VIRGINIA ELECTRIC AND POWER COMPANY

RICHMOND, VIRGINIA 23261

July 14, 1989

Director, Office of Enforcement
United States Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D. C. 20555

Serial No. 89-390A
NO/ETS R8
Docket Nos. 50-280
50-281
License Nos. DPR-32
DPR-37

Gentlemen:

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION UNITS 1 AND 2
REPLY TO NOTICE OF VIOLATIONS

We have reviewed your letter of May 18,1989 in reference to the NRC inspections conducted from September 1988 to March 1,1989, and reported in Inspection Report Nos. 50-280/ 88-32 and 50-281/88-32, 50-280/88-34 and 50-281/88-34, 50-280/88-41 ans 50-281/88-41, 50-280/88-45 and 50-281/88-45, 50-280/88-51 and 50-281/88-51,and 50-280/89-06 and 50-281/89-06. Our initial response was provided by letter Serial No. 89-390 dated June 14, 1989. Our detailed response to the Notice of Violations described in Enclosure 1 to your letter is provided in Attachment 1.

As discussed at the January 26, 1989, Enforcement Conference, several management initiatives have been undertaken to enhance safe operation and address underlying reasons for the above violations. Management has now taken an aggressive posture to resolve outstanding plant operational and design issues as evidenced by the corrective actions identified and undertaken by the Company during the most recent outages. Management is emphasizing to employees the need to increase sensitivity in assessing operational and design events and to lower the threshold for reporting deviations. Operational events and design issues are being more thoroughly reviewed to determine the root cause, safety impact, and to develop effective corrective actions.

Several organizational changes have been completed, including the addition of senior management personnel with industry experience outside our Company. To provide additional overview of nuclear related activities, a Nuclear Overview Board comprised of nuclear executives from other utilities and specialized consultants has been established. Engineering functions at the site have been consolidated under a separate superintendent. These actions have strengthened the engineering department and are providing increased control of plant design and modifications. Other organizational changes include increased staff for safety and licensing. In addition, the corporate independent review staff and operational event review staff is being increased to provide a more thorough and timely review of operational and design issues.

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A long term Configuration Management Program is being implemented to provide better documentation and verification of the plant design basis and to better control existing plant design, operating, and maintenance documents (i.e., drawings, instructions, and procedures).

An operational readiness program has been completed on Unit 1 that included safety system walkdowns and evaluations; emergency bus and safety equipment power supply testing; review of open documentation (i.e., deviations, engineering studies and work requests, technical reviews, and commitment tracking); and additional functional testing of safety systems. Key elements of this program are also being implemented for Unit 2. These efforts have achieved increased confidence in the operational capability of the units.

Increased management involvement in plant operations is further evidenced by the establishment of a formal review (Self Assessment) of plant conditions and disposition of open items prior to initiating restart activities.

We believe that the initiatives discussed above in conjunction with the results obtained to date demonstrate our commitment to achieve safe and reliable operations.

We have no objection to this report being made a matter of public disclosure.

If you have any questions, please contact us.

Very truly yours,

W. L. Stewart
Senior Vice President - Power

Attachment
1. Response to Notice of Violation and Proposed Civil Penalty

cc: Regional Administrator
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street, N. W.
Suite 2900
Atlanta, Georgia 30323

Mr. W. E. Holland
NRC Senior Resident Inspector
Surry Power Station

ATTACHMENT 1

Response to Notice of Violation

and Proposed Civil Penalty

I. Cavity Seal Failure

A.1. 10 CFR 50.59, Changes, Tests and Experiments, allows a licensee to make a change to the facility as described in the safety analysis report without prior Commission approval, unless the proposed change involves a change in the Technical Specifications or an unreviewed safety question. A change is deemed to involve an unreviewed safety question, in part, if the probability of occurrence or the consequences of an accident or malfunction of equipment important to safety previously evaluated in the safety analysis report may be increased. Further, the licensee must maintain records that include a written safety evaluation which provides the bases for the determination that the changes does not involve an unreviewed safety question. Where an unreviewed safety question is involved, the licensee shall submit an application for amendment of his license.

Surry Power Station (SPS) UFSAR Section 9.12.3.1, Refueling Cavities, states that the reactor vessel flange is sealed to the bottom of the refueling cavity by an inflatable pneumatic seal ring that prevents leakage of refueling water from the cavity. Should the seal deflate, its passive sealing design will preclude failure and leakage.

Contrary to the above, operation of the facility until September 3, 1988 without an adequate passive sealing design that would preclude failure and leakage should the seal deflate, constitutes a change to the facility as described in the FSAR. No written safety evaluation was performed to provide the bases for this change in the refueling cavity seal design. This change represents an unreviewed safety question in that the probability of occurrence of a refueling cavity seal failure previously evaluated in the safety analysis report was increased as were the consequences of such an event in that rapid draining of the refueling cavity could expose irradiated fuel assemblies, resulting in a radioactive release greater than that assumed in the FSAR.

I A1 Response

I. Cavity Seal Failure

1. Admission Or Denial Of The Alleged Violation

This violation is correct as stated.

2. The Reason For The Violation

The design of the reactor cavity seal was not clearly understood. The review of the seal design in response to IEB 84-03 was inadequate in that it did not recognize the possible failure mechanism of the reactor cavity seal. In addition, design requirements were not incorporated into maintenance procedures and operating procedures for installation and testing of the reactor cavity seal.

3. Corrective Actions Taken And The Result Achieved

Upon recognition of this problem, utilization of the reactor cavity seals was halted until the design was adequately reviewed and modified to ensure adequate passive sealing. Post installation testing requirements with a leakage rate acceptance criteria were established. The testing requirements included a demonstration of passive sealing capability under loss of instrument air conditions. Operations personnel were trained on the modified seal design and on actions to be taken in the event of a loss of cavity level event. The modified seals were tested and subsequently used in refueling activities. In addition, a revised response to IEB 84-03 was submitted to the NRC on January 9, 1989 documenting the new seal design and post-installation testing requirements.

4. Corrective Action Which Will Be Taken to Avoid Further Violations

In the future, post-installation testing of the current reactor cavity seal will include a verification of passive sealing capability. In addition, an Engineering study is underway to evaluate further enhancements of the reactor cavity seal design.

5. Date When Full Compliance Will Be Achieved

Full compliance has been achieved.

I. Cavity Seal Failure

A.2 10 CFR Part 50, Appendix B, Criterion XVI, Corrective Action, requires that measures be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected. In the case of significant conditions adverse to quality, the measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition. The identification of the significant condition adverse to quality, the cause of the condition, and the corrective action taken shall be documented and reported to appropriate levels of management.

Contrary to the above, notwithstanding the Unit 1 seal failure draining about 30,000 gallons of water from the refueling cavity which occurred on May 17, 1988, the deficiency in design was not identified and corrected because an inadequate evaluation was performed. The true nature of the seal failure was not determined (slow leak rather than sudden failure).

The two violations have been classified in the aggregate as a Severity Level III problem (Supplement I).

Cumulative Civil Penalty - $100,000 (assessed equally between the violations).

I A2 Response

I. Cavity Seal Failure

1. Admission Or Denial Of The Alleged Violation

The violation is correct as stated.

2. The Reason For The Violation

Operations and technical personnel were trained to expect "some" leakage from the reactor cavity seal when the pneumatic seal deflated. Furthermore, manipulations of instrument air to the inflatable seal had occurred over an extended period of time further reinforcing the initial conclusion (which was erroneous) that leakage had occurred slowly over that period. Therefore, when the event was formally reviewed, the leakage rate was not adequately evaluated since management direction focused the event review on human performance, (i.e., manipulation of the Instrument Air and Nitrogen backup systems) rather than the adequacy of the seal design.

3. Corrective Action Taken And The Results Achieved

Meetings were held with station personnel to discuss the significance of the issue and the need to thoroughly evaluate operational and design events. The threshold for problem reporting was lowered significantly, including a daily management review of potential safety problems. Station deviations are now routinely being evaluated by a multi-disciplinary review group. The existing operational event review staffs have been augmented to provide more immediate review of operational events and potential problems. In addition, multi-disciplinary teams are assigned by management, as necessary, to perform significant event reviews.

4. Corrective Action Which Will Be Taken To Avoid Further Violations

Continued implementation of daily management evaluations of potential safety issues in conjunction with routine and special multi-discipline reviews of deviations and significant events will serve to avoid future violations.

5. Date When Full Compliance Will Be Achieved

Full compliance has been achieved.

I. Cavity Seal Failure

B. 10 CFR Part 50, Appendix B, Criterion V, Instructions, Procedures, and Drawings, requires that activities affecting quality shall be prescribed by documented instructions, procedures or drawings of a type appropriate to the circumstances.

Contrary to the above, the licensee failed to adhere to Criterion V as evidenced by the following examples:

1. After completion of the reactor cavity seal modifications for Units 1 and 2 on April 4, 1985 until the September 1-3, 1988 AIT inspection, the licensee failed to establish instructions, procedures and drawings to assure proper operation of the inflatable seal portion of the instrument air system and backup nitrogen bottle pressurization system.

2. From April, 1987 until September 3, 1988, abnormal operating procedures did not provide adequate instructions for a rapid loss of refueling canal level as many of the necessary actions developed in response to IE Bulletin 84-03, Refueling Cavity Water Leak, were deleted during procedure revisions.

3. On May 17 and 18, 1988, in order to recover refueling cavity level, operators opened the fuel transfer tube isolation valve resulting in lowering the spent fuel pool water level without the use of written procedures.

This is a Severity Level III violation (Supplement I).

Civil Penalty - $100,000

I B Response

I. Cavity Seal Failure

1. Admission Or Denial Of The Alleged Violation

The violation is correct as stated.

2. The Reason For The Violation

Procedures and documentation for the manipulation of valves of the instrument air and backup nitrogen bottle systems used in operation of the inflatable seal were inadequate. Modification to the Instrument Air system, (i.e., installation of the backup Nitrogen system), was not completed in accordance with the station design control program and therefore, procedures and instructions were not developed.

Measures to ensure that regulatory commitments are not deleted from procedures without proper review or compensatory measures were not in place.

Abnormal operating procedures did not provide detailed instruction for the restoration of cavity water level, and hence operator actions in opening the fuel transfer tube isolation valve was not specified by written procedure. However, this action was taken consistent with operator training-based knowledge.

3. Corrective Action Taken And the Results Achieved

An operating procedure has been revised to provide specific instructions for operation of the cavity seal system, including the backup nitrogen bottles, valves and regulators and includes appropriate valve operating drawings. In addition, compliance with the requirements of the Nuclear Design Control Program has been emphasized with appropriate personnel regarding the timely closeout of modification packages and the need to revise drawings and develop procedures prior to the modified system being returned to service.

A checklist has been developed to provide instructions for periodic verification of cavity level, cavity seal drain status, and status of air to the inflatable seals. In addition, a method to remotely monitor cavity level has been provided to the control room operators.

The abnormal procedure for loss of cavity level has been revised to provide more explicit guidance regarding makeup sources, evacuation of containment and notifications to Health Physics. Further definition of potential radiological hazards from loss of cavity water level has been

developed and is included in health physics documentation for responding to a loss of cavity water level event.

Management held several meetings with station personnel to discuss the significance of procedural compliance.

4. Corrective Action Which Will Be Taken To Avoid Further Violations

As part of the procedures upgrade program, a procedures writer's guide was developed. This guide was modified to provide administrative controls to require the identification and source of future regulatory commitments in procedures.

Presently, General Employee Retraining stresses the need for strict procedural compliance. As an enhancement, other training programs will be evaluated to determine whether revisions are necessary to reinforce the need for procedural compliance.

5. Date When Full Compliance Will Be Achieved

Full compliance has been achieved.

II. Additional Corrective Action Violations

10 CFR Part 50, Appendix B, Criterion XVI, Corrective Action, requires that measures be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and non-conformances are promptly identified and corrected. In the case of significant conditions adverse to quality, the measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition. The identification of significant conditions adverse to quality, the cause of the condition, and the corrective action taken shall be documented and reported to appropriate levels of management.

A. Contrary to the above, on August 29, 1988, an engineering review of test data taken in response to Information Notice 88-91, Potential Gas Binding of High Pressure Safety Injection Pumps, determined that the operability of the High Head Safety Injection (HHSI) pumps during an emergency was not assured. This significant condition adverse to quality was not identified in a Station Deviation Report nor entered into the plant corrective action system. The lack of documentation resulted in the failure to notify appropriate levels of management. Consequently, Unit 1 continued to operate at power until September 14 and Unit 2 operated until September 10, 1988, in an unanalyzed condition.

This is a Severity Level III Violation (Supplement I).

Civil Penalty - $75,000

II A Response

II. Additional Corrective Action Violations

1. Admission Or Denial Of The Alleged Violation

The violation is correct as stated.

2. The Reason For The Violation

The reason for the violation was an inadequate level of sensitivity on the part of station personnel to the reporting requirements of the design deficiency identified with the suction lines to high head safety injection (HHSI) pumps.

3. Corrective Steps Taken And The Results Achieved

The responsible supervisor was counseled and disciplined for failure to initiate a station deviation report in a timely manner. In addition, station management has conducted meetings with station personnel to emphasize the Company's policy of prompt reporting of discrepant conditions, including a lower threshold for submitting station deviation reports.

The design deficiency identified with the potential for gas accumulation in the suction lines of the HHSI pumps has been resolved with the installation of system high point vents. Appropriate procedures have also been revised to periodically vent the suction lines to ensure proper operation of the pumps.

4. Corrective Steps Which Will Be Taken To Avoid Further Violations

As an enhancement, General Employee Training and Retraining is being modified to emphasize the importance to promptly report discrepant conditions and initiate station deviations in a timely manner.

5. Date When Full Compliance Will Be Achieved

Full compliance has been achieved.

II. Additional Corrective Action Violations

B. Contrary to the above, a Station Deviation Report was written on November 20, 1987 to identify the inadequate capacity of the Control Room Ventilation Chillers to meet the 90 ton capacity specified in UFSAR Section 9.13.3.6, Control Room Ventilation System. No safety evaluation of this condition adverse to quality was performed until April 11, 1988, at which time it was determined that Surry had been operated with this system outside its design basis.

C. Contrary to the above, from an undetermined date in 1986 to September 9, 1988, both trains of the Control Room and Emergency Switchgear Room Ventilation system were required to be run simultaneously to maintain acceptable room temperatures. This degraded condition is contrary to SPS UFSAR Section 9.13.3.6 which specifies that each train shall be independent and capable of maintaining acceptable Control Room and Emergency Switchgear Room Temperature. This condition adverse to quality was not documented on a Station Deviation Report until September 9, 1988.

These two violations have been categorized in the aggregate as a Severity Level III problem (Supplement I).

Cumulative Civil Penalty - $50,000 (assessed equally between Violations B and C).

II B & C Response

II. Additional Corrective Action Violations

1. Admission Or Denial Of The Alleged Violations

The violations are correct as stated.

2. The Reason For The Violations

The reason for the violations was the failure of station management to properly assess the Main Control Room (MCR) and Emergency Switchgear Room (ESGR) ventilation systems operating conditions with respect to the system design requirements. The inadequate capacity of the control room ventilation chillers was reviewed by SNSOC with respect to operability during review of the 1987 station deviation. However, this review by engineering and station management was not properly documented with a 10 CFR 50.59 safety evaluation. At the time of the deviation (winter), the assessment was that the system function would not be affected due to the low service water temperatures. Corrective action, in the form of chiller capacity upgrades, was scheduled to be completed prior to the onset of elevated service water temperatures.

The degraded condition of the Main Control Room and Emergency Switchgear Room ventilation system resulted from 1) an inadequate design control program for the assessment of the cumulative effect of incremental heat loads being added during employment of multiple A/E design organizations, 2) an inadequate preventative maintenance program to ensure reliable operation of the equipment, and 3) an inadequate surveillance test program to ensure that system equipment was operating within an acceptable performance envelope.

3. Corrective Steps Which Have Been Taken And The Results Achieved

Management sensitivity to discrepant station conditions has been increased to ensure a thorough review of operational and design issues is performed and documented. Also, the threshold for issuance of a station deviation has been lowered to assure discrepant conditions are properly documented and addressed in a timely manner.

The 10 CFR 50.59 evaluation of the inadequate chiller capacity was subsequently completed. Also, the three control room chillers were upgraded to achieve their 90 ton design capacity.

The degraded condition of the MCR and ESGR ventilation system has been addressed as noted in our previous letters to the NRC dated January 6, 1989 (Serial No. 88-689A) and March 20, 1989 (Serial No. 88-689E). Specifically, an interim technical specification change was

provided with a technical summary report that addressed the cause of the system degradation and our interim modification and operation of the MCR and ESGR air conditioning systems to ensure design basis temperatures are maintained. This interim specification was issued by the NRC on May 30, 1989.

4. Corrective Steps Which Will Be Taken To Avoid Further Violations

The system engineer's function has been expanded since 1987. It now provides more direct engineering support and review of system operations, modifications, and associated operational activities.

Deviations which identify discrepancies in Technical Specifications or the UFSAR require a documented 50.59 safety evaluation. The safety evaluation process (50.59) has also been enhanced and training provided for personnel who perform 50.59 reviews at the station. A corporate standard has been adopted for consistent application of 50.59 reviews.

To ensure long term capability of the MCR and ESGR ventilation system, new higher capacity chillers and air handlers will be installed that will return the MCR envelope air condition system to its original design of two 100% capacity redundant trains.

In addition, the present design control program will be enhanced to ensure that the cumulative effects of plant modifications are properly considered. The existing preventive maintenance and surveillance tests for the system are being upgraded to ensure system capacity is maintained.

5. Date When Full Compliance Will Be Achieved

The interim modifications, maintenance, and necessary surveillance testing for this system are complete.

The long term modification will be completed during the next refueling outage for Units 1 & 2.

II. Additional Corrective Action Violations

D. Contrary to the above, the licensee identified the use of non-qualified replacement parts for safety-related components as a condition adverse to quality in 1983 but failed to take adequate corrective action to remove those parts from its supply system until January, 1989. This resulted in use of non-qualified replacement parts on the two Unit 1 inside recirculation spray pumps during the 1988 refueling outage and the identification of non-qualified replacement parts installed on one of the Unit 1 low head safety injection pumps prior to August, 1988.

II D Response

II. Additional Corrective Action Violations

1. Admission Or Denial Of The Alleged Violation

The violation is correct as stated.

2. The Reasons For Violation

The concern with respect to non-original equipment manufacturer parts supplied by two vendors who had been removed from our approved vendors list was initially addressed in 1983. Determination of procurement orders which were affected was not complete. Although replica parts from these vendors were identified for removal from warehouse stock during this review, the parts were not subsequently verified as being removed from the warehouse.

3. Corrective Steps Which Have Been Taken And The Results Achieved

A task team was formed during the recent outages to determine affected purchase orders and review application of replica parts from these two vendors. An engineering evaluation was written and issued to document the review. Affected purchase orders were identified and remaining replica parts from these two vendors were purged from the warehouse.

Replica parts were identified and replaced on both Unit 1 Inside Recirculation Spray pumps (1-RS-P-1A/B) and the Unit 1 Low Head Safety Injection pump (1-SI-P-1A).

There is the potential based on the application review for at least one replica casing ring and two replica shaft sleeves to be installed in fuel pool cooling pump 1-FC-P-1B and replica shaft sleeves to be installed in component cooling water pump 1-CC-P-1B. These pumps have been evaluated and demonstrated operable. The potentially suspect parts will be inspected and replaced during the next scheduled pump overhaul after replacement parts are received.

No other applications of replica parts installed in safety related equipment were found.

4. Corrective Steps Which Will Be Taken To Avoid Further Violations

A Procurement Engineering group has been established to prevent problems of this nature. Interim procedures are in place to assure purchasing/stock information is updated in accordance with Nuclear Design Control Program Standards. Further enhancements to strengthen vendor assessment and procurement programs are presently under evaluation.

5. Date When Full Compliance Will Be Achieved

Full compliance has been achieved.

II. Additional Corrective Action Violations

E. Contrary to the above, the licensee failed to take adequate corrective action to prevent the recurrence of a significant condition adverse to quality. For an undetermined period of time up to and including November 17, 1988, during periods of heavy rain, water repeatedly leaked through improperly sealed Safeguards Building roof plugs, wetting safety-related electrical components, such as the auxiliary feedwater pump motors, rendering them inoperable. Corrective actions taken by the licensee were not effective in preventing recurrence.

II E Response

II. Additional Corrective Action Violations

1. Admission Or Denial Of The Alleged Violation

The violation is correct as stated with the exception of the statement that the AFW pump motors were rendered inoperable. The AFW pump motors are designed with a drip proof enclosure and were not rendered inoperable by the roof leakage as evidenced by subsequent electrical testing. However, appropriate repairs of the roof plug were not accomplished in a timely manner.

2. The Reasons For The Violation

Initial efforts to repair the cover were of a short-term nature and did not permanently resolve the problem. This violation is an example of a previous attitude of acceptance of less than desirable conditions for an extended period of time.

3. Corrective Steps Which Have Been Taken And The Results Achieved

The roof plug cover design was evaluated and the covers were repaired. A leakage test was successfully performed to verify that leakage past the covers has been eliminated.

Management sensitivity regarding prompt and effective corrective actions has been heightened as evidenced by the higher standards conveyed to and expected of station personnel. The improvements in standards and enhancements in overall plant material condition are further evidence of heightened sensitivity to prompt and effective corrective actions.

4. Corrective Steps Which Will Be Taken To Avoid Further Violations

Continued emphasis on higher standards and a sensitivity to prompt and effective corrective actions should preclude future violations in this area.

5. The Date When Full Compliance Will Be Achieved

Full compliance has been achieved.

II. Additional Corrective Action Violations

F. Contrary to the above, Quality Control (QC) inspection logs identified a number of deviations and non-conformances for Jobs 62913, 67316, 65335, DC 88-01 and DC 87-22 for which the cause of the deviations and corrective actions were not documented to assure proper resolution.

II F Response

II. Additional Corrective Action Violations

1. Admission Or Denial Of The Alleged Violation

The violation is correct as stated in that the QC inspection log did not document the cause of deviations and nonconformances for work orders or design changes. However, the QC log was not intended to provide such documentation. Rather, the log was only used for communicating inspection deviations and nonconformances by documenting the absence of QC inspection sign off at a given hold or verification point in the document used to control the work. The package close-out and technical review process was used to ensure such working documents were not closed without the required QC approval signatures. The cause of deviations and corrective actions were documented by changes to the associated work package or through the station deviation reporting process. It is important to note, that in each case identified by the NRC, the working document was retrieved and it was shown that the corrective action was completed prior to sign-off by the QC inspector.

2. The Reason For The Violation

This violation was identified because the method used to track Quality Control (QC) observed deviations and non-conformances did not provide an easily auditable or retrievable trail from the time a given deviation or non-conformance was observed until proper resolution was achieved.

3. Corrective Steps Which Have Been Taken And The Results Achieved

As an enhancement to the QC program, a controlled departmental standard is now used to track QC identified deviations and non-conformances and follow-up on proper resolution. This provides a readily auditable record of identification, cause, and resolution of QC identified deviations and nonconformances.

4. Corrective Steps Which Will Be Taken To Avoid Further Violations

No further corrective action is required.

5. The Date When Full Compliance Will Be Achieved

Full compliance has been achieved.

II. Additional Corrective Action Violations

G. Contrary to the above, the licensee failed to correct a condition adverse to quality identified in QA Audits S84-21, S86-09, and S88-21 from 1984 until 1988. This condition involved the failure to implement a portion of ANSI Std. N18.7-1976 committed to by the licensee for establishment of a component failure trending and root cause analysis program. The recurrent audit finding was closed each time without implementing an effective program to meet the ANSI standard commitment and correct the deficient program.

These four violations have been categorized in the aggregate as a Severity Level III problem (Supplement I).

Cumulative Civil Penalty - $50,000 (assessed equally among Violations D, E, F and G).

II G Response

II. Additional Corrective Action Violations

1. Admission Or Denial Of The Alleged Violation

The violation is correct as stated with the following clarification: This deficiency was identified by the NRC in Inspection Report number 50-280/88-11 and 50-281/88-11, in April 1988, as a weakness in the audit program. The audits mentioned in NRC IR 88-32 identified additional examples of the deficiency specified in NRC IR 88-11. As these additional examples occurred prior to the NRC IR 88-11 audit, they do not present a recurrence of the same weakness.

2. The Reason For Violation

The violation occurred due to a lack of attention to, and awareness of, the requirements for audit finding closure.

3. Corrective Steps Which Have Been Taken And The Results Achieved

Audit findings are being held open for an appropriate time after completion of the corrective actions for Quality Assurance personnel to assess the effectiveness of the corrective actions. Audit findings now require the signature of the appropriate Quality Assurance supervisor before the findings can be closed. Appropriate procedures are now in place to ensure closure only after effective actions are in place.

The station auditors have been made aware of the requirements for finding closures through group meetings and memorandums. Also, the local instruction, Quality Assurance Department Instruction Nuclear (QADIN), was revised to include guidance on the requirements for the closure of audit findings.

Reference has been made to NRC Inspection Reports 88-11 and 88-32 in QADIN 18 at the point where the requirement for audit finding closure is discussed. This will provide a continued emphasis that closing audit findings is not a routine process.

Training in root cause analyses techniques has been initiated for appropriate personnel. The routine multidiscipline review of station deviations and significant event multidiscipline review teams established by management utilize root cause analysis techniques in analyzing the causes and actions necessary to correct a deviating condition or event.

4. Corrective Steps Which Will Be Taken To Avoid Further Violations

No further corrective action is required in the area of audit finding closure. Close monitoring by Quality Assurance management will continue.

It has been determined that failures will be trended using the industry Nuclear Plant Reliability Data System (NPRDS). This will also allow comparisons to industry component failure data. Appropriate station administrative procedures will be revised to require periodic component failure analysis reports using NPRDS. These reports will identify component failure trends.

In reference to the root cause analysis program, refinements for effectiveness will be made as training continues. Following these refinements, station administrative procedures will be appropriately amended and the revised program implemented.

5. The Date When Full Compliance Was Achieved

Full compliance has been achieved with respect to QA audit finding closure.

Following review of how to implement the new root cause program approach, the station administrative procedures will be revised. The program will be fully implemented by December 31, 1989.

Appropriate station administrative procedures will be revised to require periodic component failure analysis reports using NPRDS. The station administrative procedures will be revised by December 31, 1989.

III. Design Control

10 CFR Part 50, Appendix B, Criterion III, Design Control, requires, in part, that measures be established to assure that applicable regulatory requirements and the design basis are correctly translated into specifications, drawings, procedures and instructions. These measures shall include provisions to assure that appropriate quality standards are specified and included in design documents and that deviations from such standards are controlled.

Contrary to the above, the licensee failed to meet Criterion III as evidenced by the following examples:

A. The licensee failed to correctly translate the design basis for operability of the new safety-related recirculation spray heat exchangers (RSHXs) into specifications. The design inputs for calculations ME-179, 180, and 187 dated September 9, 1988, and ME-166 dated October 10, 1988 performed to determine the level of the upper level intake canal (Surry ultimate heat sink) necessary to ensure operability of the RSHXs were inadequate in that they did not include:

- accuracy of canal level instrumentation
- accurate emergency service water pump flow data
- accurate pipe fouling effects
- loss of canal water inventory by siphoning effects through the circulating water lines
- accurate water loss rates through other operating loads.

B. The licensee failed to correctly translate the design basis for operability of emergency pump house equipment into specifications. The design inputs for calculation ME-139, dated September 23, 1988, did not include the effects of extreme temperature ranges on Emergency Service Water System diesels and batteries.

C. The licensee failed to assure that applicable regulatory requirements and the design basis were correctly translated into specifications. The design inputs for Calculation 14937.16-E-2, dated May 21, 1986, did not adequately include the effects of added loads on the 125 VDC Vital Bus battery sizing.

D. The licensee failed to assure that applicable regulatory requirements and the design basis were correctly translated into specifications in that Calculation ME-79, dated November 17, 1988, did not adequately include the effects of minimum wall thickness for Component Cooling Water Heat Exchanger 1-CC-E-1B.

This is a Severity Level III Violation (Supplement I).

Civil Penalty - $25,000

III A, B, C & D Response

III. Design Control

1. Admission Or Denial Of The Violation

The violations are correct as stated.

2. The Reason For The Violations

The primary reasons for the violations are:

a. Documentation of the original design basis for the station service water system was incomplete. Therefore, the design requirements of the service water system were not fully understood nor evaluated. In addition, elements of the original licensing design base as stated in the original FSAR were subsequently found to be erroneous.

b. Indepth procedural guidance and training on the requirements for review of design inputs was not provided.

3. Corrective Actions Taken And The Results Achieved

Two actions have been taken to address the above concerns from an overall configuration management perspective. The first action involved the initiation of a Design Basis Documentation Project. This project is scheduled to run through the end of 1995 and will result in the generation of a plant Design Basis Document (DBD) including approximately 80 system DBDs per station.

The second action involved the revision of the governing Nuclear Design Control Manual (NDCM) Procedure on calculations. The procedure was revised to enhance (1) the requirements for the review of design inputs and (2) the guidance concerning the identification of calculations as preliminary until appropriate design inputs have been confirmed, including regeneration of an input calculation to support design inputs where the original calculation is unavailable. In addition to this change, the verification process for design inputs will be further enhanced as discussed in Item 4 below.

The following actions have been taken to address the specific deficiencies identified by the NRC.

a. Calculations ME-179, 180, 187 and 166, have either been revised to reflect correct design input information or been superseded by more recent calculations which have utilized correct design input information.

b. Calculations ME-188 (dated 9/21/88) and ME-189 (dated 9/23/88) were provided to respond to SSFI questions to identify extreme temperature ranges for the ESW pumphouse since the original calculations were incomplete. The new calculations were not intended to address the subsequent concern relating to the operability of the ESW pumps for these new temperature extremes. Subsequent design and procedural modifications have been implemented to separately address the operability concern. (There is an apparent typographical error in the violation. ME-139 was not dated 9/23/88 nor does this calculation deal with ESW pumphouse temperature extremes.)

c. Calculation EE-0046, completed May 31, 1989, revised the 125 VDC Battery Loading Analysis. The calculation included the DC loads currently on the safety related batteries and assumed a worst case loading profile to evaluate the acceptability of battery size. The results of the calculation indicate that battery sizing is acceptable for worst case conditions.

d. Calculation ME-79, Revision 0, dated January 21, 1986, was performed to conservatively evaluate the service life remaining on the CCW heat exchanger channel head for 1-CC-E-1B. The calculation was specifically developed based on code minimum wall requirements and did not consider localized pitting which could occur prior to reaching minimum wall thickness. The CCW heat exchanger channel heads were replaced in 1987 as a result of engineering recommendations based on this calculation. Calculation ME-79 was revised on November 17, 1988, as a result of SSFI comments to clarify the intent of the calculation.

4. Corrective Actions That Will Be Taken To Avoid Further Violations

To ensure that design inputs used in calculations, etc. undergo a proper verification, the governing NDCM procedure for calculations will be revised to include an Attachment that will be filled out and included in every new or revised calculation. This attachment will ask the preparer a number of questions to ensure he has given proper consideration to the source and the validity of his design inputs. The preparer will be required to issue the calculation as "Preliminary - Requires Confirmation" until the questions can be answered satisfactorily.

Appropriate engineering personnel and A/Es supporting North Anna and Surry will receive training on the problems identified by the SSFI and on the procedural changes which were made to help prevent recurrence of the problems.

5. The Date When Full Compliance Will Be Achieved

The specific deficiencies identified in the violation have been resolved. With respect to completion of programmatic corrective activities, revision of the governing NDCM procedure for calculations will include an attachment on design input review guidelines. Training on the revised guidelines will be completed by December 31, 1989. The Design Basis Documentation Project is currently scheduled to be completed by the end of 1995.

IV. Technical Specification 3.14.A.4 requires that the reactor shall not be taken critical unless at least two Emergency Service Water (ESW) pumps are operable.

Technical Specification 3.14 Basis states that the long term ESW flow requirement for each pump is 15,000 gpm. The three ESW pumps must each have a capacity of 15,000 gpm to be considered operable.

Contrary to the above, as of September 29, 1988, the capacity of each of the three ESW pumps was determined either through observation or review of records to be approximately 12,000 gpm each, as measured by the Quarterly Performance Test (PT 25.3). Consequently, none of the ESW pumps were operable. This condition existed for an undetermined period of time, exceeding several years, during which the reactors were operated.

This is a Severity Level III Violation (Supplement I).

Civil Penalty - $100,000

IV Response

IV. 1. Admission Or Denial Of The Alleged Violation

The violation is correct as stated.

2. The Reasons For Violation

The ESW pump surveillance test acceptance criteria were erroneously based on the 12,000 GPM design base accident requirement for recirculation spray heat exchangers as specified in the UFSAR. This flow requirement is in contrast to the long term ESW pump flow requirement of 15,000 GPM for each pump as stated in the Technical Specification basis and the UFSAR.

3. Corrective Steps Which Have Been Taken And The Results Achieved

Annubar flow elements have been installed into each of the Emergency Service Water (ESW) pump discharge lines. Each of the ESW pumps has been refurbished by the original vendor. Special testing has demonstrated that each ESW pump is now capable of supplying greater than 15,000 GPM.

4. Corrective Steps Which Will Be Taken To Avoid Further Violations

The periodic tests which demonstrates operability of the ESW pumps have been revised to utilize the newly installed flow instrumentation to verify adequate flow of at least 15,000 GPM is developed in accordance with design requirements.

5. Date When Full Compliance Will Be Achieved

Full compliance has been achieved.

V. Other SSFI Violations

A. 10 CFR 50.55a(g)(4)(ii) requires that inservice testing to verify operational readiness of pumps and valves comply with the requirements of Section XI of the ASME Boiler and Pressure Vessel Code. The licensee is committed to the 1980 Edition, Winter Addendum.

Subsection IWV, Article IWV-3212, Exercising Procedures, and Article IWV-3413, Power Operated Valves of the Winter Addendum, requires that safety-related valves be exercised to the position required to fulfill their function and that stroke time be measured. Recirculation Spray Heat Exchanger Inlet Isolation valves 1-MOV-SW-104 A, B, C, and D, and Outlet Isolation valves 1-MOV-SW-105 A, B, C, and D are required to open to perform their safety function.

Contrary to the above, on July 7, 1988, the valves were not tested as required by Article IWV-3212 and Article IWV-3413 in that they were tested and stroke-timed from the open position to the closed position rather than vice-versa.

This is a Severity Level IV violation (Supplement I).

V A Response

V. Other SSFI Violations

1. Admission Or Denial Of The Violation

The violation is correct as stated.

2. The Reasons For The Violation

The Recirculation Spray Heat Exchanger (RSHX) SW isolation valves (1-SW-MOV-104A-D, 105A-D) were originally installed as "normally open" valves. In 1988, a design change modified the valves to be "normally closed" to assist in maintaining the RSHX in dry layup. This design change resulted in a new safety function-opening of the valves on an automatic signal. The design change technical review indicated periodic test changes were required, however, these test changes were not implemented prior to the first periodic stroke test. Consequently, the stroke of the valve was timed in only one direction.

3. Corrective Steps Which Have Been Taken

The applicable periodic tests have been revised to stroke test the subject valves in the open and closed directions.

To ensure procedures identified for revision per the technical review of a design change or an engineering work request are completed in a timely manner, station management now requires procedure changes be completed prior to SNSOC approval of the technical review. SNSOC can grant exceptions to this rule provided an approved procedure deviation incorporating the necessary changes has been issued prior to the technical review. If an exception is granted, it is then documented in SNSOC meeting minutes and the item is placed into the commitment tracking system. Issuance of the permanent procedure change is then assured through commitment tracking.

4. Corrective Steps Which Will Be Taken To Avoid Further Violations

No additional actions are required.

5. The Date When Full Compliance Was Achieved

Full compliance has been achieved.

V. Other SSFI Violations

B. 10 CFR Part 50, Appendix B, Criterion V, and the licensee's accepted QA Program (Virginia Electric and Power Company, Topical Report, Quality Assurance Program, Operations Phase, VEP-1-5A, Updated) Section 17.2.5, collectively require that activities affecting quality be prescribed by procedures and accomplished in accordance with these procedures. It further requires that procedures include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished.

Contrary to the above, as of the date of the SSFI inspection, procedures in effect did not include appropriate qualitative or quantitative acceptance criteria, as evidenced by the following examples:

1. PT-23.7D, ESW Pump Batteries Weekly Check, did not include acceptance criteria for electrolyte temperature, did not compensate battery voltage for temperature, and did not specify the correct voltage to indicate an adequate battery charge.

2. PT-23.14D, Emergency Service Water Pumps Battery Replacement, did not specify the correct voltage to indicate an adequate battery charge.

3. PT-23.9D, Emergency Diesel Service Water Pump Batteries Quarterly Test, did not include adequate acceptance criteria for specific gravity, and did not provide for correcting the specific gravity measurement for temperature.

4. Procedure EMP-C-EPDC-62, Replacement of Batteries on Diesel Driven Fire Pumps, ESW Pumps and Security Emergency Diesel, dated March 25, 1986, did not include adequate acceptance criteria for specific gravity requirements.

5. Procedure MMP-CG-228, Thirty Inch Jamesbury IMO-302 Valves, RS-MOV-SW-103 A, B, C, and D, and RS-MOV-SW-203, A, B, C, and D, dated January 30, 1987, did not include appropriate acceptance criteria for checking the disc to seat clearances.

This is a Severity Level IV violation (Supplement I).

V B Response

V. Other SSFI Violations

1. Admission or Denial of the Alleged Violation:

The violation is correct as stated with the following clarification: The appropriate acceptance criteria for the Jamesbury valves is provided in Step 5.9.21 of the procedure. Therefore, the note was not detrimental with respect to acceptance criteria, as it simply specified a "go-no- go" check of full seat contact in addition to Step 5.9.21.

2. The Reason For Violation:

Various battery procedures for replacement and periodic testing did not provide adequate acceptance criteria to ensure operability of the Emergency Service Water (ESW) diesel batteries, diesel-driven fire pump batteries, and security emergency diesel batteries. An overall review of battery requirements had been initiated prior to the violation, but the cited batteries had not yet been addressed by that effort. In addition, design requirements for environmental effects on battery operability had not been appropriately specified in the original design or transferred to testing requirements.

Procedure MMP-C-G-228 contained a note for checking valve seat contact that did not apply to the Jamesbury valves covered by the procedure. The note referred to the replaced Pratt valves which the procedure previously addressed. When the procedure was revised to address the new Jamesbury valves, the note was not deleted.

3. Corrective Steps Which Have Been Taken and The Results Achieved:

PT-23.7D, 23.9D and 23.14D were revised to specify acceptance criteria for: 1) Temperature corrected specific gravity for single cell and battery average, 2) Minimum battery float voltage, 3) Assembled battery voltage.

EMP-C-EPDC-62 has been replaced by ECM-0102-1. The new procedure includes the quantitative acceptance criteria for specific gravity and voltage for installation of new batteries. These batteries are then subject to the periodic testing requirements specified above.

A temporary procedure change has been issued to delete the unnecessary note checking disc to seat contact when using MMP-C-G-228. Appropriate acceptance criteria are already provided elsewhere in the procedure.

4. Corrective Steps Which Will Be Taken To Avoid Further Violations:

MMP-C-G-228 is being revised under the procedure upgrade program. During this revision process, the discrepant note will be deleted.

5. The Date When Full Compliance Will Be Achieved:

Full compliance has been achieved for the subject battery procedures.

MMP-C-G-228 presently provides the appropriate acceptance criteria for adequate operation. However, the procedure will be revised as part of the procedure upgrade program and will delete the unnecessary note. The procedure will be revised by September 30, 1989.

V. Other SSFI Violations

C. 10 CFR 50, Appendix B, Criterion V, and the licensee's accepted QA Program, Section 17.2.5, collectively require that activities affecting quality be prescribed by procedures and accomplished in accordance with those procedures.

Contrary to the above, procedures were not established to control proper torquing of system closure fastenings as evidenced by the following examples of overtorquing fasteners during work performed on equipment:

1. For Work Order (WO) 25253, body to bonnet fasteners on pressure control valve 01-SW-PCS-100B were torqued to 590 foot-pounds (ft-lbs). The vendor-specified torque values for these fasteners is 400 ft-lbs.

2. For WO 58398, Charging Pump Lubricating Oil Cooler Service Water Pump 01-SW-P-10B, the pump casing capscrews (Item 370) and the gland seal nut plate nuts (Item 355) were torqued to 83 ft-lbs and 18 ft-lbs, respectively. The vendor-specified torque values for these fasteners is 50 ft-lbs and 10 ft-lbs, respectively.

3. For WO 29791, valve 1-RS-MOV-155A, the body to bonnet fasteners were torqued to 150 ft-lbs. The vendor-specified torque values for these fasteners is 120 to 135 ft-lbs.

4. For WO 29791 valve 1-RS-MOV-115B, the body to bonnet fasteners were torqued to 150 ft-lbs. The vendor-specified torque values for these fasteners is 120 to 135 ft-lbs.

This is a Severity Level IV violation (Supplement I).

V C Response

V. Other SSFI Violations

1. Admission Or Denial Of The Alleged Violation

The violation is correct as stated.

2. The Reason For The Violation

At the time of the violation for the examples cited, no formal torquing program was in place, although various maintenance procedures specified torque values. Subsequent to the cited examples, a torque manual was developed to provide guidance in selecting appropriate torque values, although this guidance is not complete.

3. Corrective Steps Which Have Been Taken And The Results Achieved

The specific torquing discrepancies identified in the violation have been evaluated and corrected. A maintenance department standing order has been issued to ensure torque values are verified and properly applied. The standing order requires maintenance engineering to verify any torque value provided in a maintenance procedure or obtained from the torque manual prior to torquing the equipment. Any discrepant torque values identified are resolved by a permanent procedure revision.

4. Corrective Steps Which Will Be Taken To Avoid Further Violations

Existing maintenance procedures will be reviewed to verify that the correct torque values have been incorporated. Also, the maintenance department's torque manual will be revised to clearly establish the torquing methodology used for the station.

5. Date When Full Compliance Will Be Achieved

The review and revision of the maintenance department's procedures and torque manual will be completed by October 31, 1989.

V. Other SSFI Violations

D. 10 CFR Part 50, Appendix B, Criterion VIII, and the licensee's accepted QA Program, Section 17.2.8, collectively require that measures be established for the identification and control of materials, parts, and components.

Surry Administrative Procedure SUADM-M-16, Operation of Maintenance Department, requires that material traceability be provided for safety-related parts by use of a material control tag. Upon installation of the safety-related part, the material control tag is to be attached to the work order.

Contrary to the above, adequate measures were not established for identifying and controlling materials, parts, and components, as evidenced by the following examples:

1. WO 25253 replaced the valve body, bonnet, and stem disc assembly for Pressure Control Valve 01-SW-PCV-100B, and material control tags for these replacement parts were not attached to the work order.

2. WO 58398 replaced the rotating assembly of Charging Pump Lubricating Oil Cooler Service Water Pump 02-SW-P-10B, and material control tags for these replacement parts were not attached to the work order.

3. WO 56035 replaced Intermediate Seal Heat Exchanger 02-SW-E-1A, and material control tags for this replacement part was not attached to the work order.

This is a Severity level IV violation (Supplement I).

V D Response

V. Other SSFI Violations

1. Admission or Denial of the Alleged Violation:

The violation is correct as stated.

2. The Reason For Violation:

The material control tags cited in the violation were lost during the transmittal and/or processing for storage of the work order records and could not be retrieved.

3. Corrective Steps Which Have Been Taken And The Results Achieved:

A memorandum was issued by the Station Manager to the personnel involved in the control, transmittal, and/or storage of work order documentation including material control tags. The memorandum discussed the NRC violation and reemphasized the importance of maintaining Quality Assurance documentation in a complete and auditable form. It also provided specific direction for handling/securing material control tags.

4. Corrective Steps Which Will Be Taken To Avoid Further Violations:

An evaluation will be performed to assess the means by which materials are identified and controlled and recommend improvements as applicable.

5. The Date When Full Compliance Will Be Achieved:

The evaluation of material control will be complete by October 31, 1989. Full compliance will be achieved by January 31, 1990 after implementation of approved evaluation recommendations.

V. Other SSFI Violations

E. 10 CFR Part 50, Appendix B, Criterion XI, and the licensee's accepted QA program, Section 17.2.11, collectively require that a test program be established to assure that all testing required to demonstrate that structures, systems, and components will perform satisfactory in service is identified and performed. The licensee's accepted QA program, Table 17.2.0, commits to Regulatory Guide 1.33, Quality Assurance Requirements - (Revision 2, 2/78) which endorses ANSI N18.7-1976, Administrative Controls and Quality Assurance for the Operating Phase of Nuclear Power Plants. Paragraph 5.2.7 of this Standard requires that a suitable level of confidence in structures, systems, and components on which maintenance has been performed shall be attained by appropriate performance testing.

Contrary to the above, Pressure Control Valve 01-SW-PCV-100B's valve body, bonnet, and stem disc assembly were replaced by Work Order 25253, and performance testing was not conducted following this maintenance activity.

This is a Severity Level IV violation (Supplement I).

V E Response

V. Other SSFI Violations

1. Admission or Denial of the Alleged Violation:

The violation is correct as stated.

2. Reason For Violation:

This valve is not included in the existing IST program. There is no formal post-maintenance testing program for valves not included in the IST program (ASME Section XI) and hence no performance testing requirement was specified for the valve. In addition, the location and lack of instrumentation in the piping that contains the 01-SW-PCV-100B prevented flow testing following maintenance.

3. Corrective Steps Which Have Been Taken And The Results Achieved:

Adequate performance of the valve was demonstrated by visual verification that the valve moved in response to a change in controller demand. This was accomplished when the valve stroke was adjusted by maintenance.

A special test was recently performed to verify the adequacy of service water flow through valves 01-SW-PCV-100A, B, & C. For each valve a section of pipe was removed, an orifice installed, and flow measurements taken. The special test results provided data on performance of components serviced by the valves. This data provided sufficient information to verify acceptable performance of the valve following maintenance. This information is being incorporated into a surveillance test procedure (STP) and into the post-maintenance testing program. The performance of the STP will be required as a post-maintenance test following future maintenance on the valve.

4. Corrective Steps Which Will Be Taken To Avoid Further Violations:

An evaluation will be performed to determine the post-maintenance acceptance criteria for those valves which are outside of the IST program and currently do not require such testing.

5. The Date When Full Compliance Will Be Achieved:

Incorporation of the STP into the post-maintenance testing requirements for the cited valves will be completed by August 31, 1989. The evaluation to determine post-maintenance acceptance criteria for valves outside of the IST program will be completed by June 30, 1990.