ENCLOSURE 2

BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2
NRC DOCKET NOS. 50-325 & 50-324
OPERATING LICENSE NOS. DPR-71 & DPR-62
CONTROL ROOM EMERGENCY VENTILATION SYSTEM
(NRC TAC NOS. M85143 AND M85144)

TECHNICAL SPECIFICATION PAGES - UNIT 1

LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS

BASES

BASES

3/4.7.2 CONTROL ROOM EMERGENCY VENTILATION SYSTEM

LIMITING CONDITION FOR OPERATION

3.7.2 The Control Room Emergency Ventilation System shall be OPERABLE with:

a. An OPERABLE Radiation/Smoke Protection Mode consisting of two OPERABLE control room emergency filtration subsystems.

b. An OPERABLE Chlorine Protection Mode.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2, 3, 4, 5, *, and **

ACTION:

a. In OPERATIONAL CONDITIONS 1 and 2:

1. With one control room emergency filtration unit inoperable, restore the inoperable control room emergency filtration unit to OPERABLE status within 7 days or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

2. With both control room emergency filtration units inoperable, be in at least HOT SHUTDOWN within 12 hours and in COLD SHUTDOWN within the following 24 hours.

b. In OPERATIONAL CONDITION 3:

1. With one control room emergency filtration unit inoperable, restore the inoperable control room emergency filtration unit to OPERABLE status within 7 days or be in COLD SHUTDOWN within the following 24 hours.

2. With both control room emergency filtration units inoperable, be in COLD SHUTDOWN within the following 24 hours.

c. In OPERATIONAL CONDITIONS 4, 5, and *:

1. With one control room emergency filtration unit inoperable, restore the inoperable control room emergency filtration unit to OPERABLE status within 7 days or initiate and maintain operation of the remaining OPERABLE control building emergency filtration unit in the Radiation/Smoke Protection Mode.

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* During movement of irradiated fuel assemblies in the secondary containment.

** The Chlorine Protection Mode is required to be OPERABLE at all times when the chlorine tank car is within the exclusion area.

3/4.7.2 CONTROL ROOM EMERGENCY VENTILATION SYSTEM

LIMITING CONDITION FOR OPERATION (Continued)

ACTION (Continued):

2. With both control room emergency filtration units inoperable, suspend all operations involving CORE ALTERATIONS, handling of irradiated fuel in secondary containment, and operations with a potential for draining the reactor vessel.

d. With the Chlorine Protection Mode inoperable, within 8 hours remove the chlorine tank car from the exclusion area. If the tank car physically can not be removed from the exclusion area, take the ACTIONS required in items a.2, b.2, and c.2 above.

SURVEILLANCE REQUIREMENTS

4.7.2 The control room emergency ventilation system shall be demonstrated OPERABLE:

a. At least once per 31 days by initiating flow, from the control room, through the HEPA filter and charcoal adsorbers in each filtration unit and verifying that the system operates for at least 15 minutes.

b. At least once per 18 months or (1) after any structual maintenance on the HEPA filter or charcoal adsorber housing, or (2) following painting, fire, or chemical release in any ventilation zone communicating with the system by:

1. Verifying that the cleanup system satisfies the in-place testing acceptance criteria of > 99 percent efficiency using the test procedures of Regulatory Positions C.5.a, C.5.c, and C.5.d of Regulatory Guide 1.52, Revision 1, July 1976, and the system flow rate is 2000 cfm ± 10%.

SURVEILLANCE REQUIREMENTS (Continued)

2. Verifying within 31 days after removal that a laboratory analysis of a representative carbon sample obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 1, July 1976, meets the laboratory testing criteria of Regulatory Position C.6.a of Regulatory Guide 1.52, Revision 1, July 1976.

3. Verifying a system flow rate of 2000 cfm ± 10% during system operation when tested in accordance with ANSI N510-1975.

c. After every 720 hours of charcoal adsorber operation by verifying within 31 days after removal that a laboratory analysis of a representative carbon sample obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 1, July 1976, meets the laboratory testing criteria of Regulatory Position C.6.a of Regulatory Guide 1.52, Revision 1, July 1976.

d. At least once per 18 months by:

1. Verifying that the pressure drop across the combined HEPA filters and charcoal adsorber banks is $\leq$ 5.25 inches Water Gauge while operating the filter train at a flow rate of 2000 cfm ± 10%.

2. Verifying that on a smoke detector or control room ventilation system high radiation test signal, the control building ventilation system automatically diverts its inlet flow through the HEPA filters and charcoal adsorber banks of the emergency filtration system.

3. Verifying that on a chlorine detector test signal, the control building ventilation system automatically isolates and the control room emergency filtration system cannot be started by a smoke detector or control room ventilation system high radiation test signal.

4. Verifying that the system maintains the control room at a positive pressure relative to the outside atmosphere during system operation.

3/4.7.2 CONTROL ROOM EMERGENCY VENTILATION SYSTEM

SURVEILLANCE REQUIREMENTS (Continued)

e. After each complete or partial replacement of a HEPA filter bank by verifying that the HEPA filter banks remove > 99 percent of the DOP when they are tested in-place in accordance with ANSI N510-1975 while operating the system at a flow rate of 2,000 cfm ± 10%.

f. After each complete or partial replacement of a charcoal adsorber bank by verifying that the charcoal adsorbers remove > 99 percent of a halogenated hydrocarbon refrigerant test gas when they are tested in-place in accordance with ANSI N510-1975 while operating the system at a flow rate of 2,000 cfm ± 10%.

3/4.7.1 SERVICE WATER SYSTEMS (Continued)

demonstrate operation in OPERATIONAL CONDITIONS 1 through 3 with no OPERABLE nuclear service water pumps is acceptable provided that at least two nuclear service water pumps are OPERABLE on the opposite unit and two conventional pumps are OPERABLE on the affected unit. Specific ACTION statements and LCO time limits for this situation have not been developed since a more conservative ACTION Statement has been established in order to minimize the risk of personnel error in administrating this situation.

3/4.7.2 CONTROL ROOM EMERGENCY VENTILATION SYSTEM

Background

One of the principal design objectives of the Control Building Heating, Ventilation and Air Conditioning (CBHVAC) System is to permit continuous occupancy of the Control Room Emergency Zone under normal operating conditions and under the postulated design basis events throughout the life of the plant. The Control Building HVAC System must function to provide protection to the operators for three type events: a radiation event, up to and including a Design Basis Accident (e.g., Main Steam Line Break [MSLB] Accident, Refueling Accident, Control Rod Drop Accident, or Loss of Coolant Accident [LOCA]), a toxic gas event (complete rupture of the 55 ton chlorine tank car located near the Service Water Building, or a slow leak lasting for an extended period of time), and an external smoke event. These events form the basis for the design of the Control Room Emergency Ventilation (CREVS) function of the CBHVAC System.

The CREVS is designed to meet General Design Criterion (GDC) 19 (Reference 1). In addition, the system is designed using the guidance of Regulatory Guide 1.95, Revision 1 (Reference 2). Commitments have also been made to design the radiation protection function of the CBHVAC System to meet the single failure criteria described in IEEE 279-1971, and the chlorine detection and isolation logic to single failure criteria, both with approved exceptions (Reference 12, Section 3.6).

LCO

Operability of the CREVS ensures that the control room will remain habitable for operations personnel during and following all credible hazard event scenarios external to the control room, consistent with the assumptions in the various analyses. Two redundant subsystems of the CREVS are required to be OPERABLE to ensure that at least one is available, assuming a single failure disables the other subsystem. The CREVS is considered OPERABLE when the individual components necessary to control operator exposure are operable in both subsystems. For the Radiation/Smoke Protection Mode, a subsystem is considered OPERABLE when its associated:

1. Fan is OPERABLE,

2. HEPA filter and charcoal adsorbers are not excessively restricting flow and are capable of performing their filtration functions, and

3/4.7.2 CONTROL ROOM EMERGENCY VENTILATION SYSTEM (Continued)

LCO (Continued)

3. Ductwork and dampers are OPERABLE, and air circulation can be maintained as required in Reference 12, Section 3.1.

For the Chlorine Protection Mode, a subsystem is considered OPERABLE when:

1. The isolation dampers are OPERABLE, and

2. The logic components necessary to achieve automatic isolation are functional, as described in Reference 12, Section 3.1.

Two additional OPERABILITY requirements apply to all modes of CREVS operation. The CBHVAC Control Air System must be OPERABLE to support damper operation. In addition, the Control Room Envelope must be maintained, including the integrity of the walls, floors, ceilings, ductwork, and access doors. The Control Room Envelope includes the electronic equipment rooms, the central control room area, computer rooms, kitchen, restrooms, and the supply and return ductwork up to and including the isolation dampers.

The following components, including their associated logic trains, actuation devices, and power supplies, are non-redundant. Their OPERABILITY affects both trains of the CREVS. These components are: control room (washroom) exhaust isolation damper, control room normal make-up damper, and the control room emergency recirculation damper. In addition, the Brunswick control room is not equipped with redundant outdoor air intakes (References 4 and 5).

The Radiation/Smoke Protection Mode of operation protects the control room operators from those events which may result in the release of radioactivity. The Radiation/Smoke Protection Mode of operation also provides protection to the control room operators in the event of an external smoke event.

During a radiation event, the CBHVAC System is required to automatically isolate and enter the Radiation/Smoke Protection Mode on a Control Room Intake High Radiation signal from the Area Radiation Monitoring System. Upon receipt of a high radiation signal, the CBHVAC System is automatically realigned to the emergency mode of operation. The normal fresh air inlet closes, and, at approximately the same time, the emergency air filtration units begin operation, recirculating control room air and providing filtered makeup air to minimize contamination build-up and provide positive pressure in the Control Room Envelope. The CBHVAC System responds to an external smoke event in the same manner as it does for a radiation event.

In the event of a chlorine release, the CBHVAC System enters a full recirculation mode (Chlorine Protection Mode), with no outdoor air intake. The emergency filtration trains do not start, since they do not effectively remove chlorine and may be damaged by the presence of chlorine. Protection for chlorine gas events "overrides" any concurrent, ongoing, or subsequent radiation or smoke initiation signals. The override design offers protection

3/4.7.2 CONTROL ROOM EMERGENCY VENTILATION SYSTEM (Continued)

LCO (Continued)

to operations personnel in the Control Room by providing protection against potentially fatal chlorine gas releases. This protection is required any time the chlorine tank car is within the exclusion area.

Applicability

The OPERATIONAL CONDITION applicabilities ensure that the system is capable of performing these functions when the potential for radiation releases and external smoke hazards exist. In OPERATIONAL CONDITIONS 1, 2, and 3, the system must be OPERABLE to reduce control operator exposure during and following a design basis accident, since the accident could lead to a fission product release.

In OPERATIONAL CONDITIONS 4 and 5, the probability and consequences of a design basis accident are reduced because of the pressure and temperature limitations in these OPERATIONAL CONDITIONS. Maintaining the CREVS OPERABLE is not required in OPERATIONAL CONDITIONS 4 and 5, except for the following situations under which significant radiological releases can be postulated:

1. During movement of irradiated fuel assemblies in the secondary containment,

2. During CORE ALTERATIONS, and

3. During operations with a potential for draining the reactor vessel.

Requiring OPERABILITY of the Radiation Protection Mode of the CREVS during OPERATIONAL CONDITIONS 4 and 5 ensures that the system is available during the above evolutions, with the exception the movement of irradiated fuel in secondary containment; therefore, a specific applicability OPERATIONAL CONDITION has been added for this activity.

OPERABILITY of the Chlorine Protection Mode of the CREVS is required any time the chlorine tank car is within the exclusion area. Analyses demonstrate that movement of the tank car outside the exclusion area sufficiently reduces the threat of control room operator incapacitation from a release of this chemical.

Action a.

With one emergency filtration subsystem inoperable, the inoperable subsystem must be restored to OPERABLE status within 7 days. With the unit in this condition, the remaining subsystem is adequate to perform control room radiation protection. The loss of a single emergency filtration unit means that the CREVS reliability is reduced because a single failure in the OPERABLE subsystem could result in reduced or lost system capability. The 7 day out of

3/4.7.2 CONTROL ROOM EMERGENCY VENTILATION SYSTEM (Continued)

Action a. (Continued)

service time is based on the low probability of a design basis accident and a single failure in the OPERABLE subsystem occurring during this time period, and the capability of the remaining subsystem to provide the required capabilities.

During OPERATIONAL CONDITIONS 1 and 2, the plant must be placed in an OPERATIONAL CONDITION that minimizes risk if the inoperable subsystem cannot be restored to OPERABLE status within the required 7 days. To achieve this status, the plant must be placed in HOT SHUTDOWN within 12 hours and COLD SHUTDOWN within the following 24 hours. These allowed completion times are reasonable, based on operating experience, to allow the plant to reach these OPERATIONAL CONDITIONS from full power operation in an orderly manner and without unnecessarily challenging plant systems.

The loss of both emergency filtration subsystems means that the radiation protection function is lost. The plant must be placed in an OPERATIONAL CONDITION that minimizes risk. To achieve this status, the plant must be placed in HOT SHUTDOWN within 12 hours and COLD SHUTDOWN within the following 24 hours. These allowed completion times are reasonable, based on operating experience, to allow the plant to reach these OPERATIONAL CONDITIONS from full power operation in an orderly manner and without unnecessarily challenging plant systems.

Action b.

With one emergency filtration subsystem inoperable, the inoperable subsystem must be restored to OPERABLE status within 7 days. With the unit in this condition, the remaining subsystem is adequate to perform control room radiation protection. The loss of a single emergency filtration unit means that the CREVS reliability is reduced because a single failure in the OPERABLE subsystem could result in reduced or lost system capability. The 7 day out of service time is based on the low probability of a design basis accident and a single failure in the OPERABLE subsystem occurring during this time period, and the capability of the remaining subsystem to provide the required capabilities.

During OPERATIONAL CONDITION 3, the plant must be placed in an OPERATIONAL CONDITION that minimizes risk if the inoperable subsystem cannot be restored to OPERABLE status within the required 7 days. To achieve this status, the plant must be placed in COLD SHUTDOWN within the following 24 hours. The allowed completion time is reasonable, based on operating experience, to allow the plant to reach this OPERATIONAL CONDITION from HOT SHUTDOWN in an orderly manner and without unnecessarily challenging plant systems.

The loss of both emergency filtration subsystems means that the radiation protection function is lost. The plant must be placed in an OPERATIONAL CONDITION that minimizes risk. To achieve this status, the plant must be

3/4.7.2 CONTROL ROOM EMERGENCY VENTILATION SYSTEM (Continued)

Action b. (Continued)

placed in COLD SHUTDOWN within the following 24 hours. The allowed completion time is reasonable, based on operating experience, to allow the plant to reach this OPERATIONAL CONDITION from HOT SHUTDOWN in an orderly manner and without unnecessarily challenging plant systems.

Action c.

With one emergency filtration subsystem inoperable, the inoperable subsystem must be restored to OPERABLE status within 7 days. With the unit in any of these conditions, the remaining subsystem is adequate to perform control room radiation protection. The loss of a single emergency filtration unit means that the CBEVS reliability is reduced because a single failure in the OPERABLE subsystem could result in reduced or lost system capability. The 7 day out of service time is based on the low probability of a design basis accident and a single failure in the OPERABLE subsystem occurring during this time period, and the capability of the remaining subsystem to provide the required capabilities.

During OPERATIONAL CONDITIONS 4, 5, and while irradiated fuel is being moved in secondary containment, if the inoperable emergency filtration subsystem cannot be restored to OPERABLE status within 7 days, the remaining OPERABLE subsystem may be placed in the Radiation/Smoke Protection Mode. This action ensures that the remaining subsystem is OPERABLE, and that no failures which could prevent automatic actuation will occur. This action also ensures that any active failure would be readily detected.

An alternative to placing the remaining subsystem in service is to immediately suspend activities that present a potential for releasing radioactivity that might require operation of the CREVS. This alternative places the unit in a condition that minimizes risk.

Action d.

With the Chlorine Protection Mode inoperable, the chlorine tank car must be removed from the exclusion area within the next eight (8) hours to ensure adequate protection for the operators. Chlorine gas protection is not required with the tank car outside of the exclusion area. Eight hours is considered adequate time to perform the necessary system alignments and to allow plant personnel to remove the chlorine tank car from the site in an orderly manner.

With the plant physically unable to remove the chlorine tank car from the site, as required by this statement, ACTION d. requires the plant to take actions to place the plant in a condition that minimizes risk of core damage or other types of radiological release events.

3/4.7.2 CONTROL ROOM EMERGENCY VENTILATION SYSTEM (Continued)

Surveillance Requirements

The SURVEILLANCE REQUIREMENTS (SR) in this specification verify that a subsystem in the standby mode starts on demand and continues to operate. Standby systems are checked periodically to ensure that the automatic start function is consistent with the assumptions in the Control Room Habitability Analyses (References 4 and 6). Since the environmental conditions on this system are not severe, monthly demonstration of the capability of the system to operate by SR 4.7.2.a is considered adequate. The $\geq$ 15 minute run time is considered adequate for operation of systems without heaters (Reference 16).

SR 4.7.2.b verifies the capability of the filtration system at least once every 18 months, or 1) following any structural maintenance on the filtration unit HEPA filter or charcoal adsorbers or 2) following painting, fire, or chemical release in any ventilation zone communication with the system. Testing is performed in accordance with applicable sections of Regulatory Guide 1.52, Revision 1, and ANSI N510-1975. Acceptance criteria provides assurance that the efficiency used in the Control Room dose analyses is conservative. This is consistent with the guidance provided in Generic Letter 83-13 (Reference 7).

SR 4.7.2.c verifies adequacy of the charcoal filtration system following every 720 hours of operation. The time of operation is based on the recommendations of Regulatory Guide 1.52, Revision 1 (Reference 8), and early nuclear plant filter testing (Reference 10).

SR 4.7.2.d demonstrates functional capability of the system by verifying 1) pressure drop across the HEPA and charcoal filtration units, 2) automatic emergency system initiation upon receipt of a smoke detector or high radiation test signal, 3) the override function of the chlorine protection function, and 4) ability of the system to maintain a positive pressure relative to the outside atmosphere during system operation. The maximum pressure drop of $\leq$ 5.25 inches water gauge is based on a CREVS pressure drop analysis (Reference 9) and fan capability. This maximum pressure drop ensures the system is capable of delivering rated flow with 1 inch water gauge margin for filter loading. The positive pressure test is performed to ensure that the control room is maintained positive to any potentially contaminated external atmosphere, including the outside atmosphere and adjacent building atmosphere(s). Testing of the chlorine override function ensures operability of the chlorine protection mode of the CREVS by demonstrating the capability of the system to prevent the emergency filtration units from initiating during a chlorine event.

SR 4.7.2.e and SR 4.7.2.f verify that the filtration capability of the HEPA and charcoal adsorber banks is consistent with that assumed in the Control Room Habitability Analyses (References 4 and 6) following partial or complete replacement of either filtration component. The testing is performed in accordance with the applicable sections of ANSI N510-1975 (Reference 14).

3/4.7.2 CONTROL ROOM EMERGENCY VENTILATION SYSTEM (Continued)

References

1. 10 CFR 50, Appendix A, General Design Criterion 19, Control Room.

2. Regulatory Guide 1.95, Revision 1, Protection of Nuclear Power Plant Control Room Operators Against an Accidental Chemical Release.

3. Updated FSAR, Brunswick Steam Electric Plant, Units 1 & 2.

4. NUS-3697, Revision 2, February 1983, Control Room Habitability Analysis.

5. NLU-83-673, TMI Action Item III.D.3.4 - Control Room Habitability, NRC Safety Evaluation dated October 18, 1983.

6. NUS-4758, Control Room Radiological Reanalysis, August, 1985.

7. Generic Letter 83-13, Clarification of Surveillance Requirements for HEPA Filters and Charcoal Adsorber Units in Standard Technical Specifications of ESF Cleanup Systems, March 2, 1983.

8. Regulatory Guide 1.52, Revision 1, July 1976,

9. CP&L Calculation G0077A-01, Control Room Emergency Filter System Differential Pressure Analysis.

10. Original FSAR, BSEP, Units 1 and 2, Appendix K.

11. IEEE 279-1971, IEEE Criteria for Protection Systems for Nuclear Power Generating Stations.

12. DBD-37, Design Basis Document for Control Building Heating, Ventilation, and Air Conditioning System.

13. NRC-89-103, NRC Safety Evaluation for Control Room Habitability, February 16, 1989.

14. ANSI N510-1975, Testing of Nuclear Air Cleaning Systems.

15. ANSI N509-1976, Nuclear Power Plant Air Cleaning Units.

16. NUREG-1433, Standard Technical Specifications, General Electric Plants, BWR/4, Revision 0, September 28, 1992.

3/4.7.3 FLOOD PROTECTION

The limitation on flood protection ensures that facility protective actions will be taken and operation will be terminated in the event of flood conditions. The limit of elevation 17'6" Mean Sea Level is based on the maximum elevation at which facility flood control measures provide protection to safety-related equipment.

3/4.7.4 REACTOR CORE ISOLATION COOLING SYSTEM

The reactor core isolation cooling system (RCICS) is provided to assure adequate core cooling in the event of reactor isolation from its primary heat sink and the loss of feedwater flow to the reactor vessel without requiring actuation of any of the Emergency Core Cooling equipment. RCICS is conservatively required to be OPERABLE whenever reactor pressure exceeds 113 psig even though the Residual Heat Removal (RHR) system provides adequate core cooling up to 150 psig. The condensate storage tank provides sufficient water to reduce the reactor coolant temperature and pressure to permit the RHR system to be operated.

CONTROL ROOM EMERGENCY VENTILATION SYSTEM

LIMITING CONDITION FOR OPERATION

3.3.5.5 The Control Room Emergency Ventilation System instrumentation shown in Table 3.3.5.5-1 shall be OPERABLE.

APPLICABILITY: As shown in Table 3.3.5.5-1.

ACTION:

a. With one or more detectors inoperable, take the ACTION required by Table 3.3.5.5-1.

b. The provisions of Specification 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.3.5.5 Each of the above required control room emergency ventilation instruments shall be demonstrated OPERABLE by performance of the testing at the frequency required by Table 4.3.5.5-1.

TABLE 3.3.5.5-1

CONTROL ROOM EMERGENCY VENTILATION SYSTEM INSTRUMENTATION

FUNCTION	REQUIRED NUMBER OF DETECTORS PER TRIP SYSTEM	APPLICABLE OPERATIONAL CONDITIONS	ACTION	ALARM/TRIP SETPOINT
CHLORINE ISOLATION:				
1. Control Building Air Intake (Local) Trip System	4 (a)	(b)	90	≤ 5ppm
2. Chlorine Tank Car Area (Remote) Trip System	4 (a)	(b)	90	≤ 5ppm
RADIATION PROTECTION:				
1. Control Building Air Intake	2	1, 2, 3, 4, 5, and (c)	91	≤ 7mR/hr (d)
CONTROL ROOM ENVELOPE SMOKE PROTECTION:				
1. Zone 4	2	1, 2, 3, 4, 5, and (c)	92	NA
2. Zone 5	2	1, 2, 3, 4, 5, and (c)	92	NA

(a) Four OPERABLE detectors per trip system, consisting of two detectors per trip subsystem.

(b) With the chlorine tank car within the exclusion area.

(c) During movement of irradiated fuel assemblies in the secondary containment.

(d) Allowable value of ≤ 10mR/hr.

TABLE 3.3.5.5-1 (Continued)

CONTROL ROOM EMERGENCY VENTILATION SYSTEM INSTRUMENTATION

ACTIONS

ACTION 90

a. With one chlorine detector of either or both trip subsystems of either or both trip systems inoperable, restore the inoperable detector(s) to OPERABLE status within 7 days or, within the next 6 hours, isolate the Control Room and operate in the Chlorine Protection Mode.

b. With both detectors within a trip subsystem of either trip system inoperable, within one hour isolate the Control Room and operate in the Chlorine Protection Mode.

ACTION 91

a. With one radiation detector inoperable, restore the inoperable detector to OPERABLE status within 7 days or, within the next 6 hours, isolate the Control Room and operate in the Radiation/Smoke Protection Mode.

b. With both radiation detectors inoperable, within one hour isolate the Control Room and operate in the Radiation/Smoke Protection Mode.

ACTION 92

a. With less than two (2) ionization detectors OPERABLE in either or both zones, restore two (2) detectors within each zone to OPERABLE status within 7 days or, within the next 6 hours, isolate the Control Room and operate in the Radiation/Smoke Protection Mode.

b. With less than one (1) ionization detector OPERABLE in either or both zones, within one hour isolate the Control Room and operate in the Radiation/Smoke Protection Mode.

TABLE 4.3.5.5-1

CONTROL ROOM EMERGENCY VENTILATION SYSTEM
INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTION	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION
CHLORINE ISOLATION:			
1. Local Detection Trip System	NA	M	A
2. Remote Detection Trip System	NA	M	A
RADIATION PROTECTION:			
1. Control Building Air Intake	D	M	R
CONTROL ROOM ENVELOPE SMOKE PROTECTION:			
1. Zone 4	NA	6 months	(a)
2. Zone 5	NA	6 months	(a)

(a) See Surveillance Requirement 4.7.2.d.2

MONITORING INSTRUMENTATION (Continued)

3/4.3.5.2 REMOTE SHUTDOWN MONITORING INSTRUMENTATION

The OPERABILITY of the remote shutdown monitoring instrumentation ensures that sufficient capability is available to permit shutdown and maintenance of HOT SHUTDOWN of the facility from locations outside of the control room. This capability is required in the event control room habitability is lost, and is consistent with General Design Criterion 19 of CFR 50.

3/4.3.5.3 ACCIDENT MONITORING INSTRUMENTATION

The OPERABILITY of the post-accident monitoring instrumentation ensures that sufficient information is available on selected plant parameters to monitor and assess important variables following an accident. This capability is consistent with the recommendations of Regulatory Guide 1.97, "Instrumentation for Light Water-Cooled Nuclear Power Plants to Assess Plant Conditions During and Following an Accident," December 1975, and NUREG-0578, "TMI-2 Lessons Learned Task Force Status Report and Short-Term Recommendations."

The suppression chamber water temperature monitoring system performs a dual function. It provides for accident monitoring as recommended by Regulatory Guide 1.97. This system is also designed to meet the acceptance criteria of NUREG-0661, Appendix A in monitoring average suppression chamber water temperature during normal operating conditions. Refer to Sections 3/4.3.5.3 and 3/4.6.2.1 for Limiting Conditions for Operation and Surveillance Requirements pertaining to each function.

3/4.3.5.4 SOURCE RANGE MONITORS

The source range monitors provide the operator with information on the status of the neutron level in the core at very low power levels during start-up. At these power levels, reactivity additions should not be made without this flux level information available to the operator. When the intermediate range monitors are on scale, adequate information is available without the SRMs and they can be retracted.

3/4.3.5.5 CONTROL ROOM EMERGENCY VENTILATION SYSTEM

Background

One of the principal design objectives of the Control Building Heating, Ventilation and Air Conditioning (CBHVAC) System is to permit continuous occupancy of the Control Room Emergency Zone under normal operating conditions and under the postulated design basis events throughout the life of the plant. The Control Building HVAC System must function to provide protection to the operators for three type events: a radiation event, up to and including a Design Basis Accident (e.g., Main Steam Line Break [MSLB] Accident, Refueling Accident, Control Rod Drop Accident, or Loss of Coolant Accident [LOCA]), a toxic gas event (complete rupture of the 55 ton chlorine tank car located near

3/4.3.5.5 CONTROL ROOM EMERGENCY VENTILATION SYSTEM (Continued)

Background (Continued)

the Service Water Building, or a slow leak lasting for an extended period of time), and an external smoke event. These events form the basis for the design of the Control Room Emergency Ventilation (CREVS) function of the CBHVAC System.

During a radiation event, the CBHVAC System is required to automatically isolate and enter the Radiation/Smoke Protection Mode on a Control Room Intake High Radiation signal from the Area Radiation Monitoring System. Upon receipt of a high radiation signal, the CBHVAC System is automatically realigned to the emergency mode of operation. The normal fresh air inlet closes, and, at approximately the same time, the emergency air filtration units begin operation, recirculating control room air and providing filtered makeup air to minimize contamination build-up and provide positive pressure in the Control Room Envelope. The CBHVAC System responds to an external smoke event in the same manner as it does for a radiation event.

In the event of a chlorine release, the CBHVAC System enters a full recirculation mode (Chlorine Protection Mode), with no outdoor air intake. The emergency filtration trains do not start, since they do not effectively remove chlorine and may be damaged by the presence of chlorine. Protection for chlorine gas events "overrides" any concurrent, ongoing, and any subsequent radiation or smoke initiation signals. The override design offers protection to operations personnel in the Control Room by providing protection against potentially fatal chlorine gas releases. This protection is required any time the chlorine tank car is within the exclusion area.

The CREVS is designed to meet the criteria of General Design Criterion (GDC) 19 (Reference 1). In addition, the system is designed using the guidance of Regulatory Guide 1.95, Revision 1 (Reference 2). Commitments have also been made to design the radiation protection function of the CBHVAC System to meet the single failure criteria described in IEEE 279-1971, and the chlorine detection and isolation logic to single failure criteria, both with approved exceptions (Reference 6, Section 3.6).

LCO

Operability of the CREVS instrumentation ensures that the control room operators will be protected from hazards external to the control room, consistent with the assumptions in the various analyses, through the prompt detection and initiation of the necessary protective actions of the system.

Applicability

The instrumentation associated with the Radiation/Smoke Protection Mode of the CREVS is required to be operable to automatically detect and initiate the Radiation/Smoke Protection Mode of operation during times when the potential exists for events which may result in the release of radioactive materials to the environment, up to and including design basis accidents. The specific radiological release events for which the system must provide a mitigating function are discussed in the bases of Technical Specification 3.7.2 and DBD-37 (Reference 6).

3/4.3.5.5 CONTROL ROOM EMERGENCY VENTILATION SYSTEM (Continued)

Applicability (Continued)

The instrumentation associated with the Chlorine Protection Mode of the CREVS is required to be OPERABLE to automatically detect and initiate the internal recirculation mode of operation any time the chlorine tank car is within the exclusion area.

The instrumentation associated with the External Smoke Protection function of the CREVS is required to be OPERABLE to automatically detect and initiate the Radiation/Smoke Protection Mode of operation during the same conditions as the Radiation Protection function. This ensures that habitability of the control room is maintained during times when a radiological release could potentially occur.

Actions

Radiation Protection

Two control room air inlet radiation detectors measure radiation levels in the inlet ducting of the main control room. A high radiation level automatically initiates the radiation protection mode of operation. Both channels are required to be OPERABLE to ensure that no single instrument failure can preclude the initiation of the radiation protection function of the control room emergency ventilation system. The loss of a single detector means that the CREVS reliability is reduced because a single failure in the OPERABLE subsystem could result in reduced or lost system capability. The 7 day out of service time is based on the low probability of a design basis accident and a single failure occurring during this time period, and the capability of the remaining instrumentation subsystem to provide the required isolation and is consistent with the out of service times allowed for loss of redundancy at the system level.

The loss of both detectors means that the automatic detection/isolation function of the radiation protection system is lost. Placing the CBHVAC System in the Radiation/Smoke Protection Mode is a suitable compensatory action to ensure that the automatic radiation protection function is not lost.

Chlorine Protection

The chlorine detection/isolation instrumentation is organized into two trip systems, with one trip system (remote) located near the chlorine tank car and the other located in the control building intake plenum (local). Each trip system contains two trip subsystems, with two detectors (one from each division) in each trip subsystem. Both trip subsystems in each trip system are required to be OPERABLE any time the chlorine tank car is within the exclusion area to ensure adequate protection for the control room under postulated toxic gas events.

The chlorine detectors in each trip system are arranged in a one-out-of-two-taken-twice configuration. One detector from each of the trip subsystems in a trip system must actuate to initiate the automatic detection/isolation

3/4.3.5.5 CONTROL ROOM EMERGENCY VENTILATION SYSTEM (Continued)

Actions (Continued)

function. The loss of a single chlorine detector means that the CBEVS reliability is reduced because a single failure in the remaining OPERABLE trip subsystem detector could result in reduced or lost system capability. The 7 day out of service time is based on the low probability of a design basis chlorine gas event and a single active failure occurring during this time period, and the capability of the remaining detectors to provide the required isolation capabilities. The out of service time is consistent with the out of service time allowed for loss of redundancy at the system level.

The loss of both detectors in any trip subsystem means that the automatic protection function of the chlorine detection/isolation system is lost. Placing the CBHVAC System in the Chlorine Protection Mode, through the use of control switches to close the appropriate dampers, ensures that the control room envelope is protected, while at the same time allowing a valid radiation or smoke signal to initiate appropriate protective actions. Operation in this mode is not limited in duration provided that either trip system remains functional to ensure that the override function of the Chlorine Protection Mode is not lost.

Smoke Protection

Automatic detection/isolation of the control room envelope in response to an external smoke event is dependent on the response of ionization detectors in Zones 4 and 5 of the Control Building. Multiple detectors in each of the zones provide the detection/isolation capability; however, detection by one detector in both zones is required to initiate the isolation function.

Having less than two detectors OPERABLE in a zone means the system reliability is reduced due to the loss of redundant detection capability in that zone. Allowing continued operation for up to 7 days with less than two OPERABLE detectors in either or both zones is an acceptable out of service time considering the low probability of an external smoke event and the failure of the remaining detector during this time period, and the capability of the remaining instrumentation to provide the required isolation. The out of service time is consistent with the out of service times allowed for loss of redundancy at the system level.

With less than one detector OPERABLE in either or both zones, the automatic detection/isolation function of the external smoke protection system is lost. Placing the CBHVAC System in the Radiation/Smoke Protection Mode is a suitable compensatory action to ensure that the automatic external smoke protection function is not lost.

Surveillances

Radiation Protection

Performance of the CHANNEL CHECK once every day ensures that a gross failure of the instrumentation has not occurred; thus, it is key to verifying the

3/4.3.5.5 CONTROL ROOM EMERGENCY VENTILATION SYSTEM (Continued)

Surveillances (Continued)

instrumentation continues to operate properly between each CHANNEL CALIBRATION. The CHANNEL CHECK frequency is consistent with that performed for other radiation monitors with isolation functions.

The CHANNEL FUNCTIONAL TEST is performed on each required channel to ensure that the entire channel will perform the intended function. The Control Building HVAC DBD (Reference 6) defines the specific actions to be satisfied by the radiation actuation instrumentation. The monthly frequency of the CHANNEL FUNCTIONAL TEST is consistent with that performed for other radiation monitors with isolation functions.

The CHANNEL CALIBRATION verifies the channel responds to the measured parameter within the necessary range and accuracy. CHANNEL CALIBRATION leaves the channel adjusted to ensure consistency with the system assumptions (Reference 5). The frequency of the calibration is consistent with the frequency of calibration of other radiation monitors with isolation functions.

Chlorine Protection

The CHANNEL FUNCTIONAL TEST is performed on each required channel to ensure that the entire channel will perform the intended function. The Control Building HVAC DBD (Reference 6) defines the specific actions to be satisfied by the chlorine isolation instrumentation. The monthly frequency of the CHANNEL FUNCTIONAL TEST is consistent with the testing frequencies performed by other utilities with this type of instrumentation.

The CHANNEL CALIBRATION of the trip units provides a check of the instrument loop and the sensor when the sensor is replaced. The test verifies the calibration of the existing sensor prior to removal and performs an installation calibration of the new sensor, including a complete channel calibration with the new sensor installed, to verify the channel responds to the measured parameter within the necessary range and accuracy. The CHANNEL CALIBRATION leaves the channel adjusted to ensure consistency with the system assumptions (Reference 6).

The chlorine detectors use an amperometric sensor consisting of a platinum cathode and silver anode joined by an electrolytic salt bridge, all enclosed in a permeable membrane. This design eliminates the majority of the maintenance required on previous detectors. The detectors have been in service at other facilities and have provided reliable service. The annual replacement and calibration are based on a manufacturer recommendation. The adequacy of the replacement interval has been confirmed through discussions with other utilities.

Smoke Protection

The CHANNEL FUNCTIONAL TEST for the Smoke Protection instrumentation is consistent with the testing performed in accordance with the existing Fire Detection Instrumentation requirements. CHANNEL CALIBRATION is performed in accordance with the requirements of the CREVS specification (4.7.2).

3/4.3.5.5 CONTROL ROOM EMERGENCY VENTILATION SYSTEM (Continued)

References

1. 10 CFR 50, Appendix A, General Design Criterion 19, Control Room.

2. Regulatory Guide 1.95, Revision 1, Protection of Nuclear Power Plant Control Room Operators Against an Accidental Chlorine Release.

3. Updated FSAR, Brunswick Steam Electric Plant, Units 1 & 2.

4. NUS-3697, Revision 2, February 1983, Control Building Habitability Analysis.

5. CP&L Calculation 01534A-248, Control Room Radiation Monitor Setpoint Evaluation.

6. BNP Design Basis Document (DBD)-37, Control Building Heating, Ventilation, and Air Conditioning System.

ENCLOSURE 3

BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2
NRC DOCKET NOS. 50-325 & 50-324
OPERATING LICENSE NOS. DPR-71 & DPR-62
CONTROL ROOM EMERGENCY VENTILATION SYSTEM
(NRC TAC NOS. M85143 AND M85144)

TECHNICAL SPECIFICATION PAGES - UNIT 2

BASES

BASES

3/4.7.2 CONTROL ROOM EMERGENCY VENTILATION SYSTEM

LIMITING CONDITION FOR OPERATION

3.7.2 The Control Room Emergency Ventilation System shall be OPERABLE with:

a. An OPERABLE Radiation/Smoke Protection Mode consisting of two OPERABLE control room emergency filtration subsystems.

b. An OPERABLE Chlorine Protection Mode.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2, 3, 4, 5, *, and **

ACTION:

a. In OPERATIONAL CONDITIONS 1 and 2:

1. With one control room emergency filtration unit inoperable, restore the inoperable control room emergency filtration unit to OPERABLE status within 7 days or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

2. With both control room emergency filtration units inoperable, be in at least HOT SHUTDOWN within 12 hours and in COLD SHUTDOWN within the following 24 hours.

b. In OPERATIONAL CONDITION 3:

1. With one control room emergency filtration unit inoperable, restore the inoperable control room emergency filtration unit to OPERABLE status within 7 days or be in COLD SHUTDOWN within the following 24 hours.

2. With both control room emergency filtration units inoperable, be in COLD SHUTDOWN within the following 24 hours.

c. In OPERATIONAL CONDITIONS 4, 5, and *:

1. With one control room emergency filtration unit inoperable, restore the inoperable control room emergency filtration unit to OPERABLE status within 7 days or initiate and maintain operation of the remaining OPERABLE control building emergency filtration unit in the Radiation/Smoke Protection Mode.

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* During movement of irradiated fuel assemblies in the secondary containment.

** The Chlorine Protection Mode is required to be OPERABLE at all times when the chlorine tank car is within the exclusion area.

3/4.7.2 CONTROL ROOM EMERGENCY VENTILATION SYSTEM

LIMITING CONDITION FOR OPERATION (Continued)

ACTION (Continued):

2. With both control room emergency filtration units inoperable, suspend all operations involving CORE ALTERATIONS, handling of irradiated fuel in secondary containment, and operations with a potential for draining the reactor vessel.

d. With the Chlorine Protection Mode inoperable, within 8 hours remove the chlorine tank car from the exclusion area. If the tank car physically can not be removed from the exclusion area, take the ACTIONS required in items a.2, b.2, and c.2 above.

SURVEILLANCE REQUIREMENTS

4.7.2 The control room emergency ventilation system shall be demonstrated OPERABLE:

a. At least once per 31 days by initiating flow, from the control room, through the HEPA filter and charcoal adsorbers in each filtration unit and verifying that the system operates for at least 15 minutes.

b. At least once per 18 months or (1) after any structual maintenance on the HEPA filter or charcoal adsorber housing, or (2) following painting, fire, or chemical release in any ventilation zone communicating with the system by:

1. Verifying that the cleanup system satisfies the in-place testing acceptance criteria of > 99 percent efficiency using the test procedures of Regulatory Positions C.5.a, C.5.c, and C.5.d of Regulatory Guide 1.52, Revision 1, July 1976, and the system flow rate is 2000 cfm ± 10%.

SURVEILLANCE REQUIREMENTS (Continued)

2. Verifying within 31 days after removal that a laboratory analysis of a representative carbon sample obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 1, July 1976, meets the laboratory testing criteria of Regulatory Position C.6.a of Regulatory Guide 1.52, Revision 1, July 1976.

3. Verifying a system flow rate of 2000 cfm ± 10% during system operation when tested in accordance with ANSI N510-1975.

c. After every 720 hours of charcoal adsorber operation by verifying within 31 days after removal that a laboratory analysis of a representative carbon sample obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 1, July 1976, meets the laboratory testing criteria of Regulatory Position C.6.a of Regulatory Guide 1.52, Revision 1, July 1976.

d. At least once per 18 months by:

1. Verifying that the pressure drop across the combined HEPA filters and charcoal adsorber banks is $\leq$ 5.25 inches Water Gauge while operating the filter train at a flow rate of 2000 cfm ± 10%.

2. Verifying that on a smoke detector or control room ventilation system high radiation test signal, the control building ventilation system automatically diverts its inlet flow through the HEPA filters and charcoal adsorber banks of the emergency filtration system.

3. Verifying that on a chlorine detector test signal, the control building ventilation system automatically isolates and the control room emergency filtration system cannot be started by a smoke detector or control room ventilation system high radiation test signal.

4. Verifying that the system maintains the control room at a positive pressure relative to the outside atmosphere during system operation.

3/4.7.2 CONTROL ROOM EMERGENCY VENTILATION SYSTEM

SURVEILLANCE REQUIREMENTS (Continued)

e. After each complete or partial replacement of a HEPA filter bank by verifying that the HEPA filter banks remove > 99 percent of the DOP when they are tested in-place in accordance with ANSI N510-1975 while operating the system at a flow rate of 2,000 cfm ± 10%.

f. After each complete or partial replacement of a charcoal adsorber bank by verifying that the charcoal adsorbers remove > 99 percent of a halogenated hydrocarbon refrigerant test gas when they are tested in-place in accordance with ANSI N510-1975 while operating the system at a flow rate of 2,000 cfm ± 10%.

3/4.7.1 SERVICE WATER SYSTEMS (Continued)

demonstrate operation in OPERATIONAL CONDITIONS 1 through 3 with no OPERABLE nuclear service water pumps is acceptable provided that at least two nuclear service water pumps are OPERABLE on the opposite unit and two conventional pumps are OPERABLE on the affected unit. Specific ACTION statements and LCO time limits for this situation have not been developed since a more conservative ACTION Statement has been established in order to minimize the risk of personnel error in administrating this situation.

3/4.7.2 CONTROL ROOM EMERGENCY VENTILATION SYSTEM

Background

One of the principal design objectives of the Control Building Heating, Ventilation and Air Conditioning (CBHVAC) System is to permit continuous occupancy of the Control Room Emergency Zone under normal operating conditions and under the postulated design basis events throughout the life of the plant. The Control Building HVAC System must function to provide protection to the operators for three type events: a radiation event, up to and including a Design Basis Accident (e.g., Main Steam Line Break [MSLB] Accident, Refueling Accident, Control Rod Drop Accident, or Loss of Coolant Accident [LOCA]), a toxic gas event (complete rupture of the 55 ton chlorine tank car located near the Service Water Building, or a slow leak lasting for an extended period of time), and an external smoke event. These events form the basis for the design of the Control Room Emergency Ventilation (CREVS) function of the CBHVAC System.

The CREVS is designed to meet General Design Criterion (GDC) 19 (Reference 1). In addition, the system is designed using the guidance of Regulatory Guide 1.95, Revision 1 (Reference 2). Commitments have also been made to design the radiation protection function of the CBHVAC System to meet the single failure criteria described in IEEE 279-1971, and the chlorine detection and isolation logic to single failure criteria, both with approved exceptions (Reference 12, Section 3.6).

LCO

Operability of the CREVS ensures that the control room will remain habitable for operations personnel during and following all credible hazard event scenarios external to the control room, consistent with the assumptions in the various analyses. Two redundant subsystems of the CREVS are required to be OPERABLE to ensure that at least one is available, assuming a single failure disables the other subsystem. The CREVS is considered OPERABLE when the individual components necessary to control operator exposure are operable in both subsystems. For the Radiation/Smoke Protection Mode, a subsystem is considered OPERABLE when its associated:

1. an is OPERABLE,

- HEPA filter and charcoal adsorbers are not excessively restricting flow and are capable of performing their filtration functions, and

3/4.7.2 CONTROL ROOM EMERGENCY VENTILATION SYSTEM (Continued)

LCO (Continued)

3. Ductwork and dampers are OPERABLE, and air circulation can be maintained as required in Reference 12, Section 3.1.

For the Chlorine Protection Mode, a subsystem is considered OPERABLE when:

1. The isolation dampers are OPERABLE, and

2. The logic components necessary to achieve automatic isolation are functional, as described in Reference 12, Section 3.1.

Two additional OPERABILITY requirements apply to all modes of CREVS operation. The CBHVAC Control Air System must be OPERABLE to support damper operation. In addition, the Control Room Envelope must be maintained, including the integrity of the walls, floors, ceilings, ductwork, and access doors. The Control Room Envelope includes the electronic equipment rooms, the central control room area, computer rooms, kitchen, restrooms, and the supply and return ductwork up to and including the isolation dampers.

The following components, including their associated logic trains, actuation devices, and power supplies, are non-redundant. Their OPERABILITY affects both trains of the CREVS. These components are: control room (washroom) exhaust isolation damper, control room normal make-up damper, and the control room emergency recirculation damper. In addition, the Brunswick control room is not equipped with redundant outdoor air intakes (References 4 and 5).

The Radiation/Smoke Protection Mode of operation protects the control room operators from those events which may result in the release of radioactivity. The Radiation/Smoke Protection Mode of operation also provides protection to the control room operators in the event of an external smoke event.

During a radiation event, the CBHVAC System is required to automatically isolate and enter the Radiation/Smoke Protection Mode on a Control Room Intake High Radiation signal from the Area Radiation Monitoring System. Upon receipt of a high radiation signal, the CBHVAC System is automatically realigned to the emergency mode of operation. The normal fresh air inlet closes, and, at approximately the same time, the emergency air filtration units begin operation, recirculating control room air and providing filtered makeup air to minimize contamination build-up and provide positive pressure in the Control Room Envelope. The CBHVAC System responds to an external smoke event in the same manner as it does for a radiation event.

In the event of a chlorine release, the CBHVAC System enters a full recirculation mode (Chlorine Protection Mode), with no outdoor air intake. The emergency filtration trains do not start, since they do not effectively remove chlorine and may be damaged by the presence of chlorine. Protection for chlorine gas events "overrides" any concurrent, ongoing, or subsequent radiation or smoke initiation signals. The override design offers protection

3/4.7.2 CONTROL ROOM EMERGENCY VENTILATION SYSTEM (Continued)

LCO (Continued)

to operations personnel in the Control Room by providing protection against potentially fatal chlorine gas releases. This protection is required any time the chlorine tank car is within the exclusion area.

Applicability

The OPERATIONAL CONDITION applicabilities ensure that the system is capable of performing these functions when the potential for radiation releases and external smoke hazards exist. In OPERATIONAL CONDITIONS 1, 2, and 3, the system must be OPERABLE to reduce control operator exposure during and following a design basis accident, since the accident could lead to a fission product release.

In OPERATIONAL CONDITIONS 4 and 5, the probability and consequences of a design basis accident are reduced because of the pressure and temperature limitations in these OPERATIONAL CONDITIONS. Maintaining the CREVS OPERABLE is not required in OPERATIONAL CONDITIONS 4 and 5, except for the following situations under which significant radiological releases can be postulated:

1. During movement of irradiated fuel assemblies in the secondary containment,

2. During CORE ALTERATIONS, and

3. During operations with a potential for draining the reactor vessel.

Requiring OPERABILITY of the Radiation Protection Mode of the CREVS during OPERATIONAL CONDITIONS 4 and 5 ensures that the system is available during the above evolutions, with the exception the movement of irradiated fuel in secondary containment; therefore, a specific applicability OPERATIONAL CONDITION has been added for this activity.

OPERABILITY of the Chlorine Protection Mode of the CREVS is required any time the chlorine tank car is within the exclusion area. Analyses demonstrate that movement of the tank car outside the exclusion area sufficiently reduces the threat of control room operator incapacitation from a release of this chemical.

Action a.

With one emergency filtration subsystem inoperable, the inoperable subsystem must be restored to OPERABLE status within 7 days. With the unit in this condition, the remaining subsystem is adequate to perform control room radiation protection. The loss of a single emergency filtration unit means that the CREVS reliability is reduced because a single failure in the OPERABLE subsystem could result in reduced or lost system capability. The 7 day out of

3/4.7.2 CONTROL ROOM EMERGENCY VENTILATION SYSTEM (Continued)

Action a. (Continued)

service time is based on the low probability of a design basis accident and a single failure in the OPERABLE subsystem occurring during this time period, and the capability of the remaining subsystem to provide the required capabilities.

During OPERATIONAL CONDITIONS 1 and 2, the plant must be placed in an OPERATIONAL CONDITION that minimizes risk if the inoperable subsystem cannot be restored to OPERABLE status within the required 7 days. To achieve this status, the plant must be placed in HOT SHUTDOWN within 12 hours and COLD SHUTDOWN within the following 24 hours. These allowed completion times are reasonable, based on operating experience, to allow the plant to reach these OPERATIONAL CONDITIONS from full power operation in an orderly manner and without unnecessarily challenging plant systems.

The loss of both emergency filtration subsystems means that the radiation protection function is lost. The plant must be placed in an OPERATIONAL CONDITION that minimizes risk. To achieve this status, the plant must be placed in HOT SHUTDOWN within 12 hours and COLD SHUTDOWN within the following 24 hours. These allowed completion times are reasonable, based on operating experience, to allow the plant to reach these OPERATIONAL CONDITIONS from full power operation in an orderly manner and without unnecessarily challenging plant systems.

Action b.

With one emergency filtration subsystem inoperable, the inoperable subsystem must be restored to OPERABLE status within 7 days. With the unit in this condition, the remaining subsystem is adequate to perform control room radiation protection. The loss of a single emergency filtration unit means that the CREVS reliability is reduced because a single failure in the OPERABLE subsystem could result in reduced or lost system capability. The 7 day out of service time is based on the low probability of a design basis accident and a single failure in the OPERABLE subsystem occurring during this time period, and the capability of the remaining subsystem to provide the required capabilities.

During OPERATIONAL CONDITION 3, the plant must be placed in an OPERATIONAL CONDITION that minimizes risk if the inoperable subsystem cannot be restored to OPERABLE status within the required 7 days. To achieve this status, the plant must be placed in COLD SHUTDOWN within the following 24 hours. The allowed completion time is reasonable, based on operating experience, to allow the plant to reach this OPERATIONAL CONDITION from HOT SHUTDOWN in an orderly manner and without unnecessarily challenging plant systems.

The loss of both emergency filtration subsystems means that the radiation protection function is lost. The plant must be placed in an OPERATIONAL CONDITION that minimizes risk. To achieve this status, the plant must be

3/4.7.2 CONTROL ROOM EMERGENCY VENTILATION SYSTEM (Continued)

Action b. (Continued)

placed in COLD SHUTDOWN within the following 24 hours. The allowed completion time is reasonable, based on operating experience, to allow the plant to reach this OPERATIONAL CONDITION from HOT SHUTDOWN in an orderly manner and without unnecessarily challenging plant systems.

Action c.

With one emergency filtration subsystem inoperable, the inoperable subsystem must be restored to OPERABLE status within 7 days. With the unit in any of these conditions, the remaining subsystem is adequate to perform control room radiation protection. The loss of a single emergency filtration unit means that the CREVS reliability is reduced because a single failure in the OPERABLE subsystem could result in reduced or lost system capability. The 7 day out of service time is based on the low probability of a design basis accident and a single failure in the OPERABLE subsystem occurring during this time period, and the capability of the remaining subsystem to provide the required capabilities.

During OPERATIONAL CONDITIONS 4, 5, and while irradiated fuel is being moved in secondary containment, if the inoperable emergency filtration subsystem cannot be restored to OPERABLE status within 7 days, the remaining OPERABLE subsystem may be placed in the Radiation/Smoke Protection Mode. This action ensures that the remaining subsystem is OPERABLE, that no failures which could prevent automatic actuation will occur. This action also ensures that any active failure would be readily detected.

An alternative to placing the remaining subsystem in service is to immediately suspend activities that present a potential for releasing radioactivity that might require operation of the CREVS. This alternative places the unit in a condition that minimizes risk.

Action d.

With the Chlorine Protection Mode inoperable, the chlorine tank car must be removed from the exclusion area within the next eight (8) hours to ensure adequate protection for the operators. Chlorine gas protection is not required with the tank car outside of the exclusion area. Eight hours is considered adequate time to perform the necessary system alignments and to allow plant personnel to remove the chlorine tank car from the site in an orderly manner.

With the plant physically unable to remove the chlorine tank car from the site, as required by this statement, ACTION d. requires the plant to take actions to place the plant in a condition that minimizes risk of core damage or other types of radiological release events.

3/4.7.2 CONTROL ROOM EMERGENCY VENTILATION SYSTEM (Continued)

Surveillance Requirements

The SURVEILLANCE REQUIREMENTS (SR) in this specification verify that a subsystem in the standby mode starts on demand and continues to operate. Standby systems are checked periodically to ensure that the automatic start function is consistent with the assumptions in the Control Room Habitability Analyses (References 4 and 6). Since the environmental conditions on this system are not severe, monthly demonstration of the capability of the system to operate by SR 4.7.2.a is considered adequate. The $\geq$ 15 minute run time is considered adequate for operation of systems without heaters (Reference 16).

SR 4.7.2.b verifies the capability of the filtration system at least once every 18 months, or 1) following any structural maintenance on the filtration unit HEPA filter or charcoal adsorbers or 2) following painting, fire, or chemical release in any ventilation zone communication with the system. Testing is performed in accordance with applicable sections of Regulatory Guide 1.52, Revision 1, and ANSI N510-1975. Acceptance criteria provides assurance that the efficiency used in the Control Room dose analyses is conservative. This is consistent with the guidance provided in Generic Letter 83-13 (Reference 7).

SR 4.7.2.c verifies adequacy of the charcoal filtration system following every 720 hours of operation. The time of operation is based on the recommendations of Regulatory Guide 1.52, Revision 1 (Reference 8), and early nuclear plant filter testing (Reference 10).

SR 4.7.2.d demonstrates functional capability of the system by verifying 1) pressure drop across the HEPA and charcoal filtration units, 2) automatic emergency system initiation upon receipt of a smoke detector or high radiation test signal, 3) the override function of the chlorine protection function, and 4) ability of the system to maintain a positive pressure relative to the outside atmosphere during system operation. The maximum pressure drop of $\leq$ 5.25 inches water gauge is based on a CREVS pressure drop analysis (Reference 9) and fan capability. This maximum pressure drop ensures the system is capable of delivering rated flow with 1 inch water gauge margin for filter loading. The positive pressure test is performed to ensure that the control room is maintained positive to any potentially contaminated external atmosphere, including the outside atmosphere and adjacent building atmosphere(s). Testing of the chlorine override function ensures operability of the chlorine protection mode of the CREVS by demonstrating the capability of the system to prevent the emergency filtration units from initiating during a chlorine event.

SR 4.7.2.e and SR 4.7.2.f verify that the filtration capability of the HEPA and charcoal adsorber banks is consistent with that assumed in the Control Room Habitability Analyses (References 4 and 6) following partial or complete replacement of either filtration component. The testing is performed in accordance with the applicable sections of ANSI N510-1975 (Reference 14).

3/4.7.2 CONTROL ROOM EMERGENCY VENTILATION SYSTEM (Continued)

References

1. 10 CFR 50, Appendix A, General Design Criterion 19, Control Room.

2. Regulatory Guide 1.95, Revision 1, Protection of Nuclear Power Plant Control Room Operators Against an Accidental Chemical Release.

3. Updated FSAR, Brunswick Steam Electric Plant, Units 1 & 2.

4. NUS-3697, Revision 2, February 1983, Control Room Habitability Analysis.

5. NLU-83-673, TMI Action Item III.D.3.4 - Control Room Habitability, NRC Safety Evaluation dated October 18, 1983.

6. NUS-4758, Control Room Radiological Reanalysis, August, 1985.

7. Generic Letter 83-13, Clarification of Surveillance Requirements for HEPA Filters and Charcoal Adsorber Units in Standard Technical Specifications of ESF Cleanup Systems, March 2, 1983.

8. Regulatory Guide 1.52, Revision 1, July 1976,

9. CP&L Calculation G0077A-01, Control Room Emergency Filter System Differential Pressure Analysis.

10. Original FSAR, BSEP, Units 1 and 2, Appendix K.

11. IEEE 279-1971, IEEE Criteria for Protection Systems for Nuclear Power Generating Stations.

12. DBD-37, Design Basis Document for Control Building Heating, Ventilation, and Air Conditioning System.

13. NRC-89-103, NRC Safety Evaluation for Control Room Habitability, February 16, 1989.

14. ANSI N510-1975, Testing of Nuclear Air Cleaning Systems.

15. ANSI N509-1976, Nuclear Power Plant Air Cleaning Units.

16. NUREG-1433, Standard Technical Specifications, General Electric Plants, BWR/4, Revision 0, September 28, 1992.

3/4.7.3 FLOOD PROTECTION

The limitation on flood protection ensures that facility protective actions will be taken and operation will be terminated in the event of flood conditions. The limit of elevation 17'6" Mean Sea Level is based on the maximum elevation at which facility flood control measures provide protection to safety-related equipment.

3/4.7.4 REACTOR CORE ISOLATION COOLING SYSTEM

The reactor core isolation cooling system (RCICS) is provided to assure adequate core cooling in the event of reactor isolation from its primary heat sink and the loss of feedwater flow to the reactor vessel without requiring actuation of any of the Emergency Core Cooling equipment. RCICS is conservatively required to be OPERABLE whenever reactor pressure exceeds 113 psig even though the Residual Heat Removal (RHR) system provides adequate core cooling up to 150 psig. The condensate storage tank provides sufficient water to reduce the reactor coolant temperature and pressure to permit the RHR system to be operated.

INSTRUMENTATION

CONTROL Room EMERGENCY VENTILATION SYSTEM

LIMITING CONDITION FOR OPERATION

3.3.5.5 The Control Room Emergency Ventilation System instrumentation shown in Table 3.3.5.5-1 shall be OPERABLE.

APPLICABILITY: As shown in Table 3.3.5.5-1.

ACTION:

a. With one or more detectors inoperable, take the ACTION required by Table 3.3.5.5-1.

b. The provisions of Specification 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.3.5.5 Each of the above required control room emergency ventilation instruments shall be demonstrated OPERABLE by performance of t e testing at the frequency required by Table 4.3.5.5-1.

TABLE 3.3.5.5-1

CONTROL ROOM EMERGENCY VENTILATION SYSTEM INSTRUMENTATION

FUNCTION	REQUIRED NUMBER OF DETECTORS PER TRIP SYSTEM	APPLICABLE OPERATIONAL CONDITIONS	ACTION	ALARM/TRIP SETPOINT
CHLORINE ISOLATION:				
1. Control Room Air Intake (Local) Trip System	4 (a)	(b)	90	≤ 5ppm
2. Chlorine Tank Car Area (Remote) Trip System	4 (a)	(b)	90	≤ 5ppm
RADIATION PROTECTION:				
1. Control Room Air Intake	2	1, 2, 3, 4, 5, and (c)	91	≤ 7mR/hr (d)
CONTROL ROOM ENVELOPE SMOKE PROTECTION:				
1. Zone 4	2	1, 2, 3, 4, 5, and (c)	92	NA
2. Zone 5	2	1, 2, 3, 4, 5, and (c)	92	NA

(a) Four OPERABLE detectors per trip system, consisting of two detectors per trip subsystem.

(b) With the chlorine tank car within the exclusion area.

(c) During movement of irradiated fuel assemblies in the secondary containment.

(d) Allowable value of ≤ 10mR/hr.

TABLE 3.3.5.5-1 (Continued)

CONTROL ROOM EMERGENCY VENTILATION SYSTEM INSTRUMENTATION

ACTIONS

ACTION 90

a. With one chlorine detector of either or both trip subsystems of either or both trip systems inoperable, restore the inoperable detector(s) to OPERABLE status within 7 days or, within the next 6 hours, isolate the Control Room and operate in the Chlorine Protection Mode.

b. With both detectors within a trip subsystem of either trip system inoperable, within one hour isolate the Control Room and operate in the Chlorine Protection Mode.

ACTION 91

a. With one radiation detector inoperable, restore the inoperable detector to OPERABLE status within 7 days or, within the next 6 hours, isolate the Control Room and operate in the Radiation/Smoke Protection Mode.

b. With both radiation detectors inoperable, within one hour isolate the Control Room and operate in the Radiation/Smoke Protection Mode.

ACTION 92

a. With less than two (2) ionization detectors OPERABLE in either or both zones, restore two (2) detectors within each zone to OPERABLE status within 7 days or, within the next 6 hours, isolate the Control Room and operate in the Radiation/Smoke Protection Mode.

b. With less than one (1) ionization detector OPERABLE in either or both zones, within one hour isolate the Control Room and operate in the Radiation/Smoke Protection Mode.

TABLE 4.3.5.5-1

CONTROL ROOM EMERGENCY VENTILATION SYSTEM
INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTION	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION
CHLORINE ISOLATION:			
1. Local Detection Trip System	NA	M	A
2. Remote Detection Trip System	NA	M	A
RADIATION PROTECTION:			
1. Control Room Air Intake	D	M	R
CONTROL ROOM ENVELOPE SMOKE PROTECTION:			
1. Zone 4	NA	6 months	(a)
2. Zone 5	NA	6 months	(a)

(a) See Surveillance Requirement 4.7.2.d.2

MONITORING INSTRUMENTATION (Continued)

3/4.3.5.2 REMOTE SHUTDOWN MONITORING INSTRUMENTATION

The OPERABILITY of the remote shutdown monitoring instrumentation ensures that sufficient capability is available to permit shutdown and maintenance of HOT SHUTDOWN of the facility from locations outside of the control room. This capability is required in the event control room habitability is lost, and is consistent with General Design Criterion 19 of CFR 50.

3/4.3.5.3 ACCIDENT MONITORING INSTRUMENTATION

The OPERABILITY of the post-accident monitoring instrumentation ensures that sufficient information is available on selected plant parameters to monitor and assess important variables following an accident. This capability is consistent with the recommendations of Regulatory Guide 1.97, "Instrumentation for Light Water-Cooled Nuclear Power Plants to Assess Plant Conditions During and Following an Accident," December 1975, and NUREG-0578, "TMI-2 Lessons Learned Task Force Status Report and Short-Term Recommendations."

The suppression chamber water temperature monitoring system performs a dual function. It provides for accident monitoring as recommended by Regulatory Guide 1.97. This system is also designed to meet the acceptance criteria of NUREG-0661, Appendix A in monitoring average suppression chamber water temperature during normal operating conditions. Refer to Sections 3/4.3.5.3 and 3/4.6.2.1 for Limiting Conditions for Operation and Surveillance Requirements pertaining to each function.

3/4.3.5.4 SOURCE RANGE MONITORS

The source range monitors provide the operator with information on the status of the neutron level in the core at very low power levels during start-up. At these power levels, reactivity additions should not be made without this flux level information available to the operator. When the intermediate range monitors are on scale, adequate information is available without the SRMs and they can be retracted.

3/4.3.5.5 CONTROL ROOM EMERGENCY VENTILATION SYSTEM

Background

One of the principal design objectives of the Control Room Heating, Ventilation and Air Conditioning (CBHVAC) System is to permit continuous occupancy of the Control Room Emergency Zone under normal operating conditions and under the postulated design basis events throughout the life of the plant. The Control Room HVAC System must function to provide protection to the operators for three type events: a radiation event, up to and including a Design Basis Accident (e.g., Main Steam Line Break [MSLB] Accident, Refueling Accident, Control Rod Drop Accident, or Loss of Coolant Accident [LOCA]), a toxic gas event (complete rupture of the 55 ton chlorine tank car located near

3/4.3.5.5 CONTROL ROOM EMERGENCY VENTILATION SYSTEM (Continued)

Background (Continued)

the Service Water Building, or a slow leak lasting for an extended period of time), and an external smoke event. These events form the basis for the design of the Control Room Emergency Ventilation (CREVS) function of the CBHVAC System.

During a radiation event, the CBHVAC System is required to automatically isolate and enter the Radiation/Smoke Protection Mode on a Control Room Intake High Radiation signal from the Area Radiation Monitoring System. Upon receipt of a high radiation signal, the CBHVAC System is automatically realigned to the emergency mode of operation. The normal fresh air inlet closes, and, at approximately the same time, the emergency air filtration units begin operation, recirculating control room air and providing filtered makeup air to minimize contamination build-up and provide positive pressure in the Control Room Envelope. The CBHVAC System responds to an external smoke event in the same manner as it does for a radiation event.

In the event of a chlorine release, the CBHVAC System enters a full recirculation mode (Chlorine Protection Mode), with no outdoor air intake. The emergency filtration trains do not start, since they do not effectively remove chlorine and may be damaged by the presence of chlorine. Protection for chlorine gas e nts "overrides" any concurrent, ongoing, and any subsequent radiation or smoke initiation signals. The override design offers protection to operations personnel in the Control Room by providing protection against potentially fatal chlorine gas releases. This protection is required any time the chlorine tank car is within the exclusion area.

The CREVS is designed to meet the criteria of General Design Criterion (GDC) 19 (Reference 1). In addition, the system is designed using the guidance of Regulatory Guide 1.95, Revision 1 (Reference 2). Commitments have also been made to design the radiation protection function of the CBHVAC System to meet the single failure criteria described in IEEE 279-1971, and the chlorine detection and isolation logic to single failure criteria, both with approved exceptions (Reference 6, Section 3.6).

LCO

Operability of the CREVS instrumentation ensures that the control room operators will be protected from hazards external to the control room, consistent with the assumptions in the various analyses, through the prompt detection and initiation of the necessary protective actions of the system.

Applicability

The instrumentation associated with the Radiation/Smoke Protection Mode of the CREVS is required to be operable to automatically detect and initiate the Radiation/Smoke Protection Mode of operation during times when the potential exists for events which may result in the release of radioactive materials to the environment, up to and including design basis accidents. The specific radiological release events for which the system must provide a mitigating function are discussed in the bases of Technical Specification 3.7.2 and DBD-37 (Reference 6).

3/4.3.5.5 CONTROL ROOM EMERGENCY VENTILATION SYSTEM (Continued)

Applicability (Continued)

The instrumentation associated with the Chlorine Protection Mode of the CREVS is required to be OPERABLE to automatically detect and initiate the internal recirculation mode of operation any time the chlorine tank car is within the exclusion area.

The instrumentation associated with the External Smoke Protection function of the CREVS is required to be OPERABLE to automatically detect and initiate the Radiation/Smoke Protection Mode of operation during the same conditions as the Radiation Protection function. This ensures that habitability of the control room is maintained during times when a radiological release could potentially occur.

Actions

Radiation Protection

Two control room air inlet radiation detectors measure radiation levels in the inlet ducting of the main control room. A high radiation level automatically initiates the radiation protection mode of operation. Both channels are required to be OPERABLE to ensure that no single instrument failure can preclude the initiation of the radiation protection function of the control room emergency ventilation system. The loss of a single detector means that the CREVS reliability is reduced because a single failure in the OPERABLE subsystem could result in reduced or lost system capability. The 7 day out of service time is based on the low probability of a design basis accident and a single failure occurring during this time period, and the capability of the remaining instrumentation subsystem to provide the required isolation and is consistent with the out of service times allowed for loss of redundancy at the system level.

The loss of both detectors means that the automatic detection/isolation function of the radiation protection system is lost. Placing the CBHVAC System in the Radiation/Smoke Protection Mode is a suitable compensatory action to ensure that the automatic radiation protection function is not lost.

Chlorine Protection

The chlorine detection/isolation instrumentation is organized into two trip systems, with one trip system (remote) located near the chlorine tank car and the other located in the control building intake plenum (local). Each trip system contains two trip subsystems, with two detectors (one from each division) in each trip subsystem. Both trip subsystems in each trip system are required to be OPERABLE any time the chlorine tank car is within the exclusion area to ensure adequate protection for the control room under postulated toxic gas events.

The chlorine detectors in each trip system are arranged in a one-out-of-two-taken-twice configuration. One detector from each of the trip subsystems in a trip system must actuate to initiate the automatic detection/isolation

3/4.3.5.5 CONTROL ROOM EMERGENCY VENTILATION SYSTEM (Continued)

Actions (Continued)

function. The loss of a single chlorine detector means that the CREVS reliability is reduced because a single failure in the remaining OPERABLE trip subsystem detector could result in reduced or lost system capability. The 7 day out of service time is based on the low probability of a design basis chlorine gas event and a single active failure occurring during this time period, and the capability of the remaining detectors to provide the required isolation capabilities. The out of service time is consistent with the out of service time allowed for loss of redundancy at the system level.

The loss of both detectors in any trip subsystem means that the automatic protection function of the chlorine detection/isolation system is lost. Placing the CBHVAC System in the Chlorine Protection Mode, through the use of control switches to close the appropriate dampers, ensures that the control room envelope is protected, while at the same time allowing a valid radiation or smoke signal to initiate appropriate protective actions. Operation in this mode is not limited in duration provided that either trip system remains functional to ensure that the override function of the Chlorine Protection Mode is not lost.

Smoke Protection

Automatic detection/isolation of the control room envelope in response to an external smoke event is dependent on the response of ionization detectors in Zones 4 and 5 of the Control Room. Multiple detectors in each of the zones provide the detection/isolation capability; however, detection by one detector in both zones is required to initiate the isolation function.

Having less than two detectors OPERABLE in a zone means the system reliability is reduced due to the loss of redundant detection capability in that zone. Allowing continued operation for up to 7 days with less than two OPERABLE detectors in either or both zones is an acceptable out of service time considering the low probability of an external smoke event and the failure of the remaining detector during this time period, and the capability of the remaining instrumentation to provide the required isolation. The out of service time is consistent with the out of service times allowed for loss of redundancy at the system level.

With less than one detector OPERABLE in either or both zones, the automatic detection/isolation function of the external smoke protection system is lost. Placing the CBHVAC System in the Radiation/Smoke Protection Mode is a suitable compensatory action to ensure that the automatic external smoke protection function is not lost.

Surveillances

Radiation Protection

Performance of the CHANNEL CHECK once every day ensures that a gross failure of the instrumentation has not occurred; thus, it is key to verifying the

3/4.3.5.5 CONTROL ROOM EMERGENCY VENTILATION SYSTEM (Continued)

Surveillances (Continued)

instrumentation continues to operate properly between each CHANNEL CALIBRATION. The CHANNEL CHECK frequency is consistent with that performed for other radiation monitors with isolation functions.

The CHANNEL FUNCTIONAL TEST is performed on each required channel to ensure that the entire channel will perform the intended function. The Control Building HVAC DBD (Reference 6) defines the specific actions to be satisfied by the radiation actuation instrumentation. The monthly frequency of the CHANNEL FUNCTIONAL TEST is consistent with that performed for other radiation monitors with isolation functions.

The CHANNEL CALIBRATION verifies the channel responds to the measured parameter within the necessary range and accuracy. CHANNEL CALIBRATION leaves the channel adjusted to ensure consistency with the system assumptions (Reference 5). The frequency of the calibration is consistent with the frequency of calibration of other radiation monitors with isolation functions.

Chlorine Protection

The CHANNEL FUNCTIONAL TEST is performed on each required channel to ensure that the entire channel will perform the intended function. The Control Building HVAC DBD (Reference 6) defines the specific actions to be satisfied by the chlorine isolation instrumentation. The monthly frequency of the CHANNEL FUNCTIONAL TEST is consistent with the testing frequencies performed by other utilities with this type of instrumentation.

The CHANNEL CALIBRATION of the trip units provides a check of the instrument loop and the sensor when the sensor is replaced. The test verifies the calibration of the existing sensor prior to removal and performs an installation calibration of the new sensor, including a complete channel calibration with the new sensor installed, to verify the channel responds to the measured parameter within the necessary range and accuracy. The CHANNEL CALIBRATION leaves the channel adjusted to ensure consistency with the system assumptions (Reference 6).

The chlorine detectors use an amperometric sensor consisting of a platinum cathode and silver anode joined by an electrolytic salt bridge, all enclosed in a permeable membrane. This design eliminates the majority of the maintenance required on previous detectors. The detectors have been in service at other facilities and have provided reliable service. The annual replacement and calibration are based on a manufacturer recommendation. The adequacy of the replacement interval has been confirmed through discussions with other utilities.

Smoke Protection

The CHANNEL FUNCTIONAL TEST for the Smoke Protection instrumentation is consistent with the testing performed in accordance with the existing Fire Detection Instrumentation requirements. CHANNEL CALIBRATION is performed in accordance with the requirements of the CREVS specification (4.7.2).

3/4.3.5.5 CONTROL Room EMERGENCY VENTILATION SYSTEM (Continued)

References

1. 10 CFR 50, Appendix A, General Design Criterion 19, Control Room.

2. Regulatory Guide 1.95, Revision 1, Protection of Nuclear Power Plant Control Room Operators Against an Accidental Chlorine Release.

3. Updated FSAR, Brunswick Steam Electric Plant, Units 1 & 2.

4. NUS-3697, Revision 2, February 1983, Control Room Habitability Analysis.

5. CP&L Calculation 01534A-248, Control Room Radiation Monitor Setpoint Evaluation.

6. BNP Design Basis Document (DBD)-37, Control Building Heating, Ventilation, and Air Conditioning System.

TABLE 3.3.3-1

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION

TRIP FUNCTION	MINIMUM NUMBER OPERABLE CHANNELS PER TRIP SYSTEM[a]	APPLICABLE OPERATIONAL CONDITIONS	ACTION
1. CORE SPRAY SYSTEM			
a. Reactor Vessel Water Level - Low, Level 3	2	1, 2, 3, 4, 5	30
b. Reactor Steam Dome Pressure - Low (Injection Permissive)	2[f]	1, 2, 3, 4, 5	31
c. Drywell Pressure - High	2	1, 2, 3	30
d. Time Delay Relay	1	1, 2, 3, 4, 5	31
e. Bus Power Monitor[d]	1/bus	1, 2, 3, 4, 5	32
2. LOW PRESSURE COOLANT INJECTION MODE OF RHR SYSTEM			
a. Drywell Pressure - High	2	1, 2, 3	30
b. Reactor Vessel Water Level - Low, Level 3	2	1, 2, 3, 4[b], 5[b]	30
c. Reactor Vessel Shroud Level (Drywell Spray Permissive)	1	1, 2, 3, 4[b], 5[b]	31
d. Reactor Steam Dome Pressure - Low (Injection Permissive)			
1. RHR Pump Start and LPCI Injection Valve Actuation	2[f]	1, 2, 3, 4[b], 5[b]	31
2. Recirculation Loop Pump Discharge Valve Actuation	2[f]	1, 2, 3, 4[b], 5[b]	31
e. RHR Pump Start - Time Delay Relay	1	1, 2, 3, 4[b], 5[b]	31
f. Bus Power Monitor[d]	1/bus	1, 2, 3, 4[b], 5[b]	32