U.S. NUCLEAR REGULATORY COMMISSION

REGION V

Report No: 50-397/91-44

Docket No: 50-397

Licensee: Washington Public Power Supply System
P. O. Box 968
Richland, WA 99352

Facility Name: Washington Nuclear Project No. 2 (WNP-2)

Inspection at: WNP-2 site near Richland, Washington

Inspection Conducted: November 4 - December 8, 1991

Inspectors: R C Sorensen 12/11/91
R. C. Sorensen, Senior Resident Inspector — Date Signed

David L Proulx 12/11/91
D. L. Proulx, Resident Inspector — Date Signed

Approved by: PH Johnson 12/11/91
P. H. Johnson, Chief
Reactor Projects Section 3 — Date Signed

Summary:

Special Inspection on November 4 - December 8, 1991 (Report No. 50-397/91-44)

Areas Inspected: Special inspection by the resident inspectors of various problems, both reported and NRC-identified, associated with the containment atmospheric control (CAC) system. During this inspection, Inspection Procedures 61726, 62703, 71707, 71710, 90712, and 92700 were utilized.

Safety Issues Management System (SIMS) Items: None.

Results:

General Conclusions and Specific Findings

Significant Safety Matters: The material condition and operability of the containment atmospheric control (CAC) system have not been maintained as required.

Summary of Violations and Deviations: Four apparent violations were identified involving the CAC system, as follows:

* Seismic supports for the CAC system were not assembled as required (paragraph 4.a).

* The "A" Train of the CAC system was inoperable from December 1990 until September 1991 because of loss of lubricating oil from the blower housing (paragraph 5.a).

* Both trains of the CAC system were inoperable from before initial plant startup until procedures were revised in August 1991 to provide for manual operation, because improper recycle flow controllers were installed (paragraph 5.b).

* The licensee did not report the inoperability of both trains of CAC (caused by the use of improper flow controllers) within the time periods required by 10 CFR 50.72 and 50.73 (paragraph 5.b).

DETAILS

1.. Persons Contacted

*L. Oxsen, Deputy Managing Director
*J. Baker, Plant Manager
L. Harrold, Assistant Plant Manager
*J. Irish, Program Analyst, Bonneville Power Administration
*R. Webring, Plant Technical Manager
*A. Hosler, Licensing Manager
*S. Davison, Quality Assurance Manager
*J. Peters, Administrative Manager
S. McKay, Operations Manager
*K. Worthen, Operations Engineer
*J. Snyder, Lead Engineer
P. Inserra, System Engineer
D. Bosi, Plant Support Engineering
*L. Sharp, Plant Support Engineering

The inspectors also talked with other cognizant licensee representatives.

*Attended the Exit Meeting on December 6, 1991.

2. Background

The containment atmospheric control (CAC) system is composed of two redundant, full capacity hydrogen-oxygen recombiners manufactured by Air Products and Chemicals, Inc., with associated piping, valves, and components. The system is designed to Seismic Category I requirements and in accordance with Regulatory Guide 1.7 and Criterion 41 of 10 CFR 50, Appendix A. The recombiners serve to limit the concentration of oxygen and hydrogen in the primary containment following a postulated loss-of-coolant accident (LOCA). The recombiners are located outside the primary containment. Each CAC train was procured from the vendor as a skid-mounted unit, and is composed of a water scrubber, a constant-speed blower, a catalytic recombiner, and an aftercooler.

The process gas from the containment atmosphere first enters the water scrubber where particulates, droplets, and soluble trace impurities are removed by direct continuous contact with water in a packed bed column. After leaving the top of the water column, the gas passes through a demister which traps any entrained water (the water, with entrapped particulates and dissolved solids, leaves the bottom of the scrubber and is directed to the suppression pool). The gas then enters the blower. The blower is designed to provide a constant 65.7 SCFM flow through the system and connected piping. The process gas then enters the preheater where it is heated to a temperature of 500 to 550 degrees F. Heating of the gases to a temperature of 500 degrees prior to their entering the catalytic recombiner prevents degradation of the catalyst bed by halogens that are potentially present in the process gas. The gas then enters the catalytic recombiner, where oxygen and hydrogen react on the catalyst bed to form water vapor. The hot effluent gas is then cooled in the aftercooler; which utilizes standby service water as a heat sink. The condensate from the aftercooler is separated in a moisture separator and directed to the suppression pool.

Typically, 55% of the recombiner discharge flow is recycled back to the blower suction. Thus, the hydrogen/oxygen mixture that enters the blower is diluted by this recycle flow (principally nitrogen). It is very important to closely control this recycle flow. For every 1% concentration of hydrogen in the process stream, the catalytic recombiner exit temperature will increase approximately 140 degrees above the 500 degree recombiner inlet temperature supplied by the preheater. The recombiner unit is designed to trip at an exit temperature of 1150 degrees. Thus, insufficient recycle flow could eventually cause the unit to trip on high temperature (if containment hydrogen concentration were greater than about 5%).

An important consideration for the CAC system is that the blower and motor are enclosed within a steel vessel. The vessel is bolted closed and has no access port. The inside of the vessel is part of primary containment; thus, the blower cannot be inspected during normal plant operation.

3. Previous NRC Findings Regarding the CAC System

Previous NRC findings regarding the CAC system were documented in NRC Inspection Report No. 50-397/91-28 (inspection period ending on September 17, 1991). The following is a summary of those findings.

The inspector had performed a detailed walkdown of the CAC system to verify that the plant configuration and system lineups were in accordance with the as-built drawings, that system operating procedures correctly reflected the FSAR and as-built drawings, that the material condition of the system was satisfactory, and that vendor-recommended preventive maintenance activities were being performed. The findings in these various areas can be categorized as follows:

a. Preventive Maintenance

Some maintenance activities specifically recommended in vendor technical manuals were not being addressed by the licensee. Although the vendor (Switzer Co.) recommended that the lubricating oil in the CAC blowers be changed every 500 hours of operation, or at least every six months (whichever comes first), a lubrication schedule had not been established. The licensee stated that the decision had been made during startup that, since the CAC blowers are run on a very infrequent basis for short periods of time, a lubricating oil changeout frequency of once per 40 years was sufficient. Based on this, the licensee had no lubricating schedule for the CAC blowers. No records were available at the time of the inspection documenting that this evaluation had been accomplished. However, the licensee stated at the exit meeting that these records would be provided.

Further, it was noted by the inspector that the licensee's lubrication schedule for the motor that drives the CAC blower was more restrictive than that for the blower itself, in that the schedule required the motor's oil to be changed every five years. The vendor technical manual for the motor recommends an oil change every 3 to 9 months of operation, which is much less restrictive than the vendor recommendation for the CAC blowers. It appeared, therefore, that the licensee had used inconsistent engineering judgement in the rationale for developing lubrication schedules for these safety related components. The licensee stated at the exit meeting that they were planning to establish a preventive maintenance action to change the oil in the blowers every five years.

The vendor technical manual also recommends that the blower and motor should be "bumped" at least once every two weeks by applying power and rotating the shaft to a new position. This is to prevent flat spots from developing on the motor/blower shaft. The licensee had not periodically rotated these fans since plant startup, and was unaware of this vendor recommendation. The system engineer stated that this could lead to "running the CAC fans to destruction," and felt that the biweekly rotation of the fans was not warranted. The inspector noted, however, that the vendor manuals guarantee that the CAC motors and blowers can run for several years of continuous operation without failure. This finding was especially significant, given that the licensee found one of the CAC blowers seized while trying to conduct a surveillance test in September 1991 (see paragraph 5.a below). It had apparently been seized since December 1990, the last time this particular surveillance test had been conducted. This problem would have been discovered much sooner had this vendor recommendation been implemented. The licensee stated at the exit meeting that additional consideration was being given to periodically rotating the blowers.

b. System Material Deficiencies

While conducting a walkdown of the CAC system (during the previous inspection), the inspector had noted the following labeling or material condition discrepancies:

* The label plates for valves CAC-V-307A and 308A were reversed.

* The label plates for valves CAC-V-301A and 302A were reversed.

* Loose bolts were noted on the torque switch cover for CAC-V-6.

c. Review of CAC Operating Procedures PPMs 2.3.3A and 2.3.3B

The inspector had also noted minor discrepancies in operating procedures. No verification and validation (V&V) had been accomplished for them as of the time of the previous inspection. This was especially significant given that the CAC operating procedures are directly referenced by the Emergency Operating Procedures (EOPs). Discrepancies noted were:

* Plant Procedures Manual (PPM) Sections 2.3.3A and 2.3.3B directed operators to use a key to operate keylocked switches for valves CAC-FCV-1A, 1B, 4A, and 4B. None of these valves has a keylocked switch for operation from the control room.

* PPMs 2.3.3A and 2.3.3B listed drawing M-554, Revision 16, as the applicable reference for the valve lineup. The actual revision for drawing M-554 in effect during the inspection period was Revision 46. Revision 16 dates from prior to plant startup.

* CAC-TCV-4B was listed as CAC-TCV-48 in PPM 2.3.3B.

* The as-built drawing listed the proper position of CAC interface valves RHR-V-134A and RHR-V-134B as open, while PPMs 2.3.3A and 2.3.3B required these valves to be shut.

* Valves CAC-V-5A and CAC-V-5B perform identical functions for Trains A and B of CAC, respectively. However, the required position of CAC-V-5A was open in PPM 2.3.3A and the required position of CAC-V-5B was shut in PPM 2.3.3B.

* Drawing M-554 and PPMs 2.3.3A and 2.3.3B listed different positions for CAC-V-316A and CAC-V-316B (isolation valves for similar pressure gauges).

The licensee stated that these discrepancies would probably have been identified by V&V of the most recent revision to these procedures. However, the inspector noted that these errors had existed in these operating procedures through several previous revisions.

These findings gave an initial indication, in the aggregate, of insufficient attention to proper maintenance and operation of the CAC system. This was addressed in the cover letter which transmitted the inspection report to the licensee.

4. <u>Additional Findings Regarding CAC Maintenance and Configuration Control</u>

Additional inspector observations related to the CAC system were made during late September and early October, 1991, as follows:

a. While observing a surveillance test on CAC Temperature Control Valve (TCV)-4A, just prior to plant startup on September 26, the inspector observed a 3/4-inch hex nut on the floor of the "A" CAC skid near TCV-4A. This nut appeared to have come from CAC piping restraint PS-5, which the inspector noted was not made up properly. This restraint had apparently been disassembled for work on TCV-4A, although the maintenance work request (MWR) that authorized work on this valve did not authorize removal of PS-5. The inspector informed the equipment operator who was performing the surveillance and the Shift Manager, who indicated that mechanical maintenance would restore PS-5 to its proper configuration.

On October 2, the inspector revisited the CAC skids to verify the licensee's action, and noted that the hex nuts for restraint PS-5 were loose. The inspector informed the Plant Manager of the findings of September 26 and October 2 at the resident inspectors' weekly exit meeting on October 3, 1991.

On October 9, 1991, the inspector again checked the "A" CAC skid restraint PS-5 and noted that the hex nuts for this restraint were still loose. The inspector then checked the PS-5 restraint on the "B" CAC skid for a possible generic problem. Although the inspector noted that the hex nuts on PS-5 of the "B" train of CAC were tight, the restraint configuration was different from PS-5 on the "A" train. PS-5 for CAC "A" was configured such that two hex nuts straddled the restraint bar (and were loose) on one side of the restraint's "U-bolt", with the other side of the U-bolt having only one hex nut. However, the configuration for PS-5 on the "B" CAC skid consisted of two hex nuts outside of the restraint bar on each side of the U-bolt (hereafter referred to as a lock nut and jam nut configuration).

The inspector obtained the licensee's vendor drawing CVI-4-1371-18.20 to determine the proper method for the PS-5 restraint configuration. The drawing revealed that the lock nut and jam nut configuration was proper, leading the inspector to conclude that PS-5 on the "A" train was made up improperly. Since this vendor drawing also showed the configuration for other restraints on the two trains of CAC, the inspector inspected a sample of 20 of the 76 pipe restraints to determine whether any additional deficiencies existed. Besides the problem with PS-5, the inspector noted the following additional discrepancies:

<u>CAC "A" Train Skid:</u>

PS-3	Missing one jam nut, other nuts straddling support
PS-15	Missing both jam nuts
PS-18	All nuts loose

<u>CAC "B" Train Skid:</u>

PS-11	Missing both jam nuts
PS-15	Missing both jam nuts
PS-18	Missing one jam nut

The inspector notified the Plant Manager of these deficiencies on October 10, 1991, and the Plant Manager directed a 100% verification of the pipe supports for both CAC skids. During the licensee's walkdown of these supports, the following additional deviations from the vendor drawing were noted:

<u>CAC "A" Train Skid:</u>

PS-10	Missing 3 of 4 nuts, U-bolt held in place by the only remaining nut
PS-12	All nuts loose

<u>CAC "B" Train Skid</u>

PS-10	All 4 nuts missing, U-bolt in place
PS-14	Missing one lock nut, all other nuts loose
PS-20	Two nuts loose
PS-22	Missing both jam nuts, lock nuts staked in place
PS-23	Missing one jam nut, other nuts tight
PS-35	Excessive gap between U-bolt and pipe (3/16 inch vice allowable 1/16 inch)
PS-38	Two nuts loose

The licensee issued Problem Evaluation Request (PER) 291-841 on October 11, 1991 to address issues associated with the CAC supports. It was the licensee's position that the CAC system was still operable and seismically qualified, based on engineering judgement, because sufficient rigidity of the system piping apparently still existed. However, the above deficiencies taken together appear to violate 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings" (397/91-44-01).

It is important to note that, according to knowledgeable licensee representatives, the method used to seismically qualify the CAC skids was to place each on a shaker table and subject it to a safe shutdown earthquake (SSE). Since they were not qualified by analysis, there are no calculations which support the seismic qualification. The loose, missing, or improperly configured pipe supports depicted above therefore appeared to place the seismic qualification of the CAC skids (at the time of the inspector's observations) in question. The licensee corrected the identified discrepancies on October 11, 1991.

b. Technical Specification 4.6.6.1.b.4 states that the CAC system shall be demonstrated operable at least every 18 months by "verifying through a visual examination that there is no evidence of abnormal conditions within the recombiner enclosure; i.e., loose wiring or structural connections, deposits of foreign materials, etc." The licensee interpreted this visual examination to apply to each of the CAC skids. However, a specific procedure or checklist for performing this visual examination did not exist at the time of

this inspection. The licensee performs this inspection as a single step at the completion of the required 18 month CAC functional test. This single procedural step did not provide any specific direction on how to perform this examination; it merely repeated verbatim the words of the Technical Specification quoted above. Specific guidance also had not been provided for the performance of system walkdowns by the system engineer. The inspector noted that this TS is unique in specifically requiring a periodic walkdown of the CAC system, and concluded that improved guidance on its implementation was needed.

Vendor drawing CVI-4-1371-18.20 provided no torquing specification for the pipe support nuts. Since a number of these nuts were found to be loose or missing, the inspector requested more information concerning the torquing requirements the licensee utilizes in this application. The inspector will review this information during a future inspection (Followup Item 397/91-44-02).

c. On October 21, 1991 the inspector verified that the licensee had restored the CAC pipe restraints to the correct configurations in accordance with the vendor drawing. However, during this walkdown, the inspector identified an additional deficiency. The inspector found a conduit plug for CAC-PT-1A (a pressure transmitter for CAC fan 1A) on the floor, and discovered that another plug was loose on that same pressure transmitter. An opening in the side of the pressure transmitter, with electrical leads visible inside, was apparently where the plug on the floor belonged. This was brought to the attention of the electrical maintenance engineering staff, who initiated prompt corrective action to fix the apparent problem. The pressure transmitter was later determined to be subject to environmental qualification requirements. However, the system engineer stated that the 572-foot elevation of the reactor building (where the CAC skids are located) is not susceptible to a high energy line break, as other parts of the reactor building are. The CAC skid components are only qualified for a warm, moist environment; thus, he preliminarily indicated that the environmental qualification of CAC-PT-1A would not have been affected by the missing and loose plugs discussed above.

According to Technical Memorandum (TM) 2004, Revision 0, electrical and instrumentation equipment for the CAC skids have bottom entry conduit, which precludes condensation in the conduit from draining into a component and potentially resulting in failure or loss of accuracy. TM-2004 does not address the case wherein an instrument such as the pressure transmitter described above is exposed to the secondary containment environment at one side. The inspector therefore concluded that the environmental qualification of this configuration was indeterminate (Unresolved Item 397/91-44-03).

The above findings, taken as a whole, further demonstrate a persistent weakness in the proper attention to, and configuration control of, an important safety-related system. The licensee also missed opportunities

to identify the above deficiencies on their own by not providing more complete guidance on the implementation of TS surveillance requirement 4.6.6.1.b.4, as discussed above.

5. Recent Licensee Event Reports (LERs) Associated with the CAC System

a. LER 91-25 - "A" Train of the CAC System Rendered Inoperable Longer Than Allowed by the Technical Specifications (TS) Due to Loss of Oil in Hydrogen Recombiner Blower

On September 3, 1991, the CAC functional test for train "A" was initiated. The CAC blower tripped approximately six seconds after receiving an auto-start signal (there is a six-second time delay for the low flow trip signal to allow the blower to establish an adequate flow rate). The blower motor was found to be drawing excessive current, indicating a locked rotor condition. An oil drain plug in the bottom of the blower housing was found completely removed and lying at the bottom of the steel enclosure around the motor/blower assembly. This had caused the lubricating oil to drain from the blower housing. Upon uncoupling the motor from the blower, the motor was found to rotate freely, but the blower was seized. Disassembly of the blower revealed severe bearing damage.

The immediate six-second time delay trip, coupled with the bearing damage, indicated that the blower was already in a locked rotor condition when the functional test was initiated on September 3. This led the licensee to conclude that the bearing damage must have occurred the last time the blower was operated. This was determined to have been during a surveillance test on December 8, 1990. Thus, the "A" train of CAC had been inoperable since that time. This meant that WNP-2 had operated for over four months in Mode 1 with the "A" train of CAC inoperable and the appropriate action statement of the TS not carried out. This is an apparent violation of the TS, Section 3.6.6.1, as stated in TS 3.0.2 (397/91-44-04). The action statement for TS 3.6.6.1 requires that an inoperable CAC train be restored to an operable status within 30 days or that the reactor be placed in Hot Shutdown within the following 12 hours.

The licensee speculated that the oil drain plug fell out due to vibration from the blower while it was operating. The oil had been replaced during the 1990 annual refueling outage, but inadequate maintenance instructions had been provided, in that no torquing requirements had been specified for reinstallation of the drain plugs. The blower was operated for about eight hours on December 8 and the licensee speculates that it was during that time period that the drain plug fell out. Lockwires were installed on all blower drain plugs, both "A" and "B" trains, in September 1991. Maintenance procedures were enhanced to require the drain plugs in each blower to be torqued, lockwired, and verified. The LER stated that the 1990 refueling outage was the first time the "A" train blower/motor assembly had been removed since startup. The "B" blower/motor assembly had not been removed prior to September 1991.

The licensee did not adequately explain in the LER how this bearing damage escaped detection during the surveillance test conducted on December 8. Further, had the licensee implemented a periodic rotation of the blower as recommended by the vendor (paragraph 3.a), this failure of the blower would have been discovered much sooner, perhaps in time to comply with the action statement requirements. This is especially important, given that normal system configuration (as discussed in paragraph 2 above) does not allow easy detection of a low bearing oil level condition. Although there are sightglasses associated with both the blower and motor, they are contained within the steel enclosure vessel. This enclosure forms a part of primary containment and cannot be opened during plant operation, severely limiting the licensee's ability to verify adequate lubrication.

Failure of the "A" train CAC in this manner is another example of poor maintenance of, and insufficient attention to, the material condition of an important safety related system. As noted above, the licensee missed an opportunity to identify this failure in a timely manner by not implementing a preventive maintenance action (periodic rotation of the CAC blowers) recommended by the vendor.

b. <u>LER 91-29 - Inadequate Primary Containment Hydrogen Recombiner Recycle Flow Control</u>

A problem dealing with the recycle flow in each CAC skid was discovered by a contract engineer during the licensee's setpoint evaluation program. Recycle flow, as discussed in paragraph 2, is used to control the rate of hydrogen recombination in the catalytic recombiner. It is controlled by varying the position of flow control valves (FCV). Valves CAC-FCV-6A and 6B serve this function. By further opening CAC-FCV-6A or 6B, more flow is passed through the recycle line back to the blower suction, further diluting the hydrogen stream from the drywell and decreasing the rate of hydrogen recombination. Conversely, further closing CAC-FCV-6A or 6B results in less recycle flow to the blower suction, resulting in less dilution of the hydrogen stream from the drywell and increasing the rate of hydrogen recombination.

CAC valve FCV-6A (Train B is identical) is controlled by a locally mounted flow indicating controller, CAC-FIC-67A, which receives a signal of actual recycle flow from flow transmitter CAC-FT-7A. CAC-FIC-67A was designed to be controlled by Master Controller CAC-FC-67A, located in the control room. CAC-FC-67A receives input on total recombiner discharge flow from CAC-FT-6A and provides a setpoint signal, in the automatic mode, to CAC-FIC-67A.

To operate properly, CAC-FC-67A must also be able to ratio the flow sensed in the recycle line (CAC-FT-7A) to the total recombiner discharge flow, which is sensed in the recombiner discharge line (by CAC-FT-6A). However, the type of controllers installed are not ratio type controllers, but are proportional-integral controllers, and do not receive an input from actual recycle flow (CAC-FT-7A).

Since they are not capable of ratio type control, their output will either integrate up or down until the recycle valves are either fully open or fully closed. Consequently, when in automatic, the recombiner would have either tripped on high exit temperature (because of too little recycle flow, if containment hydrogen concentration was greater than about 5%) or failed to effectively remove hydrogen (because of too much recycle flow), allowing hydrogen concentration in the primary containment to increase to a potentially flammable mixture.

It should be noted that PPM 2.3.3A and PPM 2.3.3B required CAC-FC-67A and 67B to be in the automatic mode for post-LOCA operation. This would have required the operator to correctly diagnose improper operation of the CAC system and then place the controllers in the manual mode. It appeared to the inspector that operation of the CAC system in this manner could have presented difficulty to the operators, particularly since existing procedures did not provide guidance on manual operation of the system. As stated in the LER, PPMs 2.3.3A and 2.3.3B were revised (on August 29, 1991) to require operation of CAC with CAC-FC-67A/B in the manual Mode.

This LER noted that the design discrepancy being reported had existed since plant construction and startup. Records indicated that a Startup Problem Report (SPR) was written in 1981 to document that the wrong type of controller was supplied for use with the CAC skids. This discrepancy was dispositioned and tracked by a Project Engineering Directive (PED) in 1982 and the applicable SPR was closed out. The PED directed that new ratio controllers be procured and installed as designed. A memorandum from Bechtel to their electrical contractor directed that the work be accomplished per the PED. However, the work was never accomplished and there are no records indicating that the new controllers were ever procured. Failure of the licensee's tracking systems to ensure implementation of the PED was still being researched by the licensee at the conclusion of the inspection. It appears, therefore, that these controllers have been unable to perform their intended function since plant startup, and consequently, that the CAC system has been inoperable since the plant was first started up in 1984. This is an apparent violation of the TS, Section 3.6.6.1 (397/91-44-05). As previously stated, the licensee revised system procedures on August 29, 1991 to provide for manual system operation.

A System Lineup Test was performed in April 1983 and a Preoperational Test was performed in December 1983. Neither of these tests identified that the wrong type of controllers was installed. The required 18 month surveillance test of the CAC system was also unable to identify the existence of this controller deficiency.

Another aspect of this LER is noteworthy. A safety evaluation was performed in November 1991 to allow for manual operation of CAC-FC-67A/B. It determined that the 55% recycle flow used as the analyzed flow rate in the FSAR, and originally used as the setpoint

for CAC-FC-67A and 67B in the CAC operating procedure, would probably have resulted in tripping of the recombiner due to high catalyst temperature. This was because the blower flow rate during the preoperational test was actually measured to be 86 SCFM at atmospheric pressure vs. the 65.7 SCFM stated in the FSAR. The flow rate would be even higher at elevated containment pressures. As a result of these findings, the licensee made additional changes to PPMs 2.3.3A and 2.3.3B to provide for stationing an additional operator at the CAC operating panel during post-LOCA conditions.

Finally, the inspector noted that the controller deficiency was first discovered and documented in a PER on August 7, 1991, and was addressed by a procedure revision which was issued on August 29. However, the licensee's reportability assessment was not completed until October 31 (at which time a report was made pursuant to 10 CFR 50.72), and LER 91-29 was not issued until December 2. This extended period after the controller deficiency was identified before it was reported to the NRC is an apparent violation of the reporting requirements of 10 CFR 50.72 and 50.73 (397/91-44-06).

The inspector concluded that the licensee had missed opportunities to discover and correct this problem with the CAC flow controllers. It appeared that without operator action, the CAC system would not have been able to fulfill its intended safety function. In addition, operating procedures in effect from plant startup until August 29, 1991 directed the use of the automatic mode for the CAC controllers and provided no guidance to operators on how to control the CAC system in the manual mode.

6. Miscellaneous Problem Evaluation Requests

Other problems with valves CAC-FCV-6A and 6B have also been identified by the licensee. Problem Evaluation Request (PER) 291-481 documented a deficiency in May 1991, in that neither valve would achieve its full 1-3/8" stroke. Valve FCV-6A would only stroke 1". Also, the valve was 80% closed when a 50% signal (12 milliamps) was applied to it, vs. the 50% closed that it should have been. Likewise, FCV-6B would only stroke 1-1/8" and reached 80% closed when a 50% closed signal was applied to it. These conditions were significant, in that they would have affected the ability of the CAC system to achieve the proper recycle flow, and therefore to avoid system shutdown on high catalyst temperature. These conditions were corrected before the end of the 1991 refueling outage, and were determined by the licensee not to have affected system operability.

7. Conclusions

Apparent violations of regulatory requirements were identified during this inspection, as discussed in the foregoing paragraphs. These are summarized as follows:

* Seismic supports for the CAC system were not assembled as required (paragraph 4.a).

* The "A" Train of the CAC system was inoperable from December 1990 through September 1991 because of loss of lubricating oil from the blower (paragraph 5.a).

* Both trains of the CAC system were inoperable from before initial plant startup, until procedures were revised in August 1991 to provide for manual operation, because improper recycle flow controllers were installed (paragraph 5.b).

* The licensee did not report the inoperability of both trains of CAC (caused by the use of improper flow controllers) within the time periods required by 10 CFR 50.72 and 50.73 (paragraph 5.b).

The NRC expects safety systems to be operable in accordance with the Technical Specifications, configured in accordance with design drawings and the Final Safety Analysis Report, operated with correct procedures, and maintained in a manner which provides a high degree of confidence that the system will perform its intended safety function when called upon. The above apparent violations and other inspection findings discussed earlier in this report indicate that this requisite attention to the CAC system by Supply System management has not been provided. It appears that the involvement of the engineering, quality assurance, operations, and maintenance organizations in the CAC system has been insufficient.

8. Unresolved Item

Unresolved items are matters about which the NRC requires further information in order to determine whether the matters represent violations, deviations, or acceptable items. An unresolved item identified during this inspection is discussed in paragraph 4.c of this report.

9. Exit Meeting

An exit meeting was conducted with the indicated licensee personnel (refer to paragraph 1) on December 6, 1991. The scope of this inspection and the inspectors' findings, as noted in this report, were discussed and acknowledged by the licensee representatives.

The licensee did not identify as proprietary any of the information reviewed by or discussed with the inspectors during the inspection.