

ORGANIZATION: FARWELL & HENDRICKS, INC.
CINCINNATI, OHIO

REPORT NO.: 99900918/93-01

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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: Richard 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
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APPROVED: Gregory C. Qualina 11/17/93
Gregory C. Qualina, Chief Date
Reactive Inspection Section 2
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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