



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

Report Nos.: 50-338/88-11 and 50-339/88-11

Licensee: Virginia Electric & Power Company  
 Richmond, VA 23261

Docket Nos.: 50-338 and 50-339

Facility Name: North Anna 1 and 2

Inspection Conducted: April 6 - May 13, 1988

Inspectors:	<u><i>[Signature]</i></u>	<u>6/28/88</u>
	J. L. Caldwell, SRI	Date Signed
	<u><i>[Signature]</i></u>	<u>6/28/88</u>
	L. P. King, RI	Date Signed
Approved by:	<u><i>[Signature]</i></u>	<u>6/28/88</u>
	F. Cantrell, Section Chief	Date Signed
	Division of Reactor Projects	

SUMMARY

Scope: This routine inspection by the resident inspectors involved the following areas: plant status, unresolved items, licensee event report (LER followup), review of inspector follow-up items, monthly maintenance observation, monthly surveillance observation, operator safety verification, and operating reactor events. During the performance of this inspection, the resident inspectors conducted reviews of the licensee's backshift operations on the following days - April 7,8,10,11,12,13,14,15,18, and 27 May 2,4,9,10,11, and 12.

Results: No violations were identified.

## REPORT DETAILS

## 1. Licensee Employees Contacted

- \*G. E. Kane, Station Manager
- \*R. C. Driscoll, Quality Control (QC) Manager
- \*R. O. Enfinger, Assistant Station Manager
- \*M. L. Bowling, Assistant Station Manager
- J. A. Stall, Superintendent, Operations
- \*M. R. Kansler, Superintendent, Maintenance
- A. H. Stafford, Superintendent, Health Physics
- D. A. Heacock, Superintendent, Technical Services (Acting)
- J. L. Downs, Superintendent, Administrative Services
- J. R. Hayes, Operations Coordinator
- E. S. Hendrixson, Engineering Supervisor (Acting)
- D. E. Thomas, Mechanical Maintenance Supervisor
- G. D. Gordon, Electrical Supervisor
- \*L. N. Hartz, Instrument Supervisor
- F. T. Terminella, QA Supervisor
- \*J. P. Smith, Superintendent, Engineering
- \*D. S. Roth, Nuclear Specialist
- \*J. H. Leberstein, Engineer

Other licensed employees contacted include technicians, operators, mechanics, security force members, and office personnel.

## \*Attended exit interview

NRC Management Site Visit: On April 14 and 15, M. Ernst, Deputy Regional Administrator, Region II, and L. Engle, NRR Project Manager for North Anna, visited the site to attend the operational assessment exit meeting. On April 15, B. Wilson, Branch Chief Division of Reactor Projects (DRP), visited the site to attend the operational assessment exit meeting. On April 15, J. Taylor, Deputy Executive Director for Operations and W. Troskoski, Region II Coordinator for the EDO's Office, visited North Anna to attend the operational assessment exit, tour the facility, and discuss with the licensee NRC management interests and concerns associated with the performance of the North Anna Power Station. F. Cantrell, (Region II) Section Chief, DRP, met with the resident inspector to review site activities on April 18 and May 9, 1988.

## 2. Exit Interview (30703)

The inspection scope and findings were summarized on May 13, 1988, with those persons indicated in paragraph 1 above. The licensee acknowledged the inspectors findings. The licensee did not identify as proprietary any of the material provided to or reviewed by the inspectors during this inspection.

Findings:

(Open), LIV 338,339/88-11-01 - Failure to perform TS required channel check surveillance requirements on the wide range containment pressure instrumentation (see paragraph 5).

(Open), Unresolved item 338,339/88-11-02 - Potential for the recirculation spray heat exchangers to have been inoperable during plant operations with the service water or lake temperature greater than 83 degrees F (see paragraph 10).

(Open), IFI 338/88-11-03 - Questions relating to the leak rate testing of the low head safety injection suction valves from the containment sump (see paragraph 9).

(Open), IFI 338,339/88-11-04 - Development of the check valve PM program in response to IE Notice 86-09 and 86-01.

## 3. Plant Status

## Unit 1

Unit 1 commenced the inspection period operating at approximately 100% power. On April 14, the licensee tagged out the Unit 1 steam supply to the steam driven auxiliary feedwater pump to inspect the steam supply check valves. These valves were inspected as a result of the problems discovered with the Unit 2 steam supply check valves (see Section 7 for details).

Unit 1 ended the inspection period operating at approximately 100% power.

## Unit 2

Unit 2 began the inspection period operating at approximately 100% power. On April 4, two days prior to the start of the inspection period, the licensee experienced problems with shutting one of the steam supply valves to the steam driven auxiliary feedwater pump. The licensee discovered a washer lodged between the seat and the disc of valve 2-MS-TV-211B which prevented the valve from fully closing. On April 7, the licensee determined the source of the washer to be from the internals of upstream check valve 2-MS-119 (see Section 7 for details). On April 15, the 2A Low Head Safety Injection (LHSI) pump failed to meet its Technical Specification (TS) criteria for minimum differential pressure during a surveillance test. The licensee discussed the situation with the pump vendor, made adjustments as recommended, and retested the pump satisfactorily later on April 15. On May 4, the unit experienced a partial train B Containment Depressurization Actuation (CDA). One of the three relays associated with the Unit 2 train B CDA signal inadvertently actuated and all of the equipment associated with that relay actuated to its safety condition. The operators prevented the train B outside recirculation spray pump from starting by placing the switch in pull to lock. The operators were able to restore the affected components to the

required alignment prior to the need to commence a TS required shutdown (see Section 10 for details).

Unit 2 ended the inspection period operating at approximately 100% power.

#### Both Units

On April 15, the Region II operational assessment team conducted an exit meeting with the licensee, concluding two weeks of inspection effort. The exit meeting was attended by J. Taylor, Deputy Executive Director for Operations; W. Troskoski, Region II Coordinator for the EDO Office; L. Engle, NRR Projects Manager for North Anna from NRC Headquarters; M. Ernst, Deputy Regional Administrator for Region II; B. Wilson, Branch Chief Division of Reactor Projects, and the operation assessment team staff from the Region II office.

During the week of April 25-23, the North Anna Station Manager traveled to Japan to meet with the Japanese and conducted a tour of the Japanese nuclear facilities. This is associated with the continued interchange and agreements established between VEPCO and the Japanese nuclear community.

#### 4. Unresolved Items

An Unresolved Item is a matter about which more information is required to determine whether it is acceptable or may involve a violation or deviation.

One unresolved item was identified during this inspection and is discussed in paragraph 10.

#### 5. Licensee Event Report (LER) Follow-up (92700)

The following LERs were reviewed and closed. The inspector verified that reporting requirements had been met, that causes had been identified, that corrective actions appeared appropriate, that generic applicability had been considered, and that the LER forms were complete. Additionally, the inspectors confirmed that no unreviewed safety questions were involved and that violations of regulations or Technical Specification (TS) conditions had been identified.

LERs that identify violation(s) of regulations(s) and that meet the criteria of 10 CFR, Part 2, Appendix C, Section V shall be identified as License Identified Violations (LIV) in the following closeout paragraphs. LIVs are considered first-time occurrence violations which meet the NRC Enforcement Policy criteria for exemption from issuance of a Notice of Violation. These items are identified to allow for proper evaluation of corrective actions in the event that similar events occur in the future.

(Closed) LER 338,339/88-018, Missed Surveillance Post Accident Containment Pressure Transmitters. This LER identifies a problem with TS 4.3.3.6 channel check and channel calibration surveillance requirements for the

containment wide range pressure accident monitoring instrumentation. The inspector became aware of this situation in early April while reviewing the licensee's deviation reports. Once the licensee identified that the proper instrumentation was not being monitored, the TS action statement was entered which gave the licensee 48 hours on both units to correct the situation or be in at least hot shutdown within the next 12 hours. The licensee was able to verify calibration of the wide range instrumentation and performed an appropriate channel check to allow termination of the action statement prior to exceeding the 48 hours.

The licensee has determined that even though it was not recognized that TS required the wide range containment pressure instrumentation to be channel checked monthly and calibrated every refueling outage, the wide range instrumentation was being calibrated every refueling outage for other reasons. The instruments that were used by the operators in lieu of the wide range had a pressure range of 0 to 50 psia which is greater than the maximum pressure assumed during the Designed Based Accident (DBA).

The wide range instruments were installed in 1981 and the licensee committed at that time to use them to meet the requirement of TS for the accident monitoring containment pressure instrumentation. The design change that installed the instruments did not identify any TS required surveillance procedure needing changes. However since 1981, the licensee has developed a better program for reviewing design changes to insure all TS requirements are met or needed changes are identified. This program was not instituted in time to prevent this event.

Based on the fact that the instruments were calibrated and operable and the licensee identified the problem, and instituted corrective action to prevent recurrence, this situation will be identified as a Licensee Identified Violation (LIV) 338,339/88-11-01.

#### 6. Review of Inspector Follow-up Items (92701)

(Open) IFI 338/88-05-03: Request for additional information concerning maintenance history on Unit 1 RTD bypass isolation valves. The licensee provided the maintenance history to the inspector. A review of the maintenance history reveals that 1-RC-55 had no record of the packing being replaced. This valve was a contributor to the greater than 10 gpm Unit 1 Reactor Coolant System (RCS) leak that occurred on March 24 (see inspection report 338,339/83-05, Section 10, Operating Reactor Events). Inspector will continue to follow licensee's program to repack or replace these valves.

(Closed) IFI 338/88-05-04: Request for additional information involving exposure, applicable procedures and ALARA reviews concerning the Unit 1 containment entries at power on March 24, 1988. The inspector received the information from the health physics department. A review showed that the exposure received for the entries was approximately 1.8 Rem. No ALARA review had been performed because it was predicted that less than 1 Rem would be received. The inspector discussed his concern with the health

physics superintendent regarding the improper initial estimate of the entry. The licensee is reviewing containment entry procedures. The inspector will monitor further entries to ensure all procedures are followed.

#### 7. Monthly Maintenance (62703)

Station maintenance activities affecting safety related systems and components were observed/reviewed, to ascertain that the activities were conducted in accordance with approved procedures, regulatory guides and industry codes or standards, and in conformance with Technical Specifications.

On May 3, the inspectors witnessed the replacement of the carbon pack rings for the Unit 2 steam driven auxiliary feedwater pump governor valve. The valve had been identified earlier as having a packing leak. The maintenance was performed per Mechanical Maintenance Procedure MMP-C-GV-1, Safety-Related Motor Operated and Air Operated Valve Repair and Inspection in General. The inspector reviewed the MMP and determined that the majority of the work was being performed per "write-in steps" provided by the foreman in charge of the job. The "write-in steps" had a Quality Control (QC) sign-off for closeout listed after the signoff for valve reassembly. The inspector questioned the maintenance personnel on what the QC inspector was signing for and was told that the QC step was for inspection of the valve internals prior to reassembly. Since the step was listed after valve reassembly, and the QC inspector was not at the work site, the maintenance technician stated that he would have the "write-in steps" changed to be placed in the proper sequence. The inspector also questioned the step which installed the flange nuts because there were no torque requirements. The technician stated that they would determine the torque requirements and add them to the procedure. The procedure was properly changed and the valve was reassembled. However, two of the nuts could not be torqued because of their location. The technician stated that they would have to make an adapter to allow torquing the last two nuts.

The maintenance was not completed during the day shift on May 3 but was completed early on day shift on the following day, May 4. It appeared that no work had been performed during either the evening shift or the mid shift. The Maintenance Superintendent informed the inspector that the maintenance crew assigned to the job was instructed not to turn the work over but to complete the work the following day. This was done to allow the same personnel to complete the work in an attempt to ensure that there would be no problems caused by new personnel working on the turbine. The inspector asked the licensee to describe their policy concerning inoperable TS equipment and was told that the policy was to minimize the time which the equipment was out of service. The inspector will continue to monitor the licensee's maintenance activities to ensure that the licensee enforces their policy to minimize the time that required safety-related equipment is inoperable.

On May 7, 1988, while preparing to repair the leak on the 2A-LP heater drain pump recirculation line, a welder's chipping hammer penetrated the piping. The line between the recirculation orifice 2-SD-RO-203A and check valve 2-SD-414, which is approximately three inches downstream of the recirculation orifice was determined by the licensee to be paper thin. An inspection of the piping section upstream of 2-SD-RO-203A shows it has lost approximately 3/4 of its wall thickness. The line was isolated by the licensee. The licensee has radiographed all of the recirculation lines from each of the four Unit 1 and Unit 2 LP heater drain pumps. Only the 2A-LP heater drain pump recirculation piping had indication of wall thinning. The licensee is in the process of replacing the piping. The affected piping was considered small bore and thus was excluded from the inspection performed during the last refueling outage.

On April 4, 1988, during the performance of the surveillance test 2-PT-71.1, Steam Driven Auxiliary Feedwater Pump (2-FW-P-2) and Valve Test, one of the steam supply trip valves 2-MS-TV-211B failed to close fully. The licensee declared the Unit 2 steam driven auxiliary feedwater pump (2-FW-P-2) inoperable, tagged out the steam supply and performed maintenance on valve 2-MS-TV-211B. During the maintenance, the licensee discovered a washer lodged between the seat and disc which prevented the valve from fully closing. The licensee removed the washer, repaired the valve and retested the pump satisfactorily the following day, April 5, 1988.

The licensee informed the inspectors of the problems associated with the Unit 2 steam supply trip valve and their determination that the washer was similar to those used in the upstream steam supply line check valves. The inspectors questioned the licensee as to whether they were going to inspect the upstream check valves for damage or loss of components. The licensee agreed to inspect the check valve internals and on April 7, the steam supply to the Unit 2 auxiliary feedwater turbine was isolated for the inspection of the check valves. During the inspection, the licensee discovered that check valve 2-MS-119 had the disc retaining nut and washer missing. The other two check valves had all their components intact, however, the internal components of check valve 2-MS-117 were degraded. The licensee replaced the disc, nut, and washer on both 2-MS-117 and 2-MS-119 and returned the system to service. The licensee conducted an inspection of the steam supply line, including radiography, and were unable to find the missing nut. A Justification for Continued Operation (JCO) was written to allow continued operation with the loose part in the steam supply to the turbine. The JCO concluded that the loose parts should not enter or damage the turbine based on: the torturous path that the loose parts would have to follow, the vertical pipe run just before entering the turbine trip valve, and the size of the turbine trip valve inlet strainer. Consequently, the steam supply was unisolated, the turbine tested, and the system declared operational.

Following the discovery of the problems related to the Unit 2 steam supply check valves, the inspectors requested the licensee inspect the Unit 1 steam driven auxiliary feedwater pump steam supply check valves. On April

14, upon receiving replacement components for the check valves, the licensee isolated the steam supply to the Unit 1 auxiliary feedwater turbine and inspected the check valves. One of the check valves, 01-MS-124, was found to be missing the disc retaining nut and washer and the other two had all the components intact but in a degraded condition. All three check valves were reassembled with new components and the disc retaining nuts were welded to the disc stem. As in Unit 2, the licensee was unable to find the loose parts and the JCO used for Unit 2 was determined to be applicable for Unit 1.

The licensee requested the vendor make recommendations as to the affect of the loose parts in the steam supply to the turbine. The vendor suggested that the licensee conduct several disassemblies of the Terry Turbine's equipment. The licensee is presently reviewing the vendor recommendations and will provide the inspector with a response. In the mean time, the licensee is continuing to perform radiography on various parts of the steam supply line in an attempt to locate the loose parts.

Following the discovery of the Unit 2 check valve problem, the licensee reviewed the information and recommendations for repair of check valves provided by INPO and the NRC. Consequently, the Unit 1 check valves have their nuts tack welded in place. Following the Unit 1 check valve repairs, the licensee disassembled two of the Unit 2 check valves and tack welded the nuts in place. Only the Unit 2 check valve, 2-MS-117, remains without the disc retaining nut being welded in place. This valve was reassembled with new components and the licensee has committed to weld the disc retaining nut in place once a new bonnet gasket arrives on site.

The inspectors questioned the licensee about their check valve inspection program and were informed that they had originally evaluated the INPO SOER 86-3 and IEIN 86-09 and 86-01 which discussed check valve problems as not applicable to North Anna. However, several months earlier, based on problems discovered with check valves in several other systems, the licensee decided to revisit the INPO SOER 86-3 and establish a check valve Preventative Maintenance (PM) program. This program is still in the formulation phase and the licensee engineers will be reviewing a newly released EPRI study on critical check valves to determine the plant specific application.

Since the problems have been discovered with the auxiliary feedwater steam supply check valves, the licensee has committed to establish and implement a check valve PM program in response to the INPO SOER 86-3 prior to the 1988 Unit 2 refueling outage and the 1989 Unit 1 refueling outage. The licensee will also revise their response to IEIN 86-09 and 86-01 based on the problems associated with the auxiliary feedwater steam supply check valves. The inspectors will continue to follow the licensee's action relating to check valve evaluation and the development of a check valve PM program. This is identified as Inspector Followup Item 338,339/88-11-04, pending completion of the development of the check valve PM program.

No violations or deviations were identified.

8. Monthly Surveillance (61726)

The inspectors observed/reviewed technical specification required testing and verified that testing was performed in accordance with adequate procedures, that test instrumentation was calibrated, that limiting conditions for operation (LCO) were met and that any deficiencies identified were properly reviewed and resolved.

On May 3, 1988, while performing ISI surveillance, 2-PT-213.5, the quench spray pump suction valve MOV-QS-200B failed to open on the stroke test. A work request was issued and the valve was MOVATS tested. The torque bypass switch had to be readjusted due to it opening before the valve came off its seat. The valve was satisfactorily tested and returned to service.

On May 5, the inspector witnessed the post-maintenance testing portion of Work Order (WO) 5900073803. This work order was initiated to repair loss of Emergency Diesel Generator (EDG) field annunciator for the 2H EDG such that it could be acknowledged in the control room. The retest and repair were conducted per Electrical Maintenance Procedure EMP-C-RT-2, Trouble Shooting, Repair and Replacement of Protection Relays. The retest involved actuating the 2H EDG loss of field annunciator from the EDG control panel and verifying that the control room operator could acknowledge the alarm. The retest was conducted satisfactorily. The electrical technicians informed the inspector that cleaning the contacts was all that was required to repair the problem. The technicians also performed a calibration of the high field voltage alarm setpoint and the low field voltage alarm setpoint. Both of these were slightly out of calibration and had to be adjusted. The inspector reviewed the procedures associated with the maintenance and retest and did not identify any problems.

On April 15, 1988, the inspectors witnessed the surveillance test for the auxiliary feedwater turbine auxiliary feedpump (2-PT-71.1). This was performed following removal of the dampening control for the turbine governor, reassembly of the check valves in the main steam lines to the turbine, and replacement of the carbon packing rings for the turbine governor valve.

On April 29, the inspector witnessed the performance of post maintenance testing of the 1H EDG following coolant change out per Mechanical Maintenance Procedure MMP-EG-5. The post maintenance test was conducted per Operating Procedure 1-OP-6.8, Slow Start Operation of 1H Emergency Diesel Generator. This test had to be conducted five times following coolant chemistry adjustments in order to get the coolant chemistry in specification. The licensee changed the procedure MMP-EG-5, prior to the performance of the 2H EDG coolant change out to allow full draining of the coolant after each diesel run. The performance of 1-OP-6.9 only had to be conducted twice to get the coolant chemistry in specification for the 2H EDG. The inspector did not identify any problems.

Also on April 29, the inspectors witnessed valve stroke time testing per Performance Test 1-PT-213.3, Valve Inservice Inspection (Containment Atmosphere Cleanup System). The inspector verified that the operator was aware of the ASME Section XI requirements for valve stroking. The inspector observed the operator reviewing the log in the control room which listed the last stroke time, the stroke time which if exceeded would place the valve in an "alert" status, and the maximum acceptable stroke time. The test was conducted satisfactorily.

The inspector witnessed the periodic test of 2-FW-P-3A. The pump had been taken out of service to do preventative maintenance. During the test the inspector noted that an open work request was hanging on the pump. This request required the packing gland on the pump to be adjusted during the next periodic test. The inspector questioned operations personnel and was told that the work was not scheduled. The inspector will followup on events surrounding this work evolution.

No violations or deviations were identified.

#### 9. Operational Safety Verification (71707)

By observations during the inspection period, the inspectors verified that the control room manning requirements were being met. In addition, the inspectors observed shift turnover to verify that continuity of system status was maintained. The inspectors periodically questioned shift personnel relative to their awareness of plant conditions. Through log review and plant tours, the inspectors verified compliance with selected Technical Specification (TS) and Limiting Conditions for Operations.

In the course of the monthly activities, the resident inspectors included a review of the licensee's physical security program. The performance of various shifts of the security force was observed in the conduct of daily activities to include: protected and vital areas access controls; searching of personnel, packages and vehicles, badge issuance and retrieval, escorting of visitors, patrols; and compensatory posts. In addition, the resident inspectors observed protected area lighting, protected and vital areas barrier integrity, and verified an interface between the security organization and operations or maintenance.

On a regular basis, radiation work permits (RWP) were reviewed and the specific work activity was monitored to assure the activities were being conducted per the RWPs. Selected radiation protection instruments were periodically checked and equipment operability and calibration frequency was verified.

The inspectors kept informed, on a daily basis, of overall status of both units and of any significant safety matter related to plant operations. Discussions were held with plant management and various members of the operations staff on a regular basis. Selected portions of operating logs and data sheets were reviewed daily.

The inspectors conducted various plant tours and made frequent visits to the control room. Observations included: witnessing work activities in progress; verifying the status of operating and standby safety systems and equipment; confirming valve positions, instrument and recorder readings, annunciator alarms, and housekeeping.

The following comments were noted:

The inspectors investigated the reason for increased makeup to the RWST (refueling water storage tank). A review of 1-OP-7.7 which contains a section on filling the RWST showed that the Unit 1 RWST was filled nineteen times between January 1, 1988 and April 24, 1988 with approximately 5000 gallons each time. This is the equivalent of approximately 0.5 gpm leakage. The engineering department provided the inspector with calculations to show that if a pressure of 23 psia is maintained in the volume control tank then water from the RWST could not be leaking past MOVs 1-CH-115B and D into the suction of the charging pumps. It is suspected that the leak is through the check valve and closed motor operated valves from the containment sump to the suction of the low head safety injection pumps. This is based on a boron sample of the sump and the pumping rate from the sump. The inspector verified that no type "C" testing (per Appendix J of 10 CFR 50) takes place on these valves. The licensee will provide information concerning testing or inspection of these valves to the inspectors. This is identified as IFI 338/88-11-03.

On May 2, 1988, the inspector checked the shipping papers on shipment 058C-129. This was a Class "B" shipment of spent resin and was shipped in a high integrity container. The inspector requested the licensee to show him the calculations to classify the curie content of the shipment. The licensee uses the "PADMAN" computer program to classify waste. The inspector did not identify any problems.

No violations or deviations were identified.

#### 10. Operating Reactor Events (93702)

The inspectors reviewed activities associated with the below listed reactor events. The review included determination of cause, safety significance, performance of personnel and systems, and corrective action. The inspectors examined instrument recordings, computer printouts, operations journal entries, scram reports and had discussions with operations, maintenance and engineering support personnel as appropriate.

On May 4, Unit 2 experienced a partial Train "B" Engineered Safety Feature (ESF) actuation of the Containment Depressurization Actuation (CDA) System. The licensee determined that the actuation was due to a ground introduced into the solid state protection system while performing maintenance on the "B" quench spray pump suction valve MOV-QS-20CB (Motor Operated Valve). An actual containment spray did not occur because of prompt operator action to place the train "B" recirculation spray pumps (RSP) in "pull to lock" (PTL) prior to the start timer completing its

sequence. The plant remained stable throughout the event, and there was no equipment damage.

The partial CDA caused the following ESF actuations to occur:

- a. Service Water flow was initiated to the four recirculation spray heat exchangers (RSHX).
- b. Approximately 800 gallons of brated RWST water was sluiced to the containment recirculation spray sump through an idle train "B" quench spray pump.
- c. The safeguards ventilation system dampers shifted to redirect flow from the normal vent path to the iodine filter.
- d. Service water flow was isolated from the Unit 2 component cooling water heat exchangers.
- e. The 2J emergency bus stub bus breaker tripped. (There were no loads on the stub bus.)

The inspector was in the control room at the time of the event monitoring the licensee's action. Following the event the licensee determined that one of the three relays associated with train "B" CDA System picked up due to a ground being experienced on MOV-QS-200B. The ground was caused by a technician using a screwdriver in the MOV to adjust the limit switch set screw following MOVATS testing. The screwdriver grounded the vital 120 VAC in the MOV simulating a CDA actuation for relay K643. This resulted in the activation of all the CDA components associated with K643 relay. The licensee is investigating the need to have vital 120 VAC energized in the MOV when not in use for test purposes.

As a result of the partial CDA, the service water isolation valves to the RSHX opened and allowed service water to flow through the RSHX. The inspectors requested the licensee provide the necessary safety evaluation justification for leaving the recirculation spray heat exchangers filled with service water. The updated Final Safety Analysis Report (UFSAR) states that the heat exchangers will be dry and blown out with compressed air. The inspectors received Deviation Report 88-391 written on 5/6/88 which indicated that prior to the partial CDA that the RSHXs on both units had not been drained and purged in accordance with UFSAR Section 6.2.2.2.5. Periodic Test Procedures 1-PT-210.1 and 2-PT-210.1 "Valve Inservice Inspection (Service Water MOVs to RSHX)" were deviated with a Station Nuclear Safety and Operation Committee (SNSOC) "prior to use approval" to allow the RSHXs to remain filled with water on 6/14/87 and 10/26/87, respectively. The review of the periodic test (1-PT-210.1) procedure deviation incorrectly assessed that there was no change to the operating procedures as described in the UFSAR. The 10 CFR 50.59 review performed for the 2-PT-210.1 procedure deviation did not consider the design limitations of the fouling factor; only corrosion effects on the RSHXs were considered.

The inspectors' review of the justification for continued operation uncovered the fact that the fouling factor for the heat exchanger was zero. This is not in accordance with good design practice and the recommended standards set by TEMA (Tubular Exchanger Manufacturers Association).

UFSAR Section 6.2.2.2.5 states that "in order to ensure long-term reliability of the recirculation spray coolers, following each periodic test of the heat exchanger inlet and outlet valve, the heat exchangers are to be put in dry layup by first isolating the heat exchangers and then draining water out through the heat exchanger drain valves. An air hose is then attached to each of the four heat exchanger vents and the exchanger is purged with compressed air until there is no visual indication of moisture discharging from the drains. The vents and drains are then closed". This statement does not indicate that the main reason for this requirement is that the heat exchangers were bought with a zero fouling factor.

The licensee has stated in his justification for continuing operation that engineering has reviewed the ability of the North Anna recirculation spray coolers to perform their design basis function with tube wall fouling on the service water side greater than the design fouling factor of zero. Photographs of the recirculation spray cooler lower tubesheet taken during 1984 refueling outage were examined and observations of engineering personnel who have viewed the lower tubesheet area were solicited. Engineering concluded that a fouling factor for the service water side of the cooler is 0.002. Preliminary calculations were performed by engineering to evaluate the effect of the increased fouling factor on the heat transfer capability of the RSHXs coolers. The licensee has concluded that the RSHXs will meet all design heat rejection requirements for service water temperatures up to 83 degrees F assuming a fouling factor of 0.002.

Engineering has requested the architect/engineer, Stone and Webster, to provide information to support a revised calculation for the design basis containment depressurization accident analysis using the increased fouling factor for the RSHXs. The results of the analysis should be available by May 16, 1988.

There are no present requirements for inspecting the cleanliness of the RSHX and considering that there has been a past history of leakage into the RSHXs, the inspectors feels that the original design fouling factor of zero was incorrectly determined. A more realistic fouling factor needs to be used which conservatively assumes leakage into the RSHXs. The present configuration of the piping does not allow a performance test of the RSHXs. The inspector has requested the original design data sheet for the RSHXs, the photographs taken of the tube sheet of the RSHX during 1984 outage, and the engineering calculations to justify continued operation at service water temperatures up to 83 degrees F. This will be considered Unresolved Item (URI) 338,339/88-11-02, pending the inspectors' review of (1) engineering calculations, (2) design data sheets for the heat

exchanger, (3) photographs of the tube sheet, and (4) review of 1-PT-210.1 and 2-PT-210.1 procedure deviations.

No violations or deviations were identified.

17. Letter P. M. Sears, NRC, to J. B. Randazza, MYAPCo, "Request for Additional Information, Item II.D.1 of NUREG-0737, Performance Testing of Relief and Safety Valves," December 31, 1986.
18. Letter G. D. Whittier, MYAPCo, to NRC Document Control Desk, "Request for Additional Information, Item II.D.1 of NUREG-0737, Performance Testing of Relief and Safety Valves," March 31, 1987.
19. Letter G. D. Whittier, MYAPCo, to NRC Document Control Desk, "Response to Request for Additional Information, Item II.D.1 of NUREG-0737, Performance testing of Relief and Safety Valves," August 13, 1987.
20. C. L. Nalezny, Supplement to Technical Evaluation Report TMI Action NUREG-0737 (II.D.1) Relief and Safety Valve Testing, Three Mile Island Unit 1 Docket No. 50-289, EGG-RST-6593 Supplement, June 1985.
21. Letter K. P. Baskin, Southern California Edison Company, to J. R. Miller, NRC, Transmittal of Summary Report on the Operability of Power Operated Relief Valves in C-E Designed Plants, CEN-213, July 1, 1982.
22. Letter R. S. Huffman, Dresser, to R. J. Quinn, Baltimore Gas and Electric, "Baltimore Gas and Electric, Calvert Cliffs Units 1 and 2, Power Operated Relief Valves, CE PO 9903304 and 9903305", August 12, 1985.
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