7. Contrary to the requirements of Section 5 of Topical Report No. NEDO-11209-04A and Supplement A (page 12) dated August 1, 1979, to EOP 42-1.00 which designates a functional specification as a design document subject to the requirements of EOP 42-6.10, "Engineering Document Issue and Application," the functional specification for SAFER01 was not controlled in accordance with EOP 42-6.10; e.g., (a) no identifying number, (b) no revision number, and (c) identification and signatures of originator, reviewer, and approver were missing.

C. UNRESOLVED ITEMS:

None

D. STATUS OF PREVIOUS INSPECTION FINDINGS:

1. (Closed) Nonconformance (82-03): Documented instructions or procedures were not utilized to communicate quality requirements relating to the dispositioning of potential design action items.

EOP 55-4.00 was revised on July 14, 1982, to formalize the requirement that the Change Control Board (CCB) maintain a list of potential design action items. This EOP requirement was supplemented with a "Procedure for Potential Design Action Items" (latest issue June 21, 1983) which provides documented criteria for the disposition of potential design action items. The CCB also reviews and approves the disposition of items.

2. (Open) Nonconformance (83-01): Use of the "Design Memo" was not delineated, accomplished, or controlled by any document such as a procedure or instruction.

   GE issued procedure PDS-008, "Design Memos," in May 1983 which effectively documented existing practices for the control of design memos and a Quality Assurance Newsletter was issued in June 1983 to emphasize proper control of design inputs as committed. This item will remain open pending NRC review of evidence that the control of design memos has been discussed in ongoing Nuclear Engineering Division Quality Assurance training and that a GE internal audit has included the control of design memos in the scope of the audit.

3. (Closed) Unresolved Item (83-01): It was not apparent if a GE specification (22A4019) requirement, assuring that the use of manifold and common piping is within the limits of physical separation and common mode failure, was considered or required on some BWR designs.

   During the 83-01 inspection the NRC inspector was not able to obtain the GE specification for piping and tubing process instrumentation which applied to Browns Ferry. A licensee event report had stated that HPCI high steam flow isolation switches were both rendered inoperable by one equalizing valve leaking past its seat. During this inspection the GE specification for Browns Ferry was examined to determine requirements relative to instrument manifold piping design. It was found that GE designed the piping according to applicable specification requirements at the time.

4. (Closed) Unresolved Item (83-01): It is not apparent that GE is in compliance with Section NB-3672.7 of the ASME Code which states, in part, "Where assumptions are used in calculations or model tests, the likelihood of underestimates of forces, moments, and stresses, including the effects of stress intensification, shall be evaluated." For clamps and supports in the 100 KIP category, GE has not performed a formal evaluation of the effect of clamp induced local pipe stress.

The NRC has completed its initial evaluation of this problem. The Division of Engineering has concluded that certain loadings induced by these specialized pipe clamps can result in significant localized stresses in the piping if not properly evaluated during design. The NRC is now considering several courses of action for identifying, correcting, and controlling problems in this area of piping design. When these actions have been defined, we will evaluate GE's design conformance; therefore, we consider this unresolved item closed, but it will be inspected further during future inspections.

E. OTHER FINDINGS OR COMMENTS:

1. Design Verification - The intent of this area of inspection was to conduct a review of design process control activities for the Nuclear Control and Instrumentation Division (NC&ID). During this inspection the NRC inspector concentrated on the design verification of changes to verified designs.

   It was noted during the review of EOP 42-6.00, "Independent Design Verification," that the deferral of required design verifications is allowed for original design as well as for changes to original design. When a verification is deferred, a "Design Verification Status Change Notice" (DVSCN) form must be processed to identify the document, the scheduled date of deferred verification completion, design record file reference if applicable, and distribution identical to that of the issued document (includes project in most cases). The project managers/program managers are then responsible, based on DVSCN input, to notify the external user about the deferred verification status of applicable design data, together with schedule for verification and any limitations on the application of data or product hold requirements and to notify the user when verification has been completed. A review of design/design change documents on the River Bend project revealed that DVSCNs were not being prepared for verification deferrals in most cases and the external users were not being notified about the deferred verification status of applicable design data. This lack of control of deferred verifications was identified as a nonconformance (see Section B.1). In addition to the future closeout of this nonconformance, this area will be reviewed further during a future NRC inspection to access GE program for tracking and closeout of deferred verifications.

2. HVAC Heat Load Sizing for the HPCI System (River Bend) - This area of inspection resulted from a 10 CFR Part 50.55(e) report stating that the heat loads provided to S&W by GE for the sizing of HVAC in the

HPCI diesel generator room were about 1/3 the expected values. This item was reviewed during the 82-02 and 83-01 inspections and remained open pending the notification of all affected projects with final heat load values. Based on actual testing done by one of the diesel suppliers, GE has provided the revised specifications and/or revised vendor manual data to all affected projects. This item is considered closed.

3. Common Mode Failure of Differential Pressure Switches (Browns Ferry) - This item resulted from a licensee event report which stated that the HPCI high steam flow isolation switches were both rendered inoperable by one equalizing valve leaking past its seat. These switches have a common high pressure (HP) and low pressure (LP) sensing line, but each switch has its own individual HP and LP isolation and equalizing valve. If one equalizing valve leaks, it could cause both redundant switches to actuate at a higher steam flow or not at all. Plant designs (BWRs) later than Browns Ferry have separate instrument taps and sensing lines for each switch which eliminates this problem. This item was reviewed during the 83-01 inspection and GE personnel were not able to immediately obtain the specification for piping and tubing process instrumentation for Browns Ferry. During this inspection, the specification for Browns Ferry was examined and it was determined that GE designed the piping according to applicable specifications. Also, it was noted that GE issued a Service Information Letter (SIL No. 335) in July 1982 regarding the "Control of Differential Pressure Sensor Equalizing Valves." One of the GE recommendations contained in that letter was to remove installed equalizing valves and cap the low and high side pipe stubs. Such removal would prevent equalizing valving errors and also prevent sensor errors due to leaky equalizing valves.

   No violations or nonconformances were identified in this area of the inspection and this item is considered closed at GE.

4. Solenoid Valves Associated with the Main Steam Line Saftey Relief Valves (SRVs) - Prior to 1979, SRVs were shipped and tagged as not having passed equipment qualification (EQ) testing. These SRVs had AVCO solenoids. An engineering evaluation test performed on the solenoid/actuators showed certain deficiencies. GE recalled all SRVs, specified a new solenoid (Crosby Model CVG-01), and proceeded with EQ testing. The new solenoid failed the EQ testing. The CVG-01 solenoid could not be actuated with minimum available dc voltage during a postulated loss of coolant accident. The inability to actuate was due to inadequate magnetic properties and the

increased coil electrical resistance at elevated LOCA temperatures. GE reported the foregoing in a 10 CFR Part 21 report. The valve was subsequently modified and subjected to a qualification program per IEEE Standard 323-1974. The qualification was approved by the NRC (Equipment Qualification Branch of the Office of Nuclear Reactor Regulation). It appears that the original qualification requirements were implemented by GE.

During the review, in the 1979 time frame, SRVs were shipped by GE to the following plants under construction:

Perry 1 and 2
Nine Mile Point
Black Fox 1 and 2
Grand Gulf 1 and 2
Clinton 1 and 2

As noted above, these SRVs had been EQ tested to criteria in effect at the time. Subsequently, NUREG-0588 was issued causing the imposition of new EQ requirements. In 1982, Perry and Nine Mile Point ansmitted to GE new radiation requirements which were generated by requirements in NUREG-0588. GE was contracted to perform EQ testing to the new requirements. Certain sealing materials in the SRVs failed the test. GE took the following actions:

a. A Potentially Reportable Condition (PRC) memorandum was generated and evaluated.

b. In their evaluation, GE concluded that the equipment was environmentally qualified to original requirements (pre-NUREG-0588). For that reason, GE concluded that the described condition (failed test) does not constitute a deviation from the specification or a substantial safety hazard per 10 CFR Part 21.

c. GE notified by mail all of the affected plants (except Black Fox which is a cancelled plant) of the failure of the subject valve to perform its function after being exposed to the test radiation.

d. Nine Mile Point and Perry wrote 50.55(e) reports concerning the failure of the SRV actuator during EQ testing.

In their evaluation, GE concluded that the SRVs were qualified by test to the pre-NUREG-0588 requirements, thus, were in compliance with applicable specifications, standards, and Regulatory Guides prior to the TMI event and the subsequent issue of NUREG-0588. In their evaluation, GE concluded that because compliance with NUREG-0588 was beyond the original contract requirements, 10 CFR Part 21 does not apply to this situation.

After the failed test GE notified all relevant applicants who were using the SRVs. Two of the applicants notified NRC through 50.55(e) reports. Thus, no specific violations or nonconformances were identified. The GE conclusion that the condition (failed test) does not constitute a substantial safety hazard simply because the SRV passed requirements in place before the promulgation of NUREG-0588 is incorrect. The reasons put forth for GE's conclusions are unsatisfactory, even though 10 CFR Part 21 requirements were satisfied in this case. Even though the requirements of NUREG-0588 may not apply to a basic component, test failures of such components should be evaluated to determine if a condition exists which could contribute to the exceeding of a safety limit (defect) and is, therefore, reportable.

5. Qualification of Rosemount 1152 Transmitters - This area of inspection is a continuation of the 83-01 inspection which identified that a more detailed review of GE Control and Instrumentation Division (C&ID) needed to be made.

In the previous inspection the NRC inspector identified some concerns in the C&ID scope of work. The first concern was that GE accepted equipment that did not meet purchase order requirements. The inspector reviewed the purchase order file for the Rosemount 1152 transmitter, procurement 282-X8G55. This review included all design documents and specifications that were referenced in the purchase order. From this review, there was no evidence of a change in the purchase order requirements prior to delivery and acceptance of the purchased equipment that would have relieved Rosemount from qualifying their transmitters to meet IEEE 323-1974 requirements. However, approximately 8 months after the delivery of these transmitters, an Engineering Change Notice was issued by GE to reflect a qualification requirement change from IEEE 323-1974 to IEEE-1971 on all previous and future procurements. This resulted in one nonconformance identified (B.2 above).

The next concern was that Certificates of Compliance (C of C) issued by Rosemount did not certify that the purchase order requirements

were met and GE accepted these limited C of Cs. The inspector reviewed GE purchase specification 225A6635 entitled "Purchase Spec. for Essential Components." This specification details what the vendor shall include in the transmitted certificates of compliance for the procured items. A review of the Rosemount 1152 transmitter C of Cs revealed that they contained all of the required information imposed by GE. GE now requires that the C of Cs contain a statement certifying that the product meets the requirements of the purchase order and referenced documents and be signed by the supplier's authorized QA representative. Five C of Cs with these GE requirements imposed on them were reviewed and found to contain the proper information. In this area of the inspection, no nonconformances were identified.

The next area of concern was that the retrieval of procurement documents were very cumbersome. The C&ID procurement activities have been combined with Engineered Equipment and Installation (EE&I) procurement. The responsibilities have been transferred, yet the procurement documentation centralization has yet to occur. This separation of documentation causes difficulties in retrieval activities. Until this documentation is transferred, retrieval concerns will persist.

6. Corrosion in Dikkers Safety Relief Valve Actuators - This item concerns a 10 CFR Part 50.55(e) report by Mississippi Power and Light to NRC Region II of internal corrosion of safety relief valve actuators on Grand Gulf, Units 1 and 2. This corrosion was discovered during routine maintenance of a Dikkers' main steam line safety relief valve. Six of twenty installed actuators were found to be internally corroded. In addition, corrosion was found in six of eight spare SRVs for Unit 1 and one of eight spare Unit 2 SRVs. All of the evidenced corrosion was on galvanized steel.

The NRC inspector reviewed records of the Dikkers' SRV for actions taken on this reportable item. Wyle Test Labs were contracted by GE to test one of the corroded SRV actuators to determine if the specified Class 1E function of the device would have been compromised by this corrosion. The results of the test showed that leakage rates were within designated design specifications. GE concluded that the test provided a basis for demonstration that the noted corrosion products will not affect the required SRV Class 1E function.

Corrective action was initiated by Mississippi Power and Light to clean and return the affected actuators to their original condition. Fifteen actuators that were corroded have been refurbished, tested, and returned to their original condition. The six installed Unit 1 actuators were replaced with Unit 1 and Unit 2 spare actuators. The Unit 2 actuators that have not been installed will be inspected prior to installation.

GE supplies these Dikkers' SRV actuators to the Clinton and Nine Mile Point, Unit 2, projects. GE's engineering stated that these projects were made aware of possible corrosion concerns on the Dikkers' SRV actuators. As of this date GE engineering has received no information from these other potentially impacted projects on any corrosion detected. Because of the seemingly isolated nature of the corroded Dikkers SRV actuator to the Grand Gulf, Unit 1 and 2, projects, GE engineering has concluded that the cause of the corrosion was storage conditions at the Grand Gulf site. Region II will be notified of GE conclusions for any actions deemed necessary.

There were no nonconformances or unresolved items identified.

7. CRD Systems Clamps - This area of inspection was performed as a result of a 10 CFR Part 50.55(e) report from Niagara Mohawk Power Corporation (NMPC) in June 1983 concerning the CRD system clamp on Nine Mile Point, Unit 2, project (NMP2).

In the abovementioned report, NMPC stated that the CRD system piping clamps were included with the reactor vessel internals supplied by GE. The clamps restrain piping in the area of CRD housing. Reactor Control, Incorporated (RCI), which was a subcontractor for S&W, utilized the clamps as ASME-qualified components in CRD piping analysis. It was stated in the 50.55(e) report that GE informed S&W that the clamps were intended for use only as shipping clamps and are not ASME-qualified components. During the inspection the NRC inspector examined numerous design and procurement documents relating to the CRD piping system and its components. The following is a summary of this review.

a. GE's scope of work for the CRD hydraulic line is from the CRD housing up to and including the attachment coupling at the periphery of the CRD housing pattern.

b. The CRD hydraulic lines are to be be designed, fabricated, inspected, and material selected and examined in accordance with ASME Boiler and Pressure Vessel Code, Section III, latest edition and latest applicable addenda for Class 2 components.

c. Design considerations for CRD hydraulic lines include the following:

- Normal and upset conditions: design pressure, static weight, operating basis earthquake, and design temperature.

- Faulted conditions: design pressure, static weight, safe shutdown earthquate, and design temperature.

d. The CRD hydraulic lines are classified as essential components in accordance with GE specification 22A3762.

e. The insert and withdrawal lines are to be installed in a preplanned sequence that considers the access limitations imposed when the CRD housings and in-core housings are installed. Framing and clamping the insert and withdrawal lines, and their orientation and welding to the CRD housings, is defined on the CRD hydraulic line installation kit drawing.

f. The installation kit drawing was classified as an essential component drawing.

g. The installation kit drawing did not indicate that the CRD clamps were shipping clamps and had to be removed.

It is noted from the information listed above that the CRD hydraulic line was classified as an essential component (an ASME Class 2 piping system) and its failure would effect the integrity of the reactor coolant pressure boundary. The CRD clamp which was designed by GE as a connection between the hydraulic line and the CRD housing structure was classified as a nonessential component but no assurance was provided that its failure would not cause a loss of the integrity of the reactor coolant pressure boundary.

In addition, during the inspection, no evidence was identified which indicated that GE communicated in writing that the CRD clamps were nonessential components and could not be used as a permanent structural item in the CRD system piping analysis performed by RCI.

Nonconformances B.3 and B.4 above were identified in this area of the inspection. The generic implications of this item are still being evaluated.

8. Errors in Response Spectra - On September 27, 1982, Long Island Lighting Company (LILCO) notified NRC Region I of an apparent discrepancy in the Ghosh-Wilson computer program used to develop the response spectra for the Shoreham project. A review of numerous documents by the NRC inspector indicated that the discrepancy occurred in an internal subroutine used by S&W to calculate the stiffness matrices for triangular finite elements. In determination of the triangular element stiffness, the program divides such an element into three triangular subsections, then it calculates the stiffness of each subsection and combines them together to formulate the stiffness matrix of the overall triangular element. In performing this function, the program incorrectly ignored the stiffness of two subsections, assigning the stiffness matrix of one subsection to the entire triangular element. The problem subroutine has been corrected to include the stiffness matrices of all triangular subsections.

   In addition to the error in the above subroutine, on February 15, 1983, LILCO reported an error that has been identified in the data transmitted by S&W to GE affecting the rotational response spectra and the rotational time history computations for the reactor pressure vessel and its associated piping and components. The NRC inspector found that the error consisted of mislabeling of the units used in the response spectra. The rocking acceleration data transmitted were labeled radian/sec^6, whereas the correct unit was g/ft. GE has been informed of this problem and is presently reviewing the Mark II confirmatory analysis.

   This item will be examined during a future inspection at S&W.

9. Computer Code Development and Use - This inspection was conducted in response to a request from the Division of Systems Integration, Office of Nuclear Reactor Regulation concerning the development and use of the SAFER and GESTR computer codes used for ECCS analysis. The objectives of the inspection were to determine that these codes are developed and used in accordance with NRC requirements and guidance for design control of computer codes and that procedures exist that ensure that the Commission will be notified of matters reportable under NRC regulations 10 CFR Part 21 and 10 CFR Part 50.55(e) as applicable.

The preceding objectives were accomplished by a review of: (1) applicable procedures from the EOP Manual; (2) the contents of design record file (DRF) A00-1160 (SAFER01); (3) the contents of DRF A1002 (GESTR08); (4) DRF A00-01320 (SAFER/TLTA Qualification); (5) SAFER01 User Manual; and (6) GESTR08 User Manual.

The review of the preceding documents disclosed: (1) both codes were developed and used in accordance with procedures that were effective during the related activity; (2) the procedures applicable to computer codes have improved significantly since the initial inspection in 1978 (Ref. Report No. 99900403/78-03); (3) the development and testing of both codes were independently reviewed by a design review team; (4) the verification tests for the codes involved data from simulation tests and/or actual plants (Vermont Yankee and Peach Bottom); and (5) the DRFs were well organized and contained adequate documentation of code activities.

Three nonconformances were identified in this area of the inspection (see paragraphs B.5, B.6, and B.7 above).

ORGANIZATION: GENERAL ELECTRIC COMPANY
NUCLEAR ENERGY BUSINESS OPERATIONS
SAN JOSE, CALIFORNIA

REPORT NO.: 99900911/83-03	INSPECTION DATE(S) 9/19-23/83, 9/26-30/83	INSPECTION ON-SITE HOURS: 202

CORRESPONDENCE ADDRESS: General Electric Company
Nuclear Energy Business Operations
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Vice President and General Manager
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San Jose, California 95125
ORGANIZATIONAL CONTACT: Mr. N.G. Shirley, Sr. Lic. Eng., Environ. Qualification
TELEPHONE NUMBER: (408) 925-1192

PRINCIPAL PRODUCT: Nuclear Steam System Supplier

NUCLEAR INDUSTRY ACTIVITY: The General Electric, Nuclear Energy Business Operations (GE-NEBO) has a work force of approximately 7650 people with approximately 98 percent of that work force devoted to domestic nuclear activity. Approximately 100 of the 7650 personnel are assigned to the environmental qualification (EQ) test program.

ASSIGNED INSPECTOR: H. S. Phillips, for — 11/14/83
G. T. Hubbard, Equipment Qualification Sec. (EQS) — Date

OTHER INSPECTOR(S): L. B. Parker, EQS
P. R. Bennett, Consultant, Sandia National Laboratories (SNL)
L. D. Bustard, Consultant, SNL

APPROVED BY: H. S. Phillips — 11/14/83
H. S. Phillips, Chief, EQS — Date

INSPECTION BASES AND SCOPE:

A. BASES: GE Quality Assurance (QA) Topical Report (TR) No. NEBO-11209-04A

B. SCOPE: This inspection was made to: (1) review inspector followup items identified in NRC Report 99900911/83-01; (2) evaluate EQ documentation at Valley Forge; (3) evaluate EQ documentation and test activities at San Jose; and (4) evaluate the QA program implementation for controlling the EQ in the areas of instructions, procedures, and drawings; document control; control
(cont. on next page)

PLANT SITE APPLICABILITY:

50-440, 50-441, 50-458, 50-459, 50-354, 50-410

SCOPE: (cont.) of special processes; inspection; handling, storage and shipping; inspection, test, and operating status; nonconforming materials, parts, or components; and corrective action.

A. VIOLATIONS:

None

B. NONCONFORMANCES:

1. Contrary to TR NEBO-11209-04A, Revision 4, dated December 31, 1982, and Engineering Work Authorization (EWA) No. EAJ08-23, Revision 0, issued March 21, 1983, there was no documented objective evidence that out-of-specification conditions for baseline functional data, thermal aging calibration data, and radiation aging data [recorded for CO3 temperature elements tested under Test Plan and Procedures (TP&P) 524.1020, Revision A, dated May 11, 1983] were documented or that the test requestor had been notified of the out-of-specification conditions.

2. Contrary to TR NEBO-11209-04A, Revision 4, dated December 31, 1982, and paragraph 4.7.7 of NEDE-24326-1-P, dated January 1983, there was no documented objective evidence that the single application of the initial accident transient and dwell at peak temperature, as required by Attachment 1 to EWA No. EAJ08-23, Revision 2, issued June 20, 1983, had been justified for the CO3 temperature element qualification tests.

C. UNRESOLVED ITEMS:

None

D. OTHER FINDINGS OR COMMENTS:

1. QA Program: This inspection consisted of the completion of the EQ QA programmatic audit at San Jose initiated during the inspection documented in Report No. 99900911/83-01. This inspection consisted of visits to the GE engineering office at Valley Forge, Pennsylvania, and the engineering and test operation facilities at San Jose, California. The programmatic efforts consisted of an evaluation of the procedures that provide detailed supplemental support to the sections of the Topical Report that were not reviewed during the 83-01 inspection and evaluation of the implementation of these procedures.

2. Supplemental Procedures Review: The NRC inspector evaluated 10 Engineering Operating Procedures (EOP) and 2 other procedures that provide detailed support to the Topical Report. No nonconformances were identified.

3. QA Program Implementation Review: The NRC inspector evaluated the implementation of the reviewed sections of the Topical Report relative to the EQ program by examining representative records and files, conducting interviews with personnel, and by visual inspections and observations.

   Findings concerning the implementation of the reviewed sections of the Topical Report, as described in supplemental procedures, are as follows:

   a. Instructions, Procedures, and Drawings: The NRC inspectors evaluated the implementation of the supplemental procedures as they relate to this section of the Topical Report by examining 14 EOPs, 3 TP&Ps, 3 other miscellaneous procedures, 9 drawings, 5 specifications, and 3 design record files (DRF). No nonconformances were identified.

   b. Document Control: The NRC inspectors evaluated the implementation of this criterion by verifying the issuance and control of 6 EWAs, 2 EWA revisions, 1 project work authorization, 14 EOPs, 4 EOP revisions, 3 TP&Ps, 3 engineering review memorandums. 5 design verification summaries, 3 procedures, 9 drawings and 5 specifications. No nonconformances were identified.

   c. Special Processes: The NRC inspector determined that GE-NEBO does have procedures to control special processes and the qualification of personnel; however, this criterion is not applicable to the EQ work peformed at GE.

   d. Inspection: The NRC inspector evaluated the implementation of this criterion by examining one EOP and three TP&Ps and conducting interviews with test operations personnel. The evaluation determined that inspection and/or test points are established in the TP&Ps and independent verification that procedures are followed is accomplished during EQ testing. No nonconformances were identified.

   e. Handling, Storage, and Shipping: The NRC inspector evaluated the implementation of this criterion by examination of two EOPs, two log sheets for test items received in test operations, one computer printout, one form, and three test items in the test item storage area. No nonconformances were identified.

f. Inspection, Test, and Operating Status: The NRC inspector evaluated the implementation of this criterion by examination of one EOP and three TP&Ps. The inspector determined that the status of each test is indicated in the TP&P notebook established for each test program. No nonconformances were identified.

g. Nonconforming Materials, Parts, or Components: The NRC inspector evaluated the implementation of this criterion by examination of one procedure, one EWA, two EWA revisions, two nonconformance and corrective action forms, one nonconformance log, and one TP&P. One nonconformance (see nonconformance described in paragraph B.1) was identified during the evaluation of this criterion.

h. Corrective Action: The NRC inspector evaluated the implementation of this criterion by examination of one procedure, two nonconformance and corrective action forms, and one TP&P. No nonconformances were identified.

4. Technical Evaluation of Qualification Projects: The NRC inspectors evaluated project documentation packages which support qualification of equipment. These consisted of six projects originating from the Valley Forge office and three projects originating from San Jose. The following table summarizes the projects examined:

Project	Instrument Type	Documents Examined
C01	transmitter	PPQS, FPR, Environmental Profile data sheets, EWA
C03	temperature element	PPQS, PAR, FPR, TP&P, Environmental Profile data sheets, EWA
C07/08	flowmeter & transmitter	PAR, PPQS, PTE, FPR, EWA
C09	pressure switch	Qual Report, PPQS, FPR
C13	transmitter	Qual Report, PPQS, FPR
C33	transmitter	Qual Report, PPQS, FPR

S05B	MSIV limit switch	TP&P, PPQS, EWA
S06	MSIV LCS heater	PPQS, TP&P, EWA
S07	SLCS explosive valve	PPQS, TP&P, EWA

KEY

FPR= functional performance requirements; PPQS= product performance qualification specification; PAR= product analysis report; TP&P= test plan and procedures; PTE= pretest test evaluation; MSIV= main steam isolation valve; LCS= leakage control system; SLCS= standby liquid control system.

The following inspection activities were performed for the selected projects:

a. Inspection to verify that NUREG-0588 requirements were being satisfied by the qualification projects.

b. Inspection to verify that composite environmental profiles enveloped the environmental conditions for each instrument use and location.

c. Inspection to verify the correctness of aging analyses and calculations.

d. Inspection to verify that qualification requirements were consistently specified by the GE documents that establish qualification; i.e., the FPR, the PAR, the PPQS, the TP&P, the test report, and the qualification report. These documents are sometimes written by different people, possibly at geographically different work locations; i.e., San Jose and Valley Forge.

e. Inspection to verify the adequacy of experimental facilities for tests in progress.

f. Inspection to verify the adequacy of qualification documentation including experimental logbooks.

g. Inspection and evaluation of technical issues.

During the technical review and evaluation of these projects, the NRC inspector evaluated two open followup items from inspection report 83-01. The two items specifically related to PPQS No. 22A5768, dated May 12, 1982. Specifically, some test requirements were possibly unattainable and some of the margins employed in the PPQS were not consistent with the recommended practices of NEDE 24326-1-P.

The NRC inspector reviewed Revision 2 of PPQS, dated August 10, 1983, and determined that the previous PPQS 73 megarads/hour dose rate requirement had been changed to give a maximum megarads/hour dose rate requirement for radiation testing. In addition, EWA EAJ-08-22, Revision 0, Supplement C, dated March 21, 1983, revised the required test dose rate to a more obtainable value. The requirement for a one second temperature rise time from 135°F to 345°F to simulate the start of an accident steam environment was found to still be a test requirement; however, it was noted that the test program was not active during the inspection. The PPQS requirement for a 100-day accident simulation was evaluated and determined to be attainable. The above followup items are considered closed except for the one second temperature rise time. This one second requirement will be reviewed during a future inspection to see whether or not it was attained.

The inspector's review of the PPQS also verified that temperature and pressure margins were consistent with NEDE 24326-1-P and the PPQS now included two transient ramps for environmental transients of initial accident transient and dwell at peak temperature as recommended by NEDE 24326-1-P. The above followup item is considered closed.

During the technical review of these projects, the nonconformance described in paragraph B-2 was identified.

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

REPORT NO.: 99900524/83-01	INSPECTION DATE(S) 9/26-30/83	INSPECTION ON-SITE HOURS: 29

CORRESPONDENCE ADDRESS: Gibbs and Hill, Incorporated
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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 33 percent of the 1200 employees of Gibbs and Hill, Incorporated (G&H) at their New York facilities and nuclear plant sites. Major projects include the design of Comanche Peak, Units 1 and 2; Beaver Valley, Unit 1, equipment update; Bellefonte, Unit 1, design studies; Nine Mile Point, Unit 1, service contract; and Prairie Island, Unit 1, upgrade of plant computer.

ASSIGNED INSPECTOR: P. H. Harrell, Reactor Systems Section (RSS) — Date: 10/31/83

OTHER INSPECTOR(S):

APPROVED BY: C. J. Hale, Chief, RSS — Date: 11/2/83

INSPECTION BASES AND SCOPE:

A. BASES: 10 CFR Part 50, Appendix B and G&H Topical Report No. GIBSAR-17-A.

B. SCOPE: Status of previous inspection findings, design change control, and the following: (1) a potential 10 CFR Part 50.55(e) report by Texas Utilities Generating Company stating that the G&H specification incorrectly identified the pressurizer surge line as schedule 140 piping instead of the required schedule 160 piping; and (2) a G&H 10 CFR Part 21 report of defects in the component cooling water system.

PLANT SITE APPLICABILITY:

Comanche Peak, Units 1 and 2 (50-445/446).

A. VIOLATIONS:

None

B. NONCONFORMANCES:

None

C. UNRESOLVED ITEMS:

None

D. STATUS OF PREVIOUS INSPECTION FINDINGS:

1. (Closed) Nonconformance (82-03): Previous issues of drawings are not being marked "superseded" nor does G&H project procedures require that superseded drawings be so marked.

   The inspector verified that the corrective actions and preventive measures stated in the G&H letter dated February 25, 1983, had been completed. This verification included: (1) a spot check of stick files to verify previous issues of drawings have been marked "superseded", (2) a review of procedure DC-3 for inclusion of requirements that drawings be marked "superseded", and (3) a review of the G&H internal QA audit that verified implementation of the new drawing procedural requirements.

2. (Closed) Nonconformance (83-03): G&H project procedures do not provide provisions for the distribution of drawings and their revisions.

   The inspector verified that the corrective actions and preventive measures stated in the G&H letter dated February 25, 1983, had been completed. Verification included: (1) a spot check to verify drawings were being distributed in accordance with the drawing distribution list, (2) a review of procedure DC-3 to assure the appropriate requirements had been included, and (3) a spot check to assure that the job engineers had received a memo issued by the project manager on February 23, 1983, and that the job engineers understood their responsibilities in issuing and updating drawing distribution lists.

3. (Closed) 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 description for the computer programs CISRS and DLFPW did not show the methods, assumptions, and equations used to model the physical system.

   The corrective actions committed by the G&H letter dated September 24, 1982, for the computer program CONVERT were verified in NRC Inspection Report No. 99900524/82-03. The preventive measures were also verified in the 82-03 report. Followup was performed during this inspection to verify that corrective actions for computer programs CISRS and DLFPW had been completed as stated in the G&H response.

   The inspector reviewed the program description for computer programs CISRS and DLFPW and verified that the methods, assumptions, and equations used to model the physical system had been provided as required by procedure EDP-10. A spot check was also performed for other G&H computer programs.

4. (Closed) 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.

   The inspector verified that the corrective actions and preventive measures stated in the G&H letter dated September 24, 1982, had been completed. Verification included: (1) a review of the computer verification forms for computer programs CRRS and CREED to verify completeness and that the information contained on the forms met the requirements of procedure EDP-10, (2) a spot check of other computer programs to verify the verification forms had been completed, and (3) a review to assure that a list of all verified programs was being distributed to all engineering managers.

5. (Closed) 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 inspector verified that the corrective and preventive actions stated in G&H letter dated September 24, 1982, had been performed. Verification included a review of procedure EDP-10 against the requirements stated in ANSI N45.2.11-1974 as well as the committed actions stated in the G&H response letter.

E. OTHER FINDINGS OR COMMENTS:

1. This effort was a followup 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.

   G&H has performed approximately 17 analyses in the area of mitigating the consequences of environmental conditions exceeding allowables in the event of a postulated rupture in certain fluid system piping outside containment. Based on the analyses performed, G&H determined that changes were required in the steam generator blowdown, auxiliary steam, and chemical volume and control systems. Typical system changes include conversion of valves to automatic valve operation, addition of instrumentation, and a rework of existing logics. G&H has transmitted the results of their analyses to Texas Utilities Services, Inc. (TUSI), and TUSI has issued design change authorizations (DCAs) to make the appropriate system changes.

   Based on the documentation reviewed within this area of the inspection, no nonconformances or unresolved items were noted.

2. Texas Utilities Generating Company Potential 10 CFR Part 50.55(e) Report - The report states that the G&H specification called for the pressurizer surge line to be schedule 140 piping whereas the Westinghouse (W) specification required the piping to be schedule 160.

   Design of the pressurizer surge line was not within the G&H scope of work but was part of the W design. The surge line was installed as schedule 160 piping using a W construction drawing.

However, after initial installation, the pressurizer had to be moved and a 1-foot section of piping was added to the surge line to accommodate the move. When this 1-foot section of piping was added, a piece of schedule 140 was used instead of the existing schedule 160. The exact reason for this mixup could not be determined at G&H. G&H stated that W had performed an analysis of the as-built piping configuration and the analysis verified that the piping was acceptable.

During review of documentation, the inspector noted that G&H had assigned a piping line number to the surge line. The piping line number scheme used by G&H identifies to which piping class the line belongs, in this case Class 2501. The G&H specification states that Class 2501 is to be schedule 140.

G&H provided the inspector with a DCA that had been generated in February 1983. This DCA changed the G&H specification to note that the surge line was to be schedule 160 to eliminate possible confusion. The surge line is the only piping within the W scope of work that was given a G&H piping number. G&H could not provide a reason why this surge line was the only one in the W scope given a G&H number.

Based on the documentation reviewed within this area of the inspection, no nonconformances or unresolved items were identified.

3. G&H 10 CFR Part 21 Report, Defects in the Component Cooling Water System - The report states that the nonsafeguards portion of the system is not isolated automatically in case of a failure in its pressure boundary.

A design error in the component cooling water (CCW) system was discovered when G&H was performing flood analyses due to thru-wall cracks in moderate energy piping systems. G&H discovered that the leak rate out a postulated pipe crack was greater than the system fill rate. Due to the physical configuration of the system, the leak would cause the entire (both safeguards and the nonsafeguard trains) system to be drained. To prevent this, G&H made design changes to the system so the safeguards and the nonsafeguard trains would automatically isolate from one another. The G&H design changes have been transmitted to TUSI for incorporation into the CCW system.

While performing the flooding analyses, G&H also discovered that each of the three trains had a radiation monitor connected to the train piping by nonseismically supported, nonsafety grade piping. If it was assumed that the radiation monitor piping would fail following a seismic event, then neither of the safeguards cooling trains would be able to perform its intended function. G&H made design changes to the system installation to correct the problems and transmitted the changes to TUSI for incorporation into the CCW system.

The system design errors described above have been part of the CCW system since it was originally designed and the errors had been inadvertently overlooked until discovered during the performance of the flooding analyses. Evaluation of this condition concluded that it was an isolated error. Other systems were reviewed to determine whether the condition existed, no similar problems were found.

Based on the documentation reviewed and actions taken by G&H in this area of the inspection, no nonconformances or unresolved items were identified.

4. Design Change Control - A review was performed of the G&H calculations used as the basis for plant changes required to correct design defects in the tornado venting systems. The calculations were performed to determine the actual differential pressure (dp) across doors during a design basis tornado and compare this value with the dp value the doors were designed to withstand.

The calculations concluded that approximately twenty doors in the plant would require modification and that five doors required further evaluation. The list of the doors requiring modification were transmitted to TUSI for the necessary modifications. The doors requiring further evaluation are now being processed by G&H.

This item will remain open pending G&H's completion of the reevaluation of the five doors and after-modification design verification of the approximately twenty doors.

ORGANIZATION: GILBERT/COMMONWEALTH
READING, PENNSLYVANIA

REPORT NO.: 99900525/83-02	INSPECTION DATE(S) 8/2-5/83	INSPECTION ON-SITE HOURS: 64

CORRESPONDENCE ADDRESS: Gilbert/Commonwealth
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Executive Vice President
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Reading, Pennsylvania 19603

ORGANIZATIONAL CONTACT: W. F. Sailer, General Manager, QA Division
TELEPHONE NUMBER: (215) 775-2600

PRINCIPAL PRODUCT: Architect engineering and consulting services.

NUCLEAR INDUSTRY ACTIVITY: The total effort committed to domestic nuclear activities at the Reading facility is approximately 900 people. Major projects include Perry, Units 1 and 2; Three Mile Island, Unit 1, restart; continuing services for V. C. Summer, Unit 1; Crystal River, Unit 3; Ginna Station; Virginia Electric and Power Company; and the Tennessee Valley Authority.

ASSIGNED INSPECTOR: C J Hale /for 8/31/83
P. H. Harrell, Reactor Systems Section (RSS) Date

OTHER INSPECTOR(S): C. J. Hale, RSS

APPROVED BY: C J Hale 8/31/83
C. J. Hale, Chief, RSS Date

INSPECTION BASES AND SCOPE:

A. BASES: 10 CFR Part 21 and Topical Report GAI-TR-106.

B. SCOPE: Status of previous inspection findings, an allegation by a former G/C employee that G/C was not reporting substantial safety hazards as required by 10 CFR Part 21, an NRC Region II report (50-395/83-12) identifying discrepancies found at V. C. Summer that are potentially generic problems at G/C, and a notification by NRC Region I that Three Mile Island calculations may not have been properly developed and controlled.

PLANT SITE APPLICABILITY:

V. C. Summer (50-395), Perry (50-390/391), and Three Mile Island (50-289/320).

ORGANIZATION: GILBERT/COMMONWEALTH
READING, PENNSYLVANIA

REPORT NO.: 99900525/83-02	INSPECTION RESULTS:	PAGE 2 of 7

A. VIOLATIONS:

Contrary to Section 21.31 of 10 CFR Part 21, procurement documents issued after January 1978, for safety-related services subject to 10 CFR Part 21, did not impose the required provisions of 10 CFR Part 21.

This is a Severity Level V violation (Supplement VII).

B. NONCONFORMANCES:

1. Contrary to Section 17.3.2 of G/C Topical Report GAI-TR-106, Revision 2A, dated February 1980, completed calculation 5142-003.1, identified as "important to safety", was processed in accordance with the Engineering Operations Manual instead of the required procedures in the Design Control Procedures Manual (corrective actions and preventive measures were taken prior to the end of the inspection, see E.2 below).

2. Contrary to Section 17.4 of G/C Topical Report GAI-TR-106, Revision 2A, dated February 1980, procurement documents for safety-related services were not reviewed or approved by QA, nor were quality program requirements imposed on contractors providing safety-related computer services.

C. UNRESOLVED ITEMS:

None

D. STATUS OF PREVIOUS INSPECTION FINDINGS:

1. (Closed) Nonconformance (82-02): Procedures/instructions in effect before November 2, 1981, did not assure that all necessary and required information was included in Engineering Change Notice (ECN) 1427-FM for the V. C. Summer plant.

   G/C has completed a comprehensive review of all ECNs issued prior to November 2, 1981. The review did not find any similar problems as was noted on ECN 1427-FM. A spot check of the G/C review was performed and no other problems were noted.

2. (Open) Unresolved Item (83-01): It is not apparent that G/C is in compliance with Section NB-3672.7 of the ASME Code as G/C has not performed an evaluation of the effect of clamp-induced local pipe stresses in their stress analysis.

NRC's evaluation of this subject is continuing, therefore this item was not reviewed during this inspection.

3. (Closed) Followup Item (83-01): The calculation for the pipe support shown on drawing D4-4549-S-322-641 was not available for review because it was in the process of being microfilmed.

   Calculation set 1E12A15(B) for pipe support on drawing D4-4549-S-322-641 on piping system E-12 was reviewed and found to have included the torsional effects of the anticipated loads. The torsional loads were reviewed and found to be within acceptable limits.

4. (Closed) Followup Item (83-01): G/C could not show that sufficient lateral support had been provided to prevent buckling of pipe supports on piping system E12.

   This item is currently being reviewed in detail by the Mechanical Engineering Branch (MEB), Office of Nuclear Reactor Regulation (NRR). Any further action necessary for this item will be initiated from the MEB organization.

E. OTHER FINDINGS OR COMMENTS:

1. Design Control Process Subcommittee: On October 16, 1981, the Design Control Process Subcommitte issued their report concerning the effectiveness of the G/C design control process, which was in response, in part, to a finding in Inspection Report No. 99900525/81-01. This report contained 16 recommendations for enhancing the design control process.

   Subsequent NRC inspections have continued to monitor the implementation status of these recommendations. Fifteen of the recommendations have been implemented.

   During this inspection, the resulting revisions to the Design Control Procedures (DCPs) were reviewed to verify the incorporation of the recommendations. Similarly, the Engineering Operations Manual and the Project Operations Manual were reviewed, the latter being developed as a result of certain subcommittee recommendations.

   One item remains incomplete from the subcommittee recommendations, the development of a system to quantitatively monitor and report on the effectiveness of the design control process. This item is

scheduled for consideration at the August meeting of the Quality Assurance Advisory Committee. This item will be followed during subsequent inspections. Implementation of the revised features in the DCPs and the other manuals will be covered in future programmatic inspections in the design process area.

2. Calculation Review: As a result of inspections performed by NRC Region I personnel of General Public Utility - Three Mile Island (GPU-TMI), concerns regarding the performance of G/C in the design process area were expressed particularly in the area of development and control of calculations.

   Nineteen calculations were reviewed for content and programmatic conformance. These calculations involved several disciplines (mechanical, structural, and shielding) across two G/C projects (Perry and TMI) completed during 1982 and 1983. Within the area of this review, two nonconformances and one violation were identified.

   GPU-TMI uses three safety classifications for systems and structures: not important to safety (NITS), important to safety (ITS), and nuclear safety-related. The G/C QA program has two classifications: NITS and ITS. All G/C activities are subject to the controls of the Engineering Operations Manual and activities subject to 10 CFR Part 50, Appendix B have the additional requirements of the Design Control Procedures (DCP) Manual.

   During the review of TMI structural calculations, it was noted that several calculations classified by GPU as ITS were processed by G/C as NITS; therefore, the DCP requirements were bypassed. This resulted in a nonconformance (B.1 above).

   Before the conclusion of the inspection, G/C contacted the other disciplines involved in TMI activities. Memos dated August 3 and 4, 1983, were reviewed that stated the nonconformance (B.1 above) did not exist in their areas. An August 4, 1983, memo from the structural group stated that eight nonconforming calculations were identified from their review of TMI calculations (to be corrected by August 19, 1983) and that a memo would be issued to discipline personnel advising them of the problem and the actions to take to prevent recurrence. Further, subsequent internal audits of the TMI project will include an item to verify this condition is now being controlled.

No written response to nonconformance B.1 is required and G/C's actions will be verified during a future inspection. This nonconformance is not applicable to the Perry project because of a different classification system used by the utility. It appears that a proper design verification was performed on the eight TMI structural calculations involved in nonconformance B.1.

The second nonconformance (B.2 above) was identified during the review of shielding calculations. Several calculations used an uncertified version of the RELAP-5 computer program procured in the form of services from University Computing Company. In pursuing this subject, it was determined that G/C QA personnel were not reviewing and approving these types of procurements for safety-related services. Consequently, no QA requirements were imposed on these contracts nor were the requirements of 10 CFR Part 21 (see A above).

3. Potential G/C Generic Problems: An NRC Region III report (50-395/83-12) for V. C. Summer identified four problem areas that are potentially generic concerns at G/C. The four areas are: (1) misapplication of cold space criteria; (2) misapplication of jet impingement criteria; (3) pipe support snubber design errors; and (4) PORV piping analysis.

   a. A review of the misapplication of cold space criteria was performed to determine if this problem is generic in nature and may effect other plants designed by G/C. The review revealed that the error on the V. C. Summer plant was discovered during the IEB 79-14 review. G/C piping designers at the V. C. Summer site were using vendor drawings for valve weight design input; however, the vendor drawings were not being maintained up to date and did not reflect changes in valve weights being supplied by the vendor. G/C piping designers at the corporate offices were using design specifications that were generated by the G/C mechanical department. The design specifications were kept up to date and were the proper document to be used for design input. G/C stated that it could not be determined why the piping designers at the V. C. Summer site were using vendor drawings for design input. The G/C corrective action included: (1) a 100% review of the problem area and appropriate actions taken to correct all the support problems found; (2) notification to all G/C field designers to assure they are using the design specifications in lieu of vendor drawings; and (3) verification that all V. C. Summer design specifications are up to date.

G/C stated that the problem is not generic because field designers on other projects use design specifications instead of vendor drawings. G/C also stated that the design specifications for other projects are up to date. Based on the documentation reviewed in this area, no nonconformances or unresolved items were identified.

b. A review was performed to determine if the misapplication of jet impingement criteria found at V. C. Summer was a generic problem at G/C. This problem occurred due to a lack of total definition for load placement in the G/C-generated design specification. G/C stated the FSAR contained a detailed load placement definition but the analysts were not aware of the definition. The cause of the differences between the design specification and FSAR definitions and why the analysts were not aware of the FSAR definition was not determined during this inspection. This particular item will be followed up during a future inspection.

A review has been performed by G/C and the results determined that pipe stresses were still within code allowables and no hardware changes were required. G/C has provided their analysts and contractors with updated design input to be used for jet impingement analyses.

This does not appear to be a generic problem as the design specification approach used by the V. C. Summer project is unique to that project. G/C stated that other projects use different approaches. Based on the documentation reviewed in this area, no nonconformances or unresolved items were noted.

c. The problem regarding pipe support snubber design was discovered during a walk-down of system piping prior to plant heatup. During the walk-down, it was found that some snubbers were "bottomed out." G/C stated that this problem was due to design oversight by the G/C piping design section. The analysis section supplied new data showing changes in piping movement to the piping design section. The piping design section was to convert the new piping movement data into settings for the snubbers, and then put the settings on drawings for issuance to the field. Due to a design oversight, the piping design section did not supply the new snubber settings on the drawings.

G/C has done a 100% review of the as-built snubber settings and has made appropriate corrections where required. To prevent recurrence, G/C has issued a design bulletin to reemphasize support design responsibilities. In addition, G/C has changed check sheets and calculation sheets to include a specific item to verify the snubber setting has been checked.

G/C stated they have checked pipe support snubber design activities on their other projects and have found no problems. Based on this check, it appears that this is not a generic problem. Based on the documentation reviewed in this area, no nonconformances or unresolved items were noted.

d. The area of PORV piping analysis was not reviewed during this inspection. The area will be inspected during a future inspection.

4. (Allegation) Substantial Safety Hazards not Reported as Required by 10 CFR Part 21: Based on an allegation made by a former G/C employee, potential reportable event (PRE) files were reviewed in detail to verify that G/C is reporting substantial safety hazards in accordance with 10 CFR Part 21. PRE files contain the documented evaluation by G/C as to whether the identified error is reportable.

Twelve PREs were reviewed in detail to determine if the evaluation was performed per the requirements of 10 CFR Part 21 and the G/C procedure for evaluating errors for reportability. The sample of PREs reviewed included all projects where G/C has provided engineering services.

Based on the PREs reviewed, no instances were noted where G/C had not performed evaluations in accordance with their procedure and the requirements of 10 CFR Part 21. It appears that G/C has a program in place and is properly implementing the program to meet their responsibilities for reporting substantial safety hazards to the NRC. No nonconformances or unresolved items were identified during this inspection.

ORGANIZATION: GILBERT/COMMONWEALTH
UTILITIES GROUP
READING, PENNSYLVANIA

REPORT NO.: 99900525/83-03	INSPECTION DATE(S) 10/11-13/83	INSPECTION ON-SITE HOURS: 14

CORRESPONDENCE ADDRESS: Gilbert/Commonwealth
Utilities Group
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ORGANIZATIONAL CONTACT: W. F. Sailer, General Manager, QA Division
TELEPHONE NUMBER: (215) 775-2600

PRINCIPAL PRODUCT: Architect engineering and consulting services.

NUCLEAR INDUSTRY ACTIVITY: The total effort committed to domestic nuclear activities at the Reading facility is approximately 900 people. Major projects include Perry, Units 1 and 2; Three Mile Island, Unit 1, restart; continuing services for V. C. Summer, Unit 1; Crystal River, Unit 3; Ginna Station; Virginia Electric and Power Company; and the Tennessee Valley Authority.

ASSIGNED INSPECTOR: G S Madsen for 11/9/83
P. H. Harrell, Reactor Systems Section (RSS) Date

OTHER INSPECTOR(S):

APPROVED BY: G S Madsen for 11/9/83
C. J. Hale, Chief, RSS Date

INSPECTION BASES AND SCOPE:

A. BASES: 10 CFR Part 21; 10 CFR Part 50, Appendix B; and Topical Report GAI-TR-106.

B. SCOPE: Followup of previous inspection findings, design change control, and implementation of 10 CFR Part 21. This inspection was performed at the Gilbert/Commonwealth (G/C) Oak Ridge office.

PLANT SITE APPLICABILITY:

Watts Bar, Units 1 and 2 (50-390/391) and Bellefonte, Units 1 and 2 (50-438/439).

ORGANIZATION: GILBERT/COMMONWEALTH
UTILITIES GROUP
READING, PENNSYLVANIA

REPORT NO.: 99900525/83-03	INSPECTION RESULTS:	PAGE 2 of 3

A. VIOLATIONS:

None

B. NONCONFORMANCES:

None

C. UNRESOLVED ITEMS:

None

D. OTHER FINDINGS OR COMMENTS:

1. Followup inspection of a nonconformance (81-03) - A piping system analyst did not identify nor note on the affected system isometric drawing that the spatial orientation of the x-axis used in a stress calculation was reversed from conventional orientation.

   This effort is a followup to a nonconformance, previously closed at the G/C Reading office, to verify that the G/C committed actions had been taken by personnel in the G/C Oak Ridge office.

   The inspector verified that the actions stated in NRC Report 99900525-82-02 had been completed. The verification included: (1) the receipt of a memo issued by G/C Reading to all T-PIPE users and the appropriate distribution of the memo within the G/C Oak Ridge organization, and (2) receipt of revised procedural instructions issued by G/C Reading to the personnel in the G/C Oak Ridge office.

   Based on the documentation reviewed in this area of the inspection, no nonconformances or unresolved items were noted.

2. Followup inspection of a TVA 10 CFR Part 50.55(e) report (82-02) - Incorrect response spectra were used at several support locations. This inspection was performed to complete an inspection initiated at the G/C Reading office.

   G/C Oak Ridge office personnel are currently working under a services contract with TVA. Within the scope of this contract, all current work is being performed under TVA direction and under the TVA QA program.

ORGANIZATION: GILBERT/COMMONWEALTH
UTILITIES GROUP
READING, PENNSYLVANIA

REPORT NO.: 99900525/83-03	INSPECTION RESULTS:	PAGE 3 of 3

A review was performed of tasks previously completed under the G/C QA program. Within the area inspected and the documentation reviewed, no nonconformances or unresolved items were identified.

3. Implementation of 10 CFR Part 21 - A review was performed to verify that the requirements of 10 CFR Part 21 were being properly implemented. The review included verification that the posting requirements were properly being met, that the G/C corporate reporting procedure was readily available, and that the G/C Oak Ridge personnel were following procedural requirements for reporting potentially reportable events.

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

4. Design Change Control - A review was performed to verify that changes to G/C design documents were being implemented into the appropriate document.

   During this review it was noted that the Project Pipe Stress Analysis Instructions were being changed by the use of a "control memo" issued by the G/C Reading office. During this inspection it could not be determined what type of instructions or procedures were used to control the issuance of "control memos." This area will be inspected during a future inspection at the G/C Reading office.

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

ORGANIZATION: GUYON ALLOYS, INC.
HARRISON, NEW JERSEY

REPORT NO.: 99900819/83-01	INSPECTION DATE(S) 9/12-15/83	INSPECTION ON-SITE HOURS: 22

CORRESPONDENCE ADDRESS: Guyon Alloys, Inc.
ATTN: Mr. G. H. Grunthaler
Vice President, Technical Services
950 South Fourth Street
Harrison, New Jersey 07029

ORGANIZATIONAL CONTACT: Mr. W. Obergfell, Manager, Quality Assurance
TELEPHONE NUMBER: (713) 974-7200

PRINCIPAL PRODUCT: Ferrous and nonferrous seamless and welded tubular products, wrought products, and bolting.

NUCLEAR INDUSTRY ACTIVITY: Approximately 20 percent of present activity is devoted to the domestic nuclear field.

ASSIGNED INSPECTOR: I. Barnes 10-31-83
for D. E. Norman, Reactive and Component Program Section (R&CPS) Date

OTHER INSPECTOR(S):

APPROVED BY: I. Barnes 10-31-83
I. Barnes, Chief, R&CPS Date

INSPECTION BASES AND SCOPE:

A. BASES: 10 CFR Part 50, Appendix B and 10 CFR Part 21.

B. SCOPE: This inspection was made as a result of the notification by WFI Nuclear Products, Inc. (WFI) that bar stock from which fittings had been manufactured and furnished to Guyon Alloys, Inc. (Guyon), and subsequently to nuclear power plants, had been misidentified.

PLANT SITE APPLICABILITY:

Misidentified fittings: Docket Nos. 50-456, 50-457, 50-508, and 50-509.

ORGANIZATION: GUYON ALLOYS, INC.
HARRISON, NEW JERSEY

REPORT NO.: 99900819/83-01	INSPECTION RESULTS:	PAGE 2 of 4

A. VIOLATIONS:

None

B. NONCONFORMANCES:

Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraphs 7.4.2 and 7.5.3 in Section 7 of the QA manual, QA review of a certified material test report (CMTR) for a forged ASME SA 105 20-inch, 300 lb. orifice did not assure compliance with Code (ASME Section III, Class 2, 1971 Edition through Winter 1972 Addenda) requirements, as evidenced by an April 5, 1983, Guyon certification to Bechtel stating that the material was in compliance with the Code although the CMTR did not indicate required heat treatment had been performed.

C. UNRESOLVED ITEMS:

None

D. OTHER FINDINGS OR COMMENTS:

1. Furnishing of Potentially Incorrect Material by WFI - Pravel, et al. (attorneys at law) notified the Director of Inspection and Enforcement on September 14, 1981, that WFI 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, Type 304 L and 316 L bar stock which was misstamped was used to fabricate socket weld pipets by WFI and shipped to Guyon through their Wayne, Pennsylvania, and Pasadena, California, sales offices, and to one other contractor. The following areas were reviewed by the NRC inspector:

   a. Generic Aspects - Guyon Alloys was notified by Pravel on September 14, 1981, that material supplied under purchase orders (POs) A-45698-NW (Wayne, Pennsylvania, office) and A-27166-LAN (Pasadena, California, office) may have been fabricated from the wrong material. Forty-five items (ASME Section III, Class 2 socket weld pipets) from PO A-45698-NW and 12 from PO A-27166-LAN were determined to be misstamped. The items from PO A-45698-NW had been sold to Commonwealth Edison for use at Braidwood Station and those from PO A-27166-LAN had been sold to Peter Kiewit and Sons for the Washington Public Power Supply System Nuclear Project, Unit Nos. 3 and 5.

b. Corrective Action - Records were reviewed which showed Guyon notification and request for safety evaluation from customers receiving misstamped items. All items, except two which had been installed at Braidwood, were subsequently returned to the supplier. Based upon an engineering analysis, Commonwealth Edison determined that the installed items were acceptable. A corrected certification showing the correct material and authorization to remark the items was provided.

At the request of Guyon, the supplier of the bar stock (Carpenter Technology, Corporation [Carpenter]) provided a corrective action statement that all future orders for this material will receive an alloy verification check (KEVEX Analysis) at final inspection.

c. Cause of Problem - WFI received two heats of bar stock from Carpenter from which pipets were manufactured and sold to Guyon. Material was certified as SA 182 F 304 (Heat 495 AN) and SA 403 WP 316 (Heat 498 AN). A subsequent analysis by Carpenter showed that Heat 495 AN was actually SA 182 F 316 and Heat 498 AN was SA 403 WP 304. The cause of the problem could not be determined during this inspection since it originated at Carpenter.

Within this area of inspection, no nonconformances were identified.

2. Procurement Document Control - Guyon customers may place orders for nuclear supplies at any one of the sales offices. Purchases from vendors are also made from these offices. All POs for nuclear supplies must be approved by Quality Assurance located at Houston, Texas, or Harrison, New Jersey. The NRC inspector reviewed several customer contracts and vendor POs to determine if the appropriate review cycle was being complied with and to compare Code and other technical and regulatory requirements to those required by Guyon customers.

Within this area of inspection, no nonconformances were identified.

3. Control of Purchased Material - The approved vendors list and vendor audit records and/or ASME Certificate were reviewed to determine if purchases were being made from approved sources.

ORGANIZATION: GUYON ALLOYS, INC.
HARRISON, NEW JERSEY

REPORT NO.: 99900819/83-01	INSPECTION RESULTS:	PAGE 4 of 4

Se eral material test reports from vendors and certifications made by Guyon were compared with customer requirements to determine whether material being shipped was complying with all requirements.

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

4. Identification and Control of Materials, Parts, and Components - A review was conducted of the nuclear material area to determine if material was being properly stored and identified with heat number, serial number, part number, or other appropriate method.

   Within this area of inspection, no nonconformances were identified.

5. Internal Audits - Internal audit records for the 1981-1983 time period were reviewed to determine if all areas of the Quality Assurance program were being audited as required and to determine if appropriate corrective action had been taken by management to correct deficiencies identified during the audits.

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

ORGANIZATION: HAYWARD TYLER PUMP COMPANY
BURLINGTON, VERMONT

REPORT NO.: 99900345/83-01	INSPECTION DATE(S) 8/25/83	INSPECTION ON-SITE HOURS: 8

CORRESPONDENCE ADDRESS: Hayward Tyler Pump Company
ATTN: Mr. R. L. Parrin
Vice President and General Manager
P. O. Box 492, 80 Industrial Parkway
Burlington, Vermont 05401

ORGANIZATIONAL CONTACT: Mr. R. W. McMillan, QA Manager
TELEPHONE NUMBER: (802) 863-2351

PRINCIPAL PRODUCT: Nuclear pumps.

NUCLEAR INDUSTRY ACTIVITY: Approximately 50 percent of current production.

ASSIGNED INSPECTOR: for I. Barnes, Reactive and Component Program Section (R&CPS) 9-1-83 Date

OTHER INSPECTOR(S):

APPROVED BY: for I. Barnes, Chief, R&CPS 9-15-83 Date

INSPECTION BASES AND SCOPE:

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

B. SCOPE: This inspection was made in order to witness liquid penetrant examination of spare ASTM B164 Class A (Monel) pump shafts which had been returned from the Comanche Peak Steam Electric Station. The return was requested after it was determined that flame straightening had been performed on one of the shafts and which could result in surface cracking of the subject material.

PLANT SITE APPLICABILITY:

Flame straightening of Monel pump shafts: 50-445/446.

ORGANIZATION: HAYWARD TYLER PUMP COMPANY
BURLINGTON, VERMONT

REPORT NO.: 99900345/83-01	INSPECTION RESULTS:	PAGE 2 of 3

A. VIOLATIONS:

None

B. NONCONFORMANCES:

None

C. UNRESOLVED ITEMS:

None

D. STATUS OF PREVIOUS INSPECTION FINDINGS:

Implementation of corrective action commitments was not reviewed during this inspection for nonconformances identified in NRC Inspection Report Nos. 99900345/82-02 and 82-03.

E. OTHER FINDINGS OR COMMENTS:

1. Liquid Penetrant Examination of Pump Shafts - The NRC inspector reviewed Procedure Nos. 01-009-987 and 7.0.4/1-1 and verified by certification review that the halide and sulfur contents of the examination materials were in compliance with Procedure No. 7.0.4/1-1 requirements. The liquid penetrant examinations of the four returned shafts were witnessed and verified to have been performed in accordance with the technical requirements of Procedure No. 7.0.4/1-1. Rejectable relevant indications were not observed in three of the four returned shafts; i.e., Batch No. 797B-002, Upper Shaft; Batch No. 931A-003, Inter Shaft; and Batch No. 928A-003, Inter Shaft. Review of the original manufacturing route sheets for these shafts did not indicate flame straightening operations had been performed. Examination of the other shaft (i.e., Batch No. 199F-001, Lower Shaft), which was indicated by the manufacturing route sheet to have been flame straightened, resulted in the identification of rejectable indications in two localized areas which were located approximately 180° apart and, respectively, 94" and 95" from the bottom end of the shaft. Approximately 0.005" was removed from the surface by hand filing in the two areas showing liquid penetrant indications and the examination repeated. At this time, liquid penetrant indications were not observed.

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

ORGANIZATION: HAYWARD TYLER PUMP COMPANY
BURLINGTON, VERMONT

REPORT NO.: 99900345/83-01	INSPECTION RESULTS:	PAGE 3 of 3

2. Manufacturing Record Review - A review was performed of the shaft manufacturing route sheets and of the applicable material purchase orders and vendor certified material test reports. As a result of this review, the following observations were made:

   a. The ASTM B164 Class A shaft materials were procured in 1980 with a requirement that the materials be supplied in a hot finished and stress relieved condition. The temperature cycle for stress relief was not defined to the vendor and was not indicated on the manufacturer's certified material test reports to have been performed. The NRC inspector was informed by Hayward Tyler personnel that the stress relief cycle was an internal requirement and was used for dimensional stability purposes during machining operations.

   b. Records were available which indicated that two shafts (i.e., Batch No. 797B-002 and Batch No. 928A-003) were subsequently sent to a vendor for performance of a defined stress relief cycle. Similar records were not available which would indicate that the other two shafts (i.e., Batch No. 931A-003 and Batch No. 199F-001) had received a stress relief cycle.

   c. Review of the route sheet for the flame straightened shaft, Batch No. 199F-001, showed that the route sheet had been originally issued for a different material item (i.e., Batch No. 928A-001) and then changed to show Batch No. 199F-001. The change, apparently, was made after initial verification of material identity, and prior to any shaft machining operations. The reasons for the substitution could not be established from the records reviewed.

ORGANIZATION: INTERNATIONAL NUTRONICS, INC.
PALO ALTO, CALIFORNIA

REPORT NO.: 99900928/83-01	INSPECTION DATE(S) 10/4-6/83	INSPECTION ON-SITE HOURS: 48

CORRESPONDENCE ADDRESS: International Nutronics, Inc.
ATTN: Mr. J. G. Parker
President
1237 North San Antonio Road
Palo Alto, California 94303

ORGANIZATIONAL CONTACT: Mr. A. L. Gunby, Principal Engineer
TELEPHONE NUMBER: (415) 968-5257

PRINCIPAL PRODUCT: Gamma irradiation services.

NUCLEAR INDUSTRY ACTIVITY: One percent of International Nutronics, Inc. (INI) business is for gamma irradiation testing services of Class 1E safety-related equipment for environmental qualification of nuclear power plants. The INI parent corporate office is at Palo Alto, California. To date, only the Irvine, California, facility has conducted irradiation test services on nuclear grade components for nuclear power plants.

ASSIGNED INSPECTOR: A. R. Johnson
A. R. Johnson, Equipment Qualification Section (EQS) — Date: 11/30/83

OTHER INSPECTOR(S): E. A. Salazar, Consultant, Sandia National Laboratories

APPROVED BY: H. S. Phillips
H. S. Phillips, Chief, EQS — Date: 11/30/83

INSPECTION BASES AND SCOPE:

A. BASES: 10 CFR Part 50, Appendix B and 10 CFR Part 21.

B. SCOPE: The purpose of the inspection was: (1) to review INI corporate quality assurance manuals and the supplemental procedures at the Palo Alto test facility; (2) to verify the implementation of the QA program to meet the applicable 10 CFR Part 50, Appendix B, requirements; and (3) to review INI compliance with 10 CFR Part 21.

PLANT SITE APPLICABILITY:

Not identified.

ORGANIZATION: INTERNATIONAL NUTRONICS, INC.
PALO ALTO, CALIFORNIA

REPORT NO.: 99900928/83-01	INSPECTION RESULTS:	PAGE 2 of 9

A. VIOLATIONS:

None

B. NONCONFORMANCES:

1. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and INI QA procedures QA 50-16-C and QA 50-15-A, INI certification (test report) did not fully identify a downtime of approximately 11 out of 212 hours as a nonconformance (anomaly) to the test plan for job No. 58841. The subject certification and the corresponding irradiation data sheet failed to describe the anomaly including disposition, notification to the test sponsor, corrective action for avoiding recurrence, and written appended summary to fully document the event.

2. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and INI QA procedure QA 50-18-B, no audit schedule had been prepared by INI to provide a comprehensive system of planned and periodic audits. No audits have been performed to date at either the Palo Alto or Irvine facilities as directed by the corporate QA manager.

3. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and INI QA procedures QA 50-2C and QA 50-17-A, training records of personnel involved in the equipment qualification process of irradiation aging of safety-related components were not currently in the QA record file.

C. UNRESOLVED ITEMS:

None

D. OTHER FINDINGS OR COMMENTS:

1. QA Program Review: The INI quality assurance program is described in their "Quality Assurance Manual for 10 CFR 50 Programs" (QAM), first issue, dated July 1, 1983. The QAM includes 19 QA procedures (QA 50-1 through QA 50-19) which establishes a corporate QA program in accordance with the 16 applicable criteria of 10 CFR Part 50, Appendix B. The QAM establishes a corporate QA program for both the parent INI test facility at Palo Alto and their satellite test facility at Irvine, California. Procedures to implement the corporate QA procedures of the QAM at each INI facility are independent. The implementing procedures at the Irvine facility will be reviewed during a subsequent NRC inspection at a future date.

Findings concerning the implementation of the applicable criteria of 10 CFR Part 50, Appendix B, which could be reviewed and verified during this inspection are as follows:

a. Organization: The organizational structures of INI were reviewed including functional responsibilities and authorities of the quality assurance personnel. Lines of communication with appropriate authority were established. The corporate QA manager has direct responsibility for the QA program which controls both the Palo Alto and Irvine facilities. Each facility is implementing the corporate QA program and is directed by a facility quality control manager. The corporate QA manager reports directly to the INI president.

No nonconformances were identified.

b. QA Program: The NRC inspection team evaluated the INI QA program established by the QAM and verified the implementation of applicable criteria (16 out of 18) of 10 CFR Part 50, Appendix B. The QAM and QA procedures are adequate to control the irradiation test activity (see paragraph D.1 of this report).

No nonconformances were identified.

c. Design Control: INI does not perform design functions. This criterion is not applicable.

d. Procurement Document Control: INI has only one calibration service vendor other than the National Bureau of Standards (NBS) of which INI receives certification for their dosimetry standards. INI has an established service agreement with the one service vendor for periodic maintenance and adjustment of their spectrophotometer instrument. The conditions and terms for these calibration services are fully described in the service agreement. INI receives field service reports for each 6-month servicing of the instrument which is calibrated to the manufacturer's published instructions.

No nonconformances were identified.

e. Instructions, Procedures, and Drawings: The INI QAM did require instructions and procedures to implement the QA program. INI QA procedures (19 each) were an integral part of

the QAM. The NRC inspection team identified three nonconformances where INI failed to follow procedures (see paragraph B of this report).

f. Document Control: The NRC inspection team evaluated the implementation of the QAM to determine if INI documents were properly reviewed, approved, and issued and that changes to these documents were adequately controlled.

No nonconformances were identified.

g. Control of Purchased Material, Equipment, and Services: INI does not purchase materials and equipment used in safety-related applications and has only one calibration service vendor other than the NBS. Therefore, INI does not require vendor source evaluations/surveys, maintaining supplier histories, nor an approved evaluated supplier list. INI has an established service agreement with the one calibration service vendor for periodic maintenance and adjustment (see paragraph D.2.d of this report). Receipt inspections are performed upon receipt of test specimens only and are implemented under the QA procedure QA 50-10-C, "Inspection."

No nonconformances were identified.

h. Identification and Control of Materials, Parts, and Components: Identification and control of specimens for irradiation are to be accomplished in accordance with QA procedure QA 50-8-A. Customer tags and identifiying numbers are to be documented as a means of positive identification. Items are to be segregated when nonconforming. Since no testing activity for nuclear grade components has occurred at the Palo Alto facility, implementation of this criterion will be evaluated during a subsequent NRC inspection.

No nonconformances were identified.

i. Control of Special Processes: INI does not perform welding, heat treating, nor nondestructive examination on specimens received for irradiation. This criterion is not applicable.

j. Inspection: Inspection activities at INI are to be accomplished in accordance with QA procedure QA 50-10-C which controls customer inspections, receiving inspections, and final inspections at the INI facilities. Quality assurance inspection surveillances, including the requirement for a QA plan and a documented quality record form as directed by the QA manager, is to be implemented when necessary. Since no testing activity for nuclear grade components has occurred at the Palo Alto facility, implementation of this criterion will be evaluated during a subsequent NRC inspection.

No nonconformances were identified.

k. Test Control: INI does not specify written test requirements, methodologies, or acceptance criteria but only meets the requirements for contractual irradiation services as specified in the customer's test plan, specification, or work statement in the purchase order and contract. The INI QA program does provide specific detailed instructions for conducting a test program, which includes dosimeter readings and other detailed direction, requiring quality assurance review and approval. Customer test plans which define the customer's acceptance criteria are reviewed by quality assurance prior to testing. The INI QA program provides the option for a written and approved QA plan involving more extensive inspection and surveillance to be prepared by the QA manager when insufficient test instructions, specifications, and test documents are not provided by the customer. The QA manager has the authority to interrupt any test program if it is determined that good quality assurance practices are not being followed. Surveillances of irradiation tests are fully documented as ordered by the written QA plan. Prerequisites to given test programs are being addressed and include the approval of procedures and data sheets, calibrated instrumentation, appropriate and adequate equipment, appropriate data acquisition and adequate recording practices, and trained and certified personnel. INI prepares a certification of the test services conducted for all nuclear grade components and equipment tested in their facilities.

The NRC inspection team reviewed and evaluated the QA records for testing performed at the Irvine, California, facility on two equipment qualification tests involving several instrumentation chambers with associated hardware and insulated cables for a major west coast test laboratory. These products were

manufactured by an instrument manufacturer which supplies this equipment for use in the nuclear power plant NSSS scope of supply for a major reactor manufacturer. Within the scope of this review, the NRC inspection team determined that: (1) test and test inspection activities were performed in accordance with detailed test procedures; and (2) all necessary information and data collected to allow evaluation of testing results were properly recorded and documented.

No nonconformances were identified.

l. Control of Measuring and Test Equipment: The NRC inspection team verified the INI compliance with written procedures as they relate to control of measuring and test equipment. INI presently has only one calibration service vendor other than NBS. INI has an established service agreement with its spectrophotometer instrument manufacturer for periodic maintenance and adjustment (see paragraph D.2.d of this report). All calibration functions with respect to dosimetry systems, including dose mapping, are performed in-house and are traceable to the NBS.

The NRC inspection team evaluated the implementation of the INI control of measuring and test equipment by: (1) selecting two samples of test equipment and verifying current calibration; and (2) review of records of those samples traceable to secondary and primary standards (certifications to NBS). Measuring and test equipment were calibrated, adjusted, and maintained at prescribed intervals against certified standards having known and valid relationships to nationally recognized standards.

No nonconformances were identified.

m. Handling, Storage, and Shipping: The NRC inspection team evaluated the implementation of the INI QA procedure which controls handling, storage, and shipping activities. Controls to handle, test, and disposition in accordance with the QA procedure were in place. Since no testing activity for nuclear grade components and equipment had occurred at the Palo Alto facility, the NRC inspection team could not verify compliance to the INI QA procedure for handling and dispositioning of damaged equipment as no records were in the QA file. This criterion will be further evaluated during a subsequent NRC inspection.

No nonconformances were identified.

n. Inspection, Test, and Operating Status: The NRC inspection team evaluated the implementation of the INI QA procedure which controls the test status on nuclear items to be radiation aged prior to testing. INI may use the QA plan as a record to assign responsibility for indicating test status when a QA plan is prescribed by the QA manager. For simple contractual cases, the items for test will be accompanied by their respective inspection records.

No nonconformances were identified.

o. Nonconforming Materials, Parts, or Components: The NRC inspection team evaluated the implementation of the INI QA procedure which controls parts and components (test specimens). Controls to identify, segregate, and disposition nonconforming items were reviewed. No test items have been damaged by shipment to date. All nonconforming items inspected for physical damage are reviewed by the site QC manager and by the customer representative to determine disposition.

Nonconformances to the test plan are reviewed by the site QC manager and by the customer representative to determine disposition to retest, continue test, or return to the customer. INI did not fully identify a nonconformance (anomaly) to the test plan, in which approximately 11 hours of downtime out of 212 hours occurred on several instruments (ion chambers and associated cables) during a radiation test at the Irvine, California, facility (see paragraph B.1 of this report for the nonconformances identified).

p. Corrective Action: The NRC inspection team evaluated the implementation of the INI QA procedure which controls the adequate and timely response for corrective action of nonconformances. No test items have been damaged by shipment to date. No conditions adverse to quality in the testing programs for reactor components have been identified to date. This criterion will be further evaluated during a subsequent NRC inspection.

No nonconformances were identified.

q. Quality Assurance Records: The NRC inspection team evaluated the implementation of the INI QA procedure which controls QA records. The NRC inspection team reviewed the QA record files for two tests performed by INI at their Irvine, California, facility. The NRC inspection team reviewed such records as purchase orders, shipping memorandums, receiving inspection reports, radiation data sheets, run data sheets, procedures for dosimetry log books, letters, correspondence with customers, site test records, test program logs, and radiation certifications. All records reviewed were properly identified and stored, however, training records for personnel involved in aging of safety-related components were not in the record file (see paragraph B.3 of this report for nonconformance).

No nonconformances were identified.

r. Audits: The NRC inspection team could not evaluate the implementation of the INI QA procedure which controls audits. No audit schedule had been prepared by INI to provide a comprehensive system of planned and periodic audits. No audits have been performed to date (see paragraph B.2 of this report for nonconformance).

3. 10 CFR Part 21 Review: The NRC inspector verified INI's compliance with the requirements of 10 CFR Part 21 by examining the bulletin board posting of: (1) the 10 CFR Part 21 regulation; (2) Section 206 of the Engergy Reorganization Act of 1974; and (3) a procedure adopted by Process Technology pursuant to the regulations.

No violations were identified.

ORGANIZATION: LAKESIDE BRIDGE AND STEEL COMPANY
MILWAUKEE, WISCONSIN

REPORT NO.: 99900342/83-01	INSPECTION DATE(S) 9/26-30/83	INSPECTION ON-SITE HOURS: 26

CORRESPONDENCE ADDRESS: Lakeside Bridge and Steel Company
ATTN: Mr. A. L. Dolgaard
Director, Quality Assurance
5300 North 33rd Street
Milwaukee, Wisconsin 53207

ORGANIZATIONAL CONTACT: Mr. A. L. Dolgaard, Director, QA
TELEPHONE NUMBER: (414) 462-5900

PRINCIPAL PRODUCT: Containment system components and component supports.

NUCLEAR INDUSTRY ACTIVITY: Approximately 10 percent.

ASSIGNED INSPECTOR: R. E. Oller — 11-8-83
R. E. Oller, Reactive and Component Program Section (R&CPS) — Date

OTHER INSPECTOR(S):

APPROVED BY: I. Barnes — 11-8-83
I. Barnes, Chief, R&CPS — Date

INSPECTION BASES AND SCOPE:

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

B. SCOPE: This inspection included status of previous inspection findings, welding controls, nondestructive examination control, and procurement control.

PLANT SITE APPLICABILITY:

Not identified.

ORGANIZATION: LAKESIDE BRIDGE AND STEEL COMPANY
MILWAUKEE, WISCONSIN

REPORT NO.: 99900342/83-01	INSPECTION RESULTS:	PAGE 2 of 3

A. VIOLATIONS:

None

B. NONCONFORMANCES:

None

C. UNRESOLVED ITEMS:

None

D. STATUS OF PREVIOUS INSPECTION FINDINGS:

1. (Closed) Nonconformance (82-01): Failure by the manufacturing department to identify the applicable revision level for procedure No. 4.1.2 on eight manufacturing process sheets for contract No. C-9233.

   The NRC inspector verified that in accordance with the vendor's corrective action response letter dated July 22, 1982, a training class was conducted at which responsible personnel were given reinstruction in the proper completion of manufacturing process sheets. In addition, review of manufacturing process sheets contained in documentation packages for currently completed work verified that these records are being reviewed for completeness by the QA coordinator.

E. OTHER FINDINGS OR COMMENTS:

1. Welding Control - The NRC inspector reviewed four sections of the Lakeside Bridge and Steel Company's (LBS) ASME accepted QA manual to verify that this activity was controlled by the QA program.

   Observations were made in the shop of weld material bulk storage, hot holding ovens, and issuance activities.

   A review was also made of the following documents concerning the work performed on support steel for the Nine Mile Point station: (a) a list of QA approved welding materials; (b) a weld material control procedure; (c) a list of qualified welders; (d) three welding procedure specifications and the related supporting procedure qualification records; (e) ASME Code performance qualification records for four welders; (f) weld material issuance slips; and (g) ten completed manufacturing process sheet travelers.

Within this area, no nonconformances were identified.

2. Nondestructive Examination Control - The NRC inspector reviewed Section 14.0 of the LBS QA manual to verify that this activity was controlled by the QA program.

Observations were made of the type and batch identification markings on dye penetrant (PT) materials, and the calibration status of magnetic particle (MT) and ultrasonic (UT) test equipment.

A review was also made of the following documents: (a) supplier certifications for PT materials; (b) approved LBS procedures for the MT, PT, UT, and visual (VT) methods; (c) an LBS procedure for qualification and certification of NDE personnel; (d) qualification and certification records for three NDE technicians in the techniques of PT, MT, UT, and VT; and (e) NDE inspection records related to work identified on 11 manufacturing process sheet travelers.

Within this area, no nonconformances were identified.

3. Procurement Control - The NRC inspector reviewed Section 8.0 of the LBS QA manual to verify that this activity was controlled by the QA program.

In addition, the following documents were reviewed: (a) an LBS procedure governing selection and approval of suppliers of materials and services; (b) an approved vendor list; (c) procurement documents consisting of purchase orders, material specifications, checklists and LBS QA-21 forms, common to five purchases of materials and services.

Within this area, no nonconformances were identified.

ORGANIZATION: MORRISON-KNUDSEN COMPANY, INCORPORATED
POWER SYSTEMS DIVISION
ROCKY MOUNT, NORTH CAROLINA

REPORT NO.: 99900702/83-01	INSPECTION DATE(S) 7/25-29/83	INSPECTION ON-SITE HOURS: 30

CORRESPONDENCE ADDRESS: Morrison-Knudsen Company, Inc.
Power Systems Division
ATTN: Mr. W. Frank Jones
Vice President and General Manager
101 Gelo Road
Rocky Mount, North Carolina 27801
ORGANIZATIONAL CONTACT: Mr. R. H. Stauber, Manager - Quality Assurance
TELEPHONE NUMBER: (919) 977-2720

PRINCIPAL PRODUCT: Emergency diesel engine driven generators and associated equipment.

NUCLEAR INDUSTRY ACTIVITY: Preparing for production on an order for Pennsylvania Power and Light Company.

ASSIGNED INSPECTOR: W. E. Foster — 9/23/83
W. E. Foster, Reactive and Component Program Section (R&CPS) — Date

OTHER INSPECTOR(S):

APPROVED BY: I. Barnes — 9/24/83
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 10 CFR Part 50.55(e) reports pertaining to: (1) defective check valves in the diesel generator (DG) starting air systems of units that had been furnished to the Watts Bar Nuclear Plant (WBNP), Unit Nos. 1 and 2; (2) deficient DG fuel oil day tank suction check valves in units that had been furnished to the St. Lucie Plant (SLP), Unit No. 2; (3) radiated heat of the DG that exceeds published information in units that had been furnished to WBNP,
(cont. on next page)

PLANT SITE APPLICABILITY:
Air Start Check Valves: 50-390, 50-391, Fuel Oil Day Tank Check Valve: 50-389. Radiated Heat: 59-390, 50-391, 50-389, 50-397, 50-416, 50-417, 50-522, 50-523, 50-327, 50-328, 50-312, 50-344, 50-466, 50-467, 50-556, 50-557, 50-346 and 50-333. Bearings and Fan Belt: 50-389. Hydrogen Ignitors: 50-440, 50-441, 50-458, and 50-459.

SCOPE: (cont.) Unit Nos. 1 and 2; and (4) incorrect power takeoff (PTO) shaft bearings and fan belt problems on units that had been furnished to SLP, Unit No. 2. The Power Systems Division (PSD) of Morrison-Knudsen Company, Incorporated, issued 10 CFR Part 21 reports on items 1 and 3; additionally, they had issued a 10 CFR Part 21 report on deficient hydrogen ignitors furnished to the: (a) Perry Nuclear Power Plant and (b) River Bend Station. Evaluation of the latter item was also accomplished.

A. VIOLATIONS:

Contrary to Section 21.21(b)(3)(v), (vi), and (viii) of 10 CFR Part 21 dated December 30, 1982, regarding the report dated September 1, 1982, filed with NRC/RII, which pertained to heat radiated concerns:

a. The date on which the information of such defect or failure to comply was obtained had not been included in the report.

b. The number and location of all diesel generators equipped with engines that failed to comply with published data on heat radiation in use at, supplied for, or being supplied for one or more facilities subject to 10 CFR Part 21 had not been included in the report.

c. Advice that has been, is being, or will be given to purchasers related to the noncompliant diesel engines has not been included in a 10 CFR Part 21 report.

This is a Severity Level V violation (Supplement VII).

B. NONCONFORMANCES:

1. Contrary to paragraph 3.4 of the supplement to Procurement Control Procedure (PCP) 202, which was referenced in Morrison-Knudsen Company, Incorporated, PSD's corrective action response letter dated November 5, 1981, the purchase requisition for Purchase Order (PO) No. 50206 6036/379 did not indicate whether or not 10 CFR Part 21 and/or 10 CFR Part 50, Appendix B applied.

2. Contrary to Criterion V of Appendix B to 10 CFR Part 50, paragraphs 1.3.1 and 1.3.3 of Section 1.3, Revision 0, of the Quality Assurance Manual and paragraph 3.1 of Engineering Procedure (EP) 202, Revision 3, regarding the redesign of the fuel oil day tank suction check valve, by eliminating the spring:

a. The step of the calculations which substantiates that the valve would perform satisfactorily without its spring had not been verified by others.

b. Necessary drawings and documents relating to the design change of the valve had not been annotated.

c. A design review report had not been initiated to document the review associated with removal of the valve spring.

3. Contrary to Criterion V of Appendix B to 10 CFR Part 50, and Item 14 of paragraph 3.6 of EP 501, Revision 2, appropriate persons had not signed Engineering Change Notice 8712 as evidenced by the same person signing the "Draft, Checked, and Engineering Manager" spaces.

4. Contrary to Criterion V of Appendix B to 10 CFR Part 50, paragraphs 7 and 18.5 of Ebasco Services, Incorporated's Specification FLO 2998-305, Revision 2, and Specification 7-74A-Ta, seismic requirements had not been satisfied for the redesigned fuel oil day tank check valve.

C. UNRESOLVED ITEMS:

The diesel generators at the SLP had been modified by using a PTO bearing and drive belt different from those reflected in as-shipped documentation. Engineering had revised some drawings to reflect some of the changes; however, it was not apparent that current documents had been provided to the purchaser. Further, it was not apparent that the purchaser possessed information required to order replacement parts. The NRC inspector was informed that PSD was not required to maintain engineering documents and supply related documents to the purchaser on field modifications. This item is considered unresolved pending detailed review of customer procurement requirements.

D. FOLLOWUP ON PREVIOUS INSPECTION FINDINGS:

The findings identified in Inspection Report No. 99900702/81-01 were not fully evaluated during this inspection and, consequently, will remain open. However, initial review revealed that the supplement to PCP 201 was not totally implemented. As a result, the nonconformance detailed at paragraph B.1 was identified.

E. OTHER FINDINGS OR COMMENTS:

Followup on Regional Requests -

a. The Tennessee Valley Authority (TVA) filed a 10 CFR Part 50.55(e) report on September 21, 1981, with NRC/RII. The report indicated that check valves in the DG air start system were disassembling in service at the WBNP, Unit Nos. 1 and 2. The sixth interim report is dated April 8, 1983.

Morrison-Knudsen Company, Incorporated's PSD filed 10 CFR Part 21 reports with NRC/RII on August 27, 1981, and May 21, 1982. The latter report states that a defective valve had not been returned to PSD, therefore, the cause of the failure could not be determined; however, it appears that an improper valve was selected for the application.

While there have been at least eight failures of these valves at WBNP, apparently the usage of the valves in this application has been limited to WBNP. Corrective action will be taken by TVA and preventive measures by PSD will be nonuse of the valves in this application.

b. Florida Power and Light Company (FPL) filed a 10 CFR Part 50.55(e) report with NRC/RII on March 16, 1982, followed with a final report dated May 17, 1982. The reports indicated that fuel oil flow was being impeded by the day tank suction check valve.

According to internal documentation "the valve should have been a swing check type" but one was not available "at the time to the ASME Code." As a result, a spring loaded piston type valve was selected. The deficiency was manifested by the valves' failure to open due to insufficient suction of the fuel pumps to overcome the force exerted by the valve springs. In addition to nondetection during design review, it was not detected during testing because the day tank was "by-passed . . . to do fuel consumption tests." It was determined that this condition was limited to the SLP.

Calculations had been performed to indicate that the valves would operate satisfactorily without the springs. An Engineering Change Proposal and an Engineering Change Notice had been initiated to revise the vendor drawing to depict the valve without the spring. The NRC inspector was informed that the vendor concurred with the action. The design control measures had not been totally implemented; as a result, the nonconformances detailed in paragraphs B.2 and B.3 were identified. PSD personnel maintain that formal design control measures were not intended; rather, the activity was undertaken to gain the attention of the valve manufacturer. Further, they maintain that proper operation after removal of the spring provides design review. The valve springs were removed at the site and available documents indicate that operation was satisfactory. It was noted that no action had been taken to assure that their seismic qualification had been maintained; this resulted in the nonconformance detailed in paragraph B.4.

Corrective actions and preventive measures could not be verified because records of these activities were not presented to the NRC inspector.

c. TVA filed a 10 CFR Part 50.55(e) report with NRC/RII on September 3, 1982. The report indicated that published heat loss data of the diesel engine was erroneous. Apparently, the cause of the problem is the failure to update the data for a stationary installation in a confined area. The NRC inspector was informed that the data was generated based upon installation of the diesel engine in a locomotive.

PSD filed a 10 CFR Part 21 report with NRC/RII on September 1, 1982. The report did not include all of the required information; as a result, the violation detailed in paragraph A was identified.

PSD had completed a factory test to determine the amount of heat that is radiated from the DG. Also, they have requested several of their clients to conduct these tests at their locations; some have complied with the requests.

Corrective action will be taken, when necessary, by the users.

d. FPL filed a 10 CFR Part 50.55(e) report with NRC/RII on October 1, 1982. The report indicated that the PTO shaft bearings were overheating. These bearings supply power to the radiator fans through belts. A final 10 CFR Part 50.55(e) report on excessive fan belts "flapping and twisting" was filed on February 25, 1983.

The NRC inspector was informed that this configuration was limited to the SLP and operation was satisfactory during factory activities. Apparently, foundations and alignments are critical for correct installation and these had not been accomplished with sufficient accuracy.

PSD assisted the purchaser in resolving these problems and reports indicate that performance is satisfactory. Engineering changes had been made for different PTO bearings and drive belts, but the changes were not reflected in all the appropriate drawings, the "Master Bill of Material," or the "Instructions/Parts Manual." The NRC inspector was informed that it is not the responsibility of PSD to keep the engineering documents current subsequent to shipment of the hardware. The NRC inspector was unable to determine how correct parts could be obtained when an outdated "Instructions/Parts Manual" was used as the source of information. This concern is identified as an unresolved item in paragraph C.

e. PSD filed 10 CFR Part 50.55(e) reports with NRC/RII on January 28 and April 8, 1983. The reports pertained to a leak that had been detected in hydrogen ignitors during tests. The cause had been identified as a change in the manufacturing process of the supplier of the glow plug. Suspect hardware had been corrected and preventive measures will be the accomplishment of the brazing operation that had been deleted by the supplier of the glow plug.

The corrective actions and preventive measures associated with this problem will be further reviewed during a future inspection.

ORGANIZATION: MORRISON-KNUDSEN COMPANY, INCORPORATED
POWER SYSTEMS DIVISION
ROCKY MOUNT, NORTH CAROLINA

REPORT NO.: 99900702/83-01	INSPECTION RESULTS:	PAGE 7 of 7

PSD issued PO No. 45917 6043, dated August 14, 1981, to Corporate Consulting and Development Company, Ltd. (CCL) for accomplishment of environmental qualification of the hydrogen ignitors for the Grand Gulf Nuclear Station, Unit 1. The PO invoked: (1) IEEE Standards 323-1974 and 344-1975; (2) NUREG 0588; (3) 10 CFR Part 21; and (4) Bechtel Specification Nos. 9645-M-198.0 and 9645-G-QA-1, which references 10 CFR Part 50, Appendix B and ANSI N45.2. A cursory review of changes to the PO did not reveal that the aforementioned requirements had been affected. A speedy review of Volume 1 of the Qualification Report prepared by CCL indicates that some tests were performed by other laboratories.

In an effort to assess the effectiveness of the corrective actions and preventive measures, the following areas were evaluated: (a) change control, (b) manufacturing process control, and (c) records. This was accomplished by evaluating the following documents for requirements and/or implementation of requirements: 3 drawings, 4 specifications, 18 procedures, 5 POs, 13 internal memoranda, 24 letters, and numerous documents identified as meeting minutes, reports, engineering change proposals, and notices, test procedures and data, electronically transmitted messages, certificate of conformance, and a procedure qualification record.

ORGANIZATION: NUCLEAR POWER SERVICES, INC.
SECAUCUS, NEW JERSEY

REPORT NO.: 99900531/83-02	INSPECTION DATE(S) 9/12-16/83	INSPECTION ON-SITE HOURS: 26

CORRESPONDENCE ADDRESS: Nuclear Power Services, Inc.
ATTN: Albert J. Moellenbeck
President
One Harmon Plaza
Secaucus, New Jersey 07094

ORGANIZATIONAL CONTACT: Mr. Pete Mottola, Quality Assurance Manager
TELEPHONE NUMBER: (201) 865-6550

PRINCIPAL PRODUCT: Engineering and design services.

NUCLEAR INDUSTRY ACTIVITY: Engineering and design of pipe supports. Total staff consists of approximately 150 engineers, designers, and draftsmen. Approximately 90 percent of the staff is located at field sites.

ASSIGNED INSPECTOR: P. M. Sears — 10/6/83
P. M. Sears, Reactor Systems Section (RSS) — Date

OTHER INSPECTOR(S):

APPROVED BY: C. J. Hale — 10/6/83
C. J. Hale, Chief, RSS — Date

INSPECTION BASES AND SCOPE:

A. BASES: 10 CFR Part 50, Appendix B and 10 CFR Part 21.

B. SCOPE: Status of previous inspection findings.

PLANT SITE APPLICABILITY:

Docket Nos. 50-445 and 50-446.

ORGANIZATION: NUCLEAR POWER SERVICES, INC.
SECAUCUS, NEW JERSEY

REPORT NO.: 99900531/83-02	INSPECTION RESULTS:	PAGE 2 of 5

A. VIOLATIONS:

None

B. NONCONFORMANCES:

None

C. UNRESOLVED ITEMS:

None

D. STATUS OF PREVIOUS INSPECTION FINDINGS:

1. (Closed) Nonconformance (81-01): Quality assurance program did not take into account the need for special skills to attain the required quality, nor did it provide assurance that all prerequisites for design activities had been satisfied, in that the NPS Personnel Qualification and Verification Program procedure (EPP-2) did not provide sufficient assurance that personnel hired to perform nuclear safety-related design analyses actually possess the special skills and qualifications needed.

   Procedure EPP-2 was revised incorporating the above comments.

2. (Closed) Nonconformance (81-01): Quality assurance records of indoctrination and training did not furnish evidence that activities affecting quality were stored either in separate and secure storage locations or in a single fire and waterproof area.

   A separate and secure storage location has been obtained and records that are maintained at the office in Secaucus have been and are being duplicated and filed at the remote facility.

3. (Closed) Nonconformance (81-01): Documented procedures did not assure that changes to drawing 2S-874B and calculations SC-111-2-31 and SC-265-3E-709 were reviewed for adequacy by authorized personnel.

   The item pertaining to drawing 2S-874B was considered by the individual making the revision to be of such a minor nature that the individual took it upon himself to perform both functions of originator and checker. That drawing has since been revised to the next level revision (Revision 3). Included and documented in the revision box of Revision 3 is the statement that the previous

revision has been completely rechecked. In calculation SC-111-2-31, the horizontal and vertical forces were interposed. The subject calculation was revised. The reanalysis showed no effect on the design.

Calculation SC-265-2E-709, sheets 174 and 175, had no orignator's initials but only a checker's initials. These have been completely rechecked and documented.

Detailed training of personnel involved in preparation, checking, and approval of design documents has been accomplished and documented by NPS to prevent recurrence of such errors.

4. (Closed) Nonconformance (81-01): Drawing No. 2S-510-R1 was changed on December 26, 1979, without justification and pages 154, 155, 174, and 175 of calculation package SC-265-2E-709 were changed on April 18, 1981, without being reviewed and approved by the same organizations that performed the original review.

   The system in effect at NPS calls for calculation pages to be left in the calculation package and marked "void" if there is a change in design. Calculation SC-510-R1 contained such pages marked "void." The change in design had almost no explanation because it was self-evident from the voided sketches and the new sketches why the change had taken place. This part of Nonconformance D.4 of Inspection Report No. 99900531/81-01 is closely related to Nonconformance D.5 of Inspection Report 99900531/81-01; however, because the reason for the changes is self-evident from the voided sketches, this part of the nonconformance was in error and is withdrawn.

   Revision boxes on sheets 154, 155, 174, and 175 of calculational package SC-265-2E-709 denote the approval cycle of the concrete design and were not applicable to the steel design of the supports covered by the calculation. The signatures required to document the calculation were those which appeared in a different section and the revision boxes above were for information only. Because of the foregoing, this part of Nonconformance D.4 of Inspection Report No. 99900531/81-01 was in error and is withdrawn.

5. (Closed) Nonconformance (81-01): Design analyses were not sufficiently detailed as to purpose, method, and assumptions in that the basis for sizing the fillet welds used in six examined structural calculations could not be determined by an appropriately qualified NRC inspector without recourse to the originator.

The fillet welds in question were not analyzed because it was obvious to the engineer performing the calculations that the loads were of a magnitude such that the welds were subject to low stresses. In calculations presently being performed, all engineers have been instructed to indicate a specific reference to the minimum weld size table of the code if no specific analysis is being performed on a weld in a particular structural calculation. This is now contained in a structural calculation format being used by the structural group.

6. (Closed) Nonconformance (81-01): The Personnel Verification Supervisor did not implement or cause to be implemented all of the established measures to assure that personnel engaged in quality-related activities were qualified to perform the duties to which they were assigned.

   An internal audit was conducted on the personnel qualification and verification for personnel engaged in quality-related activities currently employed by NPS. The Personnel Verification Supervisor now informs the Vice President of Engineering, in writing, of any anomalies in applicants, education, or experience qualifications. Items indicated as missing or in need of update were added and completed.

7. (Closed) Nonconformance (81-01): Nonconformance Report (NCR) was not initiated by the responsible NPS structural group supervisor after the identification and documentation in an interoffice memo that fillet welds in component supports were undersized with respect to ASME code requirements.

   A generic NCR addressing the undersized fillet welds in question was issued. That NCR indicated comments made during the NRC inspection and an NCR was initiated by each project. Training sessions were conducted and documented for personnel in specific requirements of NCRs.

8. (Closed) Nonconformance (81-01): The Comanche Peak Project QA Record Index did not identify or incorporate NCRs, CARs, procurement documents, and QA Package Review Checklists as generic project records even though they were identified as such on the master list of NPS QA records.

   As part of a revision of the Project Procedures Manual for Comanche Peak, an index of applicable QA records, including those listed above, was developed and is now incorporated.

ORGANIZATION: NUCLEAR POWER SERVICES, INC.
SECAUCUS, NEW JERSEY

REPORT NO.: 99900531/83-02	INSPECTION RESULTS:	PAGE 5 of 5

9. (Closed) Nonconformance (81-01): The design verification of pipe support No. CT-2-007-404/S22R did not assure that the design met the specific criteria in that the design verification process did not disclose that the tensile and shear force design inputs to the NPS baseplate analysis computer program were transposed.

   Structural calculation SC-111-2-31, which is related to the aforementioned pipe support, has been revised using the correct input forces for the baseplate analysis and has been reissued as Revision 2. The results of the analysis showed that the design of the baseplate is not affected. Other baseplate analyses were reviewed and it was determined that this was an isolated case. Detailed training of personnel involved in the preparation, checking, and approval of such calculations has been performed and documented to assure understanding of specific requirements relating to design verification.

10. (Closed) Nonconformance (81-01): Certain component support drawings on which fillet welds were specified to be welded at the Comanche Peak, Unit 1 and 2 sites, were examined and the welds were found not to be in accordance with ASME Code requirements.

    A NPS review was conducted of pipe support designs to ascertain the extent of the undersized fillet weld problem. Their conclusions were, that based on current Code criteria, none of the welds would be considered undersized. A 10 CFR Part 21 panel was convened to evaluate the results of the review. The panel concluded that those welds, even if they had been welded to the dimensions on the sketch, did not constitute a substantial safety hazard and, thus, were not reportable. Detailed training of personnel in the preparation and approval stages of design documents was performed and documented to preclude this situation happening in the future.

11. (Closed) Violation (81-01): Posting of either 10 CFR Part 21, Section 206 of the Energy Reorganization Act of 1974 and adopted procedures or Section 206 and an appropriate notice had not been accomplished.

    The appropriate revision of 10 CFR Part 21, Section 206 of the Energy Reorganization Act of 1974 and an appropriate notice directing personnel to the location of the implementing procedure has been posted.

E. OTHER FINDINGS OR COMMENTS:

None

ORGANIZATION: NUCLEAR QUALIFICATION SERVICES
ASSONET, MASSACHUSETTS

REPORT NO.: 99900926/83-01	INSPECTION DATE(S) 7/19-20/83	INSPECTION ON-SITE HOURS: 30

CORRESPONDENCE ADDRESS: Nuclear Qualification Services
ATTN: Mr. M. W. Randall
President
Myricks Airport
168 Padelford Street
Assonet, Massachusetts 02702

ORGANIZATIONAL CONTACT: Mr. M. W. Randall, President
TELEPHONE NUMBER: (617) 822-2457

PRINCIPAL PRODUCT: Seismic analysis

NUCLEAR INDUSTRY ACTIVITY: Nuclear Qualification Services (NQS) is a seismic analysis organization that performs seismic qualification of safety-related equipment for nuclear power generating stations.

ASSIGNED INSPECTOR: G. T. Hubbard — 9-26-83
G. T. Hubbard, Equipment Qualification Section (EQS) — Date

OTHER INSPECTOR(S): H. S. Phillips, EQS
J. J. Benson, Sandia National Laboratories

APPROVED BY: H. S. Phillips — 9-23-83
H. S. Phillips, Chief, EQS — Date

INSPECTION BASES AND SCOPE:

A. BASES: 10 CFR Part 50, Appendix B and 10 CFR Part 21.

B. SCOPE: This inspection consisted of: (1) a review of the 18 criteria of 10 CFR Part 50, Appendix B described in the NQS Quality Assurance Manual (QAM); (2) verification that the applicable criteria of the quality assurance (QA) program had been implemented in compliance with their QAM; and (3) 10 CFR Part 21 inspection.

PLANT SITE APPLICABILITY:

Not identified.

ORGANIZATION: NUCLEAR QUALIFICATION SERVICES
ASSONET, MASSACHUSETTS

REPORT NO.: 99900926/83-01	INSPECTION RESULTS:	PAGE 2 of 6

A. VIOLATIONS:

1. Contrary to Section 21.21(a) of 10 CFR Part 21, NQS had not developed or adopted the required procedures for projects 1086, 1134, and 1027.

2. Contrary to Section 21.6 of 10 CFR Part 21, NQS had failed to post the required documents.

3. Contrary to Section 21.31 of 10 CFR Part 21, NQS did not impose the requirements of 10 CFR Part 21 on subcontract purchase order (PO) 1027-1, dated May 6, 1983.

B. NONCONFORMANCES:

1. Contrary to Criterion II of Appendix B to 10 CFR Part 50, NQS's documented QA program, as described in the QAM, neither addresses all criteria nor describes how some of the criteria will be implemented. Examples are as follows:

   a. The QAM does not describe NQS's organizational structure and the duties associated with the positions.

   b. The QAM does not describe the training or qualification requirements for personnel performing activities affecting quality.

   c. The QAM does not describe how design and QA requirements, contained in incoming purchase orders (POs) and their changes are incorporated in analytical efforts and final reports.

   d. The QAM does not give a detailed description of how POs and their changes are issued and controlled to assure that appropriate QA and technical specification requirements are included in them.

   e. The QAM does not describe how obsolete documents are controlled to prevent their use.

   f. The QAM does not give a detailed description identifying who is responsible for vendor selection and how vendor selection is accomplished.

   g. The QAM does not describe how vendor efforts are controlled to assure vendor work is in compliance with POs.

h. The QAM does not describe how deficiencies in analytical efforts are identified and controlled.

i. The QAM does not describe how corrective action is controlled.

j. The QAM does not require the use of checklists for performing internal audits.

2. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 4.1 of the QAM, dated May 16, 1983, NQS failed to stamp all the required numbers on drawings received and filed in project file No. 1038.

3. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 4.2 of the QAM, dated May 16, 1983, there was no documented objective evidence that technical report (TR) No. 1063, Revision 2, was subjected to the same review as the original report.

4. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 5.0 of the QAM, dated May 16, 1983, critical data necessary for seismic analysis on project No. 1086 was not retrievable from NQS files during this NRC inspection.

C. UNRESOLVED ITEMS:

None

D. OTHER FINDINGS OR COMMENTS:

1. Quality Assurance Manual: The QA program is described in the QAM, which established a QA program in accordance with the applicable 18 criteria of 10 CFR Part 50, Appendix B. The NRC inspection team's review of the QA program consisted of an examination and evaluation of the QAM. The review determined that the following criteria were not applicable to the NQS operation: (1) Identification of Materials, Parts, and Components; (2) Control of Special Processes; (3) Inspection; (4) Test Control; (5) Control of Measuring and Test Equipment; (6) Handling, Storage, and Shipping; and (7) Inspection, Test, and Operating Status. The NRC inspection team identified the nonconformance described in paragraph B.1 during the QAM review.

2. Supplemental Procedures Review: The NRC inspector's review of the QA program determined that NQS did not have procedures that supplemented any QAM procedures and that such procedures were not necessary for their operations.

3. QA Program Implementation Review: Since NQS did have QAM implementing procedures for all the applicable criteria of 10 CFR Part 50, Appendix B, the NRC inspectors only evaluated QA program implementation for the areas that NQS had established QAM implementing procedures. The NRC inspectors evaluated these areas by examining representative records and conducting interviews with the president of NQS.

   Findings concerning the implementation of the evaluated criteria of 10 CFR Part 50, Appendix B, as described in the QAM, are as follows:

   a. Organization: The NRC inspector did not evaluate the implementation of this criterion since the QAM did not describe the organizational structure and associated position duties (see nonconformance described in paragraph B.1). Discussions with the president did identify that NQS is a small organization with five to six employees. The president is responsible for the QA program and essentially serves as the QA manager. Implementation of this criterion will be evaluated during a future NRC inspection.

   b. QA Program: The NRC inspector evaluated this criterion to the extent possible by verifying that a QA program was implemented by the QAM and by verifying the implementation of the criteria of 10 CFR Part 50, Appendix B that NQS had implemented. The total implementation of this criterion will be evaluated during a future NRC inspection after NQS has developed and implemented procedures for the applicable criteria of Appendix B. The NRC inspector was not able to evaluate personnel qualification requirements, since none had been described in the QAM (see nonconformance described in paragraph B.1).

   c. Design Control: The NRC inspector did not evaluate this criterion since the QAM did not implement adequate procedures detailing how design and QA requirements from incoming POs and their changes are incorporated into analytical efforts and final reports (see nonconformance described in paragraph B.1). Implementation of this criterion will be evaluated during a future NRC inspection.

d. Procurement Document Control: The NRC inspector did not evaluate this criterion since the QAM did not implement procedures describing how POs and their changes are issued and controlled so that appropriate QA and technical specification requirements are included in them (see nonconformance described in paragraph B.1). Implementation of this criterion will be evaluated during a future NRC inspection.

e. Instructions, Procedures, and Drawings: The NRC inspector's evaluation determined that this criterion was applicable to the NQS operations to the extent that the issuance of the QAM and its revisions are controlled. The inspector's review determined that the QAM and its five revisions had been approved by the president, as required by the QAM.

No nonconformances were identified.

f. Document Control: The NRC inspector reviewed three test reports, one project file including customer drawings, and two customer specifications to verify compliance with QAM procedures. The two nonconformances described in paragraphs B.2 and B.3 were identified during the evaluation of this criterion.

g. Control of Purchased Material, Equipment, and Services: The NRC inspector did not evaluate the implementation of this criterion since the QAM did not implement procedures in the following areas: (1) identification of who is responsible for vendor selection and how vendor selection is accomplished; and (2) description of how vendor efforts are controlled to assure that vendor work is in compliance with the PO requirements (see nonconformances described in paragraph B.1). Implementation of this criterion will be evaluated during a future NRC inspection.

h. Nonconforming Materials, Parts, or Components: The NRC inspector did not evaluate the implementation of this criterion since the QAM did not implement procedures describing how deficiencies in analytical efforts are identified and controlled (see nonconformance described in paragraph B.1). Implementation of this criterion will be evaluated during a future NRC inspection.

i. Corrective Action: The NRC inspector did not evaluate the implementation of this criterion since the QAM did not implement procedures describing how corrective action is controlled (see nonconformance described in paragraph B.1). Implementation of this criterion will be evaluated during a future NRC inspection.

j. Quality Assurance Records: The NRC inspector evaluated the implementation of QAM procedures for this criterion by review of four project files. One nonconformance (described in paragraph B.4) was identified during the evaluation of this criteria.

k. Audits: The NRC inspector verified the implementation of QAM audit procedures by evaluation of two vendor audits and the audit log sheet. Evaluation of internal audit checklists was not performed since internal audit checklists were not required by QAM procedures (see nonconformance described in paragraph B.1). Implementation of internal audit checklists will be evaluated during a future NRC inspection.

4. 10 CFR Part 21 Implementation: The NRC inspector determined that NQS had not: (1) adopted 10 CFR part 21 procedures; (2) posted the required documents; or (3) included the 10 CFR Part 21 requirement in a subcontract or PO (see violations described in paragraphs A.1, A.2, and A.3).

ORGANIZATION: P.X. ENGINEERING COMPANY, INC.
BOSTON, MASSACHUSETTS

REPORT NO.: 99900204/83-01	INSPECTION DATE(S) 8/15-19/83	INSPECTION ON-SITE HOURS: 26

CORRESPONDENCE ADDRESS: P.X. Engineering Company, Inc.
ATTN: Mrs. Denyse Johnson
Manager, Quality Assurance
P. O. Box C-1019
Boston, Massachusetts

ORGANIZATIONAL CONTACT: Mrs. Denyse Johnson, Manager, Quality Assurance
TELEPHONE NUMBER: (617) 269-6210

PRINCIPAL PRODUCT: Pressure vessels, tanks, and structural frames.

NUCLEAR INDUSTRY ACTIVITY: Currently, there is no nuclear-related work being performed.

ASSIGNED INSPECTOR: L. E. Ellershaw, Reactive and Component Program Section (R&CPS) — 9-27-83 Date

OTHER INSPECTOR(S):

APPROVED BY: I. Barnes, Chief, R&CPS — 9-27-83 Date

INSPECTION BASES AND SCOPE:

A. BASES: 10 CFR Part 21 and Appendix B to 10 CFR Part 50.

B. SCOPE: This inspection was made as a result of the receipt by NRC of a 10 CFR Part 21 report dated March 23, 1983, from Bergen-Paterson Pipesupport Corp. (B-P) pertaining to "slugged" welds in a main steam system restraint frame assembly fabricated by P.X. Engineering Company, Inc. (P.X.) that was to be furnished to the Carolina Power and Light Company (CP&L) Shearon Harris Nuclear Power Plant, Unit 1. Two other frame assemblies had previously been supplied.

PLANT SITE APPLICABILITY:

50-400.

ORGANIZATION: P.X. ENGINEERING COMPANY, INC.
BOSTON, MASSACHUSETTS

REPORT NO.: 99900204/83-01	INSPECTION RESULTS:	PAGE 2 of 5

A. VIOLATIONS:

None

B. NONCONFORMANCES:

None

C. UNRESOLVED ITEMS:

None

D. OTHER COMMENTS OR FINDINGS:

10 CFR Part 21 Report -

1. Background - Ebasco Services, Inc. (ESI), the architect/engineer at the Shearon Harris site, received a verbal allegation from a former P.X. welder that certain welds in the main steam tunnel vent stack restraint frame (Drawing No. C-1-188) had been "slugged." ESI notified B-P, the frame contractor, of this allegation on February 4, 1983. B-P had subcontracted this work to P.X. on Purchase Order No. C-47235 dated August 26, 1982. The frame assembly was being fabricated by P.X. at this time with subsequent delivery being made to B-P of six frame sections. The first three sections were released for shipment from P.X. on February 18, 1983. B-P contracted with Briggs Engineering Company to perform radiography of those weld joints whose configuration would lend themselves to "slugging." Radiography was performed and it was determined "that the density difference between the suspected foreign material and the weld material was not sufficient to be shown on the film and that the expected void caused by the partial penetration weld design, would mask any other void." It was further determined that ultrasonic examination (UT) would be the best mode for detecting any foreign material. B-P made a decision to await receipt of the final three sections before having UT performed. On March 10, 1983, the remaining three sections were shipped from P.X. to B-P. At that time, Briggs Engineering performed UT which revealed indications of weld defects in one specific joint on each of the six frame sections. On March 11, 1983, B-P mechanically removed a section of the frame containing the UT indications and prepared a cross section for metallographic examination. This examination, performed by Massachusetts Materials Research, Inc., substantiated the allegation of apparent "slugging." The "slug" appeared to be

a 3/16" (approximate) covered electrode. Chemical analysis of a drilled sample of one "slug" showed that it conformed to F-No. 4 grouping which includes SFA-5.1 (probably Type E-7018 electrode). The second drilled sample was slightly skewed into the deposited weld metal. This sample showed a higher silicon content than SFA-5.1 allows (0.91 vs. 0.75 maximum). However, this silicon content is within specification allowances for A-No. 1 deposited weld metal analysis, which also includes SFA-5.1 Type E-7018 electrode. As a result, B-P notified NRC by a 10 CFR Part 21 report dated March 23, 1983, following an initial 10 CFR Part 50.55(e) report to NRC by CP&L on March 18, 1983.

2. Inspection Findings - Prior to conducting the inspection at P.X., the NRC inspector visited B-P at Laconia, New Hampshire, on August 15 and 16, 1983, for the purpose of reviewing the background information and observation of the weld joint cross sections. Visual examination of the weld joint cross section confirmed the apparent "slugging" of the weld. It was also determined at this time that P.X. had previously fabricated two other frame assemblies (C-1-189 and C-1-195) which had been provided to the Shearon Harris site. Another frame assembly (C-1-181) had been in the early fabrication stages at P.X., but was removed with completion of fabrication to be performed at B-P. Frame Nos. C-1-181 and C-1-195 were basically of a tubular construction and the configuration would not lend itself to "slug" welding. However, to assure that "slugging" was not done on the other three frame assemblies, UT was performed on those weld joints which could possibly have been "slugged"; the results of which did not disclose further evidence of this condition. It should be noted that the alleger addressed "slugged" welds on frame No. C-1-188 only.

Review of B-P's purchase order to P.X. for frame assembly No. C-1-188 revealed that fabrication was required to be performed in accordance with ANSI B31.7, welders were required to be qualified in accordance with Section IX of the ASME Code, and weld acceptance criteria were to be defined in B-P's Procedure No. BP-9-5, Supplement G, "Visual Inspection of Non-NF-Welds." In addition, 10 CFR Part 21 was identified as being applicable to this order. The purchase order did not, however, reference use of a quality assurance program that complied with the requirements of 10 CFR Part 50, Appendix B. A subsequent NRC inspection conducted at B-P established that provisions for the use of an appropriate quality assurance program were not included in B-P's procurement documents to P.X. (see NRC Inspection Report No. 99900209/83-03).

ORGANIZATION: P.X. ENGINEERING COMPANY, INC.
BOSTON, MASSACHUSETTS

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The NRC inspector continued the inspection at P.X. on August 17-19, 1983. It was established that P.X. did not invoke their ASME approved quality assurance program for this work; thus, there was no quality assurance documentation other than material test reports for the base metal and welding materials used. The only P.X. documentation required by B-P consisted of a certified material manufacturer's certificate of compliance.

Review of the B-P drawing supplied to P.X. showed that the welds in question were 5/8" partial penetration bevel groove welds with a minimum effective throat of 3/4". Discussion with P.X. personnel revealed that both the flux core arc welding (FCAW) and shielded metal arc welding (SMAW) processes were used on the frame assembly. Observation of the weld indicated that it was most likely that SMAW was the process used due to the stop-and-go nature of the weld face. An attempt was made to identify the particular welders involved. P.X. estimated that the welding of the "slugged" joints took place in November 1982 for the first three sections, and January 1983 for the last three sections. P.X. does maintain weld wire requisition slips for covered electrodes in order to control electrode inventory. A review of over 200 weld wire requisition slips associated with this job showed that 16 welders performed welding. However, the estimated time frame for the welding of the "slugged" joints narrowed the list down from 16 welders to 3 welders and 1 fitter. P.X. had previously informed B-P that one of the welders and the fitter performed approximately 90-95 percent of the welding on the "slugged" joints.

The NRC inspector reviewed the welder qualifications of eight welders including the three suspected welders and the fitter. The qualifications were in accordance with Section IX of the ASME Code. A review was made of the two welding procedure specifications (WPS) used on this job, WPS W-59 (SMAW) and WPS W-38 (FCAW), and the applicable procedure qualification records (PQRs). The WPSs and their PQRs were in accordance with the requirements of Section IX of the ASME Code.

It was established that the fitter was employed by P.X. on June 14, 1982, two of the three welders were employed on September 3, 1982, and the third welder was employed on August 31, 1982. All four employees were laid off on January 31, 1983. As stated previously, the allegation was made by a former P.X. welder on or before February 4, 1983.

ORGANIZATION: P.X. ENGINEERING COMPANY, INC.
BOSTON, MASSACHUSETTS

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It was further established that there were apparent labor problems at P.X. and the three welders and the fitter were involved in a union organizing activity.

The inspection findings indicate that certain employees may have attempted to discredit P.X.; probably due to the unsettled labor conditions. The weld joint involved is of such a configuration that "slugging" with 3/16" electrodes (approximate size) would not benefit P.X. The fitters and welders at P.X. are on an hourly wage and are not paid on a "piece work" basis; therefore, they also would not benefit from "slugging."

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

REPORT NO.: 99900255/83-01	INSPECTION DATE(S): 10/31-11/3/83	INSPECTION ON-SITE HOURS: 50

CORRESPONDENCE ADDRESS: Pacific Scientific Company
Kin-Tech Division
ATTN: Mr. P. A. Hadnagy
Director, Technical Operations
1346 South State College Boulevard
Anaheim, California 92803
ORGANIZATIONAL CONTACT: Mr. P. A. Hadnagy, Director, Technical Operations
TELEPHONE NUMBER: (714) 774-5217

PRINCIPAL PRODUCT: Mechanical shock arrestors.

NUCLEAR INDUSTRY ACTIVITY: Approximately 50 percent.

ASSIGNED INSPECTOR: for R. E. Oller, Special Projects Section (SPS) Dec 1 83 Date

OTHER INSPECTOR(S): J. W. Hamilton, Reactive Inspection Section

APPROVED BY: C. J. Hale, Chief, SPS 12/1/83 Date

INSPECTION BASES AND SCOPE:

A. BASES: 10 CFR Part 50, Appendix B and 10 CFR Part 21.

B. SCOPE: This inspection was performed to evaluate the QA program implementation in the areas of: status of previous inspection findings, manufacturing process control, nonconformances and corrective action, 10 CFR Part 21, equipment calibration, and procurement control. In addition, a followup was made of a 10 CFR Part 21 report by Pacific Scientific Company (PSCO) concerning spring failures in shock arrestors.

PLANT SITE APPLICABILITY:

Spring failures, 50-482 and 50-483.

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

REPORT NO.: 99900255/83-01	INSPECTION RESULTS:	PAGE 2 of 5

A. VIOLATIONS:

None

B. NONCONFORMANCES:

1. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and procedure No. ID-19, Revision G, no subcontractor's certificate of calibration for the coordinate measuring machine SN-QC-30 was maintained for the calibration performed on June 7, 1983.

2. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 7.1.1 of PSCO QAM, Section 7, PSCO Purchase Order No. T24950 was placed for capstan springs although the supplier was not on the applicable Approved Supplier List (ASL).

3. Contrary to Criterion V of Appendix B to 10 CFR Part 50, Manufacturing/Assembly Outline No. 1801614-01, and Service Bulletin No. 1801-01 for reworking PSA-1 and PSA-2 shock arrestors, provisions were not included for the special markings on the capstan spring and external inspection stamping which were observed being performed during this inspection.

C. UNRESOLVED ITEMS:

None

D. STATUS OF PREVIOUS INSPECTION FINDINGS (By R. E. Oller):

(Closed) Unresolved Item (82-02): 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.

Review during this inspection verified that PSCO has added a Supplement 4, dated May 19, 1983, to their QA manual. This supplement describes the repair activity and provides instructions for accomplishing it.

E. OTHER COMMENTS OR FINDINGS:

1. Manufacturing Process Control (By R. E. Oller): The NRC inspector reviewed four sections of the PSCO's QA manual to verify that this activity is controlled by the QA program.

   Observations were made in the shop of inprocess assembly operations of shock arrestors. Discussions were also held with QC inspection personnel concerning inspection activities and their documentation.

   A review was also made of: (a) five inspection and manufacturing procedures, (b) two parts manufacturing outline travelers, and (c) two assembly outline traveler record packages.

   Within this area, no nonconformances were identified.

2. Nonconformances and Corrective Action (By R. E. Oller): The NRC inspector reviewed Section 12.0 of the PSCO's QA manual to verify that these activities are controlled by the QA program.

   Observations were made of locked cages containing nonconforming materials and items.

   A review was also made of: (a) three related procedures; (b) a nonconforming item log, (c) a list of material review board members, and (d) ten record packages consisting of related Trouble and Failure Reports, Failure Analysis and Corrective Action Reports, and/or Vendor Corrective Action Reports.

   Within this area, no nonconformances were identified.

3. 10 CFR Part 21 Requirements (By R. E. Oller): The NRC inspector examined the documents posted on the PSCO's bulletin board and reviewed their deficiency reporting procedure.

   Within this area, no violations were identified.

4. Equipment Calibration (By R. E. Oller): The NRC inspector reviewed Section 13.0 of the PSCO's QA manual to verify that this activity is controlled by the QA program.

   Observations were made in the shop of the calibration status and physical maintenance of 24 measuring and testing devices used for process control and inspection acceptance.

A review was also made of three calibration procedures, PSCO calibration records, and subcontractor certificates of calibration for the above 24 devices.

Within this area, one nonconformance was identified. This item concerned the failure by QA to have a subcontractor's certificate of calibration for the coordinate measuring machine (SN QC-30) which was calibrated on June 7, 1983 (see paragraph B.1).

5. Procurement Control (By John Hamilton): The NRC inspector reviewed Section 7 of the PSCO QA manual to verify that this activity is controlled by the QA program.

A review was also made of four purchase orders, the current ASL, two ASLs applicable to the reviewed purchase orders, the survey/audit evaluation reports for three vendors, and five vendor procedures. This review was performed to verify that procurement documents were being controlled in accordance with procedures; that they suitably included or referenced all necessary requirements for procurement of materials, equipment, and services; and that subvendors are required to provide appropriate QA programs.

One nonconformance was identified (see paragraph B.2) in regard to the failure of PSCO to limit procurement of capstan springs from vendors on the ASL.

6. Broken and Cracked Capstan Spring Tangs in Pacific Scientific Mechanical Shock Arrestors (PSA-1, PSA-2) (By John Hamilton):

a. Background: PSCO notified the NRC, Region V, with a 10 CFR Part 21 report based on arrestors at Union Electric Calloway Station, by Daniel International personnel, where five of seven shock arrestors tested failed due to a broken tang on each of the five capstan springs.

Upon receipt, PSCO substantively duplicated the Daniel performance test traces that indicated the capstan spring tangs had been broken off prior to the Daniel testing.

Eleven shock arrestors were returned from Wolf Creek Station by Union Electric Company which had capstan springs from the same spring lot as the five shock arrestors with broken spring tangs. Magnetic particle examination revealed seven of eleven capstan springs had indications of cracking at the inside radius of one

or both of the formed tangs. PSCO personnel stated that no evidence of improper assembly, defective material, or handling abuse was observed for any of the 18 returned shock arrestors.

b. Findings: The NRC inspector verified by review of records and interviews with PSCO personnel, that the information supplied in the 10 CFR Part 21 report was complete and accurate with regard to proper identification of deficiency cause. Independent testing demonstrated that forming of the tang after age hardening at 900°F caused the high residual stress which induced hydrogen cracking during silver plating.

The NRC inspector verified the adequacy of the customer notification of defective hardware by review of the documentation used by PSCO personnel to evaluate the affected items and the notification letters to each effected customer.

It was ascertained by review of procurement documents that PSCO has now specified the manufacturing process requiring the spring vendor to form the spring before age hardening and has imposed a 100 percent MT examination of the spring tang root after silver plating.

One nonconformance was identified (see paragraph B.3) in regard to the failure of PSCO to incorporate rework operations and markings in the applicable procedure and bulletin. Corrective action was taken before the end of the inspection by revision of the Service Bulletin No. 1801-01 to include provisions for marking and stamping. Preventive measures were not taken during the inspection.

ORGANIZATION: PATEL ENTERPRISES, INC.
HUNTSVILLE, ALABAMA

REPORT NO.: 99900931/83-01	INSPECTION DATE(S) 10/17-21/83	INSPECTION ON-SITE HOURS: 52

CORRESPONDENCE ADDRESS: Patel Enterprises, Inc.
ATTN: Dr. M. C. Patel
President
3400 Blue Spring Road, Northwest, Suite B-3
Huntsville, Alabama 35810

ORGANIZATIONAL CONTACT: Mr. M. Kimbrell
TELEPHONE NUMBER: (205) 859-5000

PRINCIPAL PRODUCT: Engineering services.

NUCLEAR INDUSTRY ACTIVITY: Patel Enterprises, Inc. (PEI) provide nuclear services related to the following: equipment qualification program development; material aging analysis; qualification documentation assessment; qualification maintenance programs; and seismic qualification programs to include design and analysis. Approximately 50 percent of the services are nuclear power related. A total of 19 employees are devoted to these efforts.

ASSIGNED INSPECTOR: J. R. Agee — 11/9/83
J. R. Agee, Equipment Qualification Section (EQS) — Date

OTHER INSPECTOR(S): H. S. Phillips, Chief, EQS

APPROVED BY: H. S. Phillips — 11/9/83
H. S. Phillips, Chief, EQS — Date

INSPECTION BASES AND SCOPE:

A. BASES: 10 CFR Part 50, Appendix B and 10 CFR Part 21.

B. SCOPE: This inspection consisted of: (1) QA manual (QAM) review; (2) evaluation of QA program implementation; and (3) 10 CFR Part 21 requirements review.

PLANT SITE APPLICABILITY:

50-250/251, 50-335, 50-389, 50-250/251/335/389, 50-261/324/325/400/401/402/403, 50-423/496/497, others.

ORGANIZATION: PATEL ENTERPRISES, INC.
HUNTSVILLE, ALABAMA

REPORT NO.: 99900931/83-01	INSPECTION RESULTS:	PAGE 2 of 7

A. VIOLATIONS:

None

B. NONCONFORMANCES:

None

C. UNRESOLVED ITEMS:

None

D. OTHER FINDINGS OR COMMENTS:

1. Quality Assurance Manual Review - The inspector reviewed the QAM and determined that it consisted of 18 sections that describe in the procedures the actions necessary to comply with the requirements of the 18 criteria of Appendix B to 10 CFR Part 50.

   No nonconformances were identified.

2. QA Program Implementation - The inspector evaluated the implementation of the QA program procedures by examining representative records and files, conducting interviews with personnel, and making visual inspections and observations. Findings concerning the implementation of procedures relating to the 18 criteria of Appendix B to 10 CFR Part 50 are as follows:

   a. Organization - The inspector reviewed PEI's organizational structure including functional responsibilities and authorities. The inspector determined from the review that management authorities and responsibilities are delineated in writing and that the QA manager reports directly to the president of the corporation and has authority to stop work pending resolution of quality matters.

      No nonconformances were identified.

   b. Quality Assurance Program - The inspector evaluated this criterion by verifying that a QA program was implemented in accordance with the QAM and the 18 criteria of Appendix B to 10 CFR Part 50. The evaluation of training which is a part of this criterion included an examination of Quality Engineering Procedure (QEP) 2.1, "Quality Assurance Orientation and

Training"; QEP 9.2, "Personnel Qualification and Certification Program for Engineers"; and review of ten personnel files containing training records.

No nonconformances were identified.

c. Design Control - The inspector verified the implementation of the QAM design control procedure by examination of the QEP 3.1, "Control of Engineering and Design Calculations"; QEP 3.2, "Computer Program Verification"; QEP 3.3, "Aging Library Procedures"; QEP 3.4, "Nuclear Engineering Analysis Procedures"; and one test plan prepared by PEI. Each of these documents had been reviewed, verified, and approved in compliance with design control criteria.

No nonconformances were identified.

d. Procurement Document Control - The inspector verified the implementation of the QAM procurement document control procedures by reviewing the QEP 4.1, "Procurement Document Control"; 11 purchase orders (POs); and discussing these activities with QA management. The POs that were reviewed had imposed 10 CFR Part 50, Appendix B and 10 CFR Part 21 requirements. Procurement document changes required the same review and approval as original procurement documents.

No nonconformances were identified.

e. Instructions, Procedures, and Drawings - The inspector verified implementation of the QAM procedure by review of the QEP 5.1, "Preparation and Control of Quality Engineering Procedures and Project Instructions," and six project instructions (PIs) as they relate to this criterion. A specific PI that was reviewed included PI No. 8217-1, "Preparation and Control of Specification," Revision Original, dated September 9, 1982, which had been reviewed and approved in compliance with the instructions of this section of the QAM

No nonconformances were identified.

f. Document Control - The inspector verified implementation of the QAM procedure by review of QEP 6.1, "Control of Technical Documents"; and QEP 6.2, "Control and Distribution of Job Related Documents." The inspector verified adequate control

and distribution of six documents including three QA manuals, two QEPs, and a project order. Each was identified in a controlled distribution list; each was in the possession of the indicated person; and each had been signed-off on the respective sign-off sheets in compliance with QEPs 6.1 and 6.2.

No nonconformances were identified.

g. Control of Purchased Material, Equipment, and Services - The inspector verified implementation of the QAM procedure by review of the QEP 7.1, "Control of Purchased Material, Equipment and Services"; and review of the "Approved Supplier List" (ASL), including related audits and data concerning PEI evaluations of the approved suppliers. The inspector also verified that purchased materials are inspected for shipping damage and met quality and specification requirements.

No nonconformances were identified.

h. Identification and Control of Materials, Parts, and Services - The inspector verified the implementation of the QAM procedure by review of the QEP 8.1, "Identification and Control of Material, Parts, and Services." Also reviewed were two PIs and two equipment specifications for the identification, receipt, inspection, and storage of materials, parts, and components for use on PEI projects.

No nonconformances were identified.

i. Control of Special Processes - The inspector verified that activities requiring special processes fall outside the scope of PEI operations and, therefore, are not applicable.

j. Inspection - The inspector verified the implementation of the QAM procedure by review of the QEP 10.1, "Inspection Procedures," that requires that all inspection activities to be performed by PEI will be conducted ". . . by qualified personnel not reporting to the supervisors responsible for the project . . ." Also found inspection activities to be documented. Inspection documents identified charactistics, methods, and acceptance criteria.

No nonconformances were identified.

k. Test Control - The inspector verified that the QAM procedure adequately describes test control activities necessary to comply with Criterion XI of 10 CFR Part 50, Appendix B; however, no QEP implementing procedures had been provided because PEI does not conduct tests. PEI does address and maintain the control of project testing activities for which they are contractually responsible. In this case, they prepare test plans or procedures, associated checklists, test reports, and lists of personnel performing the tests in compliance with the QAM procedure and as required by the contract.

No nonconformances were identified.

l. Control of Measuring and Test Equipment - The inspector verified that the QAM procedure adequately describes control of measuring and test equipment activities to comply with the related Criterion XII of 10 CFR Part 50, Appendix B; however, no QEP implementing procedures had been provided because PEI does not perform measurement and calibration functions. The QAM procedure has been provided and states that ". . . Should Patel activities be expanded to require utilization of such equipment, detailed procedures will be developed as determined by project requirements."

No nonconformances were identified.

m. Handling, Storage, and Shipping - The inspector verified that the QAM procedure adequately describes required handling, storage, and shipping to comply with Criterion XIII of 10 CFR Part 50, Appendix B; however, no QEP implementing procedures had been provided because PEI does not normally perform handling, storage, and shipping activities. The QAM states, in part, ". . . The Program Manager/Project Engineer shall be responsible for preparing Project Instructions for special handling, storage, and shipping requirements . . . . The Vice-President, Nuclear Power Services Division . . . shall be responsible for review and approval of such Project Instructions from a technical standpoint . . . ." The inspector reviewed three receiving inspection reports and three shipping inspection reports for PEI Job No. 8306, PO No. K-345 N-1325, for which special handling, receiving, shipping instructions were required. Each had been reviewed and approved in compliance with the QAM procedures and a specific PI for this one project requirement.

No nonconformances were identified.

n. Inspection, Test and Operating Status - The inspector verified that the QAM procedure adequately describes inspection, test, and operating status to comply with Criterion XIV of 10 CFR Part 50, Appendix B; however, no QEP implementing procedures had been provided because PEI does not conduct tests and such activities are not required.

No nonconformances were identified.

o. Nonconforming Materials, Parts, or Components - The inspector verified that the QAM procedure had been implemented by review of the QEP 15.1, "Nonconformance Control," which requires that deficiencies in design and analysis detected during performance of contractual design and analysis projects be reported. Such deficiencies are considered "nonconformances" and are handled in accordance with QEPs or PIs. Where materials, parts, or components are received for specific projects, defective items are tagged as nonconforming and placed in a segregated area. All nonconformances are documented on appropriate forms such as receipt/inspection checklists, notice of anomaly reports, etc. Nonconforming items of a potential safety-related nature are referred to the client and handled in accordance with 10 CFR Part 21 procedures/requirements.

No nonconformances were identified.

p. Corrective Action - The inspector verified that the QAM procedure had been implemented by review of the QEP 16.1, "Corrective Action," which requires that significant conditions adverse to quality shall be reported and that the corrective action includes the cause of the condition and the method to be used to correct the cause to preclude repetition of the condition. All such conditions shall be reported in accordance with applicable QEPs. Items of safety significance will be handled in compliance with 10 CFR Part 21 procedures

No nonconformances were identified.

q. Quality Assurance Records - The inspector verified that the QAM procedure had been implemented by review of the QEPs 17.1, "Quality Assurance Records Storage and Retention"; 17.2, "Project Records Retention", and inspection of project, procurement document, personnel, and quality assurance records files. The inspector verified that the QA department maintains

an index of records including location of lifetime and nonpermanent records. Although the inspector did not examine the permanent duplicate records storage facility, the identity and location of the storage area was obtained. PEI identifies and maintains official QA records of the following types: qualification records of personnel; inspection records; results of reviews, inspections, and audits; records of formal training; design specifications or applicable data; procedural plans; calculations; and analyses.

No nonconforming items were identified.

r. Audits - The inspector verified that the QAM procedure had been implemented by review of the QEPs 18.1, "Quality Audits and Follow-up Corrective Action"; 18.2, "Qualification of Quality Assurance Audit Personnel"; and examination of QA internal and external audit files, management audit files, and QA personnel auditor files. The inspector further reviewed the internal and vendor annual audit schedules including completed audits and annual audits scheduled to be conducted. The inspector verified that the PEI lead auditor and auditor had been qualified in accordance with ANSI N45.2.12 and N45.2.23.

No nonconformances were identified.

3. 10 CFR Part 21 - The inspector verified the QAM procedure, "Reporting of Defects and Noncompliances per 10 CFR 21," had been implemented by examination of the contents of the 10 CFR Part 21 documents and related procedures that were posted in two separate locations in the PEI facilities. One PEI employee was questioned about his knowledge of 10 CFR Part 21 requirements. His comments about receiving Part 21 training was confirmed by review of his personnel training records.

No nonconforming items were identified.

ORGANIZATION: RESEARCH DYNAMICS, INC.
CINCINNATI, OHIO

REPORT NO.: 99900930/83-01	INSPECTION DATE(S) 8/22-24/83	INSPECTION ON-SITE HOURS: 48

CORRESPONDENCE ADDRESS: Research Dynamics, Inc.
ATTN: Dr. J. N. Anno, President
637 Redna Terrace, Unit 1
Cincinnati, Ohio 45215

ORGANIZATIONAL CONTACT: Dr. M. J. Pool, Quality Assurance Officer
TELEPHONE NUMBER: (513) 772-8400

PRINCIPAL PRODUCT: Environmental testing services.

NUCLEAR INDUSTRY ACTIVITY: Research Dynamics, Inc. (RDI) provides equipment and qualification testing services for the commercial nuclear power industry.

ASSIGNED INSPECTOR: SB Parker for — 11/3/83
J. R. Agee, Equipment Qualification Section (EQS) — Date

OTHER INSPECTOR(S): B. E. Bader, Sandia National Laboratories
U. Potapovs, Chief, Vendor Program Branch

APPROVED BY: SB Parker for — 11/3/83
H. S. Phillips, Chief, EQS — Date

INSPECTION BASES AND SCOPE:

A. BASES: 10 CFR Part 50, Appendix B and 10 CFR Part 21.

B. SCOPE: This inspection was conducted to (1) evaluate the RDI test facility; (2) review the QA manual; (3) inspect QA program implementation; (4) inspect 10 CFR Part 21 procedures and implementations; and (5) management exit meeting.

PLANT SITE APPLICABILITY:

50-358

ORGANIZATION: RESEARCH DYNAMICS, INC.
CINCINNATI, OHIO

REPORT NO.: 99900930/83-01	INSPECTION RESULTS:	PAGE 2 of 8

A. VIOLATIONS:

1. Contrary to Section 21.21(a) of 10 CFR Part 21 which was imposed on RDI by the customer, RDI had not developed or adopted the required procedures to provide for evaluating deviations and informing the customer (licensee) in order for the cause of the deviation to be evaluated.

2. Contrary to Section 21.6 of 10 CFR Part 21 which was imposed on RDI by the customer, RDI had failed to post Section 206 of the Energy Reorganization Act of 1974.

3. Contrary to Section 21.31 of 10 CFR Part 21 which was imposed on RDI by the customer, RDI had purchased safety-related testing services without specifying in the purchase order (PO) or test specification that the provisions of 10 CFR Part 21 applied.

B. NONCONFORMANCES:

1. Contrary to Criterion IV of Appendix B to 10 CFR Part 50, RDI's procurement documents did not require the University of Cincinnati, Winkel Cobalt-60 laboratory to provide a quality assurance program which was consistent with the pertinent provisions of 10 CFR Part 50, Appendix B, and commensurate with testing services performed.

2. Contrary to Criterion V of Appendix B to 10 CFR Part 50, RDI had not established implementing procedures for the following criteria: QA program, procurement document control; instructions, procedures, and drawings; document control; control of purchased material, equipment, and services; identification and control of materials, parts, or components; inspection; test control; control of measuring and test equipment; handling, storage, and shipping; inspection, test, and operating status; nonconforming material, parts, or components; corrective action; quality assurance records; and audits.

C. ACTION ON PREVIOUS INSPECTION FINDINGS:

None

ORGANIZATION: RESEARCH DYNAMICS, INC.
CINCINNATI, OHIO

REPORT NO.: 99900930/83-01	INSPECTION RESULTS:	PAGE 3 of 8

D. OTHER FINDINGS OR COMMENTS:

1. Test Facility - The NRC inspector (hereinafter referred to as the inspector) inspected the site facilities and discussed with RDI management the details of their test facilities and capabilities. RDI has, within its facility, in conjunction with the University of Cincinnati's Winkel Cobalt-60 laboratory, capabilities for conducting thermal aging, radiation aging, and loss-of-cooling accident (LOCA) testing of safety-related electrical equipment. This includes adequate high-speed data acquisition systems and calibration capabilities traceable to the National Bureau of Standards (NBS). Seismic testing facilities are nearby and under contract to RDI. Thus, RDI is able to provide full environmental qualification test programs, including expertise and capability, to develop and provide required customer approved test plans and procedures.

2. QA Manual Review - The inspector reviewed the QA manual (QAM) and verified it consists of 16 sections that describe the procedures necessary to comply with the requirements of 16 of the 18 criteria of Appendix B to 10 CFR Part 50. The QAM does not cover design control and special processes, since RDI does not provide new design verification or calculations relating to components. Also, RDI performs no special processes such as nondestructive testing. Within this area of the inspection, no nonconformances were identified.

   The QAM description of some QA functions is vague and presented in a passive manner; for example, the manual should be more assertive in the description of the responsibilities and authorities of the QA department. Some QA activities are described in one section of the manual, whereas, the material is more applicable to another section; for example, material concerning testing procedures and sequence which is currently displayed in Section II would be more aptly presented in Section XI. Within this area, no nonconformances were identified.

3. QA Program Implementation - The inspector verified the implementation of the QA program by examining representative records and files, conducting interviews with personnel, and making visual inspections and observations.

   Comments concerning the implementation of the QA program and procedures relating to the 18 criteria of Appendix B to 10 CFR Part 50 are as follows:

a. Organization - The inspector reviewed RDI's organizational structure including functional responsibilities and authorities of management personnel. The inspector determined from the review that management authorities and responsibilities are delineated in writing and that the QA manager reports directly to the chairman of the corporation. Included in his duties are the identification of quality problems, and the recommendation and implementation of solutions to such problems. Within this area no nonconformances were identified.

b. Quality Assurance Program - The inspector evaluated this criterion by verifying that a QA program was implemented in accordance with the QAM. Sixteen of eighteen criteria of Appendix B to 10 CFR Part 50 were addressed. The inspector verified by review of the personnel records of two employees that indoctrination and training are provided for all employees. Also, audit records indicated that management of the organization regularly reviews the status and adequacy of the QA program; however, no QA implementing procedures for the criterion had been established. See nonconformance item B.2.

c. Design Control - The inspector verified that RDI does not provide services in the area of design control. This criterion does not apply to RDI.

d. Procurement Document Control - The inspector verified that the QAM procedure for this criterion provides limited instructions for "Request for Purchase" but no QA implementing procedure had been prepared and implemented. See nonconformance item B.2.

Three RDI POs that had been issued were reviewed and tracked to final issue. These POs for services and equipment were adequately approved and signed off by the QA department but did not impose 10 CFR Part 50, Appendix B and 10 CFR Part 21 requirements on the subcontractor or vendor. See nonconformance item B.1

e. Instructions, Procedures, and Drawings - The inspector verified the QAM addresses this criterion in a very general manner but does not describe or provide methods for implementing this criterion or the remaining criterion of the QAM whose activities affect quality; i.e., no QA implementing procedure had been provided. See nonconformance item B.2.

f. Document Control - The inspector verified implementation of this criterion by tracking the progress of QA documents, test plans, test procedures, POs, and materials on the way to the document control center and/or to the designated officers, such as, the document controller, QA officer, I&C officer, or purchasing controller. Each of the categories of documents are reviewed and approved by a designated counterpart, the QA manager, or the program manager (president). Changes to these documents are approved by the president or the QA manager. Distribution is designated by the program manager. New documents are assigned specific identification numbers by the document controller. Obsolete documents are marked "Superseded by _____." Disposition of superseded documents are determined by the recipient of the document. Although the functions described above are performed by RDI, they have not been described in QA implementing procedures. See nonconformance item B.2.

g. Control of Purchased Material, Equipment, and Services - The inspector verified implementation of this criterion by examining the material vouchers of incoming equipment (instruments) and verifying that the items received conformed to the procurement documents. The instruments were purchased from vendors from which instruments had been previously purchased and from which "Certificates of Conformance" (COC) had been obtained for the equipment. The inspector did not verify that RDI had audited the suppliers since the COCs had been received. Although RDI followed acceptable practices for this criterion, no QA implementing procedures had been provided. See nonconformance item B.2.

h. Identification and Control of Materials, Parts, and Components - The inspector verified the implementation of this criterion by review of the implementing procedure RDI-INT-110 and tracking the progress of several QA-designated components to the controlled access storage area where the items were tagged and stored. Cross-reference records identified the storage area or the location of the instruments in use. No nonconformances were identified.

i. Control of Special Processes - The inspector verified that RDI does not perform testing activities requiring special processes. This criterion does not apply to RDI.

j. Inspection - The inspector verified the implementation of this criterion by examining the records where the QA department had inspected and monitored pretest and ongoing test activities to verify compliance with procedures; however, no QA implementing procedures for these inspection practices had been written. See nonconformance item B.2.

k. Test Control - The inspector evaluated the QAM requirements by review of the qualification report for item No. 10, RDI-CO-QTR-010 and by observing activities during the preparation, startup, and demonstration of the RDI test facility capability to conduct a LOCA test.

The test, RDI-CO-QTR-010, documents that testing was performed in accordance with the test plan, procedure, IEEE Standards 323-74 and 344-75, and identified acceptance criteria and allowable tolerances.

Although the test activities and test report demonstrated that good technical expertise prevails in the RDI test facility, no written QA procedures had been implemented for performance of qualification tests. See nonconformance item B.2.

l. Control of Measuring and Test Equipment - The inspector verified that this criterion had been implemented by review of Section H, "Equipment Requiring Calibration," of RDI procedure RDI-INT-110 and examining the I&C calibration laboratory records, files, and forms which documented the calibration of equipment and the recall system.

Although the RDI policy letter RDI-INT-106, "Instrument Calibration", RDI-INT-112, "Computerized Equipment File Procedures"; and RDI-INT-129, "Implementation of Computerized Data Base Procedures (RDI-INT-112)" have been proposed with a tentative date for implementation, no control of measuring and test equipment procedures has been implemented. See nonconforming item B.2.

m. Handling, Storage, and Shipping - The inspector verified that this criterion had been implemented by examining records of incoming items, storage, and disposition of the equipment by the I&C officer. Although the inspector verified the equipment was inspected, tagged, and stored in a protected and identified storage area, no QA implementing procedures had been provided for these activities. See nonconformance item B.2.

n. Inspection, Test, and Operating Status - The inspector verified that this criterion had been implemented by examining the test report RDI-CO-QTR-010 and the test facility test log which revealed that ongoing test activities and the test status are well documented; however, no QA implementing procedures for this criterion had been established. See nonconforming item B.2.

o. Nonconforming Materials, Parts, or Components - The inspector verified that this criterion had been implemented by review of the form, "Report of Nonconforming Material," and inspection of the I&C lab where nonconforming items had been identified, tagged, and segregated for disposition. No QA implementing procedure for this criterion had been established. See nonconforming item B.2.

p. Corrective Action - The inspector verified that the QAM described a program for correcting conditions adverse to quality. The QAM required that the cause of the deviation be identified and corrective actions to avoid further nonconformances specified. Since no test corrective action items had been encountered, no examples were reviewed. The QAM adequately addresses this criterion; however, no QA implementing procedure had been provided. See nonconformance item B.2.

q. Quality Assurance Records Program - The inspector verified the QAM describes a program for maintenance of QA records. In this program RDI proposes to maintain duplicate files of test results submitted to their customer. The inspector reviewed PO-RDI-VO-418 for the procurement of a Class D file cabinet for storage of the duplicate test results. No QA procedures for implementation of this criterion had been provided. See nonconformance B.2.

r. Quality Assurance Audits - The inspector verified that QAM requirements had been implemented by review of several audit reports that were filed in the document controller's document control files. The QAM described a program for conducting unannounced monthly audits. No QA procedures were described for implementing this criterion. See nonconformance item B.2.

4. 10 CFR Part 21 - The NRC inspector examined the vendor's 10 CFR Part 21 reporting system and determined: (1) that RDI had not posted 10 CFR Part 21 or Section 206 of the Energy Reorganization Act of 1974; (2) had not adopted appropriate procedures for evaluating deviations and informing the customer; and (3) had not specified in POs for testing services that the provisions of 10 CFR Part 21 applied. See Violations A.1, 2, and 3. Subsequent to the identity of these violations to the RDI management RDI posted 10 CFR Part 21, Section 206 of the Energy Reorganization Act of 1974, and a notice which describes the regulations/procedures, including the name of the individual to whom reports should be addressed and where procedures may be examined.

5. Management Exit Meeting - The inspector met with members of management on August 26, 1983, at the conclusion of the inspection and discussed details of the inspection findings. RDI management acknowledged these findings.

ORGANIZATION: ROBERTSHAW CONTROLS COMPANY
FULTON SYLPHON DIVISION
KNOXVILLE, TENNESSEE

REPORT NO.: 99900722/83-02	INSPECTION DATE(S) 8/8-12/83	INSPECTION ON-SITE HOURS: 33

CORRESPONDENCE ADDRESS: Robertshaw Controls Company
Fulton Sylphon Division
ATTN: Mr. W. T. Moon
General Manager
2318 Kingston Pike, S.W.
Knoxville, Tennessee 37901
ORGANIZATIONAL CONTACT: Mr. J. W. Giesler, Quality Engineer
TELEPHONE NUMBER: (615) 546-0550

PRINCIPAL PRODUCT: Thermostatic and control valves, liquid level switches, and pressure gages.

NUCLEAR INDUSTRY ACTIVITY: Manufacture of parts for the nuclear industry constitutes less than 1/2 percent of the corporate product.

ASSIGNED INSPECTOR: J. Barnes for Wm. D. Kelley, Reactive and Component Program Section (R&CPS) — 9/27/83 Date

OTHER INSPECTOR(S):

APPROVED BY: I. Barnes, Chief, R&CPS — 9/27/83 Date

INSPECTION BASES AND SCOPE:

A. BASES: 10 CFR Part 21 and 10 CFR Part 50, Appendix B.

B. SCOPE: The inspection included review of quality assurance program, status of previous inspection findings, design and document control, nonconformances and corrective action, manufacturing process control, and audits.

PLANT SITE APPLICABILITY:

Not identified.

ORGANIZATION: ROBERTSHAW CONTROLS COMPANY
FULTON SYLPHON DIVISION
KNOXVILLE, TENNESSEE

REPORT NO.: 99900722/83-02	INSPECTION RESULTS:	PAGE 2 of 5

A. VIOLATIONS:

None

B. NONCONFORMANCES:

1. Contrary to paragraph II.A of the Robershaw Controls Company (RCC) letter dated May 25, 1983, in-process inspection had not been brought into full compliance with paragraph 5.2 of the Quality Policy and Procedures Manual (QPPM) as evidenced by the failure to perform required inspection of the 5/8-inch diameter characteristics for the Shop Order 33928 stem assembly, and the four stem assemblies contained in Shop Order 34582.

2. Contrary to Criterion V of Appendix B to 10 CFR Part 50, paragraph 1.2.2 of ANSI B16.5-1977 and General Note of Figure X1-3120-1 to Section III of the ASME Code, machined 5-inch, 150-pound ASME Section Code Class 3 regulating valve bodies were noted to not contain the ASME code required radius at the flange hub. Review of the applicable drawing (i.e., No. N-20135-D1) showed that a radius requirement had not been specified at this location.

3. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 3.1.8 of the QPPM, only a small percentage of gages scheduled for periodic inspection from August 1 to August 10, 1983, had been inspected by the Gage Laboratory personnel.

C. UNRESOLVED ITEMS

None

D. STATUS OF PREVIOUS INSPECTION FINDINGS:

1. (Closed) Unresolved Item (Report No. 99900722/80-01): Flanges for 5-inch, 150-pound ASME Section III Code Class 3 carbon steel regulating valve bodies had been backfaced in accordance with RCC Drawing No. N-20135-D1, Revision B, which did not specify a radius at the flange hub.

   The NRC inspector reviewed three RCC interdepartmental correspondences and verified that the chief project engineer had reviewed ASNI B16.5-1977, ANSI B16.34-1977, and Section III of the ASME Code and stated, ". . . I arrived at the conclusion that the radius is not specified at the point in question." This review did not apparently take into account the ASME Code requirement that

integral type flanges with a hub slope adjacent to the flange of less than 1:3 have a fillet radius at least 0.25 of the wall thickness, but not less than 3/16 inch. This was identified as a nonconformance (see paragraph B.2).

2. (Closed) Violation (Report No. 99900722/83-01): Posted copies of 10 CFR Part 21, Section 206 of the Energy Reorganization Act of 1974, and procedures adopted pursuant to the regulations, had not been placed in a conspicuous position available to shop personnel concerned with the manufacture of safety-related equipment.

   The NRC inspector verified that the December 30, 1982, revision of 10 CFR Part 21, Section 206 of the Energy Reorganization Act of 1974, and RCC Inspection Instruction Index No. 33.237, Revision 0, had been posted on the plant main bulletin board, in the office of the Director of Quality and in the Quality Office.

3. (Open) Nonconformance (Report No. 99900722/83-01): In-process inspection had not been performed as evidenced by lack of records for eight spring and stem assemblies (82158-C1, Revision G) at the final inspection station, and the establishment by the NRC inspector that the assemblies were dimensionally nonconforming.

   A partial review was made by the NRC inspector of this item, although correspondence had not been completed with the vendor in regard to nonconformance corrective actions.

   The NRC inspector verified by review of Form F-269 for the stem assembly (82158-C1) that the eight stem assemblies had been reinspected on March 14, 1983. However, evidence was not available which would indicate that in-process inspection had been brought into full compliance with paragraph 5.2 of the QPPM as committed by the RCC letter of May 25, 1983, in that the required inspection of the 5/8-inch diameter characteristic had not been performed for the Shop Order 33928 stem assembly and the four stem assemblies contained in Shop Order 34582. This was identified as a nonconformance (see paragraphs B.1).

E. OTHER FINDINGS OR COMMENTS:

1. Review of Quality Assurance Program:

   a. The NRC inspector reviewed the RCC QPPM applicable to non-ASME manufactured items and ascertained that MIL-I-45208A was used

by RCC as a guide for establishing the QPPM contents. RCC concurred with the NRC inspector that the manual did not meet the requirements of Appendix B to 10 CFR Part 50.

b. The NRC inspector reviewed the ASME accepted RCC Quality Assurance Manual for the manufacture of nuclear power system components. No nonconformances or unresolved items were identified in this area of the inspection.

2. Manufacturing Process Control:

a. Nuclear contracts were not in production during the time of this inspection.

b. The NRC inspector reviewed both quality assurance programs (ASME and non-ASME products) and inspected the plant facilities. It was established that: (1) drawings were available at the work station as stated in the program; (2) roving and final inspections were conducted and the results recorded on Forms F-269 (Results of Inspection), F-157 (Quality Control Process Inspection Records) or F-837 (Record of First Article Inspection); (c) the gages on welding equipment had been calibrated and the calibration was current; and (d) process cards and quality control procedure cards were at the work stations.

c. It was ascertained that only limited inspection of gages (calibration) had been performed from August 1 to August 10, 1983. The QPPM lists the inspection interval in production days and it was noted by the NRC inspector that the specified intervals had been exceeded for most of the gages. This was identified as a nonconformance (see paragraph B.3).

3. Design and Document Control:

a. The NRC inspector reviewed both quality assurance manuals (ASME and non-ASME products), one seismic qualification report for a 6-inch temperature regulator, three stress calculation reports for temperature regulators, and a design report for one liquid level control. It was verified that the design of products was controlled and documented in accordance with the requirements of the applicable quality assurance program.

b. The NRC inspector observed that a few corrections had been made to a design calculation using "white-out". RCC concurred that this was a poor practice for making corrections and stated that the use of "white-out" would be discontinued.

No nonconformances or unresolved items were identified within this area of inspection.

4. Nonconformance and Corrective Action: The NRC inspector reviewed the nonconformance log, selected nuclear nonconformity reports, 10 check lists, 3 measuring and test equipment records, 1 heat treatment chart, 14 radiographs, 1 radiographic procedure, 1 welding procedure, and 1 liquid penetrant procedure. The NRC inspector verified from this review that nonconformances were being identified, dispositions made, and corrective actions completed in accordance with the requirements of the quality assurance program.

5. Audits:

a. Internal Audits - The NRC inspector reviewed the internal audit report for 1982 and verified that it had been conducted in accordance with the requirements of the ASME accepted quality assurance program and that the 15 audit findings had been satisfactorily resolved.

b. Vendor Audits - The NRC inspector reviewed both quality assurance manuals (ASME and non-ASME products), the approved vendors list, and three vendor files. It was ascertained that: (1) audits of non-ASME product material vendors are not required and the product quality is controlled by receiving inspection; and (2) audits were either performed by RCC on vendors supplying items for ASME Code stamped products, or a current copy of the ASME Quality System Certificate was in the file for the vendor.

No nonconformances or unresolved items were identified within this area of the inspection.

ORGANIZATION: THE ROCKBESTOS COMPANY
A MEMBER OF THE MARMON GROUP
WALLINGFORD, CONNECTICUT (NEW HAVEN PLANT)

REPORT NO. 99900277/83-01	INSPECTION DATE(S) 6/6-10/83	INSPECTION ON-SITE HOURS: 97

CORRESPONDENCE ADDRESS: The Rockbestos Company
A Member of the Marmon Group
ATTN: Mr. E. S. Reed, Vice President
and General Manager
P. O. Box 778
Wallingford, Connecticut 06492
ORGANIZATIONAL CONTACT: Mr. G. G. Littlehales, Manager, Quality Assurance
TELEPHONE NUMBER: (203) 265-6500

PRINCIPAL PRODUCT: Insulated wire and cable.

NUCLEAR INDUSTRY ACTIVITY: Currently the testing laboratory located at the New Haven Plant conducts all loss-of-coolant accident (LOCA) simulations, thermal aging, and flame tests performed for safety-related electrical qualification tests for Rockbestos produced cable and wire. Nuclear-related manufacturing effort at the New Haven Plant now accounts for approximately two percent of the plant's total output.

ASSIGNED INSPECTOR: A. L. Smith 8/2/83
A. L. Smith, Equipment Qualification Section (EQS) Date

OTHER INSPECTOR(S): L. B. Parker, Reactive and Component Program Section
H. S. Phillips, Chief, EQS
L. D. Bustard, Sandia National Laboratories

APPROVED BY: H. S. Phillips 9/6/83
H. S. Phillips, Chief, EQS Date

INSPECTION BASES AND SCOPE:

A. BASES: 10 CFR Part 50, Appendix B and 10 CFR Part 21.

B. SCOPE: This inspection consisted of: (1) a review of the 18 criteria of 10 CFR Part 50, Appendix B described in the Rockbestos Quality Assurance Manual (QAM) and associated procedures; (2) verification that the applicable criteria of the quality assurance (QA) program had been implemented in
(cont. on next page)

PLANT SITE APPLICABILITY: Docket Nos. 50-206, 50-208, 50-213, 50-220, 50-237, 50-245, 50-249, 50-250, 50-251, 50-255, 50-263, 50-265, 50-266, 50-277, 50-278, 50-282, 50-286, 50-293, 50-295, 50-301, 50-304, 50-305, 50-306, 50-309, 50-313, 50-317, 50-318, 50-333, 50-335, 50-336, 50-361, 50-362, 50-368, 50-369, 50-373,
(cont. on next page)

SCOPE: (Cont.) compliance with their written procedures; (3) 10 CFR Part 21 inspection; and (4) status of previous inspection findings.

PLANT SITE APPLICABILITY: (Cont.) 50-374, 50-377, 50-389, 50-409, 50-410, 50-413, 50-414, and 50-508.

A. VIOLATIONS:

Contrary to Section 21.31 of 10 CFR Part 21, Rockbestos procured safety-related testing services from Isomedix, Inc. without specifying in the procurement documents that the provisions of 10 CFR Part 21 applied.

B. NONCONFORMANCES:

1. Contrary to the requirements of Criterion V of Appendix B to 10 CFR Part 50 and paragraph 19.1.1 of the Rockbestos QAM, Rockbestos had not performed the required annual audits of the safety-related equipment qualification test area prior to May 10, 1983; however, purchase orders dating back to 1974 required testing under the controls of 10 CFR Part 50, Appendix B.

2. Contrary to the requirements of Criterion V of Appendix B to 10 CFR Part 50 and paragraph 13.10 of the Rockbestos QAM, there was no documented evidence available to indicate that the required evaluation of the Robertshaw recorder calibration discrepancy had been performed.

3. Contrary to the requirements of Criterion V of Appendix B to 10 CFR Part 50 and Sections III.1 and IV.1 of Rockbestos Quality Procedure No. Q-9, test plans prepared by Rockbestos did not contain the identification of the individual(s) who prepared them and had not been reviewed and approved by appropriately qualified personnel.

4. Contrary to the requirements of Criterion V of Appendix B to 10 CFR Part 50 and Section II of the Rockbestos Technical Manual for Class 1E Qualification Tests (TMQT), the test plan for RSS-6-109/LE did not include the chemical spray requirements contained in the governing specification (X3AJ04) or describe the method to be used to monitor electrical loading requirements.

5. Contrary to the requirements of Criterion V of Appendix B to 10 CFR Part 50 and Section 8 of the Rockbestos Technical Manual for Class 1E qualification tests, there was no evidence to indicate that Rockbestos was documenting, evaluating, and dispositing unanticipated test variations, nonconformances, or deviations.

6. Contrary to the requirements of Criterion V of Appendix B to 10 CFR Part 50 and Section 17.4 of the Rockbestos QAM, Rockbestos had not established corrective action system for qualification testing of safety-related cable.

7. Contrary to Criterion X of Appendix B to 10 CFR Part 50, the Rockbestos QA program did not provide for inspection and/or monitoring of activities affecting the quality of their safety-related testing effort.

8. Contrary to the requirements of Criterion XI of Appendix B to 10 CFR Part 50 and customer specification X3AJ04, the Rockbestos test instrumentation was not adequate to demonstrate that the required LOCA parameters were achieved.

9. Contrary to the requirements of Criterion XI of Appendix B to 10 CFR Part 50 and Section 3.3 of customer specification X3AJ04, no documented evidence was available to indicate that the pH was monitored during test report QR 3803.

10. Contrary to the requirements of Criterion XI of Appendix B to 10 CFR Part 50 and the test plan for RSS-6-109 testing (dated November 22, 1982), no documented evidence was available to indicate that the cables were continuously energized with a voltage potential of 600 VAC.

11. Contrary to the requirements of Criterion XI of Appendix B to 10 CFR Part 50, Rockbestos had not performed an adequate technical evaluation of test results as evidenced by conflicts between the test results contained in test report QR 3803 and the supporting test data.

C. UNRESOLVED ITEMS:

None

D. STATUS OF PREVIOUS INSPECTION FINDINGS:

1. (Open) Nonconformance (82-03): The NRC Region IV report contained 11 nonconformances identified during the NRC inspection of August 16-20, 1982, at the New Haven and Wallingford, Connecticut, facilities. During this NRC inspection (June 6-10, 1983), no subsequent actions were taken by the NRC inspector concerning these nonconformances, because Region IV has not completed the evaluation of Rockbestos' written response to the 82-03 inspection report.

2. (Open) Nonconformances and Unresolved Items (82-02): The NRC Region IV report for the inspection conducted May 4-5, 1982, at the East Granby, Connecticut, facility identified 14 nonconformances and 3 unresolved items. No action was taken concerning these items during this inspection pending Region IV evaluation of the Rockbestos response to the 82-02 report.

3. (Open) Followup Item (81-01): Evaluation of the original qualification testing of the RSS-6-100 series coaxial cable. In May, 1981, General Atomic Company submitted a 10 CFR Part 21 report reporting a failure of Rockbestos RSS-6-104 coaxial cable during main steam line break and oven tests. Rockbestos responded to this failure by (a) redesigning the construction of the coaxial and triaxial cable series; (b) performing qualification type tests on the "newer" second and third generation coaxial and triaxial cables; (c) recognizing that the redesign causes an additional technical concern for the larger diameter members of the RSS-6-100 series cables (for example RSS-6-109); and (d) performing specialized qualification tests for a customer on the RSS-6-109 cables to alleviate qualification concerns.

   In spite of the extensive effort, the information obtained during this inspection raises questions as to whether qualification has been adequately demonstrated by the Rockbestos effort. Several technical concerns or problems were identified by the inspection team:

   a. Inadequate Type Test Data: The NRC inspection team determined that test documentation was inadequate or nonexistent. Rockbestos engineers did not: (1) analyze, evaluate, disposition, and record test variations, deviations, or nonconformances. Raw data showed multiple drops in temperature

and pressure during LOCA testing; however, the final report profiles did not show these drops and the report does not describe any evaluation or conclusion reached regarding the raw data versus the final report profile (see nonconformances B.5 and B.11); (2) the test plan required that the cables being tested be continuously energized with a voltage potential of 600 VAC, however, raw test data/records did not show that this was accomplished (see nonconformance B.10); and (3) specification X3AJ04 required that a specific pH be maintained; however, neither test data/records nor interviews with test personnel could demonstrate that this test requirement was met (see nonconformance B.9).

b. Questionable Test Strategy: Qualification of RSS-6-109 triaxial cable experienced electrical failure during several Rockbestos tests. Each of these tests employed a thermal aging-irradiation-steam test sequence. Thermal aging exposures of 7 days at 150°C, 29 days at 120°C, and 83 days at 110°C were employed. The failure mode, as explained by Rockbestos, was that thermal expansion of the dielectric results in extrusion of the dielectric insulation through the metallic braid. During aging, the extruded dielectric is oxidized and upon cooling does not contract to its original position prior to the thermal exposure. The nonextruded dielectric, however, does contract, producing voids in the insulation. Rockbestos has never experienced this problem when unaged RSS-6-109 cable is exposed to a LOCA environment. Speculatively, several reasons may explain the nonoccurrence of voids during LOCA testing of unaged cable: (1) Rockbestos has always irradiated the cables to 200-220 Mrad prior to the LOCA exposure. The irradiation may harden the dielectric and mitigate the degradation mechanism. It is interesting to note that Rockbestos performed an irradiation-thermal aging-steam test sequence on RSS-6-109 cables and did not observe electrical failures. The aging exposure was 7 days at 150°C; (2) oxygen necessary for oxidation of the extruded dielectric is swept from the steam chamber at the start of the LOCA simulation; and (3) the temperature exposures of LOCA simulations are of shorter duration than those employed by Rockbestos during its thermal aging exposures. The first two speculative reasons are artifacts of qualification testing techniques. For example, performing a steam exposure on unirradiated, unaged specimens would verify whether irradiation mitigates void formation. It would also simulate actual accident conditions for a recently installed cable. If the test chamber had an

overpressure of oxygen applied during the steam application, then an oxidation atmosphere would be present. Rockbestos engineers did not consider these factors during retesting of the subject cable.

c. Inadequate Instrumentation: Instrumentation (a 7-day circular chart) lacked resolution to demonstrate ramp times of the steam chamber used to simulate LOCA in accordance with IEEE Standard 323 and customer specification X3AJ04. Therefore raw data does not demonstrate that ramp times to achieve required pressure and temperature requirements were met. Test report QR 3803, dated April 22, 1983, presents a data profile described as "Test actually performed by Rockbestos." This profile has a ramp from 100°F to 440°F in 10 seconds; however, test report QR 3803 states: "The test chamber was prewarmed to approximately 300°F at 100 psig." The test file notes indicate that an additional 3 minutes were required to heat from 300°F to 420°F. Therefore, there appears to be an obvious misrepresentation of the actual versus the reported profile (see nonconformance B.8).

There was no instrumentation to monitor: (1) chemical spray rate or pH; (2) energized cable; and (3) functionability for equipment tested per NUREG-0588, Sections 2.2(7) and 2.2(9) for test report QR 3803 (see nonconformances B.9 and B.10).

Test report QR 3803, dated April 22, 1983, indicates that the temperature controller has a range of 100-400°F and an accuracy of ± 1%. During the testing, the controller was used to monitor temperatures above 400°F. Also, during a previous test starting on March 3, 1983, this controller was shown to be out of calibration by 20-30°F for temperatures between 300 and 340°F. The controller was not recalibrated prior to the test documented in test report QR 3803. Therefore, the test report misstates the actual instrumentation accuracy (see nonconformance B.2).

The humidity bath temperature indicator, electrical test set No. 2567, and chemical spray flow meter were not covered under Rockbestos calibration system.

d. Test Failures:

A test plan (undated) describing a qualification test for RSS-6-109 cables required a 200 VAC withstand test between the two shields of the triaxial cable. All cables tested failed to

hold voltage during these tests. The test plan is not clear whether these tests were for engineering information or part of the acceptance criteria. The test report written to describe this test, QR 3803, dated April 22, 1983, does not mention the voltage tests nor the test results (see nonconformance B.11).

E. OTHER FINDINGS OR COMMENTS:

1. Quality Assurance Manual: The NRC inspection team performed an in-depth review/evaluation of the Rockbestos QAM to assure that the Rockbestos quality assurance program addresses and is consistent with all applicable regulatory requirements. The basic Rockbestos QAM, consisting of 19 sections, was written to meet the requirements of MIL-I-45208A, 10 CFR Part 50, Appendix B, and ANSI N45.2-1977.

   The NRC inspection team identified the nonconformance discussed in paragraph B.7 above during the review of the Rockbestos written quality assurance program. This nonconformance is significant because the quality organization never independently and randomly monitored environmental qualification testing of Rockbestos cable which was manufactured and tested for use in a harsh environment.

2. Supplemental Quality Assurance Procedures: The NRC inspection team performed an in-depth evaluation of various quality assurance procedures used to supplement the basic QAM, each of which is of a limited scope and describes in detail a specific area of the quality operation. The specific procedures evaluated were as follows:

   a. Qualification Test Procedure Manual
   b. Technical Manual for Class 1E Qualification Tests
   c. Receiving Inspection (Q-7B)
   d. Vendor Quality Survey (Q-1B)
   e. 10 CFR Part 21 Reporting Procedure (Q-27)
   f. Requirements for Auditing of QA Program (Q-30)
   g. Document Control (Q-9B)
   h. Training Outlines - QA/QC Personnel (Q-25B)

   No nonconformances were identified.

3. Quality Assurance Program Implementation: The NRC inspection team verified the implementation of the Rockbestos QAM and supplemental procedures by examining representative documents and records, interviewing inspection and test personnel, and by visual observations and inspections.

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

a. Organization: The NRC inspector verified the implementation of this criterion by interviewing key management and work level personnel to determine their understanding of their authority, responsibilities, and duties relative to environmental qualification testing. Organization charts were compared with actual staffing patterns. Interviews were conducted to determine whether personnel have organizational freedom to identify nonconformances, deviations, or quality deficiencies.

No nonconformances were identified.

b. Quality Assurance Program: The NRC inspection team verified that this criterion was implemented by verifying that the remaining 17 criteria of 10 CFR Part 50, Appendix B had been implemented as described in the QA and supplemental procedures. (See the evaluation of these criteria in other paragraphs of this section of the report.)

The indoctrination and training of two test personnel were verified by reviewing the position descriptions and certifications of qualification which were based on education, experience, and training. The test engineer was interviewed to verify that the QA program manual and the 10 CFR Part 21 procedures had been reviewed and were understood.

The QA manager had performed an annual review to determine the status and adequacy of the QA program and written reports had been submitted to the vice president of technology.

Nonconformances identified as described in B.1 through 11 appear to be a serious breakdown in the QA program for controlling environmental qualification testing of safety-related equipment; however, this area will be further evaluated during a subsequent inspection to determine if the nonconformances are limited to Rockbestos cable RSS-6-109 or whether these conditions are generic.

c. Design Control: The NRC inspector determined that Rockbestos designs safety-related equipment, test fixtures, and translates applicable design requirements to test plans/procedures. Three test plans were examined to determine that design requirements were translated into the plan in accordance with the Rockbestos QAM.

No nonconformances were identified.

d. Procurement Document Control: The NRC inspector reviewed three Rockbestos purchase orders, each of which related to nuclear equipment qualification, to verify that Rockbestos was processing procurement documents in accordance with their written procedures.

No nonconformances were identified.

e. Instructions, Procedures, Drawings: The NRC inspector verified implementation of the Rockbestos procedures, as they relate to this criterion, by reviewing 6 customer purchase orders, 36 associated changes, 3 customer specifications and the associated Rockbestos test reports.

No nonconformances were identified.

f. Document Control: The NRC inspector reviewed two qualification and test manuals, two test plans, and changes to these documents to verify that review, approval and issuance were accomplished in accordance with written procedures.

The nonconformance discussed in paragraph B.3 above was identified.

g. Control of Purchased Material, Equipment, and Services: The NRC inspector verified the implementation of the Rockbestos written procedures for this criterion by evaluating one audit of a vendor supplying testing services and three certificates of conformance.

No nonconformances were identified.

h. Identification and Control of Materials, Parts, and Components: The NRC inspector verified the implementation of the Rockbestos written procedures relative to this criterion by selecting two specimens that had been irradiated and establishing identification and traceability.

No nonconformances were identified.

i. Control of Special Processes: Not applicable to the equipment qualification effort.

j. Inspection: As indicated in paragraph B.5 above, Rockbestos had not established the required inspection program for monitoring or inspecting of activities affecting the quality of their equipment qualification testing. The NRC inspector examined test logs and data sheets to verify that the quality control department had not documented their participation in monitoring or inspecting the actual tests.

No nonconformances were identified in this area relative to program implementation because as noted above one nonconformance was identified relating to the failure to establish written procedures (see paragraph B.7). Therefore, implementation had not occurred. This item will be evaluated during a future inspection after a procedure is established and implemented.

k. Test Control: The NRC inspectors' verification of the implementation of Rockbestos written procedures concerning this criterion was limited to the tests conducted relative to the review of the item discussed in paragraph D.3 above.

The nonconformances discussed in paragraphs B.4, B.8, B.9, B.10, and B.11 were identified. These nonconformances represent a significant breakdown in the control of testing in this instance. Additional evaluations of other tests will be performed during a future inspection to determine if these findings are isolated or generic.

l. Control of Measuring and Test Equipment: The NRC inspector evaluated the implementation of the Rockbestos written procedures relative to this criterion to determine if

measuring and test equipment was being controlled. The last three annual calibration reports were reviewed and seven items of test equipment were examined to verify status of calibration and traceability. During this review three items of test equipment that were outside the calibration frequency date were identified; however, after a subsequent implementation review of Criterion XVIII (audits), it was established that during the Rockbestos internal audit of May 10, 1983, these same three items had been identified. Since the Rockbestos QA system had already identified these deficiencies, no additional nonconformances were identified; however, this will be a followup item during the next NRC inspection.

No nonconformances were identified; however, the Rockbestos audit report documented a significant breakdown in the calibration and measurements system that existed for several years during which EQ testing was conducted.

m. Handling, Storage, and Shipping: The NRC inspector did not perform an implementation review of the written procedures relating to this criterion. This will be accomplished during a future inspection.

n. Inspection, Test and Operating Status: No implementation review concerning this area was accomplished; hence, this will be evaluated during a subsequent inspection.

o. Nonconforming Material, Parts, or Components: This area is addressed in Section 8 of the Rockbestos Technical Manual for Class 1E qualification tests; however, its provisions had not been implemented.

The nonconformance discussed in paragraph B.5 above was identified.

p. Corrective Action: Section 17.4 of the Rockbestos QAM states, "The corrective action process shall be applicable to nuclear safety-related cable qualification test activity." The NRC inspector determined that a corrective action system had not been implemented because implementing procedures did not describe how the system worked; therefore, corrective actions were not documented (see nonconformance B.6).

q. Quality Assurance Records: The NRC inspector did not examine the implementation of the Rockbestos written procedures concerning this criterion during this inspection. This area will be evaluated during a future inspection.

r. Audits: The NRC inspector reviewed three audits and response to the audit findings. These audits were accomplished in accordance with the Rockbestos written procedures; however, only one audit (dated May 10, 1983) had been performed in the equipment qualification area.

The nonconformance discussed in paragraph B.1 above was identified and represents a significant breakdown in the Rockbestos QA program which contributed to a failure to identify unacceptable EQ testing, a failure to document test results, and a failure to maintain an acceptable calibration system.

4. Implementation of 10 CFR Part 21: The NRC inspector reivewed the Rockbestos written procedure concerning 10 CFR Part 21 and verified that the required documents had been posted in the New Haven plant. Three purchase orders were reviewed to determine if Rockbestos had imposed the requirement of 10 CFR Part 21 on the firm performing radiation aging of safety-related electrical equipment. Rockbestos purchase order No. 16715 issued to Isomedix, Inc. for safety-related testing services did not impose the requirements of 10 CFR Part 21 upon Isomedix; however, it should be noted that two purchase orders issued subsequent to No. 16715 did contain 10 CFR Part 21 requirements.

The violation discussed in paragraph A above was identified.

ORGANIZATION: THE ROCKBESTOS COMPANY
A MEMBER OF THE MARMON GROUP
WALLINGFORD, CONNECTICUT (NEW HAVEN PLANT)

REPORT NO.: 99900277/83-02	INSPECTION DATE(S) 6/20-23/83	INSPECTION ON-SITE HOURS: 96

CORRESPONDENCE ADDRESS: The Rockbestos Company
A Member of the Marmon Group
ATTN: Mr. E. S Reed
Vice President
P. O. Box 778
Wallingford, Connecticut 06492

ORGANIZATIONAL CONTACT: Mr. G. G. Littlehales, Manager, Quality Assurance

TELEPHONE NUMBER: (203) 265-6500

PRINCIPAL PRODUCT: Insulated wire and cable.

NUCLEAR INDUSTRY ACTIVITY: Currently, the testing laboratory located at the New Haven Plant conducts all loss-of-coolant accident (LOCA) simulations, thermal aging, and flame tests performed for safety-related electrical qualification tests for Rockbestos produced cable and wire. Nuclear-related manufacturing effort at the New Haven Plant now accounts for approximately 2 percent of the plant's total output.

ASSIGNED INSPECTOR: L B Parker for — 11/1/83
A. L. Smith, Equipment Qualification Section (EQS) — Date

OTHER INSPECTOR(S): L. B. Parker, EQS
L. D. Bustard, Sandia National Laboratories
J. Benson, Sandia National Laboratories

APPROVED BY: S. B. Parker for — 11/1/83
H. S. Phillips, Chief, EQS — Date

INSPECTION BASES AND SCOPE:

A. BASES: 10 CFR Part 50, Appendix B and 10 CFR Part 21.

B. SCOPE: This inspection consisted of: (1) status of previous inspection findings; (2) a completion of the inspection (began during the 83-01 inspection) to determine if Rockbestos had implemented its quality assurance (QA) program in accordance with its written procedures; and (3) a technical review of the equipment qualification test data for various Rockbestos cables.

PLANT SITE APPLICABILITY: Docket Nos. 50-206, 50-208, 50-213, 50-220, 50-237, 50-245, 50-249, 50-250, 50-251, 50-255, 50-263, 50-265, 50-266, 50-277, 50-278, 50-282, 50-286, 50-293, 50-295, 50-301, 50-304, 50-305, 50-306, 50-309, 50-313, 50-317, 50-318, 50-333, 50-335, 50-336, 50-361, 50-362, 50-368, 50-369, 50-373, 50-374, 50-377, 50-389, 50-409, 50-410, 50-413, 50-414, and 50-508.

ORGANIZATION: THE ROCKBESTOS COMPANY
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A. VIOLATIONS:

None

B. NONCONFORMANCES:

1. Contrary to the requirement of Criterion II of Appendix B to 10 CFR Part 50, Rockbestos failed to establish and implement an adequate QA program for its safety-related equipment qualification (EQ) testing effort. This is evidenced by the number of generic deficiencies identified during this inspection. Examples are: (1) numerous calibration system deficiencies; (2) use of inadequate test instrumentation; (3) engineering's failure to develop, review, and approve test plans; (4) engineering's failure to describe and require test requirements; (5) engineering's failure to identify and evaluate test nonconformances, variations, and deviations during testing and document the same in test reports; (6) engineering's failure to perform adequate evaluations of test results; (7) technical inconsistencies between raw test data and final EQ test reports; and (8) the quality assurance and control organization's failure to audit/monitor EQ testing.

2. Contrary to the requirement of Criterion XVII of Appendix B to 10 CFR Part 50, Rockbestos did not maintain the records required to provide documentary evidence of activities affecting their EQ testing effort. In addition, in numerous instances, the records that they did maintain were not identifiable and retrievable. Therefore, records were not auditable in these instances.

C. UNRESOLVED ITEMS:

None

D. STATUS OF PREVIOUS INSPECTION FINDINGS:

1. (Open) Nonconformance (82-03): The NRC Region IV report contained 11 nonconformances identified during the NRC inspection of August 16-20, 1983, at the New Haven and Wallingford, Connecticut, facilities. During this NRC inspection (June 20-23, 1983), no subsequent actions were taken by the NRC inspector concerning these nonconformances because Region IV has not completed the evaluation of Rockbestos' written response to the 82-03 inspection report.

2. (Open) Nonconformances and Unresolved Items (82-02): The NRC Region IV report for the inspection conducted May 4-5, 1982, at the East Granby, Connecticut, facility identified 14 nonconformances and 3 unresolved items. No action was taken concerning these items during this inspection pending Region IV evaluation of the Rockbestos response to the 82-02 inspection report.

3. (Open) Followup Item (81-01): Evaluation of the original qualification testing of the RSS-6-100 series coaxial cable. In May 1981, General Atomic Company submitted a 10 CFR Part 21 report reporting a failure of Rockbestos RSS-6-104 coaxial cable during main-steam-line-break (MSLB) and oven tests. Rockbestos responded to this failure by (a) redesigning the construction of the coaxial and triaxial cable series; (b) performing qualification type tests on the "newer" second and third generation coaxial and triaxial cables; (c) recognizing that the redesign causes an additional technical concern for the larger diameter members of the RSS-6-100 series cables (for example RSS-6-109); and (d) performing specialized qualification tests for a customer on the RSS-6-109 cables to alleviate qualification concerns. This item was examined extensively during the inspection of June 6-10, 1983, and a number of questions concerning whether qualification had been demonstrated by the Rockbestos effort were raised. These concerns were outlined in the 83-01 inspection report and this item will remain open pending the Region IV evaluation of the Rockbestos response to the 83-01 inspection report.

E. OTHER FINDINGS OR COMMENTS:

1. Quality Assurance Program Implementation: During the previous inspection (83-01) the NRC inspection team evaluated the implementation of the majority of the Rockbestos Quality Assurance Manual (QAM) and supplemental procedures. During this inspection, the remainder of the implementation review was completed by examining representative documents and records and by visual observations and inspections.

   Comments concerning the evaluation of the QA program and its implementation keyed to each of the remaining criterion of Appendix B to 10 CFR Part 50 are as follows:

   a. Handling, Storage, and Shipping: The NRC inspector verified implementation of the Rockbestos procedures, as they relate to this criterion, by examining a number of cable/wire samples on one mandrel.

2. (Open) Nonconformances and Unresolved Items (82-02): The NRC Region IV report for the inspection conducted May 4-5, 1982, at the East Granby, Connecticut, facility identified 14 nonconformances and 3 unresolved items. No action was taken concerning these items during this inspection pending Region IV evaluation of the Rockbestos response to the 82-02 inspection report.

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   Comments concerning the evaluation of the QA program and its implementation keyed to each of the remaining criterion of Appendix B to 10 CFR Part 50 are as follows:

   a. Handling, Storage, and Shipping: The NRC inspector verified implementation of the Rockbestos procedures, as they relate to this criterion, by examining a number of cable/wire samples on one mandrel.

      No nonconformances were identified.

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b. Inspection, Test, and Operating Status: As indicated in the 83-01 inspection report, Rockbestos had not established the required inspection program for monitoring and inspecting activities affecting the quality of their EQ testing. This item will be evaluated after Rockbestos has completed corrective action related to the 83-01 inspection report.

c. Quality Assurance Records: The NRC inspection team reviewed numerous EQ testing data packages during this inspection. Deficiencies related to the Rockbestos EQ quality assurance records are discussed in the nonconformance identified in paragraph B.2 and paragraph E.3.d below which identifies generic nonconformances with respect to Rockbestos' failure to adequately document test data and results.

d. QA Program: During this inspection, the NRC inspectors reviewed and evaluated additional qualification reports (QR) and associated test data packages as follows: QR 7801, QR 1804, QR 1804A, QR 1806, QR 1807, QR 1807R, QR 1807R1, QR 1807R2, QR 1808, QR 1811, QR 2806, QR 2806S, QR 2806S(1), QR 2806S(2), QR 2806S(3), QR 2810, QR 2811, QR 2813. QR 3802, QR 3803, and QR (no number) dated February 10, 1980. The results of this review and evaluation were correlated to each of the nonconformances (B.1-11) previously identified during the first inspection and documented in NRC Inspection Report No. 99900277/83-01 to determine if the conditions were generic. Each nonconformance (B.1-11) which was based on the review of one test report (QR 3803) and associated data packages is quoted below and is followed by a finding that indicates whether the conditions identified during the first inspection are generic to the additional 21 test reports and data reviewed during this inspection.

"1. Contrary to the requirements of Criterion V of Appendix B to 10 CFR Part 50 and paragraph 19.1.1 of the Rockbestos QAM, Rockbestos had not performed the required annual audits of the safety-related equipment qualification test area prior to May 10, 1983; however, purchase orders dating back to 1974 required testing under the controls of 10 CFR Part 50, Appendix B."

Finding: This nonconformance applies to all of the previously referenced qualification reports and associated data review.

"2. Contrary to the requirements of Criterion V of Appendix B to 10 CFR Part 50 and paragraph 13.10 of the Rockbestos QAM, there was no documented evidence available to indicate that the required evaluation of the Robertshaw recorder calibration discrepancy had been performed."

Finding: This nonconformance applies to QR 3803 and 3804; however, an internal Rockbestos audit, performed on May 10, 1983, documented a generic problem in the Rockbestos' calibration system. Therefore, this finding applies to Rockbestos' entire calibration system. Also, see paragraph 2.1.(2) below.

"3. Contrary to the requirements of Criterion V of Appendix B to 10 CFR Part 50 and Sections III.1 and IV.1 of Rockbestos Quality Procedure No. Q-9, test plans prepared by Rockbestos did not contain the identification of the individual(s) who prepared them and had not been reviewed and approved by appropriately qualified personnel."

Finding: This nonconformance applies to all qualification reports and associated data reviewed.

"4. Contrary to the requirements of Criterion V of Appendix B to 10 CFR Part 50 and Section II of the Rockbestos Technical Manual for Class 1E Qualification Tests (TMQT), the test plan for RSS-6-109/LE did not include the chemical spray requirements contained in the governing specification (X3AJ04) or describe the method to be used to monitor electrical loading requirements."

Finding: This nonconformance applies to eight additional qualification reports and associated data as decribed in paragraph 2.a.(3)(a) below.

"5. Contrary to the requirements of Criterion V of Appendix B to 10 CFR Part 50 and Section 8 of the Rockbestos Technical Manual for Class 1E qualification tests, there was no evidence to indicate that Rockbestos was documenting, evaluating, and dispositioning unanticipated variations, nonconformances, or deviations."

Finding: This nonconformance applies to all qualification reports and associated data reviewed.

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"6. Contrary to the requirements of Criterion V of Appendix B to 10 CFR Part 50 and Section 17.4 of the Rockbestos QAM, Rockbestos had not established corrective action system for qualification testing of safety-related cable."

Finding: This nonconformance applies to all qualification reports and associated data reviewed.

"7. Contrary to Criterion X of Appendix B to 10 CFR Part 50, the Rockbestos QA program did not provide for inspection and/or monitoring of activities affecting the quality of their safety-related testing effort."

Finding: This nonconformance applies to all qualification reports and associated data reviewed.

"8. Contrary to the requirements of Criterion XI of Appendix B to 10 CFR Part 50 and customer specification X3AJ04, the Rockbestos test instrumentation was not adequate to demonstrate that the required LOCA parameters were achieved."

Finding: This nonconformance applies to all qualification reports and associated data review.

"9. Contrary to the requirements of Criterion XI of Appendix B to 10 CFR Part 50 and Section 3.3 of customer specification X3AJ04, no documented evidence was available to indicate that the pH was monitored during test report QR 3803."

Finding: This nonconformance applies to all qualification reports and associated data reviewed.

"10. Contrary to the requirements of Criterion XI of Appendix B to 10 CFR Part 50 and the test plan for RSS-6-109 testing (dated November 22, 1982) no documented evidence was available to indicate that the cables were continuously energized with a voltage potential of 600 VAC."

Finding: This nonconformance applies to but is not limited to three examples described in paragraph 2.a.(3)(b) below.

"11. Contrary to the requirements of Criterion XI of Appendix B to 10 CFR Part 50, Rockbestos had not performed an adequate technical evaluation of test results as evidenced by conflicts between the test results contained in test report QR 3803 and the supporting test data."

Finding: This nonconformance applies to all qualification reports and associated data reviewed.

The findings described above demonstrate that nonconformances pertain to the 21 qualification reports and supporting data reviewed during this inspection; therefore, these findings are a generic nonconformance to Criterion II, "QA Program," of 10 CFR Part 50, Appendix B. See nonconformance B.1.

2. Technical Review of EQ Test Reports and Associated Data Packages: During this inspection, the NRC inspection team reviewed 21 EQ test reports and attempted to audit the associated "raw" data package related to each report. The team's findings resulted in the generic nonconformances identified above and are discussed further in the following paragraphs:

a. Nonconforming Conditions:

(1) Lack of Adequate Instrumentation:

(a) A 7-day circular chart recording is used to monitor steam chamber temperature. This lacks resolution to demonstrate ramp times. (Note: Specification requirements vary from 10 seconds to 5 minutes.)

(b) The chemical spray system uses a 20-gallon tank connected to the steam chamber. After initiation of the LOCA simulation, steam condensate mixes with the spray and condenses at the bottom of the steam chamber. The condensate and spray mixture is returned to the spray pump and recirculated to the spray nozzles. As steam condensate mixes with the spray, it dilutes the spray mixture and also starts to fill the bottom of the steam chamber. Chemical spray chemistry is only assured for the original 20-gallon mixture. (Typically, the spray rate is 1.5 gpm; therefore, spray chemistry is known for < 15 minutes.) The current configuration of the spray steam makes periodic surveillance of spray

chemistry difficult. The laboratory technician does not periodically monitor spray chemistry during the test.

(2) Calibration Problem.

(a) The Robertshaw Recording Controller Model BT-111-A230 was last calibrated on February 4, 1982. On March 3, 1982, a LOCA test was performed and the recorder read 20-30° too high compared to a LN potentiometer used to measure temperature. (The potentiometer was considered to be correct since its temperature reading agreed with saturated steam conditions.) Between March 3, 1982, and June 6, 1983, the recorder was not recalibrated but was used during several research and qualification tests. Qualification report 3803 documents that MSLB testing was started on December 29, 1982. Qualification report 3804 documents that LOCA testing was started on December 16, 1982.

(b) The following equipment used for qualification was not covered under the Rockbestos calibration system:

- Humidity bath temperature indicator
- Electrical test set No. 2567
- Chemical spray flowmeter

(3) No Monitoring of Important Parameters: It appears that important parameters were not monitored during several qualification tests (there is no auditable evidence). Some examples are:

(a) The chemical spray flow rate and chemistry are not documented to demonstrate that these test parameters were monitored for the following tests:

- QR (no number) dated March 19, 1979
- QR 78-01, dated March 2, 1978

- QR 1803, dated April 6, 1981
- QR 3805, dated April 22, 1983
- QR 2810, dated July 20, 1982
- QR 1806, dated December 6, 1982
- QR 2813, dated August 9, 1982
- QR 3802, dated February 3, 1983

(b) Electrical energizing of cables during LOCA of MSLB testing is not monitored. Examples are as follows:

- QR 3803, dated April 22, 1982
- QR 2806, dated April 23, 1982
- QR 3802, dated February 3, 1983

(4) Functionability During Testing Not Always Monitored: NUREG-0588, Sections 2.2(7) and Sections 2.2(9) require that equipment functionability be monitored periodically during testing. Functionability tests (insulation resistance tests are typically used by the cable industry) were not performed by Rockbestos during recent qualification tests. The cables were energized, but leakage currents, applied voltage, etc., were not monitored. Some examples are:

- QR 3803, dated April 22, 1982
- QR 3804, dated May 25, 1982
- QR 2806, dated April 23, 1982 (solid dielectric tests)
- QR 3803, dated February 3, 1983

IEEE 323-1974 also requires functionability monitoring during testing. Section 6.3.3(6) states, "The aged equipment shall next be operated while exposed to the simulated design basis event . . . . Those functions which must be performed during the simulated design basis

event shall be monitored." Section 6.3.6 states, "means shall be provided during the type test for electrically energizing the equipment, supplying simulated loads, applying input signals, and exposing it to a simulated environmental conditions."

b. Additional Technical Concerns:

(1) Adequacy of Acceptance Criteria: Rockbestos has taken a position that the only required acceptance criteria for its triaxial cables "is successful withstand of applied voltage during profile and successful withstand of applied voltage after a 40D bend upon completion of the profile." Rockbestos responded to Bechtel's comments concerning testing for South Texas (dated June 7, 1983; ST-RW-YB-0030) by stating that (1) acceptance criteria per IEEE-323/383 is the successful withstand of applied voltage during the profile and the successful withstand of applied voltage after the completion of the profile and a 40D bend test. The cable successfully met this criteria in both instances as described in QR 3804; (2) insulation resistance, where measured during qualification testing, is for engineering information only. IEEE-323/383 criteria is the 40D bend and voltage withstand; and (3) the chemical spray is administered during the first 24 hours of the environmental profile. Per IEEE-323/383, post profile testing is accomplished after 100 days and Rockbestos is not aware of a test requirement specifically to evaluate the effect of the chemical spray.

Rockbestos did not document an evaluation of the use or application of triaxial cable as relates to the environmental conditions it must withstand nor does it relate to acceptance criteria based on the intended use. For example: Rockbestos QR 2808, QR 2811, QR 3803, and QR 3804 have been generated to show qualification for RSS-6-109 triaxial cables. None of these reports discuss whether shield separability is important.

(2) Use of Similarity Analysis to Demonstrate Qualification: On May 20, 1982, Rockbestos informed Alabama Power Company that QR 2806 established "our qualification for the 'second generation' Solid Dielectric Coaxial Cable Constructions except for RSS-6-110." On May 18, 1982, supplement report QR 2806S was issued providing "Justifi-

cation of qualification of RSS-6-110 and others based on test results to date." This report asserts that qualification for the entire 100 series line is restored. However, QR 2806 only demonstrates qualification (by test) for RSS-6-104 coaxial cables and by references to previous test reports for cellular dielectric cables also. Examination of the 100 series product line indicates that it includes coaxial, triaxial, and twinax cable constructions. The use of similarity arguments may be too stretched here to establish qualification. It is interesting to note that during the same test used to show qualification of RSS-6-104 cables, other cables failed electrically, namely, RSS-6-100 A, RSS-6-109. RSS-6-110, and RSS-6-112. This fact is never mentioned in Rockbestos similarity discussions. The Rockbestos similarity discussion also never addresses the possible different use requirements for coaxial versus triaxial and twinax cable constructions. See the nonconformance identified in paragraph B.1(6).

(3) Qualification Testing of Prototypes Prior to Finalizing Production Materials and Processes: On March 19, 1979, Rockbestos issued a QR (no number) to establish qualification of its RSS-6-100 series of cables. The test specimens used in this qualification effort were produced prior to Rockbestos finalizing its production materials or processes. The following examples illustrate this fact:

(a) The qualification specimens were jacketed at Raychem due to "problems."

(b) The solid dielectric 100 series cables use a 100 compound for the dielectric. Notes suggest that qualification test specimens for the March 19, 1979, report were constructed using a 112 compound. The difference between compounds was not established during the audit.

(c) Four months after production of qualification specimens, it is reported that jacket runs to date have not been satisfactory.

However, the test engineer on April 19, 1982, asserted that "cable samples tested were identical in construction and materials to Rockbestos standard products." The test engineer was unavailable for consultation during the audit.

(4) Revisions of Generation of Test Reports Several Years After Testing: Qualification reports 1804, dated April 16, 1981, and 1804A, dated February 23, 1982, discuss qualification of Firewall EP Class 1E electric cables. Qualification report 1804A is a revision of QR 1804. During the NRC audit, the inspector requested to see supporting data for these QRs. The file that was provided contained test data from 1976. The data is inconsistent with the report in several respects. For example: QR 1804 states one sample was thermally aged for 168 HR @ 121°C. The next paragraph states the sample was subjected to 2×10^8 rads at a rate of 1×10^6 rads/hour. The data in the Firewall EP file states two lengths of #14 KR 450/KH 150 were irradiated to 200 Mrads then placed in an oven @ 121°C for 7 days (in October 27, 1976, out November 3, 1976), and then LOCA exposed from November 18, 1976, to December 18, 1976. In contrast, the Isomedix certification in the file is dated February 22, 1979, and is based on Rockbestos purchase order 88512 dated January 4, 1979 (2 years after the above LOCA test). The certification states the average dose rate was .55 megarads per hour, contradicting the QR statement of 1 Mrads/hr.

(5) Aging Data Inconsistencies: Qualification report 1804A, dated February 23, 1982, provides Arrhenius data to support thermal aging of Firewall EP insulation. The data is used to justify a 7-day 121°C exposure as equivalent to a 40-year life at 65°C. The report clearly indicates that aging was performed on KR-450 material at temperatures of 177°C, 162°C, 150°C, and 136°C.

During the audit, additional aging data for KR-450 was noted. This data was obtained at temperatures of 120°C, 130°C, and 140°C. This data is vastly different from that referenced in QR 1804A. It would imply that greater than 4000 hours of exposure at 121°C is necessary to simulate a 40-year life at 65°C. In summary, if the second set of data is correct, we could have a 2-year qualified life rather than a 40-year one.

c. Noted Conflicts in Data:

(1) Ramp Times (raw data versus test report):

(a) Qualification report 3804, dated February 7, 1983, with final revision May 25, 1983, states that test specimens were subjected to the LOCA Profile for combined PWR/BWR described by IEEE-323, Figure A1. This profile has a 10-second rise to 280°F with a 5-minute rise to 340°F. In contrast to the test report assertion, the Robertshaw temperature recording indicates that half an hour was required to achieve 255°F, with over an hour required to achieve 340°F.

(b) Qualification report 1806 Addendum, dated February 10, 1980, states that test specimens were subjected to a steam line break profile shown in Figure 2. This figure indicates that Rockbestos achieved 450°F in 60 seconds. The test file notes, in contrast, state, "Rise time to reach 430°F 14 to 16 minutes."

(c) Qualification report 3803, dated April 22, 1983, presents a profile described as "test actually performed by Rockbestos." This profile has a ramp from 100°F to 440°F in 10 seconds. In contrast, QR 3803 states, "The test chamber was pre-warmed to approximately 300°F at 100 psig." The test file notes indicate that an additional 3 minutes was required to heat from 300°F to 420°F.

(2) Time, Temperature Deviations not Mentioned in Reports:

(a) Qualification report 3804, dated February 7, 1983, states that chemical spray was applied for the first 24-hour period. In contrast, file notes indicate it was applied for the first 15 hours.

(b) Qualification report 3803, dated April 22, 1983, gives an achieved test profile with a 14-hour second peak dwell. The temperature controller recording indicated a test period of only 13 hours. Two temperature deviations occurred in this test period, each of which was 1 hour in length. Neither deviation is mentioned in the test report.

(c) Qualification report (no number) dated March 19, 1979, does not mention a 13-hour temperature deviation from 200°F to 160°F.

(d) Qualification report 2810, dated July 20, 1982, presents the achieved LOCA profile (Appendix III) with no excursions or anomalies noted or mentioned. The raw data indicates that when the specimens were subjected to a 14-day LOCA test in the autoclave, the boiler was down for one 8-hour period and one 24-hour period.

(3) Calibration Misstatements: Qualification report 3803, dated April 22, 1983, indicates that the temperature controller has a range of 100-400°F and an accuracy of ±1%. During the testing, as documented in QR 3803, the controller was used to monitor temperatures above 400°F. Also, during a previous test, starting on March 3, 1982, this controller was shown to be out of calibration by 20-30°F for temperatures between 300 and 340°F. The controller was not recalibrated prior to the QR 3803 test.

(4) Qualification Report 2806 and QR 2811 Ignore RSS-6-109 Testing Failure: Qualification report 2806, dated April 23, 1982, describes LOCA testing on RSS-6-104 cables. On May 18, 1982, supplement QR 2806S was issued providing "Justification of Qualification of RSS-6-100 and others based on test results to date." This report asserts that qualification for the entire 100 series line is restored. Qualification report 2811 repeats this assertion specifically for RSS-6-109 second generation cables. Neither report mentions that RSS-6-100A, RSS-6-109, RSS-6-110, and RSS-6-112 cables were initially included in the qualification test used to generate QR 2806. Test notes indicate that insulation voids were noted for the RSS-6-110 and RSS-6-112 cables prior to LOCA testing. Only RSS-6-100A, RSS-6-104, and RSS-6-109 cables were exposed to the LOCA environments. The RSS-6-100A cable failed to hold 150 Vac 1½ hours into the LOCA test. The RSS-6-109 cable failed to maintain 2 KVac during post-LOCA testing prior to the humidity exposure. Only the RSS-6-104 cable passed the test. Qualification report 2806 was written only mentioning RSS-6-104 test results. There is evidence suggesting that Rockbestos believed failures for some of the other cables were an artifact of accelerated aging techniques.

ORGANIZATION: THE ROCKBESTOS COMPANY
A MEMBER OF THE MARMON GROUP
WALLINGFORD, CONNECTICUT (NEW HAVEN PLANT)

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(5) Qualification Report 3803 Ignores RSS-6-109 Shield Failures: A test plan (undated) describing a qualification test for RSS-6-109 cables required a 200 Vac withstand test between the two shields of the triax cable. All cables tested failed to hold voltage during these tests. The test plan is not clear whether these tests were for engineering information or part of the acceptance criteria. The qualification report written to describe this test; QR-3803, dated April 22, 1983, does not mention the voltage tests nor the test results.

(6) Misstatements:

(a) Qualification report dated March 19, 1979, indicates that spliced cable was thermally aged prior to irradiation and steam exposures. Data file indicates splices were never thermally aged.

(b) Qualification report (no number) dated March 19, 1979: File notes indicate spliced samples failed to hold voltage 24 hours into LOCA testing. Later, insulation resistance data was successfully obtained. The qualification report never mentions test failure. Note: Rockbestos personnel during the audit indicated that this splice qualification data has never been used.

(c) Qualification reports 1807, 1807R, 1807R1, and 1811 state that specimen cables were subjected to a radiation dosage of 150.4 Mrads; however, the Isomedix radiation certifications indicate that only two dosages were available for the samples 50.7 Mrads or 200 Mrads.

(d) Qualification report 2813 contains a certification from Isomedix regarding radiation exposure. Review of the sequence of this test and discussion with the testing manager indicates that the radiation certification contained in the report is not the correct certification.

d. Other Issues:

Auditability of Test Reports - As discussed above, it is questionable in many instances, that a clear trail of documented records actually exist. For QRs 1806, 1807, 1807R, 1807R1, and 1811 the information presented in the reports could not be traced to specific test data.

As a result of the above findings, nonconformances discussed in paragraph B above were identified.

3. Regional Request (Closed): Region V requested that Region IV assure that Rockbestos had implemented its action to prevent recurrence of an incident wherein a rejected reel of cable was reoffered for acceptance.

The NRC inspector reviewed Rockbestos records that showed the following: (1) that it had been established from Ebasco records which reels had been rejected; (2) that the reels had been identified and had been dispositioned; and (3) that a system for extra QA surveillance of rejected cable had been established. Ebasco inspection/rejection cable had been established. Ebasco inspection/rejection notifications were compared to the Rockbestos list. The Ebasco inspector responsible for the WPPSS contract with Rockbestos was interviewed and he stated that the Rockbestos action to prevent recurrence of the resubmittal of rejected cable was effective in that he no longer was receiving any rejected material for acceptance. Therefore, NRC considers this item closed.

F. MANAGEMENT/EXIT MEETING:

The NRC inspectors met with Rockbestos management on June 23, 1983, at the conclusion of this inspection. The inspectors discussed the scope of this inspection and the findings. Rockbestos management acknowledge the findings as presented.

ORGANIZATION: RUSKIN MANUFACTURING COMPANY
GRANDVIEW, MISSOURI

REPORT NO.: 99900716/83-01	INSPECTION DATE(S) 9/12-16/83	INSPECTION ON-SITE HOURS: 28

CORRESPONDENCE ADDRESS: Ruskin Manufacturing Company
ATTN: Mr. R. J. Yarges
Manager, Quality Assurance
3900 Dr. Greaves Road
P. O. Box 129
Grandview, Missouri 64030
ORGANIZATIONAL CONTACT: Mr. R. J. Yarges, QA Manager
TELEPHONE NUMBER: (816) 761-7476

PRINCIPAL PRODUCT: Air handling equipment.

NUCLEAR INDUSTRY ACTIVITY: Approximately 6 percent.

ASSIGNED INSPECTOR: J. T. Conway for/ 10-26-83
R. E. Oller, Reactive and Component Program Section (R&CPS) Date

OTHER INSPECTOR(S):

APPROVED BY: J. T. Conway for 10-26-83
I. Barnes, Chief, R&CPS Date

INSPECTION BASES AND SCOPE:

A. BASES: 10 CFR Part 50, Appendix B and 10 CFR Part 21.

B. SCOPE: This inspection was made as a result of the issue of a potential 10 CFR Part 50.55(e) report by Carolina Power and Light Company (CP&L) concerning the furnishing to the Shearon Harris site of backdraft dampers which contained only one counterbalance arm in lieu of the required two. Additional areas included in the inspection were manufacturing process control, nonconformances and corrective actions, and 10 CFR Part 21 posting requirements.

PLANT SITE APPLICABILITY:

Failure to address counterbalance assemblies in seismic report for Model Nos. CBS-7 and CBS-8 backdraft dampers: 50-528/529/530, 50-275, 50-460.

ORGANIZATION: RUSKIN MANUFACTURING COMPANY
GRANDVIEW, MISSOURI

REPORT NO.: 99900716/83-01	INSPECTION RESULTS:	PAGE 2 of 4

A. VIOLATIONS:

Contrary to Section 21.6 of 10 CFR Part 21, dated December 30, 1982, posting of required documents had not been done at the Grandview, Missouri, plant.

B. NONCONFORMANCES:

1. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 1.4 of Section 260 of the QA Manual, Procedure No. P-139, Revision 1, "10 CFR Part 21 Reporting of Defects and Noncompliance," did not identify means to accomplish and document the evaluation and reporting to the NRC of conditions adverse to quality.

2. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 1.4 of Section 150 of the QA Manual, appropriate instructions or procedures had not been issued for the control of seismic design activities on Seismic Class 1, backdraft dampers that had been furnished to Shearon Harris, Unit 1, and for backdraft dampers furnished to other sites.

C. UNRESOLVED ITEMS:

None

D. OTHER FINDINGS OR COMMENTS:

1. Furnishing of Backdraft Dampers to Shearon Harris Which Did Not Appear to Meet Seismic Specifications:

a. Introduction: CP&L notified the NRC on June 2, 1983, of a potential reportable 10 CFR Part 50.55(e) condition concerning Seismic Class 1 backdraft dampers which had been furnished to the Shearon Harris Nuclear Power Plant by the Ruskin Manufacturing Company (RMC), Grandview, Missouri. The dampers were furnished with only one counterbalance arm assembly instead of the required two, and did not appear to meet seismic specifications. This matter was also reported to the NRC by RMC in a 10 CFR Part 21 report dated May 10, 1983.

b. Findings: In April 1983, RMC determined that their Seismic Report No. 1018 calculations for Model Nos. CBS-7 and CBS-8 backdraft dampers which had been supplied to the Shearon Harris project did not include the counterbalance arm assemblies and

could result in the dampers not meeting the seismic requirements of the Ebasco specification. A generic review by RMC of all orders for these models of dampers indicated that there was a total of 12 domestic and 2 foreign orders which might be affected. However, calculations indicated that only nine domestic sites might be affected.

In June 1983, RMC had seismic tests performed of the counterbalance arm assembly at Wyle Laboratories. The results reported in Wyle Seismic Report No. 46803-1, Revision A, dated June 22, 1983, were analyzed by the RMC seismic analyst and reported to Ebasco Service Company. The Shearon Harris results indicated that the furnished dampers met the original Ebasco design requirements and that no modifications were required.

Further review by RMC of their other orders for Model Nos. CBS-7 and CBS-8 dampers indicated that only three domestic orders were affected and would require modification of the counterbalance arm assemblies. The utility sites were Palo Verde; Diablo Canyon; and WPPSS, Unit 1. The RMC QA manager indicated that all three customers had been notified and that RMC was currently engaged in modifying the dampers at Palo Verde. No response to the RMC notification was stated to have been received from Diablo Canyon or WPPSS, Unit 1.

The documents reviewed during inspection of this area included (a) two design control procedures, (b) a deviation request (DR) No. GV-008 and the related engineering change notice, (c) informal seismic review sheets, (d) records of the generic review of orders for the Model Nos. CBS-7 and CBS-8 backdraft dampers, (e) Ebasco contract No. NY 435205, (f) RMC attachment, "Seismic Considerations For Mechanical Equipment," (g) Ebasco "HVAC Addendum A," (h) RMC Attachment No. 2 to DR No. GR-008, and (i) RMC Seismic Report No. 1018.

Within this area of the inspection one nonconformance was identified concerning the absence in the RMC design control procedures of documented provisions for control of seismic calculations (see paragraph B.2).

Prior to the end of the NRC inspection, QA design control procedure No. P-109 and engineering procedure E-526 were revised to formally address seismic requirements on nuclear orders.

ORGANIZATION: RUSKIN MANUFACTURING COMPANY
GRANDVIEW, MISSOURI

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2. 10 CFR Part 21 Posting Requirements: The inspection for compliance with the posting requirements of 10 CFR Part 21 resulted in the identification of one violation (see paragraph A) pertaining to the failure of RMC to post in accordance with requirements of the regulation, and one nonconformance (see paragraph B.1).

3. Manufacturing Process Control: The NRC inspector reviewed five sections of the QA manual to verify that provisions were made in the QA program for the control of this activity.

   A review was also made of the following documents concerning the Shearon Harris work and other orders: (a) two procedures governing inprocess and final inspection; (b) two documentation packages, each consisting of 13 types of records, that were applicable to Seismic Class 1 backdraft dampers shipped to Shearon Harris, Unit 1; (c) one documentation package consisting of eight types of records covering the work on five dampers shipped to the Arkansas Nuclear One project.

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

4. Nonconformances and Corrective Action: The NRC inspector reviewed two sections of the QA manual to verify that provisions were made in the QA program for control of these activities.

   A review was also made of the following documents: (a) two applicable QA procedures; (b) deviation log sheets for four RMC shops which fabricate nuclear dampers; (c) 13 completed deviation request reports; (d) a corrective action request log, and (e) three corrective action requests.

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

ORGANIZATION: SOUTHWEST FABRICATING AND WELDING CO., INC.
HOUSTON, TEXAS

REPORT NO.: 99900025/83-02	INSPECTION DATE(S) 9/13-16/83	INSPECTION ON-SITE HOURS: 24

CORRESPONDENCE ADDRESS: Southwest Fabricating and Welding Co., Inc.
ATTN: Mr. B. J. Goodwin
President and Chief Executive Officer
7525 Sherman Street
Houston, Texas 77012

ORGANIZATIONAL CONTACT: R. P. Bornes, QA Manager
TELEPHONE NUMBER: (713) 928-3451

PRINCIPAL PRODUCT: Nuclear piping assemblies, supports, and vessels.

NUCLEAR INDUSTRY ACTIVITY: The Southwest Fabricating and Welding Co., Inc. (SF&WCO) contribution to the nuclear industry represents 25 percent of its total workload.

ASSIGNED INSPECTOR: Wm McNeill 11/7/83
Wm. McNeill, Reactive and Component Program Section (R&CPS) Date

OTHER INSPECTOR(S):

APPROVED BY: I. Barnes 11/8/83
I. Barnes, Chief, R&CPS Date

INSPECTION BASES AND SCOPE:

A. BASES: 10 CFR Part 50, Appendix B and 10 CFR Part 21.

B. SCOPE: This inspection was made as a result of the receipt of a 10 CFR Part 50.55(e) report from Illinois Power Company and a 10 CFR Part 21 report from SF&WCO concerning the identification of radiographs in apparent noncompliance with the requirements of Section III of the ASME Code.

PLANT SITE APPLICABILITY:

Radiographs in noncompliance: 50-456/457; 50-454/455, 50-461/462; 50-338/339; grinding resulting in minimum wall violation: 50-400/401; inadequate ISI weld preparation: 50-400/401.

ORGANIZATION: SOUTHWEST FABRICATING AND WELDING CO., INC.
HOUSTON, TEXAS

REPORT NO.: 99900025/83-02	INSPECTION RESULTS:	PAGE 2 of 5

A. VIOLATIONS:

Contrary to Section 21.21(b)(3) of 10 CFR Part 21, the SF&WCO 10 CFR Part 21 report pertaining to the indeterminate quality of branch welds in piping assemblies failed to include that similar configurated assemblies had been furnished to the North Anna site.

B. NONCONFORMANCES:

Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 4.1.3 of Procedure QAD-16, the QA manager or his designated assistant did not initiate a Report of Nonconformance (RON) within 24 hours after notification of a potentially reportable defect (i.e., indeterminate branch weld quality in piping assemblies) from the Clinton site on June 16 and 17, 1983.

C. UNRESOLVED ITEMS:

1. 10 CFR Part 21 Report on Radiography:

a. Background - On July 22, 1983, SF&WCO notified the NRC by phone and later by letter dated July 24, 1983, of an apparent failure to comply with the requirements of paragraph NC-4424(a) in Section III of the ASME Code. NC-4424(a) requires weld surface irregularities to be removed should they produce indications in radiographs which interfere with interpretation.

The condition was discovered at the Clinton site as a result of certain butt welds being reradiographed following their repair of below minimum wall thickness conditions that had occurred because of excessive grinding during site preparation of welds for inservice inspection.

Certain branch connections (both 45° laterals and 90° elbows) were designed utilizing reinforcing pads on the piping assemblies. Radiography was performed of the branch connection welds prior to installation of the reinforcing pads. Radiographs of these welds were accepted by SF&WCO, their customer (Baldwin Associates) and the ASME authorized nuclear inspector. After acceptance, the reinforcing pads were welded into place on the piping assemblies. Subsequent review at the Clinton site of these previously accepted radiographs identified the presence of questionable indications.

The initial Clinton review also identified that some radiographs were questionable because the proper sensitivity or the proper density was not achieved. The NRC, Region III, has inspected the radiographs in question (Inspection Report No. 50-461/83-11) and reported that a plan is currently under development for reexamination and reradiography of questionable welds to resolve the above problems.

b. SF&WCO Activities - It was established that SF&WCO personnel had visited the Clinton site on June 16-17, July 31-August 4 and August 22-23, 1983. On the first trip a preliminary review was made of 76 questionable shots or views with 3 being mutually agreed to be acceptable. A detailed review of film and inspection of associated welds was made during the second trip with the Baldwin Associates, Clinton site Level III examiner.

The SF&WCO trip report and field notes identified that it had been agreed to rework by grinding a total of six welds in four piping spools, followed by reradiography of one affected view in each weld. In addition, a total of 16 views applicable to 12 welds in 8 other piping spools would be reradiographed. Only a few were identified to require reradiography because of density/sensitivity problems. The vast majority were indicated as requiring reradiography in order to resolve interpretation differences. The balance of the originally questioned radiographs were reportedly found acceptable. However, it was established by SF&WCO that one weld could not be interpreted nor reradiographed to resolve the problem. This specific weld was a 45° lateral branch connection. A review of this weld established that: (1) the original identification by SF&WCO that radiographic indications were attributable to weld surface conditions could not be verified as a result of the weld made to this surface during installation of the reinforcing pad, and (2) reradiography could not be performed because the composite piping/reinforcing pad thickness exceeded capabilities for the necessary double wall technique.

c. Generic Extent of the Problem - SF&WCO initially reviewed seven of its nuclear projects in light of this problem and identified two additional sites, Byron and Braidwood, for which piping of the same configuration had been furnished. The problem is believed to be limited to ASME Class 2 Code section spools with reinforced branch connections in that Class 1 does not permit use of reinforced connections and Class 3 does not require

ORGANIZATION: SOUTHWEST FABRICATING AND WELDING CO., INC.
HOUSTON, TEXAS

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radiography. SF&WCO stated that the only designer to have used this design configuration was Sargent and Lundy. The NRC inspector identified by review of the nuclear code log books that Class 2 piping spools had, in addition to the seven projects reviewed by SF&WCO, also been furnished to Midland, North Anna, Wolf Creek, Comanche Peak, and Zimmer. A review of the Comanche Peak fabrication was performed by SF&WCO during the inspection. Of the five projects that had been previously reviewed and established by SF&WCO to not have Class 2 reinforced branch connections, two were independently reviewed by the NRC inspector. The V.C. Summer and South Texas Project shop drawings and isometrics were examined and the SF&WCO conclusions were verified to be accurate.

d. Present Status - On the third trip to the Clinton site, SF&WCO discussed its findings with Illinois Power Company management. SF&WCO is not aware of any further developments, such as the establishment of a third party review, reradiography, etc., in regard to the Clinton site problems.

e. 10 CFR Part 21 Procedure Review - A review of the SF&WCO procedure and 10 CFR Part 21 file in regard to the Clinton problem established that the SF&WCO procedure had not been fully implemented. QAD-16 requires that deviating conditions be first documented internally on a RON. The failure to issue a RON for the Clinton problem has been identified as a nonconformance (see paragraph B above). It was also observed that the 10 CFR Part 21 procedure did not clearly address how defects reported from outside SF&WCO (e.g., field identified conditions) would be handled. In addition, the procedure did not clearly define the criteria and record requirements for evaluation. In regard to the generic review by SF&WCO to identify all sites affected by this problem, it was noted above that not all sites were reviewed by SF&WCO. SF&WCO's review of the Comanche Peak, Midland, North Anna, Wolf Creek, and Zimmer projects established that the 10 CFR Part 21 report filed by SF&WCO should have identified North Anna in addition to Clinton, Byron, and Braidwood. This has been identified as a violation (see paragraph A above).

2 Potential Deficiency Report and NRC Site Findings:

a. Base Metal Defects - A piping spool was found at the Shearon Harris site to contain an area where removal of an apparent

base material defect by grinding had resulted in the thickness being reduced below minimum wall requirements. Carolina Power and Light's Deficiency and Disposition Report No. 1272 addresses this subject and indicates that it is questionable in regard to who performed the grinding. SF&WCO stated that no previous reports had been made by customers of a similar nature. This statement could not be verified because SF&WCO does not have a formal program for the documentation of field reports or problems. SF&WCO has held work place meetings with inspection personnel on this problem.

b. Inservice Inspection Weld Preparation - An NRC inspection at the Shearon Harris site identified that certain welds on spool pieces did not meet the surface requirements of the applicable specification. After review of the welds in question on July 13-14, 1983, SF&WCO agreed that some welds did not meet the specification requirements for flatness and side slope. It appears that this problem is associated with a "draw string" effect in large diameter thin walled stainless steel piping. Additional projects for which SF&WCO have performed inservice inspection weld preparations are South Texas, Byron, and Braidwood. A phone report to SF&WCO by site personnel reported that there appears to be no problem with the Byron and Braidwood sites in this regard. No information had been received from South Texas as of the date of this inspection. SF&WCO is awaiting the results of the Harris site inspection of some 3,000 welds to further define the extent of this problem. This subject will be further reviewed during a subsequent inspection.

ORGANIZATION: TARGET ROCK CORPORATION
EAST FARMINGDALE, NEW YORK

REPORT NO.: 99900060/83-02	INSPECTION DATE(S) 8/22-26/83	INSPECTION ON-SITE HOURS: 32

CORRESPONDENCE ADDRESS: Target Rock Corporation
ATTN: Mr. D. M. Pattarini
Vice President of Engineering
1966 E. Broadhollow Road
East Farmingdale, New York 11735

ORGANIZATIONAL CONTACT: Mr. G. Abruzzo, Quality Assurance Manager
TELEPHONE NUMBER: (516) 293-3800

PRINCIPAL PRODUCT: Nuclear valves.

NUCLEAR INDUSTRY ACTIVITY: Contribution of Target Rock Corporation (TRC) to the nuclear industry represents approximately 20 percent of the total work load.

ASSIGNED INSPECTOR: I. Barnes 10-4-83
for Wm. D. Kelley, Reactive and Component Program Section (R&CPS) Date

OTHER INSPECTOR(S):

APPROVED BY: I. Barnes 10-4-83
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 follow up inspection was made as a result of a prompt report by the Tennessee Valley Authority (TVA) concerning the failure of safety/relief valves furnished to Browns Ferry Nuclear Plant, Unit 2, to operate within ASME specified set pressure tolerance. Additional areas inspected included manufacturing process control, control of special processes, training, and audits.

PLANT SITE APPLICABILITY:

Valves exceeded set pressure tolerance: 50-260.

ORGANIZATION: TARGET ROCK CORPORATION
EAST FARMINGDALE, NEW YORK

REPORT NO.: 99900060/83-02	INSPECTION RESULTS:	PAGE 2 of 5

A. VIOLATIONS:

None

B. NONCONFORMANCES:

1. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraphs 3.5.1 and 3.3.1 of the Quality Assurance Manual (QAM), paragraphs 7.3.2, 7.3.3, and 7.3.4 of the QAM that described the number and distribution of the operation history card had been revised and implemented without the approval of the QA manager and the acceptance by the Authorized Inspection Specialist and the revision had not been distributed to all holders of controlled copies of the QAM.

2. Contrary to Criterion V of Appendix B to 10 CFR Part 50, paragraph 8.4.1 of the QAM and paragraph 6.1 of procedure QCI 2130, Welding Procedure TRP 11.200, Revision B, and Welding Procedure TRP 11.203, Addendum No. 3, that had been used in production welding had not been approved.

3. Contrary to Criterion VII of Appendix B to 10 CFR Part 50, measures were not established with respect to selection and assessment of a contractor (i.e., Q-TEK Corporation) who was performing vendor audit services for TRC.

C. UNRESOLVED ITEMS:

None

D. OTHER FINDINGS OR COMMENTS:

1. TVA: Browns Ferry Nuclear Plant, Unit 2, reported that 5 out of 11 two-stage TRC safety/relief valves failed to operate within the ASME specified tolerance during test at Wyle Laboratories (WL), Huntsville, Alabama.

   a. The NRC inspector reviewed an engineering test report of the effect of excessive pilot valve seat leakage on the set lift pressure of the Model 7567F Safety/Relief Valve. The report

concludes that "Excessive pilot valve leakage has no deleterious effect on the operability of Target Rock Model 7567F SRV."

b. The NRC inspector was informed by a corporate officer that (1) the BWR owners group was investigating the corrosion product build-up on the SRV disc and seat as a cause of the increased set lift pressure, (2) TRC was serving as a consultant to the BWR owners group in regard to TRC valves, (3) TRC cannot duplicate the water chemistry of the many operating BWR plants in their valve test loop, and (4) two NRC:HQ engineers are scheduled to visit TRC in September and review TRC engineering test report No. 3892 and the valve test loop.

c. TRC has investigated the possible effect of other SRV disc and seat configurations, materials, and material combinations on the set lift pressure and eliminated certain materials and material combinations.

2. 10 CFR Part 21 Report: Combustion Engineering (CE) issued a 10 CFR Part 21 report to NRC Headquarters, Bethesda, Maryland, on November 8, 1982, which identified six anomalies with TRC solenoid valves that occurred during additional qualification tests in accordance with NUREG-0588.

a. The NRC inspector reviewed the correspondence contract number log sheet, five letters to utilities with list of valves, and TRC service bulletin. It was verified that TRC had notified 27 utilities of the solenoid valves shipped to them that may contain the CE identified anomalies and supplied each utility with their service bulletin.

b. TRC is currently assembling a service kit for each type of solenoid valve that may have CE identified anomalies so they will be available for immediate delivery to the utilities upon receipt of their purchase order.

3. Manufacturing Process Control: The NRC inspector reviewed the QAM, six implementing procedures, and the operation history cards - material move cards for four shop orders in the shop and verified that a revision to the QAM eliminating a dual set of operation history cards - material control cards had been implemented without approval of the revision by the QA Manager or acceptance by the Authorized Inspection Agency's Specialist. This was identified as a nonconformance (see paragraph B.1).

4. Control of Special Processes (Welding):

   a. The NRC inspector reviewed the QAM, 5 welding procedures, and 12 addenda to welding procedures, and verified that Revision B to welding procedure TRP 11.200 and Addendum No. 3 to welding procedure TRP 11.203 had not been approved. This was identified as a nonconformance (see paragraph B.2).

   b. There was no welding or hard facing of ASME valve parts in progress during this inspection. The NRC inspector did verify that (1) welding material was stored and identified in accordance with the requirements of the QA program, (2) the pyrometers available to the welders and inspectors were controlled by the calibration procedure and the calibration was current, and (3) welding procedures for non ASME welding was available to the welders and at the welding stations.

5. Training:

   a. The NRC inspector reviewed the QAM, three training procedures, draft of one training procedure, training records from 1974 to present, qualification log of inspection personnel, the training record log of quality assurance personnel, and the qualification data records for three inspectors. It was verified that TRC did have an ASME accepted QA program and the implementing procedures had been approved and the QA program and procedures had been implemented.

   b. It was verified by review of a draft procedure that the training requirements were being upgraded to meet the requirements of Subsection NQA-1 of Section III to the ASME Code which addresses training of auditors and inspectors.

   c. It was verified by review of training records and qualification log of quality assurance personnel that they had received the training specified in the quality assurance program.

6. Audits:

   a. Internal: The NRC inspector reviewed the QAM, three procedures, qualification of auditors, audit schedule for 1982 and 1983, and master audit files for 1982 and 1983. It was verified that the internal audits were performed on schedule by qualified auditors in accordance with the requirements of the QA program and the

program provided for timely corrective action and the reporting of audit findings to upper management.

b. Vendor: The NRC inspector reviewed the QAM, three procedures, one quality control survey, vendor audit schedule for 1982 and 1983, and vendor audits for 1982 and 1983. It was verified that TRC elected to subcontract their vendor audits and the company selected to perform the audits had not been surveyed and audited by TRC in accordance with the requirements of their QA program. This was identified as a nonconformance (see paragraph 8.3).

It was also verified that the subcontractor had performed the vendor audit in accordance with the TRC established schedule and the findings were reported to TRC and were reviewed by TRC QA personnel in accordance with the requirements of the QA program.

ORGANIZATION: TELEDYNE MCKAY
WELDING PRODUCTS DIVISION
YORK, PENNSYLVANIA

REPORT NO.: 99900797/83-01	INSPECTION DATE(S): 10/31-11/4/83	INSPECTION ON-SITE HOURS: 28

CORRESPONDENCE ADDRESS: Teledyne McKay
Welding Products Division
ATTN: Mr. M. Joseph Clark, Manager-Quality Assurance
850 Grantley Road
York, Pennsylvania 17405

ORGANIZATIONAL CONTACT: Mr. M. Joseph Clark, Manager, QA
TELEPHONE NUMBER: (717) 845-7581

PRINCIPAL PRODUCT: Welding filler metals.

NUCLEAR INDUSTRY ACTIVITY: Approximately 3.5 percent of the sales over the past 22 months.

ASSIGNED INSPECTOR: J. T. Conway 12-2-83
J. T. Conway, Reactive Inspection Section (RIS) Date

OTHER INSPECTOR(S):

APPROVED BY: I. Barnes 12-2-83
I. Barnes, Chief, RIS Date

INSPECTION BASES AND SCOPE:

A. BASES: 10 CFR Part 50, Appendix B and 10 CFR Part 21.

B. SCOPE: This inspection was made as a result of the notification by Duke Power Company that E70T-1 flux core wire was not examined for radiographic quality per SFA-5.20 prior to shipping to the Catawba nuclear site. In addition, the following programmatic areas were inspected: training/qualifications, manufacturing process control, procurement document control, calibration of measuring and test equipment, inspection, testing, audits, and reporting of defects.

PLANT SITE APPLICABILITY:

Docket No. 50-413; 50-414.

ORGANIZATION: TELEDYNE MCKAY
WELDING PRODUCTS DIVISION
YORK, PENNSYLVANIA

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A. VIOLATIONS:

None

B. NONCONFORMANCES:

1. Contrary to Criterion V of Appendix B to 10 CFR Part 50, the Preface of the Quality System Manual (QSM) and Subsection NCA-3866.2 of Section III of the ASME Code, during an evaluation of the production areas it was noted at two packaging areas (i.e., "line 5" and "off-line") that Revision 3 of QA Procedure No. 701 was at the work stations, whereas Revision 4 had been issued on December 16, 1981.

2. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Sections 3.4.1.1.3 and 3.6.2.4 of the QSM, a review of QA records relating to 11 nuclear orders revealed that the following electrode shop orders (ESOs) were not signed and dated by the test welder after acceptance:

ESO-date	Buyer/PO No.
January 10, 1983	Johnson Controls/100298
November 11, 1982	TVA/RD-870085
October 13, 1981	Anchor Darling Valve/T2672
May 12, 1983	Gould Pumps/83946

3. Contrary to Criterion V of Appendix B to 10 CFR Part 50, Section 3.8.2.1 of the QSM and paragraph 1.2.1 of QA Procedure No. 704, a review of QA records relating to 11 nuclear orders revealed that Packers Sheet (Form TM-181) was missing for material fabricated for Anchor Darling Valve on Purchase Order (PO) No. T2672.

4. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraphs 1.3 and 5.1.1 of QA Procedure No. 214, a review of "Type (a)" calibrations performed by Teledyne McKay personnel revealed that the Serial Nos. of standards used on the following calibrations were missing:

   (a) Mechanical center gages (nine items) calibrated on a monthly frequency since January 1983.

   (b) Heat treat ovens (Nos. 0193, 6822, and 6803) calibrated on March 3, 1983.

(c) Welder holding ovens (two in R&D Booth and one in QA Booth) calibrated on March 11, 1983.

(d) Leak tester temperature indicators (Nos. 1 and 2) calibrated on April 29, 1983.

5. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraphs 2.5 and 2.4 of QA Procedure No. 214, a review of POs to outside agencies for calibration services and QA records relating to calibrations performed by outside testing agencies revealed the following:

(a) PO No. 9796 dated August 11, 1983, to Mid Atlantic Calibration did not contain the required 3-part statement relative to QA programs.

(b) A description of the calibration procedures was missing for Do All Reading Company, who calibrated a master set of micrometer gage blocks as noted on their certification dated January 15, 1981, and Control Systems 21 who has conducted semiannual calibrations on the temperature controllers and recorders (approximately 75 items) since November 1980.

6. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraphs 3.2 and 6.1 of QA Procedure No. 214, a review of calibration records revealed the following:

(a) Leak tester temperature indicator had not been calibrated since April 29, 1983. Semiannual calibration required.

(b) Heat treat ovens had not been calibrated since June 1983 by an outside vendor. Quarterly calibration required.

(c) Welder holding ovens had not been calibrated since March 11, 1983. Quarterly calibration required.

7. Contrary to Criterion V of Appendix B to 10 CFR Part 50, Subsections NCA-3864.2(a) and NCA-4134.2(b) of the code, and Section 2.2.1 of the QSM, a review of QA records pertaining to personnel (i.e., QA, welders, auditors, and testers) performing activities affecting quality revealed an absence of documented evidence that: (a) QA personnel (Product Test Technician, Process Material Control Technician, and Assistant Manager of QA), three welders, eight auditors, and four testers had received any QA training; and (b) qualification records were maintained for the QA personnel, the welders, or the auditors.

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WELDING PRODUCTS DIVISION
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C. UNRESOLVED ITEMS:

None

D. OTHER FINDINGS OR COMMENTS:

1. Flux Core Wire Not Examined for Radiographic Quality - Duke Power Company (Duke) notified Teledyne McKay (TMK) in August 1982 that welding filler material supplied to the Catawba Nuclear Station had not been radiographed. The material, (approximately 20,000 pounds of E70T-1 flux core wire (Heat Nos. 299T3959 and 299T4019), successfully passed Code required radiographic examinations in the field.

   TMK's position is that radiography of test welds for the qualification of welding material is only performed at the option of the purchaser. Since Industrial Welding Supply Company's PO No. 3518 dated July 23, 1979, to TMK specified that the material be manufactured to SFA-5.20 and impact tests be performed, TMK did not perform a soundness test (i.e., radiography) on the flux core wire. ASME's reply (ref. January 10, 1983, letter to Clark) to TMK's request (ref. Clark/ASME letter dated September 8, 1982) on the radiography requirements of Section III NB2400 and Section II, Part C, indicated that it is "the responsibility of the purchaser of Section III welding material to specify any additional test not required by NB-2400 for the qualification of welding material in the purchase order or material specification."

   TMK enclosed a copy of ASME's interpretation to Duke in the Clark/Roy letter dated January 11, 1983. If any additional action is required on this subject, it will be conducted with the licensee by Region II.

2. Training/Qualifications - The training records for QA and NDE personnel, as well as welders, auditors, and testers were reviewed to assure that personnel performing and verifying activities affecting quality were trained and qualified.

   In this area of the inspection, two ASME interpretations (Nos. II-81-03 and III-81-07) were brought to the attention of the NRC inspector. The two interpretations indicate that NDE personnel employed by manufacturers of welding material do not have to be qualified to SNT-TC-1A. This appears to be in direct conflict with the requirements of NB/NC/ND-5521 of Section III of the ASME Code. Nonconformance B.7 was identified in this area of the inspection.

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3. Procurement Document Control - Five POs to vendors supplying calibration service and two POs to vendors supplying NDE services were reviewed to assure that applicable technical and QA program requirements are included or referenced in procurement documents.

4. Calibration of Measuring and Test Equipment - A review of one procedure and calibration records for measuring and test equipment in the production and inspection areas was performed to assure that the devices are properly identified, controlled, and calibrated at specified intervals. Nonconformances B.4, B.5, and B.6 were identified in this area of the inspection.

5. Manufacturing Process Control - A review of 5 procedures, and Electrode Shop Orders (SOs), Product Test Data Sheets, and Packers Sheets for 11 nuclear orders were reviewed to assure that activities affecting quality are prescribed and accomplished with approved documents. It was noted that gas metal arc welding which was performed on a Product Test Data Sheet for SO No. 9073-1184 dated March 5, 1982, was not signed or dated by the welder who performed the activity. Nonconformances B.1, B.2, and B.3 were identified in this area of the inspection.

6. Inspection/Testing - A review of 5 procedures, inspection reports and X-ray records relating to 11 nuclear orders, and an evaluation of the inspection and testing areas was undertaken to assure that an effective inspection and testing program has been established.

7. Audits - Internal audit reports for 1981, 1982, and 1983, and management audits for 1981 and 1982 were reviewed to assure that all elements of the QA program were audited on an annual basis.

8. Reporting of Defects - The implementation of 10 CFR Part 21 posting requirements in regard to the reporting of defects and failures to comply was assessed by inspecting the shop fabrication area.

ORGANIZATION: TRANSAMERICA DELAVAL, INCORPORATED
ENGINE AND COMPRESSOR DIVISION
OAKLAND, CALIFORNIA

REPORT NO.: 99900334/83-01	INSPECTION DATE(S) 7/11-15/83	INSPECTION ON-SITE HOURS: 81

CORRESPONDENCE ADDRESS: Transamerica Delaval, Incorporated
Engine and Compressor Division
ATTN: Mr. C. Mathews, General Manager
550 85th Avenue
Oakland, California 94261

ORGANIZATIONAL CONTACT: Mr. R. E. Boyer, Manager, Quality Assurance
TELEPHONE NUMBER: (415) 577-7422

PRINCIPAL PRODUCT: Emergency diesel generators.

NUCLEAR INDUSTRY ACTIVITY: Transamerica Delaval, Incorporated (TDI) has no current contracts for domestic nuclear emergency diesel generators (EDGs).

ASSIGNED INSPECTOR: J. W. Sutton — 9/26/83
J. W. Sutton, Reactive and Component Program Section (R&CPS) — Date

OTHER INSPECTOR(S): W. E. Foster, R&CPS
R. E. Oller, R&CPS

APPROVED BY: I. Barnes — 9/27/83
I. Barnes, Chief, R&CPS — Date

INSPECTION BASES AND SCOPE:

A. BASES: 10 CFR Part 50, Appendix B and 10 CFR Part 21.

B. SCOPE: This inspection was made as a result of the issuance of several 10 CFR Part 21 and 50.55(e) reports. The reports pertained to: (1) incorrectly identified bolt material, (2) failure of high pressure fuel oil injection lines, (3) failure of jacket water pump shafts, (4) failure of a crankcase cover bolt, (5) unqualified isoprene material, and (6) deficient piston skirts. These conditions were observed singly or in combination at one or more nuclear generating stations.

PLANT SITE APPLICABILITY:

Incorrectly identified bolt material: 50-400. Failure of high pressure fuel oil injection lines: 30-322, 50-206, 50-361, 50-362, 50-416, and 50-417.
(cont. on next page)

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PLANT SITE APPLICABILITY: (cont.)
Failure of jacket water pump shafts: 50-322. Failure of a crankcase cover bolt: 50-416. Unqualified isoprene material: 50-416, 50-417, 50-400, 50-413, 50-414, 50-424, and 50-425. Deficient piston skirt: 50-413, 50-414, 50-518, 50-519, 50-553, 50-554, 50-400, 50-401.

A. VIOLATIONS:

Contrary to Section 21.21(b)(1) of 10 CFR Part 21 dated December 30, 1982, a director, responsible officer, or designated person had not notified the Commission in regard to:

1. Jacket water pump shaft failures on EDGs that had been furnished to the Shoreham Nuclear Power Station.

2. A potential defect in the fuel injection line tubing that was used on EDGs furnished to Grand Gulf and San Onofre.

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

B. NONCONFORMANCES:

1. Contrary to Criterion V of Appendix B to 10 CFR Part 50, paragraph 4.6.2 of Section 4 of the Quality Assurance Manual (QAM) and paragraph 4.1.1 of Quality Control Procedure I.P.200, the receiving inspector accepted material on Purchase Order (PO) 45333, for which required mill test reports had not been received, without issuing a nonconformance form P-249.

2. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and the commitment date of July 15, 1982, in TDI's 10 CFR Part 21 report dated June 23, 1982, concerning unqualified material in flexible drive couplings of EDGs, the notification letters were not sent until August 18, 1982.

3. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and subparagraphs II.A and II.B dated January 29, 1976, and November 10, 1969, respectively, of the Drafting Room Practice, the following layout drawings for the late 1982 redesign of the EDG jacket water pump had not been (1) drawn on tracing paper and (2) signed and dated: (a) 101973, (b) 03-426-08-AA, and (c) 03-425-10-AE (lined through).

4. Contrary to Criterion V of Appendix B to 10 CFR Part 50, paragraphs 2.2 and 2.3 of Engineering Operating Procedure (EOP) 4 dated April 19, 1979, and paragraph II.A.6 dated January 29, 1976, of the

Drafting Room Practice, regarding calculations for the redesign of defective EDG jacket water pumps located at Shoreham Nuclear Power Station:

a. Calculations for the first occurrence (1979), which are written in the proper notebook, had not been signed and dated in the spaces provided.

b. Calculations for the second occurrence (1982) had not been (a) signed, and (b) written in the proper notebook.

5. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraphs 6.1.1, 6.2.1, and 6.3.1 of Section 6 dated February 27, 1981, of the QAM, "D Sheets" which pertain to quality of the product are issued by the Engineering Department; however, they are not reviewed by the manager as evidenced by the lack of provisions to identify the date, preparer, reviewer, approver, or revision. Examples are D-4986 and D-4956 which are entitled, "Assembly Instructions," and pertain to the EDG jacket water pump. It was noted that the latter document reflected the release date, four revision levels, and dates in the lower margin of the affected sheets.

6. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraphs 5.3.2, 5.3.3, and 16.2.1 of Sections 5 and 16, respectively, dated February 27, 1981, of the QAM, route sheets for the assembly of the EDG jacket water pump reflected on Drawing No. 101973, Revision C, had not been retained by Quality Control as objective evidence of inspection acceptance.

7. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraphs 2.4.1 and 9.1.1 of Quality Control Inspection Procedure No. 300 dated April 1, 1981, regarding EDG jacket water pump parts that were manufactured during the time period when defective jacket water pumps were being modified:

a. Stamp and date had not been entered at Operation No. 90 and final accept block of PRS No. 03-426-08-AE water pump shaft which was processed in October 1982. Further, the quantity accepted had not been entered in the quantity accepted block.

b. Stamp had not been entered in the final accept block of PRS No. 101969 seal retainer which was processed in September 1982.

8. Contrary to Criterion V of Appendix B to 10 CFR Part 50, Stone and Webster Engineering Corporation Specification No. SHI-89 dated June 24, 1981, paragraph 15.3.1 and its subparagraph 5 of EOP 1 dated April 20, 1981, and the "Qualification Statement for 03-425-04 Jacket Water Cooling Pump Revision" dated October 18, 1982, dynamic analysis or testing had not been conducted on the redesigned EDG jacket water pumps to assure that the seismic qualification had not been compromised.

9. Contrary to Criterion V of Appendix B to 10 CFR Part 50, and paragraph A.1 of EOP 7 dated April 20, 1981, Purchased Material Specification No. RL 019000 dated October 6, 1982, had not been approved as evidenced by the lack of a signature in the approval block.

C. UNRESOLVED ITEMS:

None

D. STATUS OF PREVIOUS INSPECTION FINDINGS:

1. (Closed) Nonconformance A (Report No. 82-02): The Quality Assurance/Quality Control organizational chart had not been updated to reflect changes in the QA/QC organization since January 1, 1982.

   The NRC inspector reviewed the current QA/QC organizational chart which was revised on January 15, 1983, showing that the Nondestructive Examination (NDE) Level III examiner is no longer the Manager of Quality Engineering.

2. (Closed) Nonconformance B (Report No. 82-02): Kobe Steel Ltd. had not been surveyed at a minimum of once every three years as required by paragraph 4.4.3 of Section 4 of the QAM

   The NRC inspector reviewed a revision to the QAM, subparagraph 4.4.5, issued April 22, 1983, which indicates that vendors who hold current ASME certificates of authorization or Quality Systems Certificates need not be surveyed or audited. Chemical analysis of subject crankshaft materials were performed and the materials found to be acceptable. The NRC inspector was informed by TDI that they intend to perform a physical inspection at Kobe Steel Ltd. within the next three months.

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3. (Closed) Nonconformance C (Report No. 82-02): (a) Component drawings released by engineering did not constitute the final instructions to assembly for definition of acceptance criteria for the governor lube oil cooler, and (b) instructions for assembly of the governor lube oil cooler had not been provided in writing from manufacturing engineering to assembly.

   The NRC inspector reviewed the lube oil governor assembly drawing and verified that the location of the cooler was not identified. In addition, the parts list for this drawing was reviewed for content. The route sheet now indicates the assembly drawing. TDI's corrective action commitments contained in the January 5, 1983, letter to the NRC have been complied with.

E. OTHER FINDINGS AND COMMENTS:

1. Carolina Power and Light Company's (CPL) 10 CFR Part 50.55(e) notification report, dated January 18, 1983, identified that bolting material for the CPL Shearon Harris, Unit 1, EDG was not properly identified in accordance with design requirements.

   The NRC inspector reviewed documents and correspondence between TDI, Ebasco, and CPL pertaining to this subject. It appeared to the NRC inspector that a misunderstanding existed as to whether the bolts and nuts were requested to be fabricated to AISI 4140 or ASTM specifications. The nuts and bolts were bought to the AISI 4140 specification which conforms to ASTM A193 Grade B7 chemical and mechanical property requirements. Specification CAR-SH-E-11, Revision 6, did not require ASTM materials to be purchased. TDI's letter of June 22, 1983, to Ebasco outlines this finding. This is not considered a generic problem.

2. Tennessee Valley Authority (TVA) 10 CFR Part 50.55(e) report to the NRC dated February 10, 1982, addressed the failure of TDI to take corrective action on TVA audit findings described in TVA audit 81V-47, conducted December 1-3, 1981. Documentation and correspondence between TVA and TDI to date was reviewed. Reaudits have been performed by TVA to determine compliance to their findings. TDI had taken action to make sure that proposed corrective actions were implemented before signing off on the corrective action form. Documentation for compliance to this requirement was reviewed.

   All outstanding items were closed out by TVA during a TVA reaudit. TVA's letter to TDI dated August 24, 1982, indicated no findings.

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3. Long Island Lighting Company (LILCO) filed a 10 CFR Part 50.55(e) report on April 20, 1983, with the NRC, Region I. The report stated that failures had occurred in fuel oil injection lines to the EDGs that had been furnished to Shoreham Nuclear Power Station, Unit 1. As a result of the documentation review by the NRC inspector, the following conditions were found to exist:

   a. Three diesel generators were supplied to the Shoreham Nuclear Station for emergency power.

   b. A failure occurred to the high pressure fuel oil injector line during routine testing of Generator No. 102 on March 3, 1983. The tubing was replaced and on March 5, 1983, a fuel injection line failed on Generator No. 103.

   c. Both lines were sent to an independent laboratory for failure analysis.

   d. A failure analysis issued by TDI dated June 24, 1983, concluded that the failure was attributable to the presence of a discontinuity on the inside diameter (I.D.) of the injection tube. This discontinuity acted as a stress riser and combined with the line operating pressures resulted in the fatigue endurance limit of the material being exceeded. The report indicated that the discontinuity was a draw seam that had been created during manufacture of the tubing.

   e. TDI conducted a 10 CFR Part 21 meeting on June 27, 1983, as required by the Division 10 CFR Policy Procedure, to evaluate the findings and to determine reportability to the NRC. The committee determined that this problem was an isolated case and was not reportable. On July 5, 1983. another meeting was held which still determined the condition to be nonreportable due to the fact that many engines had been and are running with the same type of tubing that had been installed at Shoreham.

   f. The NRC inspector requested a search be made as to when the tubing used in the Shoreham Units was purchased and if other nuclear sites could have injection lines installed that had been manufactured from the same lot of tubing.

g. TDI searched their records and found that the tubing was purchased in 1976. Purchase lots are made in 2000 ft. increments with approximately 200 ft. being used per diesel unit. The record checks indicated that besides the Shoreham nuclear site, EDGs had been furnished to Grand Gulf and San Onofre nuclear sites which had utilized tubing from the same purchase lot.

h. TDI Design Specification D-266 dated October 2, 1972, and Revisions A and B dated August 18, 1978, and August 15, 1980, contain the applicable requirements required to be followed in regard to tubing manufacturing operations. The supplier was required to furnish material certificates of conformance and test reports with each order. Purchase documentation for this period of time (1976) was not retained by TDI in that the QA program only requires retention for 5 years. The NRC inspector reviewed a recent PO for tubing, No. 45333 dated October 1, 1981, for conformance to purchase requirements. The PO required that mill test reports be furnished. A nonconformance was identified as a result of the acceptance of the material by the receiving inspector, although mill test reports had not been received (see paragraph B.1).

i. The action to preclude recurrence was contained in the failure analysis report, June 24, 1983, and indicated "more rigid QA procedures were called for. Sections from each length of tubing should be cut off, sawed lengthwise at 90° intervals, and inspected to ensure there are no draw marks on the tubing ID. Since draw seams would run the entire length of the tubing, this inspection measure will ensure that no draw seams are present in any line manufactured from that length of tubing (200 ft.). Such a QA requirement should be called for on any high pressure fuel injection line destined for use on a nuclear stand-by emergency diesel generator."

j. As a result of the NRC inspector's review of documentation, consistency of drawings, procedures, POs, letters, in-house memos, and reports, it was concluded that this failure may not be an isolated occurrence and that a potential existed for draw seams to be present in fuel injection lines of diesel generators supplied to Grand Gulf and San Onofre. In addition, review of 10 CFR Part 21 evaluation activities concerning the fuel oil line failure consisted of side notes on letters and records, etc., produced by TDI personnel during Delivered Product Trouble (DPT) meetings. These were considered

as inadequate by the NRC inspector to establish the reason for classifying this occurrence as one of a kind. The violation detailed in paragraph A was identified as a result of this review.

k. Subsequent to the inspection, TDI filed a 10 CFR Part 21 report with NRC, Headquarters. The report is dated July 20, 1983, and identifies the following nuclear generating stations with the potential defect: (1) Shoreham, (2) Grand Gulf, and (3) San Onofre.

4. LILCO filed a 10 CFR Part 50.55(e) report on October 15, 1982, with the NRC, Region I. The report stated that jacket water pump shafts had failed on EDGs that had been furnished to Shoreham Nuclear Power Station, Unit 1. Further, the report stated that the failures occurred on jacket water pumps that had been modified to preclude failures that had been experienced in similar units operating overseas.

The following conditions were observed during the course of the inspection:

a. The Engine and Compressor Division of TDI filed a 10 CFR Part 21 report on September 20, 1979, regarding "a potential failure of the drive shaft for the engine driven jacket water pump which would result in engine nonavailability." The report stated that jacket water pumps of the same design as those that failed had been installed on the three EDGs that had been furnished to Shoreham Nuclear Power Station. The NRC inspector was informed that the jacket water pumps had been modified.

b. A TDI memo dated October 18, 1982, states, in part, "In the past five months, Lilco [Long Island Lighting Company] has experienced three jacket water pump failures." Information presented as a record of evaluation was included in open areas of a form entitled, "Authorization For No Charge Billings" dated October 7, 1982, and identified LILCO as the customer. The following hand written/printed information was exhibited in the open areas: "Review 10 CFR 21 no-only site conditions at LILCO diff OK other plants not a 10 CFR 21 LILCO unique only site with this problem attendees [list of names dated 10-11-82] LILCO is aware of problem TDI & LILCO will solve [signed, dated 11/11/82]." The information is not sufficiently detailed to enable an adequate evaluation of the decision regarding reportability. The failure of the jacket water pumps had not been reported to the Commission. As a result of the foregoing, the violation detailed in paragraph A was identified.

c. Layouts are created by redlining existing drawings rather than by initiating new drawings. The redlined drawings (layouts) had not been subjected to the required signature/date cycle. Calculations had not been controlled in the manner specified. There was no indication that assembly instructions had been reviewed/approved. Route sheets for assembly of the jacket water pump had not been retained; also, some route sheets for manufacturing activity had not been completed as required. The foregoing, along with other observations, resulted in the nonconformances detailed in paragraph B.3 through B.9.

d. A TDI memo dated July 16, 1979, which addresses jacket water pumps, identifies Gulf States along with LILCO and a foreign customer. Requested documents were not presented regarding Gulf States; as a result, this issue will remain open in order to determine whether or not Gulf States received suspect jacket water pumps.

e. TDI identifies the cause as engineering and assembly induced. The NRC inspector concurs; however, in his judgement, the quality organization cannot be excluded. Based upon the observations of this area of the inspection, it is not apparent that adequate corrective actions and preventive measures have been taken. However, the NRC inspector was informed that the pumps at Shoreham Nuclear Power Station have operated past the times of the previous failures.

f. In an effort to assess the effectiveness of the corrective actions and preventive measures, the following areas were evaluated: (a) change control, (b) manufacturing process control, and (c) records. This area of the inspection was accomplished by evaluating the following documents for requirements and/or implementation of requirements: 12 drawings, 3 specifications, 6 procedures, 3 sections of the QA Manual, 5 memoranda, 7 letters, and 24 other documents identified as: analysis/calculations, packaging/shipping notifications, production routing sheets, qualification statement, material requisitions, authorization for no charge billing, failure analysis report, assembly instructions, and requests for drafting room action. The findings are indicated at other locations of this report.

g. Subsequent to the inspection, TDI filed a 10 CFR Part 21 report dated July 20, 1983, with NRC, Headquarters.

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5. Two 10 CFR Part 50.55(e) reports by Mississippi Power and Light (MP&L) Company to the NRC were filed on March 22, 1982, and April 21, 1982. These reports concerned the shorting of the generator by a sheared crankcase capscrew head of a Unit I, Division II, diesel generator furnished by TDI. This matter was reported in several interim reports by MP&L with the most recent one being Interim Report No. 6.

   a. During a 24-hour performance test, the unit tripped on a "Generator Differential" which was accompanied by electrical arcing inside the generator. Later inspection verified that the stator insulation had been damaged and the head from a 5/8 x 11 threads x 1 3/4" long capscrew was embedded in the stator. It was determined that the capscrew head was from the diesel engine's rear crankcase cover. All of the capscrews were replaced by the utility, and an analysis of the failed capscrew indicated the head broke off due to low-stress fatigue cracking during service. This cracking appeared to have been initiated by over or under torqueing of the capscrews.

   b. Findings: Review of the problem with TDI's Grand Gulf site service personnel provided the following information: The source of the capscrew head found in the generator stator was from a top capscrew in the vertical crankcase cover. The screw shank was still in the cover hole. The screws are classed as noncritical service and require torqueing of 60 foot pounds (Ft. Lb.). Since the metallurgical analysis indicated a fatigue failure mechanism, the cause appears to have been over or undertorqueing coupled with operating stresses. No information was available to indicate when this incorrect torqueing may have occurred. TDI service personnel indicated that the site Bechtel craftsman would have had a minimum of two occasions when they would have removed and replaced the crankcase cover for bearing checks after the diesel generator was delivered to the site. In addition, they would have had a TDI instruction manual which showed the required torque value of 60 Ft. Lb. for this size bolt while using a special lubricant. The TDI service personnel also indicated that this incident of a sheared screw head shorting the generator was a first time occurrence for the TDI diesel generators. The matter was discussed between TDI and MP&L personnel, but no meeting notes were made available to the NRC inspector by TDI.

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6. In 10 CFR Part 50.55(e) reports to the NRC by four electric utility companies, a misapplication of unqualified isoprene material in the flexible element of the couplings for diesel generators supplied by TDI was identified. This material was not suitable for use in the high temperature oil atmosphere of the diesel generator and would deteriorate rapidly in service. The couplings were manufactured by Koppers Company. The utilities reporting were: (1) MP&L for Grand Gulf Nuclear Station, Units 1 and 2; (2) CP&L for Shearon Harris Nuclear Power Plant, Unit 1, (3) Duke Power for Catawba Nuclear Station, Units 1 and 2, and (4) Georgia Power for Vogtle Nuclear Plant, Units 1 and 2. This matter was also reported by TDI in 10 CFR Part 21 reports to the NRC on June 23 and July 13, 1982.

   a. The action necessary to correct this deficiency was to change out the existing flexible element in the coupling with one made of neoprene which was suitable material for service. TDI, in their report, identified 10 nuclear power plants which have affected diesel generators, and indicated these cognizant parties would be notified no later than July 15, 1982.

   b. Findings: The NRC inspector verified the following information through observations, discussions, and review of documents:

      (1) The incident which prompted TDI to report on June 23, 1982, was a failure of a coupling flexible element made of isoprene in a nonnuclear diesel generator. The utilities reported subsequent to the above date. The suspect couplings were manufactured by Koppers Company starting in 1977 and purchased as stock items by TDI based on TDI's purchased material specification for "Couplings-Elastomeric, Part No. AK-007-000," dated November 11, 1976. The original version of this specification did not specify the type material of the flexible element. After the above failure, TDI issued Revisions A, B, and C to the specification in 1981, 1982, and 1983, respectively. Change A specified that the flexible element should be neoprene which is a suitable material. Change B specified service in a 175°F oil atmosphere, and Change C specified that the flexible element must have a 1/2 " wide red band on it to distinguish it as neoprene.

(2) Review of TDI notification letters verified that all nuclear order customers with affected diesel generators were notified of the deficiency. However, 10 of the TDI notification letters were dated August 18, 1982. This date was contrary to the TDI commitment date of July 15, 1982, in their 10 CFR Part 21 report and resulted in the nonconformance identified in paragraph B.2.

(3) Observation of a coupling flexible element in the stores department verified that it did not have a red band on it as required by Revision C of the purchase specification. However, this flexible element was identified only by part number and it could not be traced to specific POs placed with Koppers Company after April 25, 1983.

(4) Review of receiving inspection cards, "Vendor Inspection Report," for Koppers Company, indicated that the bases for receiving inspection of the couplings was Mil-Std 105 D.

(5) Review of 10 CFR Part 21 evaluation records concerning the isoprene flexible element established that records were inadequate to establish the cause of the misapplication and the basis for the determination that the item was reportable under 10 CFR Part 21. The only records available were entries dated June 15 and June 22, 1982, in the DPT committee weekly log. The June 15, 1982, entry indicated Product Engineering was to compile a list of engines using Kopper's Elastomer GDV drive couplings, and the June 22, 1982, entry indicated that it was determined that the Kopper's Elastomeric coupling was a 10 CFR Part 21 reportable item and the responsible individuals were to issue the appropriate notification. These DPT committee meeting notes did not provide sufficient information to show the bases for the evaluation (and do not appear to meet the requirements 10 CFR Part 21, paragraph 21.51(a) and (b)).

7. In five 10 CFR Part 50.55(e) reports to the NRC by three electric utility companies, a deficiency in the piston skirt castings of diesel generators was identified. This matter concerned the potential failure of the engine piston skirt castings of diesel generators supplied by TDI. Such failures would result in the unavailability of the diesel generators. The castings were manufactured by TDI between December 1978 and October 1981. The utilities reporting were: (1) Duke Power for the Catawba Nuclear Station, Units 1 and 2; (2) TVA for Hartsville

Nuclear Plant, Units 1 and 2, and Phipps Bend Nuclear Plant, Units 1 and 2; and (3) CP&L for the Shearon Harris Nuclear Power Plant, Units 1 and 2. This matter was also reported by TDI in a 10 CFR Part 21 report to the NRC on October 28, 1982.

The NRC inspector ascertained the following information by discussions and review of documents:

a. The incident which prompted TDI to report was a failure of a type "-AN" piston skirt casting in early 1980. The utilities subsequently made their reports to NRC. Subsequently, TDI produced a report entitled, "Failure Analysis No. 152, Piston Skirt, P/N 03-041-02-AN," dated June 20, 1983. This report included a description of events leading up to a change in foundry heat treating practice to include fan cooling of the castings. This cooling method was determined to have resulted in high residual stresses in the castings which, when combined with operating stresses, could result in failure of the castings. The report also provided recommended corrective measures including NDE, stress relieving at 1050°F, and selective grinding of the affected castings.

b. Review of six TDI notification letters verified that all utility nuclear units with affected diesel generators were accounted for. The letters included a list of foundry shop order numbers and serial numbers of the affected castings to aid the utilities in identifying the suspect castings. The letters also recommended that the castings be returned to TDI for NDE and stress relieving if possible, or replacement with suitable castings, and return for reinstallation. As of this inspection date, only Duke Power Company and Gulf States Utilities have returned skirt castings to TDI.

c. Review of a current process routing for Job No. 69501 covering reprocessing of returned castings verified that corrective action was being performed under controlled conditions using process travelers, qualified personnel, and procedures. Other records reviewed for Job No. 69501 consisted of: (a) special instruction specification No. 750R; (b) a certificate of compliance; (c) a packaging and shipping notification; (d) a magnetic particle inspection report; (e) an NDE technician's qualification record; and (f) heat treatment records for Iron ASTM A-536, Grade 100/70/03 castings. The review also

included the original master engine book of records for diesel generator S.N. 75018-2762. Within this area of the inspection, no nonconformances or unresolved items were identified.

F. EXIT INTERVIEW:

During the exit interview, at which time the inspection findings were discussed, the NRC inspectors were informed by TDI's management that they would take exception to all of the violations that had been identified during the inspection. The NRC inspector indicated that this position would be identified in the inspection report. It was determined by staff review subsequent to the inspection to defer issue of one violation which had been identified to TDI management until after performance of further inspection. This violation subject pertained to inadequate evaluation records.

ORGANIZATION: VELAN VALVE CORPORATION
WILLISTON, VERMONT

REPORT NO.: 99900346/83-01	INSPECTION DATE(S) 9/12-16/83	INSPECTION ON-SITE HOURS: 31

CORRESPONDENCE ADDRESS: Velan Valve Corporation
ATTN: Mr. E. I. Francois
Vice President, Quality Assurance
Avenue C, Griswold Industrial Park
Williston, Vermont 05495

ORGANIZATIONAL CONTACT: Mr. Duncan Winton, QC Manager
TELEPHONE NUMBER: (514) 748-7743

PRINCIPAL PRODUCT: Nuclear valves.

NUCLEAR INDUSTRY ACTIVITY: Approximately 20 percent of the production from May 1, 1982, through May 31, 1983.

ASSIGNED INSPECTOR: J. T. Conway — 11/8/83
J. T. Conway, Reactive and Component Program Section (R&CPS) — Date

OTHER INSPECTOR(S):

APPROVED BY: I. Barnes — 11/8/83
I. Barnes, Chief, R&CPS — Date

INSPECTION BASES AND SCOPE:

A. BASES: 10 CFR Part 50, Appendix B and 10 CFR Part 21.

B. SCOPE: This inspection was made as a result of the notification by the Tennessee Valley Authority (TVA) of jamming 2 1/2-inch stop check valves in the high pressure safety injection lines at the Bellefonte nuclear site. In addition, the following programmatic areas were inspected: training/qualifications; calibration of measuring and test equipment; control of purchased material, equipment, and services; audits; and reporting of defects.

PLANT SITE APPLICABILITY:

Docket No. 50-438/439.

ORGANIZATION: VELAN VALVE CORPORATION
WILLISTON, VERMONT

REPORT NO.: 99900346/83-01	INSPECTION RESULTS:	PAGE 2 of 5

A. VIOLATIONS:

Contrary to Section 21.6 of 10 CFR Part 21, a current copy of 10 CFR Part 21 was not posted in the area where Section 206 was posted.

B. NONCONFORMANCES:

1. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section 12.2.1 of QC Procedure VELW-QC-156.1, it was noted that two Field Service Reports from a Velan Service Engineer dated April 25 and May 23, 1983, and relating to the jamming disc on 2 1/2-inch stop check valves at the Bellefonte nuclear site were not in the files of the Engineering Supervisor at Plant 3.

2. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section 5.1 of QC Procedure VELW-QC-156.16, a review of training files and qualification records revealed the absence of an eye examination report for three Level II personnel - employee No. 70 for 1980 and the Manager QC and employee No. 86 for 1981.

3. Contrary to Criterion V of Appendix B to 10 CFR Part 50, Section 4.1.1 of QC Procedure VELW-QC-156.14 and Francois/Department Heads memo dated March 28, 1983, a review of "On the Job" training records revealed that applicable revised procedures contained in Revision 7 to the QA manual were not reviewed by the following personnel: NDE Level II examiner (employee No. 70), welders (Nos. WA54, WA57, WA55, and WA62), inspectors (Nos. 2, 51, 73, and 88), and the company metrologist.

4. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section 4.4.2 of QC Procedure VELW-QC-156.11, a review of gauge control records revealed that reference standards had been calibrated by the following four companies:

   1. Precision Inspection - gage blocks on an annual basis since 1978;

   2. Aviation Electric - magnaflux tester in June 1979 and August 1982;

   3. Canadian Marconi - pyrometer in September 1978, October 1980, and July 1983 and;

   4. Canadian Central Gauge - gage blocks in November 1979 and on an annual basis since 1981.

There was no documented evidence that the four companies supplying outside calibration services had been approved by Velan.

5. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section 2.3 of QC Procedure VELW-QC-156.2, there was no indication that the Quality Assurance Administrator had reviewed and/or initialed three NDE procedures and training/qualification records from Trutom who had performed radiographic and ultrasonic testing services for Velan.

C. UNRESOLVED ITEMS:

None

D. STATUS OF PREVIOUS INSPECTION FINDINGS:

1. (Closed) Nonconformance (82-01): Verification of transfer of marking on an Operation and Routing Sheet (ORS) and assembly and final inspection on a Nuclear Valve Assembly Routing Sheet (NVARS) were not stamped and dated by an inspector.

   The NRC inspector verified that the unstamped operations on the ORS and NVARS were verified by using redundant inspection records and that the responsible inspectors were retrained and their training files were updated to reflect this training. In addition, 10 ORSs for valve components at different stages of fabrication were reviewed, and all the inspection operations were signed off.

2. (Closed) Nonconformance (82-01): Calibration records were neither identified in the QC Documentation Manager's log nor stored in the vault.

   The NRC inspector verified that all noncurrent calibration records were identified in the QC Documentation Manager's log and were stored in the vault. The calibration technician had also been retrained in this area.

3. (Closed) Nonconformance (82-01): QA department reports relating to corrective action implementation did not address either the review of or the effectiveness of corrective action.

   The NRC inspector reviewed the Vice-President QA's monthly report "Review of Rejection Reports" to management from December 1982 through August 1983 and verified that corrective action statements are reviewed for applicability and effectiveness.

ORGANIZATION: VELAN VALVE CORPORATION
WILLISTON, VERMONT

REPORT NO.: 99900346/83-01	INSPECTION RESULTS:	PAGE 4 of 5

E. OTHER FINDINGS OR COMMENTS:

1. Bellefonte - In February 1983, TVA reported that seven of nine 2 1/2-inch, 1500 lb. Velan stop/check valves intermittently failed to fully open and/or showed an indication of excessive pressure drop during flushing operations of the makeup and purification and high pressure injection systems. Velan sent a service representative to the site, and his initial investigation confirmed that the pressure drop over the valve was excessive. Velan conducted experiments to isolate the significance of four different modifications that were made to the disc to achieve a satisfactory pressure drop. The test results indicate that additional and larger holes drilled around the disc will equalize the pressure above the disc and the pressure down stream; thus, resolving the jamming problem and also improving the flow characteristics of the 2 1/2-inch stop/check valve. Valves supplied earlier to Florida Power and Light, Toledo Edison, and Duke Power had discs with the larger holes. Although the problem appears isolated to the TVA valves, Velan will notify all licensees having 2 1/2-inch, 1500 lb. stop/check valves. Nonconformance B.1 was identified in this area of the inspection.

2. Bolting Torque - Bolting torque adequacy in assembled valves was evaluated by reviewing Procedure VEL-P-586, "Bolt Torquing Procedure for Bolted Bonnet Valves." Based on this review and discussions with QA personnel relating to bolting torque, the inspector's findings are as follows:

   a. Documented instructions for torquing bolts have been developed.

   b. Bolted bonnets are torqued and a record is maintained on the "Hydro/Air Test Data" form.

   c. Calibrated torque wrenches are used in all cases.

3. Training/Qualifications - Two procedures and the training records for 11 inspectors and the qualification records for 13 NDE personnel, 5 auditors, and 6 welders were reviewed to assure that personnel performing and verifying activities affecting quality were trained and qualified. It was noted that four current inspectors had not received their annual eye examination in 1983 which should have been given in May 1983. Nonconformances B.2 and B.3 were identified in this area of the inspection.

ORGANIZATION: VELAN VALVE CORPORATION
WILLISTON, VERMONT

REPORT NO.: 99900346/83-01	INSPECTION RESULTS:	PAGE 5 of 5

4. Calibration of Measuring and Test Equipment - A review of 1 procedure, 12 gage control records, and 7 certifications from four calibration service vendors was performed to assure that measuring and testing equipment are properly identified, controlled, and calibrated at specified intervals. It was noted that a 3 to 4-inch outside micrometer in the dimensional inspection area had an etched asset No. G13-3495, whereas the calibration label was identified with No. G13-3508. Nonconformance B.4 was identified in this area of the inspection.

5. Control of Purchased Material, Equipment, and Services - The approved vendors' list, dated May 1982 and June 1983, 16 purchase orders to 10 vendors, and 3 CMTRs from 2 vendors were reviewed to assure that material equipment and services were purchased from qualified vendors. It was noted that material was purchased from two vendors - Magnaflux (penetrant/magnetic particles) and Turco (dye-check developer) - who were not on the approved vendors list, and there was no documented evidence that either vendor had been evaluated or surveyed. In addition, there was no evidence of a purchase order to Trutom who performs radiographic and ultrasonic testing services for Velan. Nonconformance B.5 was identified in this area of the inspection.

6. Audits - Eighteen internal audit reports for six activities (three each), three management audit reports, and fourteen external survey reports for five vendors were reviewed to assure that all elements of the QA program were audited on an annual basis.

7. Reporting of Defects - The procedure relating to the reporting of defects and failures was reviewed and the implementation of the procedure in regard to posting requirements was verified by inspecting the shop fabrication areas. Violation A.1 was identified in this area of the inspection.

ORGANIZATION: WESTINGHOUSE ELECTRIC CORPORATION
NUCLEAR COMPONENTS DIVISION
PENSACOLA, FLORIDA

REPORT NO.: 99900104/83-02	INSPECTION DATE(S) 10/17-21/83	INSPECTION ON-SITE HOURS: 52

CORRESPONDENCE ADDRESS: Westinghouse Electric Corporation
Nuclear Components Division
ATTN: Mr. T. D. Miller, Manager, Product Assurance
P. O. Box 1313
Pensacola, Florida 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 50 percent.

ASSIGNED INSPECTOR: C J Hale for 11/18/83
R. E. Miller, Special Projects Section (SPS) Date

OTHER INSPECTOR(S): J. W. Hamilton, Reactive Inspection Section (RIS)

APPROVED BY: C J Hale 11/18/83
I. Barnes, Chief, RIS 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 Westinghouse Electric Corporation, Nuclear Components Division (WNCD), QA program in the areas of: status of previous inspection findings; nonconformances and corrective action; welding control; NDE personnel qualification; and process control. In addition, a followup was made on a 10 CFR Part 50.55(e) report by TVA concerning debris in steam generators at Watts Bar, Unit 1.

PLANT SITE APPLICABILITY:

Inadequate welding control and improper use of process route sheets 50-261.

ORGANIZATION: WESTINGHOUSE ELECTRIC CORPORATION
NUCLEAR COMPONENTS DIVISION
PENSACOLA, FLORIDA

REPORT NO.: 99900104/83-02	INSPECTION RESULTS:	PAGE 2 of 6

A. VIOLATIONS:

None

B. NONCONFORMANCES:

1. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Procedure No. PQ-04-005, manufacturing personnel were not assembling two steam generator replacement shell and tube bundle assemblies (Serial Nos. 93733 and 93734) in accordance with the operation sequences specified on the route sheets and related records.

2. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Welding Procedure No. DMP-4284-1, Revision 0, the specified arc voltage of 12 ± 1 volts was not being used during tube to tube-sheet welding on the steam generator Serial No. 93734 on Shop Order IWSL-10367.

C. UNRESOLVED ITEMS:

None

D. STATUS OF PREVIOUS INSPECTION FINDINGS (By R. E. Oller):

1. (Closed) Nonconformance A (83-01): WNCD's engineering failed to identify the Inconel weld band detail for steam generator primary nozzles in the Technical Manual No. 1440-C278 and on the customer Drawing No. 1101JG500 furnished for Beaver Valley, Unit 2.

   The NRC inspector verified that in accordance with the vendor's corrective action response letter dated July 21, 1983, both the customer drawing and the technical manual Figure 1-1 Detail "A" were updated on July 7, 1983, to show the Inconel weld band. These updated documents were then sent to the Beaver Valley facility.

2. (Closed) Nonconformance B (83-01): Inspection personnel failed to provide sufficient detail on the base metal repair map for Shop Order No. 4051 channel head nozzle as required by Procedure No. QIP-8700.

   The NRC inspector verified that in accordance with the vendor's corrective action response letters dated July 21 and September 12, 1933, a new detailed repair map was provided. This map met the documentation requirements of Procedure No. QIP-8700. To prevent recurrence, inspection personnel were given training sessions on August 5 and October 7, 1983, in the documentation requirements of Procedure No. QIP-8700.

3. (Closed) Nonconformance C (82-01): Contrary to WNCD Procedure No. PQ-04-005, inspection personnel bypassed Operation 470, Item C, "MT Final Support Key Item 25 and Restraint Key Item 14," on the route sheet for Shop Order TWRGT lower assembly, Drawing No. 1184J62, Issue 03R.

   The NRC inspector verified that in accordance with the vendor's corrective action response letters dated July 21 and September 12, 1983, the above route sheet was revised on March 31, 1983, and signed by quality engineering and manufacturing to permit the magnetic particle examination to be performed at a later operation on the route sheet. To prevent recurrence the inspection personnel were given additional instructions concerning the need to secure written permission prior to performing route sheet operations out of sequence.

4. (Closed) Unresolved Item (83-01): Examination during the March 1983 NRC inspection of procurement and fabrication records for a tube plate forging destined for the H. B. Robinson facility indicated that four massive lifting lugs had been welded to this component by the tube plate vendor (U.S. Steel Corporation) using a welding procedure supplied by Westinghouse. Based on the available information it could not be determined that the ASME Code, Section III, requirements governing temporary attachments to a pressure boundary had been satisfied.

   Subsequent to the March 1983 NRC inspection, WNCD concluded that the use of a Westinghouse welding procedure by another manufacturer complies with the applicable provisions of the ASME Code, Section III and IX. This decision was based on the code interpretation III-8-17 issued on March 25, 1982. The NRC inspector reviewed the interpretation and concurred with the WNCD conclusion.

E. OTHER COMMENTS OR FINDINGS:

1. Nonconformances and Corrective Action (By R. E. Oller): The NRC inspector reviewed sections 15.0 and 16.0 of the WNCD QA program manual to verify that these activities are controlled by the QA program.

   A review was also made of the following documents: (a) two applicable procedures; (b) a material review report (MRR) log; (c) 13 MRRs for nuclear orders; (d) a manufacturing hold for

corrective action (MHCA) log; (e) 5 MHCAs; (f) 10 product and process review report records; and (g) 2 monthly improvement program, scrap, and rework reports.

Within this area, no nonconformances were identified.

2. Welding Control (By R. E. Oller): The NRC inspector reviewed Section 9.3, "Welding Processes," of the WNCD QA program manual to verify that this activity is controlled by the QA program.

Observations were made of the inprocess tube to tube-sheet welding on a replacement steam generator for the H. B. Robinson facility.

Review was also made of the following documents: (a) welding procedure DMP-4284-1; (b) inprocess route sheet traveler for tube to tube-sheet welding in the H. B. Robinson replacement steam generator Serial No. 93734 on Shop Order No. 10367; and (c) the completed route sheet, pages 1 through 29, Issue 1, for the H. B. Robinson replacement steam generator Serial No. 93733 on Shop Order No. 10366.

Within this area, two nonconformances were identified. One concerned the failure to use the proper arc voltage specified in the welding procedure DMP-4284-1, and the other involved performing unapproved tube to tube-sheet welding on tubes other than those assigned to the route sheet Operation No. 374 as identified on the weld status sheet (see paragraph B.1).

3. NDE-Personnel Qualifications (By R. E. Oller): The NRC inspector reviewed Section 9.4, "Control of Nondestructive Examination," of the WNCD QA program manual to verify that this activity is controlled by the QA program.

A review was also made of the following documents: (a) a procedure controlling the certification of inspection personnel; and (b) training, qualification, and certification records for 10 NDE technicians for the techniques of radiography, ultrasonic testing, dye penetrant examination, magnetic particle testing, and visual examination.

Within this area, no nonconformances were identified.

4. 10 CFR Part 50.55(e) Report (By John W. Hamilton):

a. Introduction: Tennessee Valley Authority (TVA) reported to the NRC on March 25, 1983, that loose material was found on the secondary side of the Watts Bar Nuclear Plant, Unit No. 1, steam

generator. This material was found between the outer tubes and the generator shell at the tube sheet using fiberoptics prior to closure for filling operations. On October 18, 1983, during a telephone conversation with the TVA project engineer, he identified the loose material to be a plastic tube guide, a weld rod stub, portions of a grinding disc, metal machineing curls, and a broken light bulb.

b. Findings: During an NRC inspection at WNCD, records examined by the NRC inspector indicated that Westinghouse QC and the customer concurred with the cleaning operations at the Westinghouse Tampa facility during manufacturing and final cleanliness inspections of the steam generators for Watts Bar. Cleaning procedures and inspection records were reviewed for the three H. B. Robinson plant replacement steam generators being fabricated at the Westinghouse Pensacola plant.

The NRC inspector conducted the following interviews with Westinghouse personnel: (a) with the Watts Bar site by telephone; (b) with personnel who were inspectors at the Westinghouse Tampa facilities where the Watts Bar steam generators were manufactured; and (c) with personnel who were formerly Watts Bar site project managers. A review of Watts Bar site records showed that four modifications were made which penetrated the steam generator shell. A chemical flush and hydro-tests were also accomplished prior to the fiber optic inspection which identified the loose material in the secondary side of the steam generator.

It was stated by Westinghouse personnel that site erection of the steam generator was accomplished by TVA personnel while the steam generator modifications were accomplished with TVA site craft personnel and with Westinghouse QC and supervisory personnel.

Due to the lack of any adverse findings, with respect to cleaning records or procedures during this NRC inspection and due to the extensive modification history of this steam generator after date of manufacture and before the reported fiber optic inspection, the NRC inspector was unable to ascertain the origin of the loose material with the exception of the plastic tube guide which is only used during manufacturing operations. However, this item would have been expected to disintegrate during hot functional testing.

ORGANIZATION: WESTINGHOUSE ELECTRIC CORPORATION
NUCLEAR COMPONENTS DIVISION
PENSACOLA, FLORIDA

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5. Process Control (By John W. Hamilton):

a. Shop Order No. IWSL 10366 Tube Bundle: The NRC inspector observed leak testing in progress on the lower shell of the H. B. Robinson replacement steam generator. Review of the route sheets applicable to this operation revealed one nonconformance (see paragraph B.1). The operation was being performed out-of-sequence in that Operation Nos. 439 through 446 had not been signed-off. Corrective action was completed during this inspection and included switching some operations forward to be performed during final assembly, modifying the required operation to reflect the actual work performed, and completing the sign-off.

b. Shop Order IWSL-10367 Support and Baffle Assembly: The NRC inspector observed tube loading in progress and reviewed the applicable route sheets for conformance. Cleaning inspections and sign-off points were reviewed for completeness.

No nonconformances were identified.

ORGANIZATION: WESTINGHOUSE ELECTRIC CORPORATION
NUCLEAR TECHNOLOGY DIVISION
FOREST HILLS, PENNSYLVANIA

REPORT NO.: 99900900/83-02	INSPECTION DATE(S) 7/26-29/83	INSPECTION ON-SITE HOURS: 44

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. Alex Ball, Jr., Nuclear Safety Department
TELEPHONE NUMBER: (412) 373-5792

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. LOCA/thermal aging equipment qualification testing of nuclear power plant safety-related equipment is approximately 15 percent of the lab's work.

ASSIGNED INSPECTOR: A. R. Johnson — 9/26/83
A. R. Johnson, Equipment Qualification Section (EQS) — Date

OTHER INSPECTOR(S): J. J. Benson, Consultant, Sandia National Labatories

APPROVED BY: H. S. Phillips — 9/28/83
H. S. Phillips, Chief, EQS — Date

INSPECTION BASES AND SCOPE:

A. BASES: 10 CFR Part 50, Appendix B; and Topical Report (TR) No. WCAP-8370, Revision 9A, Ammendment 1.

B. SCOPE: This inspection consisted of: (1) evaluation of QA controls for Westinghouse Forest Hills engineering development, review, and approval of qualification test plans (route cards); (2) a technical review and evaluation of environmental qualification test plans prepared by Westinghouse Forest Hills; and (3) review of Westinghouse Forest Hills action on previously identified items.

PLANT SITE APPLICABILITY:

Not identified.

ORGANIZATION: WESTINGHOUSE ELECTRIC CORPORATION
NUCLEAR TECHNOLOGY DIVISION
FOREST HILLS, PENNSYLVANIA

REPORT NO.: 99900900/83-02	INSPECTION RESULTS:	PAGE 2 of 5

A. VIOLATIONS:

None

B. NONCONFORMANCES:

None

C. UNRESOLVED ITEMS:

On April 26, 1982, shipping damage was acknowledged at Radiation Technology, Inc., New Jersey, on one ITT Barton high volume pressure sensor (Serial No. 0000460) under a Westinghouse Forest Hills' purchase order for irradiation testing services. The high pressure fitting to the equipment undergoing aging testing was damaged as reported in the Westinghouse Forest Hills' test log book No. 259. Westinghouse Forest Hills' engineering test personnel were on the scene at the time and made the necessary fitting replacement. The disposition of the anomaly was reported briefly by Radiation Technology, Inc., in their final certification report of December 15, 1982. Westinghouse Forest Hills' reporting of the anomaly in the log book lacked detail of the repair/replacement. During the inspection, it could not be determined whether the high pressure fitting was part of the test equipment undergoing irradiation testing. Westinghouse Forest Hills will be required to document the replacement fitting as a thermally unaged component prior to radiation aging, and report the details of repair/replacement, if within the scope of the equipment undergoing test. W-NSID has been notified and this issue will be reviewed during a future NRC inspection at W-NSID.

D. STATUS OF PREVIOUS INSPECTION FINDINGS:

1. (Closed) Nonconformance (83-01): Westinghouse Forest Hills failed to establish procedures that describe the control of route cards for equipment qualification testing as required by TR No. WCAP-8370, Revision 9A, Ammendment 1, paragraph 17.1.5.

   Westinghouse Forest Hills' test execution and test data control procedure No. S.E. T.E.O.6, Revision 3, dated April 7, 1983, Section B, was issued to include a description of route cards and their use in controlling equipment qualification tests. The NRC inspector reviewed the above procedure and determined its implementation was adequate to meet the requirements of TR No. WCAP-8370.

Training sessions for using the above procedure were held by Westinghouse Forest Hills with their test engineering and operations personnel on April 6, 1983.

2. (Closed) Nonconformance (83-01): Westinghouse Forest Hills' material control attendant did not verify that incoming material, accepted by shipping and receiving personnel, was in conformance with the purchase order as required by TR No. WCAP-8370, Revision 9A, and implementing material control procedure No. S.E. T.E.O. MC-1, Revision 2, dated June 14, 1982, Section A.

   Prior to the conclusion of the NRC inspection on January 24-28, 1983, the required verification and inspection activities by material control personnel were completed, identifying the deviation of material and pressure rating to P.O. No. 459592. (Reference NRC Report No. 99900900/83-01, paragraph D.2.j.)

   The NRC inspector reviewed the training records of two indoctrination sessions held by Westinghouse Forest Hills on January 27, 1983, to reemphasize the responsibilities of material control and quality control personnel. One session for material control attendants covered the requirements of material control procedure S.E. T.E.O. MC-1, Revision 2. Another session for quality control technicians who process material rejection notices covered the requirements of the receiving inspection procedures, S.E. T.R. QC-1, Revision 2. These sessions were held to preclude recurrence of the identified nonconformance.

E. OTHER FINDINGS OR COMMENTS:

1. QA Control of Westinghouse Forest Hills' Qualification Test Plans, Development, Review, and Approval: The NRC inspector determined that five qualification test plans (route cards) had been developed, reviewed, and approved, in accordance with Westinghouse Forest Hills' test engineering and operations procedures No. S.E. T.E.O. 1, Revision 2, entitled "Test Prospectus" and No. S.E. T.E.O. 6, Revision 3, entitled "Test Execution and Test Data Control." The route card documents, prepared by Westinghouse Forest Hills, implement the requirements of the test prospectus received from their test sponsor, Westinghouse Water Reactor Division (WRD), Nuclear Services Integration Division (W-NSID). The NRC inspector reviewed the multiple test operations performed at Westinghouse Forest Hills and at Westinghouse subcontractors

for compliance with each test prospectus received from W-NSID. Westinghouse Forest Hills' route cards were also reviewed with respect to each test prospectus for change control, QA requirements, and special test prerequisites. The NRC inspector reviewed the route card controlled sign-off used to control sequence of testing operations, calibration, inspection, and documentation.

No nonconformances were identified.

2. Technical Evaluation of Qualification Test Plans: The NRC inspector and Sandia National Laboratory (SNL) consultant (NRC inspection team) evaluated five qualification test plans to determine whether they met the regulatory requirements of NUREG 0588/IEEE-323-1974. The NRC inspection team reviewed the five qualification test plans to the technical requirements of the W-NISD test prospectus. The NRC inspection team examined the Westinghouse Forest Hills' test engineering qualification processes which included review and examination of equipment qualification documentation on the five tests, recently conducted and currently in progress at the Westinghouse Forest Hills' test facility. The NRC inspection team examined such documents as: test program prospectus, test program prospectus revision notices, test program prospectus change control orders, route cards, route card addenda test program deviation notices, test program deviation notice logs, qualification test plans, purchase orders and requisitions, engineering and operations test procedures, receiving inspection reports, material control reports, quality control releases, and material rejection notices.

The test plans reviewed included the following safety-related equipment: (1) CKB Industries incore thermocouples, connectors, and adapters; (2) W-IGTD incore thermocouple reference junction box; (3) Minco resistance temperature detectors; (4) ITT Barton high volume pressure sensors; and (5) ITT Barton differential pressure indicating switches.

Each of the above qualification test plans and qualification documentation were examined for the following:

(1) Test equipment included a description of all materials, parts, and subcomponents.

(2) Equipment interfaces were addressed.

(3) Same equipment was used for all phases of testing and represented a standard production item.

(4) Test acceptance criteria were established as described in the test prospectus to meet applicable codes, standards, and the nuclear regulatory requirements of NUREG 0588.

(5) All prerequisites for the given test as outlined in the test prospectus have been met.

(6) Environmental conditions were established and described; e.g., pressure and temperature profiles, irradiation and thermal aging factors were consistent with those outlined in the test prospectus and prescribed in the W-NTD WCAP 8587, Revision 5, "Methodology for Qualifying Westinghouse WRD Supplied NSSS Safety-Related Electrical Equipment."

(7) Adequate test instrumentation was described and used to meet the requirements of NUREG 0588.

(8) Test results were adequately documented and reduced for evaluation by W-NISD to assure that test prospectus requirements had been met.

No nonconformances were identified.

ORGANIZATION: WESTINGHOUSE ELECTRIC CORPORATION
NUCLEAR SERVICES INTEGRATION DIVISION
MONROEVILLE, PENNSYLVANIA

REPORT NO.: 99900900/83-03	INSPECTION DATE(S) 8/30-9/2/83	INSPECTION ON-SITE HOURS: 56

CORRESPONDENCE ADDRESS: Westinghouse Electric Corporation
Nuclear Services Integration Division
ATTN: T. A. Christopher, General Manager
P. C. Box 355
Pittsburgh, Pennsyvania 51230

ORGANIZATIONAL CONTACT: Mr. Alex Ball, Jr., Nuclear Safety Department
TELEPHONE NUMBER: (412) 373-5792

PPINCIPAL PRODUCT: Engineering design analysis and development of methodology for equipment qualification testing.

NUCLEAR INDUSTRY ACTIVITY: Westinghouse-Nuclear Services Integration Division (W-NSID) is responsible for the development of equipment qualification (EQ) test plans (prospectus), relative to qualifying their nuclear grade components and systems, currently being tested in their test laboratories including
(cont. on next page)

ASSIGNED INSPECTOR: Larry B Parker for 10/17/83
A. R. Johnson, Equipment Qualification Section (EQS) Date

OTHER INSPECTOR(S): E. A. Salazar, Consultant, Sandia National Laboratories

APPROVED BY: D. F. Hubbard for 10/17/83
H. S. Phillips, Chief, EQS Date

INSPECTION BASES AND SCOPE:

A. BASES: 10 CFR Part 50, Appendix B and Topical Report (TR) No. WCAP-8370, Revision 9A, Ammendment 1.

B. SCOPE: This inspection consisted of: (1) an evaluation of quality assurance (QA) control of W-NSID design verification (by testing) processes; (2) a technical review and evaluation of environmental
(cont. on next page)

PLANT SITE APPLICABILITY:
Docket Nos. 50-247, 315, 316, 327, 328, 333, 339, 348, 364, 369, 370, 382, 395, 400, 401, 412, 413, 414, 423, 424, 425, 443, 444, 445, 446, 454, 455, 456, 457, 482, 483, 486, 498, 499, 546, 547.

ORGANIZATION: WESTINGHOUSE ELECTRIC CORPORATION
NUCLEAR SERVICES INTEGRATION DIVISION
PITTSBURGH, PENNSYLVANIA

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NUCLEAR INDUSTRY ACTIVITY: (cont)
Westinghouse-Forest Hills (W-FH), Westinghouse-Advanced Energy Systems Division (W-AESD), and Westinghouse-Research and Development (W-R&D). W-NSID and Westinghouse Nuclear Technology Division (W-NTD) are jointly responsible for the development of equipment qualification data packages (EQDPs) and equipment qualification test reports (EQTRs) which are currently being submitted to NRC-NRR for review.

SCOPE: (cont.)
qualification test plans prepared by W-NSID, and a review of W-NSID engineering analysis of test results which incorporates acceptance; and (3) review of W-NSID action on previously identified items.

A. VIOLATIONS:

None

B. NONCONFORMANCES:

None

C. UNRESOLVED ITEMS:

None

D. STATUS OF INSPECTION FINDINGS:

(Closed) Unresolved Item (83-02): Shipping damage was identified at Radiation Technology, Inc., New Jersey, on one ITT Barton high volume pressure sensor (SN 000460) under a W-FH purchase order for irradiation testing services. W-FH engineering laboratory personnel replaced the damaged fitting which had not been thermally aged. It was not known whether the fitting was part of the test equipment undergoing testing, thereby, requiring thermal aging prior to irradiation testing.

The replaced component was not identified on the high volume pressure sensor's part list. The component was classified as test apparatus, and did not require thermal aging.

E. OTHER FINDINGS OF COMMENTS:

1. QA Control of W-NSID Design Verification (by Testing) Processes:
The NRC inspector determined that the W-NSID design verification (by test engineering and analysis) processes were being accomplished in

accordance with written policies and procedures to ensure the adequacy of six safety-related components and/or systems for nuclear service. The NRC inspector determined that the design test engineering activities were accomplished in accordance with four W-NSID procedures which assured that test requirements (including acceptance limits, test objectives, test prerequisites, test equipment, instrumentation, and test methods) were correctly translated into test prospectus and other test engineering design basis documents. The NRC inspector determined that the W-NSID design test engineering activities were documented to provide adequate control and permit reviews, checks, verification, and audits of test results by personnel experienced in the subject activity. Design basis documentation (e.g., calculations, test results, assumptions, etc.) for the W-NSID engineering design and analyses of systems and equipment of the NSSS were being implemented.

No nonconformances were identified.

2. Technical Evaluation of Qualification Test Plans: The NRC inspector and Sandia National Laboratory (SNL) consultant (NRC inspection team) evaluated six equipment qualification test plans (prospectus) to determine whether they met the approved methodology of WCAP 8587 and the regulatory requirements of NUREG 0588/IEEE Std. 323-1974. The NRC inspection team reviewed the equipment qualification process prescribed in each test plan; evaluated test results; verified calculations; and reviewed assumptions, engineering letters, and documents which defined acceptance limits for the equipment undergoing testing.

Each of the six equipment qualification test plans and related engineering documents were examined for the following:

a. Test equipment included a description of all materials, parts, and subcomponents.

b. Equipment interfaces were addressed.

c. Same equipment was used for all phases of testing and represented a standard production item.

d. Test acceptance criteria was established as described in the test prospectus or in the design engineering documents, such as calculations and engineering letters to meet the nuclear regulatory requirements of NUREG 0588/IEEE 323-1974.

e. All prerequisites for the given tests as outlined in the test prospectus had been met.

f. Environmental conditions were established and described; e.g., pressure and temperature profiles, and thermal aging factors were consistent with those outlined in the test prospectus and prescribed in the W-NTD WCAP 8587, Revision 5, "Methodology for Qualifying Westinghouse WRD Supplied NSSS Safety-Related Electrical Equipment."

g. Adequate test instrumentation was described and used to meet the requirements of NUREG 0588.

h. Test results were adequately reduced and evaluated against the established acceptance criteria described in the test prospectus or in W-NSID design engineering documents, and these requirements had been met.

No nonconformances were identified.

3. Followup of 10 CFR Part 50.55(e)/10 CFR Part 21 Reports From 99900240/83-01 Inspection: A potential problem within the Westinghouse 7300 process protection system (PPS) was reported under 10 CFR Part 21 for operating plants and under 10 CFR Part 50.55(e) for plants under construction. These items were inspected during NRC inspection 99900240/83-01. During this NRC inspection, the NRC further evaluated the matters as follows:

a. The potential problem of the PPS NTC card mercury relay and the W-NSID corrective action by a replacement "reed" relay (to be qualified by a seismic test) was evaluated by the NRC inspection team. The replacement component is currently undergoing design verification by seismic testing at W-AESD. Low level seismic testing (to enable necessary NTC card replacement and/or factory retrofit for Westinghouse lead plants) was completed at W-AESD in June 1983. High level seismic testing (generic required response spectra to envelope the remaining plants affected) will be tested mid-September 1983. The start of production at Westinghouse-Industry Electronics Division (W-IED) will commence late fall 1983 for jobsite delivery in early 1984.

The NRC inspection team evaluated the W-NSID EQ test plan for the NTC card, including the electrical functional checks and

ORGANIZATION: WESTINGHOUSE ELECTRIC CORPORATION
NUCLEAR SERVICES INTEGRATION DIVISION
PITTSBURGH, PENNSYLVANIA

REPORT NO.: 99900900/83-03	INSPECTION RESULTS:	PAGE 5 of 5

quality assurance requirements imposed during seismic testing. The W-NTD seismic qualification test plan (TRS input) was not reviewed at this time. Test plans were evaluated to determine that test plans were in accordance with regulatory requirements and guidelines of Reg Guide 1.100/IEEE Std. 344-1974. The NRC inspection team reviewed purchase orders, purchase order revisions, test plans, test plan change orders, engineering letters, engineering assumptions, QA requirements, and documents which define acceptance limits, test prerequisites, and instrumentation for the equipment undergoing testing.

W-NSID will issue a field change notice (FCN) in regard to the new NTC replacement card and/or factory retrofit program which will address NTC card applicability for both operating plants and those under construction. Westinghouse project managers will send applicable site service managers directives for implementing licensee followup to the W-NSID FCN.

This item is considered open until completion of the high level seismic testing at W-AESD, and will be followed up during a subsequent NRC inspection.

ORGANIZATION: WESTINGHOUSE ELECTRIC CORPORATION
ADVANCED ENERGY SYSTEMS DIVISION
LARGE, PENNSYLVANIA

REPORT NO.: 99900920/83-01	INSPECTION DATE(S) 4/12-15/83	INSPECTION ON-SITE HOURS: 54

CORRESPONDENCE ADDRESS: Westinghouse Electric Corporation
Advanced Energy Systems Division
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P. O. Box 10864
Pittsburgh, Pennsylvania 15236

ORGANIZATIONAL CONTACT: J. L. Koetting, Manager, Product Assurance
TELEPHONE NUMBER: (412) 892-5600

PRINCIPAL PRODUCT: Seismic and dynamic qualification testing.

NUCLEAR INDUSTRY ACTIVITY: The Westinghouse Advanced Energy Systems Division (W-AESD) engineering laboratory is engaged in seismic and dynamic qualification testing services of saftey-related components and parts for nuclear power plants.

ASSIGNED INSPECTOR: A. R. Johnson — 6/7/83
A. R. Johnson, Equipment Qualification Section (EQS) — Date

OTHER INSPECTOR(S): E. A. Salazar, Consultant, Sandia National Laboratories

APPROVED BY: for HSP — 6/7/83
H. S. Phillips, Chief, EQS — Date

INSPECTION BASES AND SCOPE:

A. BASES: 10 CFR Part 21 and 10 CFR Part 50, Appendix B.

B. SCOPE: This inspection consisted of: (1) review of the quality assurance (QA) program consisting of a product assurance manual and four supplemental procedures; (2) review of applicable quality methods and procedures of the product assurance program; (3) verification that the
(cont. on next page)

PLANT SITE APPLICABILITY:

Not identified.

ORGANIZATION: WESTINGHOUSE ELECTRIC CORPORATION
ADVANCED ENERGY SYSTEMS DIVISION
LARGE, PENNSLYVANIA

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SCOPE: (Cont.) applicable 10 CFR Part 50, Appendix B Criteria I, II, V, VI, XI, XII, XIII, and XVII of the product assurance program had been implemented to the above controlling documents; and (4) review of W-AESD's compliance with 10 CFR Part 21 requirements for reporting of significant deficiencies.

A. VIOLATIONS:

None

B. NONCONFORMANCES:

None

C. UNRESOLVED ITEMS:

None

D. OTHER FINDINGS OR COMMENTS:

1. QA Program Review: The W-AESD's product assurance program is described in their "Practices and Policies of Engineering Laboratories Department for Contract Testing Manual (CTM)," EL1797, Revision 0, March 1983 and four supplemental procedures: (1) Quality Methods and Procedure (QMP) No. 1-1, Revision D, "W-AESD Product Assurance Program"; (2) Division Procedure (DP) No. 120, Revision 8, "Product Assurance Manuals"; (3) DP-203, Revision 1, "Product Assurance Plans"; and (4) DP-906, Revision 3, "Identification and Reporting of Nuclear Safety-related Noncompliance and Deficiencies". These documents establish a QA program in accordance with the 14 applicable criteria of 10 CFR Part 50, Appendix B. The NRC inspectors' review of the QA program consisted of an examination of these five documents together with ten additional QMP's and 13 additional DP's. The criteria not applicable to the W-AESD test facility are: (1) Design Control; (2) Procurement Document Control; (3) Control of Purchased Material, Equipment, and Services; and (4) Control of Special Processes.

During the QA program review, the NRC inspector identified four areas where clarifications of W-AESD procedures were recommended as follows:

a. CTM EL1797, Section 1.0, and DP-100, Revision 1, establish the control and issuance of procedures and other documents necessary for the operation of the engineering laboratory department, and constitutes the general manager's directives to instruct all W-AESD work activities. Although these directives include the controls for preparing, reviewing, approving, releasing, and distributing, it does not govern changes to these procedures, which are to be reviewed and approved by those performing the original review and approval. QMP 14-1, Revision 3, in part, as listed in Appendix I of the CTM, does prescribe controls for changes to procedures and other documents, but was not identified as part of the QA program. Change control as related to procedures and other documents was being implemented. W-AESD will clarify the use of DP 14-1 or other procedure(s) to better meet this requirement.

b. CTM EL1797, Section 5.1.6, prescribes the methods and controls by which notice of anomalies are to identify changes to the test plans, along with deviations observed during receipt inspections, electrical checkout, and mounting of environmental equipment. The CTM instructs laboratory personnel to make chronological entries into the laboratory test log to identify and disposition anomalies. No procedure exists to instruct laboratory personnel to document the specifics (time, date, run number, orientation, acceleration level, etc.) of anomalies. However, identification, disposition, and specifics of anomalies in the test log book were being accomplished. W-AESD will clarify their procedural methods and employ a more formal basis for documenting anomalies.

c. CTM EL1797, Sections 4.2.9, 4.3.10, and 4.3.11, and DP 730-1, Revision 1, establish control, storage, and retention requirements for QA records. Section 4.2.9 above retains a master QA file (test specification, test plan, work statements, project control releases (orders), product assurance review plans, etc.) indefinitely. Section 4.3.11 above requires the final test report and original test log to be maintained in the engineering laboratory vault for a minimum period of 2 years prior to being transferred to the Westinghouse permanent record storage center. Section 4.3.10 above requires all test data (raw and reduced) and the test report to be transmitted to the test sponsor. W-AESD will clarify their procedures

requiring the master QA record file to be transferred to the permanent record storage center. All QA records are to be retained, in auditable form, for the qualified life of the electrical equipment undergoing test. This is the responsibility of the end user and, therefore, W-AESD may elect to transmit all QA records to the test sponsor. Clarification of W-AESD procedures in this respect will be forthcoming.

d. CTM EL1797, Sections 4.3.2 and 5.1.4, and DP 652-2, Revision 2, and QMP 6-1D, Revision E, establish control of the test sponsor's furnished equipment and material. Section 4.3.2 above requires receiving inspection of test articles by the engineering laboratory personnel for visual damage and documenting the damage report in the test log book. Conversely, QMP 6-1 places the responsibility of receipt inspection on the product assurance personnel to inspect customer furnished equipment/material to detect transportation damage. Product assurance operations are instructed to document damage on the Inspection and Materials Disposition Report (IMDR) Form 59214. Product assurance operations are also instructed to control damage/deterioration within the facility and maintain an accountability. The hierarchy of CTM EL1797, Section 4.3.2, allows the QA manager to waive the requirements of QMP 6-1, on the basis that engineering laboratory personnel are more technically knowledgeable to inspect test articles. W-AESD will clarify their procedures to require involvement of QA personnel with engineering personnel during receiving inspection activity of test articles.

W-AESD clarifications to their established procedures identified above will be reviewed during a subsequent NRC inspection.

No nonconformances were identified.

2. QA Program Implementation Review: The NRC inspector 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 applicable criteria of 10 CFR Part 50, Appendix B reviewed during this inspection are as follows:

a. Organization: Organizational structures were reviewed including functional responsibilities and authorities. Lines of communication with appropriate authority are established. Organizational freedom of the W-AESD product assurance function existed. The QA manager has independence and reports directly to the general manager.

No nonconformances were identified.

b. QA Program: The NRC inspector evaluated this criterion by verifying the implementation of applicable criteria of 10 CFR Part 50, Appendix B. Accomplishment of the W-AESD training and indoctrination program will be verified during a subsequent NRC inspection.

No nonconformances were identified.

c. Instructions, Procedures, and Drawings: The NRC inspector verified implementation of ten written QMP's during this inspection.

No nonconformances were identified.

d. Document Control: The NRC inspector reviewed four test reports, two test log books, and related changes to verify proper review, approval, and issuance. No test plans or specifications have been written by W-AESD to date. W-AESD procedures (CTM, EL 1797, Section 5.1) call for a "Statement of Work" prescribed and entered in the test log book when test plans are not included in their contracts. Change control to procedures, test reports, and other instructions were being accomplished.

No nonconformances were identified.

e. Test Control: W-AESD does not specify written test requirements, methodologies, or acceptance criteria, but only meets the requirements for contractural services as specified in the customer's test plan/contract. When customer test plans are not submitted under contract, W-AESD will prescribe a work statement requiring customer approval. Work statements are entered in the test log book.

The test log is a chronological history kept by the assigned test engineer and initiated upon receipt of the test item as prescribed by W-AESD procedure. All pertinent observations to the test article are entered and signed by laboratory personnel. These observations include incoming inspection, preliminary electrical checkout, mounting details, electrical/mechanical monitoring, tests performed, anomalies (along with the disposition), and changes or deviations to the customer test plan. When an anomaly occurs, which requires a change in test plan, the change is identified in the test log and is agreed to by the customer and/or W-AESD. The NRC inspector reviewed two such test logs to evaluate two seismic tests performed by W-AESD.

Within the scope of this review, the NRC inspector determined that: (1) test and test inspection activities were performed in accordance with detailed test procedures; (2) all necessary information and data collected to allow evaluation of test results were properly recorded and documented; (3) the installation of test specimens on the seismic tables were as prescribed in the test plans; and (4) anomalies were documented and dispositioned in a timely manner.

No nonconformances were identified.

f. Control of Measuring and Test Equipment: The NRC inspector verified W-AESD compliance with written procedures as they relate to control of measuring and test equipment. W-AESD had no calibration service vendors. W-AESD performs all calibration in-house. The NRC inspector evaluated the implementation of a calibration system by: (1) selecting a sample of test equipment and verifying current calibration; (2) review of records of that sample traceable to secondary and primary standards (certifications); and (3) review of a representative sample of calibration records for test equipment. Measuring and test equipment were calibrated, adjusted, and maintained at prescribed intervals against certified standards having known and valid relationships to nationally recognized standards.

No nonconformances were identified.

g. Handling, Storage and Shipping: The NRC inspector evaluated the implementation of the the W-AESD CTM 1795 and supplemental procedures which control handling, storage, and shipping activities. The NRC inspector inspected four items that had been received, handled, and tested, and found that these items were dispositioned in accordance with procedures. The NRC inspector also verified the implementation of the QA procedures controlling the receiving inspection actvity for test articles. The NRC inspector reviewed two IMDR's to disposition damage and maintain accountability.

No nonconformances were identified.

h. QA Records: The NRC inspector evaluated the implementation of the W-AESD CTM EL 1797 and supplemental procedures which control QA records. The NRC inspector reviewed the QA record files for two tests performed by W-AESD. The NRC inspector reviewed such specific records as the master file, test plan, test data, test report, work statement, log book, and other documents sent to the permanent storage vault. All records reviewed were properly identified and stored.

No nonconformances were identified.

3. 10 CFR Part 21 Review: The NRC inspector verified W-AESD compliance with the requirements of 10 CFR Part 21 by review of DP-906, Revision 2 (July 1, 1982), and by examining the postings of: (1) the regulations, (2) Section 206 of the Energy Reorganization Act of 1974, and (3) the procedure adopted by W-AESD pursuant to the regulations.

No violations were identified.

4. Followup Items:

a. W-AESD will clarify their procedural methods as discussed in Sections D.1.a, D.1.b, D.1.c, and D.1.d of this report. A detailed review of the procedural changes and their implementation will be conducted during a subsequent inspection.

b. Implementation of the remaining 6 out of 14 applicable criteria, which were not evaluated during this inspection, will be evaluated during a subsequent NRC inspection, and are as follows: (1) Identification and Control of Materials, Parts, and Components; (2) Inspection; (3) Inspection, Test, and Operating Status; (4) Nonconforming Materials, Parts, or Components; (5) Corrective Action; and (6) Audits.

ORGANIZATION: WESTINGHOUSE CANADA, INC.
NUCLEAR PRODUCTS, CONTRACTING ENGINEERING DEPT.
HAMILTON, ONTARIO

REPORT NO.: 99900929/83-01	INSPECTION DATE(S) 9/20-23/83	INSPECTION ON-SITE HOURS: 56

CORRESPONDENCE ADDRESS: Westinghouse Canada, Inc.
Nuclear Products, Contract Engineering Dept.
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Hamilton, Ontario L8N 3K2
ORGANIZATIONAL CONTACT: Mr. R. C. Hayes, Manager Systems Test
TELEPHONE NUMBER: (416) 528-8811, Ext. 7204

PRINCIPAL PRODUCT: Testing services for fuel module assemblies for CANDU reactors. Test services for U.S. and Canadian power plants.

NUCLEAR INDUSTRY ACTIVITY: The Westinghouse Canada, Inc. (W-CI), Nuclear Products Contract Engineering Department, performs developmental, performance, verification, and qualification testing on safety-related components and equipment for nuclear power plants. Approximately 15 percent of the laboratory's work is thermal aging and LOCA/HELB testing.

ASSIGNED INSPECTOR: H. S. Phillips for 11/8/83
A. R. Johnson, Equipment Qualification Section (EQS) Date

OTHER INSPECTOR(S): E. A. Salazar, Consultant, Sandia National Laboratories

APPROVED BY: H. S. Phillips 11/8/83
H. S. Phillips, Chief, EQS Date

INSPECTION BASES AND SCOPE:

A. BASES: 10 CFR Part 50, Appendix B and 10 CFR Part 21.

B. SCOPE: The purpose of the inspection was: (1) to review the W-CI Quality Assurance Program Manual (QAPM) and supplemental procedures; (2) to verify the implementation of the QA program to meet the applicable 10 CFR Part 50, Appendix B requirements; and (3) a technical review and evaluation of environmental qualification test plans/reports prepared by W-CI and a review of W-CI engineering analysis of test results which constitutes acceptance.

PLANT SITE APPLICABILITY:

Docket Nos. 50-315, 316, 440, 441, 458, 459.

ORGANIZATION: WESTINGHOUSE CANADA, INC.
NUCLEAR PRODUCTS, CONTRACT ENGINEERING DEPT.
HAMILTON, ONTARIO

REPORT NO.: 99900929/83-01	INSPECTION RESULTS:	PAGE 2 of 12

A. VIOLATIONS:

None

B. NONCONFORMANCES:

1. Contrary to Criterion II of Appendix B to 10 CFR Part 50, the established quality assurance program as defined by the QAPM did not provide control over the following activities affecting quality.

   a. The QAPM did not provide controls for identifying and dispositioning test anomalies, deviations, and nonconformances to test plans/procedures during the time tests were conducted.

   b. The QAPM did not address the need for documenting the indoctrination and training of test personnel. To the contrary, Section 6 of W-CI Procedure No. QAP-01, Revision 1, stated that formal written documentation is not considered necessary.

   c. The QAPM did not address the need for source evaluations/surveys and inspections. No approved test service subcontractor's list exists at W-CI. No survey or inspection of irradiation and seismic testing subcontractors or calibration service vendors had been performed or documented.

   d. The QAPM did not address 10 CFR Part 21 posting requirements and did not contain procedures for evaluating and reporting deviations and defects.

2. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and W-CI QA Procedure QAP-02, Revision 0, dated September 1983, the W-CI project engineer failed to issue test procedures, instructions, and inspection methods for contract No. 546-CAV-491448-BN for an equipment qualification test.

C. UNRESOLVED ITEMS:

None

D. OTHER FINDINGS OR COMMENTS:

1. QA Program Review: W-CI quality assurance program is described in their "Quality Assurance Program for Contract Engineering Activities" Manual QAP-01, Issue 2, Revision 1, dated August 1983 (QAPM), and

one supplemental procedure "Quality Assurance Documentation Description and Procedures for Qualification Testing," QAP-02, dated September 1983. These documents establish a QA program in accordance with the 16 applicable criteria of 10 CFR Part 50, Appendix B. The criteria not applicable to the W-CI test facility are: (1) Design Control and (2) Control of Special Processes. During the QA program review, the NRC inspector identified four areas where the established QA program (QAPM) did not provide control over activities affecting quality and one area where W-CI failed to follow procedures as follows:

a. Neither the QAPM, W-CI Procedure QAP-02, nor existing implementing procedures established in writing the necessary controls for nonconforming materials, parts, or components (Criterion XV of 10 CFR Part 50, Appendix B) to identify and disposition test anomalies, deviations, and nonconformances to test plans/procedures during the time tests were conducted. Test anomalies, deviations, and nonconformances to test plans/procedures that were considered by the project engineer and contracts engineering manager to be significant were fully documented in the final test report which is submitted to their customers (see B.1.a above).

b. Neither the QAPM, W-CI Procedure QAP-02, nor existing implementing procedures established in writing the necessary controls for indoctrination and training of test personnel (Criterion II of 10 CFR Part 50, Appendix B). Although indoctrination and training of test personnel was being accomplished by each project engineer, the need for documenting this effort was not addressed in the QAPM. To the contrary, Section 6 of the QAPM stated that formal written documentation was not considered necessary (see B.1.b above).

c. Neither the QAPM, W-CI Procedure QAP-02, nor existing implementing procedures established in writing the necessary controls for purchased services (Criterion VII of 10 CFR Part 50, Appendix B). The QAPM did not address the need for source evaluations, source inspections, or source surveys of testing subcontractors for both seismic and irradiation test services and calibration services. No requirements existed in the QAPM to establish an approved test service subcontractor's list (see B.1.c above).

d. Neither the QAPM, W-CI Procedure QAP-02, nor existing implementing procedures established in writing the necessary

channel for evaluating and reporting significant deficiencies affecting quality (Criterion V of 10 CFR Part 50, Appendix B). The QAPM did not address the need for a written procedure to comply with the requirements of 10 CFR Part 21 regulation.

Purchase orders and contracts received and accepted by W-CI invoked the requirements of 10 CFR Part 21.

W-CI did not comply with the posting requirements (e.g., conspicuous posting on company bulletin board) of the said regulation. Neither the 10 CFR Part 21 regulation, Section 206 of the Energy Reorganization Act of 1974, nor a written W-CI procedure adopted pursuant to the 10 CFR Part 21 regulation was posted. A W-CI procedure to comply with 10 CFR Part 21, Section 21.21, was not established. (See B.1.d above.)

e. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and QA Procedure QAP-02, Revision 0, dated September 1983, W-CI failed to prescribe and issue test procedures for an equipment qualification test of an EHRS power supply for operation at voltage extremes.

2. QA Program Implementation Review: The NRC inspector verified the implementation of the QA program's procedures by examining representative records and files, by conducting interviews with personnel, and by visual inspections and observations.

Findings concerning the implementation of the applicable criteria of 10 CFR Part 50, Appendix B reviewed during this inspection are as follows:

a. Organization: Organizational structures were reviewed including functional responsibilities and authorities. Lines of communication with appropriate authority are established. The W-CI quality assurance manager has cognizance of all nuclear department QA functions (e.g., nuclear field department-CANDU, tubular products department-CANDU, including nuclear products contract engineering department) and is located at Port Hope, Ontario, where the majority of nuclear departments are geographically located. The WC-I's quality assurance group at Port Hope serves in an advisory capacity to the nuclear products contract engineering department, Hamilton, to which the systems test department manager assumes the QA responsibilities. The nuclear products contract engineering department does not assign

permanent quality control personnel. Individuals who do not have direct responsibility for performing the work are authorized by the contract engineering manager to perform inspections and carry out the QA functions. The systems test manager (QA) reports directly to the contract engineering manager.

No nonconformances were identified.

b. QA Program: The NRC inspector evaluated the QA program established by the QAPM and the implementing QAP-02 procedure and verified the implementation of 16 of the 18 applicable criteria of 10 CFR Part 50, Appendix B. The QAPM and implementing procedures adequately controlled activities affecting quality with exception to Criterion II, VII, and XV of 10 CFR Part 50, Appendix B, described in paragraph D.1 above (refer to nonconformances in B.1.a, B.1.b, B.1.c, and B.1.d).

c. Procurement Document Control: The NRC inspector reviewed outgoing purchase orders to verify QA involvement and that appropriate QA and technical requirements were being specified in accordance with applicable contracts and work orders. Services were being purchased in accordance with written instructions, drawings, specifications, or other information necessary listed in the purchase order after a review by each project engineer and approval by the system test manager.

No nonconformances were identified.

d. Instructions, Procedures, and Drawings: The QAPM and W-CI procedure QAP-02 did require instructions and procedures to control and implement the QA program. Many of the implementing procedures were contained as an integral part of the QAPM.

Test procedures for each awarded contract to control test activities was the prime responsibility of each project engineer. The project engineer was responsible to define the requirements and describe the work to be performed for a qualification test in accordance with a customer's contract. The test procedures were required to be reviewed by the project engineering manager and approved by the systems test manager. Test procedures were supported by standard laboratory department procedures. Test procedures for each test were written by the project engineers; however, on one equipment qualification test

the NRC inspector determined that the project engineer failed to issue test procedures and instructions as a result of time restraints imposed by that customer. Although the test and test results, including a handwritten procedure, were documented in the project engineers file folder, no formal instructions approved by the systems test manager had been established (refer to nonconformance in paragraph B.2).

e. Document Control: The NRC inspector evaluated the implementation of the QAPM and W-CI procedure QAP-02 to determine if W-CI documents were properly reviewed, approved, and issued and that changes to these documents were adequately controlled. The project engineer was assigned the responsibility to ensure that all documents used during testing were the correct issue and appropriately approved by a higher level of management.

No nonconformances were identified.

f. Control of Purchase, Equipment, and Services: W-CI does not purchase material and equipment used in safety-related applications for equipment qualification test programs for U.S. nuclear plants; however, services are procured.

The QAPM did not address the need for source evaluations, source inspections, or source surveys of testing subcontractors and calibration service vendors, (see paragraph D.1.b); therefore, this activity was not being accomplished (see B.1.c and B.1.d above).

g. Identification and Control of Materials, Parts, and Components: Identification and control of specimens for environmental qualification testing is being accomplished at W-CI. The NRC inspector verified that test items are clearly marked or tagged to ensure a positive method of identification. Each project engineer for each contract prescribes instructions and procedures, including checklists which suitably document the marked/tagged item to ensure that the correct and acceptable items are tested. Receiving inspection forms and accountability records are also completed as required by procedures.

No nonconformances were identified.

h. Inspection: The NRC inspector evaluated the implementation of the QAPM which outlined specific inspection responsibilities and commitments to each equipment qualification test. Inspections are performed at W-CI on test specimens when received, in-process, or when testing is completed, in accordance with written test procedures or test plans. The project engineer's written instructions for each test include hold points, suitable checklists, acceptance criteria, laboratory standards, and appropriate forms for documenting inspection activities. Inspection records on four equipment qualification tests performed at W-CI were reviewed by the NRC inspector and Sandia National Laboratory (SNL) consultant (NRC inspection team).

No nonconformances were identified.

i. Test Control: W-CI does not specify written test requirements, methodologies, or acceptance criteria but only meets the requirements for contractual services as specified in the customer's test plan/contract. Equipment qualification tests are conducted in accordance with test procedures which implement the customer's plan. These test procedures define acceptance criteria, test prerequisites, required instrumentation, and conditions of the test environment. 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 files. Final test reports were prepared and issued together with the approved test procedures/plans. The NRC inspection team reviewed the documented results and the QA documentation file (including test procedure/report submitted to customers) for five equipment qualification tests completed at W-CI.

No nonconformances were identified.

j. Control of Measuring and Test Equipment: The NRC inspection team verified W-CI compliance with written procedures as they relate to the control of measuring and test equipment. The NRC inspection team verified that master gauge standards and other devices used to calibrate equipment and instrumentation were inspected and certified at regular intervals as specified in the appropriate calibration procedure. The NRC inspection team evaluated the implementation of a calibration system by:

(1) selecting a sample of test equipment and verifying current calibration; (2) review of records of that sample traceable to secondary and primary standards (certifications); and (3) review of a representative sample of calibration records for test equipment. Measuring and test equipment were calibrated, adjusted, and maintained at prescribed intervals against certified standards having known and valid relationships to nationally recognized standards (e.g., U.S. National Bureau of Standards, National Research Council of Canada, or National Physical Laboratories of Great Britain). Instruments were suitably identified as to their calibration status by means of a sticker or tag. Calibration records were maintained by the test laboratory supervisor for the master standards and devices used to calibrate other instrumentation. Measurement verification records were maintained by the project engineer.

No nonconformances were identified.

k. Handling, Storage, and Shipping: Handling, storage, and shipping requirements at W-CI's test facility comply with individual customer contracts described in a written procedure issued by the project engineer and approved by the system test manager. The NRC inspection team evaluated three procedures which contained handling instructions for the equipment undergoing testing. Specific storage and shipping requirements to comply with individual customer requirements will be performed during a subsequent NRC inspection.

No nonconformances were identified.

l. Inspection, Test, and Operating Status: The NRC inspection team evaluated the implementation of the QAPM which controls the inspection, testing, and operating status at the time of this inspection; but no activity for aging or loss-of-coolant accident (LOCA) testing was in progress. W-CI uses a suitable checklist prepared and approved by the project engineer to ensure that all required operations have been satisfactorily completed. Two checklists for tests conducted in the past were reviewed by the NRC inspection team.

No nonconformances were identified.

m. Nonconformaing Materials, Parts, or Components: Nonconforming items are being identified, documented, and dispositioned according to the QAPM. No test specimens have been damaged by shipment (identified during receiving inspection) to date. W-CI employs methods to positively identify nonconforming items and segregates them to avoid unauthorized use. Dispositioning and reacceptance of nonconforming items is accomplished after a review and evaluation by the project engineer and the customer. W-CI's documentation (in the project engineer's file) reflects the disposition of a nonconforming item, the extent of the fault, and requires a reacceptance procedure written by the project engineer and approved by the systems test manager. Review of nonconformance notices will be accomplished during a future NRC inspection.

The W-CI QAPM did not provide controls for identifying and dispositioning test anomalies, deviations, and nonconformances to test plans/procedures during the time tests were conducted; therefore, there was no system to implement this activity (see B.1.a above).

n. Corrective Action: Corrective action is defined in the QAPM as a method to control and correct nonconforming items which have been physically damaged in shipment or in the test process to avoid unauthorized use. No test specimens on record have been damaged and dispositioned to date. The evaluation of the implementation of this criterion will be performed during a subsequent NRC inspection.

Corrective action is not addressed in the QAPM regarding test anomalies, deviations, and nonconformances (see B.1.a above).

o. Quality Assurance Records: The NRC inspection team evaluated the implementation of the W-CI QAPM and QAP-02 implementing procedure which controls QA records. The NRC inspection team reviewed the QA record file for five tests performed by W-CI and reviewed such specific records as test procedures, test plans, test reports, test log books, purchase requisitions, purchase orders, customer contracts, calibration records, certifications to national standards, instrumentation lists, inspection reports, checklists, data sheets, and audit reports. The various QA documentation at W-CI are contained in four file systems as follows: (1) central file; (2) laboratory's file; (3) laboratory supervisory's file; and (4) project engineers'

file. The NRC inspection team reviewed all of the above files with the exception of the laboratory supervisors' file. All records reviewed were properly identified and stored.

Indoctrination and training records for instruction performed by the project engineers and supervisors of test personnel did not exist. The QAPM did not address this requirement (see B.1.b above).

p. Audits: The NRC inspector reviewed two customer audit reports, performed in April 1982 by a U.S. reactor manufacturer, and performed in May 1983, by a U.S. architect engineer. Both audits were comprehensive audits of the W-CI QA program to assure the requirements of 10 CFR Part 50, Appendix B were met. Both audits identified the need for W-CI to establish or correct the following: (1) establish training and qualification of personnel; (2) establish written calibration procedures; (3) establish an internal audit checklist/procedure; and (4) no QAPM written at that time. All customer audit findings have been closed-out to date with the exception of W-CI establishing documented training and indoctrination records (see B.1.b above).

W-CI's internal audit program as described in the QAPM requires an annual audit to be performed by nuclear products contract engineering personnel, designated by the contract engineering manager, who are familiar with the work processes involved. An internal audit has not been performed to date but is on the W-CI audit schedule.

A biannual external audit program as described in the QAPM is required to be performed by the nuclear products quality assurance department (advisory QA function) at Port Hope. The QAPM directs this audit when no customer or government agency audits have been performed in a two-year period.

3. Technical Review and Evaluation of Environmental Qualification Test Plans and Reports: The NRC inspection team reviewed and evaluated four equipment qualification test plans and reports with their associated related qualification documentation to determine whether they met the regulatory requirements of NUREG 0588 and the requirements of IEEE Standard 323-1974. The NRC inspection team

reviewed the equipment qualification process prescribed in each test plan; evaluated test results, verified calcualtions; reviewed assumptions, engineering letters and memorandums in the project engineer's file; and evaluated documents which defined the work statements and contracts, including the acceptance criteria for equipment undergoing testing.

The qualification tests performed at W-CI on safety-related equipment used in nuclear power plant applications in the United States are as follows: (1) voltage extreme test on a hydrogen recombiner power supply for an NSSS manufacturer; (2) qualification aging test on a drywell penetration filler material for two lead architect engineers for two U.S. licensees; (3) multi-item qualification tests (main steam line break) after radiation aging on various nuclear splices, lug terminations, terminal boards, and potted assemblies for a U.S. licensee; and (4) a reactor containment cooling fan motor equipment qualification test (thermal aging, radiation aging, seismic aging, and LOCA conditions to IEEE-323-1974 and IEEE-334-1974). The material was manufactured by a U.S. supplier for a U.S. nuclear power plant.

Each of the four equipment qualification test plans, reports, and related engineering documentation were examined for the following:

a. Test equipment included a description of all materials, parts, and subcomponents.

b. Equipment interfaces were addressed.

c. Same equipment was used for all phases of testing and represented a standard production item.

d. Test acceptance criteria was established as described in the plan, specification, or purchase order (contract) to meet the nuclear regulatory requirements of NUREG 0588/IEEE-323-1974.

e. All prerequisites for the given tests as outlined in the test process had been met.

f. Environmental conditions were established and described (e.g., pressure and temperature profiles and thermal aging factors were consistent with those outlined in the customer's test specification, purchase order, or contract).

g. Adequate test instrumentation was described and used to meet the requirements of NUREG 0588.

h. The results were adequately reduced and evaluated against the established acceptance criteria described in the customers test specification, purchase order, or contract.

No nonconformances were identified.

ORGANIZATION: WYLE LABORATORIES
SCIENTIFIC SERVICES AND SYSTEMS GROUP
HUNTSVILLE, ALABAMA

REPORT NO.: 99900902/83-02	INSPECTION DATE(S) 6/28-7/1/83	INSPECTION ON-SITE HOURS: 56

CORRESPONDENCE ADDRESS: Wyle Laboratories
Scientific Services & Systems Group
ATTN: W. W. Holbrook, General Manager, Eastern Test and Engineering Operations
7800 Governors Drive
Huntsville, AL 35807
ORGANIZATIONAL CONTACT: Mr. E. W. Smith, Director, Contracts and Purchasing
TELEPHONE NUMBER: (205) 837-4411

PRINCIPAL PRODUCT: Research, engineering, and test operations.

NUCLEAR INDUSTRY ACTIVITY: Wyle Laboratories, Huntsville, Alabama, provides a variety of nuclear services to the industry which includes environmental and seismic qualification testing of safety-related equipment, refurbishment and recertification of valves, valve and component flow testing, mechanical and hydraulic snubber testing, decontamination, and repair.

ASSIGNED INSPECTOR: A. R. Johnson — 9-16-83
A. R. Johnson, Equipment Qualification Section (EQS) — Date

OTHER INSPECTOR(S): E. A. Salazar, Sandia National Laboratories

APPROVED BY: H. S. Phillips — 9-16-83
H. S. Phillips, Chief, EQS — Date

INSPECTION BASES AND SCOPE:

A. BASES: 10 CFR Part 21; 10 CFR Part 50, Appendix B.

B. SCOPE: This inspection consisted of: (1) evaluation of QA controls for Wyle engineering's development, review and approval of qualification plans and assessment reports, and (2) a technical review and evaluation of environmental qualification test plans prepared by Wyle engineering.

PLANT SITE APPLICABILITY:

Not identified.

ORGANIZATION: WYLE LABORATORIES
SCIENTIFIC SERVICES AND SYSTEMS GROUP
HUNTSVILLE, ALABAMA

REPORT NO.: 99900902/83-02	INSPECTION RESULTS:	PAGE 2 of 6

A. VIOLATIONS:

None

B. NONCONFORMANCES:

None

C. UNRESOLVED ITEMS:

None

D. OTHER FINDINGS OR COMMENTS:

1. QA Control of Wyle Qualification Plan/Assessment Development, Review and Approval: The NRC inspector and Sandia National Laboratory (SNL) Consultant (NRC inspection team) determined that ten qualification plans and assessments (evaluations) had been developed, reviewed and approved in accordance with Wyle quality directive (QD) No. 3.2, dated July 1982 (Section 4.1.3), and nuclear engineering department procedure (NEQ) No. 101, Revision 1, dated June 1982.

   The NRC inspection team reviewed and examined the implementation of Wyle's established quality requirements used during the engineering analysis and equipment qualification (EQ) test plan preparation.

   The NRC inspection team verified that the engineering monitor (EM) had performed his responsibilities for the technical review of all calculations and assumptions made by the project engineer, and that the requirements of contracts have been fulfilled. The NRC inspector reviewed three EQ test plans and engineering monitor logs to assure that all mandatory checkpoints throughout the program had been met and appropriate monitoring by the EM was performed.

   The NRC inspection team reviewed the qualification plans/assessments for: (1) acceptance criteria; (2) test prerequisites; and (3) test instrumentation requirements.

   No nonconformances were identified.

2. Technical Evaluation of Qualification Plans and Assessments: The NRC inspection team evaluated EQ plans and assessment reports, to determine whether they met the regulatory requirements of NUREG 0588 and the requirements of IEEE Std. 323-1971/1974.

The NRC inspection team performed a technical evaluation and review of Wyle's philosophy, methodology, engineering analysis, and formulation applied to preparing EQ test plans for licensees and customers. The evaluations consisted of a review of ten contracts in which an engineering analysis had been performed in preparing either EQ qualification plans or product assessment reports.

The NRC inspection team examined the engineering analysis process which included documents such as contract reports, technical specifications, safety analysis reports (SAR), purchase orders and service requisitions, licensee and customer letters, assessment reports, analysis reports, aging matrices, qualification plans, record of interim procedure/plan revisions (RIPPR), and test reports. The engineering analysis performed by Wyle in preparation of EQ qualification plans or assessment reports for qualification testing, reviewed during the inspection, are as follows:

Qualification Plan or Assessment Report No./(Date)	Safety-Related Equipment	Application/ Location	Test Requirement
17491-31 (1/3/83)	Ametek S&K Flow Element, Model 20-9651-8550 Ametek S&K Flow Transmitter, Model 91-16-4-20	Detects MSIV-LCS leakage	HELB
17491-41 (3/16/83)	ITT Barton Differential Pressure Switch, Model 288 Static-O-Ring Differential Pressure Switch, Model 103	Various applications, RCIC pipe chase, LPCS cubical, RWCU areas	HELB
17491-34 (12/29/82)	Amphenol Connectors used with Intermediate/Low Power Range Neutron Monitors	No DBA testing required	Extreme service environment only

ORGANIZATION: WYLE LABORATORIES
SCIENTIFIC SERVICES AND SYSTEMS GROUP
HUNTSVILLE, ALABAMA

REPORT NO.: 99900902/83-02	INSPECTION RESULTS:	PAGE 4 of 6

Qualification Plan or Assessment Report No./(Date)	Safety-Related Equipment	Application/ Location	Test Requirement
45916-03 Revision A (4/27/83)	General Electric Power and Control Cables (No. 30806 and SI-57275 for outside containment and, No. 36357 for inside drywell) Simplex Power and Instrument Cables (No. 30676, 35228, and 38806 for outside containment)	Various harsh environment applications	HELB
17491-39 (10/15/82)	Limitorque Motor Operated Valve Actuator Model SMB-0	Outside containment, RCIC pipe tunnel	HELB
17473-0480 (4/9/81)	General Atomic/Reuter Stokes High Range Radiation Monitor RD-23 Ionization Chamber	Inside containment	LOCA
17473-0200 (7/7/81) 17473-0220 (6/3/81) 17473-0230 (8/4/81)	Barksdale Pressure Switch Nos. PIH-M340SS-V, D2H-M80SS, and BIT-M12SS, respectively	Various applications outside containment	HELB
46518-01 Revision B (4/26/83)	Dikkers Safety Relief Valve Style G471-6/125.04, Cylinder, Air Valve, and Solenoid Pilot Valve	Various applications inside and outside containment	LOCA/ HELB
46105-2 (in progress)	Anchor/Darling Main Feedwater Isolation Valve Actuator (four valve actuator component qualification reports and data)	Various applications	LOCA/ HELB
E9001-122 (in progress)	Anchor/Darling Valve Actuator (aging analysis only on nonmetallic parts)	Various applications	HELB

Each of the above EQ test plans or assessment reports were examined and it was determined that:

(1) The test equipment included a description of all materials, parts and subcomponents;

(2) Equipment interfaces were described;

(3) The same equipment was used for all phases of testing and represented a standard production item;

(4) Test acceptance criteria was established as described in the applicable codes, standards and specifications from the customer;

(5) All prerequisites for the given test, as outlined in technical specifications, SAR, letters, and contract reports from the licensee or customer, have been met;

(6) Environmental conditions were established and described; e.g.,. . . . pressure and temperature profiles, radiation and thermal accelerated aging factors; and

(7) Test equipment and instrumentation were described for testing and recording test data.

3. Follow up Inspection of Reactive Item: Qualification Plan No. 46518-01, Revision B, dated April 26, 1983. Dikkers Safety Relief Valve Style G471-6/125.04, Cylinder, Air Valve, and Solenoid Pilot Valve, for Cleveland Illuminating Company, Perry Nuclear Station.

Testing requirements for the above equipment required an equipment qualification test in accordance with IEEE 382-1980, 323-1974, and 344-1975 to meet NUREG 0588, Category I.

Cleveland Illuminating notified the NRC RIII of the above Dikkers SRV Actuator Assembly test failure during the post-accident radiation functional testing at Wyle on April 13, 1983. A "Notice of Anomaly" (NOA) was issued by Wyle, and GE was notified on April 14, 1983. A GE representative was at Wyle during the failure. The test failure was identified because the acceptance criteria of the qualification plan was exceeded during a functional test

following the accident radiation exposure test. The test criteria exceeded involved: (1) SRV actuator cylinder leakage; (2) leakage of external joints; and (3) the actuator stroke. On April 14, 1983, the Dickkers SRV Actuator Assembly was disassembled and the qualifying components (e.g., cylinder, air valve, and solenoid operated pilot valve) were sent to GE for evaluation. The qualificaiton program at Wyle was terminated at GE's request. The test report is currently being prepared by Wyle. Wyle Qualification Plan No. 46518-01, Revision A, dated January 6, 1983, together with RIPPR's A1 through A5 were used during the above EQ testing.

GE is currently considering retesting the above equipment using Wyle Qualification Plan No. 46518-01, Revision B, dated April 26, 1983, using substitution materials for the viton seals of the SRV actuator components.

No further action is required at this time, however, when this equipment is retested for qualification purposes, an NRC inspection will be performed.

ORGANIZATION: WYLE LABORATORIES
SCIENTIFIC SERVICES AND SYSTEMS GROUP
HUNTSVILLE, ALABAMA

REPORT NO.: 99900902/83-03	INSPECTION DATE(S) 8/9-12/83	INSPECTION ON-SITE HOURS: 58

CORRESPONDENCE ADDRESS: Wyle Laboratories
Scientific Services and Systems Group
ATTN: Mr. W. W. Holbrook, General Manager, Eastern Test and Engineering Operations
7800 Governors Drive
Huntsville, AL 35807
ORGANIZATIONAL CONTACT: Mr. E. W. Smith, Director, Contracts and Purchasing
TELEPHONE NUMBER: (205)837-4411

PRINCIPAL PRODUCT: Research, engineering, and test operations.

NUCLEAR INDUSTRY ACTIVITY: Wyle Laboratories, Huntsville, Alabama, provides a variety of nuclear services to the industry which includes environmental and seismic qualification testing of safety-related equipment, refurbishment and recertification of valves, valve and component flow testing, mechanical and hydraulic snubber testing, decontamination, and repair.

ASSIGNED INSPECTOR: A. R. Johnson 9/26/83
A. R. Johnson, Equipment Qualification Section (EQS) Date

OTHER INSPECTOR(S): E. A. Salazar, Sandia National Laboratories

APPROVED BY: H. S. Phillips 9/28/83
H. S. Phillips, Chief, EQS

INSPECTION BASES AND SCOPE:

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

B. SCOPE: This inspection consisted of: (1) evaluation of QA controls for Wyle engineering's development, review, and approval of seismic and dynamic qualification tests plans and reports; and (2) a technical review and evaluation of seismic and dynamic qualification test procedures prepared by Wyle engineering.

PLANT SITE APPLICABILITY: 50-454, 50-455, 50-456, 50-457, 50-410, 50-528, 50-529, 50-530, 50-498, 50-499, and 50-382

ORGANIZATION: WYLE LABORATORIES
SCIENTIFIC SERVICES AND SYSTEMS GROUP
HUNTSVILLE, ALABAMA

REPORT NO.: 99900902/83-03	INSPECTION RESULTS:	PAGE 2 of 4

A. VIOLATIONS:

None

B. NONCONFORMANCES:

None

C. UNRESOLVED ITEMS:

None

D. OTHER FINDINGS OR COMMENTS:

1. QA Control of Wyle Seismic and Dynamic Qualification Test Procedure, Development, Review, and Approval: The NRC inspector and Sandia National Laboratory (SNL) consultant (NRC inspection team) determined that four Wyle seismic and dynamic qualification test procedures (plans) had been developed, reviewed, and approved in accordance with Wyle quality directive (QD) No. 5.1, Revision A, dated August 7, 1981.

   The NRC inspection team reviewed and examined the implementation of Wyle's established quality requirements used during the engineering analysis and seismic and dynamic qualification test procedure preparation.

   The NRC inspection team verified that the manager of seismic projects and the QA manager had performed their responsibilities for the technical and QA review of all seismic project engineers activities, and that the requirements of each contract had been fulfilled (calculations, assumptions, and appropriate consideration of each test sponsor's seismic and dynamic testing requirements).

   No nonconformances were identified.

2. Technical Evaluation of Seismic and Dynamic Qualification Test Procedures: The NRC inspection team evaluated Wyle's: (1) seismic and dynamic qualification test procedures, (2) equipment qualification seismic test plans, and (3) seismic and dynamic qualification test reports to determine that seismic testing met the intent of regulatory requirements and guidelines (Reg. Guide 1.100/IEEE 344-1975) contained in the test sponsor's seismic specifications.

ORGANIZATION: WYLE LABORATORIES
SCIENTIFIC SERVICES AND SYSTEMS GROUP
HUNTSVILLE, ALABAMA

REPORT NO.: 99900902/83-03	INSPECTION RESULTS: 4

The NRC inspection team performed a technical evaluation and review of Wyle's philosophy, methodology, and engineering analysis that delineate their methods for dynamic and seismic environment simulations used for qualification. The evaluation consisted of a review of three contracts in which Wyle developed three seismic qualification test procedures and one equipment qualification test plan requiring prestressing requirements for seismic consideration.

The NRC inspection team examined the engineering analysis and procedure/plan preparation process which included such documents as customer seismic specifications, customer load simulator drawings, Wyle research staff reports on generation of response spectra, other laboratory power spectrum reports on generation of response spectra, Wyle seismic specification test reports, notice of anomalies (NOAs), customer letters, customer contact reports, records of interim procedure/plan revisions (RIPPRs), and seismic data sheets. The seismic and dynamic qualification test procedures, plans, and reports were reviewed for five sets of equipment of components: Gulf and Western (G&W) Fluid Systems for EFCO 600 MSIV Actuator; G&W Fluid Systems Logic Cabinet for EFCO 600 MSIV Actuator; Cooper Energy Services Standby Diesel Generator Components for two licensees (computer analysis results KSV-0407-Z mossy simulation); and Cooper Energy Services Standby Diesel Generator Components (Wyle Seismic Simulation Test Procedure 541/8030/WB).

Each of the five Wyle seismic and dynamic qualification test procedures/plans/reports were examined for the following:

(1) Test equipment included a description of all materials, parts, and subcomponents.

(2) Equipment interfaces were addressed.

(3) The same equipment was used for all phases of seismic and dynamic testing and represented a standard production item.

(4) The required response spectra (RRS) was established as test acceptance criteria to meet customer test specifications and regulatory requirements.

(5) The test response spectra (TRS) was achieved during the simulated seismic and dynamic testing.

(6) All prerequisites for the given test, as outlined in the customer's seismic test specifications, have been incorporated into the test procedures and plans.

(7) Adequate test instrumentation was described and used to meet the customer's seismic test procedure requirements.

(8) Test results were adequately documented and reduced for evaluation to meet the customer's seismic test procedure requirements.

Seismic qualification test plan No. 17441-1 for the standby diesel generator components and equipment involves 54 test items, 102 test deletions, 16 prequalified items, 23 duplicate items, and 17 age sensitive/nonsafety-related items. Items deleted from the test were justified on the basis of a review conducted by the customer, Cooper Energy Systems, and submitted to the test facility. Evidence is available for seismic qualification of prequalified items (by previous Wyle test reports) as well as for the duplicate items and age sensitive/nonsafety-related items. The electric generator was not included in the scope of supply for items requiring seismic testing. The components and equipment involved in this qualification test plan are currently being thermally aged at Wyle prior to seismic testing.

The four items seismically tested using seismic qualification test procedure No. 541/8030/WB utilized the engineering analysis and plan preparation process from qualification test plan No. 17441-1, both for Cooper Energy Services. Both procedures/plans utilized Wyle's research staff report No. WR 83-06 in generating response spectra from Cooper Energy Systems resonant frequency and peak response acceleration tables for their equipment. Wyle utilized interim report No. SWRI Project No. 02-9290 from Southwest Research Institute to apply conservatisms in acquiring the RRS. Both procedures/plans have been approved by Cooper Energy Services.

No nonconformances were identified.

ORGANIZATION: THE ZACK COMPANY
CHICAGO, ILLINOIS

REPORT NO.: 99900785/82-02	INSPECTION DATE(S) 7/22,23,27-30, 8/4-6, 30-31, 9/2-3, & 7-10/82	INSPECTION ON-SITE HOURS: 148

CORRESPONDENCE ADDRESS: The Zack Company
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President
4600 W. 12th Place
Chicago, Illinois 60650

ORGANIZATIONAL CONTACT: Mrs. Christine Zack DeZutel
TELEPHONE NUMBER: (312) 242-3434

PRINCIPAL PRODUCT: Heating, Ventilation, and Air Conditioning Systems (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: J. T. Conway
L. E. Ellershaw, Reactive & Component Program Section (R&CPS) — Date 9/27/83

OTHER INSPECTOR(S): D. D. Chamberlain, Reactor Systems Section
H. Wescott, Project Inspector, RIII
R. M. Burton, Investigator, Office of Investigations, RIII, Field Office
R. D. Lanksbury, Reactor Inspector, RIII

APPROVED BY: I. Barnes
I. Barnes, Chief, R&CPS — Date 9/27/83

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. Inspection findings are contained in (cont. on next page)

PLANT SITE APPLICABILITY:

50-373; 50-374; 50-329; 50-330; 50-461

ORGANIZATION: THE ZACK COMPANY
CHICAGO, ILLINOIS

REPORT NO.: 99900785/82-02	INSPECTION RESULTS:	PAGE 2 of 36

SCOPE: (Cont.) NRC Report No. 99900785/82-01, while investigative findings are contained in NRC OI Report Nos. 3-82-025 and 3-82-057. The main purpose of this inspection was to assist the investigative staff in the evaluation of the identified allegations.

A. VIOLATIONS:

None

B. NONCONFORMANCES:

None

C. UNRESOLVED ITEMS:

None

D. OTHER FINDINGS OR COMMENTS:

1. Review of Allegation Background

This inspection was conducted at the request of the NRC Region III Office and in conjunction with an investigation into allegations received from former Zack Company employees, pertaining to falsified/altered quality assurance documentation; namely, material certifications.

The alleger first contacted NRC Region III, in person, on May 3, 1982, and subsequently by telephone on May 10, 1982, and again, in person, on May 19, 1982. The allegations, briefly, dealt with possible forged signatures, use of white-out to effect changes in reported results, and the adding of information to material certifications which had been received from material suppliers/manufacturers.

The Zack Company had identified these conditions in letters to their customers on the following dates: (1) Bechtel Power Corporation-Midland Plant, Units 1 and 2, August 28, 1981; (2) Baldwin Associates-Clinton Power Station, Unit 1, September 25, 1981; and (3) Commonwealth Edison Company-LaSalle County Station, Units 1 and 2, September 25, 1981.

The Zack Company was performing a review of all purchase order files, including certifications, and was taking action to rectify all discovered discrepancies. One of the actions taken was to establish a formal documentation control system. In order to implement the system, additional personnel were required.

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On September 2, 1981, the services of a Senior Quality Assurance Engineer from Project Assistance Corporation (consultants) were retained by Consumers Power Company for assignment at The Zack Company, for the purposes of establishing a formal document control system and performing an indepth review of the conditions described by The Zack Company in the letters to their customers. Subsequently, six document control personnel were employed by The Zack Company to assist in the review and implement the document control system. One of the new employees was promoted to the position of Document Control Supervisor, effective November 16, 1981. In February/April, 1982, a number of quality control documentation personnel, including the supervisor, were terminated.

On July 26, 1982, the Government Accountability Project (GAP) forwarded to the NRC a letter which detailed alleged deficiencies relative to the implementation of The Zack Company QA Program. Attached to the correspondence were three affidavits, each accompanied by a memorandum which summarized the GAP interview of the three individuals, and three additional memoranda, each of which contained additional concerns relative to The Zack Company. The body of the letter contained 22 specific allegations which were compiled by GAP and represented their interpretation of the concerns which were specified by the 3 affidavits and 6 memoranda.

NRC Region III conducted a detailed comparison between the 22 GAP allegations which were included in the July 26, 1982, correspondence and the attached affidavits/memoranda from which the 22 purportedly came. The comparative review also included all subsequent affidavits and memoranda which dealt with The Zack Company policies and practices

This detailed comparative review identified minor differences between GAP's summary of the allegations and those which we identified during our review of the affidavits and memoranda. Each of the discrepancies was individually assessed to determine its technical significance. The review concluded that the 22 GAP allegations encompassed the significant concerns raised in the affidavits and memoranda.

This report addresses the 22 GAP allegations as they pertain to activities of The Zack Company at their corporate offices in Cicero, Illinois. Those concerns contained in the 22 allegations which are site specific in nature can be found in the respective NRC Inspection Reports which address activities by The Zack Company at LaSalle (50-373/82-51 and 50-374/82-18 issued December 22, 1982), Midland (inspection underway), and Clinton (inspection pending).

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2. Inspection of Allegations:

For clarification purposes, the following information is provided. The Zack Company has established three Quality Assurance Manuals (QAM); one for each project; LaSalle, Midland, and Clinton. The LaSalle QAM (L-QAM) became effective on October 21, 1976, as Revision C. It is currently Revision 6, dated March 24, 1982. The Midland QAM (M-QAM) became effective on July 11, 1980, as Revision 0. It is currently Revision 1, dated May 11, 1981. The Clinton QAM (C-QAM) became effective on July 11, 1980, as Revision 0. It is currently Revision 1, dated September 30, 1980. In addition, Quality Control Procedures (QCP) manuals are established by project.

a. Allegation No. 1. Absence of any formal Quality Assurance Documentation Program - Until personnel were hired in the fall of 1981 to honor corrective action commitments there was no QA formal program for documents. As a result, they were in an uncontrolled state, i.e., a mess. Documents were piled on the floor.

Review:

(i) The L-QAM, Revision C, contained the following sections: Section 3-Design Control; Section 4-Procurement Control; Section 5-Document Control; and Section 18-Quality Assurance Records. During the various revisions, the format has changed somewhat so that the current Revision 6 contains the following: Section 4-Design Control; Section 5-Procurement Documents; Section 6-Drawings and Procedures; Section 7-Document Control; and Section 18-Quality Assurance Records. All of these sections address the control of documents as they relate to the specific titles of each section.

(ii) The M-QAM and the C-QAM since their dates of effectivity, have contained the following sections: Section 4-Design Control; Section 5-Procurement Document Control; Section 6-Instructions, Procedures, and Drawings; Section 7-Document Control, and Section 18-Quality Assurance Records.

The L-QAM is considerably more comprehensive than either the M-QAM or C-QAM; however, the M and C-QAMs refer to implementing QCPs. A review of the implementing QCPs and Quality Assurance Instructions (QAI), identified in the indices of the applicable project QCP manuals, revealed the following:

(i) PQCP-7, "Plant Document Control," Revision 0, dated July 28, 1980, through Revision 8, dated September 1981 addresses the control of: QA Manuals; shop tickets (travelers); and vendor/customer drawings, specifications, and procedures utilized by The Zack Company.

(ii) QAI No. 4, became effective on October 26, 1981, as Revision 0, entitled, "Control, Content and Maintenance of QA Purchase Order/Certified Material Test Report Files." Revision 1, dated February 1, 1982, and Revision 2, dated May 7, 1982, are entitled, "Control, Storage and Maintenance of Quality Assurance Purchase Order/Certified Material Test Report Files." Revision 0 was prepared by the consultant while Revision 1 was prepared by the Document Control Supervisor.

(iii) QAI No. 3, Revision 0, dated December 7, 1981, was entitled, "Record Management." Revision 1, dated May 7, 1982, is entitled "QA Record Management/Instruction."

(iv) QAI No. 7, Revision 0, dated May 10, 1982, is entitled, "QA Record Storage."

A review of the above QCP and QAIs revealed that they meet the intent of 10 CFR Part 50, Appendix B requirements.

Conclusion:

The Zack Company had written a formal document control program with the issuance of L-QAM on October 21, 1976. It is apparent that supplementary implementing procedures/instructions were not available until July 28, 1980. The NRC Region IV Vendor Program Branch had no inspection history regarding the Zack Company prior to this special inspection. However, nonconformances were identified with regard to their current document control program and are contained in NRC Inspection Report No. 99900785/82-01.

b. Allegation No. 2: Inadequate qualifications of personnel performing significant roles - Individuals without any previous nuclear experience were assigned to make decisions requiring engineering judgment, as well as detailed knowledge of professional codes and legal requirements for QA documentation. They received these assignments despite protesting that they were not qualified to make such significant decisions. The qualification deficiencies extended to the Zack auditors.

Review:

The Zack Company has a detailed written program contained in the QAMs and supporting QCPs, related to indoctrination and training, and on-going (monthly) training.

A review of the allegers' indoctrination and training records was made to determine the extent of training received and if it was consistent with their job responsibilities. The file documentation control clerk was employed on October 5, 1981.

The document control clerk who subsequently became supervisor on November 16, 1981, was employed on October 19, 1981. The first documented training for both individuals occurred on November 18, 1981, and was presented by the consultant. The description of the training is as follows:

"Technical and clerical requirements relative to implementation of Zack Procedure QA-4. Indoctrination and Instruction relative to the applicability of ANSI 45.2.9 to the Zack Quality Assurance Program. Familiarization with basic alpha-numeric filing systems and practices. Familiarization with ASTM Standard Specifications."

The clerk signed two reading lists on February 25, 1982, indicating that an extensive review had been performed during October 7, 1981 through February 24, 1982, regarding the QAM, QAIs and QCPs related to document control, 10 CFR Part 50, Appendix B, 10 CFR Part 21, ANSI standards related to procurement and QA audits, and the documentation requirements contained in the technical specifications of The Zack Company's three customers.

The supervisor received training on April 27, 1982, presented by the Lead QA Engineer, pertaining to the proper flow of quality assurance documents.

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Both individuals received training on April 28 and 29, 1982, presented by the QA Manager, regarding the proper methods for making corrections to QA documentation and records, and the use of The Zack Company QA stamp on QA documents and records. The clerk signed a reading sheet on April 29, 1982, indicating that a review of five ANSI standards had been performed.

Further, the supervisor gave a training session to an individual identified as a Quality Assurance Engineer-Documentation, on February 17, 1982. This training consisted of instruction and review of the QAM and the two QAIs relating to document control. The supervisor also wrote a letter dated December 1, 1981, which gave authority to the clerk to perform a QA record review and to use the QA Review Stamp with signature/initials.

The training records of purchasing, engineering/drafting, and internal auditors were reviewed during this inspection. Instances were identified where indoctrination, training, and qualification sessions had not been documented. Certain qualifications and certifications of auditors had not been kept current, prior to 1981. Since that time, individuals performing internal audits have been qualified through successful completion of the Auditor Training Program and the Audit Team Leader Training Program presented by Bechtel and Consumers Power Company. Numerous Quality Assurance training sessions have been provided to the engineering/drafting personnel.

Conclusion:

The Zack Company did not meet their commitments regarding monthly training sessions until May 1982; however, the training provided, appeared to be commensurate with the background and educational experience of the individuals involved. A nonconformance was identified and is contained in NRC Inspection Report No. 99900785/82-01.

c. Allegation No. 3: Missing documentation and discrepancies in welder qualifications records - To illustrate, an October 23 Interim Report found 25 discrepancies in a partial review of welding qualifications records for the LaSalle site.

Review:

This item refers to the welders at the LaSalle site, the records of which are not maintained at The Zack Company fabricating facility. This area is addressed in special safety inspection reports 50-373/82-51, 50-374/82-18. The Zack Company has committed to qualify their welders in accordance with the requirements of the American Welding Society code, AWS D1-1 and AWS D1-3.

A review of the qualification records of the four shop welders was performed, and a comparison made against the AWS requirements.

Conclusion:

During this review, one shop welder was identified as having been improperly certified as being qualified. This item has been identified as a nonconformance and is contained in NRC Inspection Report No. 99900785/82-01

d. Allegation No. 4: Inadequate training for QA personnel - Despite repeated requests for comprehensive training, Zack only offered informal guidance and self-study materials. To illustrate the quality of the training, Zack President Christine DeZutel and her husband were trained "in accordance with The Zack Company Quality Assurance Training Program" on the basis of one hour's instruction from a Zack executive in NRC regulations and professional QA standards. The company finally proposed a formal training program shortly before it dismissed the entire QA documentation staff.

Review:

Criterion II of Appendix B to 10 CFR Part 50 requires that a QA Program provide for indoctrination and training of personnel performing activities affecting quality and to assure that suitable proficiency is achieved and maintained. The Zack Company's QA program, as stated in item D.2.b above, does provide for indoctrination and training

Prior to April 30, 1982, the documentation control group reported to the QA Manager, thus QA personnel consisted of: QA Manager, two QA engineers, a QC inspector, and the document control group.

The training records of two of the document control group are addressed in item D.2.b. above. An individual was employed on August 18, 1980, as QC inspector with a subsequent job promotion to QA engineer on July 9, 1981. A review of his training records shows that he attended 43 formal training sessions between October 28, 1980 and October 6, 1981. Further, there were copies of written examinations showing his successful completion of training as a Level I and II QC inspector. He also successfully completed the Auditor Training Program provided by Bechtel-Consumers Power Company as evidenced by a Consumers Power Company letter dated April 14, 1981. Reading lists dating from August 26, 1980 through April 17, 1981, show extensive coverage of all aspects of the QA program.

Another individual was employed as a QC inspector on September 28, 1981, with subsequent promotion to QA engineer on January 19, 1982. His training records show reading lists dated October 20, 1981, and February 12, 1982, covering all aspects of the QA program. Further, he attended nine formal training sessions and successfully completed the Consumers Power Company's Audit Team Leader Training Program.

The current QA Manager was employed as a Lead QA engineer on September 8, 1981. The records show that he was previously employed as a QA engineer performing nuclear vendor audits and that he was certified as a Level II examiner in accordance with SNT-TC-1A, for magnetic particle, liquid penetrant, visual inspection, and radiography.

Conclusion:

The Zack Company's QA Program provides for indoctrination and training of personnel performing activities affecting quality. With regard to the training given to the Zack President and Vice President (her husband), the NRC found no requirements where these individuals have to be trained in QA. The formal training provided Zack employees, including the president and vice president, since July, 1980, as evidenced by the records, appears to be adequate and consistent with the job responsibilities.

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e. Allegation No. 5: Missing records due to inadequate document control - Both unauthorized management personnel, and even the owner's dog, had access to Zack QA records and Purchase Orders. As a result, records were lost or chewed up.

Review:

During a Zack Company quality assurance review of certifications, inconsistencies were identified. These were categorized into four groups:

(i) Material certifications with incomplete information

(ii) Material certifications with technical inaccuracies

(iii) Material certifications with possible unauthorized and improper modifications

(iv) Possible person/persons improperly modifying material certifications

This information was transmitted to their customers in letters dated August 28, 1981 (Bechtel Power Corporation-Midland Power Station), and September 25, 1981 (Baldwin Associates-Clinton Power Station, and Commonwealth Edison Company-LaSalle County Nuclear Station). Subsequently, letters dated October 23, 1981, with an attached document, entitled "Potential 10 CFR Part 50.55(e) Reportable Defect Evaluation for Material Certification Deficiencies," were sent to their customers. The document states in part, "There has been a breakdown of the quality assurance program as related to . . . Document Control and . Control of purchased material, equipment, and services . . . . This breakdown resulted in an incomplete review and acceptance of procurement documentary evidence (material certifications) and access to those documents by unauthorized personnel resulting in improper modifications being made . . . . The deficiencies were categorized . . . ." Two of the categories were listed as "No certification or C of C" and "Certifications missing."

Section 6 of this document, "Corrective Action," states in part, " . . . A document and records management program will be developed and implemented . . . . A documentation task force consisting of six persons has been assembled. The group experience represents over 25 years in the documentation field and over 40 years in quality assurance or related areas. Three of the six persons have at least a Bachelor degree and two have a Master degree. This group has just completed a review of all known or available purchase orders and documentation for the three projects. A centralized filing system has been established and detailed quality assurance instructions have been developed for records and receipt inspection."

The allegers were part of the documentation task force.

Conclusion:

This allegation was substantiated as it had already been identified in The Zack Company's notification to its customers. This notification occurred in August-September, 1981, prior to the allegers employment at the Zack Company.

There were no additional instances of missing documentation identified, relating to material certifications. However, a nonconformance regarding missing QA documentation was identified and is contained in NRC Inspection Report No. 99900785/82-01.

f. Allegation No. 6: Absence of required quality verification on documents that could be retrieved - This ranged from missing signatures to missing required test data, specifications, and certifications to professional codes.

Review:

The Zack Company identified this item in their notification letters and documents referenced in D.2.e. above. The deficiencies were categorized as follows:

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TYPE	DEFINITION
Clerical errors:	Those certifications that had acceptable chemical and physical test data but lacked reference to the prefix "ASTM" (i.e., A36 instead of ASTM-A-36), the revision or date of standard, the standard (i.e., ASTM, ASME or other standard) or the G-90 coating designation on sheet steel.
Signature Missing:	Those certifications that are acceptable in all aspects except, they had not been signed by an authorized representative for the company.
Signature Error:	Those certifications that are acceptable in all aspects except, the signature typed and the signature signed do not agree (i.e., J. Jones, QA Manager typed-actually signed by Tom Smith).
Wrong Standard referenced:	Those purchase order packages that contain a material certification or certificate of compliance that references a standard not included in the technical specification.
Chemical/Mechanical test data:	Those purchase order certifications which have chemical analysis and/or mechanical test data missing or is not in accordance with ASTM Standards or technical specification requirements.

Conclusion:

This allegation was substantiated, as it had already been identified in The Zack Company's notification to its customers. Additional examples are identified in a nonconformance contained in NRC Inspection Report No. 99900785/82-01.

g. Allegation No. 7: Lack of proper identification through compliance with material traceability requirements - This led to problems such as lack of required traceability for some 114,000 hexheads, bolts, nuts and similar items. Similarly, certain steel beams could not be traced with certainty, although indications are that they come from Argentina.

Review:

The NRC inspectors reviewed the Zack file packages for purchase orders (POs) C-4286, C-4473, and C-4484. PO C-4286 was placed with the Delta Screw Company (Delta) on February 4, 1981, for 20,000 bolts and 20,000 nuts. This material was designated for stock and could thus be used at any of the three sites. On February 13, 1981, Zack received the ordered material with a letter certifying that the bolts conformed to ASTM A307 and the nuts to ASTM A563. PO C-4473 was placed with Delta on August 26, 1981, for 20,000 each, bolts, nuts and washers. This material was designated for use at Midland. Subsequently, on September 4, 1981, Zack received the ordered material with a letter certifying that the bolts conformed to ASTM A307, the nuts conformed to ASTM A563, and the washers conformed to ANSI B27.2 and were made of AISI 1010 steel. The chemical and physical properties were also provided for the bolts and nuts as was the hardness of the washers. PO C-4484 was placed with Delta on September 14, 1981. Zack received the ordered material with a letter certifying that the bolts conformed to ASTM A307, the nuts conformed to ASTM A563, and the washers conformed to ANSI B27.2 and were made of AISI 1010 steel. The chemical and physical properties were also provided for the bolts and nuts as was the hardness of the washers.

On September 22, 1981, Zack wrote nonconformance reports (NCR) M-110, NCR Q-112, and Supplier Deviation Disposition Request (SDDR) 2187 (Zack No. 092281-1s). NCR M-110 was written against PO C-4484 and stated that the bolts were not marked as required by ASTM A307, and NCR Q-112 was written against PO-4286 for the same reason. SDDR 2187 was not written against any specific PO and requested acceptance of any ASTM A307 bolt not marked by the manufacturer as required. In addition, on September 28, 1981, Zack wrote hold report Q-184 against PO C-4473, and two other POs not related to this allegation, stating that the certifications for the material had not yet been reviewed.

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SDDR 2187 was dispositioned by Bechtel Power Corporation (Bechtel) on October 23, 1981, to accept any bolts not marked in accordance with ASTM A307 providing they conformed with all other requirements of Technical Specification 7220-M-151A (Bechtel's specification for HVAC systems at Midland). On October 28, 1981, Pittsburgh Testing Laboratory (PTL) provided Zack with the results of chemical analyses and physical tests performed on various material samples, including samples from PO C-4286 and PO C-4484. The results of these tests were within the specification requirements. Subsequently, Zack wrote SDDR 2219 (Zack No. 102981-2S) on October 29, 1981, to request disposition of nuts and washers purchased to ASTM A307 that do not have a manufacturers identification mark. They also noted that the nuts should be purchased to ASTM A563 and the washers to ASTM F436 and requested a specification change to reflect this. In addition, Zack stated that they were in the process of acquiring certificates of conformance from all suppliers of nuts and washers for Midland. On November 18, 1981, Zack wrote NCR M-175 stating that the nuts and washers from PO C-4484 did not have a manufacturer's identification mark as required per ASTM A307.

SDDR 2219 was dispositioned by Bechtel on November 20, 1981, stating that ASTM A307 recommends nuts per ASTM A563 and that ASTM A563 nuts are not required to be marked. Therefore, there is no deviation from specification requirements. It further stated that washers without manufacturers identification were acceptable provided they conformed with all other requirements of ASTM F436. Based on the answers to SDDRs 2187 and 2219, accepting the material "as is", and having received, reviewed and accepted the material certifications for PO C-4473, hold report Q-184 was closed for this PO on December 16, 1981.
On December 22, 1981, Zack wrote change 1 to POs C-4286, C-4473, and C-4484 stating that per agreement with Delta, the bolts and nuts of PO C-4484 were to be returned for full credit.
Subsequently, on December 30, 1981, NCRs M-110 and M-175 were dispositioned to accept ASTM A307 bolts, ASTM A563 nuts, and F436 washers without any manufacturers identification marks as approved by Bechtel on SDDRs 2137 and 2219.
On January 5, 1982, change 1 to PO C-4484 was canceled.

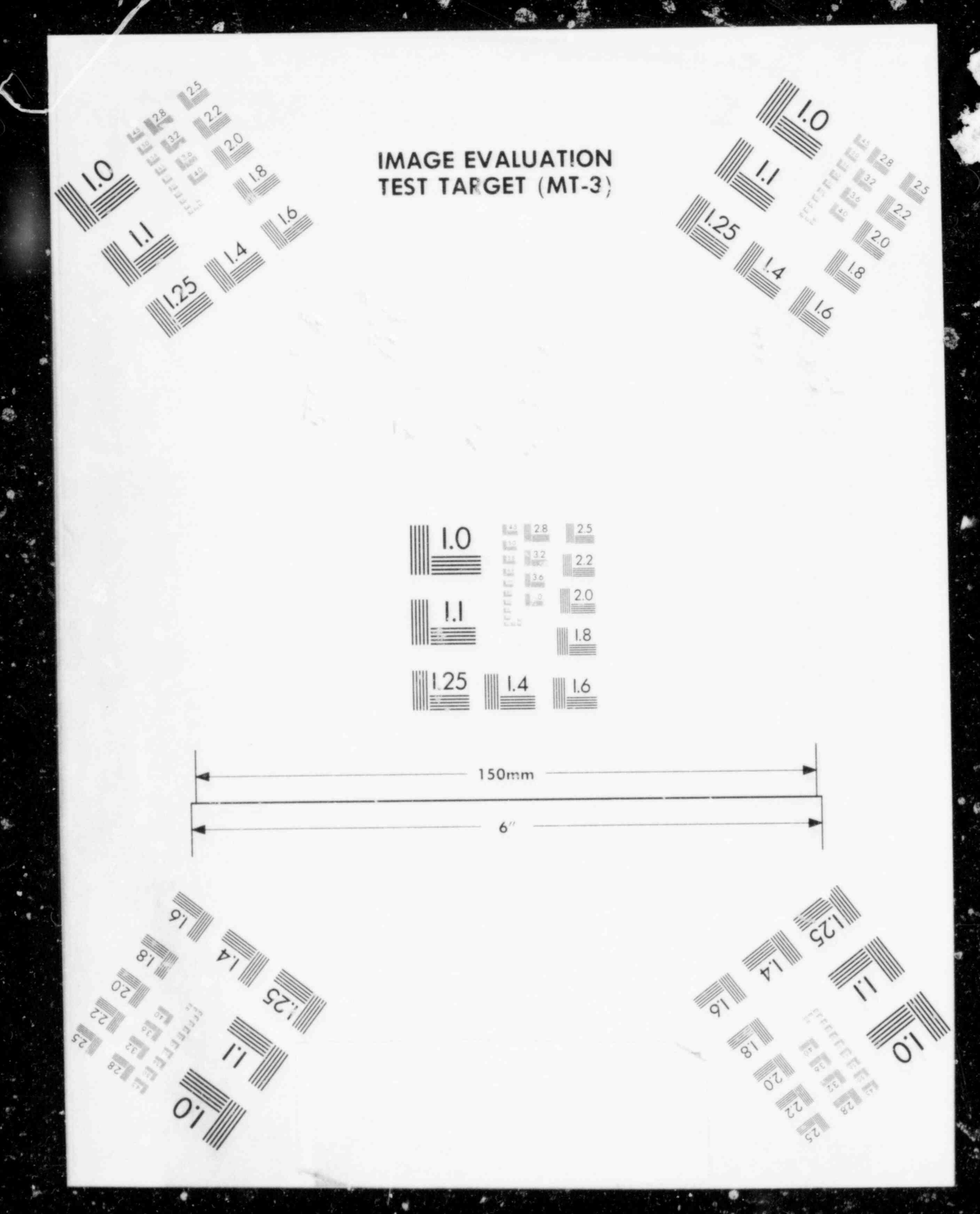
IMAGE EVALUATION
TEST TARGET (MT-3)
1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0
150mm
6"

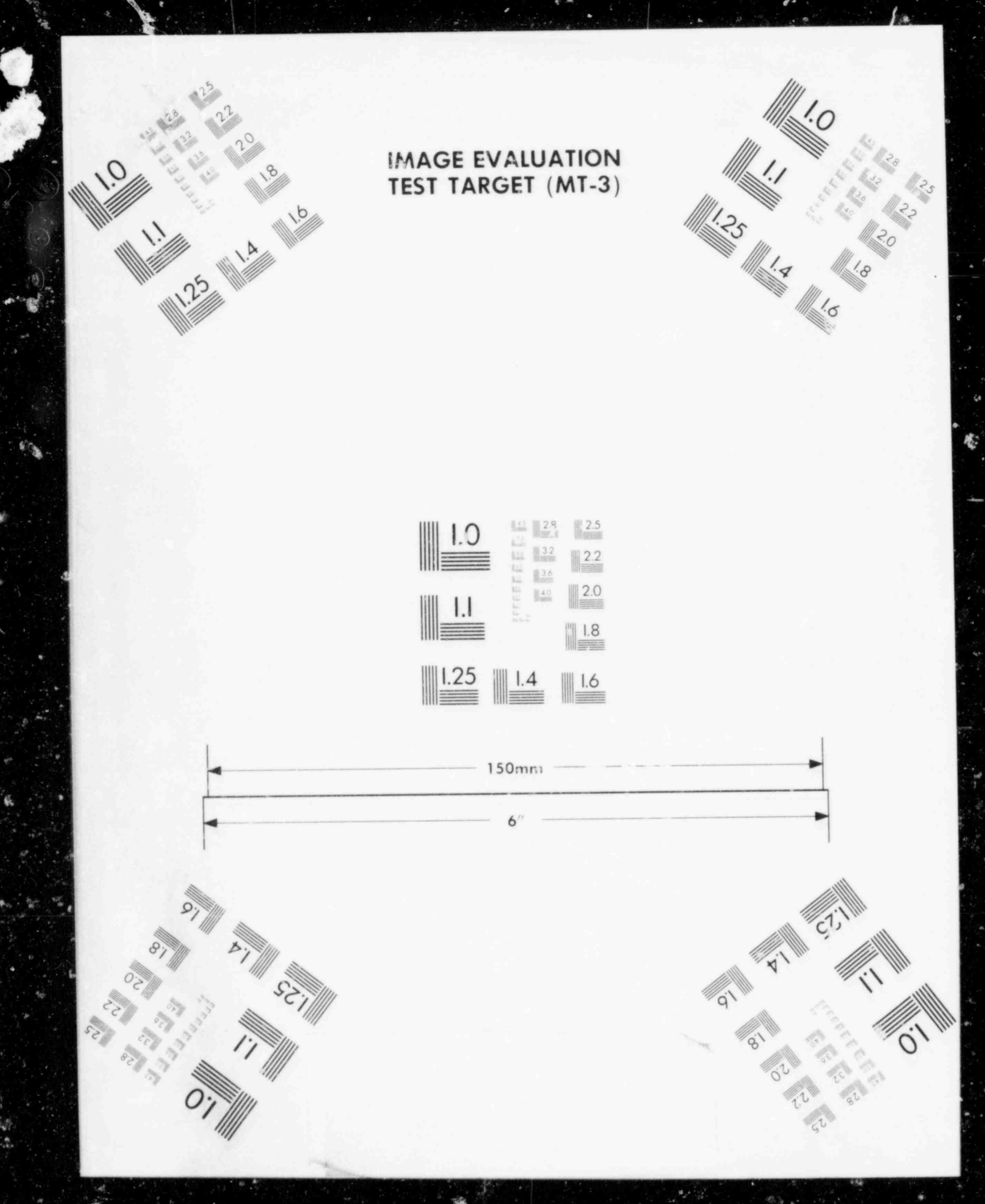
IMAGE EVALUATION
TEST TARGET (MT-3)
1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0
150mm
6"

On January 13, 1982, Delta wrote a second material certification for the washers provided under PO C-4473, apparently to correct an error on the September 4, 1981, certification. This certification stated that the washers conformed with ANSI B27.2 and were made from AISI 1010 steel, as did the previous certification, but stated that the washers were zinc plated in accordance with ASTM B633 instead of ASTM A164 as previously stated. NCR Q-112 was dispositioned on February 17, 1982, to not use the material for nuclear work, but use for nonnuclear work only. Subsequently, on February 18, 1982, Zack wrote NCR L-237 to accept the material as-is. SDDR 2577 (Zack No. 062382-1C), dated June 23, 1982, was written by Zack stating that the washers purchased on POs C-4484 and C-4473 have a certificate of conformance indicating that they are made of AISI 1010 steel and meet the requirements of ANSI B27.2. SDDR 2577 was dispositioned by Bechtel on July 13, 1982, to accept the use of washers made of AISI 1010 steel and zinc plated to ASTM B633/ASTM A164. They also stated that Technical Specification 7220-M-151A would be revised to add AISI 1010 steel for washers.

The NRC inspector also reviewed Zack Company PO C-904 dated August 22, 1979, for 300' of 8"x15"x20' ASTM A36 steel. These POs were placed with Edgecomb Metals who delivered the material to Reliable Galvanizing. Reliable Galvanizing then delivered the material to Zack, who subsequently delivered it to the Clinton site. Discussion with Zack personnel indicated that a thorough investigation had been made and it was determined that the Argentinian Steel was mixed at the galvanizing shop with another order.

A review of available documentation revealed that Zack NCR ZC CB-519, dated June 25, 1981, was written upon discovering a section of Auxiliary Steel that was identified "Somisa Ind, Argentina." Further corrective action taken was to initiate Zack NCR ZC CB-519, Revision 1, dated February 19, 1982, to perform a thorough investigation into this matter. In addition, Baldwin Associates wrote NCR 6528 and dated March 4, 1982, in order to track this item.

Investigation established that 27 hangers had been installed containing Argentinian steel members. Samples of the Argentinian steel were sent to PTL for chemical and physical analysis. The analysis performed by PTL was found to correspond to the original certified material test reports supplied by Edgecomb Metals. However, all hanger assemblies containing Argentinian steel were removed and replaced with the exception of those that were inaccessible.

Conclusion:

This allegation was not substantiated. With regard to the portion of the allegation dealing with the three Delta Screw Company purchases, contrary to the allegation an NCR or SDDR was written to disposition each purchase order discrepancy. It was noted that Zack appears to have been confused on what the requirements for the material were and in some cases were slow to write an NCR/SDDR. However, the NCRs and SDDRs were written and the material problems were dispositioned. Zack's change 1 to each of the three POs, to return some or all of the material for credit, appears to have been an error since Bechtel had already dispositioned the material as acceptable for use at Midland.

With regard to the portion of the allegation dealing with the Argentinian steel, it is noted that this issue only applies to the Clinton site and that both Zack and Baldwin Associates wrote NCRs to track this item. Material samples were taken for analysis and they met the appropriate requirements. In addition, all accessible hanger members identified as having been made with the Argentinian steel were removed and replaced with hangers made from domestic steel. Further technical evaluation on this matter will be made in a special safety inspection report on Clinton HVAC systems.

h. Allegation No. 8: Improper alteration of QA records through stickers containing signatures of questionable authenticity - This item is addressed on OI Investigation Report for Case No. 3-83-025.

Review:

In the Spring of 1981, the Zack QA Manager was notified by a Consumers Power employee stationed at the Midland Nuclear Project that some questionable Certified Material Test Reports (CMTRs) had been detected. The QA Manager conducted a preliminary investigation and identified some problems in the area of CMTR documentation. As a result of this, Zack QA personnel undertook an in-depth investigation into the documentation problems. Zack notified their customers of the inconsistencies identified on the following dates: Midland Station on August 28, 1981; Clinton and LaSalle Stations on September 25, 1981. Among the inconsistencies identified were examples of what appeared to be alterations to CMTRs. These alterations consisted of the use of stickers containing information on them such as ASTM material designations and descriptive characteristics of the material and additions/modifications on the CMTR itself as evidenced by the use of more than one type face, the use of "white-out", or handwritten modifications. The stickers also had a signature, of questionable authenticity, that gave the impression that the stickers had been signed by the same individual who had signed the CMTR.

As part of this inspection, an examination was made of CMTRs that had stickers attached to them. A comparison was made of the information contained on the sticker to that on the CMTR to which it was affixed and to revised CMTRs that had been acquired from the vendor. In many cases, the information provided on the sticker differed from that on the CMTR to which it was affixed because of the addition of the revision year for a particular ASTM standard. There were cases noted where the revision year provided on the sticker did not agree with the revision year provided on the revised CMTR acquired from the vendor. The lack of the ASTM standard year on a CMTR is not considered to be a problem from a technical viewpoint as steel manufacturers supply material to the most current standard regardless of the ASTM revision year listed on a purchase order. The exception to this, of course, is that after a new revision to an ASTM standard is published,

material already in stock will be exhausted prior to shipping material manufactured to the new revision. In addition, it is noted that the revisions to the ASTM standards are normally minor in nature and consist of correcting typographical errors and restructuring the format and other similar changes that do not affect the structural strength of the applicable material. It should also be noted, that as shown in Inspection Reports 50-373/82-51 and 50-374/82-18, there is a large design margin to failure for the materials utilized in the HVAC systems and thus sufficient room exists to allow for any minor perturbations in material changes due to revisions to the ASTM standards without affecting the soundness of the installed systems.

There were a number of cases noted where the CMTR listed information on the material type in a form that did not specifically call out an ASTM standard. The attached sticker put the information on the material type in a form that specified a particular ASTM standard. An example of this would be a CMTR listing "USS GALV. LFQ G90" with the attached sticker specifying "ASTM-A527-71/G90 COATING LFQ CHEM TREAT NO OIL". Though the example given above for the CMTR listing is not the desirable way of listing the material type, it is considered to be technically acceptable. This is based on the fact that ASTM A527, Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Lock-Forming Quality, is the only commercially available sheet steel that meets the requirements of being galvanized and of lock-forming quality (LFQ). With regard to the reference on the sticker to "CHEM TREAT NO OIL," this is not considered to be a matter of technical significance to the end use of the material and is not truly a part of the "material certification". Chemical treatment or oiling of the galvanized sheet steel is a buyer option allowed by the ASTM standard and only serves the purpose of preventing the formation of white oxide during shipment and storage. The discrepancies between the original CMTR, the sticker, and the revised CMTR, such as the listing of a general requirement ASTM standard (like A525) along with the specific ASTM standard (in this case A526 or A527), are not considered to be a material certification problem.

Conclusion:

This allegation was substantiated in that stickers of questionable authenticity had been added to a limited number of CMTRs and alterations/modifications had been made by Zack personnel to some CMTRs. However, during the review of CMTRs containing stickers and alterations/modifications and other applicable documentation, no items relating to this allegation were noted that made the structural integrity of the installed HVAC systems questionable.

i. Allegation No. 9: Improper alteration of QA records through whiting-out previous information in order to create the appearance of compliance with legal requirements - A technical evaluation of this allegation was made in combination with allegation number 8. The details of the circumstances surrounding the alleged record falsifications and suspected forgeries are provided in OI Investigation Report for Case No. 3-82-025.

j. Allegation No. 10: Improper requests by Zack management for vendors to supply unavailable information or to inaccurately upgrade quality documentation - Some vendors, such as U. S. Steel, refused to participate in the improprieties. Other vendors cooperated to the letter of the request, even retyping the spelling errors in model certification letters supplied by Zack. Another vendor returned a blank form for Zack to fill in as needed.

Review:

It was alleged that two situations existed in which Zack vendors participated in improprieties.

Situation 1:

By letter dated January 22, 1982, The Zack Company wrote to RMC (Zack's refrigerator piping supplier) requesting a letter of conformance for materials supplied to The Zack Company pursuant to purchase order C-9509. The Zack Company attached a sample letter of conformance showing the information requested.

In response to this request, RMC provided a letter of conformance dated January 22, 1982, identical to the sample letter of conformance sent by The Zack Company to RMC. (The RMC supplied letter of conformance contained the same misspelling of the word "auxilliary" [sic] in three places, as did The Zack Company supplied sample letter.)

The following information was obtained from a NRC review of RMC files and an interview of RMC employees.

During April 1976, RMC entered into a contract with The Zack Company to provide materials and install 11 air conditioning systems at Commonwealth Edison Company's LaSalle County Nuclear Station. The contract specified RMC would provide the piping, fittings and valves, refrigerant specialties, refrigerant, labor, testing, and start-up on 11 systems, which were:

Service Building (systems: SB-1, SB-2, and SB-3)

Off-Gas Building (systems: OG-1 and OG-2)

Auxiliary Building Laboratory (system: ABL-1)

Auxiliary Building Offices (system: ABO-1)

Control Room Building (systems: CR-1 and CR-2)

Auxiliary Equipment Electric Room (systems: AEE-1 and AEE-2)

Of the 11 systems, 4 (AEE-1, AEE-2, CR-1, and CR-2) were nuclear safety-related.

From the review of the RMC files by NRC personnel, it was learned RMC had a quality assurance program in effect and by letter dated April 15, 1977, The Zack Company had approved RMC's Job Procedures. This file review also disclosed that on February 14, 1978, The Zack Company wrote RMC and requested "certifications on the material that you furnish and install. This includes . . . copper tubing." RMC obtained the certification from its supplier, LeRan Copper and Brass Company, and transmitted it to The Zack Company on June 21, 1978.

Conclusion:

The Zack Company's request for a letter of conformance from RMC was not improper. There was no improprieties involved in RMC supplying Zack with the exact information they requested (in the Zack sample letter) since RMC had the same, appropriate conformance information properly documented and in their files.

Situation 2:

By letter dated March 31, 1982, The Zack Company wrote to the Weldstar Company (a Zack welding electrode supplier) and advised Weldstar that because of "site conditions," Zack had misplaced the certification for certain welding electrodes. In the letter, The Zack Company listed electrode heat numbers and requested Weldstar to "resurrect" their copies of the certifications for the electrodes pertaining to those heat numbers. The electrodes involved were type E6011, 1/8" and 3/32" diameter, and were issued in 1978 and 1979.

In response to The Zack Company's letter, Weldstar replied by letter dated April 6, 1982. The letter stated in part, "In answer to your letter dated March 31, 1982, we do not have any recall on any certification papers dating as far back as 1978.

Lincoln Electric Company has a form, which we are enclosing for your evaluation and files. This form will enable you to type any information that you are missing. Due to this material in question being typical material, there should be no problem with your company filling out this information."

A review of the Lincoln Electric Company "Certificate of Conformance to Requirements for Welding Electrode" revealed that the certificate was properly notarized. (Lincoln Electric is the manufacturer of the welding electrode in question and a supplier to Weldstar of that electrode). On the Certificate of Conformance to Requirements for Welding Electrode the only information not present on the certification which could have been typed in by The Zack Company was Zack's name, address, order number and date. This information is normally typed on the certification by the supplier of the material circa the time the original order is supplied to the purchaser.

The typical certification lists test data obtained during an annual test of material of a particular classification. It certifies that the material supplied (in this case E6011 electrode) is of the same classification, manufacturing process and material requirements as the electrode sample used in that annual test.

The American Welding Society Standard AWS A5.1-78, Specification for Carbon Steel Covered Arc Welding Electrodes, paragraph 2.9, "Certification," states, in part, "For all material furnished under this specification, the manufacturer certifies that the material, or representative material, has passed the tests required for classification by this specification. When required by the purchaser, the manufacturer shall furnish a copy of the results of those tests." It should be noted that 1/8" and 3/32" diameter E6011 electrodes have no test requirements under AWS A5.1-78. Electrode sizes having no test requirements can be classified provided at least two other sizes of that classification (e.g., 5/32" and 3/16" diameter E6011 electrodes) have passed the tests required for them. This is the case with the 1/8" and 3/32" diameter E6011 electrodes supplied by Lincoln Electric to Weldstar, and subsequently to The Zack Company.

The following information was obtained through discussions with the President and Quality Assurance Mananger of Weldstar, during a visit to Weldstar.

The only material (other than certain welding equipment and accessories) that Weldstar provides to Zack for nuclear related applications is welding electrodes. The E6011 welding electrodes supplied to Zack are manufactured by the Lincoln Electric Company, purchased from Lincoln by Weldstar, and subsequently distributed by Weldstar to its customers. All welding electrodes supplied to The Zack Company are accompanied by the appropriate certification documents. In addition, the containers in which the Lincoln Electric Company packages its E6011 welding electrodes specifically state that the material "conforms to AWS A5.1".

While at Weldstar, NRC personnel randomly reviewed four of the seven Weldstar invoices which pertained to the heat numbers referenced in The Zack Company's March 31, 1982 letter. Each of the Weldstar invoices reviewed indicated that typical material certifications had been provided with the material shipments.

Conclusion:

The Zack Company's request for copies of misplaced welding electrode certifications was not improper.

Although the certificate of conformance did not contain The Zack Company's name, address, order number or the date, there was no impropriety involved in Weldstar providing The Zack Company with the certificate for the E6011 electrodes which they supplied.

k. Allegation No. 11: Failure to distinguish between commercial and nuclear purchases on Purchase Orders - Since items purchased for nuclear use have much stricter quality verification requirements than those purchased for commercial use, this omission led to the improper upgrading program described above.

Review:

The NRC inspector reviewed the project specifications for the work being performed by The Zack Company for the LaSalle, Midland, and Clinton sites: Sargent & Lundy Engineers Technical Specification No. J-2590, Revision 1, dated April 10, 1975 through Amendment No. 1, dated November 11, 1981 - LaSalle County Station, Units 1 and 2; Bechtel Power Corporation Technical Specification No. 7220-M-151A(Q), Revision 0, dated November 17, 1976 through Revision 11, dated March 4, 1982 - Midland Power Station, and Sargent & Lundy Engineers Technical Specification No. K-2910, dated January 18, 1978 through Amendment No. 4, dated January 21, 1982 - Clinton Power Station. Certain portions of the work for all three sites have been classified as "Safety Related." In addition, the associated purchase orders from the customers to The Zack Company were reviewed, and in only one case could the imposition of 10 CFR Part 21 be identified; that being in Bechtel's purchase order number 7220-M-151, Amendment Number 21, dated March 12, 1980.

The customers procurement documents specify the materials to be used in the construction of the HVAC systems, and in the case of equipment used in the HVAC systems; e.g., balancing, fire, and gravity dampers, motors, fans, etc., even the specific suppliers The Zack Company must use. A total of 201 Zack Company procurement 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). These files covered a time frame from September 1975 to present and represent purchases destined for all three sites.

Conclusions:

The Zack Company did not distinguish between commercial and nuclear purchases of material on their purchase orders nor were they required to. They procured materials in accordance with the designated materials in the technical specifications. When purchasing equipment which is designated by the customer as safety-related, The Zack Company includes words to the effect, "Furnish and deliver all (equipment) in accordance with the attached plans, specifications, standards, technical criteria as required by specification (number). QA program, QC procedures, and seismic qualifications to be delivered."

The Zack Company infrequently used the term nuclear safety-related in their purchase orders until June 1981. At that time it was decided to try and make their purchase orders consistent with the end use of the materials they were procuring, if known.

Upgrading of materials/equipment is not considered improper. A company may procure commercial grade material/equipment and take the responsibility for upgrading to meet the requirements of their customers procurement documents.

1. Allegation No. 12: Unqualified vendors on the AVL - This occurred due to the absence of necessary surveillance of vendor QA programs.

Review:

The NRC inspector reviewed Zack's Quality Assurance Program Manual, Revision C, dated October 21, 1976. This was approved by Sargent and Lundy by letter dated October 16, 1975. Section 4 of Zack's QA Manual, titled "Procurement Control", states, in part, "the quality of all purchased equipment shall be controlled as follows: All vendors supplying equipment for this project shall be required to submit for approval, shop drawings and other data, in sufficient detail to establish that the quality of the product they are to furnish meets or exceeds the requirements of the contract. Purchasing shall maintain a card file on suppliers, and only those suppliers who qualify shall be used. To qualify, a supplier must have properly filled orders placed by the Zack Company in the past, and must have an established record of consistently delivering the correct type, grade, quality and quantity of material ...."

Zack's Quality Assurance Manual, Section 5, "Procurement Documents", Revision 5, dated March 1, 1977, approved by Commonwealth Edison Company by letter dated April 22, 1977, states, in part, "All suppliers who qualify are placed on an approved bidder's list by Zack by meeting the following conditions:

1. Submit a quality control manual or certification as required by Zack or the contract.

2. Have the submitted date approved by Zack, if required.

3. Establish a "Quality" record with Zack for at least 3 years.

4. Furnish certificates of compliance for their product if required.

All suppliers shall be maintained on active approved status providing they maintain their quality control standing with Zack, and Zack shall not require, or be required to conduct additional audits unless required by contract."

In addition, Baldwin Associates approved the Zack QA Manual, Section 8, Revision 0, dated February 28, 1979, titled "Control of Purchased Material, Equipment and Services", by letter dated June 22, 1979, for the Illinois Power Company, Clinton Project. Also, Bechtel Power Corporation approved the Zack QA Manual, Edition IV, Revision 0, dated July 11, 1980, by giving a status Level I approval.

The NRC inspector also reviewed one of Zack's initial approved vendors list. The methods of evaluation and approval of vendors was to perform an audit at the vendor's facility, place a vendor on the approved list based on an ASME Quality Systems Certificate (Materials) or an N Stamp, source evaluation, the supplier's performance for at least one year with a low rejection rate, and a review of receiving inspection reports with a low record of NCR, or hold reports.

Discussion with Zack Company personnel indicated that audit reports of several of those vendors that had been audited could not be found and that they had been misplaced or lost. A new approved vendors list, approved on July 7, 1982, was made that included only those vendors supplying nuclear safety-related and nonsafety-related-seismic items. This approved vendors list contained 51 suppliers of safety-related material equipment. Forty-five have been audited between September 1981 and June 1982 and found to be acceptable. The remaining six suppliers are holders of N Stamp or Quality System Certificates (Materials) and thus, are not required to be audited/surveyed.

Conclusion:

This allegation has not been substantiated. Procedures governing control of vendors for the LaSalle project did not require an approved vendors list. The use of vendors was based on past satisfactory experience. Based on a discussion with Zack personnel on February 7, 1983, an approved vendors list was required for the Clinton and Midland projects which was also used for the LaSalle project. The same vendors supplied material for all three projects and were considered qualified. The Zack QA Manuals for the three projects (LaSalle, Midland, and Clinton) have essentially the same requirements for vendor surveillance and is considered adequate for the safety significance of the HVAC systems, and is considered to meet the requirements of the ASME B&PV Code for a non-pressure retaining vessel.

m. Allegation No. 13: Failure to remove unqualified vendors from the AVL - Even if Zack determined a vendor was unqualified, that did not guarantee the vendor's removal from the AVL. For example, Zack received approximately 38 Purchase Orders from the Delta Screw Company during the period it was "removed" from the AVL.

Review:

During the investigation of this allegation, the NRC inspector established the following:

1. There was no 1981 fall audit of Delta Screw. However, there was an audit (C/L No. ZC-VS-82-69) performed by Zack of Delta Screw dated February 10, 1982, which found the vendor to be satisfactory.

2. There was a Zack memo, dated October 20, 1981, removing Delta Screw Company from the approved vendor list (AVL). This was the apparent result of a telecon on or before October 20, 1981, between Zack and a NRC Region III inspector discussing traceability of bolting material.

3. There was a Zack memo, dated December 17, 1981, to all Project Managers, Document Supervisor QA, Quality Engineers, QA File Approved Vendors List, and Purchasing Department, approving their commercial fastener suppliers for safety and nonsafety-related fasteners.

4. A review of the Master Purchase Order Log indicated that 12 purchase orders containing a total of 40 entries, had been placed with Delta Screw, between December 22, 1981, and February 17, 1982. There were no purchase orders placed with Delta Screw during the period of October 20, 1981, through December 17, 1981, and there was no receipt of material for the LaSalle, Midland, and Clinton projects during that period.

5. Zack officially placed Delta Screw Company on the AVL on February 10, 1982.

Conclusion:

This allegation has been substantiated in that Zack did make purchases from Delta Screw Company prior to officially placing them on the AVL on February 10, 1982. However, based on Zack's memo dated December 17, 1981, it is obvious that the intent was to place the Delta Screw Company back on the AVL effective that date and that purchases from them had been approved from that date on. Since no instances were found where purchases were placed with Delta Screw Company between October 20, 1981, and December 17, 1981, it is considered that Zack complied with the intent of their QA Manual but made a clerical error in not actually placing Delta Screw Company on the AVL until February 10, 1982.

n. Allegation No. 14: Management awareness of QA breakdown - Zack management was painfully aware of the problem. As the company conceded, "There has been a breakdown of the quality assurance program as related to criterions [sic] VI - Document Control, and VII - Control of purchased material, equipment and services . . . ." The company promised reform and training to the QA staff. But the commitments were not honored. Instead, Zack management scapegoated the staff for problems created by its own neglect.

Review:

The NRC inspector reviewed The Zack Company's potential 10 CFR Part 50.55(e) report, the reorganization effort towards establishing a formal document control system, including the use of a consultant to initiate document control procedures, and the subsequent hiring of six individuals to implement the system. In addition, the indoctrination and training records of certain of these individuals were reviewed.

Conclusion:

The Zack Company management was aware of the breakdown in quality assurance as stated in their document "The Zack Company-Potential: 10 CFR Part 50.55(e), Reportable Defect Evaluation for Material Certification Deficiencies" which was submitted to their customers under cover letters dated October 23, 1981.

The Zack Company kept its commitment to reform, by: (i) employing a consultant to establish a formal document control system; and (ii) employing six individuals to implement the established system.

The Zack Company provided indoctrination and training as identified in D.2.b. above.

o. Allegation No. 15: Harrassment, attempted intimidation and retaliation against QA staff - All current and former Zack employees who were contacted confirmed this allegation. The tactics included dismissal threats, severe personal abuse, accusations of petty misconduct, and eventually dismissal of the entire QA documentation staff through a pretextual (sic) reorganization.

This item is being addressed in OI Investigation Report for Case No. 3-82-057.

p. Allegation No. 16: Bad faith progress reports to the utilities - Zack disguised its misconduct through false reassurances to its utility customers. To illustrate, the company reported to Midland on a partial review of some 2,900 purchase orders. Although the review was less than half complete, the Zack President characterized it as a "total document audit."

Review:

A review of The Zack Company progress reports was made. The identification of the progress reports appears to be confusing in that there are external and internal progress reports. However, the following lists the reports by chronological order, with a brief description of each.

(i.a) August 28, 1981 - initial letter to Bechtel Power Corporation (Midland) from The Zack Company, addressing the identification of a possible 10 CFR Part 50.55(e) reportable defect.

(i.b) September 25, 1981 - initial letters to Baldwin Associates (Clinton) and CECO (LaSalle) from The Zack Company addressing the identification of a possible 10 CFR Part 50.55(e) reportable defect.

(ii) October 23, 1981 - letters to all three customers with attached copies of The Zack Company potential 10 CFR Part 50.55(e) Reportable Defect Evaluation for Material Certification Deficiencies. Section 3.0 of this report states that a total of 1330 purchase order (PO) packages have been reviewed as follows: Midland-550; Clinton-375; and Lasalle-405.

(iii) October 23, 1981, internal memorandum, subject: "Third Interim Report-Documentation Review Results as of October 23, 1981." This memo states in part, "It is felt that the current status of the review process should be categorized as preliminary. Essentially the review has not been an indepth analysis of all documentation. Appreciable progress has been made toward assessment but final status has not been firmly defined." The memo also states that approximately 1,750 packages have been reviewed.

(iv) January 15, 1982 - Addendum to LaSalle Power Station showing corrected PO/CMTR packages from first to second report.

(v) January 22, 1982 - letter to Baldwin Associates (Clinton) from The Zack Company, regarding an attached, updated report on the status of the material certifications identified in (ii) above.

(vi) February 10, 1982 - two letters to the LaSalle County Station QA Superintendent, from The Zack Company regarding an attached, updated status report of purchase orders.

(vii) February 12, 1982 - letter to Bechtel Power Corporation (Midland) from The Zack Company regarding an attached, updated status report dated January 15, 1982. This letter states in part, " . . . As indicated by the report, a significant increase in the number of corrected purchase order packages has been accomplished and a number of the remaining purchase orders indicated as still discrepant have only one or two items to be corrected . . . ."

(viii) February 12, 1982 - letter to Commonwealth Edison Company (LaSalle) from The Zack Company regarding an attached, updated status report dated January 15, 1982. This letter states in part, " . . . As indicated by the report, a significant increase in the number of corrected purchase order packages has been accomplished and a number of the remaining purchase orders indicated as still discrepant have only one or two items to be corrected . . . ."

(ix) April 29, 1982 - letter to Baldwin Associates (Clinton) from The Zack Company regarding an update of the report sent January 22, 1982, in (v) above.

(x) May 3, 1982 - letter to Baldwin Associates (Clinton) from The Zack Company regarding corrective actions taken as of May 3, 1982.

(xi) June 29, 1982 - internal memorandum regarding status of the Clinton Station material discrepancy reports in (v) above.

It should be noted that one letter in item (vi), and the item (vii) and (viii) letters were prepared and signed by the Document Control Supervisor, who is one of the allegers. Further, item (iv) was prepared by the Document Control Supervisor, although not signed by him.

The NRC inspector did not find reference to "a partial review of some 2,900 purchase orders."

A letter dated November 12, 1981, from the president of The Zack Company to Mr. J. W. Cook, Vice President - PE&C, Midland site, Consumers Power Company, states in part, " . . . The Zack Company would like to express our sincere gratitude to Consumers Power Company for the loan of your employee, Mr. Howard McGrane, for the total document control audit of our corporation . . . ."

Conclusion:

The document control supervisor (alleger) and his staff was responsible for the purchase order document file review and either preparing or providing input to the status reports supplied to the customers through April 29, 1982.

A nonconformance was identified and is contained in NRC Inspection Report No. 99900785/82-01.

Apparently the quote used in allegation number 16 has been changed from the actual words used in The Zack Company president's letter, such that the meaning is somewhat different. This allegation has not been substantiated.

q. Allegation No. 17: Failure to adequately discipline those responsible for records falsification - The company promised its utility clients to identify and take appropriate action against the guilty parties. Although the responsible executive was identified, the "appropriate disciplinary action" consisted of a paperwork demotion and additional training.

Review:

A review was conducted of The Zack Company report identifying certain potential 10 CFR Part 50.55(e) related deficiencies. The report revealed that among the deficiencies identified during The Zack Company review of purchase orders and corresponding certifications were "stickers" and "alterations." Stickers pertained to situations in which gummed labels had been applied to purchase order certifications and cover sheets. The Zack report states: "These labels were typed and signed by the individual originally certifying the data to indicate ASTM designation in full. Authenticity of the signature is questionable." Regarding alterations, the Zack report states alterations involve "those certifications that have apparently been altered by typed or handwritten changes."

An excerpt from The Zack Company report describes in part, the corrective action taken regarding these situations.

"Those person(s) involved in the modification to material certifications have been identified and reprimanded by The Zack Company Ownership. This reprimand consisted of demotions in position and documented letters to the personnel files. An intensive and individualized training was then given with respect to the requirements and necessity for accurate and controlled documentation.

"As stated previously, The Zack Company management and ownership assumed part of the responsibility for those unauthorized actions because it allowed an enviroment [sic] conducive to this type of action to exist. The Zack Company also has taken into consideration that the individual(s) involved are loyal employees and while their actions are not condoned, it is understood that it was done with the thought that it was helping the company. Therefore, The Zack Company perceived that the most beneficial action for both the company and the respective projects was not in the loss of these individual(s) but rather in the redirection and controlling of their efforts.

"However, because of the implications of this action by these individual(s) the responsible party(ies) have been advised that any further action of this type would result in immediate dismissal."

Conclusion:

The determination of whether or not adequate disciplinary action has been taken with regard to actions committed by the employees of a licensee's vendor, is not a matter within the purview of NRC regulations.

The matter of records falsification is addressed in OI Investigation Report for Case No. 3-82-025.

r. Allegation No. 18: Surrender to unrealistic utility deadlines - Zack was under intense pressure from its utility clients, in particular Com Ed, to rush the quality verification of its purchases. Rather than defend the integrity of its QA reform program, Zack succumbed and attempted to produce a "rush job". That is why the company pressured employees to work overtime and perform tasks for which they were not qualified. There was not time to do the job properly. (When the QA staff refused to sign off on unacceptable records, management personnel did it themselves.)

Review:

A review of correspondence of The Zack Company provided the following information. The Zack Company informed Commonwealth Edison Company (CECO), by letter dated September 25, 1981, of a potential 10 CFR Part 50.55(e) reportable defect and a review/evaluation was being conducted. An attachment to the letter, corrective action report number 014-a, committed to completion of this review by October 30, 1981. The Zack Company issued reports on October 9, 1981, and October 23, 1981, in which identified deficient items were categorized. The October 23, 1981, report committed to obtaining all missing and/or corrected certifications by December 31, 1981.

A letter from CECO to The Zack Company, dated November 2, 1981, requested submittal of all Zack Company nonconformance reports (NCR) requiring engineering disposition by CECO/Sargent & Lundy Engineers (S&L). All other NCRs were not to be submitted. On November 13, 1981, The Zack Company submitted 15 NCRs. CECO/S&L completed their disposition on December 31, 1981. In January 1982, additional Zack Company NCRs were reported open. The Zack Company was requested to submit all NCRs still open as of March 1, 1982. Discussions with The Zack Company personnel indicated that there were frequent, verbal discussions with CECO personnel prior to March 1, 1982. On March 1, 1982, The Zack Company submitted 69 NCRs which were still open. It was determined by CECO/S&L that these NCRs did not require their engineering disposition; thus, were returned to The Zack Company for their resolution. On April 1, 1982, The Zack Company submitted 21 open NCRs, which, in their view required CECO/S&L engineering disposition. The last of these NCRs were closed out on April 9, 1982. Additional information is contained in special safety inspection report 50-373/82-51, 50-374/82-18.

Conclusion:

There was no documented evidence of unrealistic utility deadlines being imposed upon The Zack Company. An issue such as working overtime is not a matter within the purview of NRC regulations.

It has already been established that The Zack Company reported conditions which included the use of labels with signatures whose authenticity is questionable, and certifications that have apparently been altered by typed or handwritten changes. Further, this was identified prior to the hiring of the QA documentation staff. It could not be determined that these practices continued after The Zack Company had identified and notified these conditions to their customers. There was no evidence of management, other than those qualified, signing off on QA records.

s. Allegation No. 19: Utility knowledge of the QA breakdown - There can be no question that the utilities have been aware of the Zack breakdown. The company was the subject of previous requests to stop shipping nonconforming material, as well as previous severe enforcement action at Midland, whose owner Consumers Power even loaned a contract employee to help straighten out Zack's QA records deficiencies. At LaSalle, Zack informed Commonwealth Edison that it could not supply adequate information to properly correct 69 of 99 QA nonconformances.

This allegation, as it pertains to LaSalle, is addressed in special safety inspection report 373/82-51; 374/82-18. The special safety inspection reports for Midland and Clinton will address this allegation as it pertains to them."

t. Allegation No. 20: Utility complicity with the ongoing breakdown - When formally notified of Zack's miseries, the QA management for the utilities and their contractors failed to face up to their responsibilities. Instead, Com Ed pressured for a rush job in the corrective action program. At Midland, the contractor Bechtel was satisfied if it were "highly probable" that Zack ordered the correct material. The Midland QA program responded to Zack's QA effort with an effort to rewrite the QA rules. Even before the effort was completed, the Midland QA management decided that "in virtually all cases, material is acceptable or will be deemed acceptable."

This allegation, as it pertains to LaSalle, is addressed in special safety inspection report 50-373/82-51, 50-374/82-18. The special safety inspection reports for Midland and Clinton will address this allegation as it pertains to them.

u. Allegation No. 21: Utility complicity with retaliation - In desperation, Mr. Howard and another Zack QA employee, Mr. Ronald Perry, disclosed the QA deficiencies to officials at LaSalle and Midland. In each case, the discussions were supposed to be confidential. In each case, the Zack employees were soon subjected to recrimination and harrassment, suggesting that the confidences were not honored. In Mr. Howard's case, the entire QA staff was dismissed within two weeks of his disclosure to the Midland QA Manager.

This item is being addressed in OI Investigation Report for Case No. 3-82-057.

v. Allegation No. 22: Inaccurate public denials by utilities of the Zack deficiencies - To illustrate, a Commonwealth Edison spokesman stated in a Chicago television interview that the Zack records were reviewed thoroughly by its Architect/Engineer Sargent & Lundy. In fact, an internal January 1982 Surveillance Report at LaSalle revealed Sargent & Lundy had . . . deleted the requirements for submitting on-site contractor documentation (such as Zack's) to S&L for review. This review is now the responsibility of the Zack Company . . . . Based on this change, S&L's letter accepting Zack's documentation is no longer required.

This allegation, as it pertains to LaSalle, is addressed in special safety inspection report 50-373/82-51 and 50-374/82-18. The special safety inspection reports for Midland and Clinton will address this allegation as it pertains to them.

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NRC FORM 335 (7-77)

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16. ABSTRACT *(200 words or less)*

This periodical covers the results of inspections performed by the NRC's Vendor Program Branch that have been distributed to the inspected organizations during the period from October 1983 through December 1983. Also included in this issue are the results of certain inspections performed prior to October 1983 that were not included in previous issues of NUREG-0040.

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