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In late June, 1988, Virginia Power personnel identified three deficiencies that are a non-conformance to 10CFR50, Appendix R requirements. The deficiencies resulted from inadequate Appendix R program training of the engineers who prepared and reviewed Design Change Packages (DCPs) 87-01 and 87-02 on Units 1 and 2, respectively. Each DCP relocated two Solenoid Operated Valves (SOVs) from the Main Steam Valve House (MSVH) to the Quench Spray Pump House (QSPH). These SOVs control the operation of the steam supply valves for the Turbine Driven Auxiliary Feedwater Pumps (TDAFP).

To prevent recurrence of similar events, training will be provided to all Architect/Engineers performing plant modifications to familiarize project personnel with the full requirements of the Appendix R Program. Also, the standard for development of DCP's will be revised to increase emphasis on the safe shutdown systems aspects of Appendix R.

An in-depth engineering analysis of the SOV relocation determined that actuation of the Auxiliary Feedwater System was not jeopardized as a result of DCPs 87-01 and 87-02, and the health and safety of the general public were not affected.

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U.S. NUCLEAR REGULATORY COMMISSION APPROVED GMB NO 3150-0104

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1.0 Description of Event

In June and October of 1987, Design Change Packages (DCPs) 37-01 and 87-02 were installed on Unit 1 and Unit 2, respectively, in response to NRC IE Information Notice 84-90 "Main Steam Line Break Effect on Environmentally Qualified Equipment". Each modification relocated two Solenoid Operated Valves (SOVs) from the 272 foot 6 inch level of the Main Steam Valve House (MSVH) to the 256 foot 0 inch level of the Quench Spray Pump House (QSPH). These SOVs control the operation of the steam supply valves for the Turbine Driven Auxiliary Feedwater Pumps (TDA^TP). (There is one IDAFP per unit, with two parallel steam supply valves per TDAFP.)

In late June, 1988, Virginia Power personnel identified the following deficiencies which resulted from failure to identify the SOVs as Appendix R Safe Shutdown equipment during the initial preparation of the DCPs: 1) Emergency lighting was not provided for Appendix R access to the QSPH, 2) affected Appendix R Abnormal Procedures were not revised, and 3) relocation of the SOVs to the QSPH had placed the SOVs in the same Appendix R fire area as the power cables for the two Motor Driven Auxiliary Feedwater Pumps (MDAFP). These deficiencies are a non-conformance to 10CFR50, Appendix R requirements.

2.0 Significant Safety Consequences and Implications

After discovery of the deficiencies, evaluations were performed to determine the impact of DCPs 87-01 and 87-02 on the availability of feedwater to the Steam Generators following a postulated 'Appendix R fire' and a concurrent loss of all offsite power.

An engineering analysis was performed for an 'Appendix R fire occurring within the 256 foot level of the QSPH. For such a fire, it is conservatively assumed that all power and control cabling in the fire area would be damaged, thereby rendering the MDAFPs inoperable, and damaging the SOV cables. Results of the analysis determined that fire damage to the SOV cables would cause the SOVs to go to the fail s fe condition, thereby opening the steam supply trip valves to the TDAFP. An engineering analysis of the complete control circuitry for the SOVs was also performed. This analysis demonstrated that a fire within any fire area of the plant could not cause both SOVs to simultaneously function improperly, and local operation of the steam supply valves would not have been required. Therefore, the fuct that the emergency lighting system and the Abnormal Procedures had not been updated to reflect the modifications in DCP 87-01 and 87-02 did not adversely affect operation of the TDAFP.

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3.0 Cause of the Event

safety of the general public were not affected.

The three deficiencies resulted from inadequate Appendix R program training of the engineers who prepared and reviewed DCPs 87-01 and 87-02. As a result, the SOVs were not identified as Appendix R Safe Shutdown ecuipment.

jeopardized as a result of DCPs 87-01 and 87-02 and the health and

In summary, actuation of the Auxiliary Feedwater System was not

4.0 Corrective Actions

TEXT (If more apace is required, use additional NRC Form 386A's/(17)

On June 12, 1988, operations personnel discovered, during a review of the Appendix R Abnormal Procedures, that one of the Abnormal Procedures still directed the operator to the MSVH instead of the QSPH to perform manual actuation of the TDAFP steam supply valves. As an immediate corrective action, temporary changes were made to the affected procedures and permanent revisions were initiated. On June 17, 1988, this discovery was reported to the engineers who were performing the annual Appendix R Report review.

On June 21, 1983, during a walkdown of the Unit 1 QSPH to inspect the SOVs, operations personnel noted that no Appendix R emergency lighting had been provided upon relocation of the SOVs. As an immediate corrective action, a station deviation report was written for the deficiency. Station management initiated an EWR to resolve the lighting deficiency. Management also evaluated the deviation report and noted that the operator could use a portable lantern, as an immediate corrective action, until long terr corrective actions could be implemented.

On June 23, 1988, during the annual update process for the 10CFR50 Appendix 'R' Report, engineering personnel identified the problem with having power and control cables for the MDAFP and the SOVs in the same fire area, as a result of DCP 87-01 and 87-02. As an immediate corrective action, station management included this information on the initial deviation report and with the scoping instructions for the EWR. In addition, special instructions were issued to operations personnel to loosen the air line fittings of the TDAFP steam supply valves in the event of a fire that necessitated remote manual actuation of these valves.

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Station engineering prepared EWR 88-158 which installed additional instrument air stop and bleed valves, on Units 1 and 2, to allow local operator actuation of the TDAFP steam supply valves from the MSVH. Since this EWR reestablished local control of the trip valves to their original MSVH location, no changes to emergency lighting or operator safe shutdown paths were necessary. Appendix R Abnormal Procedures were updated to reflect the addition of the instrument air stop and bleed valves. Implementation of EWK 88-158 was completed on July 13, 1988 for both units. An in-depth engineering analysis of the SOV relocation was then performed, which determined that relocation of the SOVs did not adversely affect the capability to provide steam flow to the TDAFPs of each unit.

5.0 Actions to Prevent Recurrence

To prevent recurrence of similar events, the following actions will be performed by the Virginia Power organization which is responsible for configuration control of Design Change Packages:

- Training will be provided to Architect/Engineers performing plant modifications to familiarize project personnel with the full requirements of the Appendix R Program.
- Future Quality Assurance periodic audits of Architect/Engineers will ensure that training is being performed and that proper documentation is maintained.
 - An Engineering Technical Bulletin will be issued to design engineering personnel engaged in nuclear work. The bulletin will reemphasize the Appendix R Program compliance when performing any design related work.
- Retraining in Appendix R Program requirements will be conducted once every two years for design engineering personnel.
- The Appendix R Abnormal Procedures will be reviewed to insure that the procedures and the Appendix R Report reflect the proper methodology for accomplishing safe shutdown activities.
- The standard for development of DCPs will be revised to increase emphasis on the safe shutdown systems aspects of Appendix R.
- An independent review will be performed in approximately one year to evaluate the effectiveness of the corrective actions and identify any additional actions that are warranted.

Vepco

VIRGINIA ELECTRIC AND POWER COMPANY

NORTH ANNA POWER STATION P. O. BOX 402 MINERAL, VIRGINIA 23117

August 10, 1988

U. S. Nuclear Regulatory Commission Attention: Document Control Desk Washington, D.C. 20555 Serial No. N-88-24 NO/DEQ: nih Docket No. 50-338 50-339

License No. NPF-4 NPF-7

Dear Sirs:

The Virgi ia Electric and Power Company hereby submits the following voluntary Licensee Event Report applicable to North Anna Units 1 and 2.

Report No. LER 88-019-00

This report has been reviewed by the Station Nuclear Safety and Operating Committee and will be forwarded to Safety Evaluation and Control for their review.

Very truly yours,

E. Kane

Station Manager

Enclosure

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

> Mr. L. Caldwell NRC ior Resident Inspector Nort Anna Power Station