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

Report Nos.: 50-280/89-39 and 50-281/89-39

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

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

Facility Name: Surry 1 and 2

Inspection Conducted: December 11-15, 1989

Inspector: C. Smith, Team Leader — Date Signed: 1/4/90

Team Members: R. Moore
S. Ninh
M. Thomas

Accompanying Personnel: F. Jape December 14-15, 1989

Approved by: F. Jape, Section Chief — Date Signed: 1/4/90
Quality Performance Section
Operations Branch
Division of Reactor Safety

SUMMARY

Scope:

This routine, unannounced inspection was conducted in the areas of design control, engineering support functions, and inspection of quality verification functions.

Results:

In the areas inspected, violations or deviations were not identified. A restructuring of corporate and station engineering resources occurred in 1989. The restructure has enhanced the nuclear design control program and the onsite engineering support capability. The system engineering program has been adequately implemented although a formal system trending methodology has not been developed. Improvement was identified in performance of 10 CFR 50.59 safety evaluations. Weaknesses identified in the previous SALP report related to the Engineering Work Request program have been aggressively pursued. A component failure cause analysis and trending program, addressed as a weakness in the previous SALP report, has not been effectively implemented. Program implementation is scheduled for January, 1990. The Station Deviation Report Program (deficiency reporting program), administratively controlled by engineering, was adequately maintained. Temporary modifications were adequately processed and controlled although minor programatic deficiencies were identified.

The capability of the licensee quality organization to identify problems in safety related activities has improved. This observation was based on improved quality of audits and development of a dedicated group to survey quality related activities.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*W. Benthall, Licensing Supervisor
*R. Bilyeu, Licensing Engineer
R. Calder, Manager - Nuclear Engineering
*P. DeTine, Supervisor, QA Performance
*E. Grecheck, Assistant Station Manager
*R. Green, Systems Engineering Supervisor
*D. Hart, Supervisor, QA Audit
*R. McManus, Supervisor, Engineering
*E. Smith, Jr., Manager, QA
*T. Sowers, Superintendent, Engineering
*B. Stanley, Systems Engineering Supervisor
*G. Thompson, Supervisor, Maintenance Engineering

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

Other Organizations

Stone and Webster Engineering Corporation
J. Hendricks, Field Support Engineer
P. Liakos, Head of SWEC Design Engineering
A. Plarry, Electrical Engineer

NRC Resident Inspectors

*W. Holland, Senior Resident Inspector
*J. York, Resident Inspector

*Attended exit interview

2.0. Design Control Program (37700)

NDCM No. 1.1, Design Organization, Revision 4, defines the organization responsible for establishment and execution of an effective nuclear design control program and describes the lines of authority and interfaces among the various sections involved. Power Engineering Services is the designated design authority for Surry Nuclear Station in accordance with the requirements of Virginia Power Nuclear Policy statement, Engineering, dated July 3, 1989. Organizational responsibilities, levels of authority, and lines of internal and external interfaces are specified in this and other lower-tier quality implementing procedures.

The inspectors determined that Power Engineering Services was reorganized on January 1, 1989 and April 1, 1989. This reorganization resulted in the formation of the following groups:

Superintendent of Engineering
Station Engineering Services
Supervisor Design
Supervisor Configuration Management
Supervisor System Engineering
Supervisor Advisory Operations

Engineering Technical Bulletin No. 89-04, dated March 1, 1989, provided a summary of the changes made to the NDCMs caused by the above reorganization; described the responsibilities of the new groups; and established interim procedural guidelines to be used pending completion of specific procedural changes. Engineering Technical Bulletin No. N-11, dated July 31, 1989, provided a second update of the Nuclear Design Control Program. Attachments 1, 2, and 3, contained a listing of those NDCMs and other lower-tier quality implementing procedures that were revised pursuant to the reorganizations of January and April 1989. The inspectors requested information concerning compensatory measures established by the licensee to facilitate engineering technical support activiities pending revision to the procedures. The inspectors were informed that no compensatory measures were required for activities performed under the ANSI N45.2-11, 1974 program. Based on review of selected NDCMS for specific design-engineering activities the inspectors concurred with the licensee's statement.

Another reorganization of Power Engineering Services occurred on November 1, 1989. This most recent restructuring of the organization is intended to provide services related only to nuclear engineering activities. The name of the group has also been changed to Nuclear Engineering Services. The Nuclear Engineering department has been Provided with additional personnel resources. This staff increase has provided the capability to strengthen onsite engineering technical support via (1) On enlarged System Engineering staff and (2) Design Engineers located onsite who provide immediate support to the Nuclear Operations staff. The reorganization of November 1, 1989, resulted in the following sections which are part of the Site Engineering Office headed by a Superintendent and an Assistant Supt. (Design):

Supervisor Mechanical Engineer
Supervisor Electrical Engineer
Lead Engineer (Civil)
Supervisor Engineering Design
Supervisor Testing
Supervisor System Engineering #1
Supervisor System Engineering #2

The inspectors conducted interviews with licensee management to ascertain the impact of the above reorganization on the nuclear design control program documents. Licensee management has prepared and issued to the

staff a document, "Jurisdiction Statements for Station Engineering" dated November 27, 1989. This document describes the responsibilities of the various sections within the Site Engineering organization.

The inspectors were informed that a procedure containing information described in the jurisdictional statement would be developed and issued by January 15, 1990. Additional required revisions to the nuclear design control program documents have been identified by licensee management as the first of Nuclear Engineering's top ten objectives.

Continued enhancements to the nuclear design control program have resulted in the restructuring of Power Engineering Services and necessitated revision to the program documents. Performance of design-engineering activities were adequately controlled, however, in that the lower-tier quality implementing procedures have not been greatly impacted. These program enhancements when completed should achieve the objectives of the Engineering Quality Plan addressed in R. W. Calder's memorandum to Nuclear Engineering employees dated October 23, 1989.

Within this area no violations or deviations were identified.

3.0 10 CFR 50.59 Safety Evaluations. (37700)

Procedure Number SUADM-LR-12, Safety Analysis 10 CFR 50.59/72.48 Safety Evaluations and Justification for Continued Operation, dated October 10, 1989, provides guidance for determining when a 10 CFR 50.59 Safety Evaluation is required. Attachment 4 specifies screening criteria to be used in determining if a 10 CFR 50.59 evaluation should be performed. Attachment 1 provides detailed guidance for preparation of the 10 CFR 50.59 Safety Evaluation. Provisions have been made to ensure that items within the purview of the Design Authority are approved by engineering personnel.

Paragraph 6.0 of the referenced procedure specifies qualification and training requirements for personnel who prepare, review, or approve 10 CFR 50.59 Safety Evaluations. The minimum qualification and training requirements are as follows:

Initial Qualifications

B.S. Degree in Engineering or science from an accredited four year college, or:

(a) six (6) years of applied engineering at (or for) a nuclear facility in the area for which qualification is sought, or

(b) six (6) years of operational or technical experience/training related to nuclear power.

None of the experience counted toward meeting the four year degree requirement can be counted toward the years-of-experience requirement.

Years-of-Experience

Two (2) years of nuclear experience in engineering and/or operations.

Systems Training

A one (1) or two (2) week course on plant systems given at either station. Any one of the following is deemed to meet and exceed this requirements:

(a) Operator Training
(b) Senior Reactor Operator Training
(c) Shift Technical Advisor Training
(d) Basic Technical Staff Training

Requirements for introductory training on 10 CFR 50.59 safety evaluations and annual retraining have also been established. Responsibilities have been assigned to the Superintendent, Nuclear Training for conducting and documenting training/re-training in accordance with paragraph 6.0. Additonally, he is required to provide the Assistant Station Manager, Nuclear Safety and Licensing, with a list of individuals who have been trained in accordance with the requirements of paragraph 6.0.

The inspectors performed independent reviews of 10 CFR 50.59 evaluations completed for selected DCP/EWRs that covered a time span from 1986 to 1989. The results of this review showed an improvement in the technical adequacy of the 50.59 evaluations completed since implementation of the 50.59 training program.

Within this area no violation or deviations were noted.

4. Onsite Engineering Support (37700)

In the previous year, the licensee has reorganized corporate (offsite) and station (onsite) engineering resources to improve the quality of plant engineering support. This inspection reviewed the staffing levels of the onsite engineering resources generally, and more specifically, the status and function of the system engineering organization and licensee actions to address engineering support weaknesses indicated in the previous Systematic Assessment of Licensee (SALP) report. The onsite engineering resources are provided by a large Engineering Services organization and several smaller engineering groups (staff of 10 to 15 each) specifically assigned to operations, licensing, and maintenance activities. For example, Safety Engineering Nuclear included Shift Technical Advisors and other engineers for direct operations support. Licensing engineers were responsible for reportability issues and NRC interfaces. Maintenance engineers generally support daily maintenance activities. The Engineering Services organization staff size was approximately 90 engineers. This organization was subdivided into system engineers (approximately 30), program engineers i.e. ISI/NDE (13) and Testing (10) and the onsite design engineering contingent from corporate (20). A procurement engineering

group (6) was being implemented but was not yet functioning during this inspection. The total onsite engineering resource was approximately 120 personnel which included a small percentage of contractor personnel. This reorganization resulted in an increase in onsite engineering staff size and an increase in the number of supervisors within the organization which increased management involvment in engineering line activities. Although all onsite engineering groups were not fully functional in their designated responsibilities the reorganization represented a substantial improvement in the onsite capacity for engineering support.

The system Engineer (SE) group was reviewed to assess the status of the functional group and their involvment in plant activities. The SE group was established in January 1989, utilizing guidance for activities from the applicable INPO Good Practice document, TS-413. Initial SE duties at that time were primarily performance of plant walkdowns of Emergency Operating Procedure (EOP) systems to support Unit 1 and 2 restart. SE program changes implemented in July 1989, included adding a supervisor, increasing staff, and issuing a procedure to document SE responsibilities and duties. A jurisdictional statement for the Engineering Services organization issued in this time frame provided an adequate designation of SE interfaces. The overall experience level of the SE group was good, encompassing a range of industry experience as startup engineers, contract engineers, and Surry Architect Engineers. The training provided was generally adequate for the scope of SE functions.

During review of SE activities it was noted that some areas of performance required further development, in particular documentation of engineering evaluations and system trending. A SE evaluation regarding a periodic test for an instrument air valve stroke limit deficiency was not documented. This evaluation was the basis for voiding a work order (WO #89-299) to adjust the valve stroke as corrective action for the failed periodic test. Following discussion with the SE on this issue it was apparrent that the determination to accept the valve stroke was reasonable. The lack of documentation to support this evaluation indicates a potential SE program weakness regarding documentation of engineering evaluations. It was not clear what level of engineering evaluations require documentation or how such documentation was to be accomplished.

In particular, evaluations which accept system or component performance outside the specified criteria should require documentation. Discussions with SE staff indicated that system performance trending was accomplished in varying degrees of effectiveness. No specific guidance on system trending was implemented which would assure consistent performance of this function. Trended parameters are determined by the individual SE. Not all SEs had developed trending mechanisms for their assigned systems however the SEs interviewed were knowledgable of available resources for trending information such as surveillance testing, NPRDS, and maintenance.

Although the SE program had not fully matured, examples were available which demonstrated that SEs were involved in plant activity. This involvment contributed to improvement in system performance, identification

of system component deficiencies, and enhancements in periodic test activity. For example, a new periodic test and post maintenance operability test procedure was developed for the Emergency Diesel Generator, operating procedures for the battery chargers were revised to increase charger lifetime, pressurizer heaters efficiency was improved, and the Containment and Recirculation spray system instrumentation was improved to provide greater indication accuracy.

The SE program was adequately implemented to accomplish the majority of its designated functions. These functions, as indicated by the applicable procedures, were primarily to monitor systems performance and support other related engineering activities as required. Large program responsibilities, i.e. ISI, NDE, EWR, Testing, MOVATS, etc., were alocated to other onsite engineering groups permitting SE focus on system performance.

Duties and interfaces were adequatedly documented, staff alocation levels were adequate for the specified duties, staff experience and training were generally appropriate for designated responsibilities. Based on the interview of selected SEs, the SEs were knowledgable of their systems and well motivated. The SE group has demonstrated involvment in plant activities.

The Engineering Work Request (EWR) program was reviewed to assess the licensee response to identifed weaknesses in this area in the previous SALP report. The indicated weaknesses were associated with the processing of EWRs and the documentation of technical reviews. The licensee has initiated corrective actions for these weaknesses and was aggressively addressing the backlog of open EWRs. The elapsed time since the intiation of these corrective actions was inadequate to accuratedly assess the effectiveness, however the scope of the actions demonstrated the licensee's responsiveness to NRC initiatives and recognition of program deficiencies. The EWR procedure, SUADM-ENG-01 was revised to assure appropriate technical reviews were completed prior to EWR closeout and return of the system or component to operable status. An additional program change was the establishment of a 90 day time limit for administrative closeout of an EWR following completion of the EWR specified activity, i.e. evaluation or modification completion. These program changes directly address the deficiencies of incomplete technical reviews and EWR closeout without documentation. The latter deficiency was related to the closeout of backlogged EWR as part of the restart effort. Some of these EWRs were completed but were not administratively closed for an extended time period resulting in difficulty in retrieving documentation.

Subsequently, EWR closures during the restart effort were, in some cases, based on engineering judgment rather than full documentation. The 90 day closure time limit addressed this performance deficiency by requiring closure while the applicable documentation and cognizant personnel are available. The procedure for 10 CFR 50.59 safety evaluations was revised to provide more detail in the check list identifying potential system impact of specific changes.

A broad sample review of EWRs which would identify the effectiveness of the above program changes was not accomplished during this inspection however, some EWRs reviewed provided an observation regarding the range of performance by differing onsite engineers. A modification EWR (#89-299) associated with component cooling water supports provided a detailed and thorough 10 CFR 50.59 safety evaluation and good documentation of modification installation and functional test activity. An EWR (#89-488) which addressed a charging pump services water pump operability contained inaccurate information and changed the operable performance range of the pump without sufficient documented basis. The resulting change was in a conservative direction therefore no safety significance was apparent in this case however the inaccuracies in this evaluation indicated an inattention to detail associated with the technical content of the evaluation. These examples provided no basis to assess the current overall acceptability of the EWR program performance. However they do illustrate the range of quality (good and marginal) achieved by different individuals utilizing the same program guidelines.

A review of the EWR backlog indicated that the licensee has been agressive in addressing the existing backlog. The actual numerical backlog has not substantially decreased over the last year however there has been an increase in the volume of EWRs generated and processed in 1989, in part due to deficiencies identified during the restart efforts. Additionally, the focus of resources on restart issues resulted in an increased backlog of nonessential EWRs. Review of the EWR process indicated that a potential safety related concern would have been identified by an initial engineering screening when the EWR was submitted. This screening identifies potential operability concerns and establishes an initial priority. The EWR program at Surry is not a problem identification mechanism which provided additional assurance that no unidentified safety problems were contained in the EWR backlog. Efforts to eliminate the EWR backlog included periodic reviews by a management committee to evaluate the need of backlogged EWRs and the dedication of eight engineers in December 1989, to process the existing backlog.

In conclusion, the licensee has agressively addressed engineering support weaknesses related to the EWR program. Corrective actions included program changes, management focus, and alocation of resources. The effectiveness of this actions will be assessed in future inspections which interface the EWR program. Review of the EWR process controls at this time provided no indication of unidentified safety concerns within the existing EWR backlog.

Corrective actions to address a technical support weakness associated with component failure cause analysis and trending addressed in the previous SALP report have not been effectively implemented. This weakness had been previously identified by the NRC and the licensee. A self initiated corrective action implemented in December 1988, was not effective. This corrective action was to issue procedure guidance, SUADM-ENG-10, and assign responsibility for this activity to the System Engineering group. The failure to adequately resolve this deficiency was

identified by the licensee. Present corrective action was in process during this inspection. The corporate organization developed a root cause evaluation training program in November 1989. Training for the plant technical staff was being conducted during this inspection time frame. The responsibility for component failure cause analysis and trending was reassigned to Maintenance Engineering. Maintenance Engineering was developing a draft procedure, SUADM-M-48, and anticipated implementing the failure analysis and trending program in January 1990. This program will be reviewed in future inspection activity.

5. Station Deviation Reports (SDR)

The inspector reviewed the Licensee' SDR program and backlog status in an effort to assess how the engineering staff responds to concerns/problems identified in the plant. A SDR is used to notify management of the need to correct a problem or potential problem which include changes to a component, structure, system or drawing. Any plant staff member can initiate a SDR and the shift supervisor is responsible for the review of SDRs, and to determine the safety implications and notifications.

The shift technical advisor is responsible for reviewing the shift supervisor's determinations and screening SDRs to identify unanalyzed plant conditions. The Safety Engineering Nuclear (SEN) group reviews SDRs for reportability and safety significance and identifies concerns that should be addressed in the disposition of SDRS. SEN has primary responsibility for assuring that SDRs are investigated, processed, and resolved in accordance with the applicable plant procedure, SUADM-O-12, Operations Department Notifications, dated October 12, 1989. The licensee currently uses a deviation report flowchart and threshold screen criteria to enhance the processing of SDRs. However, this process was not accurately described in the above procedure. The licensee has acknowledged the discrepancy in the procedure. The inspector was informed that the procedure will be revised to correct the discrepancy and will be implemented in January 1990.

A review of SDR backlog status revealed that approximatly by 3715 SDRs for both units were generated during the period of January 1 through December 12, 1989, and 1152 were still outstanding. Of the 3715 SDRs, 1427 SDRs were assigned to the engineering staff for resolution and 273 SDRs are still outstanding.

Overall, SDRs generally appeared to be properly maintained, processed and resolved in a timely and systematic manner.

6. Temporary Modifications (TM)

Review of the control room TMs log books indicated that as of December 11, 1989, there were approximately 43 active TMs for both units. Of 43 TMs, 15 TMs were older than one year. The inspector determined that

there was an apparent weakness in strict procedure compliance. Procedure SUADM-O-11, Function Bypass and Temporary Modification Control, dated May 31, 1989, stated that an EWR should be submitted and attached to the appropriate TM log sheet for a TM that is intended to remain in use or has been installed more than three months. There were approximately 16 TMs older than three months which did not have an EWR or appropriate EWR attached in the temporary log sheet. This problem was previously identified by the licensee and documented as a QA audit finding, #89-08-02, issued in November 1989. Other concerns were identified with the TM program implementation related to bypassing permanent modification control. TMs are not intended to fulfill the function of permanent modifications. The concerns include: (1) the program did not address how long a TM was to remain active and there was no requirement for management approval to extend active TMs beyond their estimated date and (2) the program did not ensure controlled copies of the control room drawings to reflect installed TMs, especially, safety-related TMs more than one year old.

Six TMs were selected for detail review to determine the effectiveness of the licensee's process control and documentation of TMs. The following six TMs were reviewed:

TM#	DESCRIPTION
S1-88-11959	#1 & #2 EDG Air Intake Lowers
S1-89-12	Spent Resin Transfer System Temporary Liner
S1-89-16	Temporary Liquid Waste Ion Exchanger
S1-89-165	Hose FP Air Compressor To Upstream 1-VS-329
S2-89-126	HCV-CC-202A Blocked Open
S2-89-147	Open Contact on 2R-RC-MOV-2595

Overall, the licensee' TM process control and documentation was generally completed as per plant procedure. It was noted that the control room TMs log books are periodically reviewed by system engineer and SNSOC.

7. Inspection of Quality Assurance and Quality Verification Activities (35702)

The previous SALP indicated a weakness in the capability of the licensee's quality organization to identify problems in safety related activities. Review of the audits listed below indicates an improvement in the quality of audits performed by the quality organization. A QA Performance Group began functioning in February 1989, to provide additional capability to identify problems in performance of safety related activities.

The inspectors reviewed selected QA audits of various site activities. Audit findings and the responses to the findings were also reviewed. The inspectors reviewed the following completed audit reports:

S88-15	Design Control
S89-08	Operations Administration
S89-09	Inservice Inspection
S89-16	Records and Procedures

In addition to reviewing the above audits, the inspectors also reviewed audit S89-23, Design Control, which was still in progress at the conclusion of this inspection. QA personnel stated that audit S89-23 was initiated by the QA department because of the reorganization of the site engineering organization which occurred in January 1989. Through review of the audit reports and discussions with site QA personnel, the inspectors made the following observations.

The audits reviewed by the inspectors were considered to be thorough, in-depth, and effective in identifying problem areas. The QA audit group is incorporating performance based activities into QA audits. The inspectors noted that the audit reports provided more detail and information on areas audited and findings identified, as compared to audit reports from previous years. Corrective action verification had been a weak performance area for the quality organization. Responses to audit findings were being reviewed more closely for corrective action adequacy and timeliness.

The inspectors noted a significant increase in escalated actions by QA for inadequate corrective actions and responses to audit findings. The inspectors noted some audit findings where acceptable responses had been received but the findings still remained open. QA personnel stated that audit findings are remaining open after receiving acceptable responses because QA personnel were verifying the effectiveness of the corrective actions following implementation.

The inspectors noted that the QA audit schedule for 1990 did not show an increase in QA audit activities, even though the SALP indicated there was a weakness in the quality organization's capability to identify problems in safety related activities. The audit schedule met minimal TS requirements. QA personnel stated that the QA Performance Group is being used to supplement the activities of the QA Audit Group by doing performance based observations of activities above and beyond the regulatory requirements. Corporate QA management recognized a need for the QA Performance Group and the group's use in providing additional capability to identify problems. The QA Audit Group will primarily be used to perform audits of the regulatory required activities. One of the functions of the QA Performance Group is to perform QA performance based observations for the QA Manager and Station Manager, or as requested by other station management through the site QA Manager. Performance Methodologies that will provide guidance to Performance Group personnel for observation activities are being developed under the guidance of the Corporate QA Manager.

The Performance Group issued monthly reports to document the results its observations. The inspectors reviewed the following QA Performance observation reports:

April 1989	Operations
May 19, 1989	Maintenance
November 16, 1989	Maintenance
December 5, 1989	Operations

The observation reports reviewed were thorough and contained considerable detail on the activities observed.

Based on the audit reports and observation reports reviewed, the inspectors determined that the licensee's quality verification activities are continuing to show improvement.

No violations or deviations were identified in the areas inspected.

8. Exit Interview

The inspection scope and results were summarized on December 15, 1989, with those persons indicated in paragraph 1. The inspectors described the areas inspected and discussed in detail the inspection results. Proprietary information is not contained in this report. Dissenting comments were not received from the licensee.

9. Acronyms and Initialisms

ANSI-	American Nuclear Standards Institute
DCP-	Design Change Package
EWR-	Engineering WOrk Request
NDCM-	Nuclear Design Control Manual
SALP-	Systematic Assessment of Licensee Performance
SDR-	Station Deviation Report
SE-	System Engineer
SNSOC-	Station Nuclear Safety and Operating Committee
TM-	Temporary Modification
TS-	Technical Specification
QA-	Quality Assurance