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Docket Nos. 50-280 and 50-281
License Nos. DPR-32 and DPR-37
EA 88-296

Virginia Electric and Power Company
ATTN: Mr. W. R. Cartwright, Vice President,
Nuclear Operations
5000 Dominion Boulevard
Glen Allen, Virginia 23060

Gentlemen:

SUBJECT: NOTICE OF VIOLATIONS AND PROPOSED IMPOSITION OF $500,000 CIVIL PENALTIES: (NRC 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 AND 50-281/88-41, 50-280/88-45 AND 50-281/88-45, 50-280/88-51 AND 50-281/88-51, 50-280/89-06 AND 50-281/89-06)

This refers to the NRC Augmented Inspection Team (AIT) inspection conducted from September 1-3, 1988; the NRC Safety System Functional Inspection (SSFI) conducted from September 12-16, September 26-30, and November 14-18, 1988; and the inspections conducted by the NRC Resident Inspectors from October 2 - November 5, 1988, November 6 - December 17, 1988, December 18, 1988 - January 28, 1989, and January 29-March 4, 1989 at the Surry Power Station, Units 1 and 2. The AIT inspection was conducted to review the facts and circumstances surrounding the failure of the Unit 1 refueling cavity seal in May 1988. The SSFI focused on the safety-related service water system and the recirculation spray system, including associated electrical systems. The reports documenting these inspections were sent to you by letters dated September 30, 1988, December 15, 1988, November 30, 1988, January 17, 1989, February 23, 1989, and April 3, 1989. As a result of the above referenced inspections, significant failures to comply with NRC regulatory requirements were identified. Accordingly, NRC concerns relative to the inspection findings were discussed at an Enforcement Conference held on January 26, 1989. The report documenting this conference was sent to you by letter dated March 2, 1989.

The NRC is particularly concerned about the adequacy of your past safety evaluations and implementation of your corrective action program. Since 1988, a significant number of safety problems have been found at Surry that appear to be due to inadequate or untimely corrective actions. For many of the violations identified as a result of the above inspections, as well as the violations described in four previous escalated enforcement actions, information was available that, if properly evaluated and acted upon, should have prevented, or led to earlier correction of, those violations. Other violations relate to significant design and evaluation issues.

The findings described in the enclosed Notice of Violations and Proposed Imposition of Civil Penalties (Notice) have been grouped into five sections. Section I considers the violations associated with the cavity seal failure; Section II involves corrective actions; Section III involves design issues; Section IV deals

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with the failure to meet technical specification operability requirements for emergency service water pumps; and, Section V addresses the remaining SSFI identified violations. Each of these findings are discussed below.

Section I of the Notice involves a significant event that occurred on May 17, 1988 with the sudden failure of the Unit 1 reactor cavity seal and loss of approximately 30,000 gallons of water from the refueling cavity. Violation I.A focuses on inadequate implementation of your design controls for the passive 'J-seal' which resulted in your operation of the facility since initial licensing in noncompliance with your FSAR. The design of the passive sealing feature was not adequate to preclude seal failure and leakage from the reactor cavity when the seal deflated. In addition, after the NRC issued IE Bulletin 84-03, Refueling Cavity Water Seal, to alert all licensees of a cavity seal failure that occurred at another plant, you did not properly evaluate the unique Surry cavity seal design and assure that appropriate cavity seal ring tolerances and installation instructions were provided. Once the seal failed, as described in Violation I.A.2, the design deficiency was not identified. We are concerned that a significant event occurred and that your initial evaluation mis-categorized the sudden seal failure as a slow leak, despite the availability of contrary data. It was not until two days after the event that a Station Deviation Report was initiated. Even then, your reviews failed to identify the true scope of the failure. Additionally, we were not informed of the significance of this event until the resident inspectors became aware of the Independent Offsite Evaluation Review report on August 30, 1988. The failure to perform a proper evaluation and take timely corrective action resulted in the plant being placed in an unanalyzed condition when the core was reloaded on May 21-23, 1988, while using the deficient cavity seal design.

Violation I.B concerns a number of procedure problems. Significantly contributing to the sudden seal failure was the fact that the inflatable portion of the seal lost pressure when instrument air was isolated and the backup nitrogen bottles were not correctly aligned. Your 1984 seal design evaluation and 1985 modifications failed to assure that procedures and drawings were established for operation of both the backup nitrogen pressure system and that portion of the instrument air system dedicated to the inflatable seal. Additionally, while abnormal procedures were revised in accordance with recommendations resulting from your IE Bulletin 84-03 review, these procedural changes were inappropriately deleted in April 1987 during a procedure revision. The third problem concerns a failure to use procedures. After the reactor cavity leak was terminated, your licensed operators elected to recover the refueling cavity water level by opening the fuel transfer tube isolation valve on May 17 and 18, 1988. This action was not contained in an approved procedure and resulted in dropping the plant spent fuel pool level. Except under emergency conditions, not the case here, it is inappropriate for station personnel to perform significant plant evolutions without approved procedures. Your line supervision should not have permitted this to happen.

An NRC investigation was conducted to determine whether Virginia Electric & Power Company officials intentionally and deliberately failed to comply with reporting requirements when they did not advise the NRC of the May 17, 1988

refueling cavity seal leak incident. The investigation concluded that the incident was processed openly, and that it did not appear that licensee officials intentionally failed to comply with NRC reporting requirements. A Synopsis of the Office of Investigations Report No. 2-88-008 is enclosed. Based on this finding, and the fact that a citation is being issued for your inadequate evaluation of this matter, i.e. Violation I.A, an additional citation will not be issued for this violation of reporting requirements.

Section II involves a number of other problems that were not properly evaluated and corrected. The NRC concludes each of these events to be significant because in each case you had information available, either through NRC correspondence or your internal deficiency reporting system, that should have prompted you to act in a more timely manner. These events raise significant questions concerning the safety attitude of your staff. Violation II.A involves the evaluation and disposition of Information Notice (IN) 88-91, Potential Gas Binding of High Head Safety Injection Pumps. An ultrasonic inspection of selected piping high points found actual gas voids on August 23, 1988. After consultation with the pump vendor, the system engineer concluded in a memorandum to his supervisors, dated August 29, 1988, that "the operability of the HHSI pumps during an emergency is in question." No Station Deviation Report was prepared, and plant supervision did not followup on the memorandum. The significance of the issue was not recognized until October 12, 1988. Both Surry units had operated until mid-September with this safety issue unresolved.

Violation II.B concerns a Station Deviation Report written on November 20, 1987 for inadequate capacity of the Control Room - Relay Room Ventilation Chillers. The Station Deviation Report specifically noted that the chillers did not meet the 90-ton capacity specified in the Updated Final Safety Analysis Report (UFSAR), and a 10 CFR 50.59 evaluation was not performed until the resident inspectors raised the issue on April 11, 1988. That evaluation subsequently determined that the design function could only be accomplished as long as service water temperature remained below 70°F. The station had previously been operated in an unanalyzed condition with service water temperature greater than 70°F.

Violation II.C concerns the entire Control Room and Emergency Switchgear Room Ventilation System. For an undetermined period of time, the station had to run two chillers and both trains of the air handling units to maintain acceptable room temperatures. This degraded condition existed at least since 1986 but corrective actions were not initiated to repair the ventilation system until a Station Deviation Report was written about September 9, 1988.

Violations II.D through G concern a number of other deficiencies related to your corrective action system. Violation II.D addresses the inadequate corrective action taken in 1983 to purge your warehouse of unqualified replacement parts and the subsequent discovery in 1988 of the use of those parts in safety-related applications. Violation II.E focuses on inadequate long-term corrective action to prevent the repeated wetting of your emergency auxiliary feedwater pump motors due to leakage of rain water through inadequately sealed roof plugs. Violations II.F and G represent other individual corrective action program deficiencies associated with assuring that QC inspection deficiencies and QA audit findings are adequately resolved.

Section III of the Notice concerns a number of design deficiency and system performance problems, some of which impacted the station's ability to maintain the ultimate heat sink. Though the hardware deficiencies may have originated during plant construction, they represent ongoing problems that were not identified during your original startup test program nor through your continuing operational surveillance testing. Violation III.A addresses a number of errors made during your design change and modification process calculations supporting the 1988 recirculation spray heat exchanger (RSHX) replacement. The calculation results were deficient in that many of the design inputs contained errors and nonconservatisms concerning the ability to maintain the upper level intake canal inventory. Violation III.B refers to the failure to consider the effects of extreme temperature ranges on Emergency Service Water components, Violation III.C refers to failure to control 125 VDC vital bus loads, and Violation III.D concerns the failure to consider component cooling water heat exchanger minimum wall thickness. Your design change and modification process should have identified these errors and nonconservatisms. After initial identification by the NRC, additional errors in several of the revised calculations were found. If left uncorrected, these errors would again have caused the station to operate outside of UFSAR assumptions.

Violation IV concerns the operability of the Emergency Service Water (ESW) pumps. Though both the Technical Specification basis and the UFSAR specify ESW pump capacity at 15,000 gpm each, your operational surveillance test only required that a 12,000 gpm capacity be demonstrated, which was the current capacity of these pumps. This degraded system performance apparently occurred over a time span of at least several years during which your test procedure acceptance criteria was revised without updating either the UFSAR or Technical Specifications. We believe your Operations and Quality Assurance Departments should have recognized this deficiency.

Section V of the Notice contains a number of Severity Level IV violations identified during the SSFI review of ongoing maintenance and testing activities. Problems included: (A) stroke testing safety-related MOVs in the wrong direction due to a deficient procedure, (B) inadequate acceptance criteria in battery test procedures, (C) maintenance procedures failed to incorporate vendor-recommended torque values for fasteners, (D) replacement parts were not identified with material control tags, and (E) a post-maintenance test was not conducted for a safety-related valve.

In addition to the violations included in the Notice, there have been four escalated enforcement actions involving the Surry facility during the previous year. In February 1988, NRC Resident Inspectors identified a failure to maintain and verify operability of heat trace circuitry for boric acid flow paths. This problem existed for an extended period of time without station personnel questioning the reason for continuously lit annunciators. In March 1988, a significant potential for overexposure of a licensee employee occurred during work to free an incore detector from a thimble tube. The event resulted from a breakdown in the management control systems which were in place to prevent such an occurrence. The civil penalty was escalated because of management's inadequate response to the event, the failure to make an adequate root cause determination, and a pattern of poor performance regarding procedural compliance. Also, in May 1988, a contractor employee exceeded the quarterly total occupational dose limits to the whole body. One of the root causes of

this violation was inadequate management support of the radiological control program. Again, the civil penalty in that action was increased because of prior poor performance in that area and inadequate corrective actions associated with a previous exposure event. Finally, in June 1988, your staff reported finding foreign material in Surry Power Station Units 1 and 2 containment sumps. Although the specific cause of this violation was a lack of adequate cleanliness controls when working on safety-related systems, a broader issue was the general control of maintenance activities that permitted foreign material problems to go undetected for an extended period of time.

In addition to the issues described above, a number of other problems occurred at Surry during the past year that, when taken together, reinforce our concern over both the design and the corrective action problems at the plant.

- The vacuum priming system, classified as nonsafety related, is required to maintain full flow through the component cooling water heat exchangers at minimum levels in intake canal. The vacuum priming system is not seismically qualified and would constitute a single failure to all four component cooling water heat exchangers during a seismic event. (Inspection Report No. 280, 281/88-14.)

- Your actions in response to NRC Information Notice 85-91, Load Sequence for Emergency Diesel Generators, was untimely in that an internal engineering review identified this as a potential concern for Surry in June, 1986, but a followup investigation at the site was not conducted until September 1988. (Inspection Report No. 280, 281/88-36.)

- Corrective action for a 1987 citation regarding inventory of special nuclear material was inadequate in that it did not establish an inventory baseline for the nuclear material. (Inspection Report No. 280, 281/88-41.)

- An adequate root cause evaluation of the failure mechanism of a containment isolation valve was not performed as committed to in a Licensee Event Report, because the defective parts were discarded prior to any engineering evaluation. (Inspection Report No. 280, 281/88-45.)

Finally, we are also concerned about recently identified programmatic problems relating to past maintenance practices on motor operated valves. These deficiencies include poor workmanship, material problems, assembly problems, missing parts, undersized actuators, electrical wiring and other problems. We will continue to monitor your actions in this area and will address any enforcement issues after completion of our inspections.

Collectively, the multiple examples of violations identified in the attached Notice, the multiple examples of past escalated enforcement actions, and other problems which have been identified in the past year represent a major breakdown in the control of licensed activities at the Surry Power Station. Accordingly, in order to emphasize the significance the NRC places on the ability of this and other licensees to self-identify deficiencies, conduct appropriate evaluations, and institute prompt and adequate corrective action, I have been authorized, after consultation with the Commission, to issue the enclosed Notice of Violations and Proposed Imposition of Civil Penalties in the amount of Five Hundred Thousand

Dollars ($500,000) for the violations described in the enclosed Notice. The Severity Levels of the violations described in the enclosed Notice are in accordance with the "General Statement of Policy and Procedures for NRC Enforcement Actions," in 10 CFR Part 2, Appendix C (1988) (Enforcement Policy). The escalation and mitigation factors in the Enforcement Policy were considered, and the base civil penalty was modified for each violation as discussed below.

Violations I.A.1, I.A.2, and B address the reactor cavity seal event. As to Violation I.A.1, your original design did not meet the performance capabilities specified in the UFSAR and the engineering evaluation performed in response to IE Bulletin 84-03 was inadequate. Also, your design control and implementation process was deficient in that drawings and procedures for the support systems installed for the inflatable portion of the seal were not developed; the nitrogen backup system was installed as a temporary modification; and operators were not adequately trained in the use of these support systems. The basic design of the passive J-seal could not meet its intended safety function due to a lack of specified design tolerances, inadequate inspection and installation procedures, and the lack of a backplate support. Once the cavity seal failed, your evaluation did not identify the seal design deficiency as described in Violation I.A.2. As a result, three days later core reload activities were commenced that exposed the plant to the risks and consequences of another failure of the defective cavity seal. These two violations have been classified in an aggregate as a Severity Level III problem. The base civil penalty for this Severity Level III problem is $50,000. In considering the circumstances of this case, the base civil penalty has been increased to $100,000 because this matter represents a significant breakdown in management control to identify and correct design deficiencies.

Apart from that, we were not informed of the event until three months after it happened. The initial reluctance demonstrated by Surry station management to promptly provide us with a copy of your preliminary investigation report was unacceptable. In view of your extensive corrective actions discussed in the Enforcement Conference to enhance your staff's sensitivity to this concern, no further action will be taken in this matter.

Violation I.B has been classified as a Severity Level III violation. Had you developed and implemented adequate procedures for the inflatable seal pressurization systems, this event would not have happened. You had the opportunity to do so in response to modifications and your own staff's recommendations that resulted from the bulletin review. The base civil penalty has been increased to $100,000 because the violation represents a significant breakdown in management control particularly in view of the duration of the procedural deficiencies as well as the notification you had based on your staff's review of the bulletin.

Several additional violations where your corrective action for known or suspected deficiencies was not timely are contained in Section II. Violation II.A concerns your staff's failure to take prompt corrective action after identification of gas voids in a portion of the safety injection (SI) piping. This has been classified as a Severity Level III violation for which the base civil penalty is $50,000. The base civil penalty is escalated 100 percent because of duration. Six weeks passed after the initial engineering evaluation determined that pump operability during an emergency was in doubt before appropriate levels of management recognized the problem. A 50 percent mitigation factor is being applied for your extensive hardware corrective actions. Therefore, the total civil penalty for this violation is $75,000.

Violations II.B and C are considered a Severity Level III problem because they both concern the same safety system. The base civil penalty is $50,000. Though the NRC recognizes the limited safety significance of the ventilation system's degraded condition, our concern is that your staff identified in one case, and should have identified in the other case, a deficiency in system performance that required an engineering evaluation to define the scope of the problem. Though your corrective actions, once complete, will adequately address this problem, the time it took for you to initiate those actions exceeded that which is reasonably expected and, therefore, mitigation is not warranted for those actions.

Violations II.D, E, F, and G are considered a Severity Level III problem for which the base civil penalty of $50,000 is being assessed. Though the significance of the individual deficient conditions may be limited, when taken together, they show a breakdown in the implementation of your corrective action program. No escalation or mitigation was deemed appropriate.

The violations in Section III represent a Severity Level III problem with your design controls. Violation III.A addresses several calculations performed to support the 1988 recirculation spray heat exchanger replacement. After the NRC identified the use of inaccurate or nonconservative design inputs, a subsequent review of your calculations found additional errors. Violations III.B, III.C, and III.D encompass a broad range of engineering design disciplines: environmental effects on safety-related components, control of electrical loads, and control of mechanical specifications. These violations have been classified as a Severity Level III problem, for which the base civil penalty is $50,000. The civil penalty is being mitigated by 50 percent because of your corrective actions which include an extensive design reconstitution and configuration control program. No other mitigation or escalation factors are considered appropriate and a $25,000 civil penalty is assessed for this problem.

Violation IV concerns inoperability of the emergency service water (ESW) pumps. We believe that you should have identified the failure of pump performance to meet the values referenced in the Technical Specification bases and UFSAR. This violation has been classified at a Severity Level III with a base civil penalty of $50,000. Escalation of 100 percent for the duration of this deficient condition is being applied because the violation existed for a number of years. The quarterly performance test acceptance criteria were changed several times to accommodate the degrading pump condition. You had the opportunity to identify this problem at those times but failed to do so. Therefore, a $100,000 civil penalty is warranted.

In sum, the number and nature of the above violations raise significant regulatory concerns. Your performance demonstrated by these violations cannot be tolerated. We recognize that you have initiated significant corrective actions and made recent management changes. But for those actions, additional enforcement action would have been taken.

You are required to respond to the enclosed Notice and you should follow the instructions specified therein when preparing your response. Your response should specifically address the corrective actions taken or planned to prevent recurrence. That response should address the scope and proposed schedule for your Configuration Management Program.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations, a copy of this letter and the enclosure will be placed in the NRC's Public Document Room.

The responses directed by this letter and the enclosed Notice is not subject to the clearance procedures of the Office of Management and Budget as required by the Paperwork Reduction Act of 1980, PL 96-511.

Sincerely,

ORIGINAL SIGNED BY
M. L. ERNST

Stewart D. Ebneter
Regional Administrator

Enclosures:
1. Notice of Violation and Proposed Imposition of Civil Penalties
2. OI Synopsis Case No. 2-88-008

cc w/encls:
M. R. Kansler, Station Manager
R. F. Saunders, Manager - Nuclear Programs and Licensing
Public Document Room (PDR)
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