

U. S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
REGION IV

Report No. 99900311/79-01

Program No. 51400

Company: General Electric Company
Switchgear Business Department
Burlington Manufacturing Operations
Agency Road, P. O. Box 488
Burlington, Iowa 52601

Inspection Conducted: May 21-23, 1979

Inspectors: *D M Hunnicutt* 6/14/79
for J. R. Agee, Contractor Inspector, Vendor Date
Inspection Branch

D M Hunnicutt 6/14/79
D. M. Hunnicutt, Chief, Components Section II, Date
Vendor Inspection Branch

Approved by: *D M Hunnicutt* 6/14/79
D. M. Hunnicutt, Chief, Components Section II, Date
Vendor Inspection Branch

Summary

Inspection on May 21-23, 1979 (99900311/79-01)

Areas Inspected: Implementation of 10 CFR 50, Appendix B criteria, and applicable codes and standards including: quality assurance manual/program; customer contracts/design control; control of measuring and test equipment; and inspection and test. The inspection involved forty-two (42) inspector-hours on site by two (2) NRC inspectors.

Results: In the four (4) areas inspected, no apparent deviations or unresolved items were identified in two (2) areas. The following deviations and unresolved item were identified in the remaining areas:

Deviations: Control of Measuring and Test Equipment - a total of four (4) instruments were not calibrated within the required calibration cycle (See Notice of Deviation, Item A). Three (3) pieces of equipment subject to calibration were not adequately identified (See Notice of Deviation, Item B).

622 074

7908130170

Unresolved Item: Customer Contracts/Design Control - certain switchgear products not yet fully qualified to meet Class 1E criteria are in a scheduled qualification test program (See paragraph C.3.c.).

Details Section

(Prepared by J. R. Agee and D. M. Hunnicutt)

A. Persons Contacted

J. N. Allen, Quality Assurance Engineer
P. A. Bertrand, Manager, Quality Assurance
G. I. Burlingame, Manager, Employee and Community Relations
*G. L. Cederquist, Manager, Power Vac Marketing
C. W. Clark, Manager, Medium Voltage Engineering
*H. D. Culley, General Manager, Power Systems Management Department,
Philadelphia, Pennsylvania
J. D. Lambert, Manager, Shop Operations
*R. J. Moffa, Manager, Manufacturing Projects
D. O. Nichols, Manager, Materials
L. E. Schilling, Manager, Burlington Plant, Accounting
B. J. Shaffer, Manager, Manufacturing Engineering
W. C. Stalcup, Manager, Burlington Manufacturing Operation

*Attended the exit meeting only. All others attended both the entrance and exit meetings.

B. Quality Assurance Manual/Program1. Objectives

The objectives of this area of the inspection were to verify that the:

- a. QA Manual had been maintained current as committed.
- b. Program had been implemented in such areas as auditing, training, receiving inspection, and nonconformances.

2. Method of Accomplishment

The preceding objectives were accomplished by:

- a. Review of the following sections of the QA Manual:
 - (1) A-5, Organization
 - (2) A-4, Quality Audits
 - (3) A-3, Training
 - (4) C-4, Receiving Inspection
 - (5) E-1, Control of Nonconforming Material

(6) Quality Assurance Provision, Quality Control, No. 2-85.1400

(7) C-2, Quality Control Approval of Raw Material Supplies

- b. Discussion with plant management personnel concerning organizational changes, specifically concerning the Quality Assurance organizations whose functions formerly reported to a line organization, but which currently report directly to the Plant Manager. A staff member has been designated the authority and responsibility for auditing plant critical areas and functions with findings to be reported directly to the Plant Manager.
- c. Review of the QA department audit files which revealed that audits had been conducted in the manufacturing inspection, testing, and quality functions throughout the plant. Detailed inspection of the Fabrication Area files revealed that audits had been conducted in this area to applicable QAIs (Quality Assurance Instructions) on the following dates: March 15, 1979; March 12, 1979; October 30, 1978; August 8-9, 1978; and May 2, 1978. Also, audits had been conducted in the following areas: Finished Process, May 2, 1979; Program audit, April 26, 1979; QA System, April 23, 1979; and QA Manual, Sections B-2, B-3, August 28, 1978.
- d. Review of training records for management personnel whose activities affect qualities. These records revealed that each member had received additional training at the corporate training facilities in such areas as professional development and education, total quality control, productibility engineering, basic reliability, quality control, process control, and quality control engineering.
- e. Review of the training records for the quality assurance engineer (QAE) and process control engineers (PCEs). These records revealed the QAE was qualified to ANSI N45.2.23 as an auditor. The PCEs had educational backgrounds, specific on-the-job process and quality training and quality training courses leading to qualification to ANSI N45.2.23.
- f. Review of receiving inspection practices for incoming materials and determined that activities were completed in compliance with implemented procedures. The NRC inspector traced typical electrical materials and related documentation from receiving through receiving inspection to storage and withdrawal to manufacturing areas. Control of the material is maintained by use of electronic data retrieval systems with terminals located at receiving, stockroom, warehouse, manufacturing and administrative areas where instantaneous accountability of the materials can be verified or processed to succeeding storage or use areas.
- g. Verified that nonconforming items are identified, segregated and stored in controlled areas. Use of the data retrieval system with

622 077

efficiently located terminals permits early identity of nonconforming materials, minimizes storage time, and expedites disposition of the materials.

3. Findings

- a. Within this area of the inspection, no deviations or unresolved items were identified.

b. Comments Related to Internal Audit Findings

In contrast to the QAI which states audit findings must be responded to within ten (10) days, several internal audit findings from the audits identified in paragraph 2.c above, had not been responded to within the required ten (10) day period. The Company practice to cope with this type incident is to reaudit the quality function identified. The QA auditor's method for determining when to reaudit the finding is to retain the audit finding folder, as a reminder, until an appropriate time arrives to conduct the reaudit. While this practice does not violate specific QA Manual, QAI or 10 CFR, Appendix B criteria, it appears to be a cumbersome method for conducting reaudits and appears to be contrary to the intent of Criterion XVI of 10 CFR 50, Appendix B which states in part, ". . . deficiencies, deviations . . . are promptly identified and corrected."

C. Customer Contracts/Design Control

1. Objectives

The objectives of this area of the inspection were to verify that:

- a. Criteria from customer specifications had been adequately addressed including quality assurance requirements and applicable codes and standards.
- b. Design concepts had been adequately reviewed and approved in compliance with approved and established procedures.
- c. Components and equipment designed for Class 1E applications had been functionally tested to meet customer specifications and referenced codes and standards.

2. Methods of Accomplishment

The preceding objectives were accomplished by:

- a. Review of customer contract Requisition No. 311-06659, Order No. 9645-E-009.4 (January 10, 1978), and SO Nos. 909103 and 909104 for 7200 V M/C Switchgear (Power/Vac).

622 078

- b. Review of the Technical Specification (TS) 9645-E-009.4 which requires compliance to QA Specification No. 9645-G-QA-1, Revision 4, and Technical Specification for Seismic of Class 1E Electrical Equipment No. 9645-E-091.0, Revision 3. TS 9645-E-009.4 states in part, ". . . the equipment shall perform in accordance with the standards including but not limited to:

ANSI C37.09	- 1969
C37.09A	- 1970
C37.90	- 1971
C37.9	- 1971
C37.90	- 1970
C37.20	- 1969, including revisions of 1970, 1972, and 1974
C57.13	- 1968
N45.2.2	- 1972
IEEE 279	- 1971
323	- 1974
384	- 1974
NEMA CC-1	- 1975
EI -2	- 1966
IPCEA-S-61-402	- 1973 . . ."

" . . . All equipment shall be qualified in accordance with the provisions of IEEE No. 323."

- c. Discussions with Quality Assurance and Engineering management personnel regarding design, fabrication, functional testing and qualification testing of metalclad, vertical lift, Power/Vac switchgear products.
- d. Review of Company correspondence letter 2904, dated March 13, 1978, entitled, "Power/Vac Test Report" which states in part, ". . . While the Power/Vac design did perform excellently . . . the following design changes are vital for Class 1E Power/Vac Nuclear Requisitions"
- e. Review of Company letter 2906, dated October 18, 1978, entitled, "(A/E)/(Facility) Requisition 311-06659, I/S No. 10, dated October 9, 1978, IEEE 323 Qualification Report (Customer) Transmittal VDT-78/2463," which contains an enclosure entitled, "Qualification Report for Power/Vac Metalclad Switchgear Furnished on Requisition 311-06659 for (Utility Site) Recirculating Pump Trip Control," approved and dated July 24, 1978.
- f. Review of Design Instruction No. DI-150.000, First Issue dated October 12, 1978, entitled, "Nuclear Class 1E (Safety Related) Applications of Switchgear Assemblies."
- g. Review of Design Instruction No. DI-191.001, Issue No. 2, dated October 25, 1975, entitled, "Seismic Design Instruction."

- h. Review of eight (8) single documents entitled, "Report of Test." These documents were further identified as Report No. RT and Req. No. 706-602-3024 for Vacuum Metalclad with Power/Vac Circuit Breakers. These documents identify electrical test data of the following types of electrical tests that were conducted on the Power/Vac circuit breakers:
- (1) dielectric impulse
 - (2) power frequency withstand test
 - (3) corona test
 - (4) radio influence voltage test
- i. Review of the following drawings for Requisition No. 9645-E-009.4-1 including:
- (1) 0147D9244, Revision 1, August 16, 1978.
 - (2) 0147D9245, Revision 1, August 16, 1978.
- These drawings for Metalclad Power/Vac switchgear were approved by the customer for release for manufacturing.
- j. Review of customer requisition 366-14471 and SO No. 909111 for Metalclad Power/Vac Switchgear. Also, review of Architect Engineer Technical Specification 300-03-AB, dated April 15, 1974, which had been reviewed and approved by the related utility company for seismic qualification testing of the switchgear manufactured by the SO No. 909111.

3. Findings

a. Deviations

None.

b. Comments

- (1) The Power/Vac Metalclad Switchgear for Requisition 311-06659 (paragraph 2.e above) has been manufactured and shipped to the utility site with certified production test reports; however, final qualification of the equipment to pertinent IEEE standards for Class 1E applications is not complete since certain integral components, specifically Class 1E relays, have not been fully qualification tested to the required IEEE standards. The qualification report for this equipment states that the test program for the integral components is scheduled for completion in late 1979.

622 080

- (2) The Power/Vac Metalclad Switchgear, Unit 102, Compartment B-001, Breaker-01 (paragraph j above) had been manufactured and was located in the final inspection and test area on the date of this inspection, May 23, 1979. The switchgear was in final checkout for shipment to the designated test site for seismic testing under electrical load conditions. Certain integral components that have been radiation aged will be installed for total test and evaluation. The Power/Vac switchgear will be returned to the Burlington Plant for further re-evaluation and disposition following the seismic qualification test.

c. Unresolved Items

Certain switchgear products identified in paragraphs 3.b.(1) and (2) above, have not been fully qualified per documentation reviewed and/or by final qualification testing; however, the equipment is in a scheduled qualification test program. The status of final qualification will be inspected during a subsequent inspection.

D. Control of Measuring and Test Equipment

1. Objectives

The objectives of this area of the inspection were to verify that:

- a. A system has been established and is maintained to assure that tools, gages, instruments, and other measuring devices or materials used in activities affecting quality are properly controlled, calibrated, and adjusted at specific periods to maintain accuracy within specified limits.
- b. Calibration records are maintained for each instrument and these records include the following information:
 - (1) Accuracy required and calibration results
 - (2) Location for use
 - (3) Calibration history
 - (4) Calibration intervals and dates due
 - (5) Person or agency performing all calibrations
 - (6) Serial number or other identification for each standard used to perform the calibration
 - (7) Name or number of the applicable calibration procedure

622 081

(8) Environmental conditions used during calibration

(9) Equipment recall schedules

2. Method of Accomplishment

The preceding objectives were accomplished by:

- a. Review of Switchgear Business Department (SBD), Quality Assurance Instructions (QAI) No. 8.1, "Control of Mechanical Measuring Instruments," Revision 3, dated June 7, 1976.

This instruction states the requirements for the periodic calibration check on mechanical measuring instruments. Measurement and control is accomplished through use of various types of inspection gages, jigs, and fixtures.

- b. Review of SBD QAI No. 8.1.1, Revision 0, dated November 28, 1978, "Test and Inspection Traceability Record."

This instruction provides a documented procedure for the traceability record of test and inspection equipment used for final acceptance prior to shipment.

- c. Review of SBD, QAI No. 8.1.8, Revision 1, dated September 13, 1976, "Calibration Instructions for Test Equipment."

This instruction is used in conjunction with the "QC Operating Procedure of the Burlington Plant for Control of Electrical Measuring Instruments."

- d. Review of SBD, QAI No. 8.2, Revision 1, dated November 18, 1974, "Storage, Identification, Selection, and Set-up of Crimping Heads for application of Wire Terminals."

- e. Review of SBD, QAI No. 8.2.1, Revision 2, dated November 11, 1975, "Calibration Procedures Micrometers and Calipers."

- f. Review of SBD, QAI No. 8.2.2, Revision 0, dated May 10, 1974, "Calibration Procedures Height Gage."

This procedure covers the accuracy checks of the height gages and related dial indicators.

- g. Review of SBD, QAI No. 8.2.3, Revision 0, dated August 31, 1977, "Control of Electrical Measuring Instruments."

This instruction states the requirements for the periodic calibration check of electrical measuring instruments.

- h. Review of SBD, QAI No. 8.2.5, Revision 1, dated November 10, 1976, "Calibration Check of Torque Wrenches."

622 082

- i. Review of SBD, QAI No. 8.2.11, Revision 0, dated October 12, 1977, "Process Controlling Instrumentation Calibration Procedure."
- j. Review of the Master Lists that established the frequencies of calibration.
- k. Verification of calibration status of randomly selected instruments, tools, gages, and surface plates. (Examples: both of the surface plates; two (2) of approximately twenty (20) OD micrometers; seven (7) of approximately thirty (30) instruments; five (5) of approximately thirty (30) torque wrenches; one (1) of approximately five (5) dial calipers; and the working set of height gages).
- l. Review of instrument calibration record files located in the receiving inspection area.
- m. Inspection of randomly selected instruments in the receiving inspection area and in the switchgear frame assembly area.

3. Findings

a. Deviations

See Notice of Deviation, Items A and B.

b. Unresolved Items

None.

E. Inspection and Test

1. Objectives

The objectives of this area of the inspection were to verify that:

- a. Procedures have been implemented for inspection of the progressive stages of the manufacture and assembly of switchgear products.
- b. Procedures have been implemented for production testing of switchgear products at appropriate stages.
- c. Inspection and test personnel are separate and independent of manufacturing organizations.

2. Method of Accomplishment

The preceding objectives were accomplished by:

- a. Review of Quality Assurance Manual, Section D-2, In-Process and Final Inspection Test, dated May 24, 1978.

622 083

b. Review of the following Quality Assurance Instructions:

- (1) 6.1.32, Inspection of Breaker Compartments - Vertical Lift Metalclad Equipment, Revision 0, April 16, 1974.
- (2) 6.1.33, Test Procedures - Vertical Lift 4.16 KV Metalclad, Revision 1, April 29, 1977.
- (3) 6.1.37, Final Assembly Inspection Metalclad Vertical Lift Switchgear, Revision 4, November 10, 1976.
- (4) 6.4.2, Final Assembly Inspection Power/Vac Metalclad Switchgear, Revision 0, September 9, 1977.

c. Inspection of assembly, inspection, and test practices for the vertical lift and power/vac switchgear and determined that on an audit basis one (1) of each five (5) compartments assembled must be signed off by the inspector. Review of the 6.1.32-A Vertical Lift Pre-Gage-Assembly Check List for several breaker compartments under assembly and verified that each had been inspected and signed off, as required. Reviewed test procedures and final test status of a typical vertical lift 4.16 KV Metalclad project and verified that electrical test sheet and test "fixem items" had been completed, stamped, and signed off by the tester in accordance with QAI 6.1.33. Reviewed the final assembly of a Power/Vac metalclad switchgear SO No. 909111 and verified that frame assembly, weld positions, component installations, structural changes, wiring installations, and identifications were in agreement with the final assembly station drawings.

3. Findings

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

F. Exit Interview

The inspectors met with management representatives (denoted in paragraph A, above) at the conclusion of the inspection on May 23, 1979, at the Burlington Plant. The inspectors summarize the scope and findings of the inspection involving the following subjects:

Quality Assurance Manual/Program
 Customer Contract./Design Control
 Control of Measuring and Test Equipment
 Inspection and Test

The management representatives had no comments in response to the items discussed by the inspectors.