



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

Report Nos.: 50-280/93-12 and 50-281/93-12

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

Docket Nos.: 50-280 and 50-281

License Nos.: DPR-32 and DRP-37

Facility Name: Surry 1 and 2

Inspection Conducted: May 3-7, 1993

Inspector: McKensie Thomas 6-2-93
M. Thomas Date Signed

Accompanying Inspectors: H. Whitener
M. Miller

Approved by: C. Julian for 6/4/93
M. Branch, Chief Date Signed
Test Programs Section
Engineering Branch
Division of Reactor Safety

SUMMARY

Scope:

This routine, announced inspection was conducted in the areas of design changes and modifications and engineering support activities.

Results:

In the areas inspected one violation and one inspector followup item (IFI) were identified.

- Violation 50-280,281/93-12-01, for failure to follow procedures in updating design drawings within the required time period following the implementation of two design change packages (DCP) (paragraph 3).
- IFI 50-280,281/93-12-02, Labeling of test valves installed in the emergency diesel generator air start system (paragraph 2.b.).

9306160176 930604
PDR ADDCK 05000280
Q PDR

- The various engineering groups worked well together to resolve complex problems that could potentially affect plant operations.
- Timely and effective engineering support was provided to resolve the pressurizer safety relief valve issue.
- Engineering has provided timely support in resolving deviation reports (DRs) and requests for engineering assistance (REA).
- A weakness was noted in the documentation of the 10 CFR 50.59 safety evaluation for DCP 92-49 (paragraph 2.b.).
- The licensee's program for reducing the DCP and engineering work request (EWR) modification backlog provided adequate justification for cancelling the DCPs reviewed.
- The licensee's self assessment efforts continue to demonstrate the licensee's commitment to improving the quality and effectiveness of engineering support provided to the plant.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

- *W. Benthall, Manager, Nuclear Licensing
- *R. Bilyeu, Licensing Engineer
 - D. Blake, Design Engineer, Station Engineering
- *R. Blount, Superintendent, Station Engineering
- *A. Fletcher, Assistant Superintendent, Station Engineering
- *B. Foster, Mechanical Engineering Supervisor, Station Engineering
- R. Green, Systems Engineering Supervisor, Station Engineering
- *D. Hart, Supervisor, Quality Assurance
- *M. Kansler, Station Manager
- *R. MacManus, Systems Engineering Supervisor, Station Engineering
- *J. Price, Assistant Station Manager, Nuclear Safety and Licensing
- *R. Saunders, Assistant Vice President Nuclear Operations
- *J. Swientoniewski, Supervisor, Station Nuclear Safety
- E. Watts, Electrical Engineering Supervisor, Station Engineering

Other licensee employees contacted during this inspection included engineers, operators, craftsmen, and administrative personnel.

NRC Resident Inspectors

- J. York, Senior Resident Inspector
- *S. Tingen, Resident Inspector

*Attended exit meeting

Acronyms and initialisms used throughout this report are listed in the last paragraph.

2. Design Changes and Plant Modifications (37700)

a. Plant Modifications to Improve Reactor Safety

The inspectors reviewed the initiatives taken by the licensee to identify and implement plant modifications to improve reactor safety. This included reviewing the licensee's efforts to reduce the backlog of DCPs and EWRs.

The licensee implemented a Level I Project Modification Package Backlog Reduction program designed to reduce the EWRs and DCPs from 333 in August 1992 to 150 by June 1993. The inspectors reviewed trend reports and monthly status reports and determined that the EWR/DCP reduction was on schedule as of April 1993 with 172 packages remaining in the backlog population. The packages in the backlog population were in various stages of completion. In some cases the engineering design work, modification implementation, and technical review were complete and final closeout awaited only sign off of the documentation. At the other

extreme, some DCP numbers were assigned, but were not funded and no engineering work had been performed. Closeout methods varied from closure with the completion of documentation, closure with partial implementation, closure with no implementation, closure by cancellation, and closure of assigned numbers which were not approved for funding. This process was consistent with the VEPCO General Nuclear Standard (STD-GN-0001, Revision 10) which provided interim instructions for changes in the design control process. Subsequent to September 16, 1991, all plant modifications (major and minor) are to be performed using the DCP process and EWRs are to be used for engineering technical evaluations. DCPs and EWRs initiated prior to this date may be completed in the old format, canceled, or converted to the new DCP format as appropriate. STD-GN-0001, Revision 11 and VPAP 0301, Revision 1, Design Change Process, specify that cancellation of EWRs/DCPs will be accomplished through a field change (FC) which identifies the reason for cancellation and if there was any impact on systems or projects resulting from not implementing the design change.

A sample of FCs for canceled EWRs/DCPs was reviewed to evaluate any impact on system reliability and safe operation of the plant. FCs reviewed and evaluated included the following:

* DCP 90-013-1, Revision 8 - 2/20/92

This was a corporate issued DCP specifying replacement of the motor operators for six valves. Replacement was completed for two valves, two valves did not require replacement, and two valves required maintenance. Subsequent to the operational readiness review, the DCP was canceled for the four valves not requiring operator replacement.

While cancellation was justified, the FC was weak in that the reason for not replacing the operators on four of the six valves had to be determined from other sources.

* EWR 89-467, Revision A - 9/25/92

This EWR was an evaluation to perform a commercial grade dedication for replacement relief valves in the component cooling water system in order to upgrade the valves to safety related status. Based on the current design change standards, EWRs are not the proper vehicle for performing commercial grade dedication of equipment. The EWR was canceled and the new valves will be procured and qualified under the Virginia Power Safety Related Dedication Procedures and Standards program.

The FC provided adequate justification for the cancellation.

* EWR 88-012, Revision J - 9/11/92

This EWR provided instructions for replacing existing auxiliary feedwater system check valves. According to a systems engineering evaluation, replacement was not necessary. The existing valves were performing satisfactorily.

Due to valve performance, cancellation was considered justified. Should valve replacement be necessary in the future, it would be addressed under the current design change standard with a DCP.

* EWR 89-730, Revision B - 8/31/92

This EWR was issued for engineering authorization to replace a leaking one inch Pacific gate valve (no longer available) with a one inch Velan gate valve. Discussions with System Engineering indicated that in a recent leak rate test the Pacific valve was not leaking. The licensee concluded that it was not necessary to replace the Pacific valve.

Cancellation of this EWR was considered justified based on valve performance.

* DCP 92-48-1

Engineering reviewed a request for engineering assistance (REA) to develop a DCP to install new ventilation flow elements. Although the new elements were slightly different from the original elements, the differences were minor and considered within the scope of the Item Equivalency Program. Procurement Engineering performed an evaluation to address the differences. The new elements are to be installed by work orders 123458 and 123459. Design Engineering will assist by providing a package of electrical wiring diagrams, equipment support drawings, and the general installation sequence identifying special implementation requirements.

Cancellation of the DCP was considered justified in that the flow elements will be installed under an approved, standing program.

* DCP 90-16-1, Revision 6 - 11/19/92

This DCP was issued to modify the reactor cavity seal. Prior to performing this modification a walkdown revealed dimensional discrepancies between the actual cavity seal area and the new seal design. Therefore, the DCP was not implemented. Instead, the original method of cavity seal was accomplished via EWR 90-328. This method is performing

satisfactorily. Consequently, DCP 90-16-1, which would require major redesign, will not be implemented.

In that the current cavity seal method is performing satisfactorily, cancellation of the redesigned seal is considered justified.

* EWR 90-158, Revision A - 10/20/92

This EWR was issued to relocate an electrical receptacle located near a battery in the emergency service water pump house to reduce an explosion hazard. An engineering walkdown prior to implementation found that the receptacle had been removed, the wires taped and the opening capped.

In that there were sufficient receptacles in the pump house, this specific receptacle was eliminated rather than relocated. Cancellation of the EWR was considered justified.

* EWR 90-237, Revision A - 9/4/92

This EWR was issued in response to valve thermal binding/bonnet pressurization problems identified in INPO Significant Operating Experience Report 84-07. Engineering reviewed all air operated (AOV) and motor operated (MOV) safety related gate valves for Surry Units 1 and 2 and issued a Type I Report on the investigative methods and findings. The review consisted of an initial screening to identify the AOVs and MOVs susceptible to the thermal binding/bonnet pressurization phenomena. A detailed analysis was performed on valves identified by the screening process. The licensee concluded that none of the valves have a significant possibility of experiencing thermal binding/bonnet pressurization leaking.

In response to the Operating Experience Review Group concerns, engineering developed calculations showing that, for the MOVs of concern, the motor operators have the capacity to open the valves against the binding forces.

Based on the valve operation histories, the analysis of operating conditions, and force calculations, cancellation of this DCP was considered justified.

Review of the above sample of FCs issued to cancel EWRs/DCPs indicated that safe operation of the plant or reliability of systems has not been compromised. Based on discussions with licensee engineering personnel, and review of the above documentation, the inspectors concluded that the licensee has a

satisfactory process for identifying and implementing plant design changes to improve reactor safety and to reduce the EWR/DCP backlog.

b. Planning, Development and Implementation of Plant Modifications

The inspectors reviewed the DCPs listed below to: (1) determine the adequacy of the 10 CFR 50.59 safety evaluations performed; (2) verify that the DCPs were reviewed and approved in accordance with TS and applicable administrative controls; (3) verify the subject modifications were installed (for those that could be physically inspected) in accordance with the DCP package; (4) verify that applicable plant operating and design documents (drawings, plant procedures, FSAR, TS, etc.) were revised to reflect the subject modifications; (5) verify that the modifications were reviewed and incorporated into the operations training program as applicable; and (6) verify that post modification test requirements were specified and that adequate testing was performed. The following DCPs were reviewed:

* DCP 88-32, Addition of Diesel Generator Sequencing, Unit 2

This modification was initially dated December 11, 1988, to add an emergency diesel generator (EDG) load sequencing scheme that would be initiated by a loss of offsite power (LOOP). The purpose of this scheme was to ensure that the maximum EDG load capabilities would not be exceeded under the worst case load applications, and therefore resolve NRC concerns described in IE Information Notice 85-91. The second part of this DCP was dated February 26, 1991, to modify the control circuits for the auxiliary feedwater pumps. The control circuits were modified by eliminating the latching relays and replacing them with auxiliary type relays. Four auxiliary relays were added to control circuits.

This DCP included both the engineering design change packages and the installation work plans. The inspectors conducted a detailed walkdown inspection to verify that components were installed and the drawings reflected the as-built plant condition. The inspectors determined that this modification was implemented in a satisfactory manner.

* DCP 91-12, RSHX Service Water Flow Element Modifications, Units 1 and 2

This DCP was implemented to replace existing pitot venturi flow elements (1-SW-FE-105A and -105B, 2-SW-FE-205A and -205B) that monitor SW flow in the supply headers to the RSHXs; and venturi flow elements (1-SW-FE-106A,B,C,D, 2-SW-FE-206A,B,C,D) that monitor SW outlet flow from each of the

RSHXs, with V-Cone flow elements. The V-Cone flow element provided stable and accurate flow indication during the RSHX flow test that was performed on April 6, 1991.

The inspectors reviewed the DCP in accordance with the criteria specified above and performed a field inspection to verify that the components were installed and the applicable drawings reflected the as-built plant configuration. The inspectors determined that this DCP was satisfactorily implemented.

* DCP 92-49, Removal of Motor Operators From 01/02-RH-MOV-100/200

This modification required the removal of motor operators from the RHR containment isolation valves 01-RH-MOV-100 and 02-RH-MOV-200. In the DCP's "Statement of the Problem", the reasons for the removal of these valves' motor operators were the initial installation had an improper design, there were significant difficulties with proper operation, and the valves repeatedly failed the "Type C" leak testing. These problems were caused by the design configuration originated for the initial installation of the motor operators by DCP 74-001 performed in 1975. The previous manual valves had motor operators remotely installed above them using a long drive shaft. Since this arrangement was not effective the motors were later disconnected and the valves were manually operated.

The purpose of DCP 74-001 was to install an overflow line from the RWST to the safeguards valve pit to prevent the uncontrolled release of radioactive water. The basis for this modification was that pumps were installed in the pit to pump the water to the liquid waste system. The motor operators were installed on the valves to automatically close upon a high level alarm on the RWST to prevent over filling. (The valves are in the lines feeding the RWST and are only used during refueling.)

In 1984 another modification was performed in this area. EWR 84-089 was initiated to prevent the release of unmonitored gaseous effluents from the RWST. This modification required the capping of the vent on top of the RWST and extended the overflow line down further in the valve pit. EWR 84-089 discussed the basis of DCP 74-001 where the manual valves had motor operators installed to provide the automatic shutoff to prevent RWST overfill.

During the review of this modification the inspectors determine that the licensee's basis for removing the motor operators was acceptable. However, several concerns were identified during the review of the safety evaluation for

the removal of the motor operators which indicated an inattention to details. The licensee's safety evaluation form required a response and an explanation for each question. The explanation provided as justification for several of the questions was that the RWST overflow occurrence had been previously analyzed in DCP 74-001 and EWR 84-089. The inspectors determined that DCP 74-001 and EWR 84-089 analyses clearly stated that the valves had motor operators added to provide automatic shutoff to prevent the RWST from being overfilled. Therefore, using the analyses from DCP 74-001 and EWR 84-089 for removing the motor operators was inappropriate. In the "Programs Review Checklist" the question for ALARA, asks if the work in the DCP affects systems, facilities, and/or equipment which process or contain radioactive materials, fluids or gases? The answer checked was no. The purpose of the earlier modifications, DCP 74-001 and EWR 84-089, was to control the release of radioactive effluents. The inspectors identified these responses in the safety evaluation as concerns that appeared to be due to inattention to details.

The inspectors concluded that the licensee's basis for removing the motor operators was justified and there was no safety concern. However, the responses to several of the questions indicated an inattention to detail.

* DCP 92-72, EG Check Valve Testing Modification, Units 1 and 2

This DCP was implemented to install a test valve in each EDG air start system between the compressor and the safety-related air receiver check valve, in order to test for back leakage by the check valve. Leak testing of the check valve is performed to meet an ASME Section XI Inservice Testing commitment.

The inspectors reviewed this DCP to the criteria specified above and performed a field inspection to verify proper installation. During the field inspection, the inspectors noted that the drawings had been updated to reflect the modification, but only one of the six test valves installed by this DCP was labeled. The inspectors discussed this discrepancy with licensee personnel who indicated that the valves were being labeled as part of the licensee's upgraded labeling program, which was still ongoing. The licensee further indicated, and the inspectors verified, that the valves were only for test purposes and performed no safety function. The inspectors will verify labeling of the test valves during a future inspection. This item will be identified as IFI 50-280, 281/93-12-02, Labeling of test valves in emergency diesel generator air start system.

The inspectors noted that, except for the discrepancies discussed above, the DCPs were satisfactorily implemented. None of the discrepancies noted had a safety impact. Violations or deviations were not identified in the areas inspected.

3. Drawing Control

The inspectors reviewed the licensee's program and procedures that were developed and implemented to maintain configuration control of the applicable drawings after DCP implementation. The program was examined to ensure that design control was maintained and that the drawings affected by DCPs were updated in a timely manner to reflect the as-built plant. The procedures reviewed for the configuration drawing control program included the following documents:

- * VPAP-0301, Virginia Power Administrative Procedure, Design Change Process
- * SUADM-ADM-11, Surry Power Station Administrative Procedure, Station Drawing Revision and Distribution

VPAP-0301 was the detailed procedure that established the process for managing the preparation and implementation of design changes. It also established interfaces among the various organizations and defined the controls necessary to assure safe implementation of station design changes. In addition, the VPAP discusses the requirements for updating the design drawings in accordance with SUADM-ADM-11. The purpose of SUADM-ADM-11 was to prescribe the method for revision of controlled drawings, for annotation of drawings to reflect design changes in progress, and to provide guidelines for proper distribution and maintenance of station controlled drawings. The inspectors selected drawings from completed DCPs to determine if the drawings were updated in a timely manner as required by the licensee's procedures. In addition, the drawings in the Control Room were examined to ensure that they were also updated. The drawings for the following DCPs were examined:

- * DCP 93-20, EPH 34.5 KV BUS NO. 5
- * DCP 92-64, CHARGING PUMP LOGIC
- * DCP 89-09, POWER SUPPLY-ATWS MIGITATION SYSTEM
- * DCP 87-26, ATWS MITIGATION SYSTEM
- * DCP 88-32, ADDITION OF DIESEL GENERATOR SEQUENCING
- * DCP 92-63, LP HEATER DRAIN PUMP RECIRCULATION LINE
- * DCP 91-12, RSHX SERVICE WATER FLOW ELEMENT MODIFICATIONS
- * DCP 92-72, EG CHECK VALVE TESTING MODIFICATIONS

During the drawing review, the inspectors identified on May 6, 1993, that the priority drawings for DCP 93-20 and DCP 92-64, which required revision within 15 days of the operational readiness review (ORR) completion date, were not completed. The ORR completion date for DCP 93-20 was April 8, 1993, and the drawing not updated was 11448-FE-1A. The ORR completion date for DCP 92-64 was April 9, 1993 and the drawings not updated were 11548-ESK-5P, -5Q, -5R, and -5S. The licensee's failure to update these 15-day priority drawings as required by SUADM-ADM-11 is identified as Violation 50-280, 281/93-12-01, Priority Drawings Not Updated. The licensee took immediate corrective action by issuing deviation reports for DCP 92-64 and DCP 93-20, identifying the discrepancies and requiring that the drawings be updated. Both DRs were dated May 6, 1993. The inspectors verified that the licensee updated the overdue drawings on May 6, 1993.

One violation was identified in the areas inspected.

4. Engineering and Technical Support Activities

The inspectors reviewed activities performed by Station Engineering in an effort to assess the effectiveness of the support being provided to the plant operations and maintenance staffs for day-to-day activities. These activities included responding to DRs, REAs, Systems Engineering activities, and self assessments.

The inspectors concluded that the various engineering groups worked well together to resolve complex problems and, in general, provided timely and effective engineering support to the plant.

a. Deviation Reports and REAs

The inspectors reviewed Engineering's involvement in resolving DRs, which included reviewing DR trend reports over the last year. The inspectors noted that from January 1992 to May 1993, a total of 654 DRs were assigned to Station Engineering (458 DRs for 1992 and 196 DRs for 1993). Engineering was only overdue in responding to 16 of the DRs (exceeding 30 days) in 1992. There have been no late DR responses for 1993. There were 13 DRs currently open for 1993 and there were no open 1992 DRs.

The inspectors also reviewed Engineering's involvement in resolving REAs. Since June 1992, 390 REAs were received by Engineering. A total of 338 REAs have been closed by Engineering, 11 REAs have been reviewed by Engineering and were awaiting review by the MMRT, and 41 REAs were under review by Engineering.

The inspectors concluded that Station Engineering provided timely responses for assigned DRs and REAs.

b. Systems Engineering

The licensee's engineering organization is diversified in specialty areas including corporate, maintenance, design, system, material, modification implementation, and testing. The inspectors reviewed engineering activities to ascertain involvement in plant operations and maintenance.

The Surry Station Engineering Services (SSES) 3.01, Revision 2, Controlling Procedure for System Engineering, identifies Maintenance Engineering (ME) as the component engineering experts and describes the System Engineer (SE) as the system expert responsible for system management and oversight. Duties included ensuring system performance per design basis; maintaining cognizance of system conditions; coordinating diverse group efforts to resolve problems; and serving as the expert for system design, regulatory, testing and operational questions. In this regard the SE writes and reviews procedures, performs system tests, reviews test results and trends system performance.

Additionally, the SE reviews all work orders on assigned systems prior to work. When multiple work orders are involved the SE generates a post maintenance testing (PMT) package which details the sequence of testing, a flow chart, procedures, and procedure changes to accomplish a meaningful PMT. This package is distributed to operations, management, maintenance and engineering for review and comment.

The inspectors reviewed DRs and REAs and determined that engineering's response in support of plant operations and maintenance was adequate and prompt. The inspectors also reviewed portions of the Station Engineering Weekly Events Reports for February 1993 - May 1993 and the System Engineering Quarterly Report for the fourth quarter of 1992. These reports present the historical problems of the system, the problems experienced during the report quarter, actions taken to resolve problems and recommendations to upgrade and enhance system reliability. The quarterly report also trends system parameters. The inspectors reviewed portions of these reports for the EDG and instrument air systems and concluded that engineering was responsive in identifying and resolving problems.

The inspectors also followed a real time event which occurred during this inspection. During startup, the pressurizer code safety valves were simmering. The licensee obtained a waiver of compliance to permit gagging the relief valves and performing the system hydrostatic test. Subsequently, system pressure was reduced to about 1900 psig to allow the code valves to seat and stabilize. System pressure was then brought up to 2135 psig, where the plant will be operated. This is 100 psi below normal operating pressure and required NRC approval and an emergency TS change.

Engineering was active in obtaining approval for operation at reduced pressure. Corporate engineering performed calculations to show adequate departure from nucleate boiling safety margin, design engineering walked down the system and developed alternate plans of action in case leakage did not stop at reduced pressure, System Engineering was involved in obtaining the waiver of compliance for the hydrostatic test and Maintenance Engineering was involved in details of gagging the valves and communicating with the vendor, and a management oversight committee followed the events closely. The inspectors considered this a good example of engineering groups working together to support the plant.

Based on review of records and observations of the licensee's response to the above event the inspectors concluded that engineering activity supports plant operations and maintenance.

c. Self Assessment

The inspectors reviewed certain aspects of the licensee's self assessment program. One assessment reviewed was the appraisal of the engineering programs. The licensee developed a rating system and performed a survey of 24 engineering programs to evaluate the programs' effectiveness. A score of 5 indicates average program effectiveness. The survey results showed that four of the programs (Appendix R, Setpoint Coordination, TS Compliance Coordination, and Computer Software Control) were rated as average to less than average. Corrective action plans were developed and entered in the licensee's commitment tracking system to enhance and improve the programs. The inspectors reviewed the action plans for three of the programs.

The inspectors also reviewed selected QA audits of engineering activities. Audits reviewed included activities such as the vendor information program, drawing update, and configuration control. The audits were detailed and identified areas of weakness and strength.

The inspectors determined that the licensee's self assessment efforts continue to demonstrate the licensee's commitment to improving the quality and effectiveness of engineering support provided to the plant.

Violations or deviations were not identified in the areas inspected.

5. Exit Interview

The inspection scope and results were summarized on May 7, 1993, 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. Dissenting comments were not received from the licensee. The following findings were discussed:

- Violation 50-280, 281/93-12-01, Failure to follow procedures in updating design drawings within the required time period. (paragraph 3)
- IFI 50-280, 281/93-12-02, Labeling of test valves installed in the emergency diesel generator air start system. (paragraph 2.b.)

6. Acronyms and Initialisms

ALARA	As Low As Reasonably Achievable
AOV	Air Operated Valve
ASME	American Society of Mechanical Engineers
ATWS	Anticipated Transient Without Scram
DCP	Design Change Package
DR	Deficiency Report
EDG	Emergency Diesel Generator
EWR	Engineering Work Request
FC	Field Change
FSAR	Final Safety Analysis Report
IFI	Inspector Followup Item
INPO	Institute of Nuclear Power Operations
KV	Kilovolts
LOOP	Loss Of Offsite Power
LP	Low Pressure
MOV	Motor Operated Valve
NRC	Nuclear Regulatory Commission
ORR	Operational Readiness Review
psi	Pounds Per Square Inch
psig	Pounds Per Square Inch Gauge
QA	Quality Assurance
REA	Request for Engineering Assistance
RH	Residual Heat
RHR	Residual Heat Removal System
RSHX	Recirculation Spray Heat Exchanger
RWST	Refueling Water Storage Tank
SW	Service Water
TS	Technical Specification