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LICENSEE CONTRACTOR AND VENDOR INSPECTION STATUS REPORT

QUARTERLY REPORT
JULY 1984 - SEPTEMBER 1984

UNITED STATES NUCLEAR REGULATORY COMMISSION



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LICENSEE CONTRACTOR AND VENDOR INSPECTION STATUS REPORT

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JULY 1984 - SEPTEMBER 1984

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Division of Quality Assurance, Safeguards and Inspection Programs
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555



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PREFACE

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

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

Firms designing nuclear steam supply systems, architect engineering firms doing design work on nuclear power plants, and certain selected vendors are currently inspected on a regular basis by the NRC. NRC inspectors, during periodic inspections, ascertain through direct observation of selected activities (including review of processes and selected hardware, discussions with employees and selected record review) whether a licensee or contractor is satisfactorily implementing a 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 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 Vendor Program Branch 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 Vendor Program Branch inspections of nuclear steam supply system designers, architect engineering firms, or other licensee contractors, subcontractors, or suppliers, will be based on programs developed to meet the commitments made by the licensee or construction permit holder. These inspections will not relieve the licensee or applicants from any inspection/verification responsibilities required by Criterion VII.

The NRC currently is continuing their evaluation of 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 party 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 licensee'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	
<p>PRINCIPAL PRODUCT: Description of type of components, equipment, or services supplied.</p> <p>NUCLEAR INDUSTRY ACTIVITY: Brief statement of scope of activity including percentage of organization effort, if applicable.</p>			
<p>ASSIGNED INSPECTOR: <u>Signature</u> Name/VPB Section</p> <p>OTHER INSPECTOR(S): Name/VPB Section</p> <p>APPROVED BY: <u>Signature</u> Name/VPB Section</p>			
<p>INSPECTION BASES AND SCOPE:</p> <p>A. <u>BASES</u>: Pertain to the inspection criteria that are applicable to the activity being inspection; i.e., 10 CFR Part 21, Appendix B to 10 CFR Part 50 and Safety Analysis Report or Topical Report commitments.</p> <p>B. <u>SCOPE</u>: 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.</p>			
<p>PLANT SITE APPLICABILITY: Lists docket numbers of licensed facilities for which equipment, services, or records were examined during the inspection.</p>			

REPORT NO.:	INSPECTION RESULTS:	PAGE 2 of 2
<p>A. <u>VIOLATIONS</u>: 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.</p> <p>B. <u>NONCONFORMANCES</u>: 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.</p> <p>C. <u>UNRESOLVED ITEMS</u>: 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.</p> <p>D. <u>STATUS OF PREVIOUS INSPECTION FINDINGS</u>: 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.</p> <p>E. <u>OTHER FINDINGS OR COMMENTS</u>: 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.</p> <p style="text-align: center;">SAMPLE PAGE (EXPLANATION OF FORMAT AND TERMINOLOGY)</p>		

CONTRACTOR 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 29, 1983
Westinghouse NTD	WCAP-8370	Revision 10/6A	August 28, 1984
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 10	May 4, 1984
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 6	March 31, 1977
General Electric Company	NEDO-11209-04A	N/A	May 24, 1983
Sargent & Lundy Engineers	SL-TR-1A	Revision 5	May 17, 1979
Bechtel - Los Angeles	BQ-TP-1	Revision 3A	December 20, 1982
Gilbert/Commonwealth	GAI-TR-106	Revision 3	May 24, 1984
Bechtel - Ann Arbor	BQ-TP-1	Revision 2A	May 7, 1981



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

(ADDRESSEE)

Gentlemen:

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

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

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

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

(ADDRESSEE)

-2-

(DATE)

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

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

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

Sincerely,

Director
Division of Quality Assurance,
Safeguards, and Inspection Programs
Office of Inspection and Enforcement

ORGANIZATION: ALLIED C & D POWER SYSTEMS
PLYMOUTH MEETING, PENNSYLVANIA

REPORT NO.: 99900765/84-01	INSPECTION DATES(S) 7/24-27/84	INSPECTION ON SITE HOURS: 20
CORRESPONDENCE ADDRESS: Allied C & D Power Systems ATTN: Mr. G. C. Branca Director, Quality Assurance 3043 Walton Road Plymouth Meeting, PA 19462		
ORGANIZATIONAL CONTACT: Mr. G. C. Branca, Director, QA TELEPHONE NUMBER: (215) 828-9000		
PRINCIPAL PRODUCT: Batteries, Chargers, and Battery Racks. NUCLEAR INDUSTRY ACTIVITY: Less than 3%		
ASSIGNED INSPECTOR:	<u>R. E. Oller</u> R. E. Oller, Reactive Inspection Section (RIS)	<u>8-13-84</u> Date
OTHER INSPECTOR(S):		
APPROVED BY:	<u>E. W. Merschoff</u> E. W. Merschoff, Chief, RIS	<u>8-21-84</u> Date
INSPECTION BASES AND SCOPE: A. <u>BASES</u> : Appendix B to 10 CFR Part 50 and 10 CFR Part 21. B. <u>SCOPE</u> : This inspection was performed to evaluate the QA program implementation in the areas of: status of previous inspection findings; QA program; 10 CFR Part 21, and battery rack manufacturing process control. In addition, a followup was made of a potential (continued on next page)		
PLANT SITE APPLICABILITY: Battery case cracking - 50-458		

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(continued)

10 CFR Part 50.55(e) report by Gulf States Utilities River Bend Station concerning cracking in plastic cases of Model 3DCU-9 batteries manufactured by C & D Batteries and furnished by GE to River Bend.

A. VIOLATIONS:

None

B. NONCONFORMANCES:

None

C. UNRESOLVED ITEMS:

It could not be verified whether or not the River Bend rack was fabricated to specifications, as C & D was unable to furnish the manufacturing records without their customer's purchase order number. This item remains open pending the obtaining of the required P.O. number.

D. STATUS OF PREVIOUS INSPECTION FINDINGS:

(Closed) Violation (Report No. 82-01): Allied C & D Power Systems (C & D) management had failed to adopt a documented procedure as required by paragraph 21.21 of 10 CFR Part 21. During this inspection the NRC inspector verified that C & D had developed and implemented "Standard Policy and Procedures No. A-14", dated March 15, 1982. This procedure was distributed (with acknowledgement receipt required) to all C & D Officers, Executive Management, Department Heads, Plant Managers, and C & D agents on or before April 2, 1982.

E. OTHER FINDINGS OR COMMENTS:

1. Quality Assurance Program:

The NRC inspector reviewed C & D's Quality System Program Policy Manual to verify that an adequate documented quality assurance program was in effect to control the manufacturing activities with regard to batteries, racks and chargers.

The C & D corporate activities are located in Plymouth Meeting, Pennsylvania, stationary batteries for nuclear service are manufactured

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at the Attica, Indiana and Conyers, Georgia plants, and battery racks are manufactured at the East Greenville, Pennsylvania plant. A review of the procedures available for each plant verified that appropriate general, quality and manufacturing type procedures specific to each plant, were available. The East Greenville procedures were reviewed at that plant.

Within this area, no nonconformances were identified

2. 10 CFR Part 21:

Review verified that C & D reporting procedure No. A-14 was adequate, available, and appropriately distributed through out the company.

Within this area, no violations were identified.

3. Battery Rack Manufacturing Process Control:

On July 26, 1984, the NRC inspector visited the C & D East Greenville, Pennsylvania rack manufacturing plant. This facility is located approximately 40 miles northwest of the corporate office.

The NRC inspector observed the sequence of standard rack fabrication activities including: (a) material receiving and inspection; (b) shearing, punching/drilling and inspection; (c) layout, fitup, tack and seam welding and inspection; (d) identification stamping and epoxy coating; (e) final dimensional inspection, and (f) packaging. At each operation the QC inspectors approved the work by signing/stamping off on a green tag attached to the item. For seismic IE rack fabrication the materials are pulled from accepted stock and assigned an invoice number. All parts of the rack are then fabricated in accordance with a drawing and a bill of material. There were no IE seismic racks in process during this inspection.

A review was made of: nonconforming work reports; a final dimensional inspection procedure; a welding procedure and the related ASME Section IX qualification records; and training and qualification records for 15 fitup and/or welding personnel.

Within this area, no nonconformances were identified.

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4. Cracked Battery Cell Cases at River Bend:

a. Introduction:

On March 19, 1984, Gulf States Utilities River Bend Station (GSU) reported a potential 10 CFR 50.55(e) construction deficiency (CDR). Several batteries used for the diesel generator for the high pressure core spray system were found to have cracks in the cell casings. The entire set of 20, Type 3DCU-9 batteries were manufactured by Allied C & D Power Systems (formally C & D Batteries). GSU has not sent a final CDR to the NRC.

b. Findings:

From discussions with C & D management and a review of documents, the NRC inspector learned that General Electric personnel at San Jose and River Bend had talked by telephone in February 1984 with the C & D Contract Administrator concerning the cracked battery cases. GE sent several of the cracked battery cases to C & D for evaluation. The defective cases were not available for examination by the NRC inspector. GE had indicated to C & D that the rack in which the batteries were mounted was dimensionally undersized and this had caused installation difficulties. Additionally, GE did not have the latest C & D installation instructions. GE proposed a field fix to enlarge the rack dimensions by 1/8 inch and submitted a written procedure which C & D approved.

C & D further informed the NRC inspector that they had concluded that the battery case defects were due to stress cracking at the front center where the seismic rack front retaining rail presses against the cases and these stress cracks were due to pressure applied by overtightening the rail during field installation. Since C & D had determined the cause of the cracking and decided that it was an isolated occurrence with no generic effects, they did not see the need for a 10 CFR Part 21 report to the NRC. The NRC inspector examined C & D sketches and photographs of the cracked cases. The manufacturing records for the River Bend rack were not available to the NRC inspector. The C & D management indicated they could not find these records without their customer's purchase order number. Consequently, the NRC inspector was unable to verify whether or not the rack was manufactured to specifications.

On August 1, 1984, the NRC inspector talked by telephone with responsible GE personnel in San Jose, and learned that the original

ORGANIZATION: ALLIED C & D POWER SYSTEMS
PLYMOUTH MEETING, PENNSYLVANIA

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River Bend HPCS diesel generator batteries had been replaced twice in the original seismic rack. The first set of batteries were improperly charged and the second set were cracked. The third and current set were put in the rack in 1984 after the rack was field expanded 1/8 inch, to relieve pressure on the cases. All three of the field installations had been performed by Stone and Webster for GSU.

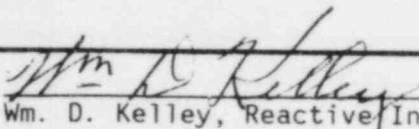
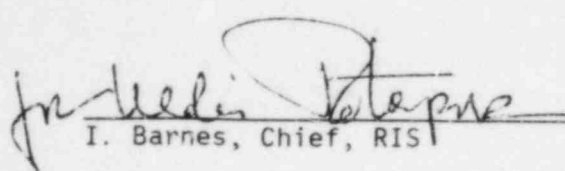
On August 2, 1984 the NRC inspector talked by telephone with a responsible GSU representative at River Bend. The Information provided confirmed the facts stated above from C & D and GE.

c. Conclusions:

The cracking of the Type 3CUD-9 battery cases appears to have resulted from a combination of an undersized rack and/or excessive pressure exerted on the cases by overtightening the seismic rack horizontal retaining rail during field installation. No records were available to verify whether or not this type and cause of cracking had occurred at other nuclear power generating stations. The C & D management indicated they considered it an isolated incident as related to battery and rack sets manufactured by them.

The cause of the undersized rack remains an unresolved item pending obtaining the needed P.O. number and further inspection at C & D concerning the rack fabrication.

ORGANIZATION: ANCHOR DARLING VALVE COMPANY
WILLIAMSPORT, PENNSYLVANIA

REPORT NO.: 99900053/84-C1	INSPECTION DATE(S): 6/4-7/84	INSPECTION ON-SITE HOURS: 22
CORRESPONDENCE ADDRESS: Anchor Darling Valve Company ATTN: Mr. A. E. Caron President 701 First Street Williamsport, Pennsylvania 17701		
ORGANIZATIONAL CONTACT: Mr. G. W. Kneiser, Quality Assurance Manager TELEPHONE NUMBER: (717) 323-6121		
PRINCIPAL PRODUCT: Nuclear valves.		
NUCLEAR INDUSTRY ACTIVITY: The Anchor Darling Valve Company's (ADVC) contribution to the nuclear industry represents approximately 40 percent of its total workload.		
ASSIGNED INSPECTOR:	 Wm. D. Kelley, Reactive Inspection Section (RIS)	7/3/84 Date
OTHER INSPECTOR(S):		
APPROVED BY:	 I. Barnes, Chief, RIS	7/3/84 Date
INSPECTION BASES AND SCOPE:		
A. <u>BASES</u> : 10 CFR Part 21 and 10 CFR Part 50, Appendix B.		
B. <u>SCOPE</u> : This inspection was made as a result of: (1) the issue of a 10 CFR Part 50.55(e) report by the Kansas Gas and Electric Company (KG&E) concerning the potential failure of essential service water valve that had been furnished to the Wolf Creek Generating Station; (2) the issue of Information Notice No. 83-70 by the Nuclear Regulatory Commission concerning vibration induced valve failures at Commonwealth Edison (continued on page 2)		
PLANT SITE APPLICABILITY:		
(1) Valve potential failure to close, 50-482; (2) vibration induced valve failures, 50-254, 50-265, and 50-295; (3) valve failure to open, 50-155; and (4) check valve potential failure to close, 50-482 and 50-483.		

REPORT NO.: 99900053/84-01	INSPECTION RESULTS:	PAGE 2 of 6
<p><u>SCOPE:</u> (continued) Company (CEC), Quad-Cities Station, Units 1 and 2, and Tennessee Valley Authority (TVA), Browns Ferry Nuclear Power Station, Unit 3; (3) the issue of a preliminary notification of an unusual occurrence by Consumers Power Company (CPC) concerning the failure of reactor depression system valves that had been furnished to Big Rock Point Nuclear Power Station; and (4) the issue of a 10 CFR Part 50.55(e) report by Standardized Nuclear Unit Power Plant System (SNUPPS) concerning the potential failure of component cooling water valves that had been furnished to the KG&E, Wolf Creek Generating Station and the Union Electric Company (UEC), Callaway Plant, Unit 1. Additional areas inspected include status of previous inspection findings and inspection and test control.</p> <p>A. <u>VIOLATIONS:</u></p> <p>None</p> <p>B. <u>NONCONFORMANCES:</u></p> <p>Contrary to Criterion V of Appendix B to 10 CFR Part 50, paragraph 4.4.3.1 of the ASME accepted Quality Assurance Manual (QAM) and the Material Rejection Notice (MRN), ADVC, when notified by Namco Controls that certain Model EA-180 limit switches had been assembled with the wrong cover gasket materials, did not identify the discrepant gasket material on an MRN, describe the corrective action to prevent recurrence and disposition of the discrepant gasket material, or secure approval of the material review board.</p> <p>C. <u>STATUS OF PREVIOUS INSPECTION FINDINGS:</u></p> <p>1. (Closed) Nonconformance (Report No. 99900053/83-02, Item A): A note which was not initialed or dated was added to PRT E9982-002-801 for drilling and tapping of a 1-inch (ips) hole in a 20-inch, 150-pound stop check valve body.</p> <p>The NRC inspector reviewed interoffice correspondence and training records and verified that the responsible ADVC personnel had been reinstructed on the necessity to initial and date changes to PRTs.</p> <p>2. (Closed) Nonconformance (Report No. 99900053/83-03): 12 inch, 150-pound flex wedge gate valves (Shop Order No. E3092-6, Serial Nos. E3092-1-1, -1-2, and -6-2) were observed to have been inspected and accepted which contained a backface radius less than the minimum specified 1/8-inch value.</p>		

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The NRC inspector reviewed a MRN and training records and verified that the material review board had approved the disposition to "use as is" based on an engineering evaluation and the inspectors had been given additional training.

D. OTHER FINDINGS OR COMMENTS:

1. Potential 10-inch Gate Valve Failure at the KG&E Wolf Creek Generating Station-

- a. The problem reported was the potential failure of a gate valve installed in vertical piping systems to close due to disengagement of the gate from the gate guides.
- b. The NRC inspector reviewed the Bechtel Power Corporation (BPC), Gaithersburg Division design specification and verified that the specification did not state that gate and globe valves would be installed in vertical piping system with the stems horizontal, however, the specification did require the swing check valves be capable of being adjusted to operate in a vertical or horizontal piping system.
- c. The NRC inspector verified by review of internal documentation that as a result of abnormal occurrences reported by CEC, LaSalle County Station in 1979, ADVC performed an evaluation of the significance of gate valves installed in vertical piping systems and notified their customers, as required by 10 CFR Part 21, that gate valves installed in vertical piping systems required modification of the gate guides.
- d. The NRC inspector reviewed correspondence and verified that BPC had notified ADVC on March 21, 1980, of five gate valves installed in vertical piping systems which had the possibility of an operability problem.
- e. BPC notified ADVC on March 16, 1984, that another 10-inch, 150-pound gate valve had been installed in a vertical piping system. The NRC inspector reviewed the ADVC Field Service Report S. O. No. 270 and verified that disc guide extensions had been installed in the valve at the plant on May 15-17, 1984, by ADVC service personnel in accordance with ADVC drawing 4337-3.
- f. The NRC inspector reviewed three gate valve body drawings revised in January 1980, and verified that the barrel of the valve body had been elongated to accommodate longer gate guides. This should preclude the possibility of the gate becoming misaligned in valves furnished after January 1980.

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2. Vibration-Induced Valve Failures-

- a. The problem reported was valve failures due to vibration - induced-loosening of fasteners.
- b. The NRC inspector reviewed five valve maintenance manuals for gate, globe, and check valves and verified that: (1) locking tabs were used to prevent the rotation of swing check valve internal cap screws; (2) the nuts holding the check valve disc to the disc arm were pinned to prevent rotation; and (3) all valve manuals recommended that all external bolting torque be checked at regular intervals (not longer than 6 months).

The manuals recommend that the customers periodic inspection program included inspection of body-bonnet and bonnet-yoke bolting.

- c. The manuals recommend that excessive rust not be allowed to build up on body-bonnet bolting of bolted bonnet valves.
- d. The last maintenance manual in the series for tilting disc check valves was at the graphic artist and will be issued upon completion.

3. SNUPPS Final 10 CFR Part 50.55(e) Report Concerning Galling of Hinge Pins and Disc Bushings-

- a. NRC Inspection Report No. 99900053/83-02 discussed ADVC's determination that the galling of the hinge pin disc bushing was reportable under 10 CFR Part 21 requirements.
- b. The report identified that the Type 416 stainless steel bushings had been replaced with Stellite-6 bushings in the four 20-inch, 150-pound tilting disc check (TDS) valves and two of the four 14-inch, 900-pound TDS valves furnished KG&E Wolf Creek Generating Station.
- c. The NRC inspector reviewed three ADVC Field Service reports and seven certificates of compliance for hinge pin bushings and hinge pins and verified that the ADVC service personnel had replaced the galled parts on the four 20-inch, 150-pound TDS valves and the four 14-inch, 900-pound TDS valves furnished UEC, Callaway Plant, Unit 1.

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<p>d. The NRC inspector reviewed an ADVC Field Service report, two Daniel International Corporation Nonconformance Reports, and KG&E startup reports and verified that the ADVC service personnel had replaced the galled parts on the four 20-inch, 150-pound TDS valves, and the four 14-inch, 900-pound TDS valves furnished KG&E Wolf Creek Plant.</p> <p>4. <u>Valves Furnished CPC Big Rock Point Nuclear Power Station Stuck in Closed Position-</u></p> <p>a. The problem reported was a valve failure to open during test due to the gate being stuck in the valve body in the closed position.</p> <p>b. The NRC inspector reviewed the Suntac Nuclear Corporation (SNC) design specification, valve specification sheet, and ADVC-Hayward drawing and verified that a 6-inch, 1500-pound fail open, ASME Section III, Class I gate valve was specified in the design specification and a split wedge gate valve was furnished by ADVC-Hayward.</p> <p>The valve operability test required by CPC was three open-close cycles with the upstream side of the disc pressurized to 105 percent of the design pressure.</p> <p>The thermal transient specified was instantaneous temperature rise from 70°F to 250°F held for 10 hours, followed by a decrease from 250°F to 70°F with a pressure rise from 0 to 1470 fasing and return to 0.</p> <p>c. The NRC inspector was informed by ADVC Williamsport management that CPC had contacted an ADVC Chicago, Illinois, sales representative concerning the valve being stuck in the closed position. ADVC marketing gave a price over the telephone for replacing either the valve or valve and actuator using the double disc design. The NRC inspector was informed that neither engineering nor field service had been contacted by the CPC for evaluation or service of the valve.</p> <p>5. <u>Invalidated Qualification of NC Limit Switches Furnished WPPSS Washington Nuclear Project, Unit 1-</u></p> <p>a. NC notified ADVC on August 30, 1979, that their Model EA-180 limit switches with date codes 02-79 through 08-79 had a top cover gasket which emitted a resin vapor at temperatures above 175°F. NC recommended the top cover gasket be replaced and the contacts cleaned on limit switches subjected to a continuous ambient temperature greater than 175°F.</p>		

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b. ADVC stated they had inspected all NC Model EA-180 limit switches in stock and changed the cover gasket on all switches with date codes 02-79 through 08-79 inclusive; however, no NRN was generated. This was identified as a nonconformance (see paragraph B).

c. The NRC inspector reviewed correspondence and verified that: (1) United Engineers and Constructors, Inc., had been notified of the invalidated qualification of limit switches furnished to WPPSS Washington Nuclear Project, Unit 1; (2) WPPSS identified 108 NC Model EA-180 limit switches that required a replacement cover gasket; and (3) ADVC supplied 108 acceptable replacement cover gaskets.

6. Inspection and Test-

The NRC inspector reviewed the QAM, drawings, gages, and nonconformance reports and verified that current drawings were available to the inspector, all gages audited had been calibrated and the calibration was current and the inspector's findings had been recorded on nonconformance reports.

ORGANIZATION: BAILEY CONTROLS COMPANY
WICKLIFFE, OHIO

REPORT NO.: 99900224/84-02	INSPECTION DATE(S): 8/20-24/84	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. W. B. Fellner, Senior Project Manager TELEPHONE NUMBER: (216) 585-8500		
PRINCIPAL PRODUCT: Recording and indicating devices, sensors, 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 nuclear purchase order agreements are with Bechtel Corporation for Hope Creek Nuclear Generating Plant (NGP) and Babcock and Wilcox for Bellefonte NGP. These orders presently extend through the first quarter of 1986.		
ASSIGNED INSPECTOR:	<u>L. B. Parker</u> L. B. Parker, Equipment Qualification Section (EQS)	<u>9-12-84</u> Date
OTHER INSPECTOR(S):		
APPROVED BY:	<u>U. Potapovs</u> U. Potapovs, Section Chief, EQS	<u>9-13-84</u> Date
INSPECTION BASES AND SCOPE		
A. <u>BASES</u> : 10 CFR Part 21 and 10 CFR Part 50, Appendix B.		
B. <u>SCOPE</u> : Inspected, evaluated, and verified the continuing implementation of Quality Assurance (QA) requirements and procedures in the equipment qualification program; and 10 CFR Part 21.		
PLANT SITE APPLICABILITY: Not identified.		

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A. <u>VIOLATIONS:</u>		
<p>Contrary to Section 21.31 of 10 CFR Part 21, BCCo did not impose the requirements of 10 CFR Part 21 on subcontract purchase order (PO) No. T 1095.</p>		
B. <u>NONCONFORMANCES:</u>		
<p>Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 4.8 of specification SP-1101-54-021, Revision 0, BCCo failed to calibrate a pressure gauge used during high energy line break (HELB) testing.</p>		
C. <u>UNRESOLVED ITEMS:</u>		
<p>Test reports RDI-BCO-QTR-001 (by BCCo subcontractor) and QR-5201-25H [by BCCo Quality Test Laboratory (QTL)] reported on the same HELB testing of a Conoflow I/P Transducer with Airpak filter-regulator. RDI-BCO-QTR-001 states testing was performed in accordance with IEEE Standard 323-83. QR-5201-25H states that IEEE Standard 323-74 was applicable.</p>		
<p>BCCo did not have a copy of IEEE 323-83 available at the time of the inspection. Also, an evaluation of the differences between IEEE 323-83 and IEEE 323-74 had not been performed.</p>		
<p>The problem of compatibility of testing under IEEE 323-83 and IEEE 323-74 will be resolved at a future inspection of the BCCo QTL.</p>		
D. <u>OTHER FINDINGS OR COMMENTS:</u>		
1. <u>QA Program Implementation Review:</u>		
<p>The NRC inspector reviewed three lab book files Q467, Q692, and Q825. These files contained POs, test procedures, qualification test plans, test reports and other documentation pertinent to the concerned testing. The NRC review was to determine whether these lab book files met the requirements of the BCCo QTL QA program specifically those concerning criterion III Design Control, IV Procurement Document Control, V Instructions, Procedures and Drawings, and XV Nonconforming Materials, Parts or Components.</p>		

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- a. Lab book files Q467 and Q692 were mild environment testing of a terminal panel and switch module respectively. The report audit and lab book file review had been completed on Q692. No nonconformances were identified.
 - b. Lab book file Q825 was for HELB testing conducted by a BCCo subcontractor on a Conoflow I/P transducer with Airpak filter-regulator. Nonconformance B and unresolved item C were identified.
2. 10 CFR Part 21 Review:
- The NRC inspector evaluated BCCo's compliance with 10 CFR Part 21 requirements by examining (a) posting and (b) a PO. The violation described in paragraph A was identified.

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LOS ANGELES POWER DIVISION/HOUSTON AREA OFFICE
LOS ANGELES, CALIFORNIA

REPORT: NO.: 99900521/84-02	INSPECTION DATE(S): 6/4-8/84	INSPECTION ON-SITE HOURS: 85
CORRESPONDENCE ADDRESS: Bechtel Power Corporation Los Angeles Power Division/Houston Area Office ATTN: Mr. L. G. Hinkleman P.O. Box 60650 Terminal Annex Los Angeles, California 90060		
ORGANIZATIONAL CONTACT: Mr. R. Dotterer TELEPHONE NUMBER: 713-235-5266		
PRINCIPAL PRODUCT: Architect - Engineering Services		
NUCLEAR INDUSTRY ACTIVITY: The total effort committed to domestic nuclear activities is nearly all of the 800 person staff within the Houston Area Office of the Los Angeles Power Division. The area office currently is providing principal Architect-Engineering and construction management services for the two (2) unit South Texas Project.		
ASSIGNED INSPECTOR:	<u>P. D. Milano</u> P. D. Milano, Vendor Program Branch	<u>8/1/84</u> Date
OTHER INSPECTOR:	D. G. Breaux, Vendor Program Branch S. Sadick, EG&G Idaho, Inc.	
APPROVED BY:	<u>Gary G. Zech</u> Gary G. Zech, Chief, Vendor Program Branch	<u>8/13/84</u> Date
INSPECTION BASES AND SCOPE:		
A. <u>BASES</u> : 10 CFR Parts 21 and 50, Appendix B.		
B. <u>SCOPE</u> : Computer code development and use, design change control, and Followup on actions resulting from previous Bechtel deficiency reports.		
PLANT SITE APPLICABILITY: 50-498, 50-499		

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A. VIOLATIONS

None

B. NONCONFORMANCES

1. Contrary to the requirements of Criterion V of 10 CFR 50, Appendix B, and Section 16 of the Bechtel Topical Report, BQ-TOP-1, documentation of corrective action resulting from computer program errors is not specified in the Bechtel Engineering Department Procedure EDP-4.38.

C. UNRESOLVED ITEMS

1. Section 4.3.2 of the South Texas Project General Project Requirements GPR-2.25, Revision 1, dated August 24, 1983, "Standard Design Review, Technical Audit and Independent Design Review," states, in part, that the independent design "reviews will be performed on a schedule developed by the BPC Manager of Engineering." The inspector requested a copy of the schedule for review. However, the independent design review schedule was not made available prior to the completion of the inspection. A future inspection should verify the existence and utilization of this schedule.
2. Section 4.3.5, Reporting, of the General Project Requirements GPR-2.25, Revision 1, dated August 24, 1983, "Bechtel STP Engineering Design Review Plan," did not require the followup and closeout of all findings resulting from the Independent Design Reviews. A draft copy of revision 2 to GPR-2.25 provides, in new section 4.2.5, that "(d)uring the review period, significant comments from the review team will be provided to the project in writing and if meetings are held, minutes will be prepared showing the resolution of comments or reference to the Project Action Item List." A future inspection should verify that the proposed method provides sufficient documentation and reporting to appropriate levels of management for the identification of the condition, the cause of the condition, and the corrective action taken.
3. The Data Processing Library Program Control Form with the attached Release/Announcement Notice is provided as a manual cover sheet for the computer program User and Theoretical Manuals. The announcing notice for the release of Bechtel computer program "BSAP" (CE 800), Version

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E15-49, provided a synopsis of twelve (12) problems that this version corrected. Two (2) of these problems, numbers E14-02 and E14-03, corrected errors that had been noted in the BSAP Error Report Number 84-01. Several of the remaining problems appeared to be of a nature that error reports, as required by Bechtel Engineering Department Procedure EDP-4.38, Revision 0 STP, dated January 13, 1984, "Computer Program Error Reporting and Corrective Action," should have also been prepared. The inspector requested that either error reports, or the reasons for these reports not being required, be provided. However, a response to this request could not be provided prior to the completion of the inspection. A future inspection should obtain the requested documentation.

4. The Computer Program Error Report, Number 83-16, issued September 12, 1983, stated in section 16, "Correction Notice/Final Disposition", that the error was corrected by the current J4 version of Computer Program, Linear Elastic Analysis of Piping Systems (ME101). Similarly, Error Report, Number 83-17, issued September 12, 1983, also stated in section 16 that the error was corrected in version J4 of the program. However, the Release Notice attached to the Data Processing Library Program Control Form issued January 20, 1984, stated that the above errors were corrected in the J5 version of the program. The NRC inspector requested clarification as to the actual date of corrections to the program. This information was not provided prior to the completion of the inspection, and should be reviewed in a future inspection.

D. STATUS OF PREVIOUS INSPECTION FINDINGS:

None

E. OTHER FINDINGS OR COMMENTS:

1. Computer Code Development and Use: The applicable procedures and instructions were reviewed to ensure that computer codes used in the design and analysis of structures, systems, and components important to safety are developed and used in accordance with NRC requirements and guidance and that a system is available and adequate to ensure that the NRC is notified of matters reportable under NRC regulations. These matters may include computer code errors. To ensure the proper development and use of computer codes, the NRC inspector reviewed the documentation for four Bechtel and one non-Bechtel developed computer programs, and the related Engineering Department Procedures. The inspection was divided in four specific areas:

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- a. Qualification of computer codes
- b. Indoctrination and training of code users
- c. Use and maintenance of computer codes and documentation
- d. Program error notification and corrective action

The requirements for the verification, documentation, and control of Standard Computer Programs (SCPs) used by Bechtel Engineering for calculations and analyses are described in Bechtel Engineering Department Procedure EDP-4.36, Revision 1, dated September 26, 1980, "Standard Computer Programs." These programs are used without detailed description and verification in the calculation packages. To support the documentation requirements of the procedure, each computer program, including those developed outside Bechtel Power Corporation, must have a User Manual, Theoretical Manual, and Verification Report to assure technical quality and appropriate use. The available manuals in the Houston Area Office for the following programs were reviewed: Spectra-Response Spectra Analysis (CE 802), Linear Elastic Analysis of Piping Systems (ME 101), Bolt (CE 050), and Baseplate II (CE 035). During this review, it was noted that the Theoretical Manual for the Baseplate II program did not exist. However, further examination of the usage of this program by the Pipe Stress and Support Group revealed that some information relating to use and limitations existed in the Pipe Support Design Criteria Manual.

The Verification Report for the computer program SPECTRA, which transforms time histories into acceleration response spectra, indicated that this code had been verified using time histories such as ramp and sinusoidal functions. This computer program verification could have been improved by using a time history of a standard earthquake.

The Engineering Department Procedure EDP-4.36 provides for a Technical Specialist for each computer program who is responsible for the technical integrity of the program. This includes "soundness of the theoretical basis, accuracy of results, adequacy and completeness of documentation and recommendations for modifications." The Technical Specialist reports to a Program Sponsor who is responsible for overall direction of program activities. As a followup in a future NRC inspection, the functions of these individuals should be reviewed to verify the adequacy of the implementation of these verification requirements.

During the review of computer program documentation, general deficiencies with respect to documentation control were noted. The Data Processing Library Program Control Form is used as a manual cover sheet and provides information relating to the current version of the program. For the computer program SPECTRA, the control forms on the User and Theoretical Manuals that were provided for review indicated

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the current version was F3-6. However, the correct version was G2-8, as indicated on the control form attached to the Verification Report. The User Manual also had penciled changes to two pages, 3-20 and A-9. In addition, none of the above manuals had a document control copy number whereas one was utilized on the copy of the manuals provided for program, Linear Elastic Analysis of Piping Systems (ME101) (i.e. number 725). A future inspection should review the document control system for these manuals and reports to ensure that the necessary controls are being utilized.

Engineering Department Procedures EDP-2.10, Revision 0 STP, dated August 12, 1982, "Engineering Management," and STP General Project Requirement GPR 2.22, Revision 4, dated April 4, 1984, "Indoctrination and Training," delineate the requirements for technical development and training for the professional engineering staff. However, formal training is not provided and documented for computer code users prior to performing design activities utilizing computer programs.

The computer code error reporting procedures and system were reviewed. During this review it was noted that the Computer Program Error Notification form (i.e. Error Report) provides only for acknowledgement of receipt of the form and acceptance of the responsibility for taking the appropriate preventive or remedial action regarding design calculation. The recommended actions to be conducted by the program user upon receipt of the error report are provided by Engineering Department Procedure EDP-4.38. However, this procedure does not require documentation of the corrective actions that may be taken regarding errors that affect design calculations.

The NRC inspector requested error reports for the computer program BSAP (CE800). However, the Information Services Library in the Houston Area Office does not maintain a file or listing of error reports for programs being utilized in this office. Thus, the request was forwarded to the Central Information Services Library at the San Francisco Power Division. These documents were not provided prior to the completion of the inspection.

Since a portion of the design was conducted by the previous architect-engineering firm, Brown and Root, utilizing computer programs under their control, the processing of error reports from Brown and Root was reviewed. The client, Houston Light and Power, receives and processes the reports, when supplied by Brown and Root under the requirements of 10 CFR 21 or 10 CFR 50.55 (e). Houston Light and Power performs no verification by audit or other means of the Brown and Root reporting process.

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Within this area of the inspection, one (1) nonconformance and two (2) unresolved items were identified.

2. Design Change Control: The South Texas Project Engineering Department Procedures were reviewed to verify that the system described was consistent with the commitments in the South Texas Project Quality Assurance Program Description and applicable regulatory commitments. The NRC Inspector reviewed the procedures that control the review and approval of field requested changes. While the field changes are requested by the constructor, Ebasco Services, Inc., only those requirements placed on Bechtel were reviewed. The review of this area indicated that the system is being managed satisfactorily.

In addition to field changes, the procedures for requesting changes to Bechtel design documents by suppliers were reviewed. During this review, it was noted that the method for requesting these changes from the supplier, Nuclear Power Services, Inc., was by means of Manufacturing Change Requests (MCRs) and Shop Information Requests (SIRs) rather than by utilizing the Bechtel Supplier Deviation Disposition Requests (SDDRs). Project Engineering Directive PED-024, Revision 0, dated April 10, 1984, "Closure of NPSI SIRs and MCRs," provides for the establishment of the method for processing the MCRs and SIRs. In this directive, the Bechtel Pipe Stress and Support Group revises the pipe support drawings as required to close these changes documents. However, unlike the procedure for control of SDDRs, the Project Engineering Directive, PED-024, is a non-Q document and does not address all the areas delineated in EDP-4.63 Revision 4 STP, dated October 17, 1983, Supplier Deviation Disposition Request. This aspect could create confusion unless the appropriate engineering personnel are aware, such as by reference, in the directive to other procedures that must also be considered.

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

3. Pipe Stress Analysis of the RHR/SI System: A 10 CFR 50.55(e) report was issued by Houston Lighting and Power (HL&P) to the NRC on December 28, 1983, concerning the pipe stress analysis design process. The concern was based on a HL&P requested third party design assessment of the pipe stress analysis performed by Bechtel for the South Texas Nuclear Project (STP). The third party design assessment was conducted by Stone and Webster Engineering Corporation (SWEC), and raised several concerns relating to 1) the level of detail and technical guidance provided in design documents, 2) an apparent lack of documentation of open items/deviations in calculations, 3) adequacy of multidiscipline input for system design/modes of operation, and 4) the use of appropriate stress intensification factors. Following receipt of the SWEC Design Assessment

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Draft Report, a point by point validation of the SWEC comments was initiated by Bechtel. In order to test the extent and validity of selected SWEC comments, Bechtel performed a random sampling survey of pipe stress calculations. This sample included 10 percent of the completed safety related stress calculations from each of the three STP pipe stress design groups. Bechtel responded on May 4, 1984 to the SWEC assessment with a report in which Bechtel identified sixteen action items. The NRC inspector reviewed the Bechtel response and determined that all areas of concern were adequately addressed. The inspector also reviewed the status of the action items which were identified, and found that, as of the date of this inspection, twelve of the sixteen action items have been completed.

Bechtel also initiated an independent design review of the STP pipe stress design control process which was performed by Bechtel Power Management (BPM) in San Francisco. BPM transmitted the draft report of this design review to the STP management in March 1984. BPM concluded based on a February 17, 1984 memo, that "the present design procedure, along with the following changes which either have been implemented subsequent to the Design Assessment Review 83-3, or are proposed to be implemented on the project, are adequate for performing the piping stress analysis in line with the current Bechtel practice." The changes include:

- a. Mechanism for documenting and statusing open items resulting from each piping stress analysis, such as nozzle loads, valve accelerations etc., and procedure for closing all these open items.
- b. Ensuring the correct selection of stress intensification factors (SIF) of specific locations, including the identification of all components in the piping isometric drawings to which the SIF will be applied.
- c. Interdiscipline coordination which will ensure that all the significant modes of operations are included in the piping analysis per Project Engineering Directive, PED-022.
- d. Ensure that piping design specifications include all the required design data for performing the piping stress analysis.

The opinion of Bechtel STP engineering management is that none of the improvements being implemented on STP, as a result of either the SWEC or the BPM reviews, involve extensive redesign or repair. Both reviews concluded that there needed to be a system to assure that design calculations with preliminary input be identified and tracked to assure review of the final input data. To address this concern, Bechtel initiated an Interim Change Notice to procedure EDP 4.37 entitled, "Design Calculation." The NRC inspector reviewed this

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change and concluded that this system needed to be more specifically defined to assure that it is properly established and functioning. This is to be assessed by Bechtel and incorporated appropriately in the next revision to EDP 4.37. In a future NRC inspection the system of input data control will be assessed to assure that all commitments are incorporated and that the system is functioning.

Also during this area of the inspection the STP General Project Requirement GPR 2.25, Revision 1, dated August 29, 1983, "Bechtel South Texas Project Engineering Design Review Plan," was reviewed. No requirement existed in the procedure for followup of corrective action to findings from the Independent Design Reviews. However, a draft of revision 2 to this procedure was provided which requires some followup documentation which could include the Project Action Item List. In a future NRC inspection, the adequacy and implementation of the proposed documentation and tracking mechanism should be evaluated.

As another follow-up on a future inspection, the BPM independent design review will be studied in more detail. This will involve assessing the technical design concerns that were raised by this review, and the subsequent response to these concerns by STP project management. In this area of the inspection no nonconformances and one unresolved item were identified.

4. SNUPPS Design Deficiency in Field-Run Cables to Valcor Solenoid Valves -
A 10 CFR Part 21 notification on March 19, 1984, was transmitted to NRC Office of Inspection and Enforcement by Gaithersburg Power Division (GPD). This notification concerned field-run cable to solenoid valves that will not withstand internal valve housing operating temperatures. This concern was similar to Los Angeles Power Division (LAPD) Deficiency Evaluation Report (DER) dated July 15, 1983, concerning Valcor solenoid valve damage during startup activity at the Palo Verde Nuclear Project. These valves experienced damaged o-rings, melted wiring insulation, and indications of excessive heat to terminal blocks as a result of plant hot functional tests.

The NRC inspector attempted to determine what level of review had transpired through the LAPD office to assure that there was no similar concern with the STP. Prior to the NRC inspection an LAPD Problem Investigation Request (PIR) was generated on May 14, 1984, and transmitted to the STP. On May 24, 1984 STP Quality Engineering generated an action item request addressing a project response to this PIR. A response had not been formulated prior to the completion of this

ORGANIZATION: BECHTEL POWER CORPORATION
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<p>inspection. The inspector could not determine at the time of the inspection whether STP made an assessment of applicability to the earlier LAPD DER, that was generated in July 83, concerning the Palo Verde Project. A review of the results of the STP Quality Engineering action item request will be made in a future NRC inspection. In this area of the inspection no nonconformances or unresolved items were identified.</p>		

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

REPORT NO.: 99900522/84-02	INSPECTION DATE(S): 5/14-17/84	INSPECTION ON-SITE HOURS: 56
CORRESPONDENCE ADDRESS: Bechtel Power Corporation San Francisco Power Division ATTN: Mr. C. D. Stratton Vice President and General Manager Post Office Box 3965 San Francisco, California 94119 ORGANIZATION CONTACT: Mr. E. R. Nelson TELEPHONE NUMBER: (415) 768-0777		
PRINCIPAL PRODUCT: Architect-Engineering Services NUCLEAR INDUSTRY ACTIVITY: The total effort committed to domestic nuclear activities is approximately 95 percent of the 7400 person staff at the San Francisco Power Division (SFPD). The Division currently provides the principal architect-engineering services for four (4) domestic units: Limerick Units 1 & 2; Susquehanna Unit 2; and Hope Creek Unit 1. In addition, this division has the project management for Diablo Canyon Units 1 & 2; twelve (12) units under a modification/repair/service-type contract, and an engineering evaluation contract with an NSSS supplier.		
ASSIGNED INSPECTOR: <u>P. D. Milano</u> P.D. Milano, Vendor Program Branch		<u>6/15/84</u> Date
OTHER INSPECTOR(S): M. Subudhi, Brookhaven National Laboratory		
APPROVED BY: <u>Gary G. Zech</u> Gary G. Zech, Chief, Vendor Program Branch		<u>7/10/84</u> Date
INSPECTION BASES AND SCOPE: A. <u>BASES</u> : 10 CFR 50, Appendix B and 10 CFR Part 21. B. <u>SCOPE</u> : Computer code development and use, design change control, and followup on previous inspection findings.		
PLANT SITE APPLICABILITY: Docket Nos.: 50-352, 50-353, 50-354, and 50-388.		

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REPORT NO.: 99900522/84-02	INSPECTION DATE(S): 5/14-17/84	INSPECTION ON-SITE HOURS: 56
CORRESPONDENCE ADDRESS: Bechtel Power Corporation San Francisco Power Division ATTN: Mr. C. D. Stratton Vice President and General Manager Post Office Box 3965 San Francisco, California 94119 ORGANIZATION CONTACT: Mr. E. R. Nelson TELEPHONE NUMBER: (415) 768-0777		
PRINCIPAL PRODUCT: Architect-Engineering Services NUCLEAR INDUSTRY ACTIVITY: The total effort committed to domestic nuclear activities is approximately 95 percent of the 7400 person staff at the San Francisco Power Division (SFPD). The Division currently provides the principal architect-engineering services for four (4) domestic units: Limerick Units 1 & 2; Susquehanna Unit 2; and Hope Creek Unit 1. In addition, this division has the project management for Diablo Canyon Units 1 & 2; twelve (12) units under a modification/repair/service-type contract, and an engineering evaluation contract with an NSSS supplier.		
ASSIGNED INSPECTOR: <u>P.D. Milano</u> P.D. Milano, Vendor Program Branch		<u>6/15/84</u> Date
OTHER INSPECTOR(S): M. Subudhi, Brookhaven National Laboratory		
APPROVED BY: <u>Gary G. Zech</u> Gary G. Zech, Chief, Vendor Program Branch		<u>7/10/84</u> Date
INSPECTION BASES AND SCOPE: A. <u>BASES</u> : 10 CFR 50, Appendix B and 10 CFR Part 21. B. <u>SCOPE</u> : Computer code development and use, design change control, and followup on previous inspection findings.		
PLANT SITE APPLICABILITY: Docket Nos.: 50-352, 50-353, 50-354, and 50-388.		

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C. <u>UNRESOLVED ITEMS:</u> None.		
D. <u>STATUS OF PREVIOUS INSPECTION FINDINGS:</u> 1. (Closed) Nonconformance (A/84-01): Outstanding design change documents (Field Change Requests/Field Change Notices/Drawing Change Notices) were not being incorporated into the base design documents by the required due date. The inspector verified that Bechtel had completed the corrective action and preventative measures described in their letter of March 1, 1984. The Design Document Register (DDR) for the Hope Creek Project was reviewed to verify that the change authorization documents were not overdue for incorporation within the time limit specified in EDP 4.47 and EDP 4.62, unless specific exemptions were given by Project Engineering in writing. However, as part of the corrective action, the EDPs 4.47 and 4.62 were revised to relax the incorporation time requirement from no later than 90 to no later than 180 days have elapsed after the change document was issued. Although the limit was relaxed, the Hope Creek Project Engineer is maintaining the 90 day time limit, and has increased the incorporation status report to a bi-weekly frequency. A review of the latest two reports and the Design Document Register indicates that this self-imposed limit is being met. The number of drawing change notices (DCNs) that can be applied to a drawing prior to requiring incorporation in the base design document has been five. The revision to EDP-4.62 has now imposed this same requirement of five on the incorporation of Field Change Requests (FCRs). The NRC inspector reviewed the Design Document Register and verified that these limits are being maintained. While no limit has been applied to the number of Field Change Notices (FCNs) that may be outstanding against a design document, the review of the Design Document Register did not indicate that this has resulted in excessive numbers of FCNs remaining outstanding.		
2. (Closed) Nonconformance (B/84-01): Procedural requirements did not exist to ensure that the summary results of Hope Creek Project Audits are transmitted to the client's Quality Assurance Department.		

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The inspector verified that Quality Assurance Department Procedure C-9 had been revised to add the client's Manager-Quality Assurance to the audit report distribution. This distribution is accomplished by attachment of copies of project audit reports conducted during the reporting period to the Quality Assurance Activity Report. The previous two activity reports were reviewed to verify the audit reports were transmitted, and found satisfactory.

3. (Closed) Nonconformance (C/84-01): Project audits on the Hope Creek Project did not include a pre-audit conference or a post-audit conference. Also, project audit reports did not identify persons contacted during pre-audit, audit, and post-audit activities.

The requirements for the audit conferences and personnel identification had been different between the QA practices described in section 16 of the PSAR and Section 1.8.1.144 of the FSAR. Section 1.8.1.144 of the FSAR addresses the commitment to USNRC Regulatory Guide 1.144, Revision 1, and ANSI N45.2.12-1977. The inspector reviewed the change to the FSAR which added exceptions to Regulatory Guide 1.144 and ANSI N45.2.12 to make FSAR Section 1.8.1.144 agree with Section 16 of the FSAR. The review of these changes verified that these sections are now in agreement.

E. OTHER FINDINGS OR COMMENTS:

1. Computer Code Development and Use: The applicable procedures and instructions were reviewed to ensure that computer codes used in the design and analysis of structures, systems, and components important to safety are developed and used in accordance with NRC requirements and guidance and that a system is available and adequate to ensure that the NRC is notified of matters reportable under NRC regulations. These matters may include computer code errors. To assure the proper development and use of computer codes, the NRC inspector reviewed the documentation for one Bechtel and one non-Bechtel developed computer program, and the related Engineering Department and Information Services Department Procedures. The inspection was divided into three specific subject areas:
 - a. Qualification of computer codes
 - b. Indoctrination and training of code users
 - c. Program/System error notification and corrective action

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The master copies of the supporting documentation for the computer programs are maintained in the Central Information Services Library. During the NRC inspector's review of this area, it was found that the new version of the BSAP program, version E15-49, was implemented on May 10, 1984, but the users were not yet informed. This version change did not require a change to the User's Manual.

For computer codes developed outside the Bechtel organization, the technical verifications of the program are not performed by Bechtel prior to their approving the code for design use. However, Bechtel personnel do perform a documentation review at the sponsor organization and undergo an informal training program to learn the use of the code.

Bechtel's Nuclear Quality Assurance Manual (NQAM) requires that all Bechtel personnel performing quality related design, procurement or construction activities receive formerly documented training, indoctrination and qualification programs. However, non-Bechtel personnel providing the same services are not required to have formally documented training programs.

No specific procedures involving proper training and indoctrination of computer code user's were available in any Q-list procedure in the Engineering Department Procedure Manual. The Engineering Department Procedure EDP 5.19, Mainframe Computer Use and Cost, however, describes some specific concerns in educating the engineering personnel responsible for quality assurance of design activities utilizing computer codes. However, this procedure is classified by Bechtel as a Non-Q document.

The computer code error reporting procedures, system, and forms were reviewed. During this review, a portion of the system was found to be governed by the Information Services (I/S) Department under I/S Procedures 4256, Program Error, and 4241, System Error. Neither of these procedures are, however, O-list documents.

Within this area of inspection, four (4) nonconformances were identified (see B.1 to B.4).

2. Design Change Control: The Engineering Department Procedures and Project Instructions were reviewed to verify that the system described was consistent with the commitments of the Bechtel Quality Assurance Manual and applicable Regulatory requirements. This review was accomplished coincident with the evaluation and followup of the responses to nonconformances resulting from inspection 84-01. While Engineering Department Project Instruction

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SAN FRANCISCO POWER DIVISION
SAN FRANCISCO, CALIFORNIA

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<p>EDPI-4.47.1 was changed in Revision 3, dated April 26, 1984, to require that Drawing Change Notices (DCNs) be revised when "one hundred eighty days have lapsed since the issue of the first DCN against the current revision," the same change was not incorporated into EDP-4.46. EDP-4.46, Revision 3, dated May 27, 1976 still requires the DCN to be "incorporated no later than 90 days after issue of the DCN." A similar situation with procedural inconsistencies was noted between the requirements of Manager of Engineering Directive MED-4.46-0, Revision 13, Project Drawings, and EDPI 4.62.1, Revision 8, Hope Creek Field Change Request/Field Change Notice. In the MED 4.46-0 a supplemental requirement to EDP 4.46 was added to ensure that all outstanding changes be incorporated at the time of processing drawing revisions. However, EDPI 4.62.1 allows FCRs/SCRs/FCNs that have not surpassed the 60th day from approval to not be incorporated into the document revision.</p> <p>In addition to the above inconsistencies, it was noted that EDP 4.62 stated in section 2.2 that FCNs may make changes to "approved engineering drawings, specifications, or other design documents." Thus, the procedure could allow a change notice to modify another change notice. The NRC inspector found that this occurred with Hope Creek FCN C-12617 modifying FCN C-12367. While allowed, this practice could tend to promote confusion for the user of a design change document which itself has changes applied against it.</p> <p>The NRC inspector also interviewed various engineering discipline group supervisors to obtain an understanding of the process of updating design calculations due to field changes.</p> <p>Many changes occur with no actual change in the design calculation. However, no system is used to track the numbers of changes to design in this category since the last revision of the calculations. This system can aid the reviewer of a change document in his verification of the effect it may have in combination with the other changes, i.e., cumulative effect.</p> <p>Within this area of inspection, two (2) nonconformances were identified (see B.5 and B.6)</p>		

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

REPORT NO.: 99900289/83-01	INSPECTION DATE(S) 4/18-21, 6/7-10/83	INSPECTION ON-SITE HOURS: 78
CORRESPONDENCE ADDRESS: Borg-Warner Corporation ATTN: Mr. R. R. Testwuide Vice President and General Manager 7500 Tyrone Avenue Van Nuys, CA 91409 ORGANIZATIONAL CONTACT: Mr. P. Milinazzo, QA Manager TELEPHONE NUMBER: (213) 781-4000		
PRINCIPAL PRODUCT: Nuclear valves. NUCLEAR INDUSTRY ACTIVITY: Commercial nuclear production totals 40 percent of production.		
ASSIGNED INSPECTOR: <u>I. Barnes</u> for W. M. McNeill, Reactive and Component Program Section (R&CPS)		<u>6-14-84</u> Date
OTHER INSPECTOR(S):		
APPROVED BY: <u>I. Barnes</u> I. Barnes, Chief, R&CPS		<u>6-14-84</u> Date
INSPECTION BASES AND SCOPE:		
A. <u>BASES</u> : 10 CFR Part 50, Appendix B, and 10 CFR Part 21. B. <u>SCOPE</u> : This inspection was made as a result of receipt of a report that improper radiographic practices may have been used for nondestructive examination of weld preparation areas of valves that had been furnished to the Perry Nuclear Station site.		
PLANT SITE APPLICABILITY:		
50-440, 50-441, 50-445, 50-446.		

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<p>A. <u>VIOLATIONS:</u></p> <p>None</p> <p>B. <u>NONCONFORMANCES:</u></p> <p>1. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 10.8.1 of the QA manual, the NRC inspector established by review of gamma source radiographs of weld preparations (preps) that not all nondestructive examinations (NDE) were performed in accordance with Borg-Warner Nuclear Valve Division NVD written practice as illustrated by the following examples:</p> <ul style="list-style-type: none">a. A different exposure technique (time and/or distance) had been used for one of the views of valve 3E23, Serial No. (S/N) 2.b. Smaller penetrameters than those required by the procedure were used for valves 3K25, S/N 3; 3G09, S/N 44; 3G10, S/N 45; 3G14, S/N 49; 3G15, S/N 50; 3G16, S/N 51; 3W06, S/N 25; 3M22, S/N 13 and 4D82, S/N 12.c. Type B film, rather than the required Type 400, was found in the film packet applicable to valve 3W06, S/N 25 for 5 of the 12 films.d. The exposure technique was changed for some views from single wall to double wall exposure as noted by penetrameter changes and shadowing of the near side wall on the radiographs for valve 4D12, S/N 6.e. Different radiographers and exposure dates were noted on the film as compared to the reader/technique sheet for valves 1V67, S/N 40 and 1V67, S/N 41.f. The exposure dates on the film were after the reader sheet acceptance dates for valve 4N63, S/N 1.g. The required 4 percent sensitivity was not achieved for valves 4K78, S/Ns 65 and 67. <p>2. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 10.8.13 of the QA manual, the original qualification records for the one presently employed radiographer were not on file.</p>		

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C. UNRESOLVED ITEMS:

A number of radiographs of weld preps (e.g., 176 at the Perry site and others at the Borg-Warner facility) have been identified with an apparently enhanced penetrometer 4T hole image. Based on the available evidence, the enhancement appears to have resulted from radiography being performed utilizing film side penetrameters. The configuration of these weld preps did not make source side placement inaccessible and these films did not have a lead letter "F" imaged on them.

D. STATUS OF PREVIOUS INSPECTION FINDINGS:

1. (Open) Nonconformance (82-03, Item A): Drawings for valves were sent to procurement and QC without being checked by engineering.

This was not addressed during this inspection.

2. (Open) Nonconformance (82-03, Item B): Purchase orders for calibration were placed with three vendors not listed on the Approved Vendors List.

This was not addressed during this inspection.

E. OTHER FINDINGS OR COMMENTS:

PENETRAMEETER ENHANCEMENT:

1. Background: About 500 2½ inch and up safety-related gate, globe, and check valves were ordered by Cleveland Electric Illuminating Company (CEI) from NVD on Purchase Order No. P-1364-K. These valves were purchased to Section III of the ASME Code (1975 Winter addenda). Volumetric examination (i.e., radiography or ultrasonics, if feasible) of cast valve bodies is not required for Class 3 applications (ND-2571). Class 2 applications (NC-2571) require volumetric examination of cast valve bodies when the nominal pipe size of the inlet piping connection exceeds 4 inches. Radiographic examination of only weld preps is required in Class 2 applications (or, alternatively, use of a quality factor of 0.7 to valve pressure ratings) when the inlet piping connection has a nominal pipe size of over 2 inches to 4 inches. Volumetric examination is required for cast valve bodies of all sizes in Class 1 applications.
2. History: Radiography was performed by a subvendor at NVD from 1976 (beginning of nuclear work) to November 1978. The radiographs were interpreted and accepted by the NVD QA department inspectors. In

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NUCLEAR VALVE DIVISION
VAN NUYS, CALIFORNIA

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<p>November 1978, NVD acquired the subvendor's equipment and personnel. At that time, the radiographers (shooters) were placed under the production department, but were reorganized in August 1980 into the QA department. Four rooms were designated for gamma source radiography and three rooms for X-ray radiography. Cobalt 60 was used in general for heavy wall valve bodies. Iridium 192 was used for thinner wall sections and some weld preps. X-ray radiography was used for some weld preps and the thinnest wall sections. Availability determined whether a weld prep was radiographed using X-ray or Iridium 192.</p> <p>3. <u>Problem Definition:</u> During the week of March 28, 1983, at the Perry site, CEI personnel in review of radiographs of NVD valves welded into piping systems questioned the validity of NVD supplied radiographs of the weld preps. It appeared that the NVD radiographs had been artificially enhanced because of the observation of very sharp and dark penetrometer 4T hole images; yet no evidence of penetrometer 2T hole images. Logically, if a 4T hole was very visible on the radiograph, then it would follow that the smaller 2T should have some measure of visibility. Also, on some NVD radiographs, a ring of lesser density (i.e., "halo") was observed around the 4T hole image. CEI issued a 10 CFR 55.55(e) report on April 11, 1983, and sent a team of representatives to NVD to discuss their findings. CEI asked NVD to duplicate the technique used originally which could not be done. On April 15, 1983, NVD issued a 10 CFR Part 21 report to the NRC based on the Perry information.</p> <p>4. <u>First NVD Inspection:</u> On April 18-21, 1983, the NRC inspected the NVD Van Nuys facility and established it was NVD's practice to ship the radiographs with the valve to the customer. Only one customer was an exception to this practice. Reader/technique sheets, however, were available for review as well as other records such as material certifications, weld repair maps, etc. Records from a sample of five questionable valves supplied to the Perry site were reviewed. The Perry purchase order and its associated specifications and correspondence were reviewed. Also reviewed were, the employment histories of 23 radiographers employed by NVD. Only one radiographer is currently employed by NVD. A review of radiographs stored in-house for one customer established that the technique sheets were not fully followed by the radiographers. This was identified as a nonconformance (see B.1 above). It was also established that qualification records were not on file (see B.2 above).</p>		

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5. Perry Site: On April 27-28, 1983, the NRC inspected NVD radiographs at the Perry site and established that some 176 radiographs at the Perry site appeared to have been enhanced. CEI personnel identified other valves which created additional questions, e.g., wrong penetrometer, no radiographs, etc. It was established the 6 of the 23 radiographers were identified as responsible for about 80 percent of the radiographs with apparent enhancement. Some overlap between shifts could be expected, e.g., one radiographer starting a valve and a second finishing the same valve on the next shift. The timeframe of the apparent enhancement was established as early as February 1979 to as late as August 1982. About 75 percent of the apparent enhancement occurred from August 1979 to July 1980. One observation at the Perry site was that some film was not identified with the standard product identification of one square notch associated with GAF type 400 film but was identified with the printed identification of type B film. Type B GAF film was last made about 1969 and was the predecessor type 400 film. The experimental technique shots made at Perry which attempted to reproduce the questionable radiographs were reviewed. A similar apparent enhancement was achieved with a thicker penetrometer. However, these shots did not clearly reproduce the apparent enhancement. The failure of radiographers to follow technique instructions was further noted at the Perry site.
6. Comanche Peak Site: On May 4 and 10, 1983, NVD radiographs were reviewed at the Comanche Peak site. A sample of body casting radiographs as well as forge and welded body radiographs were reviewed. In general, enhancement of the radiographs was not identified, but indications of the lack of control of the radiographic process was noted, e.g., radiographers failed to follow the reported technique. Two weld prep radiographs at Comanche Peak were of interest. On one of these valves, the radiograph showed a pattern of indications (e.g., acceptable gas porosity), outside the area of interest on one view that could not be found in adjacent views as one would logically expect. Site personnel could not find surface conditions that would account for these indications nor could reradiograph find the same pattern of indications. It was further noted that the required density was not achieved for either of these valves.
7. Second NVD Inspection: On June 7-10, 1983, a second inspection was made of NVD. After review of some archive film retained at the customer's request, unshipped valves, and extra radiographs, it was established that there was film at NVD with the apparent enhancement. In addition, some of the archive film was identified as Type B. NVD established with CEI a program to reradiograph a sample of 44 valves.

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NUCLEAR VALVE DIVISION
VAN NUYS, CALIFORNIA

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<p>The reradiographs were acceptable. There were questions on two of the valves dealing with patterns of indications not showing on one set of radiographs but showing on the others. CEI, at NRC's request, reviewed a sample of casting radiographs and reported that no apparent enhancement was found in these type radiographs. Thus, the problem appears to be limited to Iridium radiographs of weld preps with small penetrameters. (Note weld preps require generally small penetrameters and are difficult shots because of large section thickness changes, e.g., 1/16" to 2".) A series of experimental shots made at NVD under NRC supervision established that radiographs like the Perry radiographs could be achieved if a film side penetrameter was used in lieu of a source side penetrameter. These radiographs demonstrated a sharp dark 4T hole with no 2T hole visible. However, when the penetrameter was moved to more directly aim at the 2T hole, then 2T sensitivity could be achieved. This was identified as an unresolved item (see C above).</p>			
<p>8. <u>Industry Involvement:</u> The utilities involved are Washington Power Supply System, Carolina Power and Light, Commonwealth Edison, Arizona Public Service, Duke Power, Power Authority of the State of New York, Duquesne Light, Tennessee Valley Authority, and Texas Utilities Generating. Some valves ordered by Combustion Engineering were most likely used by Arizona Public Service. The sites involved appear to be WPPSS, Units 2, 3, and 5; Shearon Harris, Unit 1; Byron, Units 1 and 2; Braidwood, Units 1 and 2; Palo Verde, Units 1, 2, and 3; Catawba; Fitzpatrick; Beaver Valley; Bellefonte, Units 1 and 2; Hartsville; Phipps Bend; Watts Bar; and Sequoyah.</p>			

ORGANIZATION: BROWN BOVERI ELECTRIC, INCORPORATED
DISTRIBUTION APPARATUS DIVISION
COLUMBIA, SOUTH CAROLINA

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CORRESPONDENCE ADDRESS: Brown Boveri Electric, Incorporated
Distribution Apparatus Division
ATTN: Mr. D. D. Duvall, Vice President-Operations, BBEL
Norristown Road & Route 309
Spring House, PA 19477

ORGANIZATIONAL CONTACT: Mr. W. Wilhelm, Manager-Quality Control
TELEPHONE NUMBER: (803) 796-9502

PRINCIPAL PRODUCT: Medium-Voltage Power Circuit Breakers.

NUCLEAR INDUSTRY ACTIVITY: Details were not obtained during this inspection.

ASSIGNED INSPECTOR: J. T. Conway / for 9-8-83
W. C. Foster, Reactive & Component Program Section (R&CPS) Date

OTHER INSPECTOR(S): W. M. McNeill, R&CPS

APPROVED BY: J. T. Conway / for 9-8-83
I. Barnes, Chief, R&CPS Date

INSPECTION BASES AND SCOPE:

- A. BASES: Appendix B of 10 CFR Part 50, and 10 CFR Part 21.
- B. SCOPE: This inspection was made as a result of the receipt of an allegation by the Nuclear Regulatory Commission regarding: (1) failure to report defects and noncompliances as required by 10 CFR Part 21; and (2) an unsatisfactory QA program in use at the Florence, South Carolina, facility.

PLANT SITE APPLICABILITY:

Docket Nos.: 50-438/439.

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A. VIOLATIONS:

Contrary to Section 21.51(b) of 10 CFR Part 21, dated December 30, 1982, records of evaluation had not been prepared on Class 1E Type 15HK circuit breakers that had been delivered to Bellefonte Nuclear Plant (and possibly others) to determine if they were susceptible to the puffer stud failures in Type 15HK circuit breakers that had been delivered to other customers.

This is a Severity Level IV violation. (Supplement VII).

B. NONCONFORMANCES:

1. Contrary to Criterion III of Appendix B to 10 CFR Part 50, measures were not established with respect to control of design changes made at the Columbia Operations of Brown Boveri Electric, Incorporated, in the areas of materials and dimensional requirements.
2. Contrary to Criterion V of Appendix B to 10 CFR Part 50, the Quality Assurance Program did not provide methods for implementation of 10 CFR Part 21 until June 14, 1983, at which time Procedure No. 15.2 was incorporated into the procedures manual.

C. UNRESOLVED ITEMS:

None

D. OTHER FINDINGS OR COMMENTS:

1. On March 4, 1983, the Nuclear Regulatory Commission, Region II, was informed that Brown Boveri Electric, Incorporated, (Columbia and Florence, South Carolina) had not reported defects experienced during the period of May 1980 to March 4, 1983, as required by 10 CFR Part 21. Examples of concerns were:
 - a. Materials used in the manufacture of components for circuit breakers were not segregated upon receipt, therefore no traceability was established.
 - b. Circuit breaker spring guide mechanisms and mechanism housings are defective due to improper heat treatment and inadequate engineering design.
 - c. Circuit breaker jackshafts have experienced weld failures.

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- d. Company QA audit of Florence, South Carolina, plant was unsatisfactory in June 1982.
- e. Circuit breaker main contact block assembly was found to be defective.
- f. Circuit breaker puffer linkage studs have been breaking under stress.
- g. 5-15HK mechanism and cam/rollers received between November 1980 and March 1981 were defective.

All items pertained to parts manufactured at the Florence, South Carolina, facility which produces commercial grade hardware. While some of the items were verified, the basis for the concerns could not be totally established. For example, the NRC inspector observed that some rolled stock was not segregated. In the judgement of the NRC inspector, this did not pose a problem because the material was marked with its identification and tagged when it would not accommodate marking. Further, the source of material segregation requirements could not be determined, e.g., a customer requirement. The identified hardware problems were within the control of the Florence facility or the Columbia, South Carolina, facility. With one exception, it could not be determined that defective hardware had been delivered to customers or that customers had reported defective hardware. The exception noted was a report by a nonnuclear customer concerning failures of puffer linkage studs. Class 1E hardware of the type that employed identical studs had been delivered to at least one nuclear power generating plant. Records of evaluation had not been prepared to determine if the failed studs had an impact on Class 1E circuit breakers.

- 2. The spring guide and jackshaft items were identified to the NRC inspectors as conditions encountered during startup of the Columbia and Florence, South Carolina, plants. The NRC inspectors were informed that the mechanism housing required no heat treatment; however, the spring guide did require heat treatment. The design of the spring guide mechanism and the mechanism housing had been in use since the early 1960s. A review of the drawings confirmed the statements. Cracked spot welds of mechanism housings were also discussed. The NRC inspectors were informed that records which described the conditions could not be located. However, an engineering evaluation had established that sufficient structural strength of the mechanism housing existed without the spot welds. An endurance test of 5,000 cycles was reported to have been conducted on a spring guide that had not been heat treated;

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however, the number of cycles could not be verified by reviewing the informally documented test data. The NRC inspectors were informed that failure to heat treat did not represent a reliability concern and the only impact of the nonheat treated spring guide would be "some additional dust [metal particles]." A review of available documents failed to prove otherwise. The NRC inspectors were also informed that unshipped circuit breakers were examined for spring guides that had not been heat treated and untreated spring guides were replaced prior to shipping. The Switchgear System Division Quality Assurance Manager (SSDQAM) stated that (a) no mechanism housings, or jackshafts; and (b) questionable spring guides had not been shipped to nuclear generating stations. It was stated that preventive measures were established to include: (1) more systematic hardness testing and sampling; (2) increased destructive testing of spot welds; and (3) use of welder symbols on jackshafts. Welder symbols on jackshafts were verified by an NRC inspector.

3. The Florence plant supplies standard (commercial) parts and subassemblies, and there was no indication that Appendix b to 10 CFR Part 50 or 10 CFR Part 21 were contractually imposed.
4. The SSDQAM stated that defective main contact block assemblies had been erroneously identified; it should be arcing contacts. He addressed arcing contacts that had cracked and stated that he was not aware of defects concerning bonding and contact mating. There were no records to identify the problems; however, the SSDQAM stated that metallurgical cross section requirements had been established in an effort to preclude recurrence. During the exit interview, the NRC inspectors were queried regarding the relay type, HK or K. The NRC inspector responded that available information identified the type K; however, subsequent review indicated both types.
5. Field failures of the puffer linkage stud had been reported to BBEL by nonnuclear customers. The Distribution Apparatus Division Quality Control Manager/Florence, South Carolina (DADQCM/F), stated that a tooling error resulted in a stress riser and subsequent failures of the stud. The NRC inspectors were informed that actions taken to preclude recurrence involved improved tool control and revising the drawing to increase a radius on the shank. It was observed that studs in use exhibited the larger radius. Further, it was observed that: (a) test reports of the failed stud identified the material as 4140; and (b) the material (4140) had been used from August 8, 1960, until

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January 19, 1982, when it was changed to 4340. When queried about the field failures, the SSDQAM and the DADQCM/F initially indicated an unawareness. However, the NRC inspector identified two customers and research by the SSDQAM disclosed an "Inter-Office Memo" and a "Speed Letter" dated February 10, 1983, and February 19, respectively; the NRC inspectors were informed that the year of the speed letter was 1983. These documents addressed field failures of the studs. The interoffice memo indicated that copies had been sent to the SSDQAM and DADQCM/F; however, they did not recall seeing the document prior to this inspection.

The NRC inspectors determined that identical hardware had been supplied to nuclear generating stations as Class 1E, but no activity had been undertaken to determine whether or not the suspect stud had been incorporated in the hardware. BBEL personnel were informed regarding the lack of records of evaluation that a violation would be written identifying the Bellefonte Nuclear Plant. The SSDQAM stated that Bellefonte was not affected because the hardware for Bellefonte had been shipped before the problem had been detected. The NRC inspectors acknowledged the comment while pointing out that design of the stud was the same during manufacture of the hardware for Bellefonte. On June 30, 1983, the SSDQAM called one of the NRC inspectors and restated the above information. Further, he stated that there were three orders and identified the following nuclear generating stations: (a) Yellow Creek; (b) Marble Hill; and (c) Vogtle. BBEL filed a 10 CFR Part 21 report dated July 27, 1982, with the NRC headquarters. The report pertained to the deficient stud and identified Vogtle, Yellow Creek, Hartsville, and Sequoyah nuclear generating stations.

6. There were no records to identify receipt of defective cam/rollers between November 1980 and March 1981. The SSDQAM stated that he recalled a problem had been experienced during research and development activity of a circuit breaker but none with production items.
7. Audits - The 1982 system audit of BBEL Columbia was reviewed in light of the requirements established by the QA Manual. Implementing QC procedures were found to address product audits, patrol inspection, etc., and not the system audits. The QA system audits were found to be performed by BBEL corporate personnel. Qualification records were not available for review at Columbia. The annual system audits were scheduled and performed using checklists. Findings were found to be documented, with an overall

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evaluation and summary. The response to the 1982 system audit was reviewed. Corrective action was established and followup was to be performed during the next 1983 audit.

8. Change Control - Procedures were found which addressed design change controls to be applied at Spring House, the designer. Design changes, in particular, material and dimensional waivers were being performed at BBEL Columbia by a manufacturing liaison engineer who represented the designer. Review, approval, authority, and extent of permissible changes at Columbia were not defined in the QA Manual or QC procedures. This was identified as a nonconformance (see B.1 above).
9. 10 CFR Part 21 - Section 206 of the Energy Reorganization Act of 1974 and the name of the individual to whom reports are to be made, were found to be posted. A 10 CFR Part 21 procedure was found to be dated seven days before the inspection started. The procedure was a complete adoption of the BBEL Switchgear Systems Division Procedure No. 15.2. The QA Manual of Columbia Operations established the requirement for such a procedure in May 1981; further, in May of 1982, the Switchgear Systems Division established that the division level procedure was to be incorporated into the Columbia Operations QC Procedures Manual. The failure to not have a 10 CFR Part 21 procedure from May 10, 1981, to June 14, 1983, is documented as a nonconformance (see B.2 above).

The corporate procedure addresses evaluation of deviations and informing of licensees of deviations. The responsible officer and the documentation methods are identified. For the Florence facility of BBEL, a specific procedure was found which did not totally adopt Procedure No. 15.2, but addressed the unique requirements of that facility.

10. In an effort to determine the validity of the allegations, the following areas were evaluated: (a) implementation of 10 CFR Part 21, (b) manufacturing process control, (c) change control, and (d) audits.

The inspection was accomplished by evaluating the following documents for requirements and/or implementation of requirements: 19 drawings, 2 specifications, 28 procedures, 2 quality manuals, 1 purchase order, 8 internal memoranda and numerous documents identified as: reports, sales order packages, shipping packages, and shop order packages. This activity resulted in the identification of one violation and one nonconformance.

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

REPORT NO.: 99900401/84-02	INSPECTION DATE(S): 5/21-25/84	INSPECTION ON-SITE HOURS: 48
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 systems. 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: <i>fn</i> <u>Udis Potapovs</u> P. M. Sears, Vendor Program Branch, DQASIP		<u>6-27-84</u> Date
OTHER INSPECTOR(S): W. Shier, Brookhaven National Laboratory		
APPROVED BY: <u>Udis Potapovs</u> Udis Potapovs, Chief, Vendor Program Branch, DQASIP		<u>6-27-84</u> Date
INSPECTION BASES AND SCOPE: A. <u>BASES</u> : 10 CFR Part 50, Appendix B and Topical Report CENPD-210-A. B. <u>SCOPE</u> : Status of previous inspection findings, quality assurance (QA) practices for licensed computer programs and CE's actions pertaining to Circuit Breakers used in Reactor Trip Systems.		
PLANT SITE APPLICABILITY: Docket Nos. 50-368, 50-528, 50-529, 50-530, 50-361, 50-362, 50-382, 50-508, and 50-509.		

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A. <u>VIOLATIONS:</u> None.		
B. <u>NONCONFORMANCES:</u> <ol style="list-style-type: none">1. Contrary to Section 17.3.1 of CE Topical Report CENPD-210-A, Revision 3, the verification requirement contained in Section 5.2 of the Quality Assurance of Design Manual for Nuclear Power Systems, Windsor, Revision 3 QADM states only that "adequate testing shall be conducted to ensure proper operation of the code options to be used for design analysis." This does not provide for a comprehensive verification of the accuracy of the methods utilized in the "proprietary" computer codes (those developed at CE).2. Contrary to Section 17.3.1 of CE Topical Report CENPD-210-A, Revision 3, the calculations performed for the CESEC computer code verification included in CE Topical Report "CESEC Digital Simulation of a Combustion Engineering Nuclear Steam Supply System" were not independently reviewed and checked.3. Contrary to Section 17.3.1 of CE Topical Report CENPD-210-A, Revision 3, an analysis was completed using a non-certified version of CESEC computer code.4. Contrary to Section 17.3 of CE Topical Report CENPD-210-A, Revision 3, the QADM does not include a procedure for documentation and distribution of error reports affecting safety related computer codes to prevent recurrence of such errors. For example, there is no formal system for the distribution of error reports for the CESEC computer code that is used in safety related calculations.5. Contrary to Section 17.3 of CE Topical Report CENPD-210-A, Revision 3, there have been no internal audits performed on the existing error reports pertaining to the CESEC computer code.		

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6. Contrary to Section 17.3 of CE Topical Report CENPD-210-A, Revision 3, no audits have been conducted on Control Data Corp's CYBERNET Services which licenses the use of the computer program STARDYNE, even though the verification at CE of STARDYNE relies entirely on the statement by Control Data Corp that "STARDYNE is quality assured by Control Data's Application Research Center (ARC) as an NRC safety related code. Control Data's ARC quality assurance procedures correspond to requirements set forth by NRC."
7. Contrary to Section 17.17 of CE Topical Report CENPD-210.A, Revision 3 the calculation folder supporting a version of the CESEC computer code (designated as 83290) that has been used for safety related calculations was not available during this inspection.
8. Contrary to Section 17.17 of CE Topical Report CENPD-210.A, Revision 3 no documentation of error reports for the computer code ANSYS (licensed from Swanson, Inc.) is available at CE for any errors discovered in ANSYS prior to January 1984 even though ANSYS usage at CE dates back to 1975. Further, no evaluations of error reports concerning the computer code ANSYS have been documented at CE nor is such documentation being required of ANSYS users at CE.

C. UNRESOLVED ITEMS:

None.

D. OTHER FINDINGS OR COMMENTS:

1. Circuit Breaker Used in Reactor Trip Systems (RTS):

Background: On March 11, 1983, Southern California Edison reported that during testing on March 3 and 8, 1983 of reactor protection system (RPS) breakers at San Onofre 2 and 3, three reactor trip breakers on Unit 2 and one reactor trip breaker on Unit 3 failed to open on activation of the undervoltage trip coil. Both units were shut down at the time of the tests. The breakers had been procured in 1974 and the failures to operate were traced to improper maintenance. The same type breakers at other plants

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have failed to open during testing and the cause has also been found to be improper maintenance. The breakers are General Electric (GE) type AK-2. As a result of the foregoing, NRC issued IE Bulletin 83-04.

GE still manufactures this type breaker at Plainville, Conn., but not as a safety grade equipment. GE, Plainville, emphasizes that this breaker is commercial grade. The plants which use these breakers needed more spares for use when the in-service units need maintenance. CE now certifies these spares as qualified for safety related use by similarity to the older models. CE commissioned GE to do a similarity study and GE concluded that the new breakers are so closely similar to the breakers manufactured as to be indistinguishable. CE has recently procured and qualified this type breaker for (a) Arkansas Nuclear One, Unit 2; (b) San Onofre Nuclear Station, Units 2 and 3; and (c) St. Lucie Plant, Unit 2.

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

2. Computer Code Verification and Error Report Handling:

During the 84-01 inspection at CE, it was noted that CE does not impose 10 CFR Part 21 in the licensing agreement between CE and Swanson, Inc. (the owner of the computer program ANSYS). During this inspection, the verification of ANSYS and other computer codes used at CE was reviewed. CE categorizes computer codes in the following manner:

- a. State of the Art - these are computer codes which have been developed in the public domain and are used substantially without modification. Included are computer codes either purchased or developed under contract with consultants, Universities, or organizations external to CE.
- b. Proprietary - these are major computer programs developed by CE or which represent substantive proprietary modifications to State of the Art Codes.
- c. Utility - these represent a class of minor codes which automate calculations or perform simple data processing manipulations.

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- d. NRC Approved Codes - these are codes which may belong to any of the above categories but which have been reviewed by the NRC with respect to models procedures and results.

CE's Topical Report CENPD-210-A and QADM were reviewed and compared in the areas related to computer codes. The QADM describes the methods used to implement the guidelines described in CENPD-210-A. Section 17.3.1 of the Q/A Topical discusses the guidelines for safety-related code verification. However, the procedure described in Section 5.2.4.1.3.2 of the QADM for "Proprietary" codes does not include a comprehensive program for verification and qualification of these codes. The inspector noted this discrepancy between the Q/A Topical and the QADM.

Section 17.3 of the Q/A Topical discusses the guidelines for the disposition of errors or deficiencies that "adversely affect safety-related structures and components in the design process." however, the inspector's review of the QADM revealed no procedures regarding errors in safety-related "Proprietary" codes (which should be considered "components in the design process").

Two nonconformances listed in Section B.1 and B.2 were identified during this part of the inspection.

Several computer codes were chosen as examples to inspect code verification and error report handling. Those codes are as follows:

- a. ANSYS - This code is a large structural/thermal code which will handle static or dynamic, linear or nonlinear problems. It is licensed from Swanson, Inc. and CE does not have access to the source code (FORTRAN listing). It was reported by CE that ANSYS is not a heavily used code and the inspector found that users of the code had verified the small parts of the code that they were using. ANSYS, however, has been used to verify at least one other code at CE and it has not been verified overall. Errors on ANSYS are reported to ANSYS licensees by a periodic news letter. Those news letters dated prior to January 1984 are not available at CE nor were those news letters distributed to ANSYS users within CE prior to January 1984. Since January 1984, those error reports are circulated to at least some ANSYS users within CE (the cognizant engineer for ANSYS is apparently still finding ANSYS users that are not on his list). No confirmation of receipt of those error reports is required of ANSYS users at CE, nor is any confirmation required that an

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evaluation has been made of the effect on design by that error. One nonconformance listed in Section B.9 was identified in this part of the inspection.

- b. STARDYNE - This code is a large static/dynamic structural program. It is maintained by Control Data Corp on their CYBERNET Services. 10 CFR Part 21 is not imposed as part of any purchasing agreement with Control Data Corp and CE. No effort to verify this computer program has been made at CE even though it is in fairly heavy use. The inspector was informed that no error reports concerning STARDYNE have ever been received from Control Data Corp.

One nonconformance listed in Section B.7 was identified during this part of the inspection.

- c. MOD SK - This is a computer program which calculates eigenvalues and eigenvectors of lumped spring mass systems. It is a CE proprietary code having been developed and verified by CE. Its verification consisted, in part however, of comparing sample problem output of MODSK to the same sample problem output as run on ANSYS. ANSYS however does not appear to have been completely verified at CE. This item will be explored further during a future inspection. No violations or nonconformances were identified during this part of the inspection.

- d. CESEC - The CESEC computer code has been developed by CE for the analysis of a number of thermal-hydraulic safety-related transients. It is classified as a "Proprietary" code. A Safety Evaluation Report (SER) was written regarding the use of CESEC in licensing analyses in April 1984. During this inspection, a number of CESEC documents and analysis were reviewed and the findings are described below.

- 1. The inspector discussed the evolution of the CESEC code with the code author. It was stated that new versions of the code are generated from previous versions through a FORTRAN update procedure. The current code version in use was identified as CESEC-83290. It was stated that the independent review and checking has been completed, however, the calculation folder could not be produced. The inspector stated that since the code version had been created in October 1983, adequate time should

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have been available for completion of the Q/A process. In addition, a completed analysis was identified using this version of the code.

2. A list of authorized CESEC users was reviewed. This indicated that the authorized users constitute a fairly large group spread over several organizational structures.
3. When an error is detected in CESEC, an error report is distributed as an internal memorandum, to known users of the code. There is no formal file where the error reports are kept independent of other CESEC documentation.
4. The inspector was also informed that there have been no internal audits on CESEC error reports.
5. During the course of the inspection, six additional calculation folders related to CESEC were reviewed. These included the documentation of two base input decks which had been used in several applications. Except as noted below, the inspector found a good description of the analysis and an indication of the independent review. However, in the case of analysis number 14273-TM-016, a version of the CESEC code that had not been certified was used. The Q/A review statement indicated that it was contingent on the successful certification of the code version (81300). The inspector stated that since a considerable amount of time had elapsed between the completion of the analysis (September 1982) and the certification of the code version (March 1983), it would be extremely difficult to assure that the same code version was used in the analysis and in the certification without additional computer calculations. The inspector also noted that the contingency on the Q/A review had still not been removed.

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<p>6. The inspector reviewed a CE Topical Report (enclosure to letter LD-82-001) that was submitted to NRR as part of the CESEC documentation. This topical report included a section on code verification that compared CESEC calculations with results obtained with another code and with full scale reactor test data. The inspector requested the supporting calculation folder and it was stated that this was not available since the verification calculations had not been Q/A's. It was further stated that this Q/A was not required by the QADM. The inspector stated that these calculations were a very important part of the analytical basis of the code and that the QADM was deficient in this regard (see Section B.7). In addition the inspector noted that these verifications calculations probably had some bearing on the SER that was issued on CESEC.</p> <p>Nonconformances listed in Sections B.1, B.2, B.3, and B.4. were identified during this part of the inspection.</p> <p>e. ROCS - Reactor Operation and Control Simulator (ROCS) Computer Code is used for two-and three-dimensional coarse-mesh reactor core calculations. Various ROCS calculations, (e.g., core power distributions, reactivity feedback coefficients, etc.) are used as inputs to other safety related codes. A Safety Evaluation Report was issued on the use of the ROCS code in April 1983. During this inspection, the documentation of the code development was reviewed and the findings are described below:</p> <ol style="list-style-type: none">1. It was stated that codes used in core physics calculations have a cognizant engineer and a cognizant programmer assigned.2. The inspector reviewed CE Topical Report CENPD-266-P-A that was submitted to NRR in support of the ROCS code. This contained a reasonable description of the analytical basis for the code and the code verification. The inspector requested and reviewed the analysis folder for ROCS 2.3 MOD0 through MOD3. The documents provided a description of the code models and a number of test cases that compared the code results with hand calculations and reactor test data. In addition, several test cases were designed to		

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exercise a number of code options.

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

f. DOT - The DOT computer code is a discrete ordinate neutron transport code that can be used in the calculation of pressure vessel neutron fluence and in various criticality calculations. DOT is maintained by the Radiation Shielding Information Center (RSIC) at Oak Ridge National Laboratory. The inspector reviewed the CE's implementation and application of DOT and the findings are summarized below.

1. It was stated that DOT is currently used by two groups within the Nuclear Engineering Department at CE. The code is implemented and maintained by one of these groups. The version of DOT currently in use at CE is DOT 4.3 and is the latest version released by ORNL.
2. The inspector inquired about the error in DOT 4.3 that was reported in the October 1983 RSIC Newsletter. It was stated that CE knew of the error and had corrected the current operational version of the code. The inspector confirmed this in the recorded calculation prepared for the certified version of the code.
3. The inspector reviewed the recorded calculation that supported the certified version of DOT 4.3. A number of FORTRAN changes had been implemented and tested with the test problems that are supplied with the code by ORNL. It was stated that the changes did not affect the mathematical modelling but were limited to changes required to make the code operational on the CE computer system and changes affecting editing and data transfer.
4. It was stated that two analyses using DOT 4.3 have been completed and two are in progress. One of these analyses was reviewed and found to be acceptable.

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

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3. CE Reloads With Mixed Fuel Cycles

The inspector inquired about the methodology used when CE performs a reload for a plant previously fueled by another vendor creating a fuel loading situation that is only part CE fuel. Analysis of this type of fuel loadings require data for the fuel systems provided by other vendors that could be considered proprietary. It was stated that the CE's contract with customers would contain a provision requiring that this information be made available. However, it was also stated that this allocation has not occurred since the reload analyses supporting plants with mixed fuel types that CE has reloaded have been performed by the utility.

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

ORGANIZATION: DUBOSE STEEL, INC.
ROSEBORO, NORTH CAROLINA

REPORT NO.: 99900861/84-01	INSPECTION DATE: 5/21/84-5/25/84	INSPECTION ON-SITE HOURS: 62
CORRESPONDENCE ADDRESS: DuBose Steel, Inc. Post Office Box 1098 Roseboro, North Carolina 28382		
ORGANIZATIONAL CONTACT: James Dailey, QA Manager TELEPHONE NUMBER: (919) 525-4161		
PRINCIPAL PRODUCT: Steel, Alloy Steel, Stainless Steel		
NUCLEAR INDUSTRY ACTIVITY: 30-35% of company business is supplying nuclear grade material.		
ASSIGNED INSPECTOR:	<u>Edmund Q Baker</u> E. Baker, Vendor Program Branch, DQASIP	<u>7/16/84</u> Date
OTHER INSPECTOR: T. Burns, BNL Consultant		
APPROVED BY:	<u>E. W. Merschoff</u> E. W. Merschoff, Section Chief, RIS, VPB, DQASIP	<u>7/19/84</u> Date
INSPECTION BASES AND SCOPE:		
A. <u>BASES</u> : 10 CFR Part 21, 10 CFR Part 50, Appendix B, NCA-3800		
B. <u>SCOPE</u> : This inspection was made as a result of an allegation received by Region II on 2/16/84 concerning organization; procurement document control, control of purchased material, equipment, and services; identification and control of materials, parts, and components; nonconforming materials, parts or components; corrective action, and quality assurance records.		
PLANT SITE APPLICABILITY:		
50-416/417, 50-382, 50-443, 50-483, 50-460, 50-513, 50-324/325		

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<p>A. <u>VIOLATIONS:</u></p> <p>Contrary to Section 22.21 of 10 CFR Part 21, DuBose failed to report defective material within 2 days of receipt of notification that the material was defective.</p> <p>B. <u>NONCONFORMANCES:</u></p> <ol style="list-style-type: none">1. Contrary to Criterion I of Appendix B to 10 CFR 50, and paragraphs 5.2.1 and 8.3.1.2 of the Quality System Program Manual (QSPM), the authorities and duties of certain personnel affecting safety were not established and delineated in writing resulting in a lack of Quality Assurance Program independence from Sales.2. Contrary to Criterion II of Appendix B to 10 CFR 50, DuBose Steel failed to establish and implement a quality assurance program to provide control over activities affecting quality. Specifically:<ol style="list-style-type: none">a. Contrary to Criterion II of Appendix B to 10 CFR 50 and paragraph II.C of the QSPM, DuBose Steel failed to implement the training program described in the QA Program.b. Contrary to Criterion IV of Appendix B to 10 CFR 50, NCA-1140, and paragraphs 1.3.1 and 2.3.3 of the QSPM, Purchase Orders (POs) issued by DuBose did not contain requirements which had been imposed on DuBose by the Customer. In addition, suppliers who had not been audited were placed on the Approved Vendor's List and material was purchased from them.c. Contrary to Criterion V of Appendix B to 10 CFR 50 and paragraph 4.3.1 of the QSPM, written inspection plans had not been prepared by the QA Manager and neither the Receipt Inspection Report (RIR) nor the Inspection Report (IR) contained instructions on what should be inspected or acceptance criteria.d. Contrary to Criterion VII of Appendix B to 10 CFR 50, NCA-3853 (d) and paragraphs 2.6.3.1 and 4.3.5.2 of the QSPM, DuBose is not controlling purchased material as required.		

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<p>e. Contrary to Criterion VIII of Appendix B to 10 CFR 50 and paragraphs 4.3.6 and 3.3.1 of the QSPM, DuBose is not effectively maintaining the identification of material.</p> <p>f. Contrary to Criterion XIV of Appendix B to 10 CFR 50 and paragraph 4.3.1.5 of the QSPM, DuBose is not maintaining indications of inspection status.</p> <p>g. Contrary to Criterion XV of Appendix B to 10 CFR 50 and paragraphs 5.2.1, 5.3.6, and 5.3.5.1, DuBose is not controlling nonconforming material as required.</p> <p>h. Contrary to Criterion XVII of Appendix B to 10 CFR 50, inspection records do not contain all the required information i.e., type of observation, results, acceptability and action taken on deficiencies.</p> <p>i. Contrary to Criterion XVIII of Appendix B to 10 CFR 50 and paragraphs 7.3.1.2 and 7.3.1.3.1 of the QSPM, audits of all phases of the QA program were not performed.</p> <p>C. <u>UNRESOLVED ITEMS:</u></p> <p>None.</p> <p>D. <u>OTHER FINDINGS AND COMMENTS:</u></p> <p>1. <u>Investigation of Concerns Expressed In Allegation</u></p> <p>The concerns expressed in the allegation are summarized and addressed below:</p> <p>a. Allegation: The Vice-President Nuclear Division was in actuality running the QA department and had performed duties reserved for the QA Manager.</p> <p>Inspection Finding: It could not be established whether or not the Vice-President Nuclear Division was actually running the QA department in the past, but he was not running it at the time of the inspection. However, nonconformance 1 clearly shows that the Vice-President Nuclear Division performed some of the functions reserved for the QA Manager.</p>		

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<p>b. Allegation: High Stress Stamps were used on material shipped to Stone and Webster (S&W) at Nine Mile Point rather than the required low stress, round bottom stamps.</p> <p>Inspection finding: Because all material on the S&W order had already been shipped it was not possible to substantiate the concern. However, the stamps presently in use were inspected and found acceptable.</p> <p>c. Allegation: The heat number and traceability was lost on some 1-3/4 inch round bar stock (SA-36 material).</p> <p>Inspection finding: Because of the amount of material of this type shipped by DuBose and the lack of specific information it was not possible to substantiate this concern. However, nonconformances 2.c, 2.e, and 2.g do address this issue. More information is contained in e and h below.</p> <p>d. Allegation: The allegation listed nine POs and stated that "dummy orders" had been issued to make it look like commercial grade material, which was transferred from the commercial warehouse area to the nuclear warehouse area, was actually nuclear grade.</p> <p>Inspection finding: This concern was not substantiated. All nine POs were reviewed along with the Material Manufacturers CMTRs. All material was certified as meeting the requirements of the material specification and being produced under a quality system meeting the requirements of NCA-3800. The original commercial orders turned out to be the purchasing agent's handwritten copies which are then given to a secretary or clerk to type.</p> <p>e. Allegation: Sales personnel were writing letters authorizing restamping of material without any QA involvement.</p> <p>Inspection finding: The concern that sales personnel were writing such letters without <u>documented</u> QA involvement was substantiated. In fact, sales personnel generally received most incoming NCRs as well as answering them. Most of the NCRs dealt with marking requirements, heat numbers on material not matching heat numbers on CMTRs, incorrect purchase order numbers, and incorrect material grade markings. However, sales personnel also handled reports of defective material, again without <u>documented</u> QA involvement. Nonconformances 1, 2.c, 2.e, and 2.g address these concerns.</p>		

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- f. Allegation: The Vice-President Nuclear Division was performing vendor and QA audits.

Inspection finding: This concern was substantiated. However, the qualifications of the individual were reviewed and found acceptable for performing these functions. The individual had also been designated by the QA manager to perform the vendor audits.

- g. Allegation: QA files were incomplete.

Inspection finding: Although the company president had stated that this was true in the past the new QA manager had made great strides in clearing up the backlog. At the time of the inspection approximately 95% of the files had been reviewed and annotated as to what documentation was missing. DuBose had not progressed to the point of finding the missing documentation and adding it to the files. All PO files reviewed were either complete or were annotated as to what was missing.

- h. Allegation: Material is not 100% inspected for markings and dimensions.

Inspection finding: This concern was substantiated. Nonconformances 2.c and 2.g address the marking problem. However, material suppliers, under the definition of "Identification and Verification Program," NCA-4124, are not required to perform dimensional inspections.

- i. Allegation: The President, Plant Manager, and Vice-President, Nuclear Division, hire and fire QC inspectors, not the QA manager.

Inspection finding: This concern was substantiated. The President of the company stated that any of the four company officials could fire QC personnel for things like sleeping on the job, drunkenness, falsifying time sheets and the like, but only the QA manager or the President could fire QC personnel for job performance reasons.

- j. Allegation: Training for QC inspectors was either not performed or not documented.

Inspection finding: This concern was substantiated and is addressed by Nonconformance 2.a.

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2. Evaluation of Pending Part 21 Report

On December 30, 1983, Daniel International Inc. reported defective structural steel supplied by DuBose and manufactured by Northwestern Steel and Wire Co. under 10 CFR Part 21. While at DuBose the inspector reviewed the background information and actions taken by DuBose.

In reviewing the background information it was determined that a salesperson had received a verbal nonconformance report from Daniel International on heat number 77052 in August of 1983. A sample of the material was tested by Northwestern. On September 16, 1983, Northwestern informed both DuBose and Daniel International that the material had failed the torsion test. The Vice-President Nuclear Division and the President of DuBose stated that both they and the QA Manager participated in the conference call between Northwestern, DuBose, and Daniel International on September 16, 1984 when Northwestern informed them that the material had failed the torsion test. Northwestern then documented the failure in a letter to the Vice-President Nuclear Division, which was dated September 16, 1984. DuBose failed to report the defect to the NRC within the two day time frame as required by the NRC.

On December 30, 1983 Daniel International reported the defect to the NRC. In a letter dated May 10, 1984 Daniel International informed DuBose and Northwestern that a Part 21 report had been submitted to the NRC. At this time, eight months after being informed that a reportable defect existed, DuBose submitted a Part 21 report to the NRC, including a list of affected customers.

3. Related QA Program Areas:

The areas of organization; quality assurance program; procurement document control; instructions, procedures, and drawings; control of purchased material, equipment, and services; identification and control of material, parts, and components; inspection; inspection, test, and operating status; nonconforming materials, parts, or components; corrective action; quality assurance records; and audits were inspected concurrently with the concerns expressed in the allegation. This inspection was achieved through discussions and review of the DuBose Quality System Program Manual, purchase orders, approved vendors list and quality control procedures.

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A description of the inspection effort and subsequent findings in each area are described below:

- a. Organization: From a review of the DuBose Organization chart and assorted QA records it was apparent that the required separation between QA and sales/production was not observed. The Vice-President Nuclear Division position was not shown on the organization chart. There was no written description of the duties or authority associated with the position. The Vice-President and other sales personnel had performed duties reserved for the QA manager. (See Nonconformance 1.)
- b. Quality Assurance Program: A review of the DuBose QA Program and its implementation revealed that DuBose had failed to establish and implement a QA program that meets the requirements of Appendix B and NCA-3800. In addition to the nonconformances in the areas listed below, DuBose failed to implement the training program established in their QSPM. A currently active inspector had not been trained in the use of the latest revision of the QA manual although significant changes had been made. Two inspectors who worked for DuBose during the period August 8, 1983 to February 15, 1984 received no training at all. See Nonconformance 2.g.
- c. Procurement Document Control: Practically all POs issued by DuBose and all Material Manufacturer's CMTRs reviewed by the inspector referenced ASME Code editions and addenda which are later than those specified in the customer PO. Some POs and CMTRs referenced Code editions and addenda that the NRC had not approved and endorsed in 10 CFR 50.55a at the time the material was ordered. DuBose had not requested the owner's or his designee's approval for use of later editions and addendas as required by NCA-1140(b). In addition, POs were issued by DuBose prior to QA approval. (See Nonconformance 2.b.)
- d. Instructions, Procedures, and Drawings: There were no written instructions to the inspector as to what should be inspected, i.e., how many pieces; what characteristics; what the acceptance criteria were; or what to do if a deficiency was detected. The QSPM stated that either the QA Manager would prepare an inspection plan or the RIR or IR would contain sufficient information. The information was not presented in either form. See Nonconformance 2.c.

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<p>e. Control of Purchased Material, Parts, and Components: Audits of Northwestern Steel and Wire, Conners Steel, and Welded Tube Co. of America were reviewed for 1977 through 1984. Two of the Conners Steel and one of the Welded Tube audit reports were missing and at this point are assumed to have not been performed. Material was purchased from both suppliers through out this time frame and the suppliers appeared on the Approved Vendors List for the years in which the audits had not been performed. See Nonconformance 2.d.</p> <p>f. Identification and Control of Material, Parts, and Components: Although the inspector did not find any hardware associated discrepancies in this area during the inspection, there was evidence that material was not being identified and controlled in accordance with Appendix B, NCA-3800, and the QSPM. QC inspectors were not monitoring the transfer of markings at the time of cutting material. Neither the QSPM nor the QCPs instructed the QC inspectors as to how many pieces were to be checked or what to do when incorrectly marked pieces were found. From the period of January 1983 to September 1983 sales personnel issued seven letters authorizing the restamping of markings. Because a nonconformance was not initiated, the extent or nature of the marking error is not known and it must be assumed, at this point, that material traceability was lost. In addition, during a walk though the warehouse the inspector observed material stored in mixed sizes and specifications. (See Nonconformance 2.e.)</p> <p>g. Inspection, Test, and Operating Status: During a walk through the warehouse the inspector observed two stacks of stainless steel plates without the prescribed inspection status tags. (See Nonconformance 2.f.)</p> <p>h. Nonconforming Materials, Parts, or Components: Neither the QSPM nor the QCPs contained a procedure for handling nonconformance reports originating outside the company. Consequently, sales personnel were answering nonconformances and instructing customers to re-mark material without any documented QA participation. There also were no criteria for accepting material which was originally dispositioned as nonconforming because of traceability problems, i.e., more than one heat number on a piece, heat numbers on a piece not matching those on the CMTR, or a total lack of markings. DuBose was simply accepting a letter from their supplier telling DuBose to remark the material with no explanation</p>		

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of how traceability had been re-established or any supplementary documentation.

In addition, the Vice President Nuclear Division was initiating and approving resolutions of and corrective actions for nonconformance reports for defective conditions detected at DuBose. See Nonconformance 2.g.

- i. QA Records: The only information appearing on the inspection reports was, a piece count, the heat number, and the material grade and type, which were handwritten. Since there were no inspection plans, the inspection reports should have informed the inspector of how many pieces were to be inspected, what characteristics were to be inspected, and what the inspection criteria were. None of this information was given to the inspector. Therefore, there was no way of telling what characteristics had been inspected or whether they were acceptable or not.
- j. Audits: The areas of training and control of nonconformances were not audited for the previous three years, 1982, 1983, and 1984. A significant number of the nonconformances contained in this report are in these areas and may have been avoided if the internal audits had covered the whole QA Program as required.

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REPORT NO.: 99900403/84-02	INSPECTION DATE(S): 6/4 - 8/84	INSPECTION ON-SITE HOURS: 120
CORRESPONDENCE ADDRESS: General Electric Company Nuclear Energy Business Operations ATTN: W. H. Bruggeman, Vice President & 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 1,000 people with approximately 98 percent of that force devoted to domestic nuclear activity. NEBO currently has 26 reactor units under construction and 2 units under contract. NEBO has approximately 125 service contracts with various clients.		
ASSIGNED INSPECTOR: <u>P. Sears</u> P. Sears, Vendor Program Branch, DQASIP		<u>8/21/84</u> Date
OTHER INSPECTOR(S): J. Petrosino, IE R. Haroldson, EG&G		D. Weber, EG&G W. Shier, BNL
APPROVED BY: <u>J. Costello</u> J. Costello, Section Chief, VIS 2		<u>8/21/84</u> Date
INSPECTION BASES AND SCOPE: A. <u>BASES</u> : GE Topical Report No. NEDO-11209-04A and 10 CFR Part 21. B. <u>SCOPE</u> : 1. Status of previous inspection findings. 2. Validation/verification of General Electric's (GE's) plant transient computer codes and other computer codes used at GE. (continued next page)		
PLANT SITE APPLICABILITY: Docket Nos.: Hatch, Units 1 and 2 (50-321 and 50-366); Limerick, Units 1 and 2 (50-352 and 50-353); Nine Mile Point, Unit 2 (50-410)		

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B. SCOPE: (continued)

3. Procurement practices of GE's electrical equipment.
4. Electrical separation for a control panel at WNP-2.
5. Debris and bare wire in certain cabinets returned from GE San Jose.
6. GE actions in regard to certain mirror image contact deficiencies.
7. Pre-qualified welding procedures used for certain pipe whip restraint brackets.
8. Non-essential conductivity cells and conductivity indicators which might affect RHR divisional power.
9. Undervoltage relays in HPCS pump starting circuit which could block automatic initiation of HPCS pump.

A. VIOLATIONS:

None.

B. NONCONFORMANCES:

1. Contrary to Quality Control Instruction 7.2.17, Revision 12, Paragraph 3.4.1 regarding information to be included in an audit report, the GE auditor did not include the required evaluation statement regarding the effectiveness of the quality assurance program elements which were audited in the Brown Boveri, Inc. quality assurance audit report dated February 3, 1984.
2. Contrary to Engineering Operating Procedure (EOP) 42-10.00, Section 4.2.d.4 concerning Design Record Files (DRF's), the DRF's that supported the verification computer calculations for the SAFER02 computer code (DRF's No. A00-01249, A00-1320 and E00-137) did not identify the reviewer and date when performed. In addition, the calculations did not always identify the originator and date performed.

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3. Contrary to EOP 40-3.00, Section 4.3.13.1 concerning generating and maintaining the DRF, the DRF for the computer code SAFER02 did not contain a completed users manual.

4. Contrary to EOP 42-1.00, Section 3.3.2 regarding design control, no documentation was available for the analyses described in GE topical report NEDE 23785-1-P Vol. II and NEDE-24984. These topical reports were submitted to the Office of Nuclear Reactor Regulation for review.

5. Contrary to GE Topical Report NEDO-11209, Section 3.12 concerning design change control, error reports affecting the ODDYN computer code were not formally distributed to all user groups. A responsible engineer had used ODDYN for a safety related calculation but was not notified of an error that was discovered after completion of a licensing analysis.

C. UNRESOLVED ITEMS:

None.

D. STATUS OF PREVIOUS INSPECTION FINDINGS:

1. (Open) Unresolved Item (84-01):

GE's remedial actions concerning crack/indications in replacement recirculation piping shipped to the Hatch nuclear power plant were reviewed during the 99900403/84-01 inspection. GE reported that fourteen 12" risers were penetrant tested at Hatch by GE personnel after receipt and were determined to have indications. These risers had been tested using a die penetrant examination and were passed at a GE subcontractor's facility. GE's remedial actions on this item have not been completed and those actions will be reviewed during a future inspection.

2. (Open) Unresolved Item (84-01):

Representative samples of preloaded (stiff) pipe clamp applications were selected for analysis as to their effects on piping. That analysis will be done by an NRC consultant. The stresses induced in the pipe by the clamp will be calculated. Those stresses will include thermal, preload, and dynamic stresses in areas in the pipe under or near the clamps. The object of the analysis is to determine if the total stresses are within ASME code allowables. The results of this analysis will be included in a future inspection report.

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<p>3. (Closed) Nonconformance (83-02):</p> <p>Quality Control Inspection Cards (QCIC's) did not contain two signatures.</p> <p>By letter dated August 26, 1983, GE responded by stating "Quality Assurance Procedure No. 6.12 does assign responsibility for QCIC review and approval to Quality Assurance. However, two Quality Assurance signatures are neither required nor intended by Quality Assurance Procedure 6.12." By letter dated October 18, 1983 we indicated that we had reviewed GE's reply and found it responsive to the concerns raised in our Notice of Nonconformance. This item is considered closed.</p> <p>4. (Closed) Nonconformance (83-02):</p> <p>A required purchasing acknowledgement signature had not been obtained on an Inspection Report (IR) and certain IR's had not been reviewed for correctness and completeness.</p> <p>The inspector verified that GE completed corrective actions and preventive measures which involved revising QAP 15.8 and correcting the IR's. It was also verified that training concerning IR processing and requirements has been completed.</p> <p>5. (Closed) Nonconformance (83-02):</p> <p>Corrections had not been neatly lined out at some entries of the Acceptance Test Data Sheets (HFA Relay Conversion Kit) dated March 18-29, 1983. Some entries had been marked over to the extent of being indecipherable.</p> <p>The Inspector verified that supplemental work sheets had been added and that applicable procedures had been reviewed by inspection personnel.</p> <p>6. (Closed) Nonconformance (83-02):</p> <p>Mechanical assembly modification of certain relays had not been performed by a qualified technician and Quality Control had not documented the torque values and pick-up voltages of the modified relays.</p>		

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GE has revised the appropriate documents to state that modifications "must be performed by trained and experienced personnel recognized by management as capable of doing the work." GE has reinspected all of the questionable relays in stock and readjusted them as appropriate. GE also sent appropriate instructions for readjustment to customers that took delivery of the relays. Additionally, GE has conducted an unscheduled audit of the relay rework program to assure that adequate corrective and preventive measures were in place.

7. (Closed) Unresolved Item (83-02):

The minimum coil operating voltage of 250 volts direct current relays was not checked at receiving inspection. The NRC inspector noted that alternating current and 125 volts direct current relays are checked for minimum coil operating voltage. The NRC inspector verified that related drawings for the relays with 250 volts direct current coils now require 100% inspection. No nonconformances or violations were identified during this part of the inspection.

E. OTHER FINDINGS OR COMMENTS:

1. Unacceptable Welding Procedures Used on Pipe Whip Restraint

Visual and magnetic particle inspection was conducted on the completed welds connecting the pipe whip restraint brackets to the drywell structural steel at Perry NPP. The welds showed linear crack indications. Subsequent investigation into the cause of the indications showed that the pre-qualified welding procedures did not meet the requirements of the bracket material.

An investigation by GE metallurgists showed that the cracks are typical of underbead weld heat affected zone (HAZ) cracking which can result from such factors as lack of preheat, hydrogen pickup, rapid cooling and metallurgical and chemical variables inherent in the metal parts being welded.

Installation instructions for GE piping systems require the submittal to GE Nuclear Energy Business Operations (GE NEBO) by the constructor of welding procedure specifications and qualification data for all applicable welding on GE supplied NSSS piping and equipment. In the case of Perry the constructor is Cleveland Electric Illuminating Company. The installation has been subcontracted to GE Apparatus and Engineer Service (GE A&ES) which is a separate entity from GE NEBO.

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The installer submitted a welding procedure to the constructor. The constructor approved that welding procedure without submitting it to GE NEBO, and when that procedure was implemented, it resulted in faulty welds. All Perry pipe whip restraints have been removed and are being reinstalled using welding procedures which have been approved by GE NEBO and the resulting welds are passing inspection.

Investigation by GE NEBO of other plants using Perry type restraints showed all domestic plants with installed brackets had used proper welding procedures. No rejected pipe whip restraint welds caused by weld cracking were reported or found on other GE projects.

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

2. Aluminum Barriers for Electrical Separation

In certain safety related panels, thin gauge aluminum has been used for "canning" of intruder devices. That material was not considered to be fire resistant for enclosures of intruding circuits. Failure would occur were a fire to propagate through the aluminum enclosure. Originally the panels were shipped from GE NEBO with steel enclosures for intruding circuits. Because of necessary switch relocations, the steel enclosures would not fit the new mounting locations. The constructor requested approval for a material substitution from GE Valley Forge. That approval was given with no notification to GE NEBO. During the WNP-2 Operational Readiness Review, the aluminum was discovered and new enclosures fabricated from steel were installed to replace the aluminum enclosures. A generic search was done by GE NEBO which disclosed that Nine Mile Point 2 had one aluminum barrier which was replaced. No other aluminum barriers were found.

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

3. Undervoltage Relays in HPCS Pump Starting Circuit Can Block Automatic Initiation of HPCS Pump

During testing for loss of offsite power at WNP-2, it was discovered that undervoltage relays in the high pressure core spray pump starting circuit can block automatic initiation of the pump on a valid LOCA initiation signal if a loss of off-site power were to occur prior to the LOCA signal. A revision of the circuit was proposed by the field. That revision was approved and installed. The circuit had not left GE NEBO responsibility since field testing had not as yet been completed. WNP-2 is the only plant with this circuit installed.

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

4. Non-Essential Conductivity Cells and Indicators Are Connected to Divisional Power of RHR System

As a result of additional requirements generated by NUREG-0588, GE has determined in an analysis that transmitters for the conductivity cells and indicators might fail in a mode that would compromise the RHR power supply. Since conductivity indication is non-essential the solution to this problem was to change the power supply to the conductivity cell transmitters to a non-essential bus. This solution was implemented at all plants where the condition exists except at Grand Gulf which utilizes double overload protection on the conductivity cell transmitters.

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

5. Mirror Image Switches

As stated in paragraph E.5.2 of Inspection Report. 99900403/82-01, Quality Assurance had been assigned an action item to (1) verify that Series 20, Type PR-20 electroswitches with mirror image contacts had not been shipped to other users, and (2) determine how an improperly configured switch had been shipped to Mississippi Power and Light Company for Grand Gulf Nuclear Station, Unit 1.

As stated in paragraph E.1 of Inspection Report No. 99900403/83-02, Field Disposition Instructions Nos. SKKK, WAVH, and WBTF had been issued to examine the switches at (1) Clinton Power Station, Unit 1; (2) Grand Gulf Nuclear Station, Unit 1; and (3) Grand Gulf Nuclear Station, Unit 2, respectively. Switches with mirror images had not been detected at the first two locations and no information had been received regarding the last, as of the period of this inspection. The NRC inspector was informed that the switch with the mirror image deficiency detected at Grand Gulf, Unit 1, had not been returned to General Electric Company - Nuclear Energy Business Operations (GE-NE30) for verification of the deficiency. During the inspection, it was determined that another safety-related Series 20 electroswitch, GE Part No. (P/N) 272A8005, may be affected by the mirror image deficiency. The conclusion is based upon an Electroswitch Corporation letter dated January 15, 1982, which identifies the particular drawing as one "involved in the change of contacting." However, Potentially Reportable Condition File No. 80-46 was silent regarding it and the

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NRC inspector received no assurance that P/N 272A8005 had been included in the evaluation.

During this inspection, the NRC inspector noted that Potentially Reportable Condition File No. 80-46 had been extended to include P/N 272A8005. A review of the file indicated that none of the affected switches had been shipped and that the other safety-related switch was not actually deficient. This item is considered closed.

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

6. Movement of Switch Handle on Series 20K Electroswitches

As stated in Inspection Report 99900403/83-02, Illinois Power Company filed a 10 CFR Part 21 report on April 17, 1983, with the Nuclear Regulatory Commission, Region III (NRC, RIII). The report indicated that deficient Series 20K electroswitches had been supplied as basic components in various panels furnished by GE-NEBO for use at Clinton Power Station, Unit 1. The report further indicates that movement of the switch handle to either extreme position and releasing, permitting it to snap back to its normal position, "could cause the 'normal after' contacts to misoperate, thereby giving false indication as to actual switch position." Additionally, the report states, "Revision of design documents affected by the [switch] replacement will be performed by General Electric for switches in the NSSS [Nuclear Steam System Supply] scope plus those documents associated with the power Generation Control Panels." The NRC inspector was informed that General Electric had not been contacted by Illinois Power Company.

During this inspection, the NRC inspector reviewed the PRC file concerning these switches. It was ascertained that the defective switches were checked and replaced and GE-NEBO inventory has been cleared of defective Series 20K electroswitches.

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

7. Computer Code Verification/Validation

During this inspection, the development and verification of two GE computer codes (SAFER02 and ODYN) were reviewed in addition to the verification and application of the ANSYS code, which is licensed by GE. Throughout the inspection, the GE Quality Assurance Topical Report (NEDO-11209) and the "Boiling Water Reactor Engineering

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Operating Procedures" (EOP) were reviewed and utilized. The findings and observations of the inspector are summarized in the following sections.

a. SAFERO2 Computer Code

The SAFERO2 computer code has been developed by GE for the analysis of the long term BWR response following a loss of coolant accident (LOCA). The code is a combination of the analytical models included in the SAFE and REFLOOD codes and will be used as the GE 10 CFR 50 Appendix K Evaluation Model in licensing analyses. During this inspection, the code development and verification programs were reviewed and the findings are described below.

- (1) The inspector discussed the development of SAFERO2 with the cognizant individuals available. It was stated that SAFERO2 was an updated version of the SAFERO1 code which was compiled from scratch utilizing models from SAFE and REFLOOD.
- (2) The inspector reviewed GE Topical Report NEDE-23785-1-P Vol. II that described the analytical modeling included in SAFERO2. The design record file (DRF) providing the supporting analysis and independent verification for this report was requested but could not be obtained.
- (3) The topical reports describing the code verification program for SAFERO2 were reviewed. This included a comparison of the code calculations with TLTA test data and with TRAC-B01 calculations for a BWR/4 and a BWR/6. The inspector reviewed the DRF's supporting the code calculations and observed that the individual performing the analyses was identified on only some of the calculations. In addition, an independent review of the work was not indicated. It was stated that the SAFERO2 verification analyses was reviewed by a "team design review" as part of the Level 2 status (i.e., use in design applications) approval.
- (4) The inspector requested the DRF supporting the TRAC-BD1 BWR/4 calculations performed to compare with SAFERO2. It was stated that these were not available due to the microfilming process; it was also stated that these calculations were similar to the BWR/6 analysis in that the same computer input model was used with only changes to the engineered safety systems and the

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recirculation loop piping to conform to the BWR/4 design. The inspector observed that this explanation differed from the analysis described in the topical report. It was stated that the BWR/4 verification calculations were adequate since both the TRAC and SAFERO2 computations were performed with equivalent input data sets.

- (5) The SAFERO2 DRF contained a description of several code errors that were corrected in the process of creating SAFERO2. The inspector observed that the effect of each error correction was identified as minor; however, the DRF provided no discussion of how these efforts were conducted.
- (6) Several microfiche containing SAFERO2 code output from the verification calculations were reviewed. The inspector could find no indication of the code or code version that was used. It was stated that SAFERO2 was used for all calculations and that this could be traced through the computer operating system.

Three nonconformances (see section B.2, B.3 and B.4) were identified during this part of the inspection.

b. ODYN Computer Code

The ODYN computer code has been developed by GE for the analysis of a number of thermal-hydraulic safety-related transients. The model includes a one-dimensional neutronic and thermal-hydraulic simulation of the reactor core and a model representation of the pressure variations in the main steamline. The code is currently classified as Level 2 Engineering Computer Program by GE. The inspector reviewed several phases of the ODYN code development and associated application analyses, comments and observations are described below.

- (1) The inspector discussed the code development and application with several individuals including the Responsible Engineer. It was stated that ODYN is used in three different components by more than 50 individuals. Access to the code is available to anyone who has access to the GE computing system. However, the code version available is only the executable version and cannot be changed. Code modifications can only be implemented by the Responsible Engineer with management approval.

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<p>(2) It was stated that no procedure exists to identify individual code application users. Information regarding code changes and corrections is distributed through the component management.</p> <p>(3) The inspector reviewed the DRF's for versions of ODYN designated as ODYN04 and ODYN06. It was observed that several errors were corrected in the ODYN06 version including at least one that potentially affects previously completed licensing calculations. The DRF contained a quantitative summary of the results of the reevaluation of four reload applications and the three Peach Bottom Turbine Trip tests and concluded that the original analyses were acceptable.</p> <p>(4) GE Topical Report NEDE-24984 describes the methodology added to the ODYN04 code. The inspector requested the supporting DRF but it was not available. The inspector observed that ODYN04 contained a significant change to the methodology included in previous ODYN versions and that this should be documented.</p> <p>(5) Several DRF's supporting application of ODYN in licensing calculations were reviewed. These included reload applications and Safety Analysis Report calculations. In each case, the originator and independent reviewer were identified.</p> <p>(6) During the review of one application DRF, the inspector asked the cognizant engineer about the use of the ODYN04 code in licensing calculations and the effect of the code error discussed previously (Section D.2.c). It was stated that ODYN04 had been used but that the cognizant engineer was not aware of the code error and thus had not evaluated it.</p> <p>Two Nonconformances (see Sections B.3 and B.5 above) were identified during this part of the inspection.</p> <p>C. <u>ANSYS Computer Code</u></p> <p>ANSYS is a large structural/heat transfer computer code that has been developed commercially and licensed by GE. The inspector reviewed the code verification and application and had the following observations.</p>		

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- (1) The review of the ANSYS DRF indicated that GE completed a verification program consisting of the 126 test problems that are supplied with the code. These are documented in the DRF with a list of applications for which the verification program applies.
- (2) It was stated that GE has procured an executable version of ANSYS and does not have a code listing. No changes can be implemented. In addition, the code originator no longer maintains the code version that is available on the GE computer.
- (3) The inspector reviewed the DRF for an analyses utilizing ANSYS. This indicated a reasonable description of the analysis with an independent review (including auxiliary calculations to confirm the consistency of the code calculations).

There were no nonconformances identified during this part of the inspection.

8. GE Audits of Brown Boveri

During this inspection, certain GE QA audit reports were reviewed. It was noted that for the audit of Brown Boveri (audit report dated February 3, 1984) the report did not contain an evaluation statement regarding the effectiveness of Brown Boveri's QA program elements which had been audited.

One nonconformance (Section B.1) was identified during this part of the inspection.

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CORRESPONDENCE ADDRESS: General Electric Company Nuclear Energy Business Operations ATTN: Mr. 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 5000 people with approximately 98 percent of that work force devoted to domestic nuclear activity. NEBO currently has 26 reactor units under construction and 2 units under contract. NEBO has approximately 125 service contracts with various clients.		
ASSIGNED INSPECTOR:	<u>J. R. Costello</u> J. R. Costello, Acting Chief, Vendor Inspection	<u>9/11/84</u> Date
OTHER INSPECTOR(S):	L. Beltracchi, NRR/DHFS/HFEB; J. Joyce, NRR/DSI/ICSB; M. McCoy, NRR/DHFS/PSRB; D. Scaletti, NRR/DL/SSPRB; G. Dick, NRR/DL	
APPROVED BY:	<u>G. G. Zech</u> G. G. Zech, Chief, Vendor Program Branch	<u>9/11/84</u> Date
INSPECTION BASES AND SCOPE:		
A. <u>BASES</u> : GE Topical Report No. NEDO-11209-04A and 10 CFR Part 21.		
B. <u>SCOPE</u> : This inspection was made as a result of (1) a request from the Office of Nuclear Reactor Regulation for participation in a technical and QA programmatic audit of the generic safety parameter display system and (2) follow up on generic aspects of a 10 CFR Part 21 report covering fuse failures on the automatic depressurization system digital signal cards. No attempt was made to close out any of the previous inspection findings.		
PLANT SITE APPLICABILITY: Not identified except for 10 CFR Part 21 follow up which was identified at Clinton Power Station, Docket No. 50-461.		

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A. VIOLATIONS:

None.

B. NONCONFORMANCES:

None.

C. UNRESOLVED ITEMS:

None.

D. STATUS OF PREVIOUS INSPECTION FINDINGS:

No attempt was made during this inspection to close out previous inspection findings because of time constraints.

E. OTHER FINDINGS OR COMMENTS:

1. Safety Parameter Display System (SPDS)

This item resulted from a request from the NRR for participation in a design verification audit of the General Electric Safety Parameter Display System (SPDS). This display system is described in NEDE-3024-P, Licensing Topical Report for the General Electric Emergency Response Information System. The NRR audit team was composed of the following personnel:

Leo Beltracchi	NRR/DHFS/HFEB
Joseph Joyce	NRR/DSI/ICSB
Michael McCoy	NRR/DHFS/PSRB
Dino Scaletti	NRR/DL/SSPRB
George Dick	NRR/DL

The members of the NRR team reviewed the available documentation for the SPDS system development consisting of design bases and functional requirements documents; human factors evaluation; procedures and systems evaluation; and control systems evaluation. The results of this audit were discussed with the General Electric staff and will be documented by the NRR staff in a report which will be transmitted to General Electric.

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The I&E Vendor Program Branch part of the design verification audit of the General Electric SPDS covered the following areas:

- 1) Verify that procedures are consistent with NRC requirements.
- 2) Verify implementation of procedures.

The review of available documentation and discussions with the General Electric staff disclosed that the design process was controlled by the GE quality assurance program defined in GE Topical Report NEDO-11209. Examination of the design review and design verification for the Emergency Response Information System design specification showed they met all procedural requirements and were satisfactory. Both the software and hardware portions of the SPDS meet the programmatic requirements of the GE Quality Assurance Program and are controlled by Engineering Operating Procedures (EOP's). The EOP's provide rigid control for in-house and field changes both for hardware and software documents.

No violations, nonconformances or unresolved items were identified in this area of the audit.

2. Automatic Depressurization System (ADS) Digital Signal Conditioner Card Fuse Failures

Illinois Power Company notified the Regional Administrator of Region III USNRC of a potential defect or noncompliance (10 CFR Part 21) involving the failure of the automatic depressurization system in Clinton Power Station, Unit 1, due to blown fuses. The basic components involved were digital signal conditioner printed circuit cards manufactured by GE and conditionally shipped to Clinton.

Because the units were conditionally shipped for initial operation testing and had not been released for use, this malfunction was not reportable under 10 CFR Part 21. All of the units were returned to GE and reworked to prevent future malfunctions. Investigation revealed the cause of the fuse failures to be attributable to GE's assignment of pins in the card edge connector. This problem was unique to this shipment so there were no generic aspects involved.

No violations, nonconformances or unresolved items were identified in this area of the audit.

ORGANIZATION: GILBERT/COMMONWEALTH
READING, PENNSYLVANIA

REPORT NO.: 99900525/84-02	INSPECTION DATE(S): 7/23-27/84	INSPECTION ON-SITE HOURS: 128
CORRESPONDENCE ADDRESS: Gilbert/Commonwealth ATTN: Mr. H. Lorenz President P. O. Box 1498 Reading, PA 19603		
ORGANIZATIONAL CONTACT: Mr. R. Holzworth, Corp QA Prog. Mgr. 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:	<u>P. Sears</u> P. Sears, Vendor Inspection Section 2	<u>8/14/84</u> Date
OTHER INSPECTOR(S):	R. McIntyre S. Sadik (EG&G) D. Weber (EG&G)	
APPROVED BY:	<u>J. Costello</u> J. Costello, Section Chief, VIS 2	<u>8/14/84</u> Date
INSPECTION BASES AND SCOPE:		
A. BASES: Topical Report GAI-TR-106		
B. SCOPE: The scope of this inspection was as follows:		
1. Status of previous inspection findings.		
2. Error in computer program M093.		
(continued on page 2)		
PLANT SITE APPLICABILITY: Perry (50-390/391)		

ORGANIZATION: GILBERT/COMMONWEALTH
READING, PENNSYLVANIA

REPORT NO.: 99900525/84-02	INSPECTION RESULTS:	PAGE 2 of 6
<p>(continued from page 1)</p> <ol style="list-style-type: none">3. Use of "Stiff Piping Clamps" at Perry.4. Electrical penetration materials at Perry.5. High pressure Core Spray Interface to Suppression Pool Cleanup System.6. Understrength pipe support shop welds.7. Operation of Reactor Core Isolation Cooling System Equipment Room Cooler.8. Missing Rear Bracing Panels in Class 1E Motor Controls Centers. <p>A. <u>VIOLATIONS:</u></p> <p>None</p> <p>B. <u>NONCONFORMANCES:</u></p> <p>None</p> <p>C. <u>UNRESOLVED ITEMS:</u></p> <p>None</p> <p>D. <u>STATUS OF PREVIOUS INSPECTION FINDINGS:</u></p> <ol style="list-style-type: none">1. (Closed) <u>Violation (83-02):</u> A purchase order issued to University Computing Company did not specify that the provisions of 10 CFR Part 21 applied. The NRC inspector verified that purchase order had been changed to impose 10 CFR Part 21. The inspector also verified that 10 CFR Part 21 had been imposed on the other computer service companies that Gilbert/Commonwealth (G/C) uses. This item is considered closed.2. (Closed) <u>Nonconformance (83-02):</u> Purchase documents for safety-related services had not been reviewed by QA nor were quality program requirements imposed on contractors providing safety-related computer services. G/C QA w reviews and approves such purchase documents and quality program requirements are being imposed on contractors providing safety-related computer services. This item is considered closed.		

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E. OTHER FINDINGS OR COMMENTS:

1. Use of "Stiff" Piping Clamps: The compliance of safety-related piping near "stiff" pipe clamps to ASME Code, Section III, Division I (1975) was reviewed. G/C is performing an evaluation of Perry piping designs in areas where the design specifies "stiff" pipe clamps. Total pipe stresses are being re-evaluated by G/C for ten cases projected to have the highest total stresses. The overall methodology was reviewed, including the following:
 - a. the process whereby the ten highest stress cases were selected.
 - b. definition of interface loads between pipe and clamp.
 - c. methodology for the development of the local stress field in the pipe resulting from the interface loads.
 - d. methodology for incorporating the local stresses into piping design equations (Equations 9 thru 14 of the previously mentioned ASME Code Section).

G/C's evaluation was still in process during this inspection and the program will be again reviewed after it is finished.

No nonconformance or violation was identified during this part of the inspection.

2. High Pressure Core Spray (HPCS) Interfaces to the Suppression Pool Cleanup System: During a Safety System Functional Capability Review performed for Cleveland Electric Illuminating Co (CEI) by GDS Associates, a potential deficiency was identified. The potential deficiency concerned the interface between the HPCS system and Suppression Pool Cleanup (SPCU) System. The SPCU system which is non-safety related takes suction from the HPCS system via Valve E22-F015. The HPCS system will automatically start upon a level 2 loss of coolant Accident (LOCA) signal. The SPCU pump suction valves, however, close on a level 1 LOCA signal. In this situation, the HPCS pumps could experience opposing pump suction from the SPCU pump.

G/C however, determined by analysis that suction to the HPCS pump will not be lost because the pump does not have the ability to draw sufficiently to pull air back through the open SPCU line. As containment pressure increases after a the hypothesized LOCA, a

ORGANIZATION: GILBERT/COMMONWEALTH
READING, PENNSYLVANIA

REPORT NO.: 99900525/84-02	INSPECTION RESULTS:	PAGE 4 of 6
<p>greater quantity of Suppression Pool water will flow out through the SPCU line. More water, however, will be forced to the HPCS pump, thereby ensuring that the suction line to the HPCS pump will remain flooded.</p> <p>CEI implemented a design change for the controls logic for the SPCU isolation valves so they will close on a level 2 LOCA signal.</p> <p>No violations or nonconformances were identified during this part of the inspection.</p> <p>3. <u>Understrength Pipe Support Shop Welds:</u> CEI, the constructor of Perry, has contracted with Power Piping Co (PPC) for the shop fabrication of certain safety-related pipe supports to be installed at Perry. Pipe support design drawings are furnished by G/C. PPC uses these design drawings to make fabrication drawings used for the fabrication of the supports.</p> <p>Where full penetration welds are required by G/C design drawings, the weld symbol specified was an undimensioned groove weld symbol which is according to American Welding Society (AWS) 2.4. Those symbols were correctly transferred from the G/C design drawings to the PPC fabrication drawings. PPC's standard shop practice, however, was to interpret the undimensioned groove weld symbol as indicating a partial penetration weld, and partial penetration welds were provided by PPC. As a result, 132 supports requiring one or more full penetration welds were fabricated with only partial penetration welds. Of these 132 supports, 104 were shipped to Perry before discovery of the problem.</p> <p>G/C reviewed the 132 pipe support designs, with the assumption that partial penetration welds existed where full penetration welds had been specified. Of the 132 supports reviewed at the Perry site, 30 required rework or repair. The remaining 102 supports were found to be acceptable in the as-welded conditions.</p> <p>This matter will be reviewed at a future inspection at PPC.</p> <p>No nonconformances or violations were identified during this part of the inspection.</p> <p>4. <u>Electrical Penetration Pressure Boundary Bulkhead Material:</u> As a result of a G/C audit in August, 1982 at Westinghouse Industrial and Government Tube Division (WIGTD), G/C "expressed a concern in area of procurement of ASME Section III materials for penetrations previously shipped..." to Perry site.</p>		

ORGANIZATION: GILBERT/Commonwealth
READING, PENNSYLVANIA

REPORT NO.: 99900525/84-02	INSPECTION RESULTS:	PAGE 5 of 6
<p>A review of certain WIGTD purchase orders and certified material test reports for penetration pressure boundary materials showed no references that these materials were to be manufactured to ASME Section III requirements. WIGTD is presently in the process of certifying the materials used in these penetrations in accordance with rules 1 through 4 of Code Case N-242, Material Certification, approved by an ASME Council on April 12, 1979. This item will be reviewed during a future inspection at WIGTD.</p> <p>No violations or nonconformances were identified during this part of the inspection.</p> <p>5. <u>Operation of Reactor Core Isolation Cooling (RCIC) System Equipment Room Cooler:</u> A report by a G/C evaluation team, contained in G/C internal memorandum "Possible Reportable Event" (file no. 067, April 26, 1983) stated, in part, that automatic actuation of the RCIC pump occurs at reactor vessel water level 2 but the Emergency Closed Cooling Water (ECCW) System actuates automatically at level 1 (lower than level 2). The ECCW provides cooling to the RCIC room coolers. Under a hypothesized rod drop accident the RCIC system could start operation without RCIC room cooling which could possibly cause failure of the RCIC system.</p> <p>Corrective action by G/C includes modification of the RCIC cooling interlock circuit to provide automatic actuation of the ECCW cooling for the RCIC rooms whenever the RCIC system is actuated. G/C has also reviewed all the Perry safe shutdown systems for system interaction irregularities. The results of that review are documented in G/C memorandums dated September 30, 1983, "PNPP Safe Shutdown System Design Verification."</p> <p>No violations or nonconformances were identified during this part of the inspection.</p> <p>6. <u>Missing Rear Bracing Panels in Class 1E Motor Control Centers (MCC's):</u> On April 27, 1984, Eaton Corporation informed CEI that there was a possibility that several MCC's built at their Chicago plant in 1981 were shipped omitting the bolted rear bracing panel and requested CEI to inspect all MCC's for this panel. The purchase documents had been written by G/C. Of 30 MCC's shipped by Eaton, two were found to be lacking the bracing panel in six vertical sections of each MCC. Nonconformance reports OQC-823 and OQC-824 were issued by CEI as a</p>		

ORGANIZATION: GILBERT/COMMONWEALTH
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<p>result of their inspection. Rework procedures and drawings were provided by Cutler-Hammer (Eaton) and these were reviewed by the NRC inspector. The rework was completed July 13, 1984.</p>			
<p>No violations or nonconformances were identified in this part of the inspection.</p>			
<p>7. <u>Computer Program Error</u>: During an audit at G/C by SIGMA in July, 1983, an error was found in G/C's computer program M093. That error affected the accuracy of certain calculations for pipe support jet impingement loads computed for emergency conditions. G/C made a search for all calculations using M093 and it was found that approximately 100 pipe supports were affected with four of that number having recalculated loads exceeding those of the original calculations. The new loads did not, however, generate stresses exceeding allowables and no hardware changes or redesign was necessary. The computer program had been verified according to applicable procedures and the error appears to be an isolated incident.</p>			
<p>No violations or nonconformances were identified in this part of the inspection.</p>			

ORGANIZATION: GULFALLOY, INC.
HOUSTON, TEXAS

REPORT NO.: 99900343/84-01	INSPECTION DATE(S): 7/16-20/84	INSPECTION ON-SITE HOURS: 84
CORRESPONDENCE ADDRESS: Gulfalloy, Inc. ATTN: Mr. P. R. Dalton President 4730 Darien, Post Office Box 52518 Houston, Texas 77052		
ORGANIZATIONAL CONTACT: Mr. G. W. Gross, Manager Quality Assurance TELEPHONE NUMBER: (713) 672-7451		
PRINCIPAL PRODUCT: Nuclear pipe, fittings, and flanges		
NUCLEAR INDUSTRY ACTIVITY: Approximately 25 percent of the 1983 production.		
ASSIGNED INSPECTOR:	<u>J. T. Conway</u> J. T. Conway, Reactive Inspection Section (RIS)	<u>9-6-84</u> Date
OTHER INSPECTOR(S):	J. Petrosino, RIS E. Trottier, RIS	
APPROVED BY:	<u>E. W. Merschhoff</u> E. W. Merschhoff, Chief, RIS	<u>9-11-84</u> Date
INSPECTION BASES AND SCOPE:		
A. <u>BASES</u> : 10 CFR Part 50, Appendix B and 10 CFR Part 21.		
B. <u>SCOPE</u> : This inspection was made as a result of the issuance of a 10 CFR Part 50.55(e) report by Gulf States Utilities pertaining to stainless steel tubing with undersized wall thickness at the River Bend nuclear facility and a notification by Texas Utilities regarding the falsification of an inspector's eye examination. In addition, this inspection was made as part (continued on page 2)		
PLANT SITE APPLICABILITY:		
Stainless steel tubing - undersized wall thickness: 50-458		

REPORT NO.: 99900343/84-01	INSPECTION RESULTS:	PAGE 2 of 6								
<p>B. <u>SCOPE:</u> (continued)</p> <p>of an NRC review of compliance by material manufacturers and suppliers with Section III, Subsection NCA-3800 requirements of the ASME code.</p>										
<p>A. <u>VIOLATIONS:</u></p> <ol style="list-style-type: none"> 1. Contrary to Sections 21.6 and 21.21 of 10 CFR Part 21: <ol style="list-style-type: none"> a. Current copies of 10 CFR Part 21 and Section 206 of the Energy Reorganization Act of 1974 were not posted in a conspicuous area. 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 55 procurement/documentation packages for Section III material revealed that 55 customer purchase orders (PO) to Gulfalloy specified 10 CFR Part 21 as an applicable requirement, but 25 Gulfalloy POs to material manufacturers (West Jersey Manufacturing-3, Hub-1, Custom Alloy-1, Sandvik-4, Camco Fittings-3, Capitol Manufacturing-2, G&W Taylor Forge-2, Tube Turns-1, Stainless Products-1, ITT Grinnell-3, Hawley Forge-1, Teledyne Columbia-1, Rollmet-1, and Parker Hannifin-1) did not similarly specify that 10 CFR Part 21 would apply. 										
<p>B. <u>NONCONFORMANCES:</u></p> <ol style="list-style-type: none"> 1. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Sections 2.6 and 5.6 of the "Quality Assurance Program Materials Identification and Verification Manual" (QAM), a review of customer order files for nuclear orders revealed the absence of a Receiving Inspection Report for 6-6/16 in. SA-234 tees purchased from Hub, Inc. on PO No. 22-27-21955 in July 1981. 2. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Sections 5.1 and 5.2 of the QAM, a review of POs for nuclear orders revealed that the following 3 POs did not require a QA program certification statement (i.e., use a QA program accepted/approved by ASME or Gulfalloy): 										
<table style="width: 100%; border: none;"> <thead> <tr> <th style="text-align: center;"><u>PO</u></th> <th style="text-align: center;"><u>Vendor</u></th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">29-27-900471</td> <td style="text-align: center;">West Jersey Manufacturing</td> </tr> <tr> <td style="text-align: center;">29-27-900742</td> <td style="text-align: center;">Sandvik</td> </tr> <tr> <td style="text-align: center;">22-27-19675</td> <td style="text-align: center;">Capitol Manufacturing</td> </tr> </tbody> </table>			<u>PO</u>	<u>Vendor</u>	29-27-900471	West Jersey Manufacturing	29-27-900742	Sandvik	22-27-19675	Capitol Manufacturing
<u>PO</u>	<u>Vendor</u>									
29-27-900471	West Jersey Manufacturing									
29-27-900742	Sandvik									
22-27-19675	Capitol Manufacturing									

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<p>3. Contrary to Criterion V of Appendix B to 10 CFR Part 50, Section 11.2.2.1 of the QAM, and Sections 9.5 and 9.6 of SNT-TC-1A, a review of nondestructive examination (NDE) records revealed that Southwestern Laboratories (SL) was designated to perform NDE services for Gulfalloy in July 1980 and performed such services in May 1983, but a copy of SL's written practice was not on file, and there was no documented evidence that Gulfalloy had approved SL's written practice.</p> <p>4. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Subsection NCA-3861(b) of Section III of the ASME Code, a review of POs for nuclear orders and external audits revealed that Custom Pipe Coating added dimecote EZ weldable primer to 100 feet of Section III, Class 2 pipe in accordance with PO No. 22-27-17583 dated June 25, 1980. The SA-106 Pipe was ordered by Ebasco under PO No. WPS-4562, but there was no documented evidence that Ebasco had approved the QA program of Custom Pipe Coating or that the vendor was surveyed or audited by Gulfalloy.</p> <p>5. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Instrument Calibration Procedure N-7, a review of annual calibration records revealed that micrometers No. 1 (S/N 3528199) and No. 2 (S/N 4524701) were overdue for their annual calibration in 1981. Micrometer No. 1 was overdue by 6 months and micrometer No. 2 was overdue by 3 months.</p> <p>6. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Sections 13.1 and 13.3 of the QAM, a review of training records from February 1980 to July 1984 revealed an absence of records to indicate that the Power Sales/Purchasing personnel were indoctrinated with the requirements of Gulfalloy's QA program.</p> <p>7. Contrary to Criterion V of Appendix B to 10 CFR Part 50, Section 9.2 of the QAM and Subsections NCA-3869.1 and NCA-3869.2, a review of internal audits conducted in 1982, 1983, and 1984 revealed the following:</p> <ul style="list-style-type: none">a. There was no documentation to show the cause and the corrective action taken on 8 and 6 deficiencies identified in internal audits conducted in January 1982 and January 1984, respectively.b. Re-audits were not performed in any of the 8 deficient areas identified in the internal audit of January 1982. <p>C. <u>UNRESOLVED ITEMS:</u></p> <p>None.</p>		

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D. OTHER FINDINGS OR COMMENTS:

1. Stainless Steel Tubing - Wall Thickness Undersized - Gulf States Utilities reported that 3/4 inch stainless steel tubing from 3 suppliers was delivered to the River Bend site. The 10 CFR Part 50.55(e) report indicated that the tubing was 0.065 inch wall thickness but should have been 0.109 inch wall thickness to meet the engineering specification.

Gulfalloy supplied approximately 550 ft. of this tubing per Stone and Webster (SW) PO No. 12210-16134 dated March 15, 1982. SW specified the tubing to be 3/4 inch, SA-213, Type 316 in accordance with the requirements of Section III/Class 2 of the Code and S&W specification No. 211-180. The inspector reviewed S&W specification No. 211-180 and noted that it referenced ANSI B36.19 for dimensional requirements of stainless steel 2 inch OD and smaller. ANSI B36.19 requires that a weight or schedule (i.e., identify the wall thickness) be specified for each diameter of tubing.

It should be noted that S&W PO No. 12210-16134 did not designate any wall thickness. Gulfalloy ordered (PO No. 29-27-902023) 3/4 inch x 0.065 wall, SA-231 tubing to Section III/Class 2 requirements from Teledyne-Columbia on June 15, 1982. Teledyne's Certified Material Test Report (CMTR) dated July 30, 1984 noted that the material shipped to Gulfalloy was 559 ft. of SA-213 ".750 in. x .065 in. wall." The CMTR along with Gulfalloy's Material Test Report (MTR) dated August 4, 1984 and a shipping invoice, both of which identified the dimensions as "3/4 inch x .065 min wall," were sent to S&W along with the tubing which was shipped on August 30, 1982.

A review of the documents relating to the undersized tubing supplied by Gulfalloy indicates that the problem resulted from an incomplete "callout" of dimensional requirements on the customer's PO.

2. Falsified Eye Examination - During a Texas Utilities Generating Company (TUGCo) audit of the Gulfalloy QA program in December 1983, evidence could not be found that inspectors had received eye examinations during the previous 12 months. In response to this audit finding, Gulfalloy submitted eye examination reports for the subject year as well as several previous years. Upon review by TUGCo, it was discovered that the eye examination report for 1981 was actually a copy of the 1980 eye examination report with an altered date.

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Gulfalloy notified NRC, Region IV regarding this incident, and both TUGCo and Gulfalloy investigated the circumstances surrounding the falsified eye examination report dated October 22, 1981.

While the individual(s) responsible for altering the eye examination report may never be conclusively identified, the following was verified by the NRC inspector:

- a. Eye examination reports for Gulfalloy inspectors dated September 15, 1982 and January 16, 1984 were reviewed and found to be in order.
 - b. The Quality Assurance Coordinator has since left the company.
 - c. Gulfalloy management has redefined the responsibilities of the Manager of Quality Assurance and provided him a full-time assistant.
3. Instrument and Testing Equipment Control - The inspector reviewed the applicable section of the QAM and daily, monthly, and yearly calibration records for micrometers (back to 1978) and gauge blocks (back to 1977). In addition, certificates of calibration (back to 1978) provided by calibration service vendors assuring traceability to National Bureau of Standards were reviewed to assure that the measuring and test equipment is properly identified, controlled, and calibrated at specified intervals. Nonconformance B.5 was identified in this area of the inspection.
4. Compliance with 10 CFR Part 21 Requirements - A review was conducted and the shop area was inspected to verify that Gulfalloy had complied with the posting and procedural requirements of 10 CFR Part 21. Violations A.1 and A.2 were identified in this area of the inspection.
5. Training/Qualifications - Gulfalloy's training/qualification records for three inspectors, three lead auditors, and QA, power sales, purchasing, operations and warehouse personnel were reviewed to assure that personnel performing and verifying activities affecting quality were trained and qualified. The NRC inspector noted that Gulfalloy's lead auditor certification requirements closely follow ANSI-N.45.2.23 requirements even though the standard is not imposed on them.

A review of NDE records was also undertaken to assure that the certification requirements meet SNT-TC-1A. Nonconformances B.3 and B.6 were identified in this area of the inspection.

REPORT NO.: 99900343/84-01	INSPECTION RESULTS:	PAGE 6 of 6
<p>6. <u>Audits</u> - One procedure; internal audits for 1982, 1983, and 1984; and 27 material source evaluation reports (external vendor audits) were reviewed to assure that the scheduled audits were completed in accordance with applicable checklists and implemented on schedule and all areas of the QA Program were effectively and properly implemented. Seven external audits of 3 vendors were also reviewed. Nonconformance B.7 was identified in this area of the inspection.</p> <p>7. <u>Procurement Control</u> - The inspector reviewed the applicable section of the QAM, Gulfalloy's Approved Vendor List and approximately 55 procurement documentation packages. The documentation packages consisted of customer POs, Gulfalloy POs to their suppliers, CMTRs for the purchased material, and Gulfalloy MTRs and receiving inspection reports. The review was undertaken to assure that applicable regulatory technical, and QA program requirements are included or referenced in procurement documents and that material was purchased from qualified vendors.</p> <p>It was noted on an order from Ebasco (PO No. WPS-5774) and one from Joilet Valve (PO No. 10187) that CMTRs from Capitol Manufacturing and Sandvik, respectively, did not address the applicability of 10 CFR Part 21, but Gulfalloy certified on their MTRs that the material met the requirements of 10 CFR Part 21.</p> <p>Nonconformances B.1, B.2, and B.4 were identified in this area of the inspection.</p>		

ORGANIZATION: HUB, INCORPORATED
TUCKER, GEORGIA

REPORT NO.: 99900866/84-01	INSPECTION DATE(S): 9/18-9/22/84	INSPECTION ON-SITE HOURS: 65
CORRESPONDENCE ADDRESS: Hub, Incorporated ATTN: Mr. B. H. Camp Chairman of the Board 2146 Flintstone Drive Tucker, Georgia 30084		
ORGANIZATIONAL CONTACT: Mr. E. Thornton, Manager, Quality Assurance (404) 934-3101		
PRINCIPAL PRODUCT: Pipe, Valves, Fittings, Structural Steel, Fasteners		
NUCLEAR INDUSTRY ACTIVITY: Approximately 85 percent of the Energy and Process Division of Hub, Inc. sales are made to the commercial nuclear industry.		
ASSIGNED INSPECTION:	<u>E. T. Baker</u> E. T. Baker, Reactive Inspection Section (RIS)	<u>9/2/84</u> Date
OTHER INSPECTOR(S):	R. L. Cilimberg, RIS	
APPROVED BY:	<u>E. W. Merschoff</u> E. W. Merschoff, Section Chief, RIS, VPB, DQASIP, OI&E	<u>8/2/84</u> Date
INSPECTION BASES AND SCOPE:		
A. <u>BASES</u> : 10 CFR Part 21, Appendix B, and NCA-3800		
B. <u>SCOPE</u> : This inspection was made to verify implementation of the Hub, Incorporated Quality Assurance Program with respect to it's activities as a major supplier of products to the nuclear industry. It included verification of Hub's compliance with the quality assurance provisions contained in Sub-article NCA-3800 of Section III of the ASME Boiler and Pressure Vessel Code, Appendix B to 10 CFR Part 50, and 10 CFR Part 21.		
PLANT SITE APPLICABILITY: 50-400, 50-325, 50-329, 50-289, 50-285, 50-302, 50-389, 50-413, 50-414, 50-369, 50-370		

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<p>A. <u>VIOLATIONS:</u></p> <ol style="list-style-type: none">1. Contrary to Section 21.21 of 10 CFR Part 21, Hub procedures did not include an evaluation process. The procedures only covered the particular customer purchase order on which the deficiency was found. There were no provisions to review material in stock or perform a file search for other customers who might have received the same material.2. Contrary to Section 21.31 of 10 CFR Part 21, material was furnished by Hub on some purchase orders for which the applicability of 10 CFR Part 21 was a specific requirement, without similarly specifying its applicability in the Hub procurement documents for these items. In addition, neither the Quality Systems Manual (QSM) nor any other procedures require that the Part 21 applicability statement be applied to purchase orders or that anyone review the purchase orders to assure that it is there. <p>B. <u>NONCONFORMANCES:</u></p> <ol style="list-style-type: none">1. Contrary to Criterion IV of Appendix B to 10 CFR 50, NCA-1140(b), NCA-3867.4.b, and paragraph 5.3.2 of the Quality Systems Manual (QSM), Hub is not imposing on their suppliers the requirements imposed on Hub by their customers.2. Contrary to Criterion VII of Appendix B to 10 CFR 50 and Baltimore Gas and Electric (BG&E) purchase specification SP-242 Hub, is not assuring that all purchased material meets the procurement requirements.3. Contrary to Criterion X of Appendix B to 10 CFR 50, inspectors were required to inspect work which they had performed.4. Contrary to Criterion XV of Appendix B to 10 CFR 50, Hub did not have a procedure or criteria for accepting material that was initially dispositioned as nonconforming due to loss of traceability. In addition, Hub did not have a procedure for handling nonconformance reports (NCRs) received from customers.5. Contrary to Criterion XVI of Appendix B to 10 CFR 50 Hub's procedures do not require corrective action for internal nonconformances, only for nonconformances found during audits of suppliers programs.		

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<p>6. Contrary to Criterion XVII of Appendix B to 10 CFR 50 and paragraph D. of Quality Control Procedure (QCP) #6, Hub was not maintaining records as required.</p>		
<p>C. <u>UNRESOLVED ITEMS (URI):</u></p>		
<p>A review of NCRs written by Hub on material supplied to them with various marking/traceability problems resulted in the following unresolved items. In each of the NCRs listed below traceability had been lost by the time the material had reached Hub. Hub informed the supplier of the marking/traceability problem. In all cases Hub accepted a letter from the suppliers authorizing Hub to re-mark the material as appropriate corrective action and re-marked the material. No additional substantiating documentation or explanation of how traceability was re-established was requested or received. Hub has agreed to request additional substantiating documentation from their suppliers. A listing and brief description of the NCRs follows:</p>		
URI 84-01-01	NCR # 42 25% of 3995' of 2" x H Seamless A106 GrB pipe was received with two different heat numbers stenciled on each piece.	
URI 84-01-02	NCR # 56 3" SA-106 Gr. B pipe, Heat Number on pipe 366195, Heat Number on CMTR 366340.	
URI 84-01-03	NCR # 62 16 SA 193 Gr B7 studs received without any markings or tags.	
URI 84-01-04	NCR # 94 168' of 3/8" rod and 420' of 1" rod were not marked as a bundle or as individual pieces.	
URI 84-01-05	NCR # 96 A quantity of nuts were received which were marked A4. The CMTR was for trace code Y13. The response from the supplier was a new CMTR for trace code A4Y13 and instructions to mark the nuts as such.	
URI 84-01-06	NCR # 98 One 4" standard 45° Elbow SA234WPB was received with heat code JJ72 while the CMTR was for heat code LL72.	
<p>Copies of substantiating documentation or explanations should be submitted to the NRC inspector with the response to this report or as they become available.</p>		

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<p>D. <u>PREVIOUS INSPECTION FINDINGS:</u></p> <p>This was the first visit to Hub, Inc.</p> <p>E. <u>OTHER FINDINGS AND COMMENTS:</u></p> <p>1. <u>Part 21</u></p> <p>a. Four out of twenty-one purchase orders reviewed did not contain Part 21 applicability statements. Even though Hub's procedures did not require the application of or review for Part 21 applicability statements on POs most of the POs reviewed included the required statements. More consistent compliance with the regulation would result from requiring review of POs to assure the applicability statement is included. (See Violations 1 and 2.)</p> <p>2. <u>Procurement Document Control</u></p> <p>Hub, in purchasing material to fill customer orders, has referenced in their POs ASME Code editions and addenda later than those imposed on them by their customers. The Code allows this only when the mutual consent of the Owner or his designee is obtained. Hub did not request or have on hand any documentation that the Owners had consented to the changes in Code editions or addenda. Hub's position was that the Owner's acceptance of Hub's Certificate of Conformance and the manufacturer's CMTRs constituted mutual consent. It is the inspector's position that the acceptance could just as likely be a matter of oversight and that the Code had a much more formal method of mutual consent in mind. (See Nonconformance B.1.)</p> <p>In addition, NCA-3867.4.b requires that CMTRs contain a statement that the material was produced under a program which meets NCA-3800 as determined by ASME, a Certificate Holder or an organization audited and approved by a Certificate Holder. Hub does not require that the statement appear on all CMTRs where applicable. (See Nonconformance B.1.)</p> <p>3. <u>Control of Purchased Material, Equipment, and Services</u></p> <p>a. On Hub PO T-8102002, Hub specified the 1977 Edition/Summer 1978 Addenda as required by the BG&E PO. The material received by Hub and shipped to BG&E was produced to the 1977 Edition/Winter 1977 Addenda. The BG&E procurement specification imposed on Hub required that Hub obtain BG&E's approval prior to changing the Code edition and addenda under which the material was produced. Hub had not requested that approval. While the inspection was on-going Hub contacted BG&E and received verbal approval of the changes.</p>		

- b. Although Hub's procedures do not require that suppliers of material purchased for inventory be on the AVL or that QA review POs to assure that suppliers are on the AVL, only one supplier of services, a machine shop, was not on the AVL. (See Nonconformance B.2.)

4. Inspection

While witnessing an inspection of pipe, the NRC Inspector observed a Hub inspector perform a dimensional and marking inspection, complete the inspection record, and then stencil the PO number on the pipe. However, the marking procedure requires inspectors to mark each piece upon cutting or removing the piece from the bundle. In addition, the Hub QSM states that QC inspectors are responsible for applying/transferring markings and then inspecting their own work.

5. Nonconforming Materials, Parts, or Components

Hub's final disposition of material which was found to be nonconforming on receipt due to loss of traceability was inconsistent and it was obvious that there were no set criteria to determine acceptability. Of the 57 NCRs reviewed, six were found to have questionable dispositions. This item is discussed in more detail under Unresolved Items. (See Nonconformance B.4.)

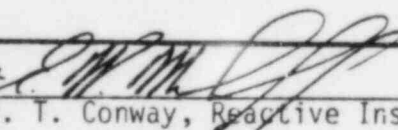

6. Corrective Action

Several instances of material shipped by Hub with incorrect markings applied by Hub personnel have occurred. Corrective action as to cause has not occurred because Hub's procedures only require corrective action for nonconformances found during audits at suppliers' facilities. It is obvious that part of the marking problem stems from the fact that the Hub inspectors mark the material and then inspect their own work. Also, as pointed out in 4. above, the markings are sometimes applied after the inspection. (See Nonconformance B.5.)

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<p>7. <u>Records</u></p> <p>Of the 63 sets of records reviewed, four instances of incomplete or missing records were observed.</p> <ol style="list-style-type: none">1. The Taylor Forge liquid penetrant inspection records for the 6" and 2" flanges on Stone and Webster PO 20285 were not approved by Taylor Forge QC inspector.2. Hub material cutting reports were not signed and dated by the person who cut the material on Hub PO 81001102, Omaha Public Power PO 04338, and TVA PO 64-943882.3. The ultrasonic test report for Hub PO T-8102002 and magnetic particle test report for Hub PO 8003310 were not available at Hub. Both reports were obtained from the manufacturer during the course of the inspection. (See Nonconformance B.6.)		

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REPORT NO. 99900282/84-01	INSPECTION DATE: 6/25-29/84	INSPECTION ON-SITE HOURS: 32
CORRESPONDENCE ADDRESS: ITT Grinnell Pipe Hanger Division ATTN: Mr. D. M. Sewell, Vice President and Director of QA 621 Dana Avenue Warren, Ohio 44481		
ORGANIZATIONAL CONTACT: Mr. D. M. Sewell, Vice President & Director of QA TELEPHONE NUMBER: (216) 373-1500		
PRINCIPAL PRODUCT: Component Supports		
NUCLEAR INDUSTRY ACTIVITY: Approximately 60% of ITT Grinnell's (ITT) work is devoted to the domestic nuclear power industry.		
ASSIGNED INSPECTOR: <u>For </u> J. T. Conway, Reactive Inspection Section (RIS)		<u>8/8/84</u> Date
OTHER INSPECTORS: E. Trottier, RIS T. Burns, Consultant		
APPROVED BY: <u></u> E. W. Merschhoff, Section Chief, RIS		<u>8/8/84</u> Date
INSPECTION BASES AND SCOPE:		
A. <u>BASES</u> : 10 CFR Part 50, Appendix B and 10 CFR Part 21.		
B. <u>SCOPE</u> : This inspection was made as a result of the issuance of a 10 CFR Part 21 report pertaining to defective valve blocks in hydraulic snubbers at the Palisades Plant and a 10 CFR Part 50.55(e) report relating to dimensional nonconformances on pipe clamps at the Bellefonte Nuclear Plant Units 1 and 2. In addition, this inspection included a followup on inspection findings identified during an NRC inspection of Diversified (continued on page 2)		
PLANT SITE APPLICABILITY:		
Defective valve blocks: 50-255; dimensional nonconformances: 50-438/439; mathematical errors: 50-445.		

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<p>B. <u>SCOPE</u> (continued):</p> <p>Threaded Products for procurement controls; a followup on mathematical errors in calculation packages for pipe hangers/supports at Comanche Peak identified during an inspection of Texas Utilities Generating Company, and an assessment of the implementation of the QA program particularly in the areas of training/qualifications, procurement control, control of purchased material and services, control of special processes, calibration of measuring and test equipment, and audits.</p> <p>A. <u>VIOLATIONS</u>:</p> <p>Contrary to Section 21.31 of 10 CFR Part 21 and page 2 of Attachment A, SQAV-1 of QA/QC Procedure No. 02A025, a review of 44 purchase orders (PO) to material suppliers and 13 POs to service vendors revealed that 4 POs for welding material (Nos. P 13625, P 13452, and P 11754 to William M. Orr Company and No. 10938 to Alloy Rods Inc.) and two POs for steel bar stock (Nos. P 11479 and P 11280 to Republic Steel) referenced type QAV-002 material, but the POs did not specify that 10 CFR Part 21 would apply.</p> <p>B. <u>NONCONFORMANCES</u>:</p> <ol style="list-style-type: none">1. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Sections 4.2 and 4.3 of QA/QC Procedure No. 10A011, a review of calibration records for measuring and test equipment (M&TE) revealed the following:<ol style="list-style-type: none">a. Honeywell calibrated the Limit Control, Dial Recorder, and Strip Chart Recorder used on the heat treat furnace on a quarterly basis since November 1982, but the January and April 1984 Field Service and Material Reports for these M&TE did not contain a statement of traceability to the National Bureau of Standards (NBS).b. R. L. Holliday calibrated the ultrasonic test units (Model Nos. USL-38 and S-301), but their certifications dated February, April, August and November 1983; and February and April 1984 did not contain a statement of traceability to the NBS.		

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2. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section C.1 of QCH-3.1 and Sections B.1 and C.1 of QAM-3.2 of the Quality Assurance Manual (QAM) a review of purchase orders (PO), Approved Vendor Lists (AVL), and vendor audits revealed the following:
- a. PO No. 13875 was placed with Hilti, Inc. on March 20, 1984 which was approximately 6 weeks past the annual audit date (previous audit was performed on February 8, 1983).
 - b. Five vendors were on the AVL dated June 5, 1984, but annual audits were overdue as noted below:

last audit in 1983

Republic Steel	April 26
United Screw and Bolt	April 20
Wetzel Plating	May 27
Lindberg Heat Treating	April 19
R. C. Holliday	May 6

C. UNRESOLVED ITEMS:

During a review of records for nondestructive examination (NDE) personnel, it was noted that a Level III magnetic particle (MT) examiner (social security no. 037-22-0236) from ITT's facility in Providence, Rhode Island, certified an individual in the Warren, Ohio facility to a Level II MT in August 1983, but the NDE records at the Pipe Hanger Division did not contain copies of the Level III's general and practical examinations. This item will remain open and will be evaluated at the next inspection of ITT's facility in Providence, Rhode Island.

D. FOLLOWUP ON PREVIOUS INSPECTION FINDINGS:

(Closed) Violation (Inspection Report 99900285/82-01) - This item addressed a dimensional interference condition that existed in some mechanical shock and sway suppressors. This interference could preclude the units from achieving their specified 10° angle cone of action.

The NRC inspector reviewed a copy of ITT's customer notification letter and the related Project - Project Manager matrix. The matrix was used to generate a letter of notification to each client. The text of the letter summarizes ITT's engineering evaluation of the problem and supplies the information necessary to correct the condition. Steps taken to prevent recurrence are:

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<p>a. A manufacturing tolerance of $\pm 7^\circ$ (vice $\pm 5^\circ$) is now specified on the associated drawings and material tolerances.</p> <p>b. Each suppressor is factory-checked with a feeler gauge having a 5° interference fit.</p> <p>E. <u>OTHER FINDINGS OR COMMENTS:</u></p> <p>1. <u>Procurement Control</u> - The inspector reviewed the procurement control section of the QAM, one procedure and 57 POs (4 - welding material, 9 - calibration services, 2 - heat treat, 40 - material, and 2 - plating) to assure that applicable regulatory, technical, and QA program requirements are included or referenced in procurement documents.</p> <p>ITT utilizes documents designated "QAV" to specify the requirements for the applicable material ordered. Nine QAVs (001 for material classified as Section III - NX2610 to 009 for welding material) address specific requirements pertaining to certification of material, certification of the QA program, repair of material, marking and identifying material, and special requirements. Quality assurance (QA) assigns the proper QAV to each Travel Order Card and Purchase Requisition and Purchasing includes the assigned QAV on each PO which is submitted to QA for approval prior to issuance.</p> <p>The 57 POs including 24 to Diversified Threaded Products (DTP) for fastener material were ordered to QAV-001, QAV-002 (Section III material) or QAV-002A (small products-NX2610) requirements, and the POs were approved by QA.</p> <p>Violation A.1 was identified in this area of the inspection.</p> <p>2. <u>Control of Purchased Material and Services</u> - The inspector reviewed 4 AVLs and 30 Vendor Survey/Audit Evaluation Sheets plus applicable check lists for audits performed by ITT on 3 testing laboratories, 6 fastener suppliers, 2 weld material suppliers, 5 calibration service vendors, one plating vendor, one heat treat vendor and 5 steel suppliers to assure that material and services were purchased from qualified vendors. Seventeen Certified Material Test Reports (CMTR) and 21 Certificate of Compliances (CC) for material (i.e., steel shapes, fasteners, etc.) were reviewed to assure that these documents from the vendors addressed the requirements in the purchase documents. All the CMTRs and CCs met the requirements requested by ITT. In addition, 38 material receipt reports including 24 pertaining to fasteners supplied by DTP were reviewed and found acceptable.</p> <p>Nonconformance B.2 was identified in this area of the inspection.</p>		

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3. Welded Performance Qualification - The inspector reviewed ITT's Performance Qualification Testing program of welders and welding operators for ferrous and non-ferrous materials. This activity is governed by the requirements of Section III, Subsection NF; Section IX; and ITT specification T-SF-101-808, Rev. 0. The program was reviewed for compliance with the requirements established in the aforementioned documents.

The performance qualification records of four welders who were currently welding on June 26, 1984 were evaluated. These records covered the performance qualification history for welders EB, EL, CM and ER during the period 1980 to 1984. Each welder was found to be qualified for the weld procedure specifications (WPS) in use on June 26, 1984 (EB-1-02-1, EL-1-01-1, CM-1-01-1 and ER-1-06-1). Additionally, each welder's qualification had been maintained during this period as required by Section IX of the ASME Code.

4. Plant Tour - The inspector toured ITT's manufacturing facility at various times during the inspection. Activities observed and evaluated for technical adequacy were: welding, hanger assembly, protective coating, receipt inspection, heat treatment, various machining operations, NDE/MT, calibration, and storage/shipping. No discrepancies were identified, and housekeeping was well organized in the observed areas.
5. Welding Material Control - The control of weld filler metal was observed at bulk storage locations and at individual work stations. The bulk storage areas were found to be clean and orderly with weld filler metal stored in unopened containers, which were marked in accordance with the requirements of ITT QAM-5.0 as to size, type, classification, heat and/or lot number. The filler metal was properly segregated to preclude mixing of sizes, type and classification.

Two bulk storage holding ovens at the filler metal issue point and four storage caddies at individual welder work stations were examined for compliance with the segregation and temperature requirements of QCH-S-5.1 and QCP 02A088, respectively. Holding oven GW 10908 was marked for storage of E7018 (1/8" and 3/16" diameter), and GW 10907 was marked for storage of E7018 (3/32" and 5/32" diameter) low hydrogen covered electrodes. Electrode sizes were found to be appropriately segregated within the storage ovens. Holding oven GW 10908 was found to be operating at 260° F and GW 10907 at 255° F. These temperatures were verified using calibrated bimetallic thermometers and are in compliance with QCP 02A008, Rev. E.

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<p>The storage caddies at each welder's work station were found to be properly operating and contained correctly segregated electrodes which were readily traceable to existing weld material requisition forms. All ovens had been verified for temperature capability (250° F minimum) within the prescribed three month calibration period.</p> <p>6. <u>Calibration of Measuring and Test Equipment (M&TE)</u> - The inspector reviewed the section of gage calibration and control in the OAM, 5 procedures, calibration records for 30 M&TE, and certifications from calibration service vendors who calibrated the recorders on the heat treat furnace, the dead weight tester, a set of gage blocks, and the MT and ultrasonic test units. M&TE included micrometers, plug gages, ring gages, pressure gages, dial indicators, torque wrenches, set rings, and a hardness test. All the devices were properly identified, controlled, and calibrated at specified intervals.</p> <p>Nonconformance B.1 was identified in this area of the inspection.</p> <p>7. <u>Weld Procedure Qualification</u> - Weld procedures used by ITT are written, qualified and approved at their Providence, Rhode Island facility. The following 4 WPS (3 in use during the inspection) and their supporting procedure qualification records (PQR) were reviewed.</p> <ul style="list-style-type: none">a. 1-01-1, Rev. 28 (PQRs 13976, 14776, 14777, 18844, 18845, 19056, 19067, 19443, 19475)b. 1-01-2, Rev. 24 (PQRs 18715, 18716, 19056, 19067, 19951, 19952)c. 1-02-1, Rev. 26 (PQRs 17327, 17328, 14688, 21223)d. 1-06-1, Rev. 19 (PQRs 14779, 15261) <p>Section III, Subsection NF was used for establishing the fabrication requirements which supplement the qualification requirements of Section IX as defined by ITT in the following documents:</p> <ul style="list-style-type: none">- QAM Definitions, Rev. 2, page 1, Item A.1.- F-H-101N-80B-Z, Rev. 2, page 2, Item IV.A.13.- QAM 5.3, Rev. 6, page 1, Item D.1. <p>The following was noted by the inspector:</p>		

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<p>a. All PQRs reviewed indicate the preheat was "60° F min" or "none." It is not clear what the preheat was during the qualification test. If it was 60° F, the WPS, as written, is fully supported and any preheat in excess of 60° F is acceptable, and a reduction is also permissible. However, without a record of the actual preheat temperature, or a narrow range, used for the qualification test, this variable is in question.</p> <p>b. The 4 WPSs indicate the preheat shall be "60° F min" and that each is qualified for use on base material or weld deposit thickness in excess of 2 in. without post weld heat treatment (PWHT). The WPS would not meet the requirements in Section III, Subsection NF without specific preheat and PWHT instructions to preclude use of the procedure on materials and/or weld deposits which are not exempt from PWHT as permitted by paragraph NF-4622.1 and Table NF-4622.7(b)-1. Although these instructions are contained in ITT Specification T-SF-101-80B, Revision 0, there is no documentation to indicate that this specification is an integral part of the WPS or that the WPS must not be used for Section III welding unless the welder knows that the requirements of T-SF-101-80B apply.</p> <p>c. Two WPSs permit use of various weld filler metal combinations which may be impractical from a control standpoint. WPS 1-01-1-28 and WPS 1-01-2-24 indicate that a weld filler metal must be selected, but it is not clear how this selection is made. WPS 1-01-1-28 states in item IV.9 that "Material Specified on M-SF-96 (Materials Specification Welding Filler Metals Ferrous Electrodes and Welding Rods) shall be used." However, the inspector questioned whether the information provided therein is of value to production personnel. The inspector also noted that control and tracking problems could result by requiring this selection be made as described.</p> <p>8. <u>Training/Qualifications</u> - The training/qualification records for 7 inspectors, 14 NDE personnel, and 5 auditors was reviewed to assure that personnel performing and verifying activities affecting quality were trained and qualified in the principles, techniques, and requirements of the activity being performed. It was noted that the auditors were certified to ANSI N45.2.23 and the inspectors met the visual requirements of SNT-TC-1A. The 11 Level II and the 3 Level III examiners met the requirements of SNT-TC-1A pertaining to their specific discipline, i.e., ultrasonic, magnetic particle, or liquid penetrant.</p>		

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<p>9. <u>Audits</u> - The inspector reviewed the section on audits in the QAM, 7 internal management audits of the QA program and 10 external audits performed on 6 vendors. All the audits were conducted with approved checklists by trained and qualified personnel.</p> <p>10. <u>Followup on Regional Requests</u> -</p> <p>a. During an NRC-Region IV inspection of Texas Utilities Generating Company's Comanche Peak Unit 1, mathematical errors were discovered in calculation packages prepared for pipe hangers/supports. Although the mathematical errors were typically "rounding up" or using values that provided engineering conservatism to calculations, ITT's Engineering Services QA Manual Procedure QCES-2.3.6 (paragraph C.1.B.1) requires identification of such "incorrect" values.</p> <p>ITT's Research, Development and Engineering Group in Providence, Rhode Island, reviewed a total of 2181 pipe hanger/support calculation packages. Of these, 1676 were properly annotated where conservative values were used, and 455 were corrected. Fifty required additional review and research to identify the reasons for deviation from established design calculation procedures. All deviations were properly documented in the group of 50. (Typical entries were, "No deflection required for this application, no deflection calculation performed.")</p> <p>In addition, ITT-Warren, Ohio conducted 9 QA program audits between May and December 1982. In the semi-annual report dated January 17, 1983, the following deficiency was identified:</p> <p style="padding-left: 40px;">Projects were generally not in compliance to requirements that all corrections to calculations be reconciled with and initialed by the original design engineer, and that all design assumptions be documented. Implementation of the required corrective actions, and the QA Refresher Training Classes will resolve these deficiencies.</p> <p>Subsequently, in the semi-annual report dated November 1, 1983 for internal QA program audits conducted between January and June 1983, the following entry regarding previous, recurring deficiencies was noted:</p>		

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Except for an occasional isolated oversight, projects are now in compliance with requirements to reconcile all calculation corrections with the original design engineer and to document all design assumptions. The deficiencies in this area are considered to be no longer generic and satisfactorily reconciled.

- b. The Tennessee Valley Authority (TVA) filed a 10 CFR Part 50.55(e) report on May 6, 1983, that described 10 deficiencies encountered with pipe clamps (general term) supplied by ITT to the Bellefonte nuclear site.

Deficiency 1 - Seventy-five, 4 in. pipe clamps would not tighten sufficiently to provide firm contact and maintain proper mechanical alignment. All 75 were returned to ITT, Warren, Ohio. Each clamp was inspected, attached to a section of 4 in. pipe and adjusted for proper fit. The adjustment took into account material tolerances in pipe size and clamp thickness (inner vs. outer diameter). Proper fit was achieved by providing a shorter tightening bolt (longer effective thread run) or using washers. The clamps were returned to TVA. Sixty-four were found unacceptable and again returned to ITT. The NRC Inspector observed the clamps and was advised by ITT that they intend to repeat the pipe clamp mock-up as before, but this time in the presence of a TVA representative.

This item will remain open and will be evaluated at the next inspection of ITT.

Deficiency 2 - This deficiency relates to ITT's Figure 306/307 Mechanical Snubbers and their inability to attain an interference-free 10° cone ($\pm 5^\circ$) of action. This item is addressed in Section D of this report.

Deficiency 3 - ITT Figure 40 riser clamps of various sizes could not be tightened sufficiently to establish and maintain proper orientation between pipe and clamp. ITT prepared Field Procedure PE-425 and forwarded it to TVA for implementation. When this procedure, which shortened clamp spacers to allow clamp halves to "snug down" further on the pipe, did not correct all Figure 40 rise clamps, ITT prepared field Procedure PE-463. This second procedure described how and where attachments were to be welded to the hanger clamp to block relative motion between pipe (actually lug ears welded to pipe) and hanger. Both procedures are intended to restrain pipe rotation.

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Deficiency 4 - Two, 1/2 in. pipe clamps for use with ITT Figure 211 size A sway struts demonstrated interference between the clamp bolt head and the clamp radius (i.e., bolt head did not sit perfectly level on clamping area). ITT concludes that the slope of the clamp bolt head is within tolerance specified in the ASME Code and transmitted this information to TVA in a letter dated April 4, 1983.

Deficiency 5 - The material thickness of pipe clamp ears varied between 1.509 and 1.350 in. Since ITT drawing 1VE MPHG-0765, Sheet 2, Detail A (Revision 1) called for a stock thickness of 1.500 in., the items were deemed to be out of tolerance. The results of ITT's analysis (contained in Telex No. GR2754, dated May 11, 1983,) indicated that while over-pressing the clamp sections during hot forging may have altered certain dimensions, the cross-sectional area of the pipe clamp ears is within the required range.

Deficiencies 6, 7, and 8 - Three sizes of pipe clamps (32, 30, and 22 in.) could not be tightened sufficiently to establish and maintain proper orientation between pipe and clamp. The resolution of these deficiencies is the same as that stated for Deficiency 3 above. Depending on pipe clamp application, either Field Procedure PE-425 or PE-463 was used to instruct field personnel in modifying the subject clamps.

Deficiencies 9 and 10 - Two 24 in. pipe clamps were twisted such that neither could be made to fit the pipe properly. The clamps were returned to ITT, and replacement clamps were shipped on February 27, 1981. ITT manufacturing and quality control personnel were appraised of the problem and cautioned to use more care in manufacturing and inspecting clamps.

- c. Consumers Power Company (Consumers) filed a 10 CFR Part 21 report with NRC Region III on September 30, 1983 addressing the failure of all 16 hydraulic snubbers that restrain the steam generators (8 per generator) to "lock-up" (i.e., no hydraulic "float" existed to restrain the steam generators in the presence of vibratory motion).

Preliminary investigation gave the cause as "dimensional stack-up" that allowed the end spring to fully compress (go solid) while the shuttle valve (spool) did not close down the hydraulic fluid flow path to lock-up the snubber. It was noted that a revision to the original design specification in June 1968 by Combustion Engineering substituted the catalogue spring with a stiffer, non-stock spring. The heavier spring was intended to change the vibratory velocity at which lock-up occurred.

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Further investigation revealed that the failure to lock up was actually a combination of two problems. First, the revision to the original purchase specification for the snubber system called for a stiffer end spring. Second, during mid-1968, ITT changed the cylinder cap bolt in their 8 in. snubber assemblies from one having a 0.25 in. counter bore to one having a 0.38 in. counter bore. When Consumer's snubbers were assembled in October 1968, the 0.25 in. counter bored cylinder cap bolt was used vice the newly specified 0.38 in. value. It was the combination of the stiffer end spring and incorrect counter bore that caused the Palisades Plant steam generator snubbers to fail to achieve lock-up.

In an October 7, 1981 letter to Consumers, ITT recommended increasing the cylinder cap counter bore to 0.38 in. or replacing the old cylinder cap with one having the required 0.38 in. size counter bore. In addition, ITT now possesses a larger test stand capable of testing a greater range of snubber sizes and lock up rates. This newer, more sophisticated equipment is now used to bench test each snubber before shipment.

- d. Arizona Public Service Company filed a 10 CFR 50.55(e) report on March 29, 1983 relating to the inability of ITT supplied mechanical shock suppressors at Palo Verde to achieve their specified plus or minus 5 degree of angulation without binding or bending. Public Service Electric and Gas Company of New Jersey (Hope Creek) and Public Service of Indiana (Marble Hill) have also filed 10 CFR 50.55(e) reports on this subject. The shock suppressors were purchased from Pacific Shock Suppressors and the clamps were ITT Figure 306/307 Mechanical Snubber Attachment Clamps. ITT has evaluated this problem of interference involving Figure 306/307 snubbers and has notified all customers based on the following shipping dates:

1. Prior to October 1978 - check for proper clearance,
2. October 1978 to April 1980 - alleviate interference by slight grinding of clamp ends and/or bracket welds,
3. After April 1980 - acceptable based on design changes.

Further, ITT has implemented corrective actions in manufacturing and Quality Control that should preclude occurrence of such deficiencies in the future.


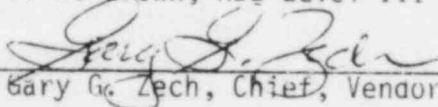
ORGANIZATION: JOHN CRANE - HOUDAILLE, INC.
TULSA OKLAHOMA

REPORT NO.: 99900858/84-01	INSPECTION DATE(S): 7/9 - 10/84	INSPECTION ON SITE HOURS: 18
CORRESPONDENCE ADDRESS: John Crane - Houdaille, Inc. ATTN: Mr. Loyd McCart Division Manager 9409 E. 55th Place Tulsa, Oklahoma 74145		
ORGANIZATIONAL CONTACT: Mr. Jack Miller, Operations Manager TELEPHONE NUMBER: (918) 664-5156		
PRINCIPAL PRODUCT: Mechanical seals and packing NUCLEAR INDUSTRY ACTIVITY: Less than 1%		
ASSIGNED INSPECTOR:	<u>R. E. Oller</u> R. E. Oller, Reactive Inspection Section	<u>8-6-84</u> Date
OTHER INSPECTOR(S):	N. J. Miegel, RIS	
APPROVED BY:	<u>E. W. Merschoff</u> E. W. Merschoff, Chief, RIS	<u>8-7-84</u> Date
INSPECTION BASES AND SCOPE: A. <u>BASES</u> : Appendix B to 10 CFR Part 50, and 10 CFR Part 21. B. <u>SCOPE</u> : This inspection was made as a result of an allegation received by the NRC concerning mishandling of nuclear sheet gasket material and the related certification document.		
PLANT SITE APPLICABILITY: Not Applicable.		

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<p>A. <u>VIOLATIONS:</u> None</p> <p>B. <u>NONCONFORMANCES:</u> None</p> <p>C. <u>UNRESOLVED ITEMS:</u> None</p> <p>D. <u>OTHER FINDINGS OR COMMENTS:</u> <u>Allegation concerning Crane-Tulsa warehouse:</u></p> <p>1. <u>Introduction:</u> On March 12, 1984, the NRC Region IV office received a letter alleging that certified nuclear sheet gasket material sold by the John Crane - Houdaille, Inc. warehouse, located in Tulsa, Oklahoma, was accidentally opened, unrolled on the floor and walked on. It was then cleaned, rerolled and sealed for shipment. The material was manufactured by John Crane - Houdaille, Inc. in Morton Grove, Illinois and sold by the Tulsa warehouse to Kamen Supply Company.</p> <p>2. <u>Finding:</u> The NRC inspectors performed an independent verification review of conditions related to the allegation. This was done through observations of storage and handling practice for both noncertified and certified gasket materials, review of procurement and shipping records, and private interviews with warehouse personnel. This review provided the following information. The Tulsa, Oklahoma branch of the John Crane - Houdaille Company is a warehouse and distribution point for items manufactured at their Morton Grove, Illinois plant. Material delivered to the Tulsa warehouse is unloaded by either the warehouse manager or a designated employee. All nuclear certified material has been plastic bagged, vacuum sealed and boxed at the Morton Grove plant. The box is opened</p>		

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<p>on arrival at the Tulsa site by either the warehouse manager or a designated employee to verify the contents, however the vacuum seal is not disturbed. After the box is opened the nuclear material is placed in a "hold" area of the warehouse where it remains until shipped to the customer. It is not mixed with the non-nuclear material. Three copies of the material certification accompany all nuclear material. One copy is retained for the files at the Tulsa facility, and the other two are generally forwarded with the material to the customer. It would be possible, however, for one or more copies of the certification to be accidentally lost or separated from the material.</p> <p>Orders for non-nuclear material placed with the Tulsa facility are filled when possible from stock on hand. If necessary, this material will be unrolled and cut to fill an order. However, nuclear certified material is not kept in stock at the Tulsa warehouse. Nuclear orders are filled by the Morton Grove plant and the Tulsa warehouse transships the order to the customer. No records were available to verify if there had been instances when nuclear certified material was opened and a portion cut from a roll. The Tulsa warehouse also does not upgrade non-nuclear stock for nuclear orders. All testing and certification is performed by the Morton Grove facility.</p> <p>The Tulsa warehouse office does not have documented procedures for material handling. Deviations from the practices described are possible, but none were identified during this NRC inspection.</p> <p>3. <u>Conclusions:</u></p> <p>Based on the above review, there was insufficient information to refute or confirm the subject allegation. However, the current documentation and material handling practices for nuclear certified material are not characteristic of practices which would contribute to the conditions described in the allegation.</p>		

ORGANIZATION: JOHNSON CONTROLS, INC.
COMPTON, CALIFORNIA

REPORT NO.: 99900070/84-01	INSPECTION DATE(S): 7/9-12/84	INSPECTION ON-SITE HOURS: 70
CORRESPONDENCE ADDRESS: Johnson Controls, Inc. Associated Piping & Engineering Division ATTN: Mr. R. L. Jordan, Q. A. Manager 1707 West Compton Boulevard Compton, California 90220		
ORGANIZATIONAL CONTACT: Mr. R. L. Jordan, Q. A. Manager TELEPHONE NUMBER: (213) 537-7200		
PRINCIPAL PRODUCT: Pipe fabrication		
NUCLEAR INDUSTRY ACTIVITY: Commercial nuclear production of the Compton, California, plant represents 40% of its production.		
ASSIGNED INSPECTOR:	 E. W. Merschhoff, Chief, Reactive Inspection Section	8/23/84 Date
OTHER INSPECTOR(S):	R. L. Cilimberg, Metallurgical Engineer B. W. Brown, NDE Level III	
APPROVED BY:	 Gary G. Zech, Chief, Vendor Program Branch	8/23/84 Date
INSPECTION BASES AND SCOPE:		
A. <u>BASES</u> : 10 CFR Part 50, Appendix B and 10 CFR Part 21.		
B. <u>SCOPE</u> : This inspection was made as a continuation of the inspection effort being applied to the fabricators of Boiling Water Reactor (BWR) recirculation piping in light of the microfissuring problems encountered during hot forming operations at the Utah Fabricating Division of Johnson Controls, Incorporated in Clearfield, Utah.		
PLANT SITE APPLICABILITY: 50-171, 50-277, 50-278, 50-293, 50-321, 50-324, 50-325, 50-366.		

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A. VIOLATIONS

Contrary to Section 21.31 of 10 CFR 21, certain procurement documents issued after January 6, 1978 for safety-related services subject to 10 CFR Part 21, did not specify the provisions of 10 CFR Part 21 as required.

B. NONCONFORMANCES

1. Contrary to Criterion I of Appendix B to 10 CFR 50, the Johnson Controls Incorporated (JCI) Quality Assurance Manual (QAM) does not, in all cases, contain the current information with respect to the authority and duties of persons performing activities affecting quality.
2. Contrary to Criterion V of Appendix B to 10 CFR 50 and paragraph 4.5.7.3 of General Electric (GE) specification 23A1625, the QAM does not specify time and temperatures for storage and drying prior to use of covered and flux-cored electrodes.
3. Contrary to Criterion V of Appendix B to 10 CFR 50 and paragraph 4.5.10 of GE specification 23A1625, paragraph 3.2.A.a of Section 3, Revision 3 of JCI fabrication procedure number SPPF-3004 specifies that the pickling solution contains 1 to 8 volume percent hydrofluoric acid instead of the 1-4 volume percent required by the GE specification.
4. Contrary to Criterion V of Appendix B to 10 CFR 50 and paragraph 5.1.E.5 of Section 5, Revision 1, of the QAM, JCI is not accounting for the quantity of discarded weld rod stubs.
5. Contrary to Criterion V of Appendix B to 10 CFR 50 and paragraph 5.3.E of Section 5.0, Revision 1, of the QAM, the Quality Control Engineer (QCE) did not sign the QW-484 form dated June 9, 1983, for welder #38.

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<p>6. Contrary to Criterion V of Appendix B to 10 CFR 50 and paragraph 5.4.B of Section 5.0, Revision 1, of the QAM, the QCE is not performing welder audits in accordance with the frequency specified.</p> <p>7. Contrary to Criterion VII of Appendix B to 10 CFR 50 and NCA-1140, JCI used weld filler metal produced to different ASME Code editions and addenda than those specified by their customers.</p> <p>8. Contrary to Criterion VII of Appendix B to 10 CFR 50 and paragraph 3.2.E.1 of the QAM, purchase orders were placed which included the following nonconformances:</p> <ul style="list-style-type: none">- PO 61265 was placed with a vendor that was not on the current AVL.- PO 61280 failed to specify the requirement that "JCI material traceability code markings must be maintained" as required by the AVL.- PO 61265 failed to specify the requirement that "Material must be controlled under QA Program dated September 28, 1983," as required by the AVL. <p>9. Contrary to Criterion VII of Appendix B to 10 CFR 50 and paragraph 3.5.A.1 of the QAM, JCI approved three suppliers and placed them on the AVL without performing a complete survey or audit.</p> <p>C. <u>UNRESOLVED ITEMS</u></p> <p>None.</p>		

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D. STATUS OF PREVIOUS INSPECTION FINDINGS

1. (Closed) Nonconformance (83-01): This nonconformance stated that it could not be verified by review of the quality assurance records that the welding engineer working in the Quality Assurance Department selected and assigned all welding procedures. JCI's response to Inspection Report 99900070/83-01 dated July 19, 1983, stated that the corrective action to this nonconformance had been implemented and the QAM would be changed to address this corrective action by September 1, 1983.

The NRC inspector verified that the corrective action had been implemented but noted that the QAM had not yet been changed to reflect this. This finding resulted in nonconformance B.1 of this inspection report.

2. (Closed) Nonconformance (83-01): This nonconformance stated that there were no training records on file that documented the accomplishment of the additional training sessions required for quality control and production personnel.

The NRC inspector verified that the required training had been held and that travelers were being properly filled out.

3. (Closed) Nonconformance (83-01): This nonconformance stated that the heat treatment for certain penetrations was not held for the specified period.

The NRC inspector verified the acceptability of JCI's disposition of this nonconformance as documented in JCI's letter to the NRC dated July 19, 1983.

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E. OTHER FINDINGS OR COMMENTS

1. Part 21

Four purchase orders reviewed by the NRC inspector did not contain the required Part 21 applicability statement. This finding resulted in a violation. JCI's 10 CFR Part 21 implementing procedures and evaluation files were also reviewed. No violations or nonconformances were noted in these areas.

2. Procurement

The inspector reviewed procurement documentation to assure that appropriate requirements had been passed down to sub-tier vendors, that suppliers to JCI were properly surveyed, audited, and placed on the approved vendors list (AVL), and that receipt inspections had been performed when appropriate. The review of the AVL revealed one instance of JCI's placing a purchase order (PO 61265) with an organization (Cabot Corporation) that was not on the AVL at the time the order was placed. Subsequent to issuing the PO, a satisfactory survey of Cabot Corporation was performed and Cabot Corporation was placed on the AVL. Additionally, two instances were noted where specific limitations which were required to be placed on suppliers based on survey/audit findings were not properly imposed. Specifically, PO 61280 failed to specify the requirement that "JCI material traceability code markings must be maintained" and PO 61265 failed to specify the requirement that "Material must be controlled under QA program dated September 28, 1983" (see Nonconformance B.8).

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With regard to audits and surveys, three instances were noted where suppliers were placed on the AVL based on incomplete audits or surveys (see Nonconformance B.9). Specifically:

1. The 5/9/83 audit of Johnson Stainless was incomplete in that the indoctrination and training, organization, procurement control, and final inspection sections were not filled out.
2. The 11/8/82 audit of Jessup Steel was incomplete in that the calibration section was not filled out.
3. The 9/26/83 audit of Cabot Corporation was incomplete in that the records retention and handling of nonconforming materials sections were not filled out and the audit was not signed.

JCI, in purchasing material to fill customer orders, has accepted material produced to ASME Code editions and addenda different than those imposed on them by their customers. The Code allows this only when the mutual consent of the owner or his designee is obtained. JCI did not request or have on hand any documentation indicating that the owners had consented to the changes in Code editions or addenda (see Nonconformance B.7).

3. Traceability

The inspector reviewed the area of traceability by recording heat numbers of pipe, fittings, and weld filler material in the field and recording lot numbers of dye penetrant materials and cleaners in use, then verifying traceability to valid certifications. No deficiencies were noted in this area.

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4. Nondestructive Examination (NDE) Review

JCI's Compton facility has three certified Level II NDE examiners currently examining nuclear components. Two are certified Level II in Radiography (RT), Dye Penetrant (PT), and Visual Testing (VT). The third inspector is certified Level II in PT and VT. The QA and QC Managers have Level II certifications which include RT, PT, VT, and Magnetic Particle (MT) examination.

The training and certification records, including eye examinations, were audited for these certified examiners. No deficiencies were noted.

The procedures listed below were reviewed for consistency with the applicable Code requirements, no deficiencies were noted.

- SPPQ-201 Liquid Penetrant Examination (Rev. 2), dated 8/16/82
- SPPQ-401 Radiographic Examination (Rev. 7), dated 5/21/82.
- SPPQ-512 Ultrasonic Examination of Inservice Welds in Nuclear Power Plant Components (Rev. 0), dated 11/20/81.
- SPPQ-512 F20589N Addendum to SPPQ 512 (Rev. 0), Ultrasonic Examination of Inservice Welds for General Electric Company, P.O. #205-83L204
- SPPQ-601 NDE Personnel Qualification Procedure (Rev. 5), dated 1/4/84.

Radiographic examination of several pipe welds were observed in progress. Although the welds being radiographed at the time were

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not on nuclear contracts, the techniques and documentation for the examinations were being done to approved procedures by certified Level II personnel. No deficiencies were noted.

The following weld radiographs and documentation were reviewed (random selection of welds):

Peach Bottom/G.E. Contract, Job No. F-20589-N

<u>Piece Mark No.</u>	<u>Weld No.</u>	<u>SN</u>	<u>Radiograph Date</u>
11203314-G001	W-A	M-0173	05/09/84
11203305-G001	W-A	M-0178	03/26/84
11203305-G001	W-G	M-0178	03/26/84
11203305-G001	W-C	M-0178	06/07/84
11203361-P002	W-A	M-0170	05/21/84
11203361-P002	W-B	M-0170	05/22/84
11203361-P002	W-B	M-0171	05/24/84
11203361-P002	W-A	M-0171	05/24/84
11203308-G001	W-B	M-0179	05/16/84
11203308-G001	W-A	M-0179	05/16/84
11203308-G002	W-B	M-0175	05/21/84
11203308-G002	W-A	M-0175	05/19/84
11203308-G001	W-A	M-0180	05/14/84
11203308-G002	W-B	M-0176	05/09/84

Pilgrim/G.E. Contract, Job No. F-20588-N

<u>Piece Mark No.</u>	<u>Weld No.</u>	<u>SN</u>	<u>Radiograph Date</u>
11203335-G001	W-B	X-9936	03/01/84
11203335-G001	W-A	X-9936	03/01/84
11203335-G002	W-A	X-9937	03/05/84

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San Onofre 2/Bechtel Contract, Job No. F-20578-N

<u>Piece Mark No.</u>	<u>Weld No.</u>	<u>SN</u>	<u>Radiograph Date</u>
2-SI-050-1	W-A	X-9432	02/08/84
2-SI-050-1	W-B	K-9432	02/08/84
2-SI-050-1	W-C	K-9432	02/08/84
2-SI-050-2	W-A	K-9433	02/07/84
2-SI-050-2	W-B	K-9433	02/07/84
2-SI-050-2	W-C	K-9433	02/07/84
2-SI-038-61	W-A	K-9437	03/28/84
2-SI-038-61	W-B	K-9437	03/28/84
2-SI-038-61	W-C	K-9437	03/28/84
2-SI-038-63	W-A	K-9439	03/22/84
2-SI-038-62	W-A	K-9438	12/03/83
2-SI-003-21	W-A	K-9444	01/18/84
2-SI-003-21	W-B	K-9444	01/23/84

Peach Bottom/Bechtel Contract, Job No. F-20570-N

<u>Piece Mark No.</u>	<u>Weld No.</u>	<u>SN</u>	<u>Radiograph Date</u>
3-10-32A-7	W-A	K-9960	06/12/84
3-10-32A-5	W-A	K-9958	06/22/84
ELL #6	W-A	K-9370	02/09/84
ELL #6	W-B	K-9370	02/09/84
3-10-32A-6	W-B	K-9959	06/22/84
3-10-32A-6	W-A	K-9959	07/05/84
3-10-32A-6	W-C	K-9959	07/05/84
3-10-32A-6	W-B	K-9971	07/09/84

Only rejectable indications which had been subsequently reported, removed, and repaired by the fabricator were noted during review of these radiographs. The radiograph quality and densities meet the applicable Code requirements.

An in-progress dye penetrant examination on 2 welds was observed on Brunswick/G.E. recirculation piping Elbow 5 (SN X-9769). The techniques, materials being used, and documentation for the examination were audited. It was concluded that the examination was done by certified Level II personnel using approved procedures and certified materials.

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5. Special Processes

The NRC inspector reviewed control and storage of weld filler material, welder qualifications, welder audits, and pickling requirements for austenitic stainless steel.

It was noted that GE specification 23A1625 required "covered electrodes and flux-cored electrodes to be used within four hours of removal from a hermetically sealed receiving container or a vented electric oven maintained at 150°F to 350°F. If not used within four hours, the electrodes shall be placed in a vented electric oven maintained at 150°F to 350°F for at least eight hours prior to reissue." However, the JCI QAM does not address these time and temperature requirements for covered and flux-cored electrodes and, consequently, they may not be satisfied in all instances (see Nonconformance B.2). Additionally, deficiencies were noted with regard to control of weld rod stubs in that the JCI QAM requires recording the quantity of weld rod returned upon completion of a task or shift in order to determine the amount of weld filler material added to a weld (pounds checked in versus pounds checked out). However, unused rods and stubs are discarded by the welders rather than being turned in as required (see Nonconformance B.4).

In the areas of welder qualification and audits, one instance was noted where the QCE did not sign the QW-484 form as required (Nonconformance B.5) and less than half of the required welder audits were being performed (Nonconformance B.6).

With regard to the pickling requirements for austenitic stainless steel, it was noted that GE specification 23A1625 required that austenitic stainless steels be pickled in a solution containing 15-25 volume percent nitric acid plus 1-4 volume percent hydrofluoric acid. JCI procedure SPPF-3004, however, specifies that the pickling solution contain 1-8 volume percent hydrofluoric acid. This finding resulted in Nonconformance B.3.

ORGANIZATION: LEHIGH TESTING LABORATORIES, INC.
WILMINGTON, DELAWARE

REPORT NO.: 99900862/84-01	INSPECTION DATE: 6/11-13/84	INSPECTION ON-SITE HOURS: 51
CORRESPONDENCE ADDRESS: Lehigh Testing Laboratories, Inc. ATTN: Mr. Leonard Weston Vice President P. O. Box 1241 - 4029 New Castle Avenue Wilmington, Delaware 19899		
ORGANIZATIONAL CONTACT: Mr. Leonard Weston, Vice President TELEPHONE NUMBER: (302) 655-7358		
PRINCIPAL PRODUCT: Chemical analysis, and metallurgical, nondestructive, and physical testing.		
NUCLEAR INDUSTRY ACTIVITY: Less than 1% of incoming work.		
ASSIGNED INSPECTOR:	<u>E. T. Baker</u> E. T. Baker, Vendor Program Branch, DQASIP	<u>7/11/84</u> Date
OTHER INSPECTOR(S):	N. J. Miegel C. Auerbach	
APPROVED BY:	<u>E. Merschoff</u> E. Merschoff, Section Chief, RIS, VPB, DQASIP	<u>7/19/84</u> Date
INSPECTION BASES AND SCOPE:		
A. <u>BASES</u> : 10 CFR Part 21.		
B. <u>SCOPE</u> : This inspection was made as a result of a 10 CFR 21 report received from Lehigh Testing Laboratories, Inc. (LTL) which identified a nonconservative error in the LTL method for analyzing the leachable fluoride concentration of thermal insulation material.		
PLANT SITE APPLICABILITY:		
Not identified during the inspection.		

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<p>A. <u>VIOLATIONS:</u></p> <ol style="list-style-type: none">1. Contrary to Sections 21.6 and 21.21 of 10 CFR Part 21:<ol style="list-style-type: none">a. Copies of 10 CFR Part 21, Section 206 of the Energy Reorganization Act, and procedures adopted pursuant to the regulations of 10 CFR Part 21 were not posted.b. Appropriate procedures to evaluate deviations or to inform the licensee or purchaser of the deviation did not exist. <p>B. <u>NONCONFORMANCES:</u></p> <ol style="list-style-type: none">1. Contrary to paragraphs 5.6.2 and 5.8.2 of the Quality Systems Manual (QSM), test reports were reissued as either "corrected" (Ultrasonic Test Report LTL # 4352A, Purchase Order (PO) # 13177C dated 2/7/83; "Corrected Copy" issued on 2/9/83) or "Amended" (Charpy V Notch Test Report LTL # 4325A, PO # 13177 dated 2/9/83; "Amended Report" issued 2/18/83); but there is no indication that the technician or department manager who approved the original test report was either made aware of, or approved, the reissued report.2. Contrary to paragraph 7.4.2 of the QSM:<ol style="list-style-type: none">a) The "QA Checklist for Laboratory Reports" for February and March 1984 were not available and there were no records available to indicate that the checks were performed these months.b) LTL Test Report # 1856B reviewed on 5/7/84 had unsatisfactory checked for two items. The test report referenced QA Deficiency Report # 84-2. However, LTL Test Report # 1856B is not referenced on the QA Deficiency Report.c) The following "QA Checklists for Laboratory Reports" had a question mark appearing at least once in the reponse column under "satisfactory." Unsatisfactory should have been checked for these items and a "QA Discrepancy Report" issued for each case.<ol style="list-style-type: none">1. LTL Report # 1844B, reviewed 5/7/84 (item 3).2. LTL Report # 1964B, reviewed 5/7/84 (item 1).		

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<p>3. Contrary to paragraph 7.4.3 of the QSM, unresolved discrepancies were noted on the results of the cross-check analysis for the months of February 1983 and March 1983. There is no objective evidence to indicate that steps are currently being taken to resolve these discrepancies.</p> <p>4. Contrary to paragraph 7.4.4, there are no records available to indicate that the tensile testing requirements of this paragraph have been met since March, 1983.</p> <p>C. <u>UNRESOLVED ITEMS:</u></p> <p>None.</p> <p>D. <u>STATUS OF PREVIOUS INSPECTION FINDINGS:</u></p> <p>This was the first inspection conducted at Lehigh Testing Laboratories, Inc.</p> <p>E. <u>OTHER FINDINGS AND COMMENTS:</u></p> <p>1. 10 CFR Part 21 Notification</p> <p>LTL notified the NRC's Office of Inspection and Enforcement by letter dated May 24, 1984 of a nonconservative error in the LTL method for analyzing the leachable fluoride concentration of nonmetallic thermal insulation.</p> <p>a. <u>Background</u> - LTL routinely receives samples of nonmetallic insulation to be analyzed for various water-leachable species such as fluoride, chloride, sodium, and silica. Material purchased by the nuclear industry is to be analyzed in accordance with NRC RG 1.36, "Nonmetallic Thermal Insulation for Austenitic Stainless Steel." RG 1.36 recommends the procedures in ASTM D 1179, "Standard Test Methods for Fluoride Ion in Water," for fluoride analysis. Lehigh has opted for Method B in the ASTM standard which employs a fluoride ion-sensitive electrode (ISE). However, since the ASTM standard does not address itself to the analysis of specific materials, Lehigh follows the procedure shown in paragraph 4.2.4.2.2.4 of Military Specification MIL-I-24244B(SH), "Insulation Material with Special Corrosion, Chloride and Fluoride Requirements" (dated 22 January 1980 through Interim Change 1, dated 11 January 1983).</p>		

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b. Findings:

Earlier this year a discrepancy was noted between fluoride values obtained by Lehigh and an insulation manufacturer, both parties using the same ISE method. It was subsequently found that a calculational error on the part of Lehigh was the cause of this discrepancy, and that this error had gone unnoticed for some time. One of the objects of this inspection was to examine the calculation used by Lehigh, to recommend corrections if indicated, and to check on a random basis whether appropriate recalculations have been performed. The formula shown in Lehigh's Standard Chemical Test Method (SCTM) F1-1, Revision 1 for calculating the fluoride concentration is as follows:

$$\text{ppm F in sample} = \frac{\text{Reading (mg) from curve}}{\frac{\text{Sample Weight (g)}}{\text{Final Volume (ml)}}} \times \text{Aliquot volume (ml)}$$

The "reading" from the curve is actually μg , and Lehigh was aware of this typographical error in the SCTM. However, this calculation is correct only for aliquot volumes of 1 ml. Lehigh typically used aliquot volumes of 10 to 50 ml and was therefore calculating the fluoride concentrations to be lower, by as much as a factor of 50, than they actually were. It was determined during the inspection that Lehigh has corrected all erroneous results and notified their customers accordingly. Lehigh has also drafted a more straight forward method for calculating the fluoride concentration which will become a part of SCTM F1-1, Revision 2 (subject to management approval).

With regard to the actual procedure, both ASTM D 1179 and MIL-I-24244 B(SH) call for 0.5 ppm fluoride as the lowest standard to be used. The military specification also specifies use of a 20 g insulation sample and volumetric dilution of the leachate to 500 ml. The inspector noted that, for many of the insulation samples handled by Lehigh, this sample preparation procedure leads to fluoride concentrations in the diluted leachate well below 0.5 ppm fluoride, thus necessitating extrapolation of the calibration line beyond the measured range. This is a very undesirable practice, and one which could easily be avoided by adopting 250 ml or even 200 ml as the final dilution volume. However, such a step would involve a relaxation of the requirements of MIL-I-24244B(SH) which LTL considers itself bound by.

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2. Other Analytical Procedures

The majority of the SCTM's currently used by Lehigh were also inspected. These SCTM's are written up by a laboratory technician and approved by the Director of Analytical Chemistry; all changes made to these procedures are required to be initialed. It could not be ascertained whether, and to what extent, the Technical Director is involved in the issuance of SCTM's. The methods are standard procedures which are based on ASTM or equivalent methods. The attention of this inspection was focussed on the calculational formulas supplied with each SCTM. Errors were found in four of these formulas which, although basically editorial in nature, verbatim compliance with the formulas would lead to erroneous results. The Director of Analytical Chemistry agreed that the formulas were erroneous and stated that (a) the relevant calculations were always performed correctly and (b) that the SCTM's would be corrected.

3. Implementation of 10 CFR Part 21

Review by the NRC inspectors of POs issued to LTL revealed that 10 CFR Part 21 has been imposed on them. LTL did not have procedures for complying with 10 CFR Part 21, nor did they have a copy of 10 CFR Part 21 posted. The violation was identified in this area of the inspection.

4. QA Program Evaluation

The LTL Quality Systems Manual (QSM) was reviewed by the NRC inspectors to assure that it addresses and is consistent with applicable codes, standards, and/or regulatory requirements. The LTL QSM, consisting of 8 sections, was not written with the intent of meeting the requirements of 10 CFR Part 50 Appendix B. A review of POs and related documentation by the NRC inspectors did not reveal a single instance when either 10 CFR Part 50 Appendix B or any other type of quality assurance requirements have been imposed upon LTL. No nonconformances were identified in this area.

5. QA Program Implementation

The NRC inspectors verified the implementation of the LTL QSM by examining representative documents and records, and interviewing personnel. The following is a summary of the results of the QA program implementation review. Nonconformances which were identified during this area of the inspection are noted.

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<p>a. Administrative Controls - The NRC inspectors evaluated the implementation of this criterion by examining all POs received by LTL during 1983 from potential nuclear customers, and the related documentation of testing performed and certifications issued. Nonconformance B.1 was identified in this area.</p> <p>b. Internal Quality Verification - The NRC inspectors evaluated the implementation of this criterion by inspecting seventeen internal checklists and related documents, three internal audit reports, and interviewing personnel. Nonconformances B.2, B.3, and B.4 were identified in this area.</p> <p>c. Non-Destructive Testing - The NDT procedures for RT, UT, MT, LP, and UT were reviewed to ensure compliance with ASME Code requirements. No nonconformances were identified in this area.</p> <p>6. General Comments</p> <p>Lehigh's analytical laboratory is adequately equipped to perform the work requested by customers. A review of the calibration and standardization procedures for laboratory equipment at LTL revealed no deficiencies. Solutions are either made up fresh, as needed, or standardized before use, depending on the procedure involved. Dedicated glassware is used for those analyses in which contamination must be minimized. All chemicals and solutions are stored in appropriate fashion, and laboratory housekeeping practices appear to be satisfactory.</p>		

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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 standby diesel generators and associated equipment. NUCLEAR INDUSTRY ACTIVITY: Approximately 15 percent		
ASSIGNED INSPECTOR:	<u>J. T. Conway</u> J. T. Conway, Reactive Inspection Section (RIS)	<u>8-21-84</u> Date
OTHER INSPECTOR(S):	E. Trottier, RIS E. L. Burns, Consultant	
APPROVED BY:	<u>E. W. Merschoff</u> E. W. Merschoff, Section Chief, RIS	<u>8-23-84</u> Date
INSPECTION BASES AND SCOPE: A. <u>BASES</u> : 10 CFR Part 50, Appendix B and 10 CFR Part 21. B. <u>SCOPE</u> : This inspection was made as a result of the issuance of 10 CFR Part 50.55(e) reports pertaining to: (1) overheated bearings in the power takeoff shafts in the diesel generator (DG) units furnished to the St. Lucie Plant, Unit 2; defective hydrogen igniters shipped to River Bend, Unit 1; and a malfunctioning maintenance/operate hand switch on a DG (continued on page 2)		
PLANT SITE APPLICABILITY: Maintenance/operate switch, 50-416; bearings, 50-389; manufacturing process control, 50-389 and 50-269; hydrogen igniters, 50-458; and procurement control, 50-389 and 50-387.		

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supplied to Grand Gulf, Unit 1. In addition, this inspection was made to assess implementation of the QA program in the areas of Part 21 reportability requirements, control of purchased material and services, nonconformances/corrective action, and manufacturing process control.

A. VIOLATIONS:

1. Contrary to Section 21.21(a)(1) of 10 CFR Part 21, adopted procedures do not provide for review, evaluation, and escalation into a Part 21 system for all identified deviations. Specifically, procedures do not exist for conducting 10 CFR Part 21 reportability evaluations and for determining corrective action when deviations or failures are identified by purchasers and licensees following delivery.
2. Contrary to Section 21.21(b)(2) of 10 CFR Part 21, notification of the existence of a defect was not reported in accordance with the 2 and 5 day requirements as noted below:
 - a. Initial notification of reportable item No. 0017, "A. C. Generator Roller Bearing" deficiency, was made by Power Systems Division (PSD) in writing, on August 2, 1983, in 5 days vice 2 days.
 - b. Initial notification of reportable item No. 0018, "Lube Oil Cooler Leak," was made by Morrison-Knudsen Co. on March 13, 1984, in 4 days vice 2 days, and written communication was made on March 16, 1984, in 7 days vice 5 days.

B. NONCONFORMANCES:

1. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Subsection NCA-4134.7 of Section III of the ASME Code, a review of calibration records and vendor audits revealed that calibration services had been provided by the following four companies, but there was no evidence that these companies had undergone a source evaluation or been approved by PSD:
 - a. Starrett - Calibrated gage block set (S/N PSD 0173) in August 1977, March 1979, August 1980, and April 1982.

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- b. Angle Repair Service - Calibrated torque wrench (S/N PSD 0174) in May 1983.
 - c. TRW-J. H. Williams Division - Calibrated torque tester (S/N PSD 880) in May 1982.
 - d. Dresser Industries - Calibrated deadweight tester (S/N PSD 0190) in March 1982 and November 1983.
2. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Subsection 2.1 of QCP-N7 of the Quality Assurance Manual (QAM), a review of procurement and vendor records for the DG (IWD No. 6002) supplied to St. Lucie, Unit 2 revealed an absence of documentation to indicate that a survey had been conducted or that PSD had a copy of the certificate prior to the purchase of Section III, Class 3 items from the following vendors:
- a. Carborundum - Receipt report for lube oil filter (B/M 304) was dated February 1977, but a certificate of authorization in the file was dated February 1978, and a survey was not conducted until October 1978.
 - b. Fastener Supply - Receipt report for bolts (B/M 605 A/B) was dated March 1978, but a survey was not conducted until October 1979.
 - c. Systems Service Corporation - Receipt report for flexible connectors (E/M 614) was dated February 1977, but a survey was not conducted until March 1980.
 - d. Machine Welding and Supply - Supplied two, 25 lb. spools of ER308C welding wire, but no documentation for this vendor was in the record files.
3. Contrary to Criterion V of Appendix B to 10 CFR Part 50, Subsections 5.0 and 6.2.1.3 of procedure No. QAP-101 and Subsection 3.1.1 of QCP-N4 of the QAM, a review of procurement packages for Section III items for the DG (IWD 6061) for the Susquehanna site revealed the following:

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- a. The QL was not on PR Nos. 49719 and 49700.
 - b. The QL was not on PO Nos. 49713, 49718, 49700, 49717, 49712, and 49714.
 - c. A QPI statement was not on PO No. 49700.
 - d. QA did not review and approve PO Nos. 49713, 49697, 49718, 49719, and 49696.
4. Contrary to Criterion V of Appendix B to 10 CFR Part 50; Subsection 5.1.1 of QCP-N9 of the QAM; Subsection 6.4.5 of NDE-100; and Subsections 8.2.a, 8.3.3, 8.3.4, and 4.6.1 of SNT-TC-1A, a review of records for NDE personnel revealed the following:
- Inspector No. 1 - Test given in March 1981 for certification to Level III-Magnetic Particle (MT) and Liquid Penetrant (PT) did not contain the required number and type of questions required by NDE-100 or SNT-TC-1A (1980 Edition). Further, there were no records of eye examinations prior to 1982.
- Inspector No. 3 - No record of: (a) copy of the practical examination for the April 1981 test given for certification to Level II-MT and PT; and (b) eye examinations for 1980, 1981, and 1982.
- Inspector No. 4 - No record of: (a) copy of the practical examination for the March 1981 test given for certification to Level II-PT, and (b) certification prior to March 1981 even though PT examinations were performed on the diesel generator for St. Lucie, Unit 2, in September and October 1978. The only record of an eye examination was November 1979.
5. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Subsection 4.6 of QCP-N9, a review of weld data sheets for Section III piping subassemblies for the DG units for Oconee and St. Lucie, Unit 2, and WPLs indicated that welding was performed to a particular procedure, but it was neither identified on the WPL and/or documentation was not made available to the NRC inspector to determine if the six welders noted below were qualified to weld to the procedure:

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<u>Welder</u>	<u>Procedure</u>	<u>Date</u>
2	W200A	(a)
3	W301/W300	(b)
4	W200/W201	(b)
	W300/W301	(b)
5	W200	(b)
	W300/W301	(b)
8	W301	(c)
10	W400	(d)

- (a) - weldments made in September and October 1978
- (b) - weldments made from July through August 1980
- (c) - weldments made in August 1980
- (d) - weldments made from November 1977 through January 1978

6. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Subsection NCA-4134.11 of Section III of the ASME Code, procedures do not exist for final product testing and 10 CFR Part 21 corrective action testing. For example, final testing for Davis-Besse emergency DGs and corrective action testing for Part 21 Reportable Item No. 0015 (concerning engine room heating loads) were not accomplished in accordance with a written procedure.
7. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Subsections 6.3.1, 6.1.3, and 6.1.4 of TCP-101, the personnel file of a designer draftsman contained neither a Training Record Form nor a Training Record as evidence that such annual training per the requirements of QCP N6, "Drawing/Document Control," had been conducted.

C. UNRESOLVED ITEMS:

1. The unresolved item (i.e., revised drawings attendant to field modification of St. Lucie, Unit 2, power take-off shaft bearing and drive belt arrangement) identified in Report No. 99900702/83-01 remains unresolved as of this date. It is the subject of ongoing litigation between Morrison-Knudsen and Florida Power & Light Company (FPL).

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2. Morrison-Knudsen's response to Nonconformance A (ref. Inspection Report No. 99900702/83-01) has not been fully implemented. Specifically, item 2(a), page four, of Mr. W. Frank Jones' letter to NRC/RIV dated October 17, 1983, states, "All personnel involved in procurement document preparation and review have received training on the requirements of PCP-201 Rev. 4 and PCP-201 Supplement Rev. 1."

An examination of all relevant training records revealed that four members of the quality division received the specified training on May 8, 1984. However, no evidence could be found that other personnel (e.g., engineering department) involved in procurement document preparation and review have received such training.

Both of these items will be addressed during a future inspection.

D. FOLLOW-UP ON PREVIOUS INSPECTION FINDINGS:

1. (Open) Violation (83-01): The corrective action pertaining to the DG engine room heat radiation concerns was discussed with PSD personnel. Notification of the condition was originally made on September 1, 1982, without mention of the corrective action which had been, was being, or would be taken. The deficiency involves potentially excessive engine room ambient temperature presumed to be the result of under-designed heating, ventilation, and cooling equipment. PSD originally predicted heat loads based on the input of the diesel engine exclusive of the generator. PSD conducted a simulated evaluation of the problem as evidenced by test report HL-183, dated April 30, 1984. General Motors-EMD, manufacturer of the diesel engine, had conducted several

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heat measurement tests also. However, the heat loading values determined by PSD and General Motors-EMD are in considerable disagreement. Communication has been established with licensees concerning the condition, and this item remains open pending further evaluation and possible additional testing.

2. (Open) Nonconformance (83-01): The purchase requisition for PO No. 50206 6036/379 did not indicate whether 10 CFR Part 21 and/or 10 CFR Part 50, Appendix B are applicable.
3. (Closed) Nonconformance (83-01): Regarding the redesign of the fuel oil day tank suction check valve by eliminating the spring:
 - a. The step of the calculation that substantiates 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.

A design review report dated August 30, 1983, which documented the review associated with removal of the spring from the fuel oil day tank suction check valve, was reviewed by the NRC inspector. It was noted that the report (including calculation sheet) was reviewed and verified by an engineer other than the preparer.

Additional training has also been conducted for all PSD personnel involved in design, design changes, design reports, and supporting calculations. This training included 10 CFR Appendix B requirements, as well as those found in the PSD QAM and appropriate implementing procedures. Furthermore, Engineering Change Proposal No. 6717, Engineering Change Notice No. 8712, and Engineering Change Notice No. 9455 were prepared to satisfy the requirements of design changes on drawings and documents (ref. PSD procedure EP 501, Revision 2).

4. (Closed) Nonconformance (83-01): Appropriate persons had not signed Engineering Change Notice 8712 as evidenced by the same person signing the "Draft, Checked, and Engineering Manager" spaces.

See NRC inspector's comments in D.3.

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5. (Closed) Nonconformance (83-01): Seismic requirements had not been satisfied for the redesigned fuel oil day tank check valve.

The NRC inspector reviewed the Velan/PSD letter dated August 2, 1984, which states that removal of the valve spring does not affect the seismic capability of the fuel oil day tank suction check valve. This same conclusion was independently arrived at by Flight Dynamics Inc., (a technical consulting firm retained by MK-PSD) and documented in the Purcell/PSD letter dated April 2, 1984.

E. OTHER FINDINGS AND COMMENTS:

1. 10 CFR Part 21 - The Morrison-Knudsen PSD process for evaluating and reporting Part 21 deficiencies was reviewed, and supporting records of the Part 21 notifications made subsequent to the July 25-29, 1983, NRC audit, were inspected.

It was determined that PSD procedures do not provide for review, evaluation, and escalation into the Part 21 system for all identified deviations. Specifically, procedures do not exist for conducting reportability evaluations and for determining corrective action when deviations or failures are identified by purchasers and licensees. However, PSD does conduct documented 10 CFR Part 21 committee review meetings, the agenda of which consists of Subject, Components, Plants Affected, and Conclusion. This ensures that PSD management is made aware of deviations or failures. The meetings also provide a forum for determining if a condition is reportable. In the case of a reportable condition, the parent organization (Morrison-Knudsen Company) requires adherence to corporate Quality Assurance Instruction (QAI)-15.1, which is not included in the PSD Quality Assurance Program manual. QAI-15.1 requires PSD to inform the Morrison-Knudsen Company Quality and Technical Services Manager of the Part 21 condition. The parent organization then provides formal notification to the NRC. Conversely, the PSD QAM prescribes that Part 21 notification be made by the PSD-Division Engineer. No procedural mechanism exists within PSD to record deficiencies identified following delivery. The Corrective Action Report (CAR) is used only to document in-process manufacturing defects. Contrary to wording in the QAM, the CAR is not used for quality deficiencies reportable by Morrison-Knudsen PSD under Part 21.

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Two notifications (Nos. 0017 [Generator Roller Bearings] and 0018 [Lube Oil Cooler Leak]) made to the NRC, subsequent to NRC Inspection Report No. 99900702/83-01, were not made in accordance with the 2 and 5-day reporting requirements of Part 21.

Item No. 0017 was reported to PSD by TVA (Supplemental Report NCR W-125-P) on July 28, 1983. PSD initially notified the NRC on August 2, 1983, by written communication, and included was a statement that corrective action would be forwarded. The August 10, 1983, follow-up letter included information concerning additional affected sites but did not include corrective action. Discussion with the PSD-Division Engineer revealed that inclusion of the corrective action statement in the August 2, 1983, correspondence was made in error since the generator roller bearings were manufactured by Parsons-Peebles/Electric Products Co. The reported condition involved wear of the generator shaft under the inner race of the roller bearings, which resulted in rubbing on the inner and outer oil seals of the bearing cover. A review of records indicated that PSD has made significant efforts to resolve this problem with Parsons-Peebles/Electric Products Co. Also, it was noted that PSD provided advisory notification to Mississippi Power & Light Co. (MP&L) Grand Gulf on August 22, 1983, with the recommendation that bearing oil should be examined periodically for brass contamination.

Item No. 0018 was reported by TVA (Supplemental Report NCR W-165-0) on March 9, 1984, and PSD informed Morrison-Knudsen Co. in accordance with QAI-15.1 on the same date. Morrison-Knudsen Co. made initial notification to the NRC on March 13, 1984. Records of PSD 10 CFR Part 21 committee review meetings conducted on March 9, 1984, March 30, 1984, and May 16, 1984, were reviewed. The lube oil cooler leak condition involved the licensee addition of a cantilever structure intended for supporting a vent piping line at the Watts Bar Nuclear Plant. TVA attached the cantilever to an existing brace welded between the diesel engine lube oil cooler and a controller panel. Paint chipping near the brace weld and eventually a minor leak in the lube oil cooler were observed subsequent to this field modification. The March 9, 1984, notification to PSD by TVA discussed the oil leak but made no mention of the support that had been added for the cooler system vent piping line. Investigation by PSD, documented in part by the March 30, 1984, 10 CFR Part 21 committee review meeting record, revealed the cause of the lube oil cooler metal fatigue to be excessive vibration imposed by the added cantilever structure. Recent notifications concerning the problem made to purchasers and licensees were reviewed, and the PSD Division Engineer stated

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that Morrison-Knudsen Co. will provide a revised summary of the situation to the NRC detailing the field modification information that was unknown to PSD at the time of the March 13, 1984, and March 16, 1984, reports.

It was also observed that PSD had an outdated posting of 10 CFR Part 21 dated December 31, 1982, which had been supplied by Morrison-Knudsen Co. This posting was noted both in the corporate offices as well as in the manufacturing facility. In addition to Part 21, the notice includes Section 206 of the Energy Reorganization Act of 1974, and an instruction that reporting of defects and noncompliances is to be made to the Morrison-Knudsen Co. Quality and Technical Services Manager. There is no mention of a reporting contact at PSD.

Violations A.1 and A.2 were identified in this area of the inspection.

2. Calibration of Measuring and Test Equipment (M&TE) - The NRC inspector reviewed records for M&TE and certifications for reference standards calibrated by outside vendors. It was noted that PSD received calibration services from four companies, but there was no documented evidence that PSD required these companies to have a QA program, or that a pre-award evaluation and post-award audits were conducted on each vendor by PSD.

Nonconformance B.1 was identified in this area of the inspection.

3. QA Manual - QCP-NO, "Manual Control" requires revision of the QAM for inclusion of the most recent Code Addenda within 6 months of the addenda issue date. A review of records verified that QAM was current as the AIA inspection specialist recently certified that all of the Code Addenda revisions, subsequent to the last QAM revision, were not applicable to the PSD QA program. Discussion with the division QA manager revealed that a significant revision to the entire QA program is planned for the near future.
4. Manufacturing Process Control - The NRC inspector reviewed 18 documentation packages for piping subassemblies in the jacket water, air start, lube oil and fuel oil systems for the DG unit (IWO No. 6022) supplied to Duke Power Company (Oconee) and 16 documentation packages for piping subassemblies in the engine and air start systems for the DG unit (IWO No. 6002) supplied to FPL (St. Lucie, Unit 2).

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Individual documents, which included shop travelers, weld data sheets, inspection reports, certifications for pipe and welding material, and NDE reports, were reviewed to assure that required inspection and NDE activities were satisfactorily completed. In addition, four NDE procedures, five welding procedures, and qualification records for four NDE personnel and six welders were reviewed to assure that special processes were performed by qualified individuals using qualified procedures.

Five of the subassemblies on the Oconee unit required MT examination, which was performed by a Level II examiner from Pittsburgh Testing Laboratory (PTL). NDE records for the Level II examiner and PTL's MT procedure were reviewed and found acceptable.

Nonconformance B.5 was identified in this area of the inspection.

5. Audits - Selected audits of PSD conducted over recent years by architect engineers, ASME, Hartford Steam Boiler Insurance Company, and licensees were reviewed. A recurrent condition was noted from the Hartford ANSI-N626 audits of October 8, 1982, and March 1, 1984, in regard to deficient requirements for visual examiners. Following the March 1, 1984, citing for corrective action, PSD revised procedure NDE-100 to fully comply with the ASME Code, Subsection NF, Paragraph NF 5521(b). No other recurrent or significant items were identified from this audit records review.
6. Corrective Action/Testing - PSD develops comprehensive reports for final product testing which are tailored to the specifications of the purchaser. Also, in certain instances, corrective action testing is performed when deviations or failures are identified following delivery. However, procedures do not exist for final product testing and for 10 CFR Part 21 corrective action testing.

Corrective action for the most recent PSD reportable item (No. 0018) was reviewed in detail. Available information included correspondence from TVA, records of 10 CFR Part 21 Committee Review meetings, and an inspection and test report from an independent consultant (Flight Dynamics, Inc.). It was concluded from this review that PSD had adequately evaluated the cause of the lube oil cooler weld failure and has instituted plans for suitable corrective action.

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Flight Dynamics, Inc. Report No. A-10-84 verified that the original Morrison-Knudsen PSD arrangement of supports and structures produces very low weld stress levels throughout the diesel engine speed range. Records of site-recorded vibration data, supplemented with calculations, proved that the cantilevered construction of the added vent line member, coupled with the existing brace between the lube oil cooler and controller panel, introduced high cyclic stresses. This condition was attributed to the combined structure of the added as well as existing supports having a natural frequency within the third harmonic of the DG speed. Consequently, the PSD recommended corrective action concerning field additions of this type will require supports to be welded to the engine skid base to avoid coincident frequency vibration loading on the lube oil cooler.

Nonconformance B.6 was identified in this area of the inspection.

7. Training/Qualification - The NRC inspector reviewed one procedure and the training/qualification records for three NDE technicians from PSD and one NDE technician from PTL to assure that individuals performing NDE on Section III components were trained and qualified. The training records for a design draftsman, purchasing manager, and a mechanic were reviewed to assure that personnel performing quality relating activities are trained.

In April 1980, PSD authorized PTL to perform NDE on piping subassemblies greater than 2 in. diameter. The certification and test records of PTL's Level II examiner who performed MT examinations on weldments for the Oconee DG unit in August and September 1980 were reviewed and found acceptable in meeting the requirements of SNT-TC-1A. However, the title page of PTL's procedure QC-MT-1 indicated that PSD had reviewed and accepted the procedure in May 1981, which is approximately 9 months after MT examination was performed by PTL using this procedure.

It was noted that PSD's Level III examiner was given a written test in March 1981 to be certified to MT and PT, but the number and type of question; do not meet the requirements of SNT-TC-1A. In addition, there were no records available to indicate that he was certified to perform NDE prior to March 1981.

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Inspector Nos. 3 and 4 were given written examinations in April and May 1981, respectively, to be certified to Level II, PT, and MT, but the practical examination was missing for both inspectors.

Nonconformances B.4 and B.7 were identified in this area of the inspection.

8. Control of Purchased Material - The NRC inspector reviewed 3 procedures, the bill of material for three DG units, and 28 POs (17-Susquehanna; 6-Sequoyah; and 5-St. Lucie, Unit 2) for components (e.g., heat exchangers, pumps, valves, air receivers, and immersion heaters) and items (e.g., fittings, fasteners, flanges, and welding electrodes) that are fabricated into components in accordance with Section III ASME Code requirements. In addition, survey/evaluation sheets and/or certificate of authorization for 10 vendors (Susquehanna) and 5 vendors (St. Lucie, Unit 2) were evaluated. This review was undertaken to assure that material was purchased from qualified vendors and that the purchased material met the technical and quality requirements identified in the POs. Eleven vendors were ASME Code certificate holders or had been audited and approved by PSD; four were not so certified or approved.

Nonconformances B.2 and B.3 were identified in this area of the inspection.

9. Followup on Regional Requests -

- a. FPL filed a 10 CFR 50.55(e) report with NRC/RII on October 1, 1982. The report indicated that the power take-off shaft bearings were overheating. (These shafts transmit power to the engine radiator fans via belts.) A final 10 CFR 50.55(e) report on excessive fan belt "flapping and twisting" was filed on February 25, 1983.

As identified in Unresolved Item C.1 of this report, litigation between Morrison-Knudsen and FPL is in progress concerning who should pay for customer drawing/document changes as a result of the required field modification.

- b. PSD filed 10 CFR 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 igniters (glow plugs) during testing. The

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cause has been identified as a change in the glow plug manufacturing process. All glow plugs have been corrected by performing the originally specified brazing operation. (The manufacturer substituted brazing with a crimping operation part way through the total production run.)

Corrective actions and preventive measures associated with all glow plugs (shipped, in-house with Morrison-Knudsen, and future orders) were as follows:

- 1) All crimped glow plugs were recalled from the field and repaired (brazed) by PSD.
 - 2) All glow plugs thus repaired were tested to the same requirements as original, brazed glow plugs.
 - 3) All repaired and tested glow plugs were returned for preoperational testing in the field.
 - 4) One repaired glow plug (serial No. 35) is being sent for environmental qualification in accordance with licensee commitments.
 - 5) All PSD customers supplied with Model 6043 hydrogen igniters (both nuclear and nonnuclear) have been informed of this potential defect and successful completion of corrective action.
 - 6) PSD now possesses both the silver brazing coils and installation procedure for future use, if necessary.
- c. Mississippi Power and Light Company filed a 10 CFR Part 50.55(e) report on November 30, 1983, with NRC/RII. The report indicated that an Electric Motor Division CM diesel supplied with a General Electric switch (SMB-10BP429, GEQA-63BM) failed to start when required (total loss of 4160 vac power to the Division III-High Pressure Core Spray-1E bus).

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This switch failure was the subject of a PSD 10 CFR Part 21 committee meeting on March 29, 1984. The minutes of this meeting were examined for the analysis of this event, and the following represents the results of this analysis and actions taken by PSD:

- 1) The switch was returned to PSD, disassembled and inspected. The cause of the misoperation was found to be a 45° misalignment between notch wheel and activating shaft. This allowed the switch to rotate normally, while not "snapping" into position since the misalignment did not correctly match up switch detent locations.
- 2) The switch was correctly reassembled at PSD and satisfactorily tested over many actuating cycles.
- 3) The determination of the cause was "human error" in the original assembly process.
- 4) PSD's April 2, 1984, letter to General Electric informed them that the 10 CFR Part 21 committee at PSD determined the problem to be neither "endemic nor generic," and thus did not fall within the purview of 10 CFR Part 21. PSD also commented that they have not seen this problem in any of the commercial or nuclear grade SBM switches on any of their machines before or since.
- 5) Corrective action taken to prevent recurrence was also contained in the letter to General Electric dated April 2, 1984. To wit: "Recommended corrective action is to inform operators and testers of this occurrence and to investigate any SBM switch which does not 'snap' into position."

ORGANIZATION: THE ROCKBESTOS COMPANY
 A MEMBER OF THE MARMON GROUP
 NEW HAVEN, CONNECTICUT

REPORT NO.: 99900277/84-01	INSPECTION DATE(S): 7/23-27/84	INSPECTION ON-SITE HOURS: 102
CORRESPONDENCE ADDRESS: The Rockbestos Company A Member of the Marmon Group ATTN: Mr. G. Jones Vice President and General Manager Post Office Drawer 1102 New Haven, Connecticut 06504		
ORGANIZATIONAL CONTACT: Mr. G. G. Littlehales, Manager, Quality Assurance TELEPHONE NUMBER: (203) 772-2250		
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 equipment qualification (EQ) for Rockbestos produced wire and cable. Nuclear related manufacturing effort at the New Haven plant now accounts for approximately 5 percent of the plants total output.		
ASSIGNED INSPECTOR:	<u>G. T. Hubbard</u> G. T. Hubbard, Equip. Qual. Section (EQS)	<u>9/6/84</u> Date
OTHER INSPECTOR(S):	J. J. Petrosino, Reactive Inspection Section A. Masciantonio, Nuclear Reactor Regulation, Equipment Qualification Branch L. D. Bustard, Sandia National Laboratories	
APPROVED BY:	<u>U. Potapovs</u> U. Potapovs, Chief, EQS	<u>9-6-84</u> Date
INSPECTION BASES AND SCOPE:		
A. <u>BASES</u> : 10 CFR Part 50, Appendix B and 10 CFR Part 21.		
B. <u>SCOPE</u> : This inspection consisted of: (1) a review of the status of the implementation of the corrective actions (CA) on the violation and nonconformances of NRC Inspection Report Nos. 99900277/83-01, 83-02, and 83-04 and (2) a review of the requalification test program (RP) being started on currently manufactured Class 1E cable types.		
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.		

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A. VIOLATIONS:

None.

B. NONCONFORMANCES:

None.

C. UNRESOLVED ITEMS:

None.

D. STATUS OF PREVIOUS INSPECTION FINDINGS:

1. (Open) Nonconformance (83-04): Rockbestos had not maintained sufficient records to furnish evidence that activities affecting quality were performed. Specifically, Rockbestos did not have the supporting data for test report F-C3798 entitled, "Qualification Tests of Electrical Cables Under Simulated Reactor Containment Service Conditions Including Loss-of-Coolant-Accident While Electrically Energized," performed by the Franklin Research Center (FRC) for Rockbestos. The NRC inspector verified that the maintenance and retention of EQ test data is required by the Technical Manual for Class 1E Qualification Tests (TM) by review and examination of it. The inspector also examined the EQ test data files to verify that the data files are now organized and arranged so that available data is retrievable. This nonconformance remains open pending an evaluation of RP test results relative to the validity of past test results affected by this nonconformance.
2. (Open) Nonconformance (83-04): Rockbestos did not evaluate or document the evaluation of 4 cable failures which occurred during the F-C3798 EQ test and 11 cable failures which occurred during the F-C3859-2 EQ test. The NRC inspector examined the TM and verified that it established procedures to be used in the future to document, evaluate, and disposition nonconformances, variations, or deviations occurring during EQ test programs. Since this nonconformance deals with actual test specimen failures, it remains open pending completion of the RP and determination regarding the validity of cable qualification tests affected by this nonconformance.
3. (Open) Unresolved Item (83-04): Rockbestos used single conductor or single twisted pair test results to establish qualification for a vastly different cable, such as an 80 conductor (80/C) cable. This is a questionable use of similarity analysis. The NRC inspectors and

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<p>Sandia consultant examined one draft RP test plan and discussed RP activities with Rockbestos Quality Assurance (QA) and engineering personnel to verify that some multiconductor cable tests are scheduled to be conducted during the RP. This item remains open pending evaluation of RP test results.</p> <p>4. <u>(Open) Nonconformance (83-03)</u>: The NRC Region IV inspection report contained five nonconformances identified during the NRC inspection of August 9-12 and 18-19, 1983, at the East Grandby, Connecticut facility. The NRC inspector took no action relative to these nonconformances during this inspection.</p> <p>5. <u>(Open) Unresolved Item (83-03)</u>: The NRC Region IV inspection report contained one unresolved item identified during the NRC inspection of August 9-12 and 18-19, 1983, at the East Grandby, Connecticut facility. The NRC inspector took no action relative to this item during this inspection.</p> <p>6. <u>Nonconformance (83-02)</u>: Rockbestos failed to establish and implement an adequate QA program for its safety-related EQ testing effort. This was identified by the number of generic deficiencies identified during the 83-02 inspection. Eight deficiency examples were identified in the report and each are discussed below:</p> <p>a. <u>(Closed) Example (1)</u>: Numerous calibration system deficiencies were identified. The NRC inspector examined the Quality Manual (QM) and verified that the Manager of Qualification and Test has been assigned the responsibility to assure calibration of qualification test equipment. The inspector's evaluation of the TM also verified the requirement for calibration of test equipment used to control and monitor EQ testing.</p> <p>b. <u>(Open) Example (2)</u>: Use of inadequate test instrumentation was identified. The NRC inspector and Sandia consultant verified that Rockbestos is upgrading its EQ test instrumentation by inspection of new test instrumentation purchased for the RP tests; evaluation of instrumentation purchase orders (POs), sales brochures, and operating manuals; and discussions with test and engineering personnel. The new instrumentation includes a new 32 channel datalogger to be used to record test parameters such as temperatures, pressures, and cable electrical energization. Other instrumentation includes thermocouples, a pressure transducer, dielectric test sets, a flowmeter, and an ionanalyzer to measure chemical spray pH. Rockbestos had received all of the new instrumentation except the flowmeter and pressure transducer at the time of this inspection; however, the instrumentation to</p>		

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be used during LOCA tests had not been installed or calibrated. This nonconformance will remain open pending completion and evaluation of the RP relative to the effect of this nonconformance on past EQ tests.

- c. (Closed) Example (3): Engineering failed to develop, review, and approve test plans. The NRC inspector examined the requirements of the TM and verified that the identity of individuals preparing, reviewing, and approving test plans is now required. The inspector also verified that the TM defines the individuals responsible for reviewing and approving test plans.
- d. (Closed) Example (4): Engineering failed to describe and require test requirements. The NRC inspector examined the TM and verified that it requires test plans to be generated which include steps in the testing sequence, a listing of properties to be measured, and a time schedule for measurements. The TM defines standard parameters to be monitored during test and provides a checklist to be included in each test plan.
- e. (Closed) Example (5): Engineering failed to identify and evaluate test nonconformances, variations, and deviations during testing and document the same in test results. The NRC inspector examined the TM and verified that it established procedures to be used to document, evaluate, and disposition nonconformances, variations, or deviations during future EQ testing programs.
- f. (Closed) Example (6): Engineering failed to perform adequate evaluations of test results. The NRC inspector examined the TM and verified that procedures were established which required that qualification test reports will be checked against test plans and supporting data by the Manager, Quality Control (QC) and Test or his designee. The inspector also verified the requirement in the TM that at least one QA or engineering individual review the test reports to assure that requirements have been met. The Sandia consultant verified, by review of the data file for qualification report QR-3803, that explanatory engineering notes had been added to the data file addressing and evaluating identified test anomalies.
- g. (Closed) Example (7): Technical inconsistencies existed between raw test data and final EQ test reports. See the actions taken by the NRC inspector and Sandia consultant discussed in paragraph D.6.f. regarding the closure of this nonconformance.

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- h. (Closed) Example (8): The quality assurance and control organization failed to audit/monitor EQ testing. The NRC inspector verified that the QA and/or QC organizations are now involved in the EQ test programs by review and examination of the TM and a draft test plan and discussions with the QA Manager and the Manager, QC and Test.
7. (Open) Nonconformance (83-02): Rockbestos did not maintain the records required to provide documentary evidence of activities affecting their EQ testing effort. The NRC inspector verified that the maintenance and retention of EQ test data is required by the TM by review and examination of it. The inspector also reviewed and examined the EQ test data files to verify that the data files are now organized and arranged so that available data is retrievable. This item will remain open until the results of the RP can be evaluated and the validity of past test results affected by this nonconformance can be determined.
8. (Closed) Violation (83-01): Rockbestos procured safety-related testing services from Isomedix, Inc. without specifying in the procurement documents that the provisions of 10 CFR Part 21 applied. The NRC inspector examined the TM to verify that 10 CFR Part 21 requirements are required to be imposed on POs issued to Isomedix. The inspector examined two POs issued to Isomedix to verify the statement in Rockbestos' letter to the NRC dated February 14, 1984, that all POs issued to Isomedix since August 1982 imposed 10 CFR Part 21 requirements. The inspector also verified that Rockbestos had received certification from Isomedix that irradiation testing services prior to August 1982 were correct as previously reported.
9. (Closed) Nonconformance (83-01): Rockbestos had not performed the required annual audits of the safety-related EQ test area prior to May 10, 1983; however, POs dating back to 1974 required testing under the controls of 10 CFR Part 50, Appendix B. The NRC inspector verified by examination of the TM and QM that annual audits of the EQ test areas are a requirement of their QA program. The inspector evaluated the annual EQ audit conducted in May 1984, to verify compliance with QA program requirements.
10. (Closed) Nonconformance (83-01): There was no documented evidence available to indicate that the required evaluation of the Robertshaw recorder calibration discrepancy had been performed. The NRC inspector examined the evaluation of the out-of-calibration status of the Robertshaw recorder that has now been performed and documented to verify its adequacy. The evaluation determined that required test

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temperatures were met in all cases where test results were employed in qualification reports. The evaluation was based on data from other pressure and temperature test instrumentation and data obtained from steam tables for saturated steam conditions. The inspector examined the calibration record file to verify that the other instrumentation was calibrated for the times it was used to support data for the questioned EQ tests. The inspector also verified that the evaluation was in the calibration record file for the recorder and in appropriate test data files. The inspector examined the QM to verify that the Manager of Qualification and Test has the responsibility to assure calibration of EQ test equipment.

11. (Closed) Nonconformance (83-01): 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. See the action taken by the NRC inspector discussed in paragraph D.6.c. regarding the closure of this nonconformance.
12. (Closed) Nonconformance (83-01): The test plan for RSS-6-109/LE did not include the chemical spray requirements contained in the governing specification or describe the method to be used to monitor electrical loading requirements. The NRC inspector evaluated the TM and verified that it requires test plans to include a listing of properties to be measured and a time schedule for the measurements. The TM defines standard parameters to be monitored during testing and provides a test checklist to be included in each test plan. Standard parameters to be monitored during test include chemical spray parameters (pH and flowrate) and electrical loading parameters (currents and voltages) of the energy cables.
13. (Closed) Nonconformance (83-01): There was no evidence that Rockbestos was documenting, evaluating, and dispositioning unanticipated test variations, nonconformances, or deviations. The NRC inspector examined the TM and verified that it established procedures to be used to document, evaluate, and disposition nonconformances, variations or deviations occurring during future EQ testing programs.
14. (Closed) Nonconformance (83-01): Rockbestos had not established a corrective action (CA) system for qualification testing of safety-related cable. The NRC inspector reviewed and evaluated the QM and TM to verify that EQ test activities are clearly subject to the CA system requirements of the QM.

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<p>15. <u>(Closed) Nonconformance (83-01)</u>: The Rockbestos QA program did not provide for inspection and/or monitoring of activities affecting the quality of their safety-related EQ testing efforts. The NRC inspector verified that the QA and/or QC organizations are now involved in the EQ test efforts by review and evaluation of the TM and a draft test plan and discussions with the QA Manager and the Manager, QC and Test.</p> <p>16. <u>(Open) Nonconformance (83-01)</u>: Rockbestos test instrumentation was not adequate to demonstrate that the required LOCA parameters were achieved. See discussion of paragraph D.6.b. for actions taken by NRC inspector and Sandia consultant relative to this nonconformance.</p> <p>17. <u>(Open) Nonconformance (83-01)</u>: There was no documented evidence available to indicate that the pH was monitored during testing supporting report QR 3803. The NRC inspector examined the TM and verified that it requires the monitoring of the pH of chemical spray during LOCA testing. This nonconformance remains open pending completion of the RP and evaluation of the validity of testing affected by this nonconformance.</p> <p>18. <u>(Open) Nonconformance (83-01)</u>: There was no documented evidence available to indicate that the cables were continuously energized with a voltage potential of 600 VAC. The NRC inspector examined the TM and a draft test plan to verify that future EQ testing will include the monitoring of the current and voltage of cable energized during EQ testing. This nonconformance will remain open pending completion of the RP and evaluation of the validity of previous testing affected by this nonconformance.</p> <p>19. <u>(Closed) Nonconformance (83-01)</u>: 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. The discussion of paragraph D.6.f. is applicable to this nonconformance; therefore, refer to it for the actions taken by the NRC inspector and Sandia consultant relative to this nonconformance.</p> <p>20. <u>(Open) Nonconformance (82-02)</u>: Various problems had been found concerning testing of cables purchased by Stone and Webster (S&W). During NRC inspection 83-03, conducted August 9-12 and 18-19, 1983, at East Grandby, the inspector reviewed the status of this nonconformance and left it open pending a reply to Rockbestos from S&W concerning Rockbestos' requested specification changes. The NRC inspector took no action on this nonconformance during this inspection and it remains open.</p>		

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21. (Open) Unresolved Items (82-02): It was not apparent that; (1) brazed connection of conductors had been measured, or (2) a procedure existed for accomplishing the task. The validity of retests for; (1) accelerated water absorption and (2) flammability properties is questionable. During NRC inspection 83-03 the NRC inspector deferred action on this item until staff technical evaluation was complete. The NRC inspector took no action on this item during this inspection; therefore, it remains open.
22. (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 NRC evaluation of the Rockbestos requalification test program being conducted in response to inspection reports 83-01, 83-02, and 83-04.

E. OTHER FINDINGS AND COMMENTS:

1. Requalification Programs: The major element of Rockbestos CA relative to the nonconformances identified in inspection reports 99900277/83-01, 83-02, and 83-04 is the RP, which should demonstrate the validity of previous qualification reports (QRs). In the RP, Rockbestos will perform tests to the requirements of IEEE-323-1974, IEEE-383-1974, and 10 CFR Part 50, Appendix B on a series of samples covering a broad range of the Class 1E cable types currently manufactured by them. Rockbestos plans to test samples identical to those tested in previous generic QRs during the RP. In those instances where previous test samples are not currently manufactured Rockbestos plans to relate appropriate RP test results to previous test samples by documenting the similarity between the test samples. Rockbestos expects that the RP results will be consistent with the results of the original QRs and will support the results reported in pre-1984 LOCA qualification reports. The discussions provided below address the findings of the

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NRC inspectors and the Sandia consultant relative to the RP. These findings are based on inspection and analysis of test equipment and instrumentation; evaluation of one draft RP test plan, the QM, and the TM; and discussions with Rockbestos QA and engineering personnel.

- a. Status: The NRC inspectors and Sandia consultant determined that Rockbestos had written a draft test plan for the testing of Firewall III chemically cross-linked polyethylene (XLPE) cable and was awaiting test samples from manufacturing. Thermal aging exposure of the chemically XLPE was scheduled to begin in late August 1984 with LOCA testing to begin in late September. The NRC inspectors discussed with Rockbestos management, as well as engineering and QA personnel, concern over the fact that the start of RP testing was running behind the estimated starting date of June 1, 1984. Rockbestos felt confident that even though the RP was starting late, that its overall completion and the issuance of test reports would be as estimated in their letter to the NRC dated February 14, 1984. The NRC will maintain close contact with Rockbestos during the RP to assure that it is completed in a timely manner.
- b. Instrumentation & Test Facilities: The NRC inspectors and Sandia consultant verified that Rockbestos is upgrading its test instrumentation for the RP as discussed in paragraph D.6.b. In summary, Rockbestos thermal aging facility is calibrated and could begin thermal aging as soon as manufacture and preparation of the cable specimens is completed. Their steam autoclave, used for LOCA testing, requires installation and calibration of its new instrumentation. Some instrumentation components (chemical spray flowmeter and the pressure transducer) had not been received at the time of the inspection. Both the chemical spray drip monitoring system and the humidity monitoring system have yet to be developed and implemented. After test instrumentation is installed and calibrated in the autoclave, Rockbestos plans to run "test" LOCA simulations to determine what temperature and pressure versus time profiles can be obtained during actual RP tests. Personnel familiarity with the new instrumentation will also need to be established through proper training and appropriate practice prior to the RP tests. Rockbestos plans to begin RP LOCA tests the last part of September 1984.
- c. Technical Issues: The NRC inspectors and Sandia consultant's review and evaluation of one draft RP test plan and the Rockbestos letter to the NRC, dated July 13, 1984, plus discussions with QA and engineering personnel, identified three technical issues which require additional information be provided to the NRC by

Rockbestos. The three issues are:

- (1) Correlation of currently produced and previously produced chemically XLPE Firewall III products.
- (2) Correlation of coaxial LD cable to coaxial LE cable.
- (3) Rationale supporting thermal aging times for test specimens with neoprene and hypalon jackets, including specimens where hypalon jacketing is bonded to ethylene propylene rubber insulation.

The NRC will review the additional information as part of the evaluation of the RP tests.

d. Test Plan: The NRC inspectors and Sandia consultant reviewed and evaluated one draft RP test plan and discussed the plan with QA and engineering personnel. The following topics were stressed during the discussions.

- (1) Rockbestos' definitions for test sample versus test specimen
- (2) Instrumentation requirements and their documentation in the test plan
- (3) Margin requirements
- (4) The applicability of detailed test procedures to the test program
- (5) The measurement of insulation resistance as engineering data during the test
- (6) Mounting connection requirements and their documentation
- (7) Special handling considerations and associated visual examination checkpoints during the testing
- (8) Acceptance criteria

In addition to the above discussed topics the inspectors recommended that Rockbestos review, in detail, the requirements of IEEE-323-1974 and IEEE-383-1974 to assure that they meet all of the requirements of these documents relative to test plans

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and test documentation.

2. Exit Meeting: At the exit meeting, the NRC inspector stressed that the RP test documentation should be adequate to show compliance with applicable standards and regulatory requirements, as well as, providing sufficient data to allow Rockbestos' customers to evaluate test results relative to their own specific requirements. The inspector also discussed that specific applications of test results will have to be reviewed on a case-by-case basis by their customers and eventually by the NRC as a part of the licensing process.

ORGANIZATION: SARGENT AND LUNDY ENGINEERS
CHICAGO, ILLINOIS

REPORT NO.: 99900507/84-02	INSPECTION DATE: 3/7-8/84 and 5/7-11/84	INSPECTION ON-SITE HOURS: 102
<p>CORRESPONDENCE ADDRESS: Sargent and Lundy Engineers ATTN: Mr. L. E. Ackmann Senior Partner 55 East Monroe Street Chicago, Illinois 60603</p> <p>ORGANIZATIONAL CONTACT: Mr. H. S. Taylor, Head, Quality Assurance Division TELEPHONE NUMBER: (312) 269-6371</p>		
<p>PRINCIPAL PRODUCTS: Architect engineering services.</p> <p>NUCLEAR INDUSTRY ACTIVITY: Sargent and Lundy (S&L) is the architect engineer on 6 nuclear power plant units that are in the design and/or construction phase. S&L is also engaged in modification, repair, or service contracts on several operating nuclear power plants.</p>		
<p>ASSIGNED INSPECTOR: <u>P. M. Sears</u> 5/31/84 P. M. Sears, Vendor Program Branch, DQASIP, OIE Date</p> <p>OTHER INSPECTOR(S): H. B. Wang, Reactor Engineer, QA Branch, DQASIP, OIE K. Morton, EG&G (Consultant) S. Morton, EG&G (Consultant)</p> <p>APPROVED BY: <u>U. Potapovs</u> 6-22-84 U. Potapovs, Chief, Vendor Program Branch, DQASIP, OIE Date</p>		
<p>INSPECTION BASES AND SCOPE:</p> <p>A. <u>BASES</u>: S&L Topical Report (TR) No. SL-TR-1A and 10 CFR Part 50, Appendix B.</p> <p>B. <u>SCOPE</u>: Status of previous inspection findings, design calculations for the fire protection/suppression system for LaSalle, Units 1 and 2 and generic aspects of that design; S&L internal audits; S&L justification for design of small bore bleed pipe support; and S&L filing systems.</p>		
<p>PLANT SITE APPLICABILITY:</p> <p>Docket Nos. 50-341, 50-374, 50-455, 50-455, 50-456, 50-457, and 50-461.</p>		

ORGANIZATION: SARGENT AND LUNDY ENGINEERS
CHICAGO, ILLINOIS

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<p>A. <u>VIOLATIONS:</u></p> <p>None</p> <p>B. <u>NONCONFORMANCES:</u></p> <p>Contrary to Section 3.2.2 of General Quality Assurance Procedure GQ3.10, Revision 7, System and Structure Design Reviews, S&L's review of a clamp support arrangement for a small bore bleed line did not assure that the possibility that the clamp support might become loose during service had been taken into account. The clamp support arrangement depends entirely on friction. Further, the review of the design calculations did not assure that a sufficient amount of friction would be available to preclude slippage during a seismic event. Such slippage would cause significant overstresses in the small diameter bleed line.</p> <p>C. <u>UNRESOLVED ITEMS:</u></p> <ol style="list-style-type: none">1. During the Internal Audit Review (see E 2 below), S&L calculation EMD-018718 was briefly reviewed. That calculation concerned a pipe support for a large bore pipe at Clinton. No part of the calculation addressed the problem of deflections nor was torsion in certain members considered in this analysis. Other calculations concerning this pipe support were not available within the time of the inspection. Those calculations will be reviewed for the above concerns during a future inspection.2. As a result of Nonconformance A.1. of 99900507/83-03, S&L committed by letter dated October 12, 1983 to initiate a special generic audit to review the use and control of piping line lists on all its major projects. During this inspection it was verified that the audit has been completed. During the audit, S&L identified three nonconformances, listed as follows along with S&L's committed corrective actions:<ol style="list-style-type: none">a. Contrary to Mechanical Standard MES-2.7 which requires the Project Manager to review and approve the Piping Line List, the List is approved by the Byron/Braidwood Mechanical Project Engineer instead of the Byron/Braidwood Project Manager; furthermore, there is no documentation indicating that it had been reviewed and approved. The Byron/Braidwood Manager will issue the project instruction covering the control of the Piping Line List. The instruction will cover documentation of the review and approval of the Piping Line List and a means for assuring consistency between the Piping Line List and associated documents.		

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<p>b. Contrary to S&L QA Program, Section 3.05 which requires status lists to be prepared, approved and distributed in accordance with documented procedures to prevent inadvertent use or obsolete documents, a status report identifying the current status of the Byron/Braidwood Piping Line List had not been issued. The Byron/Braidwood Project Manager will issue a periodic status report covering the Piping Line List.</p> <p>c. Contrary to S&L QA Program Section 3.01 which requires the design of structures, systems and components to be planned and controlled, two types of project control documents, Project Procedures and Guidelines, instead of project instructions are being used on Byron/Braidwood to control quality related activities. The Byron/Braidwood Project Manager will review all Project Procedures and Guidelines; those controlling safety-related activities will be re-issued as project instructions.</p> <p>The remedial actions delineated above will be reviewed during a future inspection.</p> <p>D. <u>STATUS OF PREVIOUS INSPECTION FINDINGS:</u></p> <p>1. (Closed) Nonconformance (84-01): S&L (a) did not complete the stress analysis using a 2.5 psig back pressure due to tornado missile effect for the Emergency Diesel Generator (EDG) Exhaust System at Byron/Braidwood, and (b) did not complete the design of additional lateral supports that were required following their reanalysis of the Fermi EDG Exhaust System.</p> <p>The NRC inspector reviewed Byron/Braidwood piping stress report IDO-02 in which the stresses caused by a 2.5 psig back pressure due to a tornado missile effect were analyzed. The analysis had been completed and it showed that all stresses are within allowables when the thrust load generated by the 2.5 psig back pressure was considered in conjunction with other applicable loads. This item is considered closed.</p>		

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The NRC inspector also reviewed documentation transmitting the designs of additional lateral supports to Detroit Edison Company (which is responsible for construction of Fermi). Documentation confirming the installation of those supports was also reviewed. This item is considered closed.

2. (Closed) Nonconformance (83-03): The design input pressure of 2.5 psig was not incorporated in the design of EDG Exhaust System at Byron/Braidwood and the flexibility of the expansion bellows was not considered in the design of the EDG Exhaust System at Fermi. Review of S&L corrective action on these items revealed the following:
 - a. Byron/Braidwood Project: The formal stress report (ID0-02) incorporating the back pressure of 2.5 psig due to tornado missile impingement which was not complete for the 84-01 inspection is now complete. That analysis shows that all stresses are within allowables when the thrust load generated by the 2.5 psig back pressure is considered.
 - b. Fermi Project: It was found in the 84-01 inspection that S&L had not completed the design of the additional lateral supports as indicated in the corrective action as described in S&L's response letter to NRC dated October 12, 1983. A review of the documentation transmitting the designs of the additional supports to Detroit Edison Company (which is responsible for construction at Fermi) and documentation confirming the installation of those supports showed that S&L has now met their commitment.

This item is considered closed.

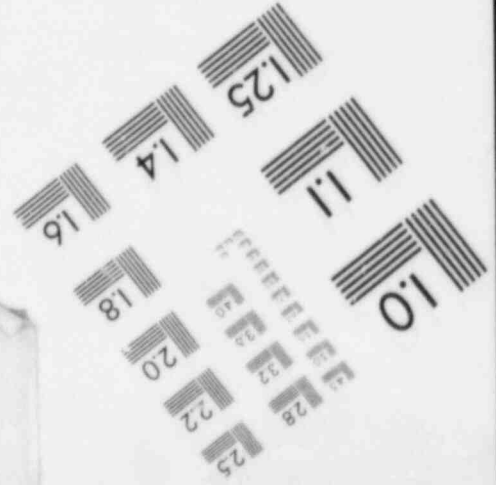
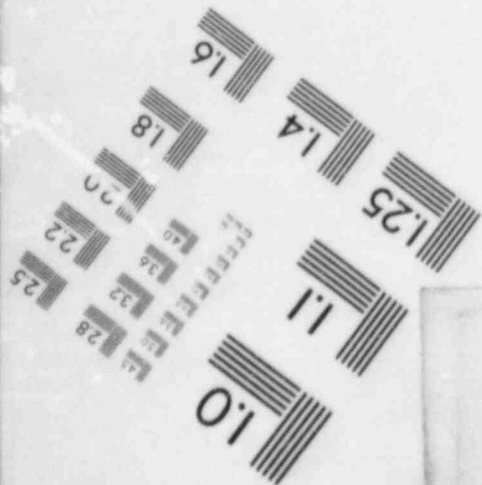
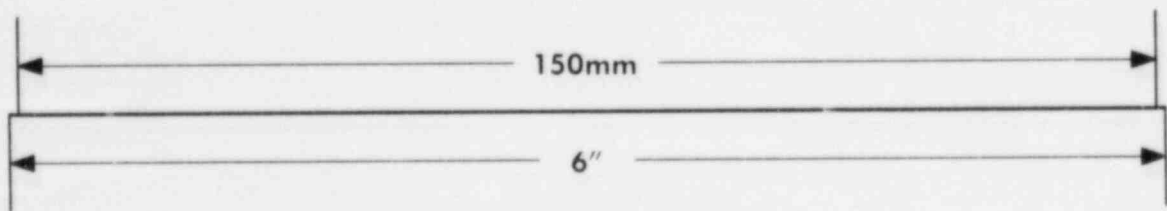
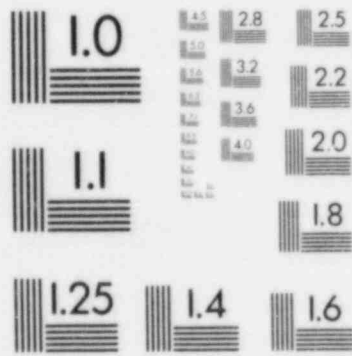
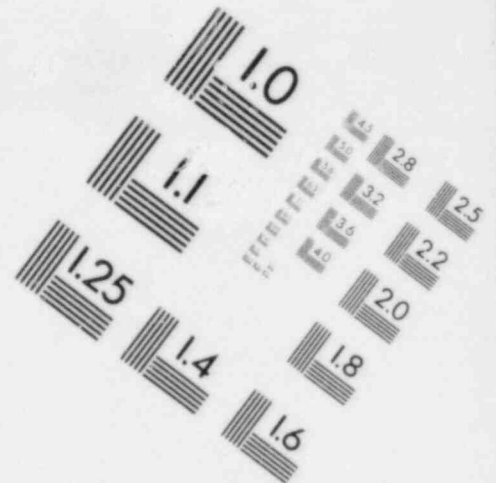
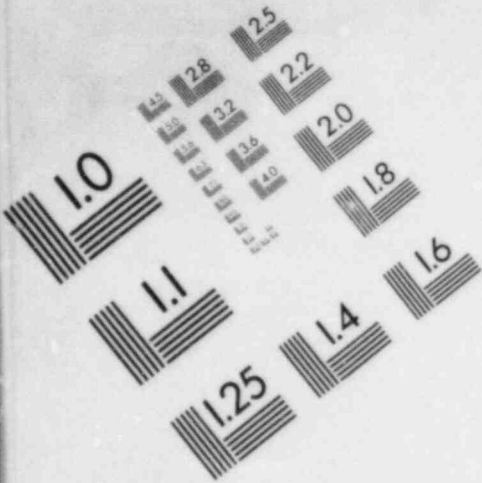
3. (Closed) Nonconformance (83-03): A temperature value of 745° F was used in the calculation file dated February 28, 1983, for the EDG Exhaust System DG-06A; however, the piping line list dated February 2, 1983 which was referenced in the above calculation file, listed a temperature value of 823° F (Clinton project).

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<p>S&L subsequently corrected the piping line list to show that the correct value of temperature is 745° F. S&L also committed to perform a special generic audit to investigate the control of piping line lists for other projects. The NRC inspector verified that the audit had been completed. This item is considered closed, however an Unresolved item (see c.1. above) has resulted from the internal audit. The internal audit generated three internal nonconformances and the corrective actions for these nonconformances will be reviewed at a future inspection.</p> <p>4. (Open) Unresolved Item (84-01): The fire protection/suppression system at LaSalle Units 1 and 2, which was designed and procured prior to 1976, was found by recent calculations to be deficient in its capability to supply water to certain areas after the piping had aged. The system would supply sufficient water before aging. As a license condition, the Office of Nuclear Reactor Regulation (NRR) stated that the licensee would provide an analysis of the fire protection water system and the capability of service water system to perform as a backup for the fire protection system prior to exceeding 5% power on LaSalle Unit 2. By letter dated February 22, 1984, the licensee (Commonwealth Edison) provided a report detailing the hydraulic characteristics of the plant fire protection water supply system, including its interface with the service water system. That analysis was reviewed by NRR and found to be acceptable (Amendment No. 1 to Facility Operating License No. NPF-18 - LaSalle County Station Unit 2, March 23, 1984).</p> <p>S&L does not have design responsibility for the fire protection/suppression system at Fermi.</p> <p>A study showed that a similar problem does not exist at Clinton.</p> <p>This item is considered closed at LaSalle 1 and 2, Fermi and Clinton. No violations or nonconformances were identified during this part of the inspection.</p> <p>A problem similar to that found at LaSalle was found in the Byron/Braidwood fire protection/suppression system. Byron/Braidwood project has not finished its analysis. That analysis will be reviewed during a future inspection.</p>		

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<p>5. (Closed) Unresolved Item (84-01): Small bore bleed lines for 14" diameter RHR valves are supported along with their individual valves from the large diameter pipe. The supports consist of simple pipe clamps on the large pipe connected by a bar to a clamp on the small bore pipe. The concern was that the large pipe clamp would slip during seismic loading, allowing the small bore pipe to bend. That design was analyzed by our consultant subsequent to the 99900507/84-01 inspection. It is our conclusion that if the large pipe clamp became sufficiently loose during service, then during a seismic event the small bleed pipe would be severely overstressed in bending. Subsequent also to the 99900507/84-01 inspection, S&L did an analysis which indicates that slippage is unlikely if proper field practice is exercised by workmen in the field. The installation procedure for the bleed line support states "A tight fit between the pipe clamp and header is required." No definition of "tight fit" is provided in the field. Lock nuts, however are called out. One nonconformance was identified in this part of the inspection (see B. above).</p> <p>E. <u>OTHER FINDINGS OR COMMENTS:</u></p> <p>1. Finding 2-22 of Byron Integrated Design Inspection indicated incomplete files were being maintained by Project Management Division (PMD). During this inspection the Structural, Electrical and Mechanical (which includes PMD) discipline files for the Fermi and Clinton projects were reviewed. The NRC inspector found the files to be kept up to date within one week and the files reviewed appeared adequate. Drawings and specifications are maintained in controlled central files, usually on aperture cards. Letters are also maintained in central files but not on aperture cards. Engineers at the working level, apparently without exception, maintain certain "working" files which are not controlled. It is their responsibility and the responsibility of their supervisors to make sure that those files contain the latest pertinent information. During this inspection, each discipline of each project was asked to produce a document (one called out in the general correspondence file). Without exception the documents were retrieved from the central file system with no difficulty.</p>		

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<p>In this area of the inspection no violation or nonconformance was identified.</p> <p>2. During a special inspection (March 7-8, 1984) S&L internal audits were reviewed. That special inspection resulted from a request by IE Headquarters and the internal audits concerned LaSalle Units 1 and 2. During this inspection internal audits concerning Byron/Braidwood, Clinton and Fermi were examined. During both inspections, audit files for audits of the past 4 years were reviewed on a sample basis. Calculations referenced in the audits were drawn from the files and reviewed. The review indicated that the S&L QA audits appear to be sufficient in quantity and quality with respect to QA procedures. It was, however, reported by our consultants that the internal audits did not involve a significant amount of detailed technical evaluation. Numerous specific calculations and documents were examined to determine if all nonconformances identified in the audits were resolved. All examined documentation indicated that corrective actions were implemented.</p> <p>During this part of the inspection, no violations or nonconformances were identified. One unresolved item was identified (see c.1. above) when calculation EMD-018718 was examined. That calculation was not part of the internal audits but was requested as a peripheral part of the inspection.</p>		

IMAGE EVALUATION
TEST TARGET (MT-3)



ORGANIZATION: STONE AND WEBSTER ENGINEERING CORP.
BOSTON, MASSACHUSETTS

REPORT NO.: 99900509/84-02	INSPECTION DATE(S): 6/25-29/84 7/9-13/84	INSPECTION ON-SITE HOURS: 60
CORRESPONDENCE ADDRESS: Stone and Webster Engineering Corp. ATTN: Mr. R. B. Kelly Vice President, Quality Assurance P. O. Box 2325 Boston, Massachusetts 02107		
ORGANIZATIONAL CONTACT: Mr. F. B. Baldwin, Assistant QA Manager TELEPHONE NUMBER: (617) 589-6566		
PRINCIPAL PRODUCT: Architectural engineering services.		
NUCLEAR INDUSTRY ACTIVITY: Major active projects include Beaver Valley Unit 2, River Bend Unit 1, Shoreham, Nine Mile Point Unit 2, Millstone Unit 3. In addition, there are approximately 50 modification/repair/service contracts. The aforementioned contracts cover work performed in the Boston, Cherry Hill, New York, and Denver offices.		
ASSIGNED INSPECTOR:	<u>Patrick M. Sears</u> Patrick M. Sears	<u>8/20/84</u> Date
OTHER INSPECTOR(S):	P. Milano, R. McIntyre, and D. Weber (EG&G)	
APPROVED BY:	<u>Gary G. Zeck</u> Gary G. Zeck, Chief, VPB, DQASIP, OI&E	<u>8/24/84</u> Date
INSPECTION BASES AND SCOPE:		
A. <u>BASES</u> : Stone and Webster Engineering Corporation (SWEC) Topical Report No. SWSQAP 1-74A and 10 CFR Part 50, Appendix B.		
B. <u>SCOPE</u> : The purpose of this inspection was to review the following items: 1. Status of previous inspection findings. 2. Procurement practices of Stone and Webster electrical equipment. 3. The reporting and disposition of computer code errors.		
PLANT SITE APPLICABILITY:		
Docket Nos. 50-322, 50-410, 50-412, 50-423, and 50-458.		

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BOSTON, MASSACHUSETTS

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<p>B. <u>SCOPE:</u>(continued)</p> <ol style="list-style-type: none">4. Potentially undersized seismic duct welds at Millstone 3.5. Main Control Board seismic mounting hold down details at Beaver Valley 2.6. Seismic hold downs for Brown Boveri load centers at Millstone 3.7. Undersized stainless steel tube wall thickness at River Bend 1.8. Linear indications in 2" plate for RHR Heat Exchanger supports at River Bend 1.9. RHR Heat Exchanger support bracing at Nine Mile 2.10. Department and Project Audits.11. Agastat Relay base attachment problems at Nine Mile Point 2. <p>A. <u>VIOLATIONS:</u></p> <p>None</p> <p>B. <u>NONCONFORMANCES:</u></p> <ol style="list-style-type: none">1. Contrary to Section 4.8.6 of Stone and Webster Engineering Corporation (SWEC) Engineering Assurance Procedure EAP-5.25, Revision 1, dated May 20, 1980, Computer Program Documentation and Qualification, an error in the use of SWEC computer program "PITRIFE" (ME-211) was documented only by means of an audit observation, number EMD-024. The audit observation was subsequently closed upon evaluation of the effect on calculations for the Shoreham Project. Error notification was not made to the users providing design activities on other projects.2. Contrary to Section 4.8.6 of SWEC Engineering Assurance Procedure EAP-5.25, Revision 1, dated May 20, 1980 Computer Program Documentation and Qualification, responses were not received from all users of SWEC computer program "STRUDL-SW" (ST-346) for error notifications 80-1 and 82-1 prior to closing out the notification.3. Contrary to Section 4, Procurement Document Control of SWEC Quality Assurance Program for River Bend 1 and 2, SWEC failed to include the requirements of River Bend 1 Specification 211.180 in certain purchase documents for 3/4" O.D. stainless steel tubing. The wall thickness required by Specification 211.180 was .109" whereas the purchase documents quoted .065".4. Contrary to Section XVI of 10 CFR Part 50, Appendix B, a potential problem was not entered into SWEC's problem evaluation system until November 28, 1983 even though a potential condition adverse to quality was delineated by a drawing reflecting as-built conditions dated August 6, 1979 which showed a large drop in the number of seismic hold down welds for the Main Control Board at Beaver Valley 2.		

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C. <u>UNRESOLVED ITEMS</u> None		
D. <u>STATUS OF PREVIOUS INSPECTION FINDINGS:</u> 1. (Open) Nonconformance (84-01): SWEC failed to require their vendors to take adequate corrective action after audits identified major and recurring conditions adverse to quality. Not inspected this inspection. 2. (Open) Nonconformance (84-01): SWEC accepted only the test report as evidence of qualification. No test plan was prepared for Boston Insulated Wire Company specification 2412.400-255 and 2412.400-257; therefore, the SWEC evaluation did not include the review of the test plan, the "auditable link" between the specification and the test results. Not inspected this inspection. 3. (Open) Nonconformance (84-01): Neither Boston Insulated Wire Company test plan nor Report B915A addressed the performance limits of failure definition (acceptance criteria) where multiple cables of the same type were tested and one or more cables failed. Therefore, it is not apparent that test requirements were met. Not inspected this inspection.		
E. <u>OTHER FINDINGS OR COMMENTS:</u> 1. <u>Main Control Board (MCB) Seismic Mounting Hold Down Details:</u> The MCB's which are presently installed on site at Beaver Valley 2 were originally tested for seismic qualification at Wyle Laboratories in September, 1977. The mounting hold down details utilized to attach the MCB's to the seismic test table were standard stitch welds using 1/4 inch fillet welds. This hold down method was transferred to the SWEC Electrical Drawing No. 12241 RE27N1. Due to improper fit-up with the structural embedment plates, a shimming detail was required. The shimming detail was added to the drawing (12241 RE27N1B). Due also to fit up problems, the number of welds and locations of welds were altered for a lesser number. As a result, the as-built number of welds is less than the number of welds identified in the approved Wyle seismic qualification report. SWEC initiated a combination of on site testing to ascertain the final as-built dynamic characteristics of the MCB's and structural analysis to verify that the as-built welds are adequate. This program verified the as-built welds.		

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<p>SWEC also initiated a generic search to determine if this problem exists at its other projects. SWEC has not as yet finished this study. The study will be reviewed in a future inspection. One nonconformance was identified during this part of the inspection (See Section B.4 above).</p> <p>2. <u>Seismic Attachment of 480 Volt Load Centers to Embedment Plates:</u> During an INPO audit in September, 1983 at Millstone 3, the method of attachment of certain Brown Boveri load centers to embedment plates was questioned. The Brown Boveri drawings indicated plug welds, which was the method of attaching used. However, when asked, Brown Boveri replied that fillet welding must be used in accordance with the seismic attachment methods used in the seismic equipment qualification testing. Corrective action consisted of providing 3/16" fillet welds 2" long located on the outside of the compartment frame to embedment plate, which is the actual configuration used in the seismic qualification tests. SWEC has not as yet finished a generic search for similar problems on other projects. The results of that search will be reviewed during a future inspection.</p> <p>No nonconformances or violations were identified during this part of the inspection.</p> <p>3. <u>Seismic Duct Welds Potentially Undersized:</u> Shortly before November 9, 1983 at Millstone 3, certain welds on Category 1 HVAC ducts were found to be less than full penetration. Purchase documents for those ducts stated that the ducts were to be fabricated according to specification 565 which in turn specifies American Welding Society (AWS) specification 9.1. The welds were to have been full penetration welds. SWEC performed some strength tests of welded specimens cut from rejected ducts. Using the results of those tests, SWEC did further analysis and concluded that, on the average, the ducts are strong enough for seismic loadings. A review of that analysis will be included in a future inspection report. SWEC did a generic search for this problem at its other projects and found no indications of similar problems. No violations or nonconformances were identified in this part of the inspection.</p> <p>4. <u>High Energy Line Break Analysis:</u> In the 99900509/83-03 (Cherry Hill Operation Center) inspection report, a high energy line break analysis was reviewed and found to be satisfactory. However, all postulated breaks on feedwater lines outside containment were reported to be calculated at the Boston Office of SWEC. A representative example of</p>		

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the circumferential breaks was reviewed at the Boston Office and no violations or nonconformances were identified.

5. Wall Thickness of 3/4" O.D. Stainless Steel Tube Undersized:
Inspection report 99900509/83-03 Section E.2 noted that 3/4" O.D. stainless steel tubing had been delivered to the River Bend Unit 1 site. The thickness required by engineering specifications was .106 inch minimum. Purchase was made from three suppliers. One purchase order quoted specifications in which .106 inch minimum wall thickness was required. Two purchase orders specified .065" wall thickness. All tubing delivered under these purchase orders was .065" wall thickness. This was reported by Gulf States Utilities Company in a 10 CFR 50.55(e) report. SWEC has performed an analysis of a "worst case" condition and concluded that .065" wall thickness is adequate for all 3/4" O.D. stainless tubing at its River Bend Project. Other projects either do not use 3/4" O.D. tube or have ordered only .065" wall tubing.

One nonconformance was identified during this part of the inspection (see Section B.3 above).
6. Residual Heat Removal (RHR) Heat Exchanger Support Bracing: During an internal audit of their Nine Mile Point 2 project conducted in January, 1984, SWEC identified a problem concerning RHR Heat Exchanger Support Bracing. In their audit report SWEC found four horizontal braces that were used in the structural analysis of the RHR Heat Exchanger Supports but were not shown on the structural drawings. Subsequently SWEC reanalyzed the entire structure with slightly relocated horizontal bracing in the structural model. The slightly relocated bracing was added to structural drawings. SWEC performed a generic search and found no similar problems. This appears to be an isolated case and no violations or nonconformances were identified in this part of the inspection.
7. Linear Indications Found in 2" Threadplates for RHR Heat Exchanger Support: During a magnetic particle inspection of welds joining threadplates to embedments for River Bend RHR Heat Exchanger Supports, linear indications were detected in the threadplates. It was determined that the indications were nonmetallic inclusions. Subsequently, liquid penetrant inspection showed one indication on one threadplate and numerous indications on another. Other plates were not examined because SWEC performed a "worst case" analysis and concluded that, even with the nonmetallic inclusions, the

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threadplates are of adequate strength. This analysis will be reviewed during a future inspection. No nonconformances or violations were identified during this part of the inspection.

8. Department and Project Audits: The policies and procedures directing the auditing process of the engineering and design activities were reviewed. The responsibility for conducting audits in this area rests with the Engineering Assurance Department. Additionally, the Quality Assurance Cost and Auditing (QACA) Division of the Quality Assurance Department performs audits to ensure the proper conduct of activities by the Engineering Assurance Division. Engineering Assurance audits the audit process of the QACA Division.

The implementation of the audit system procedures was verified by the review of selected project and department audit schedules, audit plans, standard review plans, audit reports, and audit observations. The Engineering Administration Audit Data Log for the Beaver Valley Unit 2 Project Audits was also reviewed to ensure proper documentation and tracking of open audit observations.

The review of the Department and Project Audits indicates that the system is being implemented as described in the procedures. Within this area of inspection, no nonconformances or violations were identified.

9. Computer Error Reporting: The requirements for the notification and evaluation of the impact of computer errors is defined in Stone and Webster Engineering Corporation (SWEC) Engineering Assurance Procedures EAP-5.25, "Computer Program Documentation and Qualification". While this procedure assigns the responsibility for this task and defines the degree of dissemination, the actual content for the error notification is found in SWEC Computer Department Policy and Procedure CDPP No. 7.2.3, which is not a quality-related document. Additionally, this CDPP also requires the maintenance of files for originals of error notices, a current program user's list, and completion notices. Neither of the above procedures, however, requires that copies of the outstanding error notices be placed within the applicable User's Manual for reference until such time that the computer error is corrected.

Both the Program Sponsor within the Engineering Department and the Computer Department Library maintain a file for error notices. The files differ in content in that only the Sponsor retains the responses for error evaluation from users and the Library maintains the original of the error notice. The Computer Department Library

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closes the file for a specific error upon receipt of a completion notice from the Sponsor indicating that all responses have been received and reviewed.

On reviewing the files for the SWEC computer program "STRUDL-SW" (ST-346), it was noted that the Computer Department Library files showed error notices, numbers 83-1 to 83-4, 84-1, and 84-2 as being open. However, the Program Sponsor files showed that the required action for closure of each of these notices to have been completed in February, 1984.

In section V of the Engineering Assurance Audit Report, "Computer Program Documentation/Evaluation and Qualification", dated October 17, 1983, the statement was made that "externally initiated (i.e. outside SWEC) error notifications which indicate that 10 CFR 21 applies are not dispositioned and filed in the Part 21 file. An interoffice memo is being issued by EA and Licensing which delineates the corrective and preventive action." However, this memorandum has not as yet been issued.

In this same audit, audit observation, EMD-024, was issued which described an error with the use of the computer program "PITRIFE" (ME-211) when inputting data coming from the computer program "NUPIPE." The audit observation was evaluated for the significance of the error on the Shoreham Project. However, since an error notice was not prepared in accordance with EAP-5.25, the other projects and users did not evaluate the effects of this error.

Within this area of the inspection, two (2) nonconformances were identified (See Section B.1 and B.2 above).

10. Procurement of Electrical Equipment: Procurement specification for 480 volt load centers and circuit breakers for River Bend and the 600 volt load centers, 125 volt direct current circuit breakers and switchgear for Nine Mile Point were reviewed in detail and compared with applicable SWEC procedures used in the preparation of procurement specifications. The review included the identification of applicable ANSI/IEEE standards, test requirements, and verification that the vendors had supplied the documentation required by the specifications (certifications, test report, etc.). No violations or nonconformances were identified in this part of the inspection.
11. Agastat Relay Bases: During a quality assurance surveillance in August 1983, performed by Niagara Mohawk Power Corporation (NMPC) at the Nine Mile Point Unit 2 facility, the following problems were discovered regarding safety related Agastat relay bases mounted in

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<p>the Power Corporation Control Complex (PCCC) panels M13-P612 and H13-P628:</p> <ul style="list-style-type: none">(a) 24 base mounting screws in panel P612 and 20 in panel P628 were found to be tightened to 6-inch pounds rather than the 12-inch pounds specified in General Electric (GE) shop instructions (GE Engineering Applied Practice (EAP) 304 A 1640 AP & JX).(b) Fiber washers which were to be installed between the base and the spring nut of the relay bases, in accordance with GE shop instructions, were omitted in several connections.(c) One base was discovered to be cracked. <p>The problems are documented in the NMPC Quality Assurance Surveillance Report SRNWP2-101583. In its final 50.55(e) report, NMPC states in part that a "--seismic test performed by GE in San Jose determined that a torque of 5 inch-pounds would adequately retain the Agastat Relay in the mounting position and permit normal reliable operation". Also, "--a review of GE documentation has determined that it is acceptable to have Agastat Relay Bases installed without fiber washers. The requirement for the installation of a washer was imposed in February 1981 as a product improvement and was not a backfit on those Agastat Relay Bases previously installed".</p> <p>The NRC inspector was informed that PCCC panels were only supplied to the River Bend and Nine Mile Point Facilities. The PCCC panels for River Bend were manufactured by GE/Philadelphia and SWEC stated that the problems with relay bases, as reported here, are not known to exist on these panels. The PCCC panels supplied to Nine Mile Point were manufactured by GE/San Jose, California. Therefore, it appears that the specific Agastat Relay Base problems are unique to the GE/San Jose manufacturing facility.</p> <p>No violations or nonconformances were identified in this part of the inspection. This item will be reviewed in a future inspection at GE/San Jose.</p>		

ORGANIZATION: WYLE LABORATORIES
SCIENTIFIC SERVICES AND SYSTEMS GROUP
HUNTSVILLE, ALABAMA

REPORT NO.: 99900902/84-02	INSPECTION DATE: 7/30 - 8/3/84	INSPECTION ON-SITE HOURS: 28
CORRESPONDENCE ADDRESS: Wyle Laboratories Scientific Services and Systems Group ATTN: W. W. Holbrook, General Manager 7800 Governors Drive Huntsville, Alabama 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:	<u>L. B. Parker</u> L. B. Parker, Equipment Qualification Section (EQS)	<u>8/14/84</u> Date
OTHER INSPECTOR:		
APPROVED BY:	<u>Uedlis Potapovs</u> U. Potapovs, Section Chief, EQS	<u>8-14-84</u> Date
INSPECTION BASES AND SCOPE:		
A. <u>BASES</u> : 10 CFR Part 21 and 10 CFR Part 50, Appendix B		
B. <u>SCOPE</u> : This inspection consisted of an evaluation of the implementation of your quality assurance program including the preparation of environmental qualification test plans, and procedures.		
PLANT SITE APPLICABILITY: Not identified		

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HUNTSVILLE, ALABAMA

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<p>A. <u>VIOLATIONS:</u></p> <p>None</p> <p>B. <u>NONCONFORMANCES:</u></p> <p>None</p> <p>C. <u>UNRESOLVED ITEMS:</u></p> <p>None</p> <p>D. <u>OTHER FINDINGS OR COMMENTS:</u></p> <p>The NRC inspector reviewed four equipment qualification (EQ) documentation packages, these packages included qualification plans/procedures and purchase orders. The review was to determine whether the EQ documentation packages met the applicable requirements of NUREG 0588; Regulatory Guides 1.63, 1.73, and 1.89; and IEEE Standard 323-1974, IEEE Standard 382-1980, and IEEE Standard 317-1976.</p> <p>The four EQ documentation packages covered safety-related equipment, that was to be subjected to within containment/harsh environment (loss of coolant accident/high energy line break) testing. The electrical equipment represented by the reviewed documentation included two types of modified safety relief valve solenoids, one type of electropneumatic valve positioner, two electrical motors, a typical stator, and the typical components that are used in motor control centers and controls panels.</p> <p>At the time of the inspection, all of the equipment represented by the reviewed EQ documentation packages was undergoing irradiation or thermal aging exposure, therefore test data was not available. The NRC inspector's review included examination of qualification specifications, purchase orders, qualification plans, record of procedure/plan revisions, and correspondence involving the type testing of class 1E equipment.</p> <p>The EQ documentation packages were examined to verify the following:</p> <ol style="list-style-type: none">1. List of equipment to be tested included a description of all materials, parts and subcomponents.2. Equipment to be tested was properly selected and was typical.		

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HUNTSVILLE, ALABAMA

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3. Plans and procedures and changes thereto had been approved by the appropriate personnel.
 4. Equipment interfaces had been described.
 5. Test acceptance criteria had been established as described in the applicable codes and standards.
- No nonconformances were identified.

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2. TITLE AND SUBTITLE Licensee Contractor and Vendor Inspection Status Report Quarterly Report - July 1984 thru September 1984	3. LEAVE BLANK	4. DATE REPORT COMPLETED MONTH: September YEAR: 1984
5. AUTHOR(S)	6. DATE REPORT ISSUED MONTH: October YEAR: 1984	8. PROJECT/TASK/WORK UNIT NUMBER
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