U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Docket/
Report: 50-423/92-23

License No.: NPF-49

Licensee: Northeast Nuclear Energy Company
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Facility: Millstone Nuclear Power Station, Unit 3

Inspection at: Waterford, CT

Dates: August 18, 1992 - September 14, 1992

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Inspection Scope: NRC resident inspector review of the circumstances which led to the inoperability of the hydrogen recombiner system and the auxiliary building filter system.

Results: Four apparent violations of license requirements were identified. Two of these involved the hydrogen recombiner system. Contrary to technical specification requirements, the licensee failed to maintain the 'A' train hydrogen recombiner operable for a period of about 76 days, and both trains were inoperable for six days. The second apparent violation involved the failure to adequately implement the work control process requirements for control of jumper/lifted leads, work order documentation, and retests. The third apparent violation involved the misoperation of the auxiliary building filter (ABF) system since initial plant startup. The licensee failed to control the position of the filter fan variable inlet vanes to the seasonally dependent positions. Once this condition was identified, the licensee inappropriately positioned the vanes to full open which rendered the filter system inoperable. The fourth apparent violation involved the failure to perform surveillance testing of the ABF system in the accident condition.

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DETAILS

1.0 INTRODUCTION

During this inspection, the licensee identified an extended inoperability of two safety systems at Millstone Unit 3. The hydrogen recombiner system was degraded for a period of about 90 days due to inadequate control of a lifted lead during maintenance and failure to perform a maintenance retest prior to returning the system to service. The auxiliary building filter system has been degraded during various periods since initial plant startup because of mispositioned filter fan variable inlet vanes and inadequate periodic surveillance testing to verify operability. The inspectors reviewed both events with particular emphasis on the work control and retest aspects of the hydrogen recombiner inoperability and the knowledge and implementation of the design and operating basis of the auxiliary building filter system.

2.0 INOPERABLE HYDROGEN RECOMBINER SYSTEM

2.1 Background

On August 18, 1992, the licensee identified that the motor leads to the 'A' hydrogen recombiner positive displacement blower were not connected. This resulted in the inability to develop flow through the hydrogen recombiner system which rendered the 'A' hydrogen recombiner system inoperable.

A plant equipment operator (PEO) started the 'A' hydrogen recombiner on August 18 in accordance with surveillance procedure SP 3613A.3, "Hydrogen Recombiner Valve Operability," and noted that the low flow annunciator was lit and that no flow was indicated on the flow meter. The PEO reverified the valve lineup and found that the motor leads to the blower were not terminated. The leads were lying between the motor housing and junction box. The recombiner was stopped and the shift supervisor (SS) was notified. The SS declared the 'A' hydrogen recombiner inoperable and entered the appropriate technical specification (TS) action statement. The recombiner leads were reconnected, but the 'A' hydrogen recombiner remained inoperable for three days to allow for performance of yearly preventive maintenance. The recombiner was returned to service on August 21.

During a review of operating records, the licensee noted that all containment hydrogen removal capability was lost for six days, between August 12 through 17. The 'B' hydrogen recombiner had been removed from service during this period for normal preventive maintenance concurrent with the 'A' recombiner being inoperable since May 17 due to the unterminated motor leads. During this period, the plant operated in modes 1 and 2 from June 3 through August 21, 1992. The licensee notified the NRC of this event on August 18 in accordance with 10 CFR 50.72 as a loss of accident mitigation capability.

The licensee established a task force to investigate this event. The investigation revealed that during a planned maintenance outage on May 17, 1992, isolation was established for the 'A' hydrogen recombiner and a work order (M3-91-20828) was processed to perform the yearly preventive maintenance including lubrication of the blower motor bearings, oil change for the blower gearbox, and inspection of the coupling. The work required de-termination of the motor leads in order to gain access to the blower. On May 22 the leads were disconnected in preparation for work on the blower. On May 24 operations recalled the work order. The reason for the recall could not be established. T' tags were lifted and the work package was returned to maintenance as work not authorized for performance. No maintenance retest was performed because operations had assumed that no work had been performed on the system. On June 17 the work order was canceled and discarded and a new work order created for performance of the preventive maintenance.

2.2 Hydrogen Recombiner System Design and Testing

The hydrogen recombiner system is designed to maintain the containment hydrogen concentration below its flammable limit (four volume percent) during a design basis loss of coolant accident. This system recombines hydrogen with oxygen from the containment atmosphere to form water using two redundant 100 percent capacity trains. The positive displacement blower provides the motive force to draw air from the containment building, to circulate it through the recombiner system, and to return it to the containment structure. The recombiners are manually actuated after an accident at the discretion of the Director of Station Emergency Operations. Either recombiner unit or the non safety-related mechanical vacuum pumps are capable of controlling the expected hydrogen generation. Licensee analysis has shown that if a single hydrogen recombiner is started as late as 24 hours following a design basis accident (DBA), containment hydrogen concentration will remain less than four volume percent. With no operating hydrogen recombiners, the containment hydrogen concentration is predicted to reach four volume percent in about seven days following a DBA.

Technical Specification (TS) 3.6.4 requires that two operable hydrogen recombiner trains be operable when the plant is in operational modes 1 or 2. With one train of the hydrogen recombiner system inoperable, the train must be restored to operable status within 30 days or the plant must be placed in at least hot standby within the next six hours. The TS surveillance requirements specify that at least once per six months each hydrogen recombiner shall be demonstrated operable by verifying during the hydrogen recombiner system functional test that the minimum reaction chamber gas temperature increases to greater than or equal to 700°F within 90 minutes and is maintained for at least two hours, and that the purge blower operates for 15 minutes. Satisfactory completion of surveillance procedure SP 3613A.3 fulfills these TS surveillance requirements. The last successful completion of this test was on May 13, 1992, for both trains.

2.3 Maintenance Work Control and Retest

The process for controlling work at Millstone is outlined by several administrative control procedures (ACPs). The parent procedure is ACP-QA-2.02C, "Work Orders," Revision 30. Other work control procedures pertinent to this event include ACP-QA-2.02B, "Retests," Revision 13; ACP-QA-2.06A, "Station Tagging," Revision 20; ACP-QA-2.06B, "Jumper, Lifted Lead, and Bypass Control (NEO 8.05)," Revision 11; and ACP-QA-2.06C, "Station Bypass/Jumper Control for Troubleshooting, Red Lining, and Calibration," Revision 4.

The inspector noted that in accordance with these administrative procedures, the required process for controlling the preventive maintenance of the hydrogen recombiner was as follows. Maintenance personnel identify the need to perform preventive maintenance of the hydrogen recombiners. An automated work order (AWO) is generated by the maintenance planning organization under the direction of the lead department head. The information provided in the AWO is to include the quality category of the component, the specific procedures to be used, information relevant to the work scope, and retest requirements (if known). Once the AWO is originated, the lead department head or designee must review the AWO to verify that the required information and attachments have been provided and make any changes or additions as necessary. Based on this individual's knowledge of the work scope, the minimum retest requirements are established. The AWO is then forwarded to the operations department for work authorization.

The shift supervisor (SS), senior control room supervisor, operations work coordinator, or designated senior reactor operator are required to review the AWO prior to authorization to verify that: the lead department review was completed; the specified safety tagging provides adequate protection; the retest requirements adequately address all modes of operations in which the component may be required to function; and, inclusion of any necessary additional information such as bypass/jumpers. Administrative controls are required for jumper/lifted leads and bypasses which make safety-related equipment inoperable. The jumpered device must be controlled and clearly tracked to ensure complete restoration of the component. Retests are required to be performed following any maintenance which could affect the proper functioning of the safety-related component. Prior to placing the safety-related system out-of-service, the SS directs performance of any required technical specification surveillance testing to verify operability of redundant safety systems. Subsequently, the SS or designee may authorize work to begin.

The performance of work is conducted under the supervision of the job leader. This individual is responsible for ensuring that a wide variety of requirements relating to this job are met including: personnel safety, procedural adherence, radiological controls and security program requirements, and reporting of abnormal conditions. When the job is completed, the job leader records any information that would be of historical value in the AWO; this includes documenting actual work performed in the space provided. The job leader must sign the AWO indicating that work was completed and include in the package any other documentation which would be of historical value such as the completed procedures and completed forms used during the work process (e.g., the jumper/lifted lead installation checklist). The AWO is then returned to the operations department for retest.

If the job is not finished before the equipment is required to be returned to service, the job leader is expected to consult with the SS to determine the safe status of the equipment and return the unsigned AWO to the operations department. Work orders may not be canceled if any work was performed. In this case, the work description should be changed to describe the work that was completed and the AWO process should continue as normal.

When the AWO is received by the operations department, the SS or designee will verify that the work completion block has been signed and then clear the safety tags. Prior to taking credit for safety-related systems required by TS, the SS must verify system operability as defined by TS. Once the retest is completed satisfactorily and documented, the SS or designee must review the AWO package for completeness including verification that the actual work performed addressed the problem, the safety tags have been cleared, and the retest ensures the equipment operability. Then the AWO is forwarded to the lead department.

The lead department planner will review the package for completeness and update the administrative control systems for the component on which work was performed. The lead department head or designee will review the final work package and forward the package to the nuclear plant record facility for incorporation into the plant archives.

2.4 Maintenance of the 'A' Hydrogen Recombiner

For the performance of the 'A' hydrogen recombiner yearly preventive maintenance, AWO M3-91-20828 was created. The actual work package was unavailable for review during this inspection because it had been canceled and subsequently discarded after the operations department recalled the work package and rescinded the authorization to work. The inspectors reviewed the computer record of the original AWO in the Preventive Maintenance Management System (PMMS). The following information was provided:

- Problem Description: "EEQ, 1 year required maintenance -- lubrication"
- Job Description: "EEQ, 1 year required maintenance -- (1) lubricate the compressor motor bearing (2) change the oil in the compressor gearbox (3) inspect the coupling
- Procedure: 3710AA-157M and 3710AA-157P

The procedures referenced are one page maintenance instructions. Instruction 3710AA-157P addresses the maintenance lubrication technique for the positive displacement blower gearbox oil change, and instruction 3710AA-157M addresses the lubrication of the blower motor bearings. The inspectors noted that no job description or instructions were provided for either de-termination of the blower motor leads (which is necessary to gain access to the blower motor) or control of these lifted leads. Additionally, no retest requirements or procedures were specified. The PMMS records indicate that the AWO was recalled by the operations department and subsequently canceled.

Despite the lack of records available documenting the AWO, the maintenance department night shift log indicates that the 'A' hydrogen recombiner motor leads were lifted as a result of this maintenance activity and the recombiner was not restored following cancellation of the activity. A maintenance retest was not performed upon return of the hydrogen recombiner to service. Based on the inspector review of the available information, it was apparent that the implementation of the work control process requirements for AWO job description, retest performance, lifted lead control, actual work documentation, and work order inclusion in the permanent plant record was not adequate.

2.5 Corrective Actions

As immediate corrective action the licensee reconnected the motor leads to the 'A' hydrogen recombiner and returned the system to service on August 21 following performance of preventive maintenance and operability testing. The 'B' hydrogen recombiner was operable at the time of discovery.

A task force was assembled and chartered to review the event. The task force recommended two actions for the maintenance department. The first suggested that the maintenance department review work procedures for completeness to ensure that necessary detail is provided in the preventive maintenance procedures and that retests be incorporated in the procedures as applicable. The second suggested further departmental training on the work control process with department personnel assisting in the development and presentation. The task force also recommended that a plant modification be considered to modify the hydrogen recombiner motor wiring to make de-terminating unnecessary when performing annual preventive maintenance.

The operations department issued night order 3-92-098, dated August 28, which instructs the department not to de-authorize work orders in the future, and not to accept work orders for return to service unless the work completion signature block has been signed. The maintenance department has verbally reinforced that the job task be sufficiently described in the job description section of the work order. The maintenance department is considering separating work packages which require electrical and mechanical work into separate work orders.

2.6 Inspector Assessment

The inspectors reviewed the available maintenance information regarding the inoperable hydrogen recombiners and the applicable procedures as well as the licensee's evaluation of this event. Several weaknesses were identified in work control process implementation for this maintenance activity. The validity of these observations was reconfirmed when the inspectors reviewed the maintenance records for preventive maintenance of the hydrogen recombiners during the last three years.

The yearly preventive maintenance was performed six times between November 1989 and October 1991. Two of these six work packages (M3-90-21458 and M3-91-14879) were deficient in that the description of the job and the documentation of work performed did not address the lifted leads. There was no record of controls for the lifted leads to ensure re-termination of the leads, and there were no retest requirements specified. Step 6.15 of ACP-QA-2.02C requires that the job description clearly and quantitatively defines the scope of the work to be performed. Procedure step 6.6.2 requires that the job leader ensure that the actual work completed is included in the work order documentation and that the jumper/lifted lead checklist (station form (SF) 235) is included in the completed work package. Step 6.2 of ACP-QA-2.06B requires that a jumper/lifted lead device be controlled by either an approved procedure, a tag out procedure, or a work order. In all cases, there must be a clear means to track all equipment alterations to ensure complete restoration of the equipment involved. Retest requirements are to be specified in accordance with step 6.7 of ACP-QA-2.02C and ACP-QA-2.02B to ensure that safety-related system operability is verified following any maintenance which could affect the proper system functioning. The failure to implement these requirements of the work control process is an apparent violation of TS 6.8.1 and plant procedures.

The inspectors reviewed the licensee's preliminary task force assessment of the event and recommended corrective actions. Due to conflicting information obtained from the parties involved, the investigation could not determine why the work order was returned to operations or if the work package contained documentation that the leads had been lifted. The task force made several conclusions regarding the weaknesses in the work control process. These conclusions were presented to the plant operations review committee (PORC) on September 11.

The inspectors attended one of the several PORC meetings and observed that the pertinent concerns relating to this event were discussed and that the committee members critically assessed the scope and conclusions of the task force. However, the inspectors noted that the task force and PORC did not consider two aspects of this event. Had the task force reviewed the maintenance history for the recombiners, they would have identified that in two recent cases, the jumpers/lifted lead control and retest requirements of the work control process described in section 2.3 were not implemented adequately. These observations were discussed with the unit director following the PORC meeting.

Hydrogen recombiner system operability is required by TS 3.6.4.2 when the plant is in operational modes 1 and 2. Continued power operations are permitted for 30 days when one train of the system is inoperable. With no operable hydrogen recombiners, the licensee must enter TS 3.0.3 and within one hour take action to place the plant in a condition in which the recombiners are not required. The 'A' train hydrogen recombiner system was inoperable between May 17, 1992, and August 21, 1992. During this period, the recombiners were required to be operable for about 76 days while the plant operated in modes 1 and 2. Furthermore, the 'B' train hydrogen recombiner was inoperable during preventive maintenance for six days between August 12, 1992, and August 17, 1992, when no safety-related hydrogen removal capability existed. Although the system was inoperable it was not called upon to perform its safety function. Additionally, a non safety-related backup system was available to reduce the containment hydrogen concentration should it have been necessary. Operation of this backup system under accident conditions results in a controlled release to the environment. The hydrogen recombiners are manually initiated following a DBA at the discretion of the Director of Emergency Operations. The general area of the recombiner control panels is accessible and evaluated for access following an accident. Access to the hydrogen recombiner cubicle to restore equipment operability would require some additional evaluation.

The failure to maintain the required hydrogen recombiner operability is an apparent violation of TS 3.6.4.2 and TS 3.0.3.

3.0 MISPOSITIONED AUXILIARY BUILDING FILTER FAN INLET VANES

3.1 Background

On July 4, 1992, with the plant at 78% power, the licensee identified an auxiliary building ventilation duct access door open on the common suction plenum of both auxiliary building filters (ABFs). The licensee determined that this rendered both trains of the ABF system inoperable. The access door is approximately four foot square and can only be reached by the use of a ladder. The open access door is assumed to have a non-conservative effect on the amount of air removed by the ABF system in that it may result in a reduction in flow from the analyzed areas of the auxiliary building through the ABF system.

On July 4 an operator on rounds notified the control room of an open ventilation duct access door on the ABF system. The access door provides access to a damper leading to the filter exhaust fans, 3HVR*FN6A/B. The access door was closed and latched. The licensee initially concluded that only one train of the ABF system had been inoperable. Further investigation revealed that both trains were affected and thus rendered inoperable. The licensee notified the NRC of this event in accordance with 10 CFR 50.72(b)(2)(iii)(C).

The licensee established a task force to investigate this event. The licensee concluded that the closure handles to the access door vibrated open during a June 18 surveillance. The licensee also identified that the variable inlet vanes (VIVs) to the filter exhaust fan were manually set at 20% open vice in automatic. Further investigation revealed that during pre-operational testing the licensee determined that the VIVs should be placed at 20% open in the winter and 100% open in the summer to maintain system performance. These criteria were never clearly defined or implemented. Operations had kept the VIVs set at 20% since initial startup except during surveillance testing; then they put the VIVs in automatic. On July 11 the VIVs were set at 100% as required by the summer mode of operation. Subsequent testing conducted by the licensee on August 24 revealed that both trains of the ABF system would not have started under these conditions. The licensee entered the appropriate technical specification (TS) action statement and notified the NRC of the event. Testing was continued until satisfactory operation was achieved and the licensee exited the TS action statement. Test results showed that the 'A' train exhaust fan would start in the summer mode lineup with the VIVs fixed at 50% and the 'B' train fixed at 20%.

3.2 Auxiliary Building Filter System Design

The auxiliary building general area ventilation supplies outside air to and exhausts air from all auxiliary building areas except the charging and reactor plant component cooling water (CH/CCW) pump and heat exchanger areas. The CH/CCW subsystem has its own supply and exhaust fans to control temperature in the area. When the ABF system is in the automatic mode of operation, modulating dampers position to maintain the charging pump cubicles and CCW heat exchanger area temperature above 65°F. The modulating dampers are controlled with reference to air temperature in the discharge duct of exhaust fan, 3HVR*FN13A/B (see Attachment 1). As ambient temperature in the CH/CCW area decreases, modulating dampers move to reduce fresh air supply and increase recirculation flow.

In the event of a safety injection signal (SIS), the general area ventilation shuts down, the ABF supply and exhaust fans continue to operate, and the discharge damper realigns to discharge through the filter fan. The filter inlet and outlet dampers open and the filter exhaust fan gets a start signal. In the event of a SIS, the ABF ventilation system is designed to filter building effluent prior to release through the plant ventilation vent on the turbine building roof. The ABF ensures that radioactive materials leaking from plant equipment in the charging pump and CCW heat exchanger areas following a loss of coolant accident (LOCA) are filtered prior to discharge. The ABF system also operates to provide exhaust from the CH/CCW pump and heat exchanger area to remove heat generated during an accident to prevent equipment failure. In addition, the system assists SLCRS in maintaining a negative pressure in the auxiliary building. This is accomplished by exhausting more air than is brought into the auxiliary building by the CH/CCW pump area ventilation supply fans, HVR*FN14A/B. The two systems are tested together to demonstrate the ability of SLCRS to achieve a negative 0.25 inch water gage pressure within 50 seconds inside the secondary enclosure buildings during the secondary enclosure drawdown test. Each ABF train filters 30,000 cubic feet per minute (cfm). Each SLCRS fan processes about 9500 cfm; of this about 2,700 cfm air from the auxiliary building. Final Safety Analysis Report Section 15.6.5.4. addresses the radiological consequences of a LOCA and takes credit for the SLCRS and ABF systems in the computation of off-site radiological doses.

3.3 History of System Operation

On July 4 the licensee declared both trains of the ABF system inoperable when a ductwork access door was found open. The licensee entered TS 3.0.3 and latched shut the access door. The control room was notified previously of this condition on two separate occasions, June 29 and June 30, but failed to act on this information until a third notification was received in the control room on July 4. During the investigation into the effects of the open door to the common inlet ducting the licensee identified that the filter exhaust fan VIVs were positioned in manual at 20% open vice the specified 100% position for this time of year. (Attachment 2 provides a sequence of the significant events regarding this problem.)

During pre-operational and startup testing NNECO determined that successful automatic operation of the filter exhaust fan and its associated VIV could not be achieved. The licensee identified problems with the VIV in the automatic mode (i.e., fan FN6A/B cycling, system pressure fluctuations, and fan instability). Pre-operational testing determined that as a temporary resolution the VIVs should be placed in seasonally dependant positions (100% during the summer and 20% during the winter) to ensure system operation. An outstanding startup deficiency report was issued regarding the ABF system which stated that a potential problem/concern existed and that the system operating procedure should be revised to indicate setting the VIVs in the seasonally dependent positions. This interim deficiency resolution was neither clearly established nor controlled; the VIVs were set at 20% and remained in this position. Operations have kept the VIVs set at 20% since initial startup except during supplementary leak collection and release system (SLCRS), auxiliary building ventilation, and engineered safety features (ESF) actuation surveillance testing when the VIVs were placed in automatic.

On July 11 the licensee placed the VIVs at 100% in accordance with the pre-operational testing data, information obtained by the engineering department from the auxiliary building monthly surveillance tests, and the May 19, 1992, Inservice Test (IST) 3-92-14, "SLCRS Drawdown With Boundary Breech and Modulating Damper Test."

During system evaluation subsequent to July 11 it was determined that the monthly surveillance was being performed with an additional fan supplying air to the filter system. This factor was overlooked in determining the position of the VIVs on July 11. On August 24 the licensee performed IST 3-92-017, "Test Run of Auxiliary Building Filter Fans with VIVs at 100% Open," to verify the operating parameters of the auxiliary building filter system with the provision to adjust the VIVs in 10% increments until satisfactory operation was achieved. During the test it was identified that with the VIVs 100% open and with the auxiliary building temperature indicating controller manually positioned at 100% output (closed) the auxiliary building filter fans tripped due to low suction pressure. Subsequent testing that day established system operability with the 'A' train VIV at 50% and the 'B' train VIV at 20%. The licensee entered Technical Specification 3.0.3 and declared both trains of the ABF inoperable for about two hours until one of the trains was restored. The licensee then performed SLCRS drawdown tests at the new VIV positions to provide assurance that SLCRS would meet its design basis.

On August 25th, the licensee issued bypass jumper 3-92-036 to maintain a dependable emergency configuration of the auxiliary building emergency filter system and to document the settings of the VIVs and the temperature controller in manual to establish an acceptable summer mode of operation, i.e., maximum amount of fresh air into the building with minimum recirculation. The bypass jumper was to be removed or reevaluated on or before September 15 to minimize the potential of cold weather exposure.

On August 27 the licensee performed IST 3-92-018, "Test Run of Auxiliary Building Filter Fans with VIVs in Manual at 20%," to determine the affect on the ABF system with the VIVs at 20% in the worst case summer and winter modes. With the system in the most restrictive summer mode, recirculation damper fully closed and the supply and exhaust damper fully open, both trains of filter fans operated. With the system in the most restrictive winter mode, recirculation damper fully open and the supply and exhaust damper fully closed, both trains of filter fans tripped. Therefore, during system operation in the worst case winter mode, the ABF system would have been unable to perform its safety function. The effect of automatic damper modulation with the VIVs in a fixed position has not yet been tested. The ability of the filter exhaust fans to start in an accident mode with the VIVs in automatic also has not been satisfactorily verified.

On September 14 bypass jumper 3-92-040, which superceded the August 25 jumper, was approved to address continued operability of the ABF system. Since the prior tests had demonstrated the ability of the ABF system to start and operate with dampers fixed in certain positions, the safety concern addressed by the jumper was the continued ability of the ABF system to maintain auxiliary building temperatures in this configuration. The new jumper provided that system controls could remain in manual until October 31, 1992, with the following provisions.

- Outside air temperature will be monitored each shift until temperature drops below 32°F, at which time monitoring periodicity increases to twice per shift. The data will be documented in the control room log. The boric acid precipitation temperature for normal charging system boron concentration is less than 32°F. The heat generated from components operating in the accident condition results in a 14°F temperature rise in the charging pump area. This allows operation of these components down to an outside air temperature of 18°F and still maintaining 32°F in the safety-related areas. The design basis low temperature for the area is 32°F.

- If the outside air temperature drops below 20°F the CH and CCW ventilation system will be taken out of manual and placed in automatic. The filter exhaust fan, temperature control recirculation damper, and the VIV will be positioned in automatic. The 'A' train of the ABF filter fan will be placed in pull-to-lock and declared inoperable in accordance with TS 3.7.9. This configuration has been proven to provide an operable 'B' train based on inservice and surveillance test results.

The inspector concluded that given the data on ABF system testing to date that these conditions would reasonably assure continued system performance.

Technical Specification 3.7.9 requires that when the plant is in operational modes 1 through 4, two independent ABF systems must be operable. With one system inoperable, the system must be returned to service within seven days or the unit must be placed in hot standby within six hours and cold shutdown within the following 30 hours. Technical Specification 3.0.3 requires that when a limiting condition for operation is not met within one hour, actions shall be initiated to place the unit in a mode in which the specification does not apply. For the periods of power operation between initial startup and July 11, 1992, the ABF system VIVs were set in manual at 20% open rather than in the configuration used during system operability testing. In addition, between July 11 and August 24 the VIVs were set at 100% open which rendered both ABF systems inoperable. This is an apparent violation.

3.4 System Testing

Technical Specification (TS) surveillance requirement 4.7.9 specifies that each auxiliary building filter (ABF) system shall be demonstrated operable at least once per 31 days on a staggered basis by initiating, from the control room, flow through the filters and verifying a system flow rate of 30,000 cfm +/-10% and that the system operates for at least 10 continuous hours with the heaters operating. Specification 4.7.9.d(2) requires at least once per 18 months a verification that the system starts on a safety injection test signal. Surveillance Procedures SP 3614A.1, "Auxiliary Building Filter System Operability Test," and SP 3646A.17, "Train A Engineered Safety Features with Loss of Power," are conducted to fulfill these requirements.

The inspector reviewed these surveillance procedures and noted that in each case the procedures referenced aligning the auxiliary building heating ventilation and air conditioning system per operating procedure OP 3314A, "Auxiliary Building Heating Ventilation and Air Conditioning." When aligning the ABF system as specified per SP 3614A.1, the system is reconfigured by closing the normal exhaust dampers and opening the filter supply dampers. The VIV is then placed in automatic control prior to starting its filter exhaust fan. The procedure also requires starting auxiliary ventilation exhaust fan 3HVR-FN7. When aligning the ABF system as required by SP 3646A.17 all auxiliary ventilation is secured except for the CH/CCW ventilation system. The system is aligned to filtered exhaust, the VIVs placed in automatic, and the filter exhaust fan started. In both cases the filter exhaust fan is started with the VIVs in automatic vice a seasonally dependant position. The inspector noted that the VIVs do not get a signal to go to automatic control on an engineered safety features actuation signal. At the completion of the surveillance procedures the system is returned to normal exhaust in accordance with OP 3314A and the VIVs are placed into the manual seasonally dependant position. The inspector noted that the ABF system is not tested in its design basis accident operating mode during system operability testing, in that the VIVs are placed in the automatic mode prior to initiating the surveillance procedures. In this mode, the VIVs go to the 100 percent open position for system start instead of having the VIVs fixed at 20 percent.

The supplementary collection and release system (SLCRS) TS surveillance requirement (TS 4.6.6.1.d(3)) specifies that at least once per 18 months each train of SLCRS must be tested to verify that each train produces a negative pressure of greater than or equal to 0.25 inch water gauge in the secondary enclosure building within 50 seconds after a start signal. Surveillance SP 36141.3, "Supplemental Leak Collection and Release System," is conducted to fulfill this requirement.

The inspector reviewed SP 36141.3 and noted that the SLCRS test is not performed in a design basis accident mode. The ABF ventilation system is verified in operation prior to the performance of this test with the VIV in automatic. The inspector also noted that the negative pressure test rigs are placed in their associated test locations for a minimum of 24 hours with their test valves open prior to the performance of the surveillance. Therefore, the differential pressure measured compares initial building pressure to final building pressure. However, during realignment of the ABF ventilation system, the exhaust dampers are shut and aligned to filtered exhaust with the supply fan, FN14, and exhaust fan, FN13, running. During this period of time the auxiliary building pressure would be increasing until the filter exhaust dampers open and the filter exhaust fan is started. The test rig valves are closed after the exhaust path has been secured. The inspector noted that upon an SI signal with a loss of power the ABF ventilation equipment does not get a start signal until 35 seconds after the SLCRS fan gets a start signal. The inspector questioned the licensee regarding the ability of the SLCRS to draw and maintain the required vacuum without the assistance of the ABF ventilation system. The licensee provided the inspector with startup test procedure T3314IP, "SLCRS Phase II Testing," which demonstrated the ability of SLCRS to draw the required vacuum in the various areas without assistance by the ABF system. No similar test has been conducted on a recurring basis.

3.5 Corrective Actions

As immediate corrective action, the licensee latched and locked wired shut the ABF ductwork access door. An internal task force was formed to ensure that the system remains operable at all times, to determine the impact of the VIVs set at the manual open 20% position, and to ensure that surveillance testing requirements are being run using repeatable conditions and that the results of the tests are consistent with accident usage. The licensee has performed testing and concluded that with the 'A' train VIV at 50% open, the 'B' train VIV at 20% open, and the temperature control recirculation damper fully closed in manual, satisfactory system performance is assured. The licensee is continuing to perform further evaluation of system performance/behavior. Regarding the delay in investigation of the open ductwork access door, the licensee intends to strengthen the way incoming system reports are handled by the control room. As part of the operator requalification training, the operations department expectations regarding operators' initiatives in investigating abnormal or unusual conditions will be reinforced.

3.6 Licensee Analysis of Startup Issues

Issues regarding the ABF system operation had been raised during preoperational testing of Unit 3. The inspector questioned the review process of these issues and how this potentially safety significant item was not previously addressed. The licensee provided the following information.

Prior to startup of Unit 3 in 1985, the licensee had compiled a list of over 12,000 open items. The nature of these items varied widely from cosmetic items to system operational issues. The startup joint test group (JTG), comprised of construction contractors and licensee personnel, conducted a review of these items prior to startup to determine which items were potential startup hold points or safety issues. All of the items remaining following startup (January 1986) were compiled in a database file. These items were reconciled into a comprehensive list and worked to completion by a backlog task force comprised of construction contractor engineers. By January 1988, the list had been reduced to about 1,100 items. Within the next year the backlog task force was disbanded. The responsibility for these items was transferred to Unit 3 engineering personnel. The items were reconciled into 382 items and transferred into other established tracking systems. Two hundred thirty-seven items became plant modification requests (PMRs); 143 items became nonconformance reports (NCRs); and 2 items were closed prior to the transfer. The backlog of items continued to be worked off by the Unit 3 engineering staff. As of September 1992 the item status is as follows: 9 items are closed; 50 items are nearly closed; and 323 items remain open.

The inspectors questioned the licensee's basis that no more unaddressed safety issues exist in these open items. The licensee stated that the groups which had reviewed this list since before initial plant startup had missed the significance of the ABF issue. The basis of the conclusion not to resolve this issue or implement strict controls more promptly and the applicability of this basis to other open items were not apparent. The licensee further stated that beginning January 1993 an onsite engineering group will be assembled to reduce the engineering backlog of these startup issues and other issues developed since startup. This is expected to be a five year effort. This matter is unresolved (50-423/92-23-01) pending further NRC review of the safety significance of the remaining startup issues and the licensee's schedule for resolving them.

3.7 Inspector Assessment

The inspectors concluded that since initial startup the licensee was not fully unaware of the ABF system design basis and operating parameters. Although this issue was identified as an open item prior to initial plant startup, and although there were several opportunities for identification of the safety issue, the licensee did not adequately evaluate the potential safety significance of the system operating limitations. In addition, since initial startup, ABF system operability testing has been conducted in a configuration other than the accident configuration and, therefore, has not demonstrated that the system would function as designed following an accident. Also, the ability of SLCRS to draw and maintain a vacuum without the assistance of the ABF system has not been tested since initial startup. The failure to test ABF and SLCRS in the accident mode of operation is an apparent violation of 10 CFR 50, Appendix B, Criterion XI, "Test Control," which requires testing be performed which incorporates the requirements and acceptance limits contained in applicable design documents.

Following identification of the concern on July 11, the licensee assumed that the full open position of the VIVs was the most conservative. Verification of this assumption occurred over six weeks later (August 24) and resulted in the identification that the ABF system was further degraded by this repositioning of the VIVs. This demonstrated poor engineering judgement and weak management oversight of system configuration control.

Once the full scope of the ABF problem was identified in August, the licensee implemented well-developed corrective actions to ensure temporary system operability. Plant operation review committee assessments of the bypass/jumper safety evaluations were thorough and all of the required administrative actions and contingency plans were developed fully.

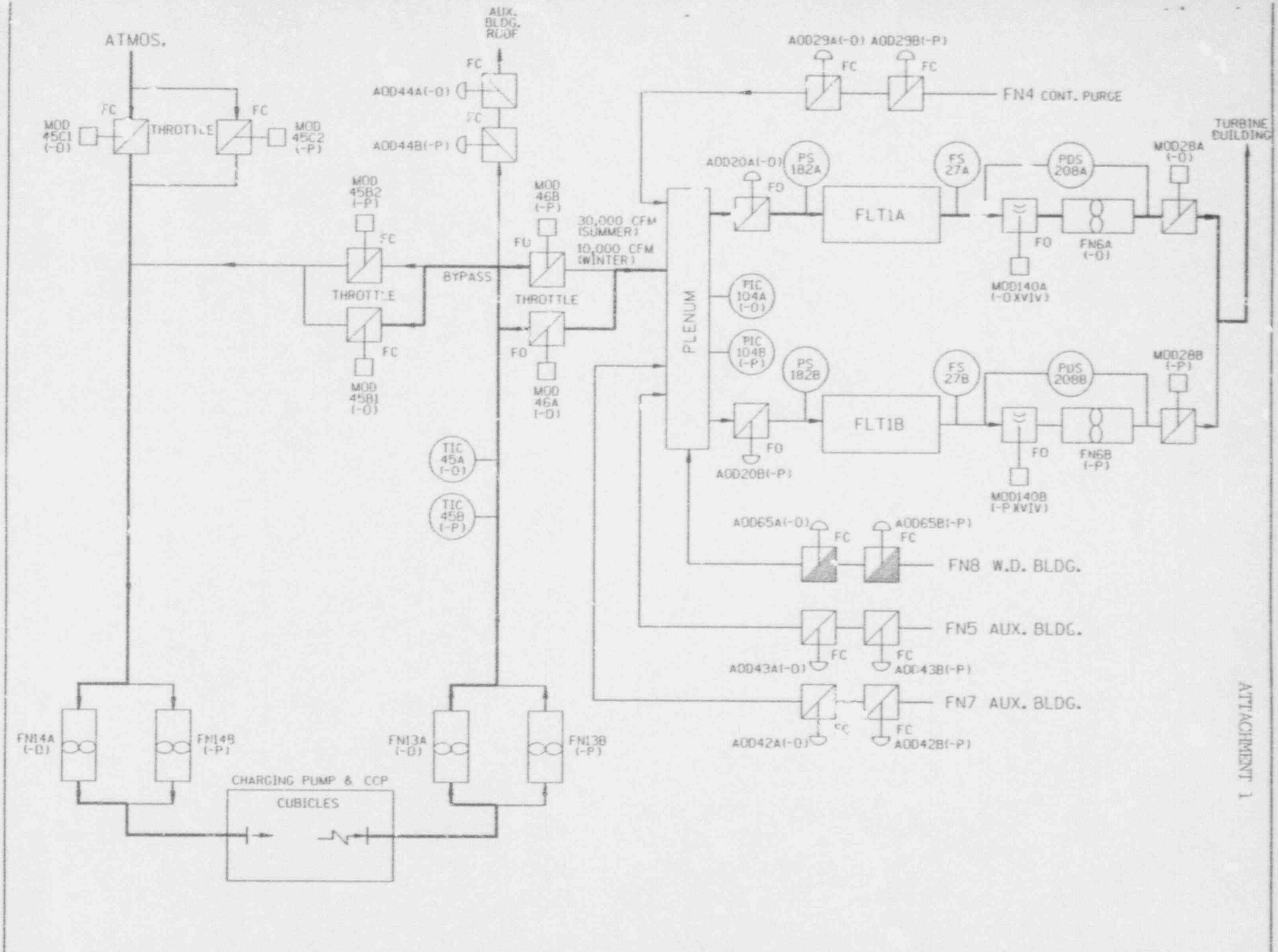
The safety significance of this event was reduced since in the event the system did not automatically actuate, operators could have started the system from the control room using normal operating procedures. The failure of the ABF system to restart following an accident would have been annunciated on the main control board.

If a LOCA occurs when two ABF trains are out of service, the licensee determined that the thyroid doses to the low population zone and exclusion area boundary would be affected. An increase in dose is anticipated in the low population zone over a 30 day period. The anticipated dose in the low population zone remains below the Part 100 limit of 300 Rem. However, the exclusion area boundary is predicted to exceed the 300 rem thyroid dose limit in this scenario.

The inspectors concluded that the operability of the ABF system was indeterminate between initial startup and July 11, 1992. Furthermore, the system was made inoperable between July 11 and August 24, 1992, by repositioning the VIVs to full open. This is an apparent violation of Technical Specifications 3.7.9 and 3.0.3

4.0 EXIT MEETING

At the conclusion of this inspection, the inspectors discussed the findings of this inspection with station management at an exit meeting on September 23, 1992. No written material regarding this inspection was provided to the licensee.



ATTACHMENT 1

ATTACHMENT 2

AUXILIARY BUILDING FILTER SYSTEM
SEQUENCE OF SIGNIFICANT EVENTS

1986	Auxiliary Building Filter (ABF) system variable inlet vanes (VIVs) positioned in manual at 20% due to a startup test deficiency. No procedure established to reset the VIVs to 100% based on seasonal temperature variations.
5/19/92	Performed IST 3-92-014 to determine SLCRS operability due to a previous corrected enclosure building breach (feedwater isolation valve bypass lines penetration). The VIVs were in automatic control during the test and the VIVs stabilize as follows: • summer mode - A train VIV at 40% B train at 18% • winter mode - A train VIV at 8% B train at 3% Because the VIVs were normally set in manual at 20%, NNECO engineering questioned the test results of the A train VIV.
6/29/92	An electrician working on a damper noted that the access door on the common inlet duct work to the ABF unit was open and notified the control room. No corrective action resulted.
6/30/92	Resident inspector independently noted that the ABF duct door was open - notified a health physics (HP) technician who notified the control room. No corrective action resulted.
7/4/92	A plant equipment operator noted the door on the common intake plenum for the ABF system was open and notified the control room. The control room staff determined that this may result in both trains of the ABF system being inoperable and entered technical specification (TS) 3.0.3. The access door was shut and TS 3.0.3 exited. Licensee event report 92-016-00 attributed the cause of the event to be vibration during the surveillance performed on 6/18/92.
7/11/92	The VIVs were positioned at 100% - based upon engineering evaluation of the 5/19/92 question regarding the A train VIV which stabilized above 20%; and the knowledge that during the monthly ABF surveillance with the VIVs in automatic the VIVs stabilize at 100%. Engineering was unaware that fan FN7 was running during the performance of this test. Bypass jumper 3-92-030 was issued to establish the ABF system in this lineup.
7/30/92	During monthly surveillance of the A train ABF system with the VIV at 20% vice in the automatic mode, filter fan FN6A tripped.

8/5/92	Engineering review of the July 30 test identified that fan FN7 was in operation during the monthly surveillance tests.
8/24/92	Performed IST 3-92-017 to verify ABF system operability with the VIV at 100% with provisions to reduce the position in 10% increments if the test failed. Fan FN7 was secured during the test. Both filter fans (FN6A/B) tripped with the VIVs at 100%; the licensee entered TS 3.0.3. Further testing determined that the A train VIV should be positioned at 50% and the B train at 20%. The licensee exited TS 3.0.3 after resetting the VIVs.
8/25/92	Bypass jumper 3-92-036 was initiated to document/approve the new VIV settings.
8/27/92	Performed IST 3-92-018 to determine the affects on ABF system operability of the VIVs at 20% in the worst case summer and winter modes. With the system aligned in the most restrictive summer mode filter fans FN6A/B operated. With the system aligned in the most restrictive winter mode (recirculation damper full open and the building supply and exhaust dampers fully closed) filter fans FN6A/B tripped.
8/31/92	The licensee issued bypass jumper 3-92-036 which expired on 9/15/92, to reposition the VIVs at 50 and 20 percent and places the recirculation damper in the manual closed (summer) position.
9/14/92	Bypass jumper 3-92-040 was issued to replace jumper 3-92-036 extending the present alignment until 10/31/92 with additional compensatory measures.