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OFFICE OF INSPECTION AND ENFORCEMENT  
REGION IV

Report No. 99900217/79-01

Program No. 51400

Company: Westinghouse Electric Corporation  
Nuclear Instrumentation & Control Department  
1111 Schilling Road  
Hunt Valley, Maryland 2130

Inspection  
Conducted: July 23-26, 1979

Inspector: R. E. Ollis for 9/7/79  
J. F. Agee, Contractor Inspector  
Components Section II  
Vendor Inspection Branch  
Date

Approved by: R. E. Ollis for 9/7/79  
D. M. Hunnicutt, Chief  
Components Section II  
Vendor Inspection Branch  
Date

Summary

Inspection on July 23-26, 1979 (99900217/79-01)

Areas Inspected: Implementation of 10 CFR 50, Appendix B criteria and applicable codes and standards including: Action on previous inspection findings; inspection to SSPS relay problems; design control; inspection test and operations status; product assurance manual/program. The inspection involved twenty-eight (28) inspector-hours on site by one (1) inspector.

Results: In four (4) of the areas inspected no apparent deviations or unresolved items were identified. Two deviations were identified in the one (1) remaining area and are described as follows:

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Deviations: Product Assurance Manual/Program - (1) Product Assurance Manual organization chart and the description of organizational responsibilities do not describe the functions of the engineering, manufacturing and purchasing department whose activities affect quality; - (2) implemented procedures of the Manufacturing Planning Manual had not been approved and signed-off by the manufacturing manager.

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3. (Closed) Deviation (Item C, Inspection Report 78-01): Certain specific procedures in the QAWI Manual had not been approved and required by the Nuclear Instrumentation and Control Department (NICD) QA Manager, prior to distribution. The inspector verified that since the last inspection all new QAWIs have been signed and approved by the QA Manager.
4. (Closed) Deviation (Item D, Inspection Report 78-01): The only QA requirements imposed on suppliers for nuclear safety related products has been the requirements of MIL-I-45208A, which does not meet the criteria of QCS-I or 10 CFR 50 Appendix B. The inspector verified the QA Manual and related QAWIs and QA Procedures had been revised to more adequately address QA criteria imposed on suppliers.
5. (Closed) Deviation (Item E, Inspection Report 78-01): Calibration procedures did not show evidence of review and approval by the QA Engineer and Calibration Laboratory Supervisor. The inspector verified the calibration procedures 3.37.1 and 3.38.1 had been rewritten and identified as procedures 4.34 and 4.33, respectively. These two procedures have been entered on the correct format and signed by the responsible party.
6. (Closed) Deviation (Item F, Inspection Report 78-01): Records show that a minimum of six (6) torque wrenches have been identified as being in and out of tolerance. Form Q-61 was not sent to a supervisor so an assessment could be made. The inspector verified corrective actions have been implemented to preclude recurrences of this type, for example, Calibration Procedure 3.9 was revised July 30, 1978, to more adequately control the issuance of torque wrenches.
7. (Closed) Deviation (Item G, Inspection Report 78-01): Numerous calibration intervals were changed without evidence of approval by the QA Engineer or Calibration Laboratory Supervisor. The inspector verified calibration intervals have been changed using past performance data of the respective equipment. All calibration lab personnel have been reinstructed to record all repair actions to provide complete repair history of all equipment to justify interval changes.

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8. (Closed) Deviation (Item H, Inspection Report 78-01): Nonconforming Material Report (NMR) 924055 did not maintain identity for eight (8) pieces of part number T677123054 nor were accurate serial numbers maintained. Records of rework performed on these items was inaccurate. The inspector verified that efforts were made to determine the cause of these anomalies. In the efforts to track the problem final determination was made to scrap the parts. The NMR reporting system has been changed and is now administered by the QA Procedure 14.4, Defective Article Report, dated March 1, 1979. Plant personnel have been reinstructed in the use of this procedure concerning nonconforming materials.
9. (Closed) Deviation (Item I, Inspection Report 78-01): System defect data had not been entered onto the quality system deficiency report. The inspector verified by discussions with QA department personnel who were familiar with the system during the years 1975 through March 1978 that maintenance of the deficiency reporting system had been neglected. The applicable QAWI 1000.10 has been revised and reimplemented by the QA Procedure No. 8.3, Quality System Defect Reporting System, dated March 1, 1979.
10. (Closed) Deviation (Items J.1 and J.2, Inspection Report 78-01): Several inspector personnel had not received their annual visual examinations on a timely basis and none of the inspection/test personnel had been visually tested to determine their ability to read JI letters or equivalent. The inspector verified by a review of a random selection of inspection/test personnel visual test record cards that the required visual tests have, since the last NRC inspection, been conducted annually. An example of some of those personnel who had been given the JI visual tests included the following:
  - M. Atkins - March 28, 1979 - passed.
  - B. Alban - March 15, 1979 - passed.
  - D. Bertsche - March 14, 1979 - passed.
  - V. Gordon - April 18, 1979 - passed.
  - B. Meise - March 15, 1979 - passed.

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11. (Closed) Unresolved Item (Inspection Report, 78-01): An approved vendor list had not been compiled. The inspector verified a comprehensive approved vendor list had been compiled and is revised quarterly.

C. Inspection to SSPS Relay Problems

1. Objectives

The objectives of this area of the inspection were to verify that NICD had redesigned and qualification tested the Westinghouse AR-relay with latch attachments that were used in the early Solid State Protection System projects. Redesign was required to prevent loss of contact continuity after the actuation coil had been de-energized.

2. Method of Accomplishment

The preceding objectives were accomplished by:

- a. Discussions with responsible design and management engineering personnel concerning redesign of the AR-latching relays used in the SSPS.
- b. Review of Westinghouse documentation affected by/or compiled to correct the AR-latching relay problems which includes the following:
  - (1) NICD document RN-B-3573, dated August 25, 1978, which redesigned the AR relays for replacement with Westinghouse NARCR contact cartridges. Typical AR relays with the new NARCR contact cartridges were seismically tested. Test Procedures and Report T-925826 were compiled describing the seismic qualification of the contact cartridges.
  - (2) Pages 6-34.1 and 6-34.2 of the applicable SSPS technical manual which were revised to reflect the design changes. These technical manual page changes were submitted to the Westinghouse Nuclear Service Division for their resubmittal to nuclear facilities whose systems were affected by the design changes.
  - (3) Procurement Specifications:
    - (a) 2383A35, Latching, Rotary Relay, 118VAC, Coil, 8 Pole, SSPS March 9, 1978.

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(b) 2383A37, non-latching Rotary Relay, 118 VDC, Coil 8 Pole, SSPS dated March 14, 1978.

(c) 2383A38 Non-latching Rotary Relay, 125 VDC, Coil 8 Pole, SSPS dated March 14, 1978.

### 3. Findings

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

#### Comments

Nuclear facilities, whose installed SSPSs included AR-latching relays affected by the redesign, were contacted, apprised of the revisions and given replacement NARCR contact cartridges for field modification.

Certain SSPSs containing the specific AR-relays that had been manufactured and placed in storage awaiting shipment instructions were returned to the NICD manufacturing and final test facility. There the obsolete AR-latching relays were modified with the NARCR contact cartridges. Retest and operation of the SSPS were satisfactory.

### D. Design Control

#### 1. Objectives

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

- a. The status of the design, qualification testing, manufacture, production testing and shipment of the SSPS.
- b. The status of additional products and systems manufactured by the NICD that are supplied as safety related Class 1E products for the commercial nuclear industry.

#### 2. Method of Accomplishment

The preceding objectives were accomplished by:

- (a) Discussions with engineering management personnel concerning the identity and status of design, qualification testing and systems manufactured at NICD. The discussions covered the following systems:

- \* (1) SSPS (Solid State Protection System)
- \* (2) NIS (Nuclear Instrumentation System)
- (3) RMS-A (Radiation Monitoring System - Analog)
- \* (4) RMS-D (Radiation Monitoring System - Digital)
- (5) Flux Mapping System
- \*\* (6) DRPI (Digital Rod Position Indicating and Alarm System)
- (7) Boron Concentration Measuring System

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- \* Those systems marked with an asterisk (\*) are manufactured as Class 1E system while the remaining systems have not been required by customers, to meet Class 1E qualifications; however those non Class 1E products and systems are manufactured to the same quality standards as the Class 1E items.
- \*\* An advanced concept of this system designed as an integral part of a PWR integrated protection system is classified as Class 1E safety related. Production of this specific Class 1E system has been scheduled but not yet started.
- b. Discussion of the SSPS which revealed the customer for the SSPSs has, historically, not required NICD to complete the final qualification testing of the system or of the integrated components; however, a current customer P.O. No. 546-CLS-223101-BS, C/N No. 007 states in part, ". . . W-NES will be responsible for the seismic test and W NICD will only provide assistance for the test . . . This test is designed to meet W-NES methodology for addressing IEEE-323, 1974. . ." NICD has compiled the test specification, "T-925828, Three Train Protection System, Pre-production Test Specification, dated June 25, 1979" for the final qualification testing of the SSPS to meet IEEE Standards 323-1974 and 344-1975.
- c. Discussions of the NIS which revealed the radiation detectors for the system are purchased from the Westinghouse Industrial and Government Tube Department (WI & GTD). W I & GTD is responsible for the qualification testing of those detectors based on specifications provided by Westinghouse - Nuclear Energy Systems (W-NES). NICD provides the remainder of the system standard electronic components. These standard electronic components are qualified to meet applicable IEEE standards for Class 1E equipment.
- d. Discussions of the RMS - analog which revealed the system will no longer be bid as a system; however, the system components will be supplied as replacement parts. Current contracts will be fulfilled but future RMSs will be bid as a digital system.
- e. Discussions of the RMS - digital which has been designed to meet the requirements of customer specifications 7220-J-291-AC dated March 19, 1979. This specification imposed thirteen (13) ANSI and ten (10) IEEE standards on the design and manufacture of the system. NICD will be required to provide complete data and computer software to adapt the radiation monitor input-output to the Radiation Monitoring Control System (RMCS).



- f. Discussion of the Flux Mapping system and Boron Concentration Measuring Systems which are classified as non-IE systems.
- g. Discussion of the DRPI system which historically has been designed, manufactured and shipped as a designated non-IE system. An advanced concept for this system, a digital control system, for which a hardware contract is under negotiation, will be classified as a Class IE system. This system, to be fabricated by Productos Electronicos, Inc., Santa Isabel, Puerto Rico, will be built to the W-NES Equipment Specification No. 953307, Revision 0, and subject to the requirements of the W-NES Quality Assurance Specification QCS-1, Revision 7. Design Control, procurement document control and control of purchased materials for the system remains the responsibility of W-NICD.

### 3. Findings

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

#### Comments:

Of the systems described above the SSPS system is currently scheduled for final qualification testing. A prototype model of the Three Train SSPS is currently scheduled for delivery to the W-Advanced Energy Department, Large, Pennsylvania, which has a test facility capable for handling the SSPS equipment. Qualification testing of the system is scheduled for the fall of 1979 contingent upon availability of the test facility. The SSPS equipment shipped to the test facility will be the property of W-NES who will have the responsibility for the final qualification of the system, the development of the final test data and the final qualification report.

### E. Inspection, Test and Operation Status

#### 1. Objectives

The objectives of this area of the inspection were to verify the status of inspection, test and operations (manufacturing) activities concerning SSPSs.

#### 2. Method of Accomplishment

The preceding objectives were accomplished by:

- a. Discussions with engineering and quality assurances personnel concerning the status of manufacture, inspection and

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production testing of SSPSs. This revealed that no new projects were in the manufacturing, inspection or test stages; however, equipment from several SSPS projects had been returned from storage to the manufacturing assembly and a final test area for modifications and refurbishment. This included replacement of system AR relays with redesigned NARCR contact cartridges, revising circuits for related relay changes, correction of applicable drawings and retesting (functional testing) the systems in compliance with initial functional test procedures, as if the systems were being tested the first time.

- b. Review of the following quality assurance procedures (QAPs) of which each was initially revised March 1, 1979.

- (1) 5.1, Assembly Inspection
- (2) 14.1, Inspection Control Tag - Assembly and Continuation Tag.
- (3) 5.5, Test Operations and Control
- (4) 12.1, Control Records - Inspection and Test Data

- c. Inspection of SSPS equipment located in the final inspection area. Equipment (cabinets) in this area, consisting of two (2) train systems, had been manufactured, production functionally tested, approved by QA final inspection, transferred to NICD storage for final shipping instructions but returned to the NICD assembly area for refurbishment. An example of this equipment was the cabinet SSPS Model No. H10331K22, TS2375A05 Revision 11, which had been in storage for one (1) year. This SSPS equipment was returned per customer P.O. No. 546-GLS-223135-BN to have the AR latching relays modified to correct known operating problems. As a precaution each cabinet contained a label reading, "CAUTION - All latching relays must use only NARCR contact cartridges". For each system cabinet under refurbishment, a new manufacturing traveler card had been initiated requiring the system to be reinspected and retested in compliance with Quality Assurance Procedure (QAP) 5.1, Assembly Inspection, dated March 1, 1979. This QAP is the successor to QAWI (Quality Assurance Work Instruction) 5000.08 to which the equipment was originally assembled, tested and inspected. The SSPS equipment on the final assembly floor represented three (3) projects for which the AR latching relays were being renovated with the newly designed NARCR contact cartridges.

All retesting and operation of the SSPSs containing the revised AR-latching relays, at the NICD final test area, had been completed with satisfactory operation.

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- d. Inspection of SSPS equipment, a Two Train Protection System, located in the final production test area. This system had been initially tested and checked-out in March 1977 and shipped to storage. It had been returned to the final assembly area to have the AR latching relays modified with NARCR contact cartridges and the related circuitries corrected, accordingly. The cabinet assemblies were being checked out and tested per Cabinet Assembly drawing Nos. 1060E355G01/2/3/4 and Test Specifications 925668 and 925790. Component (relay) replacement parts had been made in compliance with NMR (Nonconforming Material Report) No. 922252 which is now identified as a DAR (Defective Article Report).

3. Findings

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

- F. Product Assurance Manual/Program

1. Objectives

The objectives of this area of the inspection were to review the status of the Product Assurance Manual and Related QA procedures.

2. Method of Accomplishment

The preceding objectives were accomplished by:

- a. Review of the Product Assurance Manual issued February 1, 1979, and revised June 1, 1979. This manual superseded the previous NICD Quality Assurance Program document, QAWI 1000.14, dated August 1, 1977, entitled, "Application of QCS-1 Quality Systems Requirements at NICD."
- b. Review of the Quality Assurance Procedures Manual in which all procedures previously identified as QAWIs had been revised and reidentified as QAPs with implementation dated as of March 1, 1979
- c. Review of Manufacturing Planning Manual which contained Manufacturing Planning Procedures, Manufacturing Memos and Manufacturing Instructions.

3. Findings

- a. Deviations

- (1) See enclosure Notice of Deviation Item A.
- (2) See enclosure Notice of Deviation Item B.

G. Exit Interview

The inspector met with management representatives (denoted in paragraph A with an asterisk) at the conclusion of the inspection on July 26, 1979, at the Hunt Valley Plant.

The inspector summarized the scope and findings of the inspection involving the following subjects:

1. Action on Previous Inspection Findings
2. Inspection to SSPS Relay Problem
3. Design Control
4. Inspection Test and Operation Status
5. Product Assurance Manual/Program

Management acknowledged the discussions by the inspector.

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