

U.S. NUCLEAR REGULATORY COMMISSION
REGION 1

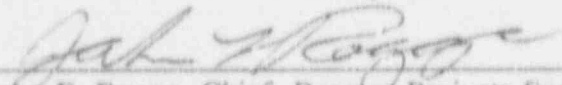
Report No. 92-04
Docket No. 50-271
Licensee No. DPR-28
Licensee: Vermont Yankee Nuclear Power Corporation
RD 5, Box 169
Ferry Road
Brattleboro, VT 05301

Facility: Vermont Yankee Nuclear Power Station
Vernon, Vermont

Inspection Period: February 11 - March 6, 1992

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Approved by:


John F. Rogge, Chief, Reactor Projects Section 3A

3/12/92
Date

Inspection Summary: This inspection report documents resident safety inspections conducted between February 11 and March 6, 1992. Station activities inspected during this period included: plant operations; radiological controls; maintenance and surveillance; emergency preparedness; security, engineering and technical support; and safety assessment and quality verification.

Results: Inspection results and conclusions are summarized in the attached Executive Summary.

EXECUTIVE SUMMARY
Vermont Yankee Nuclear Power Station
Report No. 50-271/92-04

Plant Operations

The plant was in coastdown operations and continued to make preparations for the refueling/maintenance outage beginning March 7. Procedural adherence weaknesses involving a Shift Supervisor and engineering's untimely notification of a reportable event to the Shift Supervisor, contributed to Vermont Yankee's delay in providing a timely report pursuant to 10 CFR 50.72 regarding an inoperability of the high pressure coolant injection system. Based on the recurrence of the issue from the last SALP assessment on-shift reportability expertise remains an apparent weakness.

Maintenance and Surveillance

A review of Vermont Yankee actions to address the instability of the "A" emergency diesel generator governor to control load concluded that the corrective actions taken were appropriate. Surveillance activities were observed to be performed in accordance with procedures and by knowledgeable technicians.

Emergency Preparedness

A review of the administrative portions of the Emergency Response Data System was conducted. A number of concerns involving configuration management and timely notification issues were identified. Corrective actions by Vermont Yankee to resolve these concerns were timely and appropriate.

Security

Vermont Yankee actions to respond to a group of contractor employees who exhibited a general lack of regard for personnel identification and escort requirements were timely and appropriate. Effective performance by security aided the quick medical response and assessment of an injured person outside the protected area.

Engineering and Technical Support

The inspector reviewed VY's continuing investigation of the failure of the Advanced Off-Gas System rupture disk. A review by site engineering correctly identified to plant management that the high pressure coolant injection system was inoperable as a result of the trip of its inverter. This notification, however was not timely in accordance with VY procedures.

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DETAILS

1.0 SUMMARY OF FACILITY ACTIVITIES

Vermont Yankee Nuclear Power Plant (VY or the plant) continued to operate in a safe manner, during coastdown operations from an initial power level of 91 percent of rated power to 85 percent throughout this inspection period. Outage preparation continued and on March 6 at 11:00 a.m., VY commenced reducing power to enter refueling/maintenance Outage 16. At 7:46 p.m. during the plant shutdown, the plant received a Group I isolation and reactor scram while at approximately 800 psig with the reactor at less than 1 percent rated power. The major activities planned for this outage include replacement of the main transformer, feedwater heater 3A and 3B, and the four drywell reactor recirculation units (RK3's). Inspection and maintenance on the vital buses, on the non-vital buses and in the 345 KV switchyard will coordinate work activities associated with decay heat removal and service water systems.

The offgas activity at the end of the inspection period (i.e., just prior to the shutdown to enter the outage) was 56,800 $\mu\text{Ci}/\text{sec}$. Comparatively, the offgas number prior to the last refueling outage was 55-60,000 $\mu\text{Ci}/\text{sec}$. Prior to February 10, offgas activities appeared to have followed the reduction in power due to coastdown. Since then, VY noted that it appears that the growth of the fuel pin crack is maintaining the high offgas activities even though core thermal power continues to decrease. VY analysis concludes that there is only one failed fuel pin within the core. Currently, VY plans to ship all fuel bundles returning to the core and 16 of the 128 bundles scheduled for discharge. If sipping identifies failed fuel within a bundle that was to remain in the core, that bundle will be reconstituted or replaced. VY, with the assistance of General Electric, estimated that the offgas value following start-up from Outage 16 will be 39,000 $\mu\text{Ci}/\text{sec}$. This value was based on a decay correction of three minutes, an approximation regarding uniform distribution of uranium on the fuel bundles, and refueling of a third the core.

2.0 PLANT OPERATIONS (71707, 92700, 2515/113)

2.1 Inspection Activities

The inspector verified that the facility was operated safely and in conformance with regulatory requirements. Management control was evaluated by direct observation of activities, tours of the facility, interviews and discussions with personnel, and independent verification. The inspector performed backshift and weekend inspections to assess the effectiveness of operators and conduct of operations during off-normal hours.

2.2 Inspection Findings and Significant Plant Events

2.2.1 (Open) VIO 92-04-01: Failure to Follow Procedures Resulting in a Delayed 10 CFR 50.72 Notification

On February 20, at 4:50 a.m., 125 volt direct current bus No. 1, DC-1, voltage unexpectedly increased from a nominal 132 VDC to 150 VDC for approximately 10 minutes until the on-line battery charger was replaced with the back-up charger. Bus voltage then returned to 132 VDC. Concurrent with the voltage increase, the control room operators received a high pressure

coolant injection (HPCI) inverter circuit failure alarm on the control room panel 9-3. The inverter, powered from DC-1, trips at approximately 140 VDC to protect various HPCI control circuits.

In response to this condition, the Shift Supervisor (SS) shifted the DC chargers and reset the inverter in accordance with the Alarm Response Sheet (ARS). The SS then initiated a Potential Reportable Occurrence (PRO) report in accordance with VY procedure AP 0010, Rev. 22, "Occurrence Reports/Notifications and Reports Due". The PRO is VY's vehicle to ensure that events or conditions are reviewed by engineering to determine reportability requirements. Appropriate levels of review are then performed by the Technical Services Superintendent and by the Plant Manager.

On February 24, VY site engineering personnel completed their review of this event and determined that, during the approximate 10 minutes the inverter was tripped, HPCI was inoperable. Without AC power to the flow controller circuitry, HPCI would have initiated, but would have only come up to idle speed. In addition, operators would not have been able to increase turbine speed to obtain design coolant injection flow. The inspectors considered the engineering review and determination to have been accurate and timely; however, engineering's notification to the Shift Supervisor was not immediate in accordance with AP 0010.

AP 0010 requires the Engineering Support Supervisor to "immediately inform the Shift Supervisor if a more restrictive notification is required." In this case, the engineering determination on February 24 that this event was reportable, corresponded to the discovery date as defined in the guidance contained in NUREG 1022, "Licensee Event Report System." However, it was following management review of the PRO on February 26 that notification to the SS resulted in a 4-hour ENS call at 6:10 p.m. on February 26. The call was made pursuant to 10 CFR 50.72(b)(2)(iii).

The Operations Supervisor (OS) discussed this event with the inspector on February 26 and indicated that the SS failed to notify the NRC of this event as required by 10 CFR 50.72. The preliminary apparent cause of this event was attributed to a statement in the ARS that states that if the inverter "alarm will not reset, HPCI is inoperable." In this case, the SS apparently declared the system operable, because the inverter reset. A preliminary contributing cause was the SS's failure to adequately question the operability of the HPCI system following the inverter trip. VY procedure AP 0156, Rev. 16, "Notification of Significant Events" specifically requires that an NRC 4-hour notification be made pursuant to 10 CFR 50.72 if any single train system such as HPCI fails or is found degraded in such a manner that it would not perform its intended safety function. As part of initial corrective actions, the OS discussed this event with four of eight senior reactor operator licensed individuals who are authorized to perform SS duties and initiated a review of the ARS. The inspector was informed by the OS that from this sampling of licensed individuals, he was assured that SSs understood (1) the requirements of AP 0156 and (2) that this event was reportable.

The inspector also discussed with the OS, the Shift Engineer's (SE) responsibility to enhance the SS's understanding of the status of a system and of reportability requirements, when requested. These responsibilities are specified in AP 0150, Rev. 27, "Responsibilities and Authorities of Operations Department Personnel." Further discussion focused on whether VY expected plant management and the relieving SS to question the reportability of this event during their control room log reviews. These reviews were conducted within three hours of the event. The inspector concluded that a number of opportunities existed for VY operations supervision and plant management to question the reportability of this event.

The inspector reviewed VY procedure AP 0156, and determined that appropriate information exists to adequately inform the SS that this event required NRC notification. A revision to AP 0156 was recently generated to improve the SS's assessment of conditions or events that are reportable. This improvement was implemented as part of corrective actions for a non-cited violation documented reportability concerns identified by the NRC during the April 1991 power event. The inspector concluded that the prior corrective actions were not specific to this event and therefore were not ineffective.

4, the inspector initiated a discussion with the Operations Superintendent that focused on the corrective actions for this event. During this meeting, the inspector was informed that the superintendent considers the failure to make the required NRC notification not only the fault of the SS, but that of the entire operating crew. This issue was previously addressed in the last Systematic Assessment of Licensee Performance (SALP) 89-99. In the SALP report, the NRC documented a similar concern that on-shift personnel did not fully benefit from on-shift reportability expertise. Based on the recurrence of the issue, on-shift reportability expertise remains an apparent weakness.

During subsequent discussions, the superintendent informed the inspector that the corrective action process as stipulated in the PRO, implemented "to provide root cause and corrective action regarding the red phone" was not complete.

As part of the inspector's review of the PRO, the inspector discussed this event with the site engineer who had conducted the reportability determination. The inspector questioned whether: (1) the voltage condition present on the DC bus during the event affected the operability or reliability of the other components served by the bus, (2) the voltage transient was within the analyzed limits of bus voltage, and (3) whether a common mode failure was possible on the parallel bus, DC-2. These questions were not addressed in the engineering department's answer to the PRO. The engineer stated that he would review these questions. The inspector will review these issues during the subsequent Licensee Event Report review.

The failure of VY to implement the event reporting requirements of procedures AP 0156 and AP 0010 for the HPCI inoperability that occurred on February 20, resulted in an untimely 4-hour notification as pursuant to 10 CFR 50.72 and is a violation (VIO 92-04-01).

2.2.2 (Closed) UNK 90-15-02: Ensure Timely Incorporation of Non-routine Procedural Changes

The inspector viewed VY's actions to ensure the timely incorporation of non-routine procedural changes into all applicable plant procedures and concluded that the actions were appropriate and should prevent recurrence. This issue was documented in inspection reports 90-10 and 90-15 and was identified during the NRC's review of VY's failure to meet Technical Specification (TS) requirements for emergency diesel generator (EDG) operational testing. During this event, a Yankee Nuclear Services Division (YNSD) calculation that revised EDG load was not timely incorporated into the periodic EDG surveillance testing procedure.

The corrective actions focused on revising both VY and YNSD calculation and analysis procedures to include instructions on the incorporation of plant or equipment changes into the Final Safety Analysis Report (FSAR), TS, procedures, and prints, if required. The inspector reviewed these procedures and determined that the changes appropriately addressed the item. The inspector also reviewed procedures associated with plant modification, design changes, and temporary modifications, and concluded that these procedures also provide appropriate instructions to address this concern. This item is closed.

2.2.3 Inadvertent Primary Containment Isolation System (PCIS) Group I Isolation and Reactor Scram

On March 6 at 7:46 p.m., during the shutdown to enter the refueling/maintenance Outage 16, a PCIS Group I isolation and reactor scram occurred. At the time of this event, the reactor mode switch (RMS) was in "STARTUP," rated core power was less than 1 percent, and reactor system pressure was approaching 800 psig, decreasing. As described in the TS, the PCIS Group I isolation initiates at approximately 800 psig decreasing, only if the RMS is in "RUN." The PCIS Group I isolation and reactor scram functioned properly.

VY had determined that the 800 psig safety function was not bypassed, as required, when the RMS was in "STARTUP" due to poor making and/or breaking of RMS contacts. The initial corrective action has been to electrically verify the status of RMS contacts following switch operation, which will precede activities that rely on RMS positions. This is an interim action until more definitive troubleshooting can be conducted during the outage. This event was promptly and correctly reported to the NRC. The inspectors will review the corrective actions as a result of this event when the LEK is submitted.

3.0 RADIOLOGICAL CONTROLS (71707)

Radiological controls were periodically reviewed to confirm that radiation areas were properly posted, dosimetry was properly worn, and control of material and persons exiting the radiologically controlled area were properly surveyed for contamination. Selected radiological

work activities were observed by the inspector and determined to be in conformance with the applicable radiological work permit and instructions. Routine review of radiation protection practices indicated that the radiological controls program was effective.

4.0 MAINTENANCE AND SURVEILLANCE (62703, 61726, 92700)

4.1 Maintenance Inspection Activity

The inspector observed selected maintenance activities on safety-related equipment to ascertain that these activities were conducted in accordance with approved procedures, TS, and appropriate industry codes and standards.

4.2 Maintenance Observations

4.2.1 "A" EDG Maintenance and Surveillance Testing

On February 19 at 4:20 a.m., the control room operators (CRO) secured the "A" EDG during its monthly TS required surveillance run due to the inability of the governor to control diesel load (kilowatt, KW). After the CRO would make an adjustment to increase or decrease load, the EDG tended to continue to change its load at approximately 2 KW/min. in the direction of the last control input. The CRO considered this behavior abnormal because the KW load changes were of greater magnitude and the governor seemed more sensitive than normal. The combination of CRO inputs and the reaction of the governor to operator inputs, caused the EDG KW output to oscillate outside of the surveillance required band of 2700 +/- 50KW. The oscillation had an amplitude of 50-330 KW on an operator-forced period of 2-6 minutes. The CRO never lost control of the diesel or exceeded operating limits. Based on the inability of the governor to properly control generator KW output and the constant attention required by the CRO, the SS secured the diesel and considered the surveillance incomplete. Even though governor performance was in question, the SS considered the EDG operable based on, (1) his discussions with the OS, and (2) satisfactory diesel performance during previous monthly surveillances and the April 1991 loss of off-site power event.

The Maintenance Department reviewed Service Information Letters (SILs) and contacted the diesel manufacturer, Fairbanks Morse Division of Colt Industries, to ascertain possible causes of this phenomena. VY conducted a series of vendor recommended visual inspections of linkages and fuel system components. No deficiencies were identified. A maintenance engineer stated that based on their initial review, no SILs directly pertained to this condition. He also stated that maintenance requests were previously written to address this condition on both the "A" and "B" EDGs in December and June 1991, respectively. The work was never authorized due to satisfactory diesel performance during the monthly surveillance runs. CROs informed the inspector that both diesels have previously exhibited load oscillations, however, the oscillations had been easily controlled and did not affect the satisfactory completion of the monthly surveillance tests.

On February 20, the Maintenance Department continued their investigation with the assistance of the EDG vendor representative. The TS required monthly surveillance test was again conducted. During this run, the inspector observed the CROs actions to control the diesel. The operator's actions were deliberate and in accordance with the surveillance procedure. The inspector observed the operator adjusting the diesel auto speed adjustment to control load. Again, the controller tended to ramp in the direction of the last operator input. The KW oscillations were smaller than those experienced on the morning of February 19, yet the operator was forced to continually compensate for the instability of the governor. The TS surveillance passed satisfactory.

During the next seven hours of diesel operation to satisfy in-service testing (IST) requirements, the governor droop was adjusted upwards in accordance with a procedure revision. The droop adjustment was made approximately six hours into the diesel run after approximately 1.5 hours of relatively steady state operations. This was to ascertain whether droop affected governor performance. The inspector observed that the longer the diesel operated, the fewer operator actions to control diesel load were needed. The CRO indicated that the sensitivity of the governor decreased following the increase in the droop setting. At approximately 7:30 p.m., the surveillance was satisfactorily completed.

Based on the inspector's observations during diesel operation, discussions with CROs and SSs, and a review of the TS operability requirements that were met by the satisfactory completion of the monthly surveillance test, VY's assessment to maintain the diesel in an operable status was appropriate. The Maintenance Department's decision to continue their investigation to determine the root cause of this condition was appropriate and well focused to support the operability determination.

On February 21, VY determined that the governor for the "A" EDG would be replaced to enhance the performance characteristics of the machine. VY recognized that the operation of safety-related equipment requiring continuous monitoring and interaction by operators does not contribute to safety or efficient control room operations. On February 22, VY replaced the governor, performed the TS required monthly surveillance, and declared the diesel operable. The determination for the root cause of the inability of the governor to control load is continuing. Even though the "B" EDG governor was currently performing satisfactorily, VY will replace the governor when the parts become available (12 week lead time) and plant conditions can support the maintenance activity. The inspector had no further questions on this matter.

4.3 Surveillance Inspection Activity

The inspector performed detailed procedure reviews, witnessed in-progress surveillance testing, and reviewed completed surveillance packages. The inspector verified that the surveillance tests were performed in accordance with TS, approved procedures, and NRC regulations.

4.4 Surveillance Observations

4.4.1 Routine Surveillance Testing Activity

The inspector observed the following surveillance tests in the control room and/or at the location of the equipment tested:

- OP 4121, Rev. 28 "Reactor Core Isolation Cooling System Surveillance"
- OP 4531, Rev. 20 "Radioactive Contamination Surveys"
- OP 4533, Rev. 14 "Airborne Radioactivity Concentration Determination"
- OP 4102, Rev. 22 "Refueling Outage/Fuel Movement Periodic Tests"
- OP 4308, Rev. 11 "Average Power Range Monitor Calibration"
- OP 4313, Rev. 25 "Reactor Water Low Level Scram-Isolation/Lo Lo Level Isolation Functional/Calibration"

The inspector observed that the tests were well controlled by the operators and by the instrumentation and controls technicians. The surveillance tests were performed by qualified and knowledgeable personnel and were conducted using calibrated equipment. Overall, the conduct of testing was considered good.

5.0 EMERGENCY PREPAREDNESS (71707)

5.1 Emergency Response Data System (ERDS)

The status of the ERDS project was last reported in Section 5.3 of Inspection Report 91-14. The ERDS link at VY was considered operational by the NRC in June 1991. In a December 6, 1991 letter to VY, the NRC requested confirmation that the administrative portions of ERDS implementation were complete and that VY was prepared to utilize ERDS to transmit emergency data, as required by the recent change to 10 CFR 50.72. The administrative aspects involving configuration management, and enabling the system at the time of an Alert or higher emergency classification level are described in NUREG-1394, Revision 1, ERDS Implementation. Requirements associated with ERDS are also contained in 10 CFR 50, Appendix E, Section VI.

On January 29, in its letter BVY 92-007, VY informed the NRC that the administrative implementation requirements specified in NUREG-1394 were completed. The inspector reviewed VY Emergency Plan (EP) Implementing Procedures, and station procedures, and noted a number of concerns involving the administrative implementing requirements for enabling the system and configuration management. The first concern involved the EP implementing procedures used for the Alert, Site Area Emergency, and General Emergency (OP 3501, OP

3502, and OP 3503, respectively) which contain instructions to require the Technical Support Center staff to enable the ERDS data link with the NRC, however, no mention is made to activate the link as soon as possible within one hour, as stipulated in 10 CFR 50.72 and NUREG-1394. Secondly, station procedure OP 0452, Rev. 9 "Process Computer Updating," which is used to control process computer software changes, does not address the configuration management features that need to be followed to ensure the integrity of the ERDS hardware and software configuration.

Regarding the first concern, the Emergency Plan Coordinator (EPC) plans to revise the EP implementing procedures OP 3501, OP 3502, and OP 3503 to specifically address the 10 CFR 50.72 requirement. The inspector noted that in the recent annual emergency exercise and a January 13 Communications Test, that VY has demonstrated the ability to meet the timeliness aspects of the enabling requirement. On February 20, the EPC issued changes to the subject EP implementing procedures to further ensure timely activation of the ERDS.

The inspector discussed the use of station procedure OP 0452 to control the configuration management aspects of ERDS, as envisioned by NUREG-1394, with the Reactor and Computer Engineering Supervisor. The supervisor acknowledged the inspector's comments and concerns and plans to revise OP 0452 to satisfy the provisions of NUREG-1394; namely (1) include provisions to allow the NRC to review proposed system modifications which could affect the data communications protocol in advance of these changes, and (2) changes to the Data Point Library should be submitted on the appropriate form to the NRC within thirty days of the change. Since procedure OP 0452 is scheduled for revision by July 1992 for another matter, VY requested this date for completing the necessary changes to address the NUREG-1394 issues. An entry for completion of the procedure revision was made in the VY commitment Tracking System. Actions taken by VY to resolve NRC concerns in this area were appropriate.

6.0 SECURITY (71707, 90712, 92700)

6.1 Observations of Physical Security

Compliance with the security plan was verified on a periodic basis, including the adequacy of staffing, entry control, alarm stations, and physical boundaries.

6.2 Security Response to a Medical Emergency

On February 12 at approximately 9:30 a.m., excellent performance by the VY security force contributed to the quick medical evaluation and transportation of an injured person to a medical facility. The injury occurred during the receipt of goods near the stores warehouse. Decisive, well-controlled actions by security to temporarily release their personnel exclusion measures, allowed the Medical Response Team (MRT) prompt unfettered transition from the PA to the Owner Controlled Area to assist the injured person. During the time the MRT was in this area, security maintained accountability of persons, surveillance on persons and packages, and the

integrity of the PA boundary. The ad hoc measures employed and performance by security to control PA access and maintain surveillance on persons and packages during this plant response was commendable.

6.3 Unescorted Visitors in the Protected Area

On February 12, VY identified three contractor employees badged as visitors and unescorted within the training building located within the PA. One of the three was also determined to be not in possession of his Visitor Badge. The three were part of group of 19 contractors on break from a classroom session. All 19 had already completed General Employee Training (GET). The two escorts assigned were also contractor employees and were a part of the 19 contractors. This event was identified by a VY employee in the vicinity of the training area, who responded to the observation by contacting security. A Security Shift Supervisor (SSS) responded to this event and observed that there was: (1) a lack of understanding of escort responsibilities and of VY's personnel identification and escort requirements, and (2) a general disregard for the seriousness of this event.

Based on the SSS's assessment, VY security management immediately escorted all 19 contractors out of the PA and discussed this event with the contractor's management. Additional corrective actions were to remove site access privileges from two of the 19 contractors involved in the event, and to hold a meeting, attended by an appropriate VY supervisor, to ensure all involved contractor employees understood VY requirements. The Security Supervisor also confirmed that VY's GET adequately covered badging and visitor escort requirements. The inspector concluded that VY's actions were prompt and appropriate.

7.0 ENGINEERING AND TECHNICAL SUPPORT (71707, 92701)

7.1 (Closed) UNR 91-12-02: Carbon Dioxide System Bottle Supports and Restraints

Inspection Report 91-12 documents the NRC's concerns pertaining to the adequacy of the supports and restraints of the Cardox fire suppression system's high pressure carbon dioxide gas cylinders during a seismic event. VY's initial response to this issue was timely and deliberate; however, the item was left open pending VY's further evaluation and corrective actions.

By November 1991, VY completed their review of this issue and the installation of additional supports and restraints for the carbon dioxide cylinders. A review of the seismic qualification of the Cardox system by VY and YNSD determined that the carbon dioxide suppression piping must be qualified, however, no similar requirements exist within the current licensing basis for the gas cylinders. Despite this, a review of industry and regulatory experience in this area was conducted that determined that a high pressure gas cylinder missile hazard resulting from a seismic event with non-seismic bottle restraints in use is credible and poses a potential plant and personnel safety concern.

VY exhibited a commendable safety perspective to install proper seismic restraints to eliminate the potential impact of this concern on plant operations.

7.2 (Closed) UNR 90-09-04: Resolve Issues Associated with Electrical Stroking of Valves After Manual Engagement

In Inspection Report 90-09, the NRC documented that the criteria for affixing caution labels on safety-related valves, and the tracking and documentation of procedures to control and determine operability in meeting the requirements of a procedural precaution requiring motor-operated valves (MOV's) to be electrically stroked following manual operation were unclear. This concern regarded core spray (CS) valves which had caution labels requiring electrical stroking of the valve following manual operation.

The inspector reviewed available VY correspondence associated with this issue, discussed this issue with the Senior Operations Engineer, reviewed the applicable Operations Department Standing Order, reviewed the applicable equipment operating procedures, and concluded that VY's actions to address the operability of MOV's following manual operation were appropriate and resolved the NRC's concerns.

VY has added appropriate information into both the CS and residual heat removal (RHR) procedures to inform operators of the inoperability of MOV's following manual operation which is consistent with the caution labels on the valves. Further, the Standing Order instructs control room operators to declare all MOV's inoperable, following manual engagement or electrical seating or back-seating that bypasses electrical MOV controls, until an engineering evaluation can be performed to determine operability following these types of MOV operations.

Based on the inspector's review of applicable procedures and the actions taken by VY to address this issue, this item is considered closed.

7.3 (Update) Investigation of the Failure of the Advanced Off-Gas (AOG) System Rupture Disk

On January 13 at approximately 1:30 p.m. with the plant at 100 percent of rated power, the "B" AOG train isolated during a maintenance activity to replace the "A" AOG train instrument air filters. The NRC's initial review of this event was documented in Inspection Report 92-01 and concluded that VY actions during this event were appropriate. Subsequently, VY has initiated a series of actions to address the root cause of this event and to prevent recurrence.

Following this event, VY obtained the assistance of YNSD and held a series of meetings and discussions to itemize potential causes, assess the operation of the AOG system, and to evaluate whether the AOG was operated within its design basis following the event. The overall conclusion stated that a steam pressure transient caused system pressure to exceed the burst pressure of the rupture disk. YNSD analysis indicated that the system pressure increased at a rate "more than ten times" than that originally designed. Further, YNSD has identified 10

potential causes that may have contributed to the rapid pressure increase. The majority were associated with system isolation pressure switches and isolation valve performance. A preliminary concern was also related to a possible inadequate design margin for the system to mitigate this pressure transient.

Regarding the operation of the AOG system, the preliminary results by YNSD indicates that VY has operated the AOG system in accordance with its design, however possible areas for improvement were identified with maintenance activities. Recommendations were also made to VY to improve the performance of the AOG system, to ensure that the pressure transient resulting from a dual-train system isolation would not result in a rupture disk burst and a radiation release to the environment.

In response to VY questions regarding whether the AOG system was operated within its design basis, YNSD contends that (1) there were no unreviewed safety questions, (2) the probability or consequences of an accident were not increased, and (3) system operation, with a temporary bucket forming the pressure boundary at the rupture disk, meets the intent of system operation as described in the FSAR.

The inspector concludes that the actions taken by VY engineering to determine the failure mechanism of the rupture disk were appropriate and involved sufficient engineering expertise to resolve this issue. Based on conversations with the cognizant VY engineer, the inspector was assured that VY will continue to review YNSD's recommendations and implement appropriate tests and/or changes intended to improve AOG system operation. The inspector will review VY's corrective action plan when completed and has no further questions on this matter at this time.

8.0 SAFETY ASSESSMENT AND QUALITY VERIFICATION (71707, 40500)

8.1 Periodic and Special Reports

The inspectors reviewed the following periodic and special reports for accuracy and the adequacy of the evaluation:

- Monthly Statistical Report for January 1992
- Monthly Status of Feedwater Nozzle Temperature Monitoring for January 1992
- Report of Fuel Failure Status and Parameter Trends for January 1992
- 1991 Annual Operating Report as Required by 10 CFR 50.59(b)(2)
- 1991 Personnel Exposure Report
- Fitness for Duty Program Data for the Period 7/1/91 to 12/31/91

9.6 MANAGEMENT MEETINGS (30702)

9.1 Preliminary Inspection Findings

At periodic intervals during this inspection, meetings were held with senior plant management to discuss preliminary inspection findings. A summary of findings for the report period was also discussed at the conclusion of the inspection and prior to report issuance. No proprietary information was identified as being included in the report.

9.2 Region Based Inspection Findings

Two Region based inspections were conducted during this inspection period. Inspection findings were discussed with senior plant management at the conclusion of the inspections.

<u>Date</u>	<u>Subject</u>	<u>Rpt. No.</u>	<u>Inspector</u>
02/24-28/92	Emergency Operating Procedures Team Inspection	92-80	P. Bonnett
02/24-28/92	Security Inspection	92-05	R. Albert

9.3 Significant Meetings

On March 4, a meeting was held in Region I to discuss licensed operator requalification (LOR) and training issues, as they pertain to an October, 1991 training program inspection and the current status of the LOR program.