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REGION I

Report No. 50-443/86-54

Docket No. 50-443

License No. NPF-56

Permit No. CPPR-135 Priority -- Category B/C

Licensee: Public Service Company of New Hampshire
1000 Elm Street
Manchester, New Hampshire 03105

Facility Name: Seabrook Station, Unit 1

Inspection at: Seabrook, New Hampshire

Inspection conducted: November 11, 1986 - January 2, 1987

Inspectors: A. C. Cerne, Sr. Resident Inspector
D. G. Ruscitto, Resident Inspector

Approved by: T. C. Elsasser, Chief, Reactor Projects Section 3C 1/29/87 Date

Inspection Summary: Inspection on November 11, 1986 - January 2, 1987 (Report No. 50-443/86-54)

Areas Inspected: Routine inspection by two resident inspectors of work activities, procedures, and records relative to startup testing; plant operations to include discussions with management to determine the operability status of certain system components; certain aspects of the design of the Control Building Air (CBA) and Containment Building Spray (CBS) systems; and checks of the zero-power conditions for operation required by License No. NPF-56. The inspectors also reviewed licensee action on previously identified items, including I&E Bulletins, and performed plant inspection tours. The inspection involved 187 inspection hours by two NRC inspectors.

Results: Reviews of certain aspects of the design of the CBA (paragraph 7) and CBS (paragraph 8) systems resulted in the identification of an apparent deviation and an unresolved code interpretation question, respectively.

The design, control and operation of the CBA system, in particular, appears to merit further review and/or clarification. This inspection, as discussed in paragraph 7, identified several areas where CBA system operation in accordance with the Technical Specifications (TS) raised questions of interpretation with respect to operability, reporting, security and the total system safety function, as delineated in the FSAR.

Since part of this concern relates to the lack of clarity of TS 3.7.6 with regard to the Seabrook unique CBA design, continued efforts by the licensee to revise this Technical Specification are encouraged. Although TS 3.7.6 is currently adequate from the standpoint of safe operation, modification to the Limiting Condition for Operation (LCO) and Action statements to reflect more completely the CBA design and functions would not only enhance operability, but also improve the overall understanding of this system's operation.

DETAILS

1. Persons Contacted

J. DeVincentis, Director of Engineering (NHY)
D. A. Maidrand, Assistant Project Manager (YAEC)
D. E. Moody, Station Manager (NHY)
D. G. McLain, Technical Support Manager (NHY)
J. M. Vargas, Manager of Engineering (NHY)
L. A. Walsh, Operations Manager (NHY)

Interviews and discussions with other members of licensee and contractor management, and with their staffs, were also conducted relative to the inspection of items documented in this report.

2. Plant Status

During this report period, the plant remained in Mode 5 with the reactor coolant system (RCS) either solid, with a low pressure steam bubble or the pressurizer vented to the atmosphere. Two minor operational events occurred. While both events were reportable under 10CFR50, neither had any safety impact. Refer to paragraph 7d for details of an inadvertent control room ventilation isolation on December 30, 1986.

On December 24, 1986 an inadvertent safety injection (SI) actuation occurred after performance of reactor protection system (RPS) surveillance. An operator mistakenly reset the main steam line low pressure SI signal instead of the feedwater isolation (FWI) signal. The resident inspector responded to the event and verified that the plant systems performed as designed. Approximately 3,000 gallons of water were injected into the RCS, much of which was ejected out of the then open pressurizer vent line, wetting insulation in the vicinity. The inspector monitored licensee efforts in cleaning the pipes and sampling for chloride contamination. He also reviewed plant records with particular emphasis on the computer data logger records, verifying proper plant response.

The actions of the control room operators following the SI were determined to be both proper and in accordance with procedural requirements. A four-hour ENS notification was made in accordance with 10 CFR 50.72. No violations were identified.

3. Plant Inspection Tours

The inspectors observed work activities in progress, completed work and plant status in several areas during general inspections of the plant. They examined work for any obvious defects or noncompliance with regulatory requirements or license conditions. Particular note was taken of the presence of quality control inspectors and quality control evidence such as inspection records, material identification, nonconforming material identification, housekeeping

and equipment preservation. The inspectors interviewed station staff personnel, craft personnel, supervision, and quality inspection personnel in the work areas.

a. The inspector conducted the following system walkdowns, checking piping runs and component setpoints in accordance with the NHY design drawings. He also confirmed valve position and other component status to be correct with respect to the tagging orders in effect at the time of the walkdown.

   -- Reactor head vent piping through its isolation valves to the pressurizer relief tank header piping.

   -- Residual Heat Removal (RHR) and Safety Injection (SI) piping and relief valves on both trains and cross-connected ECCS lines outside containment.

   With regard to the relief valves examined during the RHR/SI walkdown, the inspector noted the removal of any plugs or obstructions from the bonnet vent hole of valves of the balanced-bellows design. Such plug removal had been the subject of a previous NRC question on relief valves inside containment and was accomplished in accordance with Work Request (WR) 86W009846.

   The inspector also noted during field inspection tours the conduct of other maintenance activities. These included the seal welding of plates on the fuel transfer assembly rail inside containment to eliminate crud traps in a potentially radioactive area (reference: ECA 08/118224B) and the draining of the accumulator discharge line between the isolation valve and the loop check valve in order to repair a leaking manual valve, SI-V-282 (reference: WR86W007286). The position of specific valves and the operation of certain equipment, as dictated by either a maintenance activity or a TS surveillance (eg: OX 1405.07), was spot-checked periodically against the Maintenance Tagging Order. The status of these same components was also checked with respect to the main control board position and tagging.

   With regard to the above system walkdowns and observation of maintenance activities, no violations were identified.

b. As required by a license condition of NPF-56 to prevent inadvertent boron dilution and thus assure subcritical operation during the period of precriticality testing, special measures were instituted by the licensee. Among these were the sampling of the reactor coolant system (RCS) on each shift to check boron concentration above 2000 ppm and daily verification that certain valves, representing a potential flow path of unborated water, remain chain-locked-closed.

   The inspector reviewed the chemistry logs (CH-L01) for the RCS confirming that samples for boron were taken and analyzed on each shift and noting the lowest boron concentration on record to be greater than 2080 ppm.

This review covered the period prior to fuel load in October into December, 1986. The inspector also periodically spot-checked the chain-locked-closed status of certain valves identified as part of the above-noted license condition.

Prior to the issuance of NPF-56, a justification for interim operation (JIO) was discussed by the licensee with NRR and Region I with regard to the containment enclosure ventilation system. Certain design changes to the HVAC system for the charging pump cubicles were required to maintain these areas of the containment enclosure at the requisite negative differential pressure during the accident mode of operation.

The inspector witnessed certain field activities associated with this containment enclosure design change implementation. Quality control personnel were interviewed regarding inspection criteria and the schedule for the completion of system modification and testing was discussed with the responsible engineering managers. It was agreed that testing of the modified system to declare the enclosure ventilation system operable would be completed prior to Mode 4 operations.

During this inspection, the completion of the preoperational test (1-PT-100), which included drawdown pressure measurements on the charging pump cubicles and control checks for the added fans (EAH-FN-180 A&B), was noted. While the test results review will be the subject of a future NRC inspection, satisfactory completion of 1-PT-100 removes any hold on Mode 4 operation with respect to the JIO on the containment enclosure ventilation system.

No violations were identified.

4. Licensee Action on Previously Identified Items

a. (Closed) Unresolved item (86-12-02): Review of the design of the RHR suction valve interlocks and CBA fan isolation logic. As documented in the 443/86-12 inspection report (IR), a letter (NAH-U-3549) from the Westinghouse Electric Corporation dated April 4, 1986 states their position that although the Seabrook RHR isolation valve interlock design deviates from the Westinghouse recommended interlock logic, no "regulatory requirements or Seabrook specific licensing commitments...are violated as a result of these deviations."

Subsequent to issuance of this Westinghouse letter and review by the inspector, an incident occurred involving a spillage of several thousand gallons of Refueling Water Storage Tank (RWST) water into the reactor cavity and refueling area. Evaluation of this incident, as documented in Station Incident Report (SIR) 86-023, revealed that operator error was the cause. The control room operator had overlooked a procedural step and failed to isolate a RWST discharge valve (CBS-V-5) prior to opening an RHR suction valve (RC-V-88) from an RCS loop. This then created the spillage path.

The inspector noted that the above incident involved two of the valves (CBS-V-5 & RC-V-88) for which the original Westinghouse design criteria had provided an interlock which would have prevented the spill. He discussed this issue with NHY engineering personnel and was advised of their plan to install a Main Control Board alarm to warn the operators if both valves in this particular flow path were open at the same time. An alarm would also be installed in the opposite train, RHR suction flow path (ie: CBS-V-2 and RC-V-23). These design changes were implemented with the issuance of Design Coordination Report (DCR) 00561.

The inspector reviewed DCR 00561 and evaluated the installation of alarms in conjunction with the original design decision to forego the installation of valve interlocks. Taking into account the Westinghouse position, previously stated, the inspector determined that adequate system protection has now been provided and considers this issue resolved.

Also, as noted in IR 443/86-12, during the conduct of preoperational test 1-PT-38, the CBA fans (FN-16 A&B) shut off and were isolated upon reset of a safety injection "S" signal. This appeared to deviate from the FSAR commitment that all systems serving safety-related functions remain in the emergency mode upon removal of an "S" signal. The licensee issued NCR 82/1260 to document this problem and subsequently dispositioned the item to accept-as-is based upon the fact that no credit is taken for CBA fans, FN 16 A&B and the associated emergency filter unit (CBA-F-38) as part of the engineered safety feature (ESF) system.

The inspector reviewed an NRR Request for Additional Information (RAI) 420.27 and the licensee response, along with the Seabrook Safety Evaluation Report (SER), section 6.5.1.2, and confirmed that the Control Room Complex air cleaning system is not an ESF-grade filter system. Other portions of the CBA ventilation system are ESF systems, a discussion of which is provided in paragraph 7 of this report. With respect to this unresolved item, as it pertains to the CBA system, the isolation of FN-16 A&B upon reset of an "S" signal represents the intended design, which has been accepted by NRR. This issue is therefore also resolved.

Both parts of this NRC question have now been resolved, and this unresolved item is considered closed.

b. (Closed) Inspector Follow-up Item (86-18-33): Complete installation of the Public Emergency Alerting System (PEAS). This item was reviewed and documented for closure in IR 443/86-46 with one outstanding issue, involving the reinstallation of certain siren poles at deeper depths, remaining.

During this inspection, the inspector reviewed the status of PEAS siren pole rework and discussed with engineering and licensing personnel their report (CEM-87-009) on the Siren Pole Embedment Effort. The acceptance of the final pole embedments was based upon either analysis or field testing. For a specific category of poles embedded at less than the

generic values, calculated by standard industry methods, an enhanced embedment design was implemented. Either a concrete collar was placed around the pole base or the pole was anchored into the underlying ledge by means of a toe socket formed in the ledge.

For those affected poles where the above embedment redesign was not used, a full-scale field testing program was developed. This resulted in the identification of certain poor soil conditions for which the existing soil around the poles was removed and replaced by tunnel boring material from the circulating water construction drilling operation. This soil replacement resulted in higher soil shear properties.

The current status of the enhanced embedment design program indicates that four PEAS siren poles require further rework, whether it be deeper embedment, backfilling, soil replacement or relocation. Because of pending lawsuits concerning permits for the four poles, noted below, the enhancement work has been suspended.

-- Rye-1, Rye-2, Rye-3

-- Hampton Falls-3

However, based upon the performance of these poles during the conduct of the embedment testing program, stability requirements have been satisfied and the delayed rework is deemed necessary only for long-term system serviceability and not for current system operability.

Based upon the intent of this Inspector Follow-up item to assure construction completion of this activity prior to initial criticality of the reactor, the operational status of the four sirens noted above is not in question. Bi-monthly, quarterly, and annual conduct of siren system testing to assure continued operability and reliability of each siren unit is planned.

This item is considered closed.

c. (Closed) Violation (86-46-01): Non-safety related components installed over safety related equipment. New Hampshire Yankee responded to this violation on November 19, 1986 by letter to NRC Region I (SBN-1235). The licensee action included immediate removal of the identified items. Quality Assurance Surveillance checklists were revised and additional housekeeping surveillances were performed by Quality Control.

Additionally, New Hampshire Yankee Procedure MA3.1, "Work Requests" was revised to include provisions for a cleanliness inspection of work areas prior to the close of Work Requests. All maintenance personnel were retrained on MA3.1. This training was completed on January 7, 1987. Construction management issued a Construction Notice, instructing personnel to tag temporary items and identify Work Request numbers on the tag. The notice also instructs personnel to remove temporary items upon completion of the work.

New Hampshire Yankee Procedure MA3.3, titled "Housekeeping", was revised to include provisions for periodic walkdowns to beadministered by the Radwaste/Utilities Department Supervisor. These walkdowns were to identify temporary items, not specifically associated with Work Requests or Building Incomplete Items Lists.

Inspector review of these procedures indicates thorough and comprehensive corrective action.

A licensee field walkdown was completed on December 20, 1986. Subsequent field checks by the inspector revealed no new problems. A related issue identified during this item closeout deals with scaffolding and is discussed in a following paragraph (4e) of this report. The inspector has no further questions and this item is closed.

d. (Closed) Unresolved item (86-46-03): Containment Air Purge (CAP) System. This is a four part item, the first three parts of which were identified in IR 443/86-46 while the fourth part was described in IR 443/86-47.

(1) Operational Controls to prevent pressurization of the RCA tunnel following 1-CAP-FN-10 trip were in question. Currently, the visual alarm system (VAS) alarm response procedure for digital point D7274 ("Containment Air Purge Fan 10 Not Running") directs operators to stop CAP-MM-726 to prevent a positive pressure in the RCA walkway. This item is closed.

(2) The original design process failed to identify a need for the installation of backdraft damper CAP-DP-1052 in the duct from the RCA tunnel to the filter unit (CAP-F-40). The requirement for a backdraft damper to prevent backflow was identified by the NRC inspector based on previous design reviews. The licensee reviewed the original implementing design change and agreed that the damper was needed. Although this issue represents a minor design process discrepancy, the system is not safety-related and licensee corrective action was timely. The inspector has no further questions.

(3) Procurement specifications for CAP-DP-1013 required further review. The procurement specifications were reviewed and CAP-DP-1013 was verified to have been procured to a specification adequate for its use.

(4) The CAP-V-3 failure was reported in IR 443/86-47. CAP-V-3 is a 36" air operated, fail closed, butterfly valve. The inspector reviewed the Station Information Report (SIR 86-030) written to document the failure. As a result of the above investigation the solenoid valve for CAP-V-3 was found to be leaking air when de-energized, allowing the valve to open.

The main valve failure was attributed to the original orientation of the valve which was 90 degrees off-vertical. The licensee wrote a Request for Engineering Services (86-RES-0334) the disposition of which proposed to rotate the valve 90° to the vertical to prevent the misalignment that had caused the valve to seize initially. This change was performed under Design Coordination Report (DCR) 00637. The inspector reviewed the DCR as well as the DCR Implementation Plan (DIP). He conducted worksite inspections while following job progress.

Upon job completion the valve was satisfactorily tested and returned to service. The inspector had no further questions regarding the CAP-V-3 failure.

As a result of the above inspection effort and the individual conclusions reached, as documented, this four-part item is considered closed.

e. (Closed) Unresolved item (86-47-02): Impact of scaffolding and monorail hoist storage on the operability status of the equipment over which it is positioned. This issue consisted of two separate concerns - one with regard to the seismic design and structural adequacy of monorail hoists and chain fall swing arc impact on safety-related equipment over which the monorails are erected; and the other with respect to the adequacy of licensee control of scaffolding erection and its potential impact on the operability of equipment during a design basis seismic event.

The inspector reviewed UE&C calculation sheets and other design data and confirmed with NHY engineering personnel the structural adequacy of the monorail beams and hoists from a seismic standpoint. In accordance with USNRC Regulatory Guide (RG) 1.29, as implemented by the UE&C two-over-one seismic interaction program (Technical Procedure, TP-4), the monorails and associated components have been designed, including the requisite design verification, to remain structurally intact during the design basis earthquake. With regard to the swing arc of the hoist chain falls during such seismic events, NHY engineering had conducted plant walkdowns under the spatial interaction analysis program (TP-8) to identify those cases of potentially adverse impact between the chain fall and hook and nearby safety-related equipment.

For such cases where a proximity hazard was identified, normal "parking locations" for each hoist were suggested. The inspector randomly checked the storage of monorail hoists over several safety-related components and noted the implementation of tie-back details to secure the hook in its parking location, where recommended. For one case (over safety injection pump, SI-P-6B) where a tie-back design had not been implemented, the inspector observed possible interaction of the chain-fall swing with a component cooling flow indicator. This was discussed with a station staff technical support engineer and resulted in prompt analysis of this

condition by engineering personnel. Followup of the licensee analysis and corrective action, if necessary, on this isolated case will be the subject of future NRC inspection.

With regard to the other concern involving the programmatic controls over scaffolding, meetings were held with licensee engineering, station staff and licensing personnel to determine what criteria would be used to establish the operability of safety-related equipment over which the scaffolding would be erected. On December 29, 1986, NHY engineering issued "Guidelines for Erecting Temporary Structures and Performing Rigging Operations" (reference: Memorandum - CEM-86-601) to the station staff. The inspector reviewed these guidelines and held further discussions with licensee personnel, noting consideration of timing, the mode of operations, and status of the redundant safety-related train of equipment in the final determination of how such scaffolding would affect the operability of equipment.

While these guidelines are viewed to not be as prescriptive as the Technical Specifications with respect to operability actions, they do appear to represent a prudent approach by the licensee to establish a program of controls for scaffolding and similar transient loads. The inspectors observed appropriate management attention to the removal of unnecessary scaffolding from safety-related areas in preparation for Mode 4 operation. This emphasis upon both the clean-up and elimination of nonseismic material from safety-related areas and also the proper evaluation and control of such nonseismic loads, where required, indicated proper concern by licensee management on this overall issue.

The inspectors plan to conduct periodic field inspections on the continued emphasis and control over scaffolding usage, as well as monorail hoist parking, and any other examples of potentially adverse seismic interaction with safety-related components.

This unresolved item is considered closed.

f. (Closed) IE Bulletin (IEB 79-18): Audibility problems encountered on evacuation of personnel from high-noise areas. The potential for noise levels to cause audibility problems cannot be effectively measured for a period of normal operation until the commercial operation milestone is reached. Thus, licensee station staff and licensing personnel have committed to conduct a noise level survey within 30 days after commercial operation.

The inspector reviewed Action Correspondence Report No. 86-013 documenting the plan, as part of the Hearing Conservation Program, to contract with an industrial hygenist to conduct the survey and to initiate an engineering study for any areas where the Gai-tronics (ie: plant public announcement) system is found to be insufficient to sound the evacuation alarm. The Seabrook Production Integrated Commitment Tracking System lists as action item no. RE01106 the planned licensee action to address the concerns of IEB 79-18.

Although action on this item has not yet been completed, review of the licensee plan revealed an acceptable approach and a tracking system which assures implementation of the commitment and corrective action, if required. The inspector has no further questions.

This bulletin is closed.

g. (Closed) IE Compliance Bulletin (IEB 86-03): Potential failure of multiple ECCS pumps due to single failure of air-operated valve in minimum flow recirculation line. NHY responded to IEB 86-03 with a letter to the NRC (SBN-1232) dated November 14,1986 which transmitted the results of the review specified by the bulletin. This review indicated that no potential exists at Seabrook for the failure as described in IEB 86-03.

Additionally, the Seabrook SI pump recirculation design was evaluated by NRR in the Seabrook SER and specific inspection was conducted in NRC Region I IR 443/86-46 to evaluate the means by which the subject common-train recirculation flow valve (SI-V-93) would be identified as being out of its normal position.

This bulletin is closed.

5. RCS Fill and Vent

The inspector conducted an as-built walkdown on portions of the Vent Gas (VG) system. Specifically, he traced out piping and components of the RCS Vent Evacuation Pump Skid (SKD-14) located on the (-25') elevation of containment. Additionally, he traced out several loop vent lines with spool pieces temporarily installed to provide visual indication of vent status during loop fill. On top of the pressurizer, the inspector observed tygon tubing temporarily installed downstream of the manual valve (RC-V-127) in the piping which connects the PORV vent header to SKD-14. He noted that the recently installed RCS pressurizer vent valve (RC-V-468) was correctly closed with a blind flange installed on the piping downstream of this valve.

He reviewed the RCS system lineup (OS1001.01A, Rev.03) noting that the required position of RC-LCV-459, an air operated valve was listed as "NORMAL/CLOSED" while the position of the other letdown isolation valve RC-LCV-460 was listed as "AUTO". Following discussion with operations supervisory personnel, it was determined that the proper lineup notation for both valves should be "AUTO/CLOSED" to indicate the desired switch and valve positions. As a result, procedure change no.6 was issued to OS1001.01.

He also reviewed OS1020.02 (Rev.00) entitled "Equipment Vent System Operation" and OS1001.01 (Rev.03) entitled "Reactor Coolant System Evacuation Fill and Vent". The inspector witnessed the conduct of selected sections of the procedure, including RCP starting and stopping. A controlled copy of OS1001.05, RCP Operation was reviewed and initial conditions, prerequisites and precautions and limitations were verified by the inspector. The inspector also compared the RCS Vent Valves-Pre Fill and Vent Lineup (OS1001.01B) against

the NHY design drawings (ie: P&IDs). He noted that four VG valves had been omitted from the lineup. The licensee responded by issuing procedure change no.11 to OS1001.01 adding these valves.

Over the course of this inspection, each of the twelve observed procedure revisions were reviewed for consistency with respect to SM6.2, entitled "Station Operating Procedures", and specifically paragraph 4.5 regarding procedural changes.

No violations were identified.

6. Startup Test Witness

a. Control Rod Drive Mechanism Operational Test (1-ST-5): This startup test procedure verifies the proper operation and timing of each slave cycler mechanism as well as demonstrating proper operation of the control rod drive mechanisms (CRDM).

The inspector witnessed successive daily shift briefings conducted by the Test Director (TD) and the Unit Shift Supervisor (USS). He reviewed five procedure changes and verified their acceptability with respect to meeting test objectives. While witnessing the test he verified that prerequisites and initial conditions were met and that the specified precautions were observed during the test. Specific attention was paid to RCS boron concentration samples and source range nuclear instrument response while pulling rods. The inspector interviewed the responsible reactor engineer regarding his reactivity calculations using a Westinghouse document (WCAP 10982) to verify a Keff of 0.95 or less, given the planned control rod pulling evolutions. On one occasion, testing was delayed while power cabinet repairs were made.

The inspector observed the testing from both the control room and locally at the rod control cabinets where the test instrumentation was installed. He noted qualified startup enginners in their evaluation of visicorder traces of mechanism operation.

No violations were identified.

b. Movable Incore Detector System (1-ST-50): The conduct of the precriticality portion of this startup test (ie: section 6.1) provides functional checks of the six drive units and all movable in-core instrument (MICI) paths utilizing a dummy detector.

The inspector observed retest of certain of the MICI paths using a drive cable with the dummy detector installed. He noted communications, as a condition to 1-ST-50, between the control room (ie: control console) and the detector drive units in containment. Test engineering personnel located at the drive units were interviewed regarding retest conduct and the number of drive paths requiring retest.

No violations were identified.

7. Control Building Air (CBA) System

a. The Seabrook control building air handling system has been designed with a unique feature whereby the make-up air fan discharge dampers (DP-53A, DP-53B) are controlled from the opposite train. For example, the "A" train make-up air fan (FN-27A) is isolated by the "B" train damper (DP-53A). These dampers are "fail-closed" air operated dampers. Although their control and indication power is off the opposite train they also have a set of related train limit switches which cause their fan to trip if the damper closes. Therefore, the loss of a single emergency bus makes both makeup trains inoperable.

On November 20, 1986, the "B" train 4160 Volt Emergency Bus (E-6) was taken down for maintenance. Loss of this bus de-energized the "B" train fan (FN-27B) and the "B" train damper (DP-53A). The "A" train limit switches on DP-53A tripped the "A" train fan when DP-53A went shut thereby securing all makeup to the control room. This scenario from a design standpoint does not appear to be consistent with the Seabrook FSAR, section 9.4.1.1, which indicates that no single active failure will cause a loss of both makeup air systems due to redundancy of the systems.

At the time, the plant was in Mode 5 with RCS temperature at 170°F and RCS pressure at 365 psig with a pressurizer bubble. One RHR Pump and one RCP were operating. De-energizing Bus E-6 was allowed by TS since Bus E-5 was operational. While touring the control room, the resident inspector noted both trains inoperable and notified the USS. They entered action statement (b) of TS 3.7.6 entitled "Control Room Area Ventilation System". No violation of the TS occurred since the action requires suspension of core alterations or positive reactivity changes, neither of which was in progress.

The design basis that this configuration appears to deviate from is the ability to automatically maintain a pressurized control room given a single active failure (eg: loss of bus E-6). Continued pressurization is not possible with neither fan operating. Additionally, the control building exhaust fan (CBA-FN-15) and its associated control damper (CBA-DP-28) which are designed to maintain a +0.125" WG pressure in the control room are disabled by an interlock when both makeup fans are off. To manually re-open the opposite train DP-53 would bypass the high radiation trip feature of the system. At the present time it has not been determined how much infiltration may be expected in the recirculation mode with the fan off and the damper manually open.

These unique features of the Seabrook CBA design are not clearly described in the Seabrook FSAR. In fact, the loss of both makeup air systems upon a single failure of either the "A" or "B" train 4160 volt electrical bus appears to deviate from FSAR section 9.4.1.1 with respect to the single failure criterion. The inspectors discussed this issue with NRR reviewers and were advised that the NRR understanding of the unique CBA design features did not include consideration of this single failure anomaly. This perception was reinforced by the licensing acceptance of the Seabrook CBA design, as documented in SER Section 9.4.1, as follows:

"The control room area ventilation system is an engineered safety feature. Each 100% capacity redundant train of essential equipment is served from separate trains of the emergency Class 1E power system. This ensures the integrity and availability of at least one train of the control room area ventilation system in the event of any single active failure. The control room area ventilation system is designed to automatically maintain the control room and associated areas within the environmental limits required for operation of plant control and uninterrupted safe occupancy of manned areas served during all operating modes, including LOCA conditions."

While discussion is continuing with both NRR and the licensee on the adequacy of the present CBA design, the identification of a design condition whereby a safety-related function is not assured, given a single active failure, represents a deviation from the Seabrook Station FSAR, section 9.4.1.1, as it describes the design bases for the Control Room Complex Heating, Ventilation and Air Conditioning System (443/86-54-01).

b. In July 1986 during the conduct of pre-operational test PT-28.3 (the control room pessure test), temporary test equipment was installed in the CBA system. This equipment included a fan and manometer assembly which was mounted to the system piping. The equipment was installed under work request 86W005051 and included temporary modification request 86-053. As per maintenance procedure MA4.3, this temporary modification was re-evaluated in November 1986 and the decision was made to leave the equipment in place.

The inspector examined the impact of this temporary equipment on the operability of CBA system. Specifically, he was concerned with the behavior of the non-seismic temporary equipment during design basis earthquake conditions. Licensee investigation revealed that although the modification was evaluated with respect to 10 CFR 50.59, the temporary modification system as implemented had no provision for evaluating the operability of permanent plant equipment affected by the modification. During this period the CBA system was required to be operable.

Subsequent to this issue being raised by the NRC inspector, the licensee has removed the temporary modification to the CBA system piping. The temporary modification program and procedure is currently undergoing revision to more fully incorporate operability evaluations. The inspector discussed the new program with a responsible station staff engineering manager and was provided evidence that all temporary modifications, currently in effect, have received additional review to assure that the operability of safety-related equipment is not being adversely affected.

The inspector has no further questions on this issue at this time. No violations were identified.

c. On November 24,1986, the Shift Superintendent (SS) declared the "A" train control building east air intake radiation monitor (RM-6506A) inoperable due to a check source failure. The operators entered action statement 3.3.3.1 (Radiation Monitoring) which required placing the CBA System in the recirculation mode. Subsequently, the inspector questioned the applicability of TS 3.7.6 (Control Room Ventilation System) to this failure. After evaluation, the SS entered action statement b. of TS 3.7.6.

The inspector later discussed this event and TS interpretation with the Operations Manager who stated the licensee position that TS 3.7.6 does not apply if the CBA system is in the recirculation mode. However, since TS 3.7.6 covers the entire CBA system, including makeup and recirculation capabilities, the NRC position is that the application of this specification, while dependent on mode, is not obviated by any particular system configuration (eg: recirculation).

The NRC position is supported by the design and TS bases which provide for a habitable control room environment. The Seabrook FSAR specifies that habitability is ensured by continuous pressurization, as well as automatic isolation on a radiation signal. Since the plant was in Mode 5 at the time of the subject event with no core alterations or positive reactivity changes in progress, entering TS 3.7.6.b had no operational impact. If in Mode 1-4, however, and an emergency 4160 volt bus was deenergized as was the case during part of this period, a plant shutdown per TS 3.0.3 might have been required. Thus, proper application of TS 3.7.6 is particularly important to future operations of the Seabrook plant.

While the NRC position, as stated above, is enforceable, the inspectors do agree with the licensee that the TS itself is not written clearly to reflect the Seabrook specific CBA design. Earlier in this paragraph (subsection 7a), a deviation from FSAR commitments is documented. The identification of this concern also appears to stem from the uniqueness of the CBA design. In addition to evaluating any required design changes to the Seabrook CBA system, the licensee has announced their intent to seek a revision to TS 3.7.6 to align it more closely to the final Seabrook design and actual physical plant configuration.

The inspector concurs with this approach and will be participating in future discussions between NRR and the licensee, on this matter, to provide the NRC on-site perspective relative to CBA system functions and TS adherence. No violations were identified.

d. On December 30,1986, while touring the control room, the inspector reviewed the shift journal. He noted from log entries that the action statement for control room ventilation had been entered at 8:09 am and exited shortly thereafter. Further discussion with the shift operators revealed that a maintenance worker had bumped the Unit 1, West Air Intake, "A" Train radiation monitor (RE-6507A) causing an alarm. This alarm condition actuated an "A" train control room ventilation isolation (CRVI)

signal. The "A" train makeup system isolated and the "A" train recirculation system activated. The radiation signal then cleared and the operators restored the lineup to normal and exited the action statement.

The CRVI signal is an engineered safety features (ESF) signal. 10 CFR 50.72 requires a four-hour NRC notification in the event of a manual or automatic ESF actuation unless the signal is expected while testing. The SS failed to make the report within the required time frame. When notified by the inspector, the new SS who had just relieved the shift evaluated the event in accordance with the Nuclear Production Reporting Manual (NPRE) and determined that an NRC notification was required. He made the report via the Emergency Notification System (ENS) phone network at 2:30 pm.

The initial failure to report this event to the NRC under 10 CFR 50.72 was not viewed as a significant safety issue. The inspector reviewed operator actions, plant response and computer data, verifying that all systems and personnel performed as required. Minor problems were later discussed with the Operations Supervisor. The question of reportability, in this case, is directly related to the design issue documented in paragraph 7.a as a deviation. The licensee is currently drafting a Control Room Habitability System Description and Definition of Single Train Operation for discussion with NRR. The resolution of the design and TS questions will provide the requisite direction to the licensee in evaluating the ESF applicability of portions of the system design. Therefore, documentation of this event as a violation is not appropriate. In the interim, the licensee has agreed to report any such future CRVI actuations in accordance with 10 CFR 50.72 until this issue is resolved.

Shortly after the conclusion of this NRC inspection, on January 8, 1987, the Unit 1, East Air Intake, "A" Train radiation monitor (RE-6506A) failed above the alarm level causing a CRVI on train "A". The licensee made a four-hour notification to NRC via the ENS. Inspector follow-up of this event revealed that the system functioned as designed following the failure. The USS entered the appropriate TS action statements.

Reportability under 10CFR50.72 was subsequently again discussed with the station operations staff. At that time, guidance on the reporting of events under paragraph 50.73(A)(2)(iv) was provided to the licensee and is included in this IR as Attachment 1. This guidance was excerpted from a presentation made to the inspectors on the Immediate Notification Rule by the division of Emergency Preparedness and Engineering Response, NRC Office of I&E.

With regard to this most recent event, four-hour notification to the NRC, in accordance with both 10CFR50.72 and the attached guidance, was made. No violations were identified.

e. The inspector made the following observation during an inspection tour of the Unit 2 yard area.

THIS PARAGRAPH CONTAINS SAFEGUARDS INFORMATION AND IS NOT FOR PUBLIC DISCLOSURE. IT IS INTENTIONALLY LEFT BLANK.

8. Containment Building Spray (CBS) System

During this inspection period, in the course of routine operations and maintenance, the licensee identified the existence of certain leaking CBS check valves (CBS-V-25 & 26). These leaks allowed the RHR pump suction flow from the loops (ie: the normal cooling mode for the RCS in Mode 5) to pressurize the suction lines to the CBS pumps. In accordance with work request 86W01077, the check valves were subsequently disassembled and the valve seats lapped to remove any irregularities that had been causing the leakage by the closed disc/seat interface.

This maintenance activity was controlled to repair one valve at a time since the requisite work required disabling of the respective train of both RHR and CBS for each valve (ie: CBS-V-25: "B" train; CBS-V-26: "A" train). The inspector witnessed certain valve repair activities and spot-checked control of valve line-up and tagging orders to assure proper train operability in accordance with Seabrook TS. As one train was being restored to service, prior to repair on the other train valve, the inspector noted field activity to clear the danger tags on equipment and verified conduct of this activity in accordance with maintenance procedural requirements. He also walked down both trains of the RHR and CBS systems outside containment to independently check both the operating and deadlined system configurations and to confirm proper consideration of manual valves in the tag-out process. While no violations were identified in the inspection of these maintenance activities, one design question remains unresolved, as discussed below.

The inspector noted that the discharge piping from the CBS pumps had undergone design change reanalysis to a new pressure rating of 350 psig and that 350 psig relief valves were installed in the respective pipe lines for overpressure protection. However, the CBS pump suction piping, designed at 300 psig, has no relief valves installed. The inspector questioned this apparent lack of overpressure protection with respect to ASME Boiler & Pressure Vessel Code requirements. This question is particularly pertinent because of the above occurrences of check valve leakage with the CBS suction lines being pressurized greater than 300 psig and probably greater than the 330 psig (ie: 10% over design pressure) which the ASME Code dictates as the required pressure relief valve setting.

A Request for Engineering Services (86-RES-0455) was initiated by the NHY system engineer to address this NRC question. The subsequent response indicated that although the subject CBS pipe lines could be subjected to a maximum of 470 psig pressure given the observed check valve leakage conditions, the analyzed maximum temperature (104 degrees F) would provide conditions within the allowable stress limits of the piping, as constructed. Therefore, the RES concluded that the present system overpressure protection was adequate for the assumed conditions, without the need for relief valves.

The effective ASME Section III Code edition for this subject piping design is the 1971 edition, thru the Winter 1972 addenda. The licensee explained to the inspector that, in this code, Article NC-7000 (Protection Against Overpressure), the non-use of relief valves is allowed providing "the lines are designed for the maximum pressure to which they may be subjected". The inspector reviewed the RES response, the pertinent code and the original piping schedules and temperature/pressure (T/P) design data sheet for the questioned piping and determined that the following questions remain on this particular issue.

Section NB-3612.4 of the ASME Code indicates that for piping systems (eg: RHR/CBS) operating at different pressures that are connected by a valve, the lower pressure system may be designed to the higher pressure system requirements. If not, "pressure-relief devices or safety valves shall be provided to protect the lower pressure system". Since RHR is designed as a 600 psig pressure system and the subject CBS suction piping has a 300 psig design, interpertation of how the CBS suction piping meeets the "higher pressure system requirements" remains a key issue. Relating to this interpretation is the question of construction testing, since the subject CBS piping required only a 375 psig hydrostatic test (ie: 125% of design pressure). If credit were taken for a higher design pressure, additional hydrostatic testing of the system may be required.

An additional question remains with regard to the fact that 86-RES-0455 indicates that the CBS pump suction piping, under certain conditions, might be subjected to 470 psig. The original design T/P data sheet (R-132), however, only appears to have documented as a special analyzed condition a maximum

pressure of 420 psig. Therefore, there is a question whether worst case conditions for the leaking check valve scenarios, as presently known, were fully taken into consideration in the original piping design?

In meetings with the licensee and UE&C engineering personnel, it was agreed that a Code Interpretation of NB-3612.4 of ASME 1971 Code (W72) would be sought. Pending receipt of this interpretation, review by the NRC and further discussion of the impact on hydrostatic testing and the original design data analysis (ie: R-132), this issue is unresolved (443/86-54-02).

9. Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, violations, or deviations. An unresolved item disclosed during this inspection is discussed in paragraph 8.

10. Management Meetings

At periodic intervals during the course of this inspection, meetings were held with senior plant management to discuss the scope and findings of this inspection. An exit meeting was conducted on January 9,1987 to discuss the inspection findings during the period. During this inspection, the NRC inspectors received no comments from the licensee that any of their inspection items or issues contained proprietary information. No written material was provided to the licensee during this inspection, except for Attachment 1 to this report, as discussed in paragraph 7d.

ATTACHMENT 1

PARAGRAPH 50.73(A)(2)(IV)

DISCUSSION

"ANY EVENT OR CONDITION THAT RESULTED IN MANUAL OR AUTOMATIC ACTUATION OF ANY ENGINEERED SAFETY FEATURE (ESF), INCLUDING THE REACTOR PROTECTION SYSTEM (RPS). HOWEVER, ACTUATION OF AN ESF, INCLUDING THE RPS, THAT RESULTED FROM AND WAS PART OF THE PREPLANNED SEQUENCE DURING TESTING OR REACTOR OPERATION NEED NOT BE REPORTED."

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- INCLUDES ESF ACTUATIONS EITHER MANUALLY OR AUTOMATICALLY, REGARDLESS OF PLANT STATUS.

  - EVENTS WHERE AN ESF WAS NEEDED TO MITIGATE THE CON-CONSEQUENCES.

  - EVENTS WHERE AN ESF OPERATED UNNECESSARILY.

  - ESF ACTUATES IN A WAY THAT IS NOT PART OF THE PLANNED PROCEDURE.

- "ACTUATION" OF MULTICHANNEL ESF ACTUATION SYSTEMS IS DEFINED AS ACTUATION OF ENOUGH CHANNELS TO COMPLETE THE MINIMUM ACTUATION LOGIC.

- DOES NOT INCLUDE OPERATION OF AN ESF AS PART OF A PLANNED OPERATIONAL PROCEDURE OR TEST.

- THE FACT THAT THE SAFETY ANALYSIS ASSUMES THAT AN ESF WILL ACTUATE AUTOMATICALLY DURING CERTAIN PLANT CONDITIONS DOES NOT ELIMINATE THE NEED TO REPORT.