

VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

September 17, 1987

W. L. STEWART
VICE PRESIDENT
NUCLEAR OPERATIONS

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555

Serial No. 87-522A
NAPS/JHL
Docket Nos. 50-338
50-339
License Nos. NPF-4
NPF-7

Gentlemen:

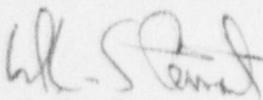
VIRGINIA ELECTRIC AND POWER COMPANY
NORTH ANNA POWER STATION UNITS 1 AND 2
NRC INSPECTION REPORT NOS. 50-338/87-21 AND 50-339/87-21

We have reviewed your letter of August 18, 1987 which referred to the inspection conducted at North Anna between June 21, 1987 and July 10, 1987 and reported in Inspection Report Nos. 50-338/87-21 and 50-339/87-21. The response to the Notices of Violation are addressed in the attachments.

We have no objection to this inspection report being made a matter of public record. If you have any further questions, please contact us.

A detailed evaluation of the loss of inventory event has been performed. This evaluation has identified the root cause of this event and describes in detail the corrective actions which have been or will be taken. This report will be provided to you and the nuclear industry following final management approval.

Very truly yours,


W. L. Stewart

Attachments

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PDR ADDCK 05000338
Q PDR

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

Mr. J. L. Caldwell
NRC Senior Resident Inspector
North Anna Power Station

ATTACHMENT

RESPONSE TO THE NOTICE OF VIOLATION REPORTED DURING THE NRC
INSPECTION CONDUCTED BETWEEN JUNE 21, 1987 AND JULY 10, 1987
INSPECTION REPORT NOS. 50-338/87-21 AND 50-339/87-21

NRC COMMENT:

During the Nuclear Regulatory Commission (NRC) inspection conducted on June 21 - July 10, 1987, violations of NRC requirements were identified. The violations involved a failure to have adequate procedures, failure to use procedures, and failure to perform a 10 CFR 50.59 safety evaluation.

In accordance with with the "General Statement of Policy and Procedure for NRC Enforcement Actions," 10 CFR Part 2, Appendix C (1987), the violations are listed below:

A. Technical Specification 6.8.1.a requires written procedures to be established, implemented and maintained covering the areas associated with the filling, draining, venting, startup, shutdown and changing modes of the Reactor Coolant System (RCS) and maintenance relating to repairs of the Reactor Coolant Pumps (RCP).

- (1) Contrary to the above, on June 17, 1987, the licensee established plant conditions per 1-OP-3.4, Unit Shutdown from Cold Shutdown (Mode 5) - 200 degrees F. to Cold Shutdown (Mode 5) - 140 degrees F. and Keff - 0.95. This procedure was inadequate in that it allowed the operators to establish conditions which led to the inadvertent voiding of the reactor vessel and steam generator tubes without the knowledge of the operators.
- (2) Contrary to the above, on June 20, 1987, with the unit in an abnormal condition, an evolution to lower pressurizer level was performed without a procedure. This evolution was performed in an attempt to reduce leakage from the RCS through "A" RCP. The result of the evolution was not only a reduction in pressurizer level, but also without the operator's knowledge of a reduction in the reactor vessel and steam generator tube level.
- (3) Contrary to the above, on June 21, 1987, the licensee attempted to perform an evolution with the intent of drawing a vacuum in the pressurizer without a procedure. This evolution was started but not completed since the licensee discovered that a vacuum had already been inadvertently established in the pressurizer. The purpose of the evolution was to reduce RCS leakage by the "A" RCP.
- (4) Contrary to the above, maintenance procedure MMP-C-RC-28, Reactor Coolant Pump Coupling Disassembly/Reassembly, used during the repairs to the "A" RCP in June 1987 was inadequate for the following reasons:

- a. There is no action statement in the procedure directing the operators to maintain the RCS at 15 PSIG to minimize the amount of leakage from the disassembled RCP. The operators are required to not exceed 15 PSIG by step 5.4.a. while lowering the shaft to minimize RCS leakage, however, no guidance is given to the operator on maintaining 15 PSIG while the pump is disconnected. A caution preceding step 7.1 that the maximum expected leak rate from a backseated RCP is 1 GPM with the RCS at 15 PSIG, however, this is a caution and implies no action on the operators part to maintain those conditions.
- b. There is no guidance provided for the use of seal injection when the procedure is used without the RCS being drained. Because this condition can occur and the effect of seal injection on a disassembled RCP directly effects the amount of leakage from the RCP, guidance is required.
- c. The steps for the alignment of the RCP and motor are not included in the procedures. The procedure is used to disassemble and reassemble the RCP coupling and prior to reassembling, alignment of the coupling is needed, those instructions are required.
- d. There is no statement concerning the minimizing of RCS leakage when the pump internals are raised from their backseated position. If the procedure states that the operators shall not exceed 15 PSIG when lowering the pump internals, the same direction is required when the pump is being raised as an increase in the expected leakage rate is just as likely.

This is a Severity Level IV violation (Supplement I) and applies only to Unit 1.

RESPONSE:

1. ADMISSION OR DENIAL OF THE ALLEGED VIOLATION:

The violation is correct as stated.

2. REASON FOR THE VIOLATION:

1-OP-3.4 was inadequate in that it did not specifically require maintaining positive pressurizer pressure nor allow for adjusting pressurizer level to minimize RCP shaft leakage while performing maintenance on an uncoupled RCP without draining and venting of the RCS.

The attempt to lower pressurizer pressure and draw a slight vacuum in the pressurizer, in order to reduce RCS leakage through the "A" RCP, should

have been performed through a prior to use procedure deviation since the evolution was not described in a procedure or the North Anna Updated Final Safety Analysis Report. This would have allowed the proper reviews for assessing the process for reducing pressurizer pressure and drawing a slight vacuum in the pressurizer. (Also refer to violation B of this inspection report.)

System operating requirements were stipulated in procedure MMP-C-RC-28 but they were in the Initial Conditions section and Limits and Precautions section, and cautions were provided in the Instruction section of the procedure. There were no specific action steps pertaining to maintaining system initial operating requirements for performing work on the RCP without the RCS drained. Additionally, the procedure was deficient since alignment was not addressed for all possible conditions. Normally when a RCP is uncoupled for motor removal, seal package work is performed. The seal procedure does contain the alignment requirements to perform the work. However, if the motor is decoupled from the pump, but no RCP seal work is to be performed (as was the case in this event), a procedure does not exist for alignment requirements for coupling the RCP and motor. This was an oversight in the generation of the procedure.

3. CORRECTIVE STEPS WHICH HAVE BEEN TAKEN AND THE RESULTS ACHIEVED:

Unit 1 and 2 operating procedures, 1/2-OP-3.4, were revised to ensure that a positive pressure is maintained in the pressurizer (with either a steam bubble or nitrogen blanket) or the RCS drained down and vented. Varying pressurizer level as a means to affect RCP shaft leakage will not be required in the revised procedures.

Since MMP-C-RC-28 did not address coupling alignment, a procedure deviation was written to procedurally control the work. Also, MMP-C-RC-28 has been reviewed to identify changes that are needed to specify adequate instructions for coupling alignment and maintaining system conditions consistent with the design of the RCP backseat.

A safety analysis was performed following the identification and understanding of the event. This analysis determined that there was no unreviewed safety question or Technical Specification change required.

4. CORRECTIVE STEPS WHICH WILL BE TAKEN TO AVOID FURTHER VIOLATIONS:

Training on the revisions to OP-3.4 will be conducted to ensure the operators understand the conditions which must be met in order to perform RCP maintenance while in Mode 5.

MMP-C-RC-28 will be revised to specifically identify requirements when the RCS is not drained. In addition, a Maintenance Operating Procedure (MOP) will be developed to support RCP coupling/motor work when the RCS is not drained. The MOP will require daily verification of initial conditions required for the specific work that is being performed when the RCS is not drained. MMP-C-RC-28 will reference and require a sign-off step for completion of the MOP.

Station personnel will be reminded, via a memo from the Station Manager, of the importance of evaluating the procedures they use with respect to plant conditions which exist during, or could result from, the performance of the procedures. Furthermore, this memo will reemphasize that employee concerns over the applicability of procedures to plant conditions and/or assigned tasks should be brought to the attention of station management promptly.

5. THE DATE WHEN FULL COMPLIANCE WILL BE ACHIEVED:

The training on OP-3.4 will be completed by November 30, 1987.

MMP-C-RC-28 will be revised and an MOP developed by December 31, 1987.

The Station Manager's memo will be issued by October 15, 1987.

ATTACHMENT

RESPONSE TO THE NOTICE OF VIOLATION REPORTED DURING THE NRC
INSPECTION CONDUCTED BETWEEN JUNE 21, 1987 AND JULY 10, 1987
INSPECTION REPORT NOS. 50-338/87-21 AND 50-339/87-21

NRC COMMENT:

During the Nuclear Regulatory Commission (NRC) inspection conducted on June 21 - July 10, 1987, violations of NRC requirements were identified. The violations involved a failure to have adequate procedures, failure to use procedures, and failure to perform a 10 CFR 50.59 safety evaluation.

In accordance with with the "General Statement of Policy and Procedure for NRC Enforcement Actions," 10 CFR Part 2, Appendix C (1987), the violations are listed below:

- B. 10 CFR 50.59 states in part that the licensee may conduct tests or experiments not described in the Final Safety Analysis Report (FSAR) without prior Commission approval if the licensee determines the test or experiment does not involve a change to the Technical Specification or an unreviewed safety question. The licensee must maintain records of these tests or experiments including a copy of the written safety evaluation which provides the basis for the determination that the test or experiment does not involve an unreviewed safety question.

Contrary to the above, on June 21, 1987, the licensee conducted an evolution with the intent of drawing a vacuum in the pressurizer, in an attempt to reduce RCS leakage, without performing a safety evaluation. This evolution which is not described in the FSAR and is clearly not a routine evolution was an attempt to change a plant parameter with a non-routine plant manipulation, and consequently is considered a test or experiment.

This is a Severity Level IV violation (Supplement 1) and applies only to Unit 1.

RESPONSE:

1. ADMISSION OR DENIAL OF THE ALLEGED VIOLATION:

The violation is correct as stated.

2. REASON FOR THE VIOLATION:

As documented in the response to Notice of Violation A, procedural inadequacies resulted in the undetected loss of RCS inventory between June 17 and June 21, 1987. This loss of inventory was not detected because the pressurizer had become subatmospheric relative to containment pressure. As a result, pressurizer level indication was no longer an adequate indication of RCS inventory. (This situation was complicated by the fact that the reactor vessel level indication system (RVLIS) was not considered reliable by the operators. There were work request stickers left on the control room display, and the system malfunction alarm was annunciating. The RVLIS display had just been integrated into the Integrated Core Cooling Monitor (ICCM) during the refueling outage.) The evolutions conducted on June 21, 1987 were intended to draw a slight vacuum in the pressurizer. Reduction of positive pressure in the RCS was desired in order to reduce the differential pressure between the RCS and the containment and thereby reduce the leakage from the RCS up through the "A" Reactor Coolant Pump (RCP) shaft. The pressure reduction was performed initially by reducing pressurizer level (to approximately 5%) to reduce the hydrostatic head. When this method was determined to be ineffective in reducing RCS leakage, the pressurizer level was then raised to a higher than normal level (to approximately 50%) and then the pressurizer was vented by cycling the PORV. The purpose of venting the pressurizer was to eliminate the positive pressure in the RCS and thereby reduce the RCS leakage up through the RCP shaft. Subsequent to this pressure reduction, it was intended to lower pressurizer level back to its normal level (to approximately 20%). In summary, the RCS was believed to be at a positive pressure relative to the containment and that the leakage up through the RCP shaft was due to this positive differential pressure. When the pressurizer PORV was cycled, the operator immediately noticed a significant decrease in pressurizer level and pressurizer relief tank (PRT) pressure. The operator also realized that the decrease in pressurizer level and PRT pressure probably meant that the pressurizer was at a significantly lower pressure than the PRT. As a result, the operator continued the already in progress inventory makeup and refilled the RCS.

It is concluded that the operator believed that the pressurizer was at a positive pressure relative to the containment which was at atmospheric pressure. In fact, due to inadequate procedures, the pressurizer was already subatmospheric. Once this condition was discovered, the pressurizer pressure was increased.

Operations personnel should have realized that the practice of reducing pressurizer pressure to reduce RCS leakage was not a routine operator action nor specifically described in the Updated Final Safety Analysis Report (UFSAR) or operating procedures. This evolution should have been evaluated in accordance with 10 CFR 50.59 to determine if there was an unreviewed safety question or a need for a Technical Specification change.

3. CORRECTIVE STEPS WHICH HAVE BEEN TAKEN AND THE RESULTS ACHIEVED:

A safety analysis was performed following the identification and understanding of the event. This analysis determined that there was no unreviewed safety question or Technical Specification change required.

4. CORRECTIVE STEPS WHICH WILL BE TAKEN TO AVOID FURTHER VIOLATIONS:

An Operations Directive will be issued to operations personnel emphasizing the importance of considering non-routine evolutions that are not specifically described in procedures or the UFSAR as requiring a safety evaluation in accordance with 10 CFR 50.59 and/or being considered as a special test. Special tests require a safety evaluation prior to performing the test.

Training on the loss of inventory event will be conducted for operations personnel and cover the root cause and corrective actions identified in our evaluation.

Station personnel will be reminded, via a memo from the Station Manager, of the importance of evaluating the procedures they use with respect to plant conditions which exist during, or could result from, the performance of the procedures. Furthermore, this memo will reemphasize that employee concerns over the applicability of procedures to plant conditions and/or assigned tasks should be brought to the attention of station management promptly.

5. THE DATE WHEN FULL COMPLIANCE WILL BE ACHIEVED:

The Operations Directive will be issued by October 1, 1987.

The training on the loss of inventory event will be completed by November 30, 1987.

The Station Manager's memo will be issued by October 15, 1987.