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Licensee Contractor and Vendor Inspection Status Report

Quarterly Report
October–December 1993

U.S. Nuclear Regulatory Commission

Office of Nuclear Reactor Regulation

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Division of Reactor Inspection and Licensee Performance
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555–0001

ABSTRACT

This periodical covers the results of inspections performed by the NRC's Vendor Inspection Branch that have been distributed to the inspected organizations during the period from October 1993 through December 1993.

TABLE OF CONTENTS

PREFACE

A fundamental premise of the Nuclear Regulatory Commission (NRC) licensing and inspection program is that licensees are responsible for the proper construction and safe and efficient operation of their nuclear power plants. The total government-industry system for the inspection of commercial 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 compliance with requirements prescribed by the NRC's rules and regulations (Title 10 Code of Federal Regulations). The NRC performs an overview of the commercial nuclear industry by inspection to determine whether its requirements are being met by licensees and their contractors, while the major inspection effort is performed by the industry within the framework of ongoing quality verification programs.

The licensee is responsible for developing and maintaining a detailed quality assurance (QA) plan with implementing procedures pursuant to 10 CFR 50. Through a system of planned and periodic audits and inspections, the licensee is responsible for assuring that suppliers, contractors and vendors also have suitable and appropriate quality programs that meet NRC requirements, guides, codes and standards.

The Vendor Inspection Branch (VIB) reviews and inspects nuclear steam system suppliers (NSSSs), architect engineering (AE) firms, suppliers of products and services, independent testing laboratories performing equipment qualification tests, and holders of NRC licenses (construction permit holders and operating licenses) in vendor-related areas. These inspections are performed to assure that the root causes of reported vendor-related problems are determined and appropriate corrective actions are developed. The inspections also review the vendors' conformance with applicable NRC and industry quality requirements, the adequacy of licensees' oversight of their vendors, and that adequate interfaces exist between licensees and vendors.

The VIB inspection emphasis is placed on the quality and suitability of vendor products, licensee-vendor interface, environmental qualification of equipment, and review of equipment problems found during operation and their corrective action. When nonconformances with NRC requirements and regulations are found, the inspected organization is required to take appropriate corrective action and to institute preventive measures to preclude recurrence. When generic implications are identified, NRC assures that affected licensees are informed through vendor reporting or by NRC generic correspondence such as information notices and bulletins.

This periodical (White Book) is published quarterly and contains copies of all vendor inspection reports issued during the calendar quarter for which it is published. Each vendor

inspection report lists the nuclear facilities to which the results are applicable thereby informing licensees and vendors of potential problems. In addition, the affected Regional Offices are notified of any significant problem areas that may require special attention.

The White Book also contains a list of selected bulletins and information notices involving vendor issues. Copies of other pertinent correspondence involving vendor issues are also included in this White Book issue.

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

INSPECTION REPORTS

INDEX

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

October 7, 1993

Docket No. 99900404

Mr. Carlo L. Caso, General Manager
Nuclear and Advanced Technology Division
Westinghouse Electric Corporation
Post Office Box 355
Pittsburgh, Pennsylvania 15230

Dear Mr. Caso:

SUBJECT: NRC INSPECTION REPORT 99900404/93-01

This letter addresses the inspection at your facility in Forest Hills, Pennsylvania, conducted by Mr. K. R. Naidu and F. H. Burrows of this office on August 16-17, 1993, and the discussions of their findings with Mr. G. Dillon and other members of your staff at the conclusion of the inspection.

The purpose of the inspection was to verify the implementation of your quality assurance program in selected areas in the re-manufacture and dedication of electrical components, specifically X-relays, being supplied as spare parts for installation in DB and DHP type circuit breakers. During this inspection, the inspectors reviewed the records related to the X-relays that were installed in circuit breakers at Connecticut Yankee Atomic Power Company's Haddam Neck nuclear power plant (Haddam Neck). On June 27, 1993, an X-relay in a DB-25 circuit breaker failed to reset and caused a power failure. During the inspection, the inspectors discussed with your staff the failures of similar X-relays that had occurred in the past; specifically five failures that had occurred at Haddam Neck in 1984. In this regard, the inspectors reviewed your letter of April 29, 1985, to Haddam Neck and determined that your evaluation of these failures was limited. The Nuclear Regulatory Commission (NRC) feels that regardless of the application of the failed X-relays, and whether they were used in safety or nonsafety-related (in DB or DHP) applications, you should have evaluated the potential consequences pursuant to the requirements of 10 CFR Part 21, particularly since you knew that X-relays were used in safety-related circuit breakers.

Areas examined during the NRC inspection and our findings are discussed in the enclosed report. This inspection consisted of an examination of procedures and representative records, interviews with personnel, and observations by the inspector.

Within the scope of this inspection, we found no instance in which you failed to meet NRC requirements. However, the NRC is concerned that you may be performing limited evaluations pursuant to 10 CFR Part 21 reporting requirements.

In accordance with 10 CFR 2.790 of the Commission's regulations, a copy of this letter and the enclosed inspection report will be placed in the NRC's Public Document Room.

Should you have any questions concerning this inspection, we will be pleased to discuss them with you.

Sincerely,

Leif J. Norrholm, Chief
Vendor Inspection Branch
Division of Reactor Inspection
and Licensee Performance
Office of Nuclear Reactor Regulation

Enclosure:
Inspection Report 99900404/93-01

ORGANIZATION:	Westinghouse Electric Corporation Forest Hills, Pennsylvania
REPORT NO.:	99900404/93-01
CORRESPONDENCE ADDRESS:	Westinghouse Electric Corporation P.O.Box 355 Pittsburgh, Pennsylvania 15230
NUCLEAR INDUSTRY ACTIVITY:	Nuclear steam supply system components and services
INSPECTION CONDUCTED:	August 16 - 17, 1993
ASSIGNED INSPECTOR:	Naidu 9/23/93 Kamalakar R. Naidu, Date Reactive Inspection Section-2 (RIS-2)
OTHER INSPECTORS:	F. H. Burrows, Electrical Engineering Branch
APPROVED BY:	for A C Wilson 9/23/93 Gregory Cwalina, Section Chief Date RIS-2, Vendor Inspection Branch
INSPECTION BASES	10 CFR Part 21, 10 CFR Part 50, Appendix B
INSPECTION SCOPE	Control of activities related to the re-manufacture of X-relays and other components installed in DB and DHP type 480 Volts breakers
PLANT SITE APPLICABILITY:	All p`ants utilizing DB and DHP type 480 Volts circuit breakers

1 INSPECTION SUMMARY

1.1 VIOLATIONS

No violations were identified during this inspection.

1.2 NONCONFORMANCES

No nonconformances were identified during this inspection.

2 INSPECTION FINDINGS AND OTHER COMMENTS

2.1 Background Information

On June 27, 1993, power to a motor control center (MCC-5) was lost at Connecticut Yankee Atomic Power Company's Haddam Neck nuclear power plant (Haddam Neck). On June 29, 1993, the Nuclear Regulatory Commission (NRC) dispatched an Augmented Inspection Team (AIT) to investigate the event. The AIT determined that a possible root cause was a failure of the X-relay to reset (move to the de-energized position) in a DB-25 circuit breaker manufactured by Westinghouse Electric Corporation (W).

The X-relay is usually denoted by the symbol 52X in the electrical control circuit schematic diagram for the breaker. On receipt of a signal to close the breaker, the X-relay energizes and one set of its normally open contacts close to enable momentary energizing of the breaker's closing coil. After the breaker closes, the same set of the breaker's X-relay contacts open to deenergize the closing coil even though the X-relay remains energized by the close signal. If the close signal is still present when the breaker trips, the X-relay serves to inhibit repeated closure attempts until the close signal is removed. Thus, it provides anti-pump protection to the breaker by preventing repeated breaker closure attempts when a continuous closure signal exists after a breaker trips.

The armature assembly (see Figure 1) of an X-relay which fits inside a brass sleeve is surrounded by the relay's electromagnetic coil. When the coil is energized, the plunger (moving core) is drawn up towards the top cap piece (stationary core) of the assembly and the latch arm operates the relay's contacts. In its uppermost position an air gap is maintained between the bullet-shaped top of the plunger and the cavity in the cap piece with the shoulder of the plunger mating with the lip on the cap. When the coil is de-energized, the moving core is designed to fall, by gravity, into its lowermost position. The failure of the moving core to fall to its lowermost position is the possible failure mode of interest at Haddam Neck.

Possible causes of the failure mode of the X-relays discussed during the AIT are:

- Residual magnetism which can prevent the moving core from falling to its lower-most position.

- Mechanical binding due to dirt accumulation between the moving core and the brass sleeve.

- Mechanical binding due to different coefficents of thermal expansion caused by heat dissipated by the energized coil.

- Dimensional variations of the X-relay frame.

On September 9, 1993, at W, in the presence of the NRC, a Haddam Neck engineer was able to cause the two parts to adhere to each other and prevent the moving core to fall freely by gravity by applying pressure to the plunger and the top cap piece of the armature while twisting them together. W and the licensee believe that residual magnetism or mechanical adherence are two of the probable causes for the parts sticking together.

During the AIT inspection, the (NRC) staff searched the failure history of W control relays. The search revealed that there had been at least 27 reported failures of the X-relay during the past nine years with failure modes similar to the recent one at Haddam Neck. The causes of these failures were reported to include dirt, aging, mechanical misalignment, or mechanical binding due to burrs. Corrective actions were usually replacement, repair or readjustment of the X-relay. Two of the 27 reported failures are discussed in paragraphs 2.2.1 and 2.2.2 of this report.

2.2 Discussion of W Policy to Report Conditions Adverse to Safety

W's Procedure OPR-19.0, "Identification And Reporting Conditions Adverse to Safety," Revision 4, of October 1, 1992, establishes the policy for identifying and evaluating potential conditions adverse to safety, and reporting such conditions to the appropriate parties. To accomplish this, W has established a Safety Review Committee to evaluate conditions adverse to safety and determine if they should be reported to responsible management. When W becomes aware of a condition adverse to safety, W staff opens a potential item (PI) file on the subject and documents all the information including evaluations and the final disposition which may include informing the NRC that it is a 10 CFR Part 21 item. W personnel stated that they did not retain the records of such evaluations performed before 1991 in which W determined that it was not adverse to safety. Additionally, W does not track or trend information provided from failure history reports such as those provided by the Nuclear Plant Reliability Data System.

W personnel stated that they do not routinely receive information on failures experienced at non-W reactor sites. Furthermore, if the failure mode of the breaker is not adverse to safety, there is no mechanism for W personnel to learn about the failure. For instance, if a reactor trip breaker fails to close because the X-relay failed, W does not considered it safety significant because the safety function of a reactor trip breaker is to open on demand. The inspectors discussed with W personnel the bases for which the following two events were not reported as 10 CFR Part 21 items.

2.2.1 Review of W Activity Associated with the Haddam Neck X-relay Failure in 1984: License Event Report (LER) 84-023 forwarded on November 28, 1984, from Haddam Neck to the NRC reported six incidents between July 1, 1984, and August 24, 1984, in which one W DB-25 and five DHP-250 type breakers failed to close when required. Five of those failures were directly attributed to X-relay malfunctions. The sixth breaker failure possibly resulted from a X-relay malfunction. The main cause of the control relay malfunctions was stated to be dust or dirt accumulation on the moving core and its latch arm assembly. Since the licensee concluded that the malfunctions presented a generic problem in the plant, the immediate action was to inspect and clean all X-relays.

In a letter of November 5, 1984, to Northeast Utilities, W stated that it was in the process of evaluating and issuing a significant Safety Hazard Report pursuant to the requirements of 10 CFR Part 21 on X-relays. Records indicate that W did not submit a 10 CFR Part 21 report on the X-relays. W's letter dated April 29, 1985, to the Connecticut Yankee Atomic Power Company (CYAPC) provided an evaluation of the six X-relay failures and determined that the X-relay failed in only one safety-related breaker and therefore W did not consider it significant or a generic design problem. W also stated that the X-relays at Haddam Neck may not have been addressed in the plant's preventive maintenance program. W concluded that the maintenance program being implemented at the plants should be continued and that inspection and cleaning of the moving parts in the X-relay armature assembly should be included. On September 2, 1993, the NRC called W to express concern over W's limited evaluation of the X-relay problem as documented in its April 29, 1985, letter to CYAPC. In the absence of other information, the NRC stated that regardless of the application of the failed X-relays (used in DB or DHP type breakers), and whether they were used in safety or nonsafety-related applications, W should have evaluated the potential consequences pursuant to the requirements of 10 CFR Part 21, particularly since W knew that X-relays were used in safety-related circuit breakers. A W representative stated that in 1985 there was no requirement to retain records of evaluations and therefore he could not determine if there were other reasons why W did not consider the failures were reportable under 10 CFR Part 21. The W representative stated that currently they perform more detailed evaluations.

2.2.2 Review of W Activity Associated with the X-relay Failure at Oconee Nuclear Power Station (Oconee): LER 92-002 of September 3, 1992, from Oconee reported that in June 1991 X-relays in the W DB-25 breakers in the Oconee emergency hydro units' field and field flashing circuitry failed. The cause of the specific failure mode was not determined and the nonsafety-grade relays were replaced with safety-grade relays. Subsequently, on January 28, 1992, a safety-grade X-relay failed to reset. As immediate corrective action the licensee inspected each X-relay to ensure that they did reset following each shutdown. A design change has now been implemented to replace the electro-mechanical anti-pump scheme provided by the X-relay with an electrical scheme.

One of the X-relays from Oconee was sent to W for examination. It was subsequently determined that the most likely cause of failure to reset was stray magnetic fields resulting from dc currents flowing near the relays. In response to concerns associated with the X-relay failures at Oconee, W added a

test to CDI CEB-0108 (W X-relay dedication instruction) to ensure that the X-relays being dedicated as Class 1E would drop out when de-energized after being energized for a period of time.

2.3 Review of the Purchase Order (PO) from Haddam Neck

The inspectors reviewed the records pertaining to the recent (just prior to the June 27, 1993, event) procurement of the X-relays by Haddam Neck from W and determined the following:

Haddam Neck issued Purchase Order (PO) No. 945288 of May 17, 1993, to W for the supply of seven 125 V dc X-relays, W part No. 33A2746G32 suitable for DB-50 and DB-25 type circuit breakers. The PO stated that the X-relays were QA Category 1, intended for installation in a nuclear-grade motor control center and required that the packaging, shipping, storage and handling of the items were to be in accordance with W Specifications OPR 405-5 and WCAP 9245. The Assembly and Test (A&T) division of W purchases commercial-grade spare parts, and dedicates and sells them to licensees as safety-grade items.

Records indicate that when Haddam Neck received the seven relays, they were inspected and the results were documented in Haddam Neck's Material Receipt Inspection Report (MRIR) 92-399 of June 16, 1993. The team reviewed MRIR 92-399 and determined that seven X-relays were received, inspected and determined to be acceptable. W's A&T department had issued a certificate of conformance (CoC) dated June 3, 1993, certifying that six 125 Vdc X-relays with serial No. 930.286-1 to -6 meet the drawing requirements of Revision 46 of Drawing 33A2746G32 and that the items were in compliance with W's NSD Quality Assurance Program Plan, WCAP 9245 and OPR 405-5. A CoC of April 28, 1993, similarly certified one more X-relay, bringing the total of X-relays supplied to seven.

The inspectors reviewed the W quality assurance records and determined that the seven X-relays described above had been drawn from a batch of 24 supplied by Westinghouse Electric Supply Company (WESCo), Murraysville, Pennsylvania. It is W A&T's policy to issue POs to WESCo to procure commercial-grade items manufactured by W affiliated companies. W A&T PO No. MA 13734M of August 11, 1989, to WESCo, Murraysville for 24 X-relays. WESCo in turn issued a PO to W Greenwood, South Carolina to supply 24 X-relays. In its PO, W specified that the X-relays should conform to Drawing No. 33A2746G32, Revision 46 "DB Single Pole Relay Assembly."

W A&T did not audit their supplier because the X-relays are purchased as commercial-grade items; it relies on its sister company to meet the requirements of the purchase order.

W's A&T quality control inspectors (QC) inspected the 24 X-relays received from W Greenwood through WESCo utilizing Engineering Control Instruction (ECI) DAR-062185-01, Revision 01, and documented twelve adverse findings in Material Deficiency Report (MDR) 11206 of June 16, 1990. A&T technicians corrected ten adverse findings in MDR 11206; the remaining two were accepted as-is. On November 11, 1991, a quality assurance (QA) representative inspected the

corrective action taken to repair the ten adverse conditions and use-as-is items and determined them acceptable.

Subsequently, the relay frames (Part No. 23A3609H01) were inspected to commercial-grade dedication instruction (CDI) CEB-108 which had an additional requirement to perform metallurgical tests on the relay frames. Metallurigal reports from the material supplier and an independent test laboratory documented that the frames of all 24 X-relays were of incorrect material. These frames along with two others were returned to the vendor. On March 12, 1993, W A&T issued PO No. MA-72697-M to Greenwood to supply replacement frames. These relay frames were used to replace the ones that had been supplied with the X-relays.

Following the frame replacements, all 24 X-relays were determined to be acceptable, and stored at W's A&T storage facility. The inspectors reviewed the records during the inspection and determined that A&T has established accountability for the acceptable X-relays.

2.4 Observation of Activities

The NRC team, accompanied by W staff, toured the A&T facilities and observed the following:

- A&T personnel demonstrated the operation of DB-25 and DB-50 circuit breakers; the inspectors were able to observe the contact movement of the X-relays when the breakers operated. Also, the test to measure the X-relay dropout voltage was demonstrated. W stated that residual magnetism is the most likely cause of the X-relay's failing to reset and the addition of a brass shim between the relay plunger's shoulder and cap piece lip to increase the armature assembly's air gap is being consider as corrective action.

- The reactor trip breakers (RTB) from the Point Beach Nuclear power plant were being refurbished.

- A&T personnel showed the inspectors the cubicle assembly which was used to replace AKR type circuit breakers manufactured by General Electric Company with W DB-416 type breakers for the Palo Verde Nuclear Generating Station, (Palo Verde) Unit 2.

  Each set of four RTBs installed at Palo Verde Station Units 1, 2 and 3 consisted of a pair each of W's DS-206 and GE's AKR type circuit breakers. Palo Verde issued a PO to W A&T to supply AKD switchgear with four DS-416 type circuit breakers to replace the existing RTBs. W informed the inspectors that it had completed the manufacture and testing of one AKD switchgear for installation at Palo Verde's Unit 2 station and had shipped it with all the qualification reports.

- W demonstrated to the team its Digitrip RMS type overcurrent trip devices.

- W showed the team A&T's automated storage system. The storage area of acceptable components appeared to be clean and free from rodents and debris. A&T personnel control the climatic conditions inside the storage area and access to it.

In addition to the above demonstrations, W stated that it had replaced the EC type overcurrent devices manufactured by General Electric Company on AK2-25, -50 and -75 type GE circuit breakers at the Niagara Mohawk and Monticello nuclear power plants with its Amptector 1 A type overcurrent protection devices.

3. PERSONS CONTACTED

Individuals contacted during the inspection are listed below:

NAME	TITLE
George Dillon	Manager, Nuclear Services Division
Tom Moser	Manager, Replacement Component Services (RCS)
Dick Miller	W Nuclear Safety
Joe Jelovich	Manager, Power Systems Engineering (PSE)
T.M. Wambaugh	Quality Assurance Engineer
J.J. Evans	Quality Assurance Manager
Jeff Black	RCS Audit Coordinator
+Dale Rygg	Manager, RCS Strategic Operations.
Dave Riffe	Engineer, RCS/PSE

+ WAS PRESENT ONLY AT THE EXIT MEETING ON 8/17/93

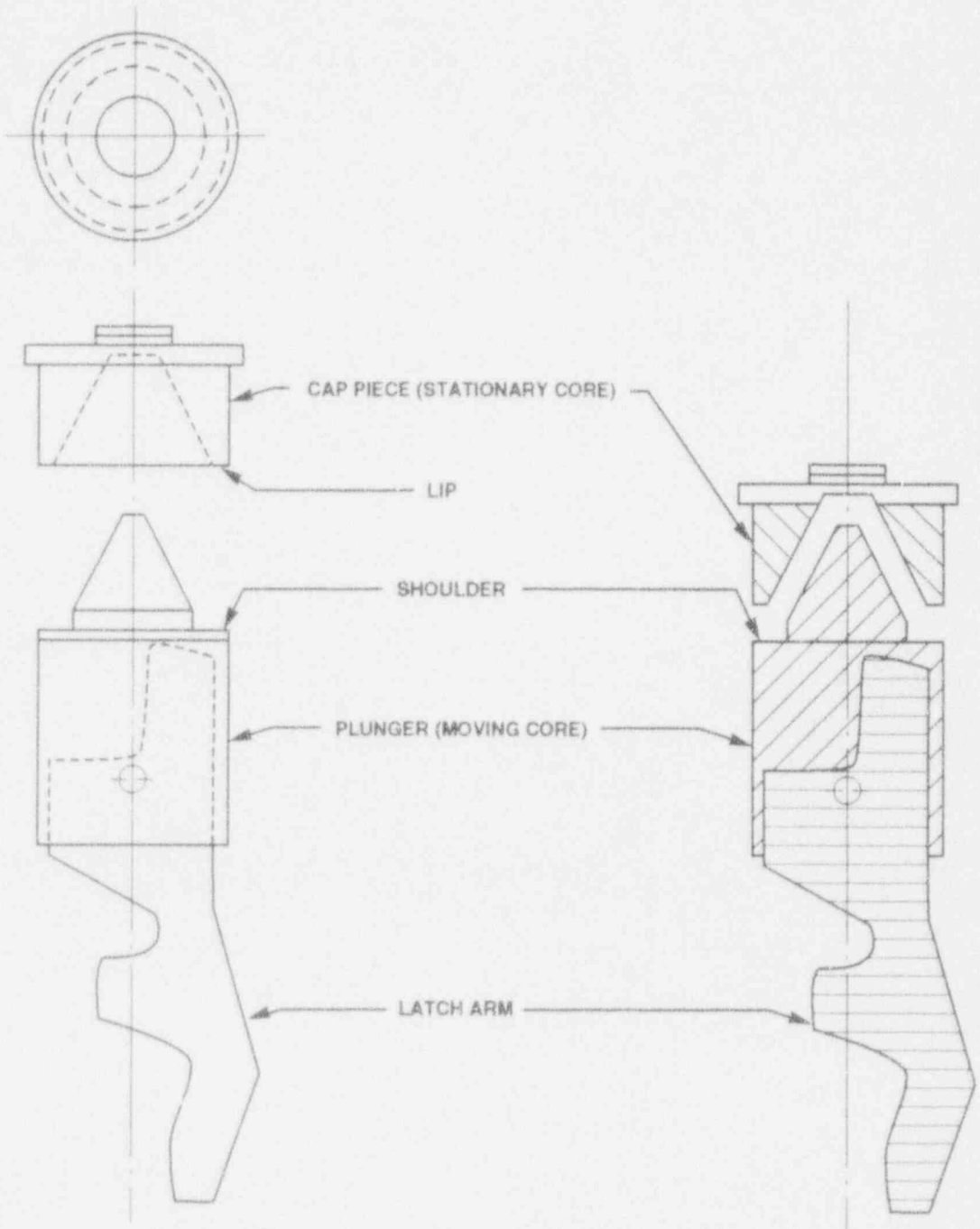

Figure 1. X-relay Magnetic Core

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

NOV 22 1993

Docket No. 99900918

Mr. John H. Hendricks, President
Farwell & Hendricks, Inc.
4600 East Tech Drive
Cincinnati, Ohio 45245

Dear Mr. Hendricks:

SUBJECT: NOTICE OF NONCONFORMANCE
(NRC INSPECTION REPORT 99900918/93-01)

This letter addresses the inspection of Farwell & Hendricks, Inc. (F&H) at Cincinnati, Ohio, conducted by Messrs. R. C. Wilson, R. K. Frahm, Jr., and B. H. Rogers of this office on October 26-28, 1993, and the discussion of their findings with you and members of your staff on October 28, 1993. The purpose of the inspection was to review the implementation of your programs for meeting the requirements of 10 CFR Part 50, Appendix B, and 10 CFR Part 21 in the dedication of commercial grade components for nuclear safety-related applications.

Areas examined during the NRC inspection and our findings are discussed in the enclosed report. This inspection consisted of an examination of procedures and records, interviews with personnel, and observations by the inspectors.

The inspectors found that the implementation of F&H's quality assurance program failed to meet certain NRC requirements. Specifically, in seven instances, dedication reports and certifications either failed to describe an adequate dedication process, or did not accurately identify the items that were dedicated. Some of the concerns consisted only of documentation errors, but in four cases the dedication process was deficient.

The specific findings and references to the pertinent requirements are identified in the enclosed Notice of Nonconformance (Notice).

The response requested by the enclosed Notice is not subject to the clearance procedures of the Office of Management and Budget as required by the Paperwork Reduction Act of 1980, Public Law No. 96-511.

In accordance with 10 CFR Part 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosures will be placed in the NRC's Public Document Room.

Sincerely,

Leif J. Norrholm, Chief
Vendor Inspection Branch
Division of Reactor Inspection
and Licensee Performance
Office of Nuclear Reactor Regulation

Enclosures:
1. Notice of Nonconformance
2. Inspection Report 99900918/93-01

ENCLOSURE 1

NOTICE OF NONCONFORMANCE

Farwell & Hendricks, Inc.
Cincinnati, Ohio

Docket No.: 99900918/93-01

Based on the results of an inspection conducted on October 26-28, 1993, it appears that certain of your activities were not conducted in accordance with NRC requirements.

Criterion V, "Instructions, Procedures, and Drawings," of Appendix B to 10 CFR Part 50 requires, in part, that activities affecting quality shall be prescribed by documented procedures and shall be accomplished in accordance with these procedures.

Section 5, "Instructions, Procedures, and Drawings," of Farwell and Hendricks Quality Assurance Manual QA-001-83, Revision 7, dated May 1, 1993, and earlier revisions, states that activities affecting quality are prescribed by documented instructions, procedures, or drawings.

Section 1.2 of Farwell & Hendricks Technical Procedure TP 3-001, "Procedure for Establishment and Procurement of Commercial Grade Items for Use as a Basic Component," Revision 0, dated May 1, 1990, states that dedication of commercial grade items (CGI) includes establishing "... complete documentation to substantiate the engineering evaluation and verification of CGI materials being used in safety-related applications."

Section 3.0 k) of Farwell & Hendricks Technical Procedure TP 3-002, "Procedures for Preparation of Certifications," Revision 1, dated October 12, 1992, requires certifications to reference the F&H qualification documentation. Section 3.0 h) requires certifications to identify the manufacturer's model number and description for the dedicated items.

Contrary to the above, Farwell & Hendricks failed to adequately document evaluations and certifications for the commercial grade item dedication process in seven instances, as follows (99900918/93-01-01):

(a) A critical characteristic for two switches shipped under Project 61458 to the Omaha Public Power District in March 1993 was not listed or verified.

(b) The design change and material verification review for the two switches in Project 61458 was not adequately defined.

(c) The dedication report and certificate of compliance for three relays shipped under Project 61277 to the Duquesne Light Company in March 1993 incorrectly identified the relays.

(d) The dedication evaluation of the three relays in Project 61277 did not establish lot homogeneity or traceability to the manufacturer.

(e) The dedication evaluation of 500 motor control center screws shipped under Project 80290 to the Tennessee Valley Authority in August 1993 did not identify or verify material strength or hardness as a critical characteristic, and did not verify traceability to the manufacturer.

(f) The certificate of conformance for the 500 screws in Project 80290 did not correctly identify pertinent qualification reports.

(g) The certificate of compliance for two motor starters and ten ground fault sensors shipped under Project 80201 to the Baltimore Gas and Electric Company in March 1993 did not correctly identify pertinent qualification reports.

Please provide a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555, with a copy to the Chief, Vendor Inspection Branch, Division of Reactor Inspection and Licensee Performance, Office of Nuclear Reactor Regulation, within 30 days of the date of the letter transmitting this Notice of Nonconformance. This reply should be clearly marked as a "Reply to a Notice of Nonconformance" and should include for each nonconformance: (1) a description of steps that have been or will be taken to correct these items; (2) a description of steps that have been or will be taken to prevent recurrence; and (3) the dates your corrective actions and preventive measures were or will be completed.

Dated at Rockville, Maryland
this 22nd day of November 1993.

ORGANIZATION:	FARWELL & HENDRICKS, INC. CINCINNATI, OHIO
REPORT NO.:	99900918/93-01
CORRESPONDENCE ADDRESS:	John H. Hendricks, President Farwell & Hendricks, Inc. 4600 East Tech Drive Cincinnati, Ohio 45245
ORGANIZATIONAL CONTACT:	Roy A. Woeste, Director of Quality Assurance Farwell & Hendricks, Inc. 4600 East Tech Drive Cincinnati, Ohio 45245 (513) 528-7900
NUCLEAR INDUSTRY ACTIVITY:	Dedication of commercial grade items for safety-related applications in most commercial nuclear power plants
INSPECTION CONDUCTED:	October 26-28, 1993
TEAM LEADER:	R C Wilson 11/12/93 Richard C. Wilson, Senior Engineer Date Reactive Inspection Section 2 (RIS2) Vendor Inspection Branch (VIB)
OTHER INSPECTORS:	Ronald K. Frahm, Jr., RIS2, VIB Billy H. Rogers, RIS2, VIB
APPROVED:	Gregory C. Cwalina 11/15/93 Gregory C. Cwalina, Chief Date Reactive Inspection Section 2 Vendor Inspection Branch
INSPECTION BASES:	10 CFR Part 21 and 10 CFR Part 50, Appendix B
INSPECTION SCOPE:	To review the implementation of selected portions of the 10 CFR 50 Appendix B quality assurance program, and the 10 CFR Part 21 notification program
PLANT SITE APPLICABILITY:	Numerous

1 INSPECTION SUMMARY

1.1 Nonconformance 99900918/93-01-01 (Open)

Contrary to Criterion V of Appendix B to 10 CFR Part 50, and to Farwell & Hendricks, Inc. (F&H) Technical Procedures 3-001 and 3-002, F&H did not document adequate evaluations and certifications for commercial grade items dedicated for safety-related use in commercial nuclear plants in seven instances (see Section 3.4 of this report).

2 STATUS OF PREVIOUS INSPECTION FINDINGS

2.1 Nonconformance 99900918/90-01-01 (Closed)

Nonconformance 99900918/90-01-01 cited several instances in which F&H sold items as safety-related without completely evaluating their suitability for use in such applications. The concerns included critical characteristics and traceability to the manufacturer of molded case circuit breakers; verification of fuse dimensions; and poppet valve material evaluation. The F&H response to the Notice of Nonconformance, dated January 2, 1991, addressed these concerns in detail. The NRC inspector reviewed the F&H response and found it acceptable, subject to additional evaluation during this inspection.

The F&H response demonstrated that proper traceability was documented for the circuit breakers in question. In addition, the F&H president stated that--with rare exceptions--even if material is ordered through a distributor, it is drop-shipped directly to F&H. Where that is not possible, F&H audits both the distributor and the manufacturer; for the exception that the president recalled, the items were custom-made and F&H received the entire lot. With respect to critical characteristics for circuit breakers, the F&H response basically stated that F&H's documentation clearly specifies all of the "generic" critical characteristics addressed by them, and that the list addressed by F&H would be expanded. Any other application-specific characteristics are the customer's responsibility.

The F&H response stated that fuse dimensions are verified during annual supplier surveys. During this inspection, the F&H Quality Assurance (QA) director stated that the F&H surveys included verifying that Bussmann performs go/no go gauge checks on samples of fuses from each manufacturing lot.

The F&H response stated that its review of the mild environment dedication file for the poppet valves showed that sufficient information was available for the dedication, but "the information was presented in a cumbersome fashion that was not readily retrievable and reviewable;" the file was revised to document consideration of all coil materials of construction. (During this inspection a new nonconformance was identified involving incomplete documentation in dedication files, as discussed in Section 3.4 of this inspection report.)

Based on their review, the inspectors closed Nonconformance 99900918/90-01-01.

3 INSPECTION FINDINGS AND OTHER COMMENTS

3.1 Entrance and Exit Meetings

In the entrance meeting on October 26, 1993, the NRC inspectors discussed the scope of the inspection, outlined the areas to be inspected, and established interfaces with F&H management and staff. In the exit meeting on October 28, 1993, the inspectors discussed their findings and concerns with F&H management and staff.

3.2 Inspection Scope

F&H has provided equipment qualification, commercial grade dedication, testing, and consulting services for about 50 nuclear utilities. Early in 1993, the company moved into new, 30,000 square foot facilities that include the three-axis seismic shake table. F&H has approximately 40 employees. Business has been about 90 percent nuclear, primarily dedicated components. Diversification and growth are expected to expand the non-nuclear business portion to 40 percent in the near future.

The NRC inspectors reviewed selected areas of F&H's quality assurance (QA) program and its implementation to assure compliance with Appendix B to 10 CFR Part 50. The areas reviewed included organization, vendor approval and control, and personnel training and qualifications. The inspectors reviewed QA program implementation by inspecting files for approximately ten dedication projects. The inspectors also reviewed the 10 CFR Part 21 program.

3.3 Quality Assurance Program Review

F&H's QA program was documented in QA manual QA-001-83, Revision 7, dated May 1, 1993, with implementation guidelines detailed in the technical procedures (TP) manual. F&H's QA program organization was detailed in Section 1 of the QA manual, "Organization, Authority, and Responsibility," and in implementing procedure TP 1-001, Revision 1, dated June 11, 1993. The QA manual and TP 1-001 both incorrectly referenced an organization chart that has been superseded by the chart dated August 27, 1993. F&H stated that the organization was changed to shift the focus of management from a narrow technical orientation to a Total Quality Management approach, and to better address utility needs and concerns. F&H initiated Corrective Action Request (CAR) 93-013 on October 16, 1993, to incorporate the current organization into the QA and TP manuals. The scheduled completion date for fully implementing the new approach was March 31, 1994, because the current organizational chart is expected to be revised again next quarter to include new business ventures. The quality assurance function appeared to have sufficient authority and organizational freedom to identify and assess quality problems in both editions of the organization chart. Apart from the issue addressed by CAR 93-013, the inspectors had no concerns in this area.

The NRC inspectors reviewed the training and qualification process and procedures and their implementation. TP 2-001, "Personnel Classification," Revision 4, dated June 11, 1993, defined F&H's method for qualifying personnel in accordance with ANSI/ASME Standard N45.2.6-1978, "Qualifications of

Inspection, Examination, and Testing Personnel for Nuclear Power Plants." The inspectors reviewed six qualification files and found them to be in accordance with TP 2-001. The inspectors observed seismic testing and verified that it was being performed by qualified level I and II technicians as required by TP 2-001. The inspectors did not identify any concerns in the training and qualification process or its implementation.

The NRC inspectors also reviewed the approved suppliers list which included primarily calibration services (level I) and vendors who have controls in place to support F&H's dedication and/or qualification programs (level II). All vendors listed were currently approved based on completed triennial audits. Commercial grade vendors were not listed and were not required to be approved by the QA department. F&H determines the quality of commercial grade items by test, review of reports, receipt inspection, or other internal means. The inspectors found no discrepancies or deviations from the controlling procedure for vendor approval and control, TP 7-001, "Control of Purchased Materials, Equipment, and Services," Revision 3, dated June 5, 1992.

3.4 Dedication Package Review

Dedication activities were governed primarily by TP 3-001, "Procedure for Establishment and Procurement of Commercial Grade Items for Use as a Basic Component," Revision 0, dated May 1, 1990, and related procedures.

The NRC inspectors selected approximately 15 dedication project files for review, primarily for equipment shipped in 1992 and 1993, from a project list and generic qualification notebooks provided by F&H. The inspectors reviewed documentation for approximately ten of these projects, some of which also included qualification of test samples (other project files referenced earlier qualification reports, which the inspectors also reviewed). No concerns were identified with the qualification activities reviewed. The inspectors did identify the following deficiencies in dedication activities:

(a) Project 61458 covered two 2-position key lock hand selector switches for the Omaha Public Power District. The licensee Purchase Order (PO) No. S078068 dated March 4, 1993, specifically called for the key to be removable in the left position only; however, this requirement was not identified as a critical characteristic and there was no record of its verification.

(b) The switch type for Project 61458 had been seismically tested for F&H qualification report No. 60678.1 dated April 11, 1990, for mild environment qualification. The dedication report for the new switches stated that "similarity analysis is based on: 1) review of manuf. literature, 2) functional testing, 3) dimensional verification [five dimensions], 4) elevated temp. test [performed at 65.7°C for 4 hours] and UL listing provide assurance for material controls and material consistency."

The NRC inspector concluded that the documented evaluation did not adequately address the possibility of material changes between the tested and new switches that could affect seismic performance. The inputs and the process for the literature review were inadequately defined (including evaluation of differences in vendor catalog sheets), the way that the UL listing was used in

establishing similarity was not defined, date code information was incomplete, and its role in the evaluation was not addressed. (Each switch contains two date codes, on the body and the contact block. The "Data Sheets for Functional Testing" recorded two date codes for each new switch, but did not specify which code applied to which part. Further, one of the date codes on the seismic test sample appeared to have been obliterated and was illegible, and the number did not appear in the test report.)

(c) Project 61277 included three ASEA/ABB relays seismically tested and dedicated for the Duquesne Light Company. Licensee PO No. D114561 dated July 31, 1992, specified Type RXME1 RK221-025-AN Version A 125 VDC, 2.7 watts. The F&H file contained a draft request for quote from F&H to ASEA/ABB with the red ink notation "not recognized by ASEA" marked for "Version A," and the F&H PO to ASEA/ABB did not specify Version A. However, the F&H dedication package, Certificate of Compliance, and invoice to the licensee all included "Version A" in the relay identification. The NRC inspector and F&H QA specialist determined that Version A was applicable to another relay type, which had been included in an earlier request for quote (RFQ) from the licensee to F&H. When the licensee revised that RFQ and the related procurement specification to issue the RFQ that actually served as the basis for the subject PO, the Version A term and also the incorrect wattage value for the relay were inadvertently retained. The 2.7 watt designation also appeared in the documents provided by F&H to the licensee, even though the ASEA/ABB literature included in the dedication package clearly shows that the type number designates a "6.5-7 w" power consumption. Although the qualification and dedication activities were satisfactory except as noted in the next paragraph, the identification of the device being qualified and dedicated was clearly inaccurate.

(d) The ASEA/ABB relays covered in Project 61277 were obtained by F&H in two shipments. A packing list in the F&H file showed that the fourth relay was shipped from ABB's Coral Springs, Florida, facility, but there was no evidence concerning the source of the first three, and the dedication package did not address that concern. Thus the dedication effort failed to establish lot homogeneity or traceability of most of the relays to the same manufacturing location. When questioned by the NRC inspector, F&H QA personnel provided an invoice showing "CRLSP" as the "shipped from" location. This information, which was not documented in the dedication file and presumably was not available to the dedicator, appears to confirm that all of the relays were obtained from the Coral Springs location.

(e) Project 80290 covered 500 self-tapping machine screws for motor control centers for Tennessee Valley Authority PO No. P-93N3H-41913D-000. The certificate of conformance stated that "the items have been evaluated as to having an equivalent form, fit, function, material, and interchangeability as the original items supplied ...". The dedication process actually consisted of a visual inspection of screw head size and shape, screw shaft diameter, thread size, and length. Hardness and strength of material were not considered critical characteristics and were not verified. At the request of the NRC inspectors, F&H weighed an original screw and one of the new screws. The original screw weighed seven percent more than the "equivalent" resale screw.

F&H procured the new screws from a commercial grade distributor with a statement on the PO that "all line items listed on this purchase order are to be shipped to F&H from the manufacturing facility." Contrary to this requirement, the distributor shipped directly from its warehouse, with no traceability to the original material manufacturer. Because of this deviation, the fasteners were rejected by F&H receipt inspection, but were dispositioned "use-as-is" with the notation that the items would be visually inspected for conformity. The NRC inspectors concluded that some verification of material properties was necessary to provide reasonable assurance that the screws would perform their intended safety function.

(f) The certificate of conformance for Project 80290 stated "See Below" for the qualification report number, but the original report number was not mentioned in the body of the certification. The second page of the certification stated "Limitations are the same as specified in the above referenced 'QUALIFICATION REPORT NUMBER AND SOURCE.'" The capitalized phrase appeared to be "boiler-plate" words intended to be replaced by a specific reference that was not provided by the writer. Thus the certificate did not properly identify the qualification basis for the dedicated items.

(g) Project 80201 covered two motor starters and ten ground fault sensors for Baltimore Gas and Electric Company PO No. 76297GX dated September 3, 1992. However, the body of the certificate of compliance only referenced the seismic and environmental qualification reports for the motor starters, which were qualified by similarity analysis. The qualification report for the ground fault sensors, which were newly qualified by F&H as part of this project, was not mentioned in the body of the certification. Thus the certificate did not properly identify the qualification basis for the dedicated items.

Criterion V of Appendix B to 10 CFR Part 50 requires that activities affecting quality must be accomplished in accordance with documented procedures. The above instances do not conform to the F&H procedures for dedication and certificate preparation, and jointly constitute Nonconformance 99900918/93-01-01.

3.5 10 CFR Part 21 Program

The NRC inspector reviewed F&H Technical Procedure 19-001, "10CFR21 Reporting Requirements," revision 2, dated October 19, 1993, and discussed the subject with F&H personnel. The November 30, 1992, revision of Part 21 was properly addressed by the procedure and posted on the bulletin boards. F&H has never filed a Part 21 report, primarily because they are neither a user nor (with infrequent, limited exceptions to date) a manufacturer of safety-related equipment, and thus seldom have occasion to identify deviations. The inspectors had no concerns with the F&H Part 21 program.

4. PERSONS CONTACTED

+	*	C.R. Farwell, Jr., Chief Executive Officer
+	*	J.R. Hendricks, President
+	*	R.A. Woeste, Director, Quality Assurance
+	*	S.A. Schultz, Director of Business
+	*	M.J. Kopp, Operations Manager
+	*	E.D. Sweeney, Contracts Engineer
	*	M. Bell, Engineering Supervisor
	*	D. Kobida, Engineering Supervisor
+	*	M.D. McClung, QA Specialist

+ Attended the entrance meeting on October 26, 1993
* Attended the exit meeting on October 28, 1993

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

December 02, 1993

Docket No. 99900912

Mr. N.J. Fredkin, Jr., Vice President
National Technical Systems
Nuclear Services Group
533 Main Street
Acton, Massachusetts 01720

Dear Mr. Fredkin:

SUBJECT: NOTICE OF VIOLATION AND NOTICE OF NONCONFORMANCE
(NRC INSPECTION REPORT NO. 99900912/93-01)

This refers to the U.S. Nuclear Regulatory Commission (NRC) inspection conducted July 6 through 9, 1993, by Messrs S.D. Alexander, G.C. Cwalina, and K.R. Naidu and Ms. A.M. Dummer of this office of your facility at Acton, Massachusetts, and to the discussions of our findings with you and members of your staff at the conclusion of the inspection.

Areas examined during the inspection are identified in the report. Within these areas, the inspection consisted of selective examination of procedures and representative records, review of technical documentation, interviews with personnel, and observations by the inspectors. The major areas reviewed included (1) implementation of your quality assurance (QA) program based on Appendix B to Part 50 of Title 10 of the Code of Federal Regulations (10 CFR Part 50), (2) implementation of your program for reporting of defects and noncompliance pursuant to 10 CFR Part 21 (particularly as these programs relate to the dedication, including seismic and environmental qualification, of commercial grade items for use in nuclear safety-related applications), with emphasis on electrical equipment manufactured by Klöckner-Moeller (K-M), GmbH, of Bonn, Germany, and (3) selected equipment qualification projects and information pertinent to the NRC's ongoing survey of industry and regulatory issues in this area.

Based on the results of this inspection, certain parts of your 10 CFR Part 21 implementation program appeared to be in violation of NRC requirements, as specified in the enclosed Notice of Violation (Notice). The violation of 10 CFR Part 21 is related to your procedures adopted pursuant to the regulation (1) establishing the threshold for employee reporting so high as to preclude in effect such reporting as the procedure was written and (2) not containing certain provisions required by the version of the regulation that became effective on October 29, 1991. It also was noted that your 10 CFR Part 21 posted notice as prescribed by your procedures lacked certain items required by the regulation. However, the inspectors found no instances in which your other practices or records were not in accordance with 10 CFR Part 21; nor did the inspectors identify any instances in which potential Part 21 issues were not properly dispositioned. The specific findings and references to the pertinent requirements are identified in the enclosed Notice and inspection report. Subsequent to the inspection, we reviewed your draft

revision to QAP-1 and, in conjunction with your answers to certain questions about it by telephone, we found that it addressed our principal concerns.

Also, during this inspection, it was found that the implementation of your QA program failed to meet certain NRC requirements. Specifically, your procedures for dedication testing of certain K-M molded-case circuit breakers for the North Anna Power Station did not specify a minimum duration for the full-load hold-in test, and the inspectors learned that the test was apparently conducted for an inappropriately short time. An unresolved item of concern was the out-of-tolerance tripping of certain K-M overload relays attributed to age. The inspectors were not able to determine during this inspection the basis for the K-M revised trip time tolerances, nor what other installations might be affected by relays with similar age/shelf-life-shifted performance characteristics.

You are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response. In your response, you should document the specific actions taken and any additional actions you plan to prevent recurrence. After reviewing your response to the Notice, including your proposed corrective actions and the results of future inspections, the NRC will determine whether further NRC enforcement action is necessary to ensure compliance with NRC regulatory requirements.

You are also requested to respond to the enclosed Notice of Nonconformance, which is based on the deficiencies in the implementation of your QA program as identified in the enclosed report. Please provide us within 30 days from the date of this letter a written statement in accordance with the instructions specified in the enclosed Notice of Nonconformance.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosures will be placed in the NRC Public Document Room.

The responses requested by this letter and the enclosed Notice are not subject to the clearance procedures of the Office of Management and Budget as required by the Paperwork Reduction Act of 1980, Public Law No. 96-511. Should you have any questions concerning this inspection, we will be pleased to discuss them with you.

Sincerely,

Leif J. Norrholm, Chief
Vendor Inspection Branch
Division of Reactor Inspection
and Licensee Performance
Office of Nuclear Reactor Regulation

Enclosures:
(1) Notice of Violation
(2) Notice of Nonconformance
(3) Inspection Report 99900912/93-01

Enclosure 1

NOTICE OF VIOLATION

National Technical Systems, Incorporated
Acton, Massachusetts

Docket No. 99900912
Report No. 93-01

During an NRC inspection conducted July 6-9, 1993, a violation of NRC requirements was identified. In accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions," 10 CFR Part 2, Appendix C (1992), the violation is listed below:

Section 21.21(a) of 10 CFR Part 21, "Reporting of Defects and Noncompliance," requires, in part, that each individual, corporation, or entity subject to the regulations in this part adopt appropriate procedures to ensure the proper evaluation of deviations and failures to comply and reporting of defects and failures to comply related to a substantial safety hazard to a director or responsible officer in accordance with certain time requirements and that an interim report is made to the NRC if the evaluation cannot be completed in the required time.

Section 21.6(b), "Posting Requirements," requires in lieu of posting the regulation and the procedures adopted pursuant to the regulation, that in addition to Section 206 of the Energy Reorganization Act of 1974, a notice be posted that (1) describes the regulation and the procedures, (2) states where they may be viewed, and (3) gives the name of the person to whom reports may be made.

Contrary to the above, as of July 9, 1993, the effective revisions of National Technical Systems, Incorporated, (NTS) procedures (Section V of the NTS Quality Assurance Manual and Quality Assurance Procedure QAP-1), adopted pursuant to 10 CFR 21.21, would not, as written, ensure proper evaluation and reporting. The procedures inappropriately required employees to report "defects that could create a substantial safety hazard in a nuclear power plant," a determination employees could not be expected to make; yet, the procedures did not specifically require employees to report to management deviations from technical procurement specifications (so that they could be evaluated), a determination employees could make. Also, the procedures had not been updated to include certain provisions required by the version of 10 CFR Part 21 that became effective October 29, 1991, which had instituted substantial changes in evaluation and reporting requirements. In addition, the NTS posted notice, pursuant to 10 CFR 21.6 and prescribed by QAM Section V, did not state where the procedures (specifically QAP-1) could be viewed and did not give the name (or title) of the person to whom reports should be made.

This is a Severity Level V Violation (Supplement VII).

Pursuant to the provisions of 10 CFR 2.201, NTS is hereby required to submit a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555 with a copy to the Chief, Vendor Inspection Branch, Division of Reactor Inspection and Licensee Performance, Office of Nuclear Reactor Regulation, within 30 days of the date of the letter transmitting this Notice of Violation (Notice). This reply should be clearly marked as a "Reply to a Notice of Violation" and should include for each violation: (1) the reason for the violation, or, if contested, the basis for disputing the violation, (2) the corrective steps that have been taken and the results achieved, (3) the corrective steps that will be taken to avoid further violations, and (4) the date when full compliance will be achieved. Where good cause is shown, consideration will be given to extending the response time. Under the authority of Section 182 of the Act, 42 U.S.C. 2232, this response shall be submitted under oath or affirmation.

Dated at Rockville, Maryland
this 23rd day of December 1993

Enclosure 2

NOTICE OF NONCONFORMANCE

National Technical Systems, Incorporated
Acton, Massachusetts

Docket No. 99900912
Report No. 93-01

Based on a Nuclear Regulatory Commission (NRC) inspection conducted July 6-9, 1993, it was found that certain of your activities were not performed in accordance with NRC requirements imposed on you by purchase order contracts with NRC licensees or their contractors.

Criterion III, "Design Control," of Appendix B to Title 10 of the Code of Federal Regulations (10 CFR Part 50), requires that design basis requirements be properly translated into design output documents (i.e., drawings, instructions and procedures).

Criterion V, "Instructions, Procedures and Drawings," of Appendix B to 10 CFR Part 50, states, in part, "Activities affecting quality shall be prescribed by instructions procedures, or drawings appropriate to the circumstances."

Criterion VII, "Control of Purchased Material, Equipment, and Services," of Appendix B to 10 CFR Part 50, states, in part, "Measures shall be established to assure that purchased material .... whether purchased directly or through contractors and subcontractors, conform to the procurement documents."

Contrary to the above, procedures, prepared by National Technical Systems, Incorporated, for dedication testing of Klöckner-Moeller molded-case circuit breakers for safety-related service at the North Anna Power Station, an activity affecting quality, were not appropriate to the circumstances and did not properly incorporate design requirements because they did not specify a minimum duration for the full-load hold-in test for the breakers. There was no documented evidence that the breakers had been adequately verified to conform to the operability specification in the procurement documents with respect to this function and there was evidence that the test had been conducted for an inappropriately short time. (93-01-02)

Please provide a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555 with a copy to the Chief, Vendor Inspection Branch, Division of Reactor Inspection and Licensee Performance, Office of Nuclear Reactor Regulation, within 30 days of the date of the letter transmitting this Notice of Nonconformance. This reply should be clearly marked as a "Reply to a Notice of Nonconformance" and should include for each nonconformance: (1) a description of steps that have been or will be taken to correct these items, (2) a description of steps that have been or will be taken to prevent recurrence, and (3) the dates your corrective actions and preventive measures were or will be completed.

Dated at Rockville, Maryland
this 22nd day of December, 1993

U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
DIVISION OF REACTOR INSPECTION AND LICENSEE PERFORMANCE
VENDOR INSPECTION BRANCH

ORGANIZATION:	National Technical Systems, Incorporated
DOCKET/REPORT NO.:	99900912/93-01
CORRESPONDENCE ADDRESS:	533 Main Street Acton, Massachusetts
ORGANIZATIONAL CONTACT:	Ms. Christine Briggs, Director of Quality (508) 263-2933
NUCLEAR INDUSTRY ACTIVITY:	Provides commercial grade dedication and equipment qualification services and dedicated equipment for the commercial nuclear power industry
INSPECTION CONDUCTED:	July 6-9, 1993
TEAM LEADER:	S.D. Alexander, Team Leader Reactive Inspection Section 2 (RIS-2) Vendor Inspection Branch (VIB) — Date: 11/22/93
OTHER INSPECTORS:	K.R. Naidu, RIS-2: VIB A.M. Dummer, Plant Systems Branch
APPROVAL:	Gregory C. Cwalina, Chief RIS-2, VIB, Division of Reactor Inspection and Licensee Performance — Date: 11/22/93
INSPECTION BASES:	10 CFR Part 21 and to Appendix B 10 CFR Part 50
INSPECTION SCOPE:	To evaluate activities related to commercial dedication in general and specifically the commercial dedication of electrical switchgear manufactured by Klockner-Moeller, Germany, and equipment qualification tests.
PLANT SITE APPLICABILITY:	Surry 1/2, (50-280, 50-281); LaSalle 1/2 (50-373, 50-374); Prairie Island 1/2 (50-282, 50-306)

1 INSPECTION SUMMARY

1.1 Violation

Contrary to the requirements of 10 CFR 21.21(a), National Technical Systems, Incorporated (NTS) procedures, adopted pursuant to the regulation, (1) required employees to report defects not within their ability to evaluate, (2) did not require reporting of deviations from technical procurement specifications (3) lacked certain provisions required by the July 1991 revision of the regulation. Contrary to Title 10 of the Code of Federal Regulations, Part 21 (10 CFR Part 21), Section 21.6(b), the posted notice prescribed by the procedures lacked certain required information. (93-01-01)

1.2 Nonconformance

Contrary to the requirements of Criteria III, V and VII of Appendix B to 10 CFR Part 50, NTS-prepared procedures for dedication testing of Klöckner-Moeller (K-M) molded-case circuit breakers for the North Anna Power Station did not properly incorporate design requirements because they did not specify a minimum duration for the full-load hold-in test, and there was evidence that the test was conducted for an inappropriately short time. (93-01-02)

1.3 Unresolved Item

Out-of-tolerance tripping of certain K-M overload relays was attributed to age. The inspectors were not able to determine during this inspection the basis for the K-M revised trip time tolerances, nor what other installations might be affected by relays with similar age/shelf-life-shifted performance characteristics. See Paragraph 3.5 of this report. (93-01-03)

1.4. Open Items

1.4.1 NTS's and/or K-M's evaluation of performance anomalies of Z4-100/K-NA overload relays identified by NTS during testing and identification of any installations in harsh-environment, Class 1E applications. See Paragraph 3.8 of this report. (93-01-04)

1.4.2 NTS's, Continental's and/or Spectrum Technology's evaluation of failures of Continental silicone rubber electrical cable during NTS's qualification testing and identification of installations of this cable in Class 1E, harsh-environment applications. See Paragraph 3.9 of this report (93-01-05)

1.4.3 NTS's and/or Static O-Rings's (SOR's) evaluation of test failures at NTS of an SOR pressure switch and a temperature switch and identifiaction of installations of these types of switches in Class 1E, harsh-environment applications. See Paragraph 3.10 of this report. (93-01-06)

2 STATUS OF PREVIOUS INSPECTION FINDINGS

There were no outstanding items from any previous inspections.

3 INSPECTION FINDINGS AND OTHER COMMENTS

3.1 Entrance and Exit Meetings

On July 6, 1993, during the entrance meeting, the Nuclear Regulatory Commission (NRC) inspectors discussed the scope of the inspection and the areas to be reviewed with the Director of Quality. On July 9, 1993, during the exit meeting, the inspectors discussed their conclusions with NTS staff identified in Section 4 of this report.

3.2 10 CFR Part 21 Review

3.2.1 Review of Procedures

The inspectors reviewed the effective revisions of NTS procedures (Section V of the NTS Quality Assurance Manual and Quality Assurance Procedure QAP-1), adopted pursuant to 10 CFR 21.21 and found that they would not, as written, ensure proper evaluation of deviations and reporting of defects or substantial safety hazard-related failures to comply. The procedures required employees to report "defects that could create a substantial safety hazard in a nuclear power plant," a determination employees could not be expected to make; yet, the procedures did not specifically require reporting deviations from technical procurement specifications and had not been updated to include certain provisions required by the version of 10 CFR Part 21 that became effective October 29, 1991, which had instituted substantial changes in evaluation and reporting requirements. In addition, the NTS posted notice, pursuant to 10 CFR 21.6 prescribed by QAM Section V, did not state where the procedures (specifically QAP-1) could be viewed, nor did it give the name (or title) of the person to whom reports should be made. This is designated Violation 93-01-01.

Although a provision for informing affected licensees or purchasers of deviations in basic components supplied to them (when the vendor determines it cannot perform the requisite evaluation) was not explicitly included in NTS procedures, such a provision is no longer specifically required by the current version of Part 21 to be included in procedures adopted to implement the regulation. In addition, no instances were identified in which NTS did not properly disposition deviations of which they were aware. Nevertheless, NTS stated that they would consider the prudence of including such a provision, particularly since the determination that NTS cannot evaluate the deviation for the creation of a substantial safety hazard is most often the case.

The inspectors also noted that there were some inconsistencies between the two procedures relating to Part 21 in the chain of reporting and handling of reports of problems from employees. NTS stated that they intended to review this situation and consider consolidating the two procedures to avoid further confusion. Subsequent to the inspection, the inspector reviewed a draft revision to QAP-1 and, in conjunction with NTS's answers to certain questions about it by telephone, found that it addressed the principal concerns.

3.2.2 Review of 10 CFR Part 21 Records

The inspectors reviewed selected NTS records pertaining to nonconformances, or other documented problems, and determined that they were handled as deviations when appropriate and the affected licensees or purchasers were notified in accordance with the regulations and NTS procedures. Associated NTS records appeared to be in compliance with the regulation in terms of completeness and retention.

3.3 Review of Electrical Switchgear Dedication

Virginia Electric Power Company (VEPCo) prepared and issued Specification SUP-0014, Revision 1 and Addenda 1, 2, and 3, dated August 6, 1991, and February 7 and June 12, 1992, respectively, for motor control centers (MCCs) intended for its Surry nuclear power plant. In response to this bid, K-M (USA, Inc.) submitted a quotation, which VEPCo evaluated and determined acceptable. VEPCo issued purchase order (PO) BNT-380110, dated March 19, 1992, to K-M for the supply of the MCCs.

The MCCs contained various quantities of 480-Vac, National Electrical Manufacturer's Association (NEMA) sizes 1 and 2, full-voltage, reversing starters, full-voltage non-reversing starters, and molded-case circuit breakers (MCCBs). NTS was contracted by K-M to perform (or be responsible for the performance of) the dedication and qualification of the MCCBs. Accordingly, NTS purchased an additional representative MCC and used it as a seismic test specimen. VEPCo required the switchgear to be qualified to meet the following standards of the Institute of Electrical and Electronic Engineers (IEEE):

- IEEE-323-1983, "Qualifying Class 1E Equipment for Nuclear Power Generating Stations"
- IEEE 344-1975, "Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations"
- IEEE 383-1974, "Standard for Type Test of Class 1E Electrical Cables, Field Splices and Connections for Nuclear Generating Stations."

VEPCo Specification SUP-0014 specified:

- Electrical components should be new and should not be purchased from vendors listed in NRC Information Notice 88-46.
- Environmental conditions, such as ambient temperature, pressure, and radiation in the turbine building and the emergency switchgear room, where the MCCs were to be installed.
- The envelope for the operating-basis earthquake (OBE) and the safe-shutdown earthquake (SSE) and required the MCCs to be qualified for the seismic environment by testing only.

- Quality assurance and reporting requirements to meet 10 CFR Part 50, Appendix B, and 10 CFR Part 21, respectively.

K-M issued PO 107466 of May 8, 1992, to NTS to prepare a test plan to dedicate the switchgear and to perform the seismic tests required to qualify the switchgear to IEEE 344-1975. In the PO, K-M stipulated the following:

> All material/services are to be in accordance with NTS QAM Revision 2 and should be included in a certificate of conformance (CoC).
>
> Meet portions of 10 CFR Part 50, Appendix B, and 10 CFR Part 21, where applicable.
>
> At the end of the qualification, NTS was to provide a CoC certifying that the switchgear was qualified to IEEE-323-1983 and IEEE 344-1975.

NTS prepared Test Procedure 60041-93N, "Test Procedure for the Qualification Testing of Series 200 Motor Control Centers," to dedicate and seismically qualify commercial grade MCCs for use in safety-related applications at VEPCo's North Anna Power Station (NAPS). The test plan specified the sequence of the activities and the party (K-M or NTS) responsible for performing them. It established the following critical characteristics with acceptance criteria to provide assurance that the items received were the items specified, that the items would perform their intended function, and that the supplied items were equivalent to the sacrificial test items.

- manufacturer's markings (K-M)
- weight
- visual configuration
- dielectric withstand voltage
- operability
- fuse test (NTS)
- breaker 300-percent time test
- breaker instantaneous trip
- contact resistance
- contactor pick-up and drop-out voltage
- overload 300-percent rated current time test

The records indicated that seismic testing was conducted in accordance with the guidelines provided in IEEE 344-1975 and enveloped the parameters provided in VEPCo's Specification SUP-0014. NTS established the qualification testing levels using composite (horizontal and vertical) peak accelerations derived by constructing a single OBE-level and a single SSE-level required response spectrum, within the limitations of the seismic simulator. NTS performed the mild environment analysis of VEPCo's turbine building and emergency switchgear room environmental conditions in accordance with IEEE 323-1983. K-M performed receipt inspection and acceptance and baseline functional testing except for contact resistance, fuse and circuit breaker testing below 125 amperes (A). NTS, mostly through its subcontractor, AC Electric Company (ACE), performed these and all the remaining tests.

However, the requirements to test circuit breakers specified in item 1 of section 7.7 of TP 60041-93N and the associated acceptance criteria were not completely adequate to demonstrate operability under all design basis conditions as required by the PO. For safety-related load breakers, operability is generally recognized to include the safety function of providing and maintaining (absent overload, fault, or other required trip conditions) reliable power for starting and running of the load. Item 1 of this section of the test plan translated this requirement as "Each breaker shall be cycled from off-on-off, into a test load equal to the AC current rating of the breaker." The acceptance criterion for this requirement was: "Each breaker shall be capable of making and breaking its rated current without damage to the item occurring. The breaker shall not trip." However, this test requirement did not provide assurance that the breaker would remain closed for the required operating time of any loads for which it was to be used. The acceptance criterion for this function recommended by National Electrical Manufacturers Association (NEMA) Standard Publication AB 4-1991 governing field verification of MCC breakers, which is the most recognized industry standard, is that, absent trippable conditions, the MCCB, in an enclosure in 25-°C ambient temperature, should carry 100-percent rated current for at least 1 or 2 hours, depending on rating.

There was no requirement specifically stated in the NTS test plan for the MCCBs to be subjected to full-load hold-in tests for an appropriate amount of time. Since this is a relatively routine test, the NRC inspectors made inquiries to determine whether the test was conducted for an appropriate time despite the lack of a specific requirement to do so. However, according to the test facility (AC Electric), the test was apparently conducted for no more than a few minutes. Hence the critical characteristic of full-load hold-in capability was not verified. This constituted a nonconformance with respect to 10 CFR Part 50, Appendix B, because (1) the procedure prescribing an activity affecting quality was not appropriate to the circumstances as required by Criterion V, (2) a design basis requirement was not properly translated into design output documents (instructions, procedures, and drawings) as required by Criterion III, and (3) contrary to Criterion VII, the purchaser did not ensure that all requirements of the procurement documents (i.e., this design specification) were met. This is designated Nonconformance 93-01-02.

In response to this finding, NTS reviewed the circumstances and made a prompt evaluation of the safety significance of this issue, which constituted a deviation from technical procurement specifications. NTS's evaluation was as follows: ACE performed testing for NTS on these 200-, 250-, and 350-A MCCBs. These larger MCCBs were used as the main breakers in the MCCs that K-M supplied to VEPCo with NTS's dedication. In all cases, the main breakers were oversized to supply current to individual MCC starter cubicles. For example, a 200-A main breaker was the protection for three breakers, specifically two 50-A breakers and one 33-A breaker. Therefore, the maximum total current draw these breakers could be expected to have at 100-percent rated load would be 133 A. However, the two 50-A breakers were for a 20-HP motor and a 25-HP motor, and the single 33-A breaker was for a 10-HP motor. The total expected load for this system would be 75 A. This 75-A load is only 38-percent of full

load on the 200-A main breaker. Other MCCs were analyzed similarly. In no case were the expected combined loads above 38-percent of the main breaker rated current.

Although, on the basis of this information, NTS acknowledged that the MCCBs' hold-in capability had not been demonstrated in the generally accepted manner, NTS concluded that there were no immediate safety concerns (i.e., the deviation would not at present create a substantial safety hazard). However, in view of the possibility of the licensee adding future loads, NTS committed to inform the licensee of the deviation and to correct its procedures for future work. No other projects were found to be affected.

3.4 Observation of Activities in Progress

3.4.1 Receipt Inspection

The inspectors observed receipt inspection being conducted on a KLF-type, 120-V, 60-Hz, 5-A, Style 290E481A09 relay supplied by ASEA Brown Boveri in response to NTS PO 34307A. Jeamont Schneider Industries of France had issued PO YA113189 to NTS for the supply of the above as a safety grade relay. The NTS inspector placed the package in the receipt inspection staging area, opened the shipping carton, and removed the relay from it. The NTS inspector then verified that the name plate details were the same as the one in the PO and that the relay did not sustain visible shipping damage and documented his findings in the designated receipt inspection report. The NTS inspector prepared a hold tag to indicate that other tests had to be conducted on these components and transferred the relay to the room where other components are stored to await further tests or inspections.

3.4.2 Dedication Activities

The inspectors observed an NTS technician perform tests on terminal blocks (TBs) manufactured by General Electric for CEGELEC Automation Company (formerly known as Comsip, Incorporated). NTS specified the tests for dedicating the TBs in Procedure 28637-92-N-7, "Receipt Inspection and Baseline Functional Dedication Test Procedure For General Electric Terminal Block."

3.4.3 Storage Room

The inspectors observed that access to the storage area was limited to authorized individuals. Nonconformance tags had been affixed to components stored in a separate rack that had not met acceptance criteria specified in the relevant test plan. Components on which inspections had not been completed were identified with hold tags. Commercial grade components, purchased by NTS for dedication, were separated from components supplied by customers for dedication by NTS.

3.5 Review of Nonconformance Reports (NCRs)

The inspectors reviewed several selected receipt testing NCRs associated with items in the segregated nonconforming item area in the storage room. The NCRs reviewed (all dated July 1, 1993) pertained to Commonwealth Edison Company

(CECo) PO 346 358, dated July 31, 1992, to NTS Acton for some safety-related, 480-V, K-M contactors, and overload relays.

- NCR 93-56 documented that several type Z0-0.68/K-NA overload relays tripped outside the specified 23-second maximum trip time with 3 times its nominal current applied. Upon consulting K-M, the manufacturer advised NTS to use +/- 20-percent tolerance. With the revised acceptance criteria, all but one tripped within limits.

- NCR 93-57 documented that some type Z0-2.1/K-NA overload relays tripped outside the specified maximum trip time of 28 seconds with 3 times nominal current applied. K-M advised increasing the retest specification from 28 to 40 seconds, at which point, all but two passed.

- NCR 93-58 documented that several type Z0-6.6/K-NA overload relays tripped outside the specified maximum trip time of 23 seconds at 300-percent nominal current. All but one tripped in time with a K-M revised maximum trip time of 45 seconds.

- NCRs 93-61, 62-64, and 65 documented that several type Z2-16/K-NA, Z2-40/K-NA, Z2-24/K-NA, and Z2-11/K-NA overload relays tripped late. At the time of the inspection, NTS was awaiting revised trip times.

According to the assigned NTS project manager, K-M attributed the late tripping to the units being older models that may have been in storage for an extended period of time. The NTS project manager stated that he had notified CECo of the test results and the revised values of the trip times so that the delayed trip times could be factored into the relay coordination. The inspectors, not being aware of any particular or commonly known shelf-life (or mild environment in-service aging) limitations on these types of overload relays, were concerned about their use in other applications, possibly with less testing where the nominal performance specifications were being relied upon. The inspectors were not able to determine during this inspection what the basis was for the K-M revised trip time tolerances, nor what other installations might be affected by relays with age/shelf-life-shifted performance characteristics. Therefor-, this issue is designated Unresolved Item 93-01-03.

3.6 Additional Dedication Package Review

Northern States Power Company (NSP) issued PO E1899SQ dated December 8, 1992, to NTS for various models and quantities of 600-V rated MCCBs, non-reversing starters, and overload relays manufactured by K-M. NTS issued PO 33918A dated February 10, 1993, to K-M to supply the quantities required by NSP. To justify qualification by similarity, NTS ordered additional circuit breakers to be used as test specimens to represent the breaker population that was to be shipped. NTS performed baseline functional testing on the sacrificial test specimens before and after seismic testing. The results of post-seismic functional testing were used to confirm the post-seismic operability of the test specimens. NTS used the results to verify equivalency of the items that were being supplied. NTS was to verify the following critical characteristics of the production items as applicable using Method 1 (as it is called in

Electric Power Research Institute (EPRI) Report NP-5652, special tests and inspections, or EPRI Method 2, commercial grade supplier survey):

- manufacturer's markings (Method 1)
- visual configuration examination (Method 1)
- design control (Method 2)
- physical dimension verification (Method 2)
- item weight (Method 1)
- dielectric withstand voltage (Method 1)
- 300-percent overload time test (Method 1) (thermal-mag only)
- contact resistance (Method 1)
- contact pick-up and dropout voltage (Method 1)
- contactor current test (Method 1)
- instantaneous trip testing (Method 1)
- rated current capability (Method 1)

NTS conducted the dedication in the following sequence:

- receipt inspection and acceptance testing
- baseline functional testing
- seismic testing
- post seismic functional testing
- certificate of compliance and test report

The team reviewed the records pertaining to this PO and observed a discrepancy in the documentation. A note in line item 2 of Section 7.1.3 of NTS Test Procedure 60174-93N stated: "This test [thermal time delay overload trip] is not performed on circuit breakers item 9 through 13 of Section 3.0." However, a single K-M NZMH6-63/ZM6-60-500-OBI-CNA-type circuit breaker equipped with adjustable instantaneous magnetic trip only was listed to be tested for response to thermal overload. The line item note was supposed to have stated: "This test is not being performed on circuit breakers item 1 and items 9 through 13 of Section 3.0." Review of the test records indicated that, appropriately, only the instantaneous trip test and not a thermal overload test was performed on this breaker. Although NTS personnel had discovered this error and documented it in a deviation report, it appears that it had not been corrected in the final report as a result of an oversight. NTS committed to inform the customer and issue a correction to the final report. This discrepancy did not materially impact activities affecting quality and, therefore, was not considered a nonconformance.

3.7 Equipment Qualification Procedural Review

NTS Standard Operating Procedures (SOPs) SOP-E1, "LOCA/HELB Testing"; SOP-E2, "LOCA System Operation"; SOP-N1, "Irradiation Exposure of Nuclear Safety-Related Test Components"; and SOP-N2, "Accelerated Thermal Aging Arrhenius Method" were reviewed. No problems were identified.

3.8 Qualification of Klöckner-Moeller Overload Relays

NTS Job 28702-92N was for the dedication of commercial grade K-M Z4-100/K-NA overload relays for harsh-environment, safety-related service at LaSalle

County Station pursuant to Commonwealth Edison PO 338098 dated April 17, 1991. The PO invoked 10 CFR Part 21 and required certification to the NTS QA program. Qualification type testing was performed on six of the relays after dedication in accordance with IEEE 323-1974 and IEEE 344-1975, including baseline functional testing, radiation aging, material analysis to determine activation energy, thermal aging, mechanical aging, seismic testing, and exposure to a simulated harsh environment.

In response to this order NTS issued PO 29166 to Kent Industries for 25 K-M overload relays. The NTS PO required that relays be manufactured from the same material batch lot, having the same date code, thus ensuring material traceability. When NTS received the relays, it performed receiving inspection and baseline functional testing. The critical characteristics were verified by special tests and inspections, including part numbers, dimensions, insulation resistance, dielectric withstand, and trip characteristics. Material similarity and traceability were checked by date code.

Anomalies that occurred during testing were documented and reported to the customer. Relay S/N 006, aged to a 10-year equivalent, tripped when the simulated accident profile was descending from the first peak. The relay was reset when the temperature reached 104 °F. The cause of the tripping was not determined. Another anomaly was that the relays did not carry the required 66 A (-1.5 A, +1 A) because of power line variances from the local utility. Current and voltage were monitored every 5 minutes and adjusted to compensate for the variations. The test time was extended to compensate for the repair of a test chamber steam leak and also to account for NTS's difficulties in maintaining required temperature and humidity according to recalculations by the customer's architect/engineering firm, Sargent & Lundy. All anomalies were documented and were reported to the customer. Although all other specimens eventually met all other acceptance criteria, the report did not make conclusions regarding the qualification of the relays.

No problems were identified with NTS's conduct of this test program that were not adequately resolved. However, questions remain regarding NTS's and/or K-M's evaluation of the reported performance anomalies and also regarding possible installations of these overload relays in harsh-environment, Class 1E applications. This issue is being pursued under Open Item 93-01-04.

3.9 Continental Cables

NTS Job 28889-92N was for the qualification of Continental silicone rubber-insulated cables for safety-related service in a harsh environment. The purchase order from Spectrum Technologies invoked 10 CFR Part 21. NTS performed baseline testing, thermal aging, and functional tests before sending the specimen cables to Isomedix for radiation aging. The cables underwent accelerated thermal aging to simulate a 40-year service life at 120 °F ambient temperature with 49 °F heat rise based on calculations by Spectrum Technologies. Isomedix used a Cobalt-60 source to irradiate the cables with 230 Mrads at a rate of less than 1 Mrad per hour.

Functional performance requirements of the cables were defined as continuity, insulation resistance, and dielectric withstand. They were verified after

thermal aging and after radiation aging. All samples were acceptable after thermal aging but failed the post-radiation functional tests. During recoiling of the samples, the inner silicone insulation cracked. The silicone insulation of the 2/0 AWG cable cracked and separated, exposing the conductor. This cable was not immersed in water nor subjected to the 2200 Vac. All other cables had greater than 5-milliamp leakage current in the immersion dielectric withstand test. The accident simulation was not performed because the cables had already failed. The results were documented and reported to the customer.

No problems were identified with NTS's conduct of this test program. However, questions remain regarding NTS's and/or Spectrum's evaluation of the failures and possible installations of this cable in Class 1E, harsh-environment applications. This issue is being pursued under Open Item 93-01-05.

3.10 SOR Pressure, Vacuum, and Temperature Switches

NTS Job 60162-93N was for the qualification testing of 10 different types of pressure, vacuum, and temperature switches made by SOR, Inc. (formerly "Static-O-Ring"), for harsh environment safety-related service. SOR performed thermal and radiation aging portions of the qualification testing. PO 52362 was for NTS to perform seismic, high-energy line break (HELB), loss-of-coolant accident (LOCA), and functional testing in accordance with SOR test plan 9058-101. The PO imposed the NTS 10 CFR 50, Appendix B, quality program and 10 CFR Part 21, with notification to SOR and the NRC. NTS performed the specified portions of a type test in accordance with IEEE 323-1974 and IEEE 344-1975. The switches were required to function during and after the adverse environment tests.

Four pressure and two vacuum switches under went a LOCA test. They were periodically actuated during and after the LOCA simulation (profile similar to IEEE 323, Appendix A) and voltage, current, actuation pressure, insulation resistance, contact resistance, and switch housing internal pressure were recorded. The set points, dead bands, and repeatability were attained for the pressure and vacuum switches by cycling the switches three times from 0 psi to the increasing set point and back to 0 psi.

A group of two pressure switches, two vacuum switches, and six temperature switches were exposed to the HELB tests. During the first HELB test, pressure and vacuum switch actuation were checked at each pressure/temperature level of the profile. However, the temperature switches were not tested for operability during the HELB profiles. After each HELB test, functional tests were performed on all switches. The set points, dead bands, repeatability, insulation resistance, and contact resistance of the pressure, vacuum, and temperature switches were checked. All of the post-HELB 1 functional test results were consistent with pre-test data.

During a second HELB test, switch actuation was checked at the 350-°F level and the 275-°F level. The set point, dead band, repeatability, insulation resistance, contact resistance, and dielectric withstand voltage were tested following the second HELB test. Temperature and pressure were too low for a period of 60 minutes, but the test was extended for 60 minutes to account for the temperature anomaly. All pressure and vacuum switches, with the exception

of pressure switch S/N 92-6-7018, operated properly. The set point, dead band and repeatability for this switch could not be accurately recorded, apparently due to diaphragm leakage and it was returned to SOR for evaluation. All temperature switches operated properly in the functional tests with the exception of one temperature switch that indicated approximately 1-mA leakage current at 900 Vac in the dielectric withstand test, other switches having no leakage during the 1-minute test. An anomaly occurred during seismic testing that was evaluated and determined not to be a failure of the switch. All anomalies were documented and reported to the customer. NTS provided no conclusions on the qualification status of the switches.

No problems were identified with NTS's conduct of this test program. However, questions remain regarding NTS's or SOR's evaluation of the failures and regarding possible installations of the two types of failed switches in Class 1E, harsh-environment applications. This issue is being pursued under Open Item 93-01-06.

3.11 NTS-Conducted Audits and Commercial Grade Surveys

The inspectors reviewed several reports of audits including Diezotronics, Inc., and GE Computer Services which appeared satisfactory. The inspectors also reviewed reports of several commercial grade surveys conducted by NTS and identified strengths and also a weakness in two of the surveys. According to the report of the survey, conducted June 28-29, 1992, of Material Testing Laboratories (Norfolk, Virginia), NTS Report NTS/CGS-92-022, dated August 21, 1992, NTS specifically witnessed all chemical analyses on two NTS jobs, semi-quantitative analysis on certain NTS wedges, and hardness testing on another NTS job. This was a good, item- and critical-characteristic-specific survey. Although some surveys were excellent, others for services were not specific about the type of calibration or service being procured. For example, another test lab subcontractor of NTS, Henry Souther Laboratories, has about eight different test capabilities, but the survey report did not specify which tests or if all tests were approved. This was more of a QA capability audit rather than a testing capability survey. Also, the survey of AC Electric did not address specifics of what AC Electric was contracted to do, other than verify they use NTS procedures. The NRC inspectors found some variability among surveys done by different NTS surveyors. Discussions with NTS on this issue addressed the ways in which somewhat more detailed procedural guidance might improve standardization and consistency in the quality of surveys.

3.12 Review of NUPIC Audit of NTS

In order to assess NTS's dispositioning of externally identified problems, the inspectors reviewed the report of an audit of NTS by a joint utility team under the auspices of the Nuclear Products Issues Council (NUPIC), conducted March 31 through April 4, 1992, identified as PSE&G [Public Service Electric and Gas - the lead utility] Report BOO-253-92, dated April 24, 1992. The audit was to verify compliance with 10 CFR Part 50, Appendix B, 10 CFR Part 21, ANSI N45.2, and EPRI Report NP-5652. NTS was found to be in compliance with NUPIC's so-called Performance Based Checklist (Rev. 2). There were two findings, but they did not affect QA program implementation or products. NTS responded, describing its corrective actions on May 20, 1992, and its actions

were found acceptable by the lead audit organization according to a PSE&G letter dated June 10, 1992. Also, the audit report contained three observations (suggestions for improvement), one of which was significant: NTS did not correlate (document) critical characteristics to intended safety functions although the report stated that NTS adequately dedicated the item. The inspectors noted that the NUPIC report indicated review and approval of NTS's external audits, but it did not address commercial grade surveys by NTS; although surveys are heavily relied upon by NTS for dedication.

4 PERSONNEL CONTACTED

N.J. Fredkin, Jr., Vice President, Nuclear Services
William C. McGinnis, Vice President, Northeast Division
* + Christine C. Briggs, Director of Quality
* + Michael P. Saniuk, Manager of Nuclear Services
* + James Dozier, Assistant Quality Assurance Manager
+ James Gaudette, Operations Manager
R.A. Everett, Project Engineer
Paul Leonard, Project Manager

+ indicates those present at the entrance meeting on July 6, 1993.
* indicates those present at the exit meeting on July 9, 1993.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

November 9, 1993

Docket No. 99901268

Mr. George A. Guarino
Senior Vice President
Taylor Forge Stainless, Inc.
P.O. Box 610
Somerville, New Jersey 08876

Dear Mr. Guarino:

SUBJECT: NRC INSPECTION REPORT NO. 99901268/93-01

This letter addresses the U. S. Nuclear Regulatory Commission (NRC) inspection of your facility at North Branch, New Jersey, conducted by Mr. Larry Campbell of this office October 18 through 21, 1993, and the discussions of his findings with you and members of your staff at the conclusion of the inspection. The performance based inspection was conducted to evaluate Taylor Forge Stainless, Inc.'s (TFS's) quality program and its implementation in selected areas such as; (1) purchased material and services and controls for subsuppliers, (2) material and traceability control, (3) inspection, and (4) ASME Code certification.

Areas examined during the NRC inspection and our findings are discussed in the enclosed inspection report. This inspection consisted of an examination of procedures and representative records, discussion and interviews with personnel, and observations by the inspector.

Although no violations or nonconformances were identified during the inspection, the NRC inspector noted several weaknesses in TFS's implementation of Section 21.21, "Notification," of Title 10 of the Code of Federal Regulations (10 CFR). These weaknesses were in TFS's 10 CFR Part 21 procedure and Part 21 evaluation for nonconforming fittings certified and supplied as Grade WP 316 stainless steel (ss) material that were later determined to be Grade WP 304 ss material. These weaknesses are discussed in detail in the enclosed inspection report.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and the enclosed inspection report will be placed in the NRC Public Document Room. No response to this report is required.

If there are any questions concerning this inspection we will be pleased to discuss them with you.

Sincerely,

Leif J. Norrholm, Chief
Vendor Inspection Branch
Division of Reactor Inspection
and Licensee Performance
Office of Nuclear Reactor Regulation

Enclosure:
Inspection Report 999001268/93-01

ENCLOSURE 1

ORGANIZATION:	Taylor Forge Stainless, Inc. North Branch, New Jersey
REPORT NO.:	999001268/93-01
CORRESPONDENCE ADDRESS:	Mr. George A. Guarino Senior Vice President Taylor Forge Stainless, Inc. P.O. Box 610 Somerville, New Jersey 08876
NUCLEAR INDUSTRY ACTIVITY:	Manufactures and supplies forgings for use in piping systems at commercial facilities and nuclear power plants.
INSPECTION CONDUCTED:	October 18 through 21, 1993

INSPECTOR: Larry L. Campbell — Date: 11/02/93
Larry L. Campbell
Reactive Inspection Section No. 1
Vendor Inspection Branch

APPROVED: Uldis Potapovs — Date: 11-04-93
Uldis Potapovs, Chief
Reactive Inspection Section No. 1
Vendor Inspection Branch

INSPECTION BASIS:	10 CFR Part 21 and Appendix B to 10 CFR Part 50
INSPECTION SCOPE:	To review and evaluate the Taylor Forge Stainless, Inc. quality assurance program and its implementation in selected areas such as; (1) purchased material and services and controls for subsuppliers, (2) material control, (3) inspection, and (4) ASME Code certification.
PLANT SITE APPLICABILITY:	Comanche Peak 1 (50-445) H. B. Robinson 2 (50-261) Limerick 1 and Limerick 2 (50-352 and 50-353) Other Plants using TFS products

1 INSPECTION SUMMARY

1.1 Observations

The NRC inspector identified weaknesses in Taylor Forge Stainless, Inc.'s (TFS's) 10 CFR Part 21 implementation procedure. Subsequent to the inspection, TFS informed the NRC inspector that its 10 CFR Part 21 procedure had been revised to clarify certain 10 CFR Part 21 requirements (Observation 99901268/93-01-01, see Section 3.2.1 of this report).

The NRC inspector found that TFS had not prepared a formal evaluation to address the acceptability of fittings supplied to Limerick that were marked with TFS Heat No. LBQD. During the conduct of the inspection, TFS prepared this evaluation (Observation 99901268/93-01-02, see Section 3.2.2.4 of this report).

2 STATUS OF PREVIOUS INSPECTION FINDINGS

In 1984 Taylor-Bonney Division, Taylor Forge Stainless, a Gulf and Western manufacturing company, was purchased by an individual and became an independent company. The purchaser renamed the company Taylor Forge Stainless, Inc..

This was the first NRC inspection at TFS.

3 INSPECTION FINDINGS AND OTHER COMMENTS

3.1 Entrance and Exit Meetings

In the entrance meeting on October 18, 1993, the NRC inspector discussed the scope of the inspection and established interfaces with TFS management. During the exit meeting on October 21, 1993, the NRC inspector discussed his findings and concerns with TFS's management and staff.

3.2 10 CFR Part 21

The NRC inspector determined that TFS has maintained the required 10 CFR Part 21 postings and a procedure for implementing 10 CFR Part 21 requirements, Procedure No. N-NRC-1, "Reporting of Defects/Non-Compliances Under 10 CFR Part 21," Revision 1, dated April 30, 1991. Although the procedure did not specifically address the revised 10 CFR Part 21 requirements that became effective October 29, 1991, the revised 10 CFR Part 21 was an attachment to Procedure No. N-NRC-1. The procedure text made reference to certain sections of 10 CFR Part 21 such as notifying the NRC as required by Section 21.21, however in some instances it was unclear which individuals were responsible for such notification or the time allowed for these individuals to perform their actions. The NRC inspector identified several weaknesses in TFS's 10 Part 21 procedure. The following are examples of these weaknesses:

a. In practice, the TFS Manager of Quality Assurance coordinates and documents the 10 CFR Part 21 evaluations and is the individual authorized by the responsible officer to provide notification to the NRC, however the procedure appears to permit any employee of TFS to perform these activities, and

b. the procedure requires that the purchasers of suspect material and the NRC be promptly notified of defects, while the attached 10 CFR Part 21 text is more prescriptive and identifies specific time limits for the various reporting requirements.

The NRC inspector reviewed TFS 10 CFR Part 21 activities to date and determined that TFS had met the 10 CFR Part 21 reporting requirements that became effective on October 29, 1991.

3.2.1 NRC Inspector Observation

The NRC inspector discussed with TFS the present format, text, and use of 10 CFR Part 21 as an attachment to Procedure No. N-NRC-1, and identified this as an area needing improvement. TFS agreed that Procedure No. N-NRC-1 needed improving and during the conduct of the inspection, an extensive revision to Procedure No. N-NRC-1 was drafted and presented to the NRC inspector. The NRC inspector and the TFS Manager of Quality Assurance discussed the proposed revision and agreed that with some additional enhancements the proposed revision would be adequate. Subsequent to the inspection, the TFS Manager of Quality Assurance informed the NRC inspector that a revision to Procedure No. N-NRC-1 was issued on October 27, 1993, and addressed these enhancements (Observation 99901268/93-01-01).

3.2.2 Implementation of TFS 10 CFR Part 21 Procedure

On November 11, 1992, Carolina Power and Light Company notified the NRC Operations Center that the H. B. Robinson Plant had purchased six, 1 inch, long radius, type 316 stainless steel (ss), 90 degree elbows from T[illegible] Pipe and Supply Company and that the material was certified and marked a[illegible]16 material by TFS. However, during receiving inspection at the H[illegible]son Plant, it was determined by analysis that the elbow material w[illegible] type 304 ss material. On November 12, 1992, TFS also notified the [illegible]nconforming elbows and other fittings, manufactured from pipe ident[illegible] by TFS as Heat No. LBQF and supplied as basic components, that appeared to have been incorrectly certified and marked.

During the inspection, the NRC inspector attempted to verify the location of all fittings manufactured from pipe identified by Mill Heat No. KSD1117, the heat number for the pipe used by TFS to manufacture nonconforming fittings. Because TFS had received two pipe shipments having this mill heat and assigned each shipment a different and unique TFS heat number (LBQD and LBQF), the NRC inspector also attempted to determine the location of all nuclear safety-related fittings manufactured from these two heats and the material of the two heats.

TFS processed the following purchase orders (POs), using pipe from Mill Heat No. KSD1117, for the supply of (a) 1 inch, schedule 40s, long radius, 90 degree elbows, (b) 1 inch, schedule 40s, long radius, 45 degree elbows, and (c) 1 inch x 3/4 inch, schedule 40 reducers. All of the fittings were required to be manufactured in accordance with Material Specification SA-403, "Specification for Wrought Austenitic Stainless Steel Piping Fittings," Grade WP 316, and the additional requirements of the ASME Section III Code:

a. DuBose Steel, Inc. PO No. 10493-53, dated April 21, 1988, for several ASME Section III, Class 2, fittings (10 each, 1 inch x 3/4 inch reducers, 10 each, 90 degree elbows, and 10 each, 45 degree elbows) for use at Comanche Peak. TFS informed the NRC inspector that the 1 inch tees on this PO were not manufactured using pipe, but were machined from forged tee blanks.

b. HUB, Inc. PO No. T 8011902, dated April 28, 1988, for 2 ASME Section III, Class 1, elbows for use at Limerick.

c. HUB, Inc. PO No. E8012701, dated May 7, 1991, for 10 ASME Section III, Class 2, elbows for use at Comanche Peak.

d. Consolidated Power Supply PO D65-14966, dated November 8, 1991, for 10 ASME Section III, Class 2, elbows for use at Comanche Peak.

e. Tioga Pipe Supply Company, Inc. PO A50998N, dated October 6, 1992, for 6 ASME Section III, Class 2, elbows for use at H. B. Robinson.

The material used to manufacture the above fittings was 1 inch, schedule 40s pipe purchased from Radnor Alloys, Inc. and supplied in accordance with the requirements of Material Specification SA-312, "Specification for Seamless and Welded Austenitic Stainless Steel Pipe," Grade TP 316, and the additional ASME Section III, Class 2, requirements. Radnor Alloys, Inc. (Radnor/Guyon Alloys, Inc. at the time the pipe was procured) purchased this pipe from Combustion Engineering on September 9, 1986, on Guyon Alloys, Inc. PO No. A79699N. TFS issued two POs to Radnor Alloys, Inc. for this pipe and supplied fittings made from the pipe as follows:

a. TFS PO No. 42-31397, dated April 28, 1988, was issued for 24 feet of pipe. The pipe was received in four 6 foot lengths on April 28, 1988, and according to TFS records had a manufacturer's heat number of KSD1117 on each of the lengths (TFS informed the NRC inspector that pipe was for a rush order and a truck was sent to Radnor to pick up this pipe the same day it was ordered). TFS assigned LBQD as its heat number for fittings manufactured from these pipe lengths and marked these lengths with the LBQD heat number.

   Based on a review of TFS material issue and return documentation and quality records, the only fittings from TFS Heat No. LBQD, supplied to customers invoking 10 CFR Part 21 or as nuclear safety-related items, were the elbows shipped to Limerick (via HUB, Inc. PO S011902).

b. TFS PO No. 42-29203, dated April 28, 1988, was also issued for 24 feet of pipe. According to TFS records, the pipe was received in three 8 foot lengths on May 2, 1988, and had a manufacturer's heat number of KSD1117 on each of the lengths. TFS assigned LBQF as its heat number for fittings made from these pipe lengths and marked these lengths with the LBQF heat number.

Based on a review of TFS material issue and return documentation and quality records, the only fittings from TFS Heat No. LBQF, supplied to customers invoking 10 CFR Part 21 or as nuclear safety-related items, were the fittings shipped to Comanche Peak (via the previously identified DuBose Steel, Inc., HUB Inc., and Consolidated Power Supply POs) and to H. B. Robinson (via Tioga Pipe Supply Company, Inc. PO No. A50998N).

The six fittings from TFS Heat No. LBQF that were supplied as nuclear safety-related to the H. B. Robinson Plant were returned and tested by Laboratory Testing Inc. (LTI), a TFS approved supplier, and found not to be in conformance with SA-403, Grade WP 316 ss, but appeared to be in conformance with Grade WP 304.

Ten of the fifty fittings from TFS Heat No. LBQF that were supplied to Texas Utilities were installed in Comanche Peak Unit No. 1 and not returned to TFS. In a letter to TFS (James G. Takacs, Manager of Quality Assurance) from Texas Utilities (F. W. Madden, Manager Mechanical Engineering), "Comanche Peak Steam Electric Station 1" Sch. 40s Fittings with Heat Code LBQF, Reportable Deviation Under 10 CFR Part 21," dated January 20, 1993, Texas Utilities informed TFS that its piping specification permits the use of one inch fittings with interchangeability between Grades WP 304 and WP 316 with the exception of one specific case, and that it has been evaluated that such substitution in this case would not adversely impact plant safety. Therefore, there is no safety concern due to the use of the subject material.

Texas Utilities did return the remaining 40 fittings (20 each-90 degrees elbows, 10 each-1 inch X 3/4 inch reducers, and 10 each-45 degrees elbows) all identified with TFS Heat No. LBQF. All 40 fittings were tested by LTI and 39 were found not to be in conformance with SA-403, Grade WP 316, but appeared to be in conformance with Grade WP 304. One fitting, a 1 inch x 3/4 inch reducer supplied as Line Item No. 5 on DuBose Steel, Inc. PO No. 10493-63 was found to be in conformance with SA-403 Grade WP 316, while the other nine fittings on this order appeared to be Grade WP 304.

The NRC inspector requested TFS to provide its rationale for the one fitting from Heat No. LBQF being in compliance with SA-403, Grade 316, while the other 39 fittings were not and also the basis for not including the fittings supplied to Limerick (via HUB Inc. PO No. T 8011902) in its 10 CFR Part 21 notification.

3.2.2.1 Basis for not Including Fittings Supplied to Limerick in the Scope of the 10 CFR Part 21 Report and the Rationale for the One Fitting to be in Conformance with Specification SA-403, Grade WP 316

Only one of the four 6 foot lengths of pipe received from Radnor Alloys, Inc. on TFS PO No. 42-31397 and identified with TFS Heat No. LBQD was used for nuclear safety-related orders. According to TFS, the remaining three 6 feet lengths were all used for commercial orders. The one 6 foot length was used on April 28, 1988, on TFS Shop Order No. N8155A-1. TFS documentation identifies that 1 foot 9 inches of the 6 feet of pipe with Heat No. LBQD was cut for the Limerick order and 4 feet 3 inches piece of pipe was returned to stock. According to TFS, this 4 feet 3 inches piece of pipe never appeared after April 28, 1988, in the inventory records as LBQD. However, TFS documentation shows that a 4 feet 1 inch piece of pipe marked with Heat No. LBQF was withdrawn from inventory on May 9, 1988, and cut into five pieces (one piece, 1 foot 10 inches long, and four pieces, 6.5 inches long). The 4 feet 1 inch piece of pipe never appeared on the inventory records as LBQF prior to May 9, 1988. TFS concluded that the 4 feet 3 inches of pipe, originally marked LBQD, was either incorrectly marked during the cutting process (both Heat Nos. LBQD and LBQF were being worked in the shop within a few days of each other) or erroneously withdrawn as LBQF.

According to TFS, two of the 6.5 inches of pipe (cut from the 4 feet 1 inch piece of pipe) were used for commercial orders. The remaining 1 foot 10 inches and two 6.5 inches pieces of pipe were tested by LTI and found to be in conformance with SA-403, Grade WP 316, chemical requirements.

Based on the above discussion, TFS concluded that the remaining sections of pipe from the 4 feet 3 inches piece of pipe was leftover piping from the Limerick order, and that because the test results show that these three sections of pipe are in conformance with SA-403, Grade WP 316, chemical requirements, the fittings supplied to Limerick also meet Grade WP 316 requirements.

Since one of the ten 1 inch x 3/4 inch reducers was determined by testing to be Grade WP 316 and nine were Grade WP 304, and according to TFS records were manufactured from one of the 8 foot lengths of pipe having Heat No. LBQF, TFS hypothesized that one reducer was destroyed during production, and that someone cut another replacement piece of pipe from the material in inventory without following TFS material control requirements. TFS concluded that the one reducer, which tested as Grade WP 316, was cut from the 4 feet 3 inches of pipe, originally cut from the 6 feet length of pipe with Heat No. LBQD. TFS believes that this accounts for the reduction in length of the 4 feet 3 inches (the amount that the shop records show that was left over from the Limerick order and was originally marked with Heat No. LBQD) to 4 feet 1 inch because 2 inches would be a reasonable cut length for manufacturing the replacement reducer.

Although the NRC inspector reviewed the documents TFS used in support of its conclusions and, in general, agreed with the approach used by TFS in determining the location of the pipe having Combustion Engineering Mill Heat

No. KSU1117 and fittings having TFS forging Heat Nos. LBQD and LBQF, the NRC inspector expressed concerns regarding TFS's inadequate material control during the period when the fittings were manufactured for Limerick. TFS conclusions were based, in part, on the hypothesis that in two instances (incorrect marking of the 4 feet 3 inches piece of pipe and cutting of the 2 inches of replacement pipe) TFS personnel failed to maintain material control. Because of these hypothesized instances of inadequate material control, the NRC inspector reviewed other safety-related orders processed by TFS during this period (see Section 3.4 of this report).

3.2.2.2 TFS 10 CFR Part 21 Corrective Action

In a letter to the NRC, dated February 12, 1993, TFS identified its final corrective action to preclude recurrence for the nonconforming fittings reported in TFS 10 CFR Part 21 Report, dated November 12, 1992. TFS stated, in part, that it intends to perform chemical analysis of each piece of raw material such as plate and tubular products, and for items such as forgings and discs, material overchecks will be performed on one item from each heat and not on each piece. TFS further stated that this includes incoming nuclear raw material and nuclear raw material currently in its inventory, if not previously tested. During the inspection, the NRC inspector reviewed TFS Procedure No. N-QVV-1, "ASME Qualified Vendor Validation," Revision 3, dated February 19, 1993, and determined that the identified corrective action to preclude recurrence had been incorporated, however Section 4.A of Procedure No. N-QVV-1 permits TFS to perform a survey or audit at the vendor's facility on an annual basis instead of performing the material overchecks, if the material was provided by an ASME accredited material manufacturer or supplier.

TFS informed the NRC inspector that even though Procedure No. N-QVV-1 permits surveys and audits to be performed instead of material overchecks, it has not, to date, chosen to perform surveys or audits instead of performing material overchecks to verify material. The NRC inspector considered the corrective action stated by TFS to be adequate.

TFS issued Corrective Action Request (CAR) No. N58, dated March 1, 1993, to Radnor Alloys, Inc. The CAR stated, in part, that pipe supplied to TFS on TFS PO No. 42-29203 was marked, certified, and supplied incorrectly. Radnor Alloys, Inc.'s response to CAR N58, dated March 8, 1993, stated, in part, that a corrective action request had been sent to C. E. Tubes, Inc. (formerly Combustion Engineering), however due to the number of years since this shipment, it is not possible for anyone to conclusively determine how or where this mix occurred. The response also stated that subsequent to the pipe shipment for TFS PO No. 42-29203 (this PO ordered type 316 ss pipe), in 1987 C. E. Tubes Inc. started performing 100% alloy identification on all ASME Section III material as part of its final inspection and that this practice should prevent recurrence. In a letter to Radnor Alloys, Inc. from C. E. Tubes, Inc., dated April 16, 1993, C. E. Tubes, Inc. stated, in part, that after research and investigation it was found that the material supplied to Guyon, Inc. was certified correctly. This letter continues by stating that in addition to this pipe (type 316 ss for TFS PO No. 42-29203), 1 inch, schedule 40, type 304 ss pipe was also supplied to Radnor/Guyon Alloy, Inc. and that the mix of material did not occur at Combustion Engineering.

3.2.2.3 TFS 10 CFR Part 21 Evaluation

The NRC inspector reviewed TFS's evaluation for the fittings identified in its November 11, 1992, 10 CFR Part 21 report. The evaluation file contained correspondence to the NRC, with TFS customers purchasing the suspect fittings, and with the end users of the fittings. The file also contained a detailed description showing where the pipe having Combustion Engineering Mill Heat No. KSD1117 was used as well as the specific use and current location of fittings from TFS Heat Nos. LBQF and LBQD.

3.2.2.4 NRC Inspector Observation

The NRC inspector found that an evaluation addressing the acceptability of the fittings, having TFS Heat No. LBQD, manufactured from Combustion Engineering Mill Heat No. KSD1117, and supplied for use at Limerick, had not been formally documented and approved by the TFS Manager of Quality Assurance. During the conduct of the inspection, an evaluation addressing the fittings supplied to Limerick was prepared and approved by the TFS Manager of Quality Assurance. This evaluation concluded that the fittings manufactured from TFS Heat No. LBQD and supplied to Limerick were the correct material, SA-403, Grade WP 316, while fittings made from TFS Heat No. LBQF were manufactured from Grade WP 304 material (Observation 99901268/93-01-02).

3.2.2.4 TFS Procurement Documents

The NRC inspector reviewed the following nuclear safety related POs and determined that TFS had invoked the requirements of 10 CFR Part 21:

a. PO No. 05578, issued to Laboratory Testing, Inc. for material testing services, dated December 7, 1992.

b. PO No. 05111, issued to Pyrometer Equipment for calibration services, dated January 4, 1993.

3.4 Review of HUB Inc. Audit of TFS and Purchase Orders

The NRC inspector selected one of the customers, HUB Inc., that had received fittings from TFS Heat No. LBQF, in order to determine if objective evidence existed that other fittings supplied along with the nonconforming fittings (marked LBQF) were in conformance with PO requirements. HUB Inc. was selected based on the fact that it had recently performed a survey at TFS.

3.4.1 Review of Fittings Supplied to HUB Inc. with the Nonconforming Fittings from TFS Heat No. LBQF

The NRC inspector reviewed HUB Inc. PO E8012701 (the PO under which 10 elbows were supplied to Comanche Peak that were incorrectly certified and marked as Grade WP 316) and performed a review of TFS Line Item No. 06087-1, 6 inch x 4 inch, schedule 40s, reducing tees. These tees were manufactured and certified to be in accordance with the requirements of SA-403, Grade WP 304/304L and the additional Class 2 requirements of the 1989 Edition and 1989 Addenda of the ASME Section III Code. These tees (TFS Heat Nos. LFFN-1 and LFFN-2) were supplied as upgraded fittings as permitted by NCA-3867.4(e)(g) of the ASME Section III Code. The documentation for the upgraded fittings included the original manufacturer's (Sumitomo Metal Industries, LTD.) material test reports and TFS material overchecks. The results of the TFS material overchecks (material analysis performed by LTI) revealed that the pipe used to manufacture the tees meet the physical and chemical requirements of SA-403, Grade WP 304/304L.

3.4.2 HUB Inc. Audit of TFS

The NRC inspector reviewed the results of the HUB Inc. survey performed at TFS on August 23, 1993. In a letter to TFS (Jim Takacs) from HUB Inc. (Charles E. Thornton, Jr.), dated August 26, 1993, HUB Inc. stated that no negative findings were identified during its survey at TFS.

3.5 In-process Work and Inspection Activities

The NRC inspector observed TFS preannealing, forming, and annealing and quenching five pieces of 3 inch, schedule 160, 90 degree elbows on TFS Shop Order No. 4705N-1. These elbows were being manufactured in accordance with the requirements of SA-403, Grade WP 304s, and the additional Class 1 requirements of the 1974 Edition through 1975 Addenda of the ASME Section III Code for Consolidated Power Supply. The NRC inspector found no abnormalities while observing these activities.

The NRC inspector also observed the following inspection activities and found no abnormalities:

a. TFS's review of the radiographic film for the weld seam in a 12 inch, 45 degree, long radius elbow, TFS Heat No. LHXA-1, on TFS Shop Order 4884N-1.

b. Wall thickness measurements for two randomly selected elbows, Line Item 47, on TFS Shop Order No. 4422N.

c. Final marking of several types and sizes of nuclear safety-related fittings.

4 PERSONNEL CONTACTED

Taylor Forge Stainless, Inc.

* George A. Guarino, Senior Vice President
* William F. Bobzin, Vice President-Manufacturing
* Martin S. Capoferri, Vice President
* James G. Takacs, Manager of Quality Assurance
* Mark A. Prystauk, Assistant Manager Quality Assurance
Dave Onsuchak, Cutting and Heat Treat Foreman
Betty Lou Baldwin, Production Control
Nancy Winebrake, Quality Control Inspector
Jim Williamson, Furnace Operator

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*Attended the Entrance and Exit Meetings

Selected Bulletins, Generic Letters, and Information Notices
Concerning Adequacy of Vendor Audits and
Quality of Vendor Products

	ISSUED	TITLE
1.	Information Notice 91-21 Supplement 1	Inadequate Quality Assurance Program of Vendor Supplying Safety-Related Equipment
2.	Information Notice 93-88	Problems With X-Relays in DB- and DHB-Type Circuit Breakers Manufactured by Westinghouse
3.	Information Notice 93-87	Fuse Problems With Westinghouse 7300 Printed Circuit Cards
4.	Information Notice 93-91	Misadjustment Between General Electric 4.16-kV Circuit Breakers and Their Associated Cubicles
5.	Information Notice 93-97	Failures of Yokes Installed on Walworth Gate and Globe Valves

CORRESPONDENCE RELATED TO VENDOR ISSUES

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

OCT 25 1993

Mr. Neil C. Schemm
Hendrick, Spanos & Phillips
1410 Peachtree Center Tower
230 Peachtree Street, N.W.
Atlanta, Georgia 30303

Re: Response to Request for 10 C.F.R § 21.4 Interpretation

Dear Mr. Schemm:

This is in response to your letter of October 6, 1993, in which you requested an interpretation of the scope of applicability of the 10 C.F.R. Part 21 (Part 21) reporting responsibilities of parent and subsidiary corporations. In a subsequent phone call to your office, an attorney from our Office of the General Counsel (OGC) asked whether the hypothetical situation you posed was based on the Johnson Yokogawa Corporations's recent request for information from OGC regarding their Part 21 reporting responsibilities in relation to their parent corporation, Yokogawa Electric Corporation. You replied that your firm represents the Johnson Yokogawa Corporation and that your hypothetical stemmed from their circumstances.

Rather than respond to a hypothetical scenario, OGC would prefer to provide you with a copy of our letter to the Johnson Yokogawa Corporation based on the actual circumstances surrounding your inquiry. (See enclosure) We would also like to take this opportunity to stress two points relating to your hypothetical and subsequent phone call. First, a corporation is not automatically relieved of Part 21 reporting requirements simply because it states that it is supplying commercial grade instrumentation. The element of corporate control plays a critical role in reaching that conclusion. If a parent corporation's relationship with its subsidiary indicates that as the parent corporation it controls the activities of its subsidiary, in other words, the subsidiary is the alter ego of its parent corporation, that control would create reporting responsibilities pursuant to 10 C.F.R Part 21 for the parent corporation. In such cases, were the parent corporation to become aware of a defect which had the potential of creating a substantial safety hazard while "supplying" commercial grade instrumentation which it had instructed its subsidiary to dedicate for nuclear use, the parent corporation would be responsible for ensuring that those defects were reported to the NRC. Second, the fact that a corporation is a foreign corporation would not relieve it of Part 21 reporting requirements if they existed since, as 10 C.F.R. § 21. 2, "Scope," points out, "... The regulations in this part apply also to each individual, corporation, partnership or other entity doing business within the United States ...."

If you have any further questions regarding Part 21 reporting responsibilities, you may contact Maria Schwartz at (301) 504-1838.

Sincerely,

Robert L. Fonner

Robert L. Fonner
Special Counsel for Fuel Cycle and
Safeguards Regulations
Office of the General Counsel

cc w/encls:

Leif J. Norrholm, VIB
Walter Haass, VIB

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

October 13, 1993

Mr. Martin Cohen, Project Manager
Nuclear Service Group
Johnson Yokogawa Corporation
10601 Decatur Road
Post Office Box 16097
Philadelphia, Pennsylvania 19154-3299

Dear Mr. Cohen:

This is in response to your letter of August 3, 1993, in which you requested confirmation of the responsibilities you believe are applicable to your corporation and its parent corporation, Yokogawa Electric Corporation (YEC) in Japan, regarding the requirements of 10 CFR Part 21 (Part 21), "Reporting of Defects and Noncompliance." Your concern is related to the basic components Johnson Yokogawa Corporation (JYC) is providing to nuclear power plants.

The General Counsel makes officially binding interpretation of regulations only in extraordinary circumstances and those interpretations are codified and published in 10 CFR Part 8. Your inquiry does not require such an interpretation. While I am pleased to provide these views on the issues you raise concerning the applicability of the reporting requirements of Part 21 to JYC and its parent corporation, YEC, these views are not to be construed as a binding interpretation pursuant to 10 CFR § 21.4.

Your question pertains to the Part 21 reporting responsibilities of the Nuclear Service Group (NSG) as they relate to YEC. The facts that you have provided describe a scenario in which NSG, a branch of JYC located in Philadelphia, dedicates commercial grade instrumentation supplied to it by Johnson Yokogawa Corporate Facility, a branch of JYC located in Georgia, and YEC which is located in Japan and Korea. In addition, YEC owns 50% of JYC.

At the outset, it is important to stress several points regarding Part 21 reporting requirements: 1) Part 21 was enacted to upgrade the system of detecting and anticipating defects in components which have the potential of creating a substantial safety hazard; 2) Part 21 is applicable to basic components only, not commercial grade components. Basic components may be designed and manufactured in accordance with commercial grade standards, but must then be subjected to a dedication activity to assure that the component is suitably qualified to perform in a safety-related application; 3) a corporation is not automatically relieved of Part

21 reporting requirements simply because it states that it is supplying commercial grade instrumentation. The element of corporate control plays a critical role in reaching that conclusion; and 4) the fact that a corporation is a foreign corporation would not relieve it of Part 21 reporting requirements if they existed since, as 10 CFR 21. 2, "Scope," points out, "... The regulations in this part apply also to each individual, corporation, partnership or other entity doing business within the United States ...."

Certain basic components, subject to the reporting requirements of Part 21, are characterized by their conformance to the quality assurance provisions of 10 CFR Part 50, Appendix B during their design and manufacture. An organization which dedicates a commercial grade item thus making it a basic component must evaluate all defects and failures to comply that may be identified subsequent to the shipment of these components to a licensed facility or, if unable to do so, advise the purchaser or affected licensees of such defects. After evaluation, those defects and failures to comply that are determined to potentially create a substantial safety hazard must be reported to the NRC in accordance with the provisions of Part 21.

Applying this information to the facts that you have provided to us, YEC is providing commercial grade instrumentation to a subsidiary corporation which dedicates that instrumentation. While ownership establishes an interest in the activities of JYC and, as your letter points out, channels of communication exist between these corporations, it does not appear that YEC controls the activities of JYC. To the extent that YEC does not control the activities of its subsidiary and is supplying commercial grade items, YEC is not responsible for Part 21 reporting requirements.

10 CFR 21.7, "Exemptions," states that suppliers of commercial grade items are exempt from the requirements of Part 21 "to the extent that they supply commercial grade items." That exemption should not be interpreted broadly. In fact, the statement "to the extent that they supply commercial grade items" indicates that this is not a blanket exemption and that other factors must be considered, such as corporate control, which can play a large role in determining the knowledge and authority one corporation has over the activities of the other. Sharing common product information in and of itself, does not indicate control and is, as YEC commented, a "good business practice" which keeps JYC informed of service or problem notices. Nor does YEC's knowledge that it is manufacturing and supplying commercial grade instrumentation to JYC for JYC to dedicate, demonstrate that YEC controls JYC's activities. However, if YEC's relationship with JYC indicated that as the parent corporation it controlled the activities of its subsidiary, e.g., directing JYC to seek the business of nuclear power reactor operators for YEC products and to dedicate commercial grade instrumentation in doing so, then that control would create

reporting responsibilities pursuant to Part 21 for YEC. In that case, if YEC were to become aware of a defect which had the potential of creating a substantial safety hazard while "supplying" commercial grade instrumentation which it had instructed its subsidiary, JYC, to dedicate for nuclear use, YEC would be responsible for ensuring that those defects were reported to the NRC.

Another aspect of your inquiry concerns the Part 21 reporting requirements of JYC as these relate to NSG. The corporation, JYC, rather than NSG, must ensure that Part 21 reporting requirements are met. 10 CFR 21.21 (c)(5) points out that "The director or responsible officer may authorize an individual to provide the notification required by this paragraph, provided that, this shall not relieve the director or responsible officer of his or her responsibility under this paragraph." The requirements of Part 21 are satisfied when an individual from NSG, authorized by the director or responsible officer of JYC, notifies the NRC of a defect or noncompliance which could create a substantial safety hazard. However, as §21.21 (c)(5) indicates, this authorization does not absolve the corporation's director or responsible individual of his or her reporting responsibilities. In other words, there must be procedures in place so that JYC can meet its Part 21 responsibilities.

If you have any further questions regarding the Part 21 reporting responsibilities of JYC and YEC, you may contact Maria Schwartz at (301) 504-1888.

Sincerely,

Robert L. Fonner

Stuart A. Treby
Assistant General Counsel for
Rulemaking and Fuel Cycle
Office of the General Counsel

cc: Robert L. Fonner, OGC
Leif J. Norrholm, VIB
Walter Haass, VIB

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This periodical covers the results of inspections performed by the NRC's Vendor Inspection Branch that have been distributed to the inspected organizations during the period from October through December 1993

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