UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30323

Report Nos.: 50-280/90-11 and 50-281/90-11

Licensee: Virginia Electric and Power Company
Glen Allen, VA 23060

Docket Nos.: 50-280 and 50-281 Licensee Nos.: DPR-32 and DPR-37

Facility Name: Surry 1 and 2

Inspection Conducted: February 12-16, 1990

Inspector: M. D. Hunt 3/14/90
M. D. Hunt Date Signed

Approved by: for T. E Conlon, Chief 3/14/90
T. E Conlon, Chief Date Signed
Plant Systems Section
Engineering Branch
Division of Reactor Safety

SUMMARY

Scope:

This special, unannounced inspection was conducted in the areas of employee concerns regarding inadequate maintenance of the Reactor Protection System, incorrect module found in steam generator control loop for feedwater control and questionable Raychem splices installed on 50 Rosemont transmitters in containment.

Results:

One non-cited violation was identified in the area of Procedural Controls for Storage, Repair, and Control of Installation of Control System Components.

The employee concerns were partially substantiated

REPORT DETAILS

1. Persons Contacted

Licensee Employees

W. R. Benthall, Supervisor, Licensing
*S. R. Burgold, Supervisor, Instrumentation and Controls (I&C)
H. D. Collar, Supervisor, Quality Control
*D. S. Hart, Supervisor, Quality Assurance
*M. R. Kansler, Station Manager
*J. W. Ogren, Supervisor, Plant Maintenance
E. R. Smith, Jr., Manager, Quality Assurance
*T. B. Sowers, Superintendent, Engineering
E. Watts, Supervisor, Onsite Engineering-Electrical

Other licensee employees contacted during this inspection included engineers, and technicians.

NRC Resident Inspectors

*W. E. Holland
L. Nicholson
J. York

*Attended exit interview

2. Employee Concerns

a. Inadequate Maintenance of Reactor Protection System (RPS) (RII-90-A-0008), and Incorrect Module Found in the Steam Generator Control Loop for Feedwater Control

(1) Concern

The NRC (RII) received an employee concern regarding inadequate maintenance of the RPS by the use of non safety related, non traceable and non qualified parts and lack of procedures. Also, an inoperative module was found in the feedwater control system. The module required revisions before the control loop would function properly.

(2) Discussion

These two concerns were examined together due to their commonality. Interviews were held with several I&C

Technicians and supervisors, QA auditors and QC inspectors. The I&C maintenance shop and the storage area were examined during this inspection.

The inspectors observed several work bench drawers which contained printed circuit (PC) boards that had been cannibalized to obtain certain components needed to repair other PC boards. There were also drawers that contained resistors, diodes, capacitors...etc., which were not controlled in any manner.

The repairs of the PC boards were accomplished using the manufacturer's troubleshooting procedures. The testing of the repaired modules is performed usually by the individual performing the repair after which the module is placed in unlocked storage cabinets located in the same room as the reactor control system cabinets. There was no procedure found which identified the acceptance criteria or required any verification for repaired module acceptance. The repaired modules were tagged to indicate the date of repair and placement of the module in the storage cabinets. The inspectors were advised that when a module is taken from these storage cabinets to replace a failed module, the repair tag is attached to the work request document and eventually the serial number of the replacement module is entered into a loop folder for that instrumentation loop. No other document is generated to indicate where the module has been placed or why the action was necessary. There is no procedure that directs these activities.

Quality Assurance Audit S88-20, dated March 17, 1988, identified weaknesses in administrative control of procedures, predictive maintenance and material storage. As a result of these findings Administrative Procedure No. SUADM-ADM-47, Operation of the Instrument Department, was issued September 18, 1989. This procedure gives general directions for instrumentation personnel performing maintenance activities but does not provide specific instructions regarding control for repair parts for PC boards and modules, or specify any acceptance testing or peer verification.

Quality Assurance Audit No. S89-25 dated January 31, 1990, again identified that preventive maintenance (PM) procedures had not been developed and; therefore, traceability of electronic components is not maintained, instructions for repair of process modules were not provided and electronic components were not stored in the proper environment. Management has addressed these problems but had not yet completed the corrective actions which require the development of additional procedures.

Discussions were held with various technicians and supervisory personnel regarding these employee concerns. It should be noted that the technicians are well versed in the methods for performing I&C maintenance, both planned and emergency even though no procedures exist to control their total activities. All those interviewed stated that they performed I&C maintenance in a similar manner with regard to module repair and replacement. The inspectors were advised that control modules had been interchanged between units when one unit was not operating and the other unit was in operation and required emergency repairs. The only documentation was the issuance of a repair work order for the defective module that was reinstalled into the non non-operating unit control system. It was stressed that never have modules been exchanged when both units were operating. Additionally, the inspectors were informed that an I&C supervisor had to approve the exchanging of modules between units. No documentation was developed other than a repair work request during these exchanges.

From these interviews along with the examination of the I&C shop facilities and storage areas, it is apparent that there is a lack of procedural controls for: control of miscellaneous electrical parts such as diodes, resistors, transistors, capacitors, etc.; repair, testing and storage of repaired modules; cannibalization of parts from rejected PC boards; and the interchanging of modules between units.

It was strongly emphasized by the I&C technicians and supervision that any time a repaired module is installed a performance test (PT) is conducted to insure proper operation of the instrumentation or control loop. By this testing, there was a verification check of the adequacy of the module repair but this appeared far removed from the actual repair cycle and may or may not test the entire functions for the repaired modules since certain modules have varied applications.

(3) Conclusions

The concern regarding inadequate maintenance of the reactor protection system was partially substantiated in that there were insufficient procedural controls in place to provide assurance that PC boards and control modules were repaired with qualified parts, that testing of repaired modules was adequate, and that storage of repaired modules was controlled. In view of the fact that instrument and control loop performance testing is performed when a module is replaced, the safety significance is greatly reduced. In addition, the licensee through QA audits has identified the weaknesses in the I&C maintenance department

and has committed to have in place by April 20,1990, procedures to control those activities found deficient by the QA audits and further emphasized by this inspection. 10 CFR Part 50 Appendix B, Criterion V in part requires activities affecting quality shall be perscribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances... Contrary to this requirement the licensee did not have adequate procedures to control the maintenance and repair of componets in the reactor protection and control systems. This condition is identified as a non-cited violation (NCV) 50-280,281/90-11-01, Lack of Procedural Controls for Storage, Repair and Control of Installation of Control System Components. This licensee identified violation is not being cited because criteria specified in Section V.G.1 of the NRC Enforcement Policy were satisfied.

The second concern was not substantiated because the feedwater control loop in question was non safety-related; therefore, no documents were generated and the module in question was not available for review. However, the fact that the module did not function properly and was later modified could be attributed in part to the previously discussed concern and violation.

b. Raychem Splice on Cable to Rosemount Transmitter Inside Containment (RII-90-A-0015)

(1) Concern

The NRC (RII) received information on the possibility of inadequate Raychem splices on approximately 50 Rosemount transmitters located inside containment (see attachment).

(2) Discussion

The licensee phoned Raychem to obtain information about ordering an engineered kit for a specific Raychem splice that was designed by VEPCO engineers. Raychem informed VEPCO that they (Raychem) would not have designed the splice, for this application, like VEPCO had done. Also, the inline butt splice would not be an effective seal due to the difference in wire diameters. The wire from the transmitter is approximately 0.042 inches in diameter and the field were is approximately 0.133 for #14 AWG and 0.108 for #16 AWG. Raychem declined the request to furnish an engineered kit with all the parts as shown on the VEPCO drawing.

(3) Findings

The inspector reviewed the VEPCO designed splice configuration and held discussions with engineering personnel at the site and

the corporate office in Richmond, Virginia. Also, discussions were held with appropriate I&C supervision and QC personnel. The following information was obtained:

(a) Engineering

The Raychem splice, as shown in the attachment, is used on Rosemount conduit seal connectors inside containment. There are six (6) of these splices in Unit 1 and fifteen (15) splices in Unit 2. This splice design is used whenever the licensee replaces an existing Conax conduit seal connector with a Rosemount, model 353C, conduit seal connector (CSC). This occurs whenever the transmitter is replaced. Both the Conax and Rosemount CSCs are EQ qualified but the Conax is difficult to disassemble in the field; therefore, the licensee is replacing them.

The Raychem splice is an unusual design that was necessitated by the unqualified inline butt splice (items 1 and 2 in the attachment) and the fact that the licensee did not want to seal on the jacket of the incoming field cable. The inspector considers the splice to be qualified because all the Raychem parts that make it up are individually qualified in similar applications. The term "splice" as used is somewhat of a misnomer when in actuality the design should be called an enclosure.

(b) I&C Supervision

Discussions were held with I&C supervisors and specifically the supervisor that participated in the telephone call to Raychem. To the best of his memory and with the aid of notes, Raychem did point out that the butt splice (items 1 and 2) would be considered unqualified by them (Raychem). With respect to furnishing "engineered kits", Raychem pointed out that the VEPCO design was unusual and that they would not have designed it as such for the particular application. Furthermore, "engineered kits" furnished by Raychem are kits involving designs done by Raychem. The supervisor stated that Raychem did not pass judgement on the adequacy of the overall configuration.

(c) Quality Control

Discussions were held with QC personnel to determine the extent of inspection given to the installation of the subject splice. The installation was done in accordance with NUS-2030 and Engineering Work Requests (EWRs) 89-338

and 89-422. The EWR has a QC hold point on line item 4.6. Procedure SUADN-QA-03 defines hold point as a preselected step in a procedure that requires QC witnessing. Interviews with several QC inspectors verified that Raychem splices in containment are always witnessed.

(4) Conclusions

The inspector agrees with the licensee that the subject splice, even though it is an unusual design, is qualified for the intended use as a water/moisture proof enclosure for the two (2) unqualified inline butt splices. The concern was not substantiated.

3. (Closed) Violation 50-280/89-12-01, Failure to Maintain Cable Tray Covers in Place as Required by Appendix R. The licensee submitted a response dated July 16, 1989, which stated that procedures have been revised or written to insure that cable tray covers are reinstalled after construction and maintenance activities are completed; and cable trays will be marked to indicate where covers must be in place. Walk downs by the regional and on-site inspectors verified that this work is nearing completion.

4. Licensee Event Report (LER) Review (92700)

(Closed) LER 280/89-37, "A" S/G Header to Line SF Channel IV Declared Inoperable Due to Malfunctioning Pressure Comparator. This issue involved a failure of a comparator module and the failure of the replacement module after approximately four hours in service. As the result, a commitment was made to review the repair and testing methods associated with module refurbishment in the I&C shop. Additionally a QA audit identified a finding regarding traceability of electronic components not being maintained. In view of the commitments made by the licensee in the exit meeting for this inspection, this item is closed.

5. Exit Interview

The inspection scope and results were summarized on February 16, 1990, with those persons indicated in paragraph 1. The inspectors described the areas inspected and discussed in detail the inspection results listed below. Proprietary information is not contained in this report and dissenting comments were not received from the licensee.

The non-cited violation 50-280/281/90-11-01, Lack of Procedural Controls for Storage, Repair and Control of Installation of control System Components was discussed. The licensee committed to develop and have in place by April 20, 1990, procedures for:

- Control of miscellaneous electrical parts such as: diodes, resistors, transistors, capacitors, etc.
- Repair testing and storage of repaired modules
- Cannibalization of parts from reject printed circuit (PC) boards
- Interchanging of components between units

Attachment:
Specification for Electrical
Installation

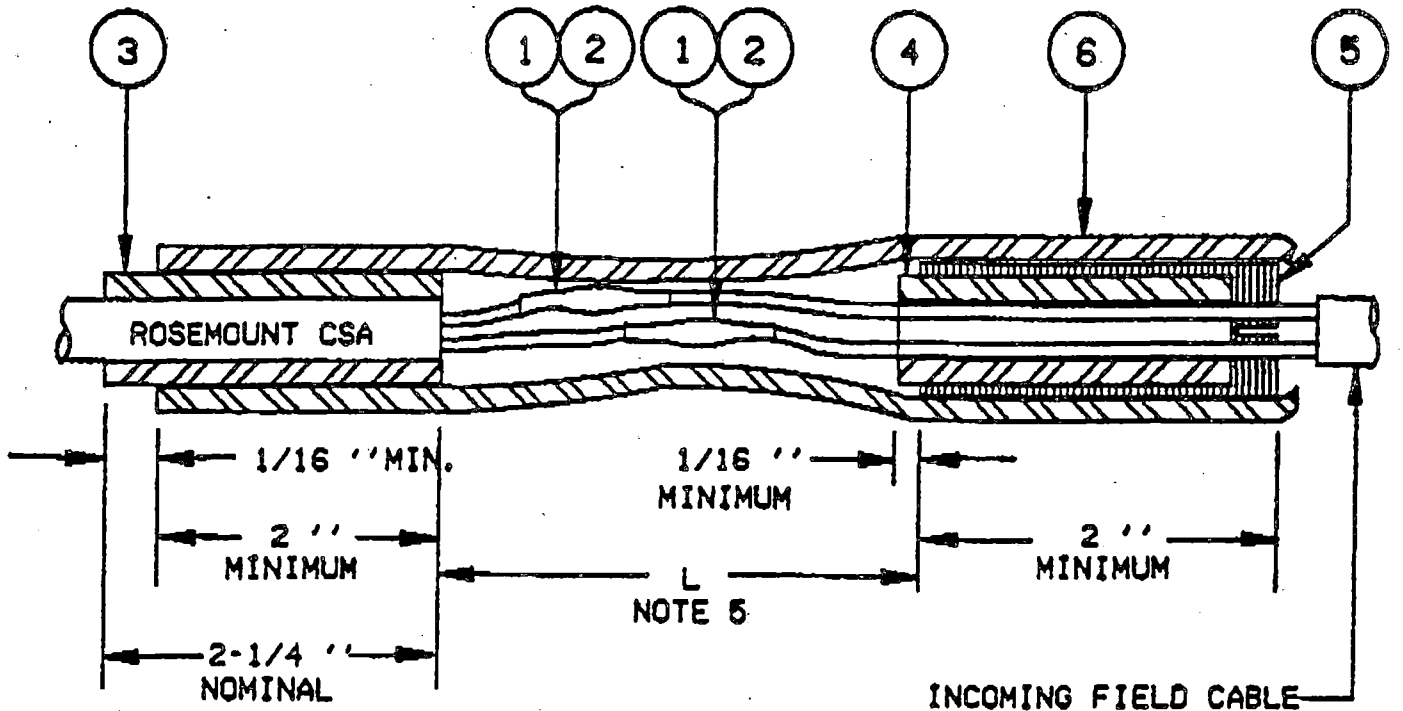
VIRGINIA POWER

TITLE SPECIFICATION FOR ELECTRICAL INSTALLATION

STANDARD NO.
NUS-2030 & NAS-3014

RAYCHEM BREAKOUT SPLICE
WITH
ROSEMOUNT CONDUIT SEAL

FIGURE NO. 10



MATERIALS

1) BUTT SPLICE - BURNDY YSV1418 FOR AWG 22 - 14 WIRE (2 - REQUIRED)
2) BUTT SPLICE JACKET - RAYCHEM NO. WCSF-070-N (2 - REQUIRED)
   (FOR ELECTRICAL PROTECTION ONLY)
3) SHIM SLEEVE - RAYCHEM NO. WCSF-115-N
4) SHIM SLEEVE - RAYCHEM NO. WCSF-200-N OR WCSF-200-U
5) CABLE BREAKOUT - RAYCHEM NO. 302A812-52/144
6) OVERALL SEALING SLEEVE - RAYCHEM NO. WCSF-300-N

NOTES

1) SEE - (DETAIL A) OF FIGURE 10A FOR INSTALLATION OF ITEMS NO.1 AND NO.2 ABOVE
2) SEE - (DETAIL B) OF FIGURE 10A FOR DESCRIPTION OF ITEM NO.5
3) SHIELD ON INCOMING CABLE TO BE TAPED BACK AND INSULATED FROM GROUND
4) SEALING SLEEVE (ITEM NO. 6) TO EXTEND PAST BREAKOUT A MINIMUM OF 1/4 "
5) THE DIMENSION 'L' IS TO BE CHOSEN SUCH THAT THE NOMINAL PRE-SHRUNK LENGTH OF WCSF-300-N IS 6 INCHES