Docket File

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

September 14, 1993

Docket Nos. 50-325
and 50-324

Mr. R. A. Anderson
Vice President
Carolina Power & Light Company
Brunswick Steam Electric Plant
Post Office Box 10429
Southport, North Carolina 28461

Dear Mr. Anderson:

SUBJECT: ISSUANCE OF AMENDMENT NO. 164 TO FACILITY OPERATING LICENSE NO. DPR-71 AND AMENDMENT NO. 195 TO FACILITY OPERATING LICENSE NO. DPR-62 REGARDING SERVICE WATER SYSTEM - BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2 (TAC NOS. M85466 AND M85467)

The Nuclear Regulatory Commission has issued the enclosed Amendment No. 164 to Facility Operating License No. DPR-71 and Amendment No. 195 to Facility Operating License No. DPR-62 for Brunswick Steam Electric Plant, Units 1 and 2. The amendments change the Technical Specifications in response to your submittal dated December 31, 1992, as revised by letter dated July 20, 1993, and supplemented August 9, 1993, and August 27, 1993. The July 20, 1993, letter made two additional TS change requests.

The amendments change the Technical Specifications to (1) revise the number of nuclear service water pumps (NSWP) required to be operable from two NSWP per unit to three NSWP serving the site whenever either unit is in operational condition 1, 2, or 3; (2) revise the action statements associated with certain service water system pump configurations in all operational conditions, (3) incorporate the surveillance requirements of TS 4.7.1.2.c into the action statement of b.4 of TS 3.7.1.2, and add a quarterly surveillance of the pressure switch logic and valve actuation capability associated with the service water to the diesel generators supply to the emergency diesel generators as TS 4.7.1.2.c.

DF01

A copy of the related Safety Evaluation is also enclosed. A Notice of Issuance will be included in the Commission's bi-weekly Federal Register Notice.

Sincerely,

Original signed by:

Patrick D. Milano, Senior Project Manager
Project Directorate II-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosures:
1. Amendment No. 164 to License No. DPR-71
2. Amendment No. 195 to License No. DPR-62
3. Safety Evaluation

cc w/enclosures:
See next page

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

CAROLINA POWER & LIGHT COMPANY, et al.

DOCKET NO. 50-325

BRUNSWICK STEAM ELECTRIC PLANT, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 164
License No. DPR-71

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment filed by Carolina Power & Light Company (the licensee), dated December 31, 1992, as revised by letter dated July 20, 1993, and supplemented August 9, 1993, and August 27, 1993, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications, as indicated in the attachment to this license amendment; and paragraph 2.C.(2) of Facility Operating License No. DPR-71 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 164 , are hereby incorporated in the license. Carolina Power & Light Company shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance and shall be implemented within 30 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

S. Singh Bajwa, Acting Director
Project Directorate II-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: September 14, 1993

ATTACHMENT TO LICENSE AMENDMENT NO. 164

FACILITY OPERATING LICENSE NO. DPR-71

DOCKET NO. 50-325

Replace the following pages of the Appendix A Technical Specifications with the enclosed pages. The revised areas are indicated by marginal lines.

Remove Pages	Insert Pages
XI	XI
XII	XII
3/4 7-2	3/4 7-2
3/4 7-2a	3/4 7-2a
3/4 7-2b	3/4 7-2b
3/4 10-5	3/4 10-5
B3/4 7-1	B3/4 7-1
B3/4 7-1a	B3/4 7-1a
B3/4 7-1b	B3/4 7-1b
B3/4 7-1c	B3/4 7-1c
B3/4 7-1d	B3/4 7-1d
B3/4 7-1e	B3/4 7-1e
B3/4 7-1f	B3/4 7-1f
B3/4 7-1g	B3/4 7-1g
B3/4 7-1h	B3/4 7-1h
--	B3/4 7-1i
--	B3/4 7-1j

BASES

BASES

3/4.7.1 SERVICE WATER SYSTEMS

LIMITING CONDITION FOR OPERATION

3.7.1.2 The Service Water System shall be OPERABLE with at least:

In OPERATIONAL CONDITIONS 1, 2, and 3:

Three OPERABLE site nuclear service water pumps, and two OPERABLE conventional service water pumps capable of supplying the nuclear and conventional headers.

In OPERATIONAL CONDITIONS 4 AND 5:

Three OPERABLE site nuclear service water pumps, and two OPERABLE Unit 1 service water pumps, nuclear and/or conventional, powered from separate emergency buses and capable of supplying the nuclear header.

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

ACTION:

a. In OPERATIONAL CONDITIONS 1, 2, or 3:

1. With one OPERABLE conventional service water pump:

   a. Ensure that, if only one Unit 1 nuclear service water pump is OPERABLE, the OPERABLE conventional service water pump is powered from a separate emergency bus than the OPERABLE Unit 1 nuclear service water pump, and

   b. Restore at least one additional conventional service water pump to OPERABLE status within 7 days.

   Otherwise, be in at least HOT SHUTDOWN within 12 hours and in COLD SHUTDOWN within the following 24 hours.

2. With no conventional service water pumps OPERABLE:

   a. Ensure both Unit 1 nuclear service water pumps are OPERABLE, and

   b. Restore at least one conventional service water pump to OPERABLE status within 72 hours.

   Otherwise, be in at least HOT SHUTDOWN within 12 hours and COLD SHUTDOWN within the following 24 hours.

3. With two OPERABLE site nuclear service water pumps, unless the provisions of ACTION b.4 apply for Unit 2, restore one additional site nuclear service water pump within 7 days or be in at least HOT SHUTDOWN within 12 hours and COLD SHUTDOWN within the following 24 hours.

LIMITING CONDITION FOR OPERATION (Continued)

ACTION: (Continued)

4. With two OPERABLE site nuclear service water pumps and one OPERABLE conventional service water pump:

   a. Ensure at least one Unit 1 nuclear service water pump is OPERABLE, and

   b. Ensure that, if only one Unit 1 nuclear service water pump is OPERABLE, the OPERABLE conventional service water pump is powered from a separate emergency bus than the OPERABLE Unit 1 nuclear service water pump, and

   c. Restore two conventional service water pumps or three site nuclear service water pumps to OPERABLE status within 72 hours.

   Otherwise, be in at least HOT SHUTDOWN within 12 hours and COLD SHUTDOWN within the following 24 hours.

5. With less than two OPERABLE site nuclear service water pumps, be in at least HOT SHUTDOWN within 12 hours and COLD SHUTDOWN within the following 24 hours.

b. In OPERATIONAL CONDITIONS 4 or 5:

1. With one OPERABLE Unit 1 service water pump, restore at least two Unit 1 service water pumps to OPERABLE status within 7 days. Otherwise, suspend all operations that have a potential for draining the reactor vessel.

2. With no OPERABLE Unit 1 service water pumps, suspend all operations that have a potential for draining the reactor vessel.

3. With two OPERABLE site nuclear service water pumps, unless the provisions of ACTION b.4 apply, restore at least one additional nuclear service water pump to OPERABLE status within 7 days. Otherwise, take the ACTION required by Specification 3.8.1.2.

4. With the service water system nuclear header inoperable, operation of both units may continue provided that two Unit 2 nuclear service water pumps are OPERABLE, both units' nuclear service water header valves are administratively controlled as required to ensure cooling water to the diesel generators, at least two Unit 1 conventional service water pumps are OPERABLE on the conventional header, and vital ECCS loads are aligned to the conventional service water system header. Restore the service water system nuclear header and at least three site nuclear service water pumps to OPERABLE status within 14 days. Otherwise, take the ACTION required by Specification 3.8.1.2.

5. With less than two OPERABLE site nuclear service water pumps, take the ACTION required by Specification 3.8.1.2.

SURVEILLANCE REQUIREMENTS

4.7.1.2 The service water system shall be demonstrated OPERABLE:

a. At least once per 31 days by verifying that each valve (manual, power-operated, or automatic) servicing safety related equipment that is not locked, sealed, or otherwise secured in position, is in its correct position.

b. At least once per 18 months during shutdown, by verifying that each automatic valve servicing safety-related equipment actuates to its correct position on the appropriate ECCS actuation test signals.

c. At least once per 92 days by verifying that the alternate diesel generator service water supply valve will open on a low header pressure signal.

3/4 10.5 PLANT SERVICE WATER

LIMITING CONDITION FOR OPERATION

3.10.5 The service water conventional header required to be operating per Specification 3.7.1.2 ACTION b.4 may be removed from operation by stopping the pumps to permit isolating and draining the service water nuclear header for maintenance provided that:

a. The service water conventional header remains lined up to supply cooling water to the required ECCS loads.

b. The draining/maintenance on the service water nuclear header will not affect the service water conventional system or lineup described in a. above.

c. Average coolant temperature is $\leq$100°F and the heatup rate is $\leq$10°F per hour.

d. Two dedicated, qualified members of the unit operational staff are assigned to initiate the service water conventional header pumps, should any of the following occur:

1. Any event occurs which requires ECCS actuation.

2. Primary coolant temperature exceeds 180°F.

3. A loss of offsite power occurs.

APPLICABILITY: OPERATIONAL CONDITIONS 4 and 5 with the nuclear header inoperable.

ACTION: With the requirements of the above specification not satisfied, as soon as practicable, restore the:

a. Service water conventional header to operating status per the requirements of Specification 3.7.1.2 ACTION b.4, or

b. Service water nuclear header to OPERABLE status per Specification 3.7.1.2.

SURVEILLANCE REQUIREMENTS

4.10.5 When the service water conventional header is not operating as specified above:

a. Prior to securing all service water pumps, verify that the service water conventional header is lined up to supply cooling water for ECCS by verifying that each valve servicing safety-related equipment that is not locked in the proper position is administratively controlled in the proper position.

3/4.7.1 SERVICE WATER SYSTEMS

The service water system is designed to provide cooling water for the removal of heat from equipment such as the emergency diesel generators, Residual Heat Removal (RHR) pump coolers, and room coolers for Emergency Core Cooling System (ECCS) equipment, that is required for a safe reactor shutdown following a design basis accident (DBA) or transient. The service water system also provides cooling to the Reactor Building Closed Cooling Water (RBCCW) System and the Residual Heat Removal Service Water (RHRSW) System, as required, during normal and shutdown operation. The service water system provides lubricating water for the service water pumps and cooling water for the service water pump motors. During the initial stage (0 - 10 minutes) of a LOCA or LOOP, the service water system must automatically provide cooling water to the emergency diesel generators. Following the first 10 minute period, additional safety-related and shutdown cooling loads must be supplied. The service water system also provides flow to the Turbine Building Closed Cooling Water System, the Chlorination System, and fill to the Circulating Water System.

The service water system design allows either (or both) unit's nuclear header to supply diesel generator cooling water when required. The phrase "site nuclear service water pump" refers to any nuclear service water pump on either unit. Other pump designations refer to the specific unit under discussion. The four nuclear service water pumps on site, two per unit, are each on a separate emergency bus so that a single failure could prevent only one nuclear service water pump from operating.

The OPERABILITY requirements are structured to ensure that the service water system is capable of automatically supplying sufficient cooling water for the Diesel Generators assuming no operator action for the first 10 minutes following a DBA, and that at least one service water pump per unit is available to supply the safety-related and shutdown cooling loads after the first ten minutes following a DBA. The OPERABILITY requirements for the service water system are, in general, based on a LOCA (Loss of Coolant Accident), and in some cases combined with a LOOP (Loss of Offsite Power), since this event or combination would provide the most significant challenge to the system's capabilities.

The four nuclear service water pumps are powered from separate emergency buses. The three conventional service water pumps on each unit are on separate emergency buses. For each unit, two of the conventional pumps are on the same emergency buses as the two unit nuclear service water pumps. The loss of one nuclear pump and one conventional pump on the unit due to a single failure of one emergency bus has been accounted for in the OPERABILITY requirements. However, conventional service water pump OPERABILITY will be more strictly defined in cases where only one nuclear pump and one conventional pump are available for operation. Therefore, with one unit nuclear service water pump and one conventional service water pump available, the conventional service water pump must be powered from a separate emergency bus to be considered OPERABLE.

3/4.7.1 SERVICE WATER SYSTEMS (Continued)

In OPERATIONAL CONDITIONS 1, 2, and 3, a conventional service water pump must be capable of supplying water to both the nuclear header and the conventional header to be considered OPERABLE. This will ensure that the vital header and RHR service water heat exchangers can be supplied from either header when a single failure of any header isolation valve is assumed and personnel access is not available for manual valve alignment. In OPERATIONAL CONDITIONS 4 and 5, because of reduced primary pressure, the possibility of a LOCA is not considered credible and access is considered available to manually position header isolation valves if required. Therefore, in OPERATIONAL CONDITIONS 4 and 5, a conventional pump may be considered OPERABLE when only the nuclear header discharge valve is OPERABLE except as specifically identified in the ACTION statement for a nuclear header outage. This allows maintenance on the conventional header without reducing service water system OPERABILITY. However, a conventional pump aligned to the nuclear header is not considered to meet the requirements for an OPERABLE nuclear pump since it is not automatically powered and restarted on the diesel generators following an accident signal.

For OPERATIONAL CONDITIONS 1, 2, 3, 4, and 5, and a DBA in either unit, two nuclear service water pumps from one or both units are capable of supplying sufficient flow to cool all four emergency diesel generators under worst-case scenarios while also supplying flow to other potential flow paths (vital header loads, cross-header leakage, and lubewater). To prohibit any single failure from preventing the supply of service water to the diesel generators during the first 10 minutes following a DBA, at least three nuclear service water pumps per site are required while in OPERATIONAL CONDITIONS 1, 2, 3, 4, or 5.

After the first 10 minutes following a DBA, additional loads require cooling water on the affected unit. These loads include RHR and CS pump room coolers, RHR service water heat exchangers, and RHR pump seal heat exchangers. Evaluations have determined that the RHR pump seals, as well as the equipment in rooms serviced by the RHR and CS room coolers, remain within the manufacturers' temperature limits for at least the first 10 minutes of a DBA. Operator action is credited after the first 10 minutes following a DBA to make the necessary pump and valve alignments either remotely or manually, except that manual action inside the Reactor Building following a LOCA while in OPERATIONAL CONDITIONS 1, 2, and 3 is not credited because of the potential for unsafe conditions.

In OPERATIONAL CONDITIONS 1, 2, and 3, one conventional service water pump supporting the affected unit is capable of supplying the additional required safety-related and shutdown equipment. No single failure can prevent the necessary loads from being aligned to one of the nuclear or conventional headers by manual or remote operator action. To prohibit any single failure from preventing the supply of service water after the first 10 minutes following a DBA, at least two operable conventional service water pumps are required while in OPERATIONAL CONDITIONS 1, 2, or 3.

3/4.7.1 SERVICE WATER SYSTEMS (Continued)

In OPERATIONAL CONDITIONS 4 and 5, one unit service water pump, nuclear or conventional, is capable of supplying additional required safety-related and shutdown equipment. Manual action in the Reactor Building is credited to align equipment to the nuclear header if required. To prohibit any single failure from preventing the supply of service water after the first 10 minutes following a DBA, at least two operable unit service water pumps, nuclear or conventional, are required while in OPERATIONAL CONDITIONS 4 and 5.

The allowed out-of-service times and compensatory measures established in the ACTION statements are conservative. Although the probability and consequences of a DBA are reduced in OPERATIONAL CONDITIONS 4 and 5, the ACTION statements for the nuclear service water pumps for a unit in OPERATIONAL CONDITIONS 4 or 5 are based on the assumption that the other unit is in OPERATIONAL CONDITIONS 1, 2, or 3. Specific ACTION statements and LCO time limits have not been established for both units in OPERATIONAL CONDITIONS 4 or 5 since the ACTION statements for one unit in OPERATIONAL CONDITIONS 4 or 5 are more conservative.

In OPERATIONAL CONDITIONS 4 and 5, because of reduced core decay heat load, the reduced possibility of a LOCA, and the accessibility to the reactor building for manual operator action, the vital header loads could be manually aligned to the nuclear header if a failure prevented remote valve alignment. Therefore, the operability requirements for the unit service water pumps apply for nuclear or conventional pumps. With one OPERABLE unit service water pump, the core spray and LPCI systems remain OPERABLE. However, to minimize the possibility of loss of these systems due to loss of the single pump, the out-of-service time for one OPERABLE unit service water pump is set at 7 days. For no OPERABLE unit service water pumps, the core spray and LPCI systems must be declared inoperable. This is equivalent to the ACTION statement for core spray and LPCI systems inoperable.

ACTION statement 3.7.1.2.b.4 for OPERATIONAL CONDITIONS 4 and 5 allows one unit to operate with the nuclear service water header inoperable for up to 14 days provided that:

a) two nuclear service water pumps are OPERABLE on the other unit,
b) both unit's nuclear service water header valves are administratively controlled as required to ensure cooling water to the diesel generators.
c) the service water system conventional header is OPERABLE with two unit conventional service water pumps OPERABLE, and
d) vital ECCS loads are aligned to the conventional service water system header.

Considering any additional single failure, this requirement ensures at least one OPERABLE nuclear service water pump to supply the Diesel Generators during the first 10 minutes after a DBA and one OPERABLE conventional service water pump to supply the unit safety-related and shutdown cooling loads following the first 10 minutes after a DBA. By requiring administrative control of both unit's nuclear header valves, the ACTION statement minimizes the risk of inadvertent valve action that could reduce cooling water flow to the diesel generators.

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.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

CAROLINA POWER & LIGHT COMPANY, et al.

DOCKET NO. 50-324

BRUNSWICK STEAM ELECTRIC PLANT, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 195
License No. DPR-62

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment filed by Carolina Power & Light Company (the licensee), dated December 31, 1992, as revised by letter dated July 20, 1993, and supplemented August 9, 1993, and August 27, 1993, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment; and paragraph 2.C.(2) of Facility Operating License No. DPR-62 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 195 , are hereby incorporated in the license. Carolina Power & Light Company shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance and shall be implemented within 30 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

S. Singh Bajwa, Acting Director
Project Directorate II-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: September 14, 1993

ATTACHMENT TO LICENSE AMENDMENT NO. 195

FACILITY OPERATING LICENSE NO. DPR-62

DOCKET NO. 50-324

Replace the following pages of the Appendix A Technical Specifications with the enclosed pages. The revised areas are indicated by marginal lines.

Remove Pages	Insert Pages
XI	XI
XII	XII
3/4 7-2	3/4 7-2
3/4 7-2a	3/4 7-2a
3/4 7-2b	3/4 7-2b
3/4 10-5	3/4 10-5
B3/4 7-1	B3/4 7-1
B3/4 7-1a	B3/4 7-1a
B3/4 7-1b	B3/4 7-1b
B3/4 7-1c	B3/4 7-1c
B3/4 7-1d	B3/4 7-1d
B3/4 7-1e	B3/4 7-1e
B3/4 7-1f	B3/4 7-1f
B3/4 7-1g	B3/4 7-1g
B3/4 7-1h	B3/4 7-1h
--	B3/4 7-1i
--	B3/4 7-1j

BASES

3/4.7.1 SERVICE WATER SYSTEMS

LIMITING CONDITION FOR OPERATION

3.7.1.2 The Service Water System shall be OPERABLE with at least:

In OPERATIONAL CONDITIONS 1, 2, and 3:

Three OPERABLE site nuclear service water pumps, and two OPERABLE conventional service water pumps capable of supplying the nuclear and conventional headers.

In OPERATIONAL CONDITIONS 4 AND 5:

Three OPERABLE site nuclear service water pumps, and two OPERABLE Unit 2 service water pumps, nuclear and/or conventional, powered from separate emergency buses and capable of supplying the nuclear header.

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

ACTION:

a. In OPERATIONAL CONDITIONS 1, 2, or 3:

1. With one OPERABLE conventional service water pump:

   a. Ensure that, if only one Unit 2 nuclear service water pump is OPERABLE, the OPERABLE conventional service water pump is powered from a separate emergency bus than the OPERABLE Unit 2 nuclear service water pump, and

   b. Restore at least one additional conventional service water pump to OPERABLE status within 7 days.

   Otherwise, be in at least HOT SHUTDOWN within 12 hours and in COLD SHUTDOWN within the following 24 hours.

2. With no conventional service water pumps OPERABLE:

   a. Ensure both Unit 2 nuclear service water pumps are OPERABLE, and

   b. Restore at least one conventional service water pump to OPERABLE status within 72 hours.

   Otherwise, be in at least HOT SHUTDOWN within 12 hours and COLD SHUTDOWN within the following 24 hours.

3. With two OPERABLE site nuclear service water pumps, unless the provisions of ACTION b.4 apply for Unit 1, restore one additional site nuclear service water pump within 7 days or be in at least HOT SHUTDOWN within 12 hours and COLD SHUTDOWN within the following 24 hours.

LIMITING CONDITION FOR OPERATION (Continued)

ACTION: (Continued)

4. With two OPERABLE site nuclear service water pumps and one OPERABLE conventional service water pump:

   a. Ensure at least one Unit 2 nuclear service water pump is OPERABLE, and

   b. Ensure that, if only one Unit 2 nuclear service water pump is OPERABLE, the OPERABLE conventional service water pump is powered from a separate emergency bus than the OPERABLE Unit 2 nuclear service water pump, and

   c. Restore two conventional service water pumps or three site nuclear service water pumps to OPERABLE status within 72 hours.

   Otherwise, be in at least HOT SHUTDOWN within 12 hours and COLD SHUTDOWN within the following 24 hours.

5. With less than two OPERABLE site nuclear service water pumps, be in at least HOT SHUTDOWN within 12 hours and COLD SHUTDOWN within the following 24 hours.

b. In OPERATIONAL CONDITIONS 4 or 5:

1. With one OPERABLE Unit 2 service water pump, restore at least two Unit 2 service water pumps to OPERABLE status within 7 days. Otherwise, suspend all operations that have a potential for draining the reactor vessel.

2. With no OPERABLE Unit 2 service water pumps, suspend all operations that have a potential for draining the reactor vessel.

3. With two OPERABLE site nuclear service water pumps, unless the provisions of ACTION b.4 apply, restore at least one additional nuclear service water pump to OPERABLE status within 7 days. Otherwise, take the ACTION required by Specification 3.8.1.2.

4. With the service water system nuclear header inoperable, operation of both units may continue provided that two Unit 1 nuclear service water pumps are OPERABLE, both units' nuclear service water header valves are administratively controlled as required to ensure cooling water to the diesel generators, at least two Unit 2 conventional service water pumps are OPERABLE on the conventional header, and vital ECCS loads are aligned to the conventional service water system header. Restore the service water system nuclear header and at least three site nuclear service water pumps to OPERABLE status within 14 days. Otherwise, take the ACTION required by Specification 3.8.1.2.

5. With less than two OPERABLE site nuclear service water pumps, take the ACTION required by Specification 3.8.1.2.

SURVEILLANCE REQUIREMENTS

4.7.1.2 The service water system shall be demonstrated OPERABLE:

a. At least once per 31 days by verifying that each valve (manual, power-operated, or automatic) servicing safety related equipment that is not locked, sealed, or otherwise secured in position, is in its correct position.

b. At least once per 18 months during shutdown, by verifying that each automatic valve servicing safety-related equipment actuates to its correct position on the appropriate ECCS actuation test signals.

c. At least once per 92 days by verifying that the alternate diesel generator service water supply valve will open on a low header pressure signal.

3/4 10.5 PLANT SERVICE WATER

LIMITING CONDITION FOR OPERATION

3.10.5 The service water conventional header required to be operating per Specification 3.7.1.2 ACTION b.4 may be removed from operation by stopping the pumps to permit isolating and draining the service water nuclear header for maintenance provided that:

a. The service water conventional header remains lined up to supply cooling water to the required ECCS loads.

b. The draining/maintenance on the service water nuclear header will not affect the service water conventional system or lineup described in a. above.

c. Average coolant temperature is ≤100°F and the heatup rate is ≤10°F per hour.

d. Two dedicated, qualified members of the unit operational staff are assigned to initiate the service water conventional header pumps should any of the following occur:

1. Any event occurs which requires ECCS actuation.

2. Primary coolant temperature exceeds 180°F.

3. A loss of offsite power occurs.

APPLICABILITY: OPERATIONAL CONDITIONS 4 and 5 with the nuclear header inoperable.

ACTION: With the requirements of the above specification not satisfied, as soon as practicable, restore the:

a. Service water conventional header to operating status per the requirements of Specification 3.7.1.2 ACTION b.4, or

b. Service water nuclear header to OPERABLE status per Specification 3.7.1.2.

SURVEILLANCE REQUIREMENTS

4.10.5 When the service water conventional header is not operating as specified above:

a. Prior to securing all service water pumps, verify that the service water conventional header is lined up to supply cooling water for ECCS by verifying that each valve servicing safety-related equipment that is not locked in the proper position is administratively controlled in the proper position.

3/4.7.1 SERVICE WATER SYSTEMS

The service water system is designed to provide cooling water for the removal of heat from equipment such as the emergency diesel generators, Residual Heat Removal (RHR) pump coolers, and room coolers for Emergency Core Cooling System (ECCS) equipment, that is required for a safe reactor shutdown following a design basis accident (DBA) or transient. The service water system also provides cooling to the Reactor Building Closed Cooling Water (RBCCW) System and the Residual Heat Removal Service Water (RHRSW) System, as required, during normal and shutdown operation. The service water system provides lubricating water for the service water pumps and cooling water for the service water pump motors. During the initial stage (0 - 10 minutes) of a LOCA or LOOP, the service water system must automatically provide cooling water to the emergency diesel generators. Following the first 10 minute period, additional safety-related and shutdown cooling loads must be supplied. The service water system also provides flow to the Turbine Building Closed Cooling Water System, the Chlorination System, and fill to the Circulating Water System.

The service water system design allows either (or both) unit's nuclear header to supply diesel generator cooling water when required. The phrase "site nuclear service water pump" refers to any nuclear service water pump on either unit. Other pump designations refer to the specific unit under discussion. The four nuclear service water pumps on site, two per unit, are each on a separate emergency bus so that a single failure could prevent only one nuclear service water pump from operating.

The OPERABILITY requirements are structured to ensure that the service water system is capable of automatically supplying sufficient cooling water for the Diesel Generators assuming no operator action for the first 10 minutes following a DBA, and that at least one service water pump per unit is available to supply the safety-related and shutdown cooling loads after the first ten minutes following a DBA. The OPERABILITY requirements for the service water system are, in general, based on a LOCA (Loss of Coolant Accident), and in some cases combined with a LOOP (Loss of Offsite Power), since this event or combination would provide the most significant challenge to the system's capabilities.

The four nuclear service water pumps are powered from separate emergency buses. The three conventional service water pumps on each unit are on separate emergency buses. For each unit, two of the conventional pumps are on the same emergency buses as the two unit nuclear service water pumps. The loss of one nuclear pump and one conventional pump on the unit due to a single failure of one emergency bus has been accounted for in the OPERABILITY requirements. However, conventional service water pump OPERABILITY will be more strictly defined in cases where only one nuclear pump and one conventional pump are available for operation. Therefore, with one unit nuclear service water pump and one conventional service water pump available, the conventional service water pump must be powered from a separate emergency bus to be considered OPERABLE.

3/4.7.1 SERVICE WATER SYSTEMS (Continued)

In OPERATIONAL CONDITIONS 1, 2, and 3, a conventional service water pump must be capable of supplying water to both the nuclear header and the conventional header to be considered OPERABLE. This will ensure that the vital header and RHR service water heat exchangers can be supplied from either header when a single failure of any header isolation valve is assumed and personnel access is not available for manual valve alignment. In OPERATIONAL CONDITIONS 4 and 5, because of reduced primary pressure, the possibility of a LOCA is not considered credible and access is considered available to manually position header isolation valves if required. Therefore, in OPERATIONAL CONDITIONS 4 and 5, a conventional pump may be considered OPERABLE when only the nuclear header discharge valve is OPERABLE except as specifically identified in the ACTION statement for a nuclear header outage. This allows maintenance on the conventional header without reducing service water system OPERABILITY. However, a conventional pump aligned to the nuclear header is not considered to meet the requirements for an OPERABLE nuclear pump since it is not automatically powered and restarted on the diesel generators following an accident signal.

For OPERATIONAL CONDITIONS 1, 2, 3, 4, and 5, and a DBA in either unit, two nuclear service water pumps from one or both units are capable of supplying sufficient flow to cool all four emergency diesel generators under worst-case scenarios while also supplying flow to other potential flow paths (vital header loads, cross-header leakage, and lubewater). To prohibit any single failure from preventing the supply of service water to the diesel generators during the first 10 minutes following a DBA, at least three nuclear service water pumps per site are required while in OPERATIONAL CONDITIONS 1, 2, 3, 4, or 5.

After the first 10 minutes following a DBA, additional loads require cooling water on the affected unit. These loads include RHR and CS pump room coolers, RHR service water heat exchangers, and RHR pump seal heat exchangers. Evaluations have determined that the RHR pump seals, as well as the equipment in rooms serviced by the RHR and CS room coolers, remain within the manufacturers' temperature limits for at least the first 10 minutes of a DBA. Operator action is credited after the first 10 minutes following a DBA to make the necessary pump and valve alignments either remotely or manually, except that manual action inside the Reactor Building following a LOCA while in OPERATIONAL CONDITIONS 1, 2, and 3 is not credited because of the potential for unsafe conditions.

In OPERATIONAL CONDITIONS 1, 2, and 3, one conventional service water pump supporting the affected unit is capable of supplying the additional required safety-related and shutdown equipment. No single failure can prevent the necessary loads from being aligned to one of the nuclear or conventional headers by manual or remote operator action. To prohibit any single failure from preventing the supply of service water after the first 10 minutes following a DBA, at least two operable conventional service water pumps are required while in OPERATIONAL CONDITIONS 1, 2, or 3.

3/4.7.1 SERVICE WATER SYSTEMS (Continued)

In OPERATIONAL CONDITIONS 4 and 5, one unit service water pump, nuclear or conventional, is capable of supplying additional required safety-related and shutdown equipment. Manual action in the Reactor Building is credited to align equipment to the nuclear header if required. To prohibit any single failure from preventing the supply of service water after the first 10 minutes following a DBA, at least two operable unit service water pumps, nuclear or conventional, are required while in OPERATIONAL CONDITIONS 4 and 5.

The allowed out-of-service times and compensatory measures established in the ACTION statements are conservative. Although the probability and consequences of a DBA are reduced in OPERATIONAL CONDITIONS 4 and 5, the ACTION statements for the nuclear service water pumps for a unit in OPERATIONAL CONDITIONS 4 or 5 are based on the assumption that the other unit is in OPERATIONAL CONDITIONS 1, 2, or 3. Specific ACTION statements and LCO time limits have not been established for both units in OPERATIONAL CONDITIONS 4 or 5 since the ACTION statements for one unit in OPERATIONAL CONDITIONS 4 or 5 are more conservative.

In OPERATIONAL CONDITIONS 4 and 5, because of reduced core decay heat load, the reduced possibility of a LOCA, and the accessibility to the reactor building for manual operator action, the vital header loads could be manually aligned to the nuclear header if a failure prevented remote valve alignment. Therefore, the operability requirements for the unit service water pumps apply for nuclear or conventional pumps. With one OPERABLE unit service water pump, the core spray and LPCI systems remain OPERABLE. However, to minimize the possibility of loss of these systems due to loss of the single pump, the out-of-service time for one OPERABLE unit service water pump is set at 7 days. For no OPERABLE unit service water pumps, the core spray and LPCI systems must be declared inoperable. This is equivalent to the ACTION statement for core spray and LPCI systems inoperable.

ACTION statement 3.7.1.2.b.4 for OPERATIONAL CONDITIONS 4 and 5 allows one unit to operate with the nuclear service water header inoperable for up to 14 days provided that:

a) two nuclear service water pumps are OPERABLE on the other unit,
b) both unit's nuclear service water header valves are administratively controlled as required to ensure cooling water to the diesel generators.
c) the service water system conventional header is OPERABLE with two unit conventional service water pumps OPERABLE, and
d) vital ECCS loads are aligned to the conventional service water system header.

Considering any additional single failure, this requirement ensures at least one OPERABLE nuclear service water pump to supply the Diesel Generators during the first 10 minutes after a DBA and one OPERABLE conventional service water pump to supply the unit safety-related and shutdown cooling loads following the first 10 minutes after a DBA. By requiring administrative control of both unit's nuclear header valves, the ACTION statement minimizes the risk of inadvertent valve action that could reduce cooling water flow to the diesel generators.

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.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 164 TO FACILITY OPERATING LICENSE NO. DRP-71

AND AMENDMENT NO. 195 TO FACILTY OPERATING LICENSE NO. DPR-62

CAROLINA POWER & LIGHT COMPANY

BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2

DOCKET NOS. 50-325 AND 50-324

1.0 INTRODUCTION

By letter dated December 31, 1992, as revised by letter dated July 20, 1993, and supplemented by letters dated August 9, 1993, and August 27, 1993, Carolina Power and Light Company (CP&L or the licensee) requested an amendment to the service water system (SWS) Technical Specifications (TSs) for the Brunswick Steam Electric Plant, Unit Nos. 1 and 2 (BSEP). The July 20, August 9, and August 27, 1993, letters provided changes and additional information that were not outside the scope of the initial determination of no significant hazards consideration as published in the Federal Register.

The amendment request proposes revision of the number of nuclear service water pumps (NSWPs) required to be operable from two NSWPs per unit to three NSWPs serving the site whenever either unit is in operational condition 1, 2, or 3, revision of the action statements associated with certain SWS pump configurations in all operational conditions, incorporation of TS surveillance 4.7.1.2.c into proposed action b.4 of TS 3.7.1.2, addition of a quarterly surveillance of the pressure switch logic and valve actuation capability associated with the SWS supply to the emergency diesel generators (EDGs), and complete revision of the bases for TS 3/4.7.1.2.

The proposed TS revision is associated with a recent plant modification to upgrade the thrust bearing capacity of the NSWP motors. Prior to the modification, the pump motor's thrust bearing could fail due to overloading under low pump flow conditions. In order to prevent this condition, a minimum flow path had been maintained to ensure adequate pump flow under all credible accident conditions. With the upgrade to the pump motor's thrust bearing, the licensee has determined that the NSWPs are capable of withstanding all credible low flow conditions. Therefore, the minimum flow path is no longer required to prevent pump damage. In addition, the licensee determined by analysis that, without the minimum flow path, any two operating NSWPs are sufficient to ensure adequate cooling to the four EDGs under all credible conditions. The third operable NSWP serving the site, which is required by the proposed TS Limiting Condition for Operation (LCO), is assumed to be disabled by the design basis single failure.

2.0 BACKGROUND

The BSEP SWS provides water for lubrication and cooling of selected systems and components. The SWS serving each unit is subdivided into two major headers, nuclear and conventional, which are normally operated independently. The nuclear header normally is aligned to supply cooling water to the reactor building closed cooling water (RBCCW) system heat exchangers. The conventional header normally supplies service water to the turbine building closed cooling water (TBCCW) system and certain balance-of-plant equipment in other areas. The conventional header is capable of being aligned to supply the RBCCW heat exchangers in place of the nuclear header.

For each unit, two nuclear service water pumps (NSWPs) are dedicated to supply the nuclear header, and three conventional service water pumps (CSWPs) are normally available to supply the conventional header. However, the CSWPs can be individually aligned by operator action to discharge directly to the nuclear header instead of the conventional header. Each NSWP is powered from a separate emergency bus. Two of the three CSWPs associated with each unit are powered from the same two emergency buses powering the NSWPs associated with that unit. The remaining CSWP is powered from an emergency bus associated with the opposite unit. Due to this configuration, a single failure of an emergency bus may result in the loss of one NSWP and one CSWP from the same unit and the loss of a CSWP from the opposite unit. Standby NSWPs and standby CSWPs start automatically on low header pressure. In addition, all NSWPs start automatically on a loss of coolant accident (LOCA) signal or a loss of offsite power (LOOP) signal. However, the CSWPs must be started manually following a LOCA or LOOP.

The four EDGs are the only SWS loads common to both units. Two EDGs are normally supplied from each unit's nuclear header, but low service water supply pressure sensed by a pressure switch at an EDG causes the service water supply to that EDG to automatically transfer to the opposite nuclear header. The transfer logic permits only a single transfer per EDG, regardless of the service water supply pressure provided following the first transfer. A LOCA signal or a LOOP signal generates an EDG start signal and automatically opens the service water supply valve to the jacket water cooler.

Other safety-related loads associated with each unit include the residual heat removal service water system (RHRSW) pumps, core spray (CS) and residual heat removal (RHR) pump room coolers, RHR pump seal heat exchangers, lubricating water for the SWS pumps, and cooling water for the RHRSW pump motors. The vital service header supplies the pump room coolers and pump seal heat exchangers. The RHRSW pumps take suction directly from a separate header and are started remotely. The RHRSW pumps have a low suction pressure trip. The vital service and RHRSW suction headers are connected to both the conventional and nuclear headers, and the vital service and RHRSW suction headers can be aligned, using remotely operable valves, in configurations where cooling water is supplied by the nuclear header alone, the conventional header alone, or a combination of the nuclear and conventional headers such that each header serves one train.

The valves controlling flow from the vital service header to the individual components served by the vital header are air-operated, and these valves are assumed to fail open due to loss of the unqualified service air compressors following a LOCA or LOOP. The two motor operated header isolation valves for each unit, individually supplying service water from the nuclear header to the vital service and RHRSW suction headers, are powered from a single emergency bus, and this emergency bus is separate from the emergency bus supplying power to the header isolation valves on the conventional header. Portions of the SWS which are not safety-related are capable of being isolated from the safety-related portions by redundant, electrically independent, motor operated valves. The service water supply from the unit nuclear header to the RBCCW heat exchangers is automatically isolated by redundant valves on a LOCA signal or LOOP signal for that unit. Leakage across the isolation valves between the nuclear and conventional headers piping has been identified when one of the two headers is depressurized.

3.0 EVALUATION

3.1 Limiting Conditions for Operation

The licensee's letter dated July 20, 1993, included the following as attachments: "Service Water System Hydraulic Analysis Report" (containing calculations G0050A-16, Rev. 1, and G0050A-18, Rev. 0), "Analysis for Tech Spec 3.7.1.2 Proposed Change" (OSW-0048, Rev. 0), "Unit 2 Hydraulic Analysis" (G0050A-12, Rev. 5), and "Unit 1 Hydraulic Analysis" (G0050A-10, Rev. 5). These analyses are based on the licensee's computer models of the SWS using the KYPIPE hydraulic analysis code, and they document the calculated hydraulic performance of the SWS under the pump configurations permitted for continuous operation under the proposed revisions to TS 3.7.1.2 which the licensee determined to be limiting. The test procedures, test data, and engineering evaluations used in the latest validation of the service water system computer models were submitted as attachments to a letter dated August 9, 1993. A description of the methodology used to validate the computer models and the results of additional analyses verifying the capability of a single CSWP to supply adequate cooling water for long term decay heat removal were provided in a letter dated August 27, 1993.

During the first 10 minutes of a design basis event, the EDGs and the service water pump lube water system are the only loads which must be supplied by the service water system. The licensee's analyses assume that the vital service header loads also receive cooling water flow during the first 10 minutes of a LOCA and during the first 10 minutes of a LOOP, if that assumption is most restrictive. After the initial 10 minute period, the SWS must provide cooling to other essential loads to support long term decay heat removal. The 10 minute period where no operator action or assistance is allowed was established as the design basis for all engineered safety features by CP&L's response to an Atomic Energy Commission staff question during review of the original BSEP Final Safety Analysis Report. The 10 minute period also coincides with the analyzed time for manual initiation of the containment cooling mode of RHR presented in the Updated Final Safety Analysis Report. The containment cooling mode of RHR requires the operation of the RHRSW system.

The proposed TS revision for the SWS requires three NSWPs serving the site and two CSWPs associated with each unit initially operable in operational conditions 1, 2, and 3. From this initial configuration, assuming a single failure, at least two site NSWPs will remain operable to support operation of the EDGs, and at least one service water pump for each unit in operational condition 1, 2, or 3 will remain operable to support long-term decay heat removal after the first 10 minutes of the event. Necessary pump, header, and valve alignments for long-term decay heat removal can be made by remote operator action. However, manual operator action within the reactor building is not credited because of the potential for unsafe conditions in the reactor building following a LOCA. In operational conditions 1, 2, and 3, a CSWP must be capable of supplying cooling water to both the nuclear header and the conventional header to be considered operable. This will ensure that the vital service header and the RHRSW suction header can be supplied from either the nuclear or conventional header when a single failure is assumed which results in inoperability of any header isolation valve and personnel access is not available for manual valve alignment.

In operational condition 4 or 5, three NSWPs serving the site and a total of at least two service water pumps (nuclear or conventional) powered from separate emergency buses and capable of supplying the nuclear header are required by existing TS 3.7.1.2. The three initially operable NSWPs ensure that two NSWPs are available to provide cooling water flow to the EDGs following a single failure. Two operable service water pumps powered from separate power supplies for each unit in operational condition 4 or 5 ensure that at least one service water pump for decay heat removal will remain operable following a single failure. Necessary pump, header, and valve alignments to support operating equipment can be made by remote or manual operator action.

The staff reviewed the results of the licensee's SWS analyses, which were provided as attachments to the letter dated July 20, 1993, and found that all potential system configurations were evaluated. The licensee adequately justified the limiting accidents and single failures considered in the analyses. However, the staff noted that a qualitative analysis which was intended to show that a single CSWP is capable of supplying sufficient cooling water flow after the first 10 minutes of a design basis event was based on an inadequately justified assumption. In response to staff concerns regarding this assumption, the licensee provided the results of a quantitative analysis in their letter dated August 27, 1993. This analysis demonstrated that a single CSWP is capable of providing adequate cooling water flow after the first 10 minutes of a design basis event using the computer models of the SWS.

Acceptance criteria used in evaluating the limiting configurations were based on achieving acceptable cooling water flow to all components and maintaining adequate net positive suction head for the operating service water pumps. The acceptance criteria include an allowance for a five percent deviation from the calculated flow in order to provide margin for inaccuracies in the computer models. Each SWS configuration was evaluated at the design high and low bay levels. If both units were assumed to be in operational condition 4 or 5, extreme low bay level and flood levels were also evaluated. High energy line breaks such as a LOCA were not considered credible for evaluation for units in operating conditions 4 and 5. The evaluation also included an allowance for leakage into a depressurized header. In configurations where an unacceptable condition was calculated to exist, an automatic function, such as transfer of one or more EDGs to the opposite nuclear header on low service water header pressure or low RHRSW suction header pressure trips of one or more RHRSW pumps, was calculated to occur. The licensee determined that these automatic functions would restore the SWS to a configuration with acceptable component flow and adequate net positive suction head. The staff found the acceptance criteria used in the evaluation and the scope of the evaluation to be acceptable.

The staff also reviewed the test procedures, test data, and engineering evaluations used in the most recent validation of the SWS computer models. The most recent test procedures collected flow data from just three configurations where all components received flow. However, the licensee indicated that the SWS computer model was developed and refined using test data collected for seven different configurations. The configurations tested included conditions where one or two NSWPs were operating, two or four EDGs were aligned to the header, and with the two RHRSW booster pumps in operation or secured. The most recent tests were used to verify the accuracy of the model in predicting the flow through safety-related components served by the nuclear header. Although the computer models were developed from test data where the NSWPs are supplying only the nuclear header, the licensee determined that the model results are applicable to all system configurations based on the similarity of the piping arrangement for the nuclear and conventional headers and the performance similarity of the service water pumps. Based on the licensee's statements regarding the validation of the computer models to test results for a number of system configurations and the licensee's determination that the computer models developed for the nuclear header configuration are also applicable to the conventional headers, the staff concluded that an adequate basis was established to support use of the computer models for system flow verification. Based on the engineering evaluations used in the most recent validation of the SWS computer models, the staff concluded that the five percent margin applied to the calculated cooling water flow rates is acceptable. The engineering evaluations and computer models are subject to design review in accordance with CP&L's quality assurance program.

Overall, the staff found the licensee's evaluation in support of the proposed TS revision acceptable. Since the evaluation demonstrates that SWS configurations following limiting single failures satisfy the licensee's acceptance criteria with regard to component cooling water flow and service water pump net positive suction head, the proposed limiting conditions for operation of the SWS are acceptable.

3.2 Action Statements

A summary of the proposed action statements associated with the limiting conditions for operation under TS 3.7.1.2 for a single unit is provided below:

a. In Operational Conditions 1, 2, and 3:

1. With one operable CSWP, if only one NSWP associated with the same unit is operable, ensure that the operable CSWP is powered from a separate emergency bus than the operable NSWP, and restore one additional CSWP to operable status within 7 days. Otherwise, be in at least hot shutdown within 12 hours and in cold shutdown within the following 24 hours.

2. With no operable CSWPs, ensure both NSWPs associated with the same unit are operable, and restore at least one CSWP to operable status within 72 hours. Otherwise, be in at least hot shutdown within 12 hours and in cold shutdown within the following 24 hours.

3. With two operable site NSWPs, unless the provisions of action b.4 for operational conditions 4 and 5 apply for the opposite unit, restore one additional site NSWP within 7 days. Otherwise, be in at least hot shutdown within 12 hours and in cold shutdown within the following 24 hours.

4. With two operable site NSWPs and one operable CSWP, ensure that at least one NSWP associated with the same unit is operable and that the operable CSWP is powered from a separate emergency bus than the operable NSWP, if only one NSWP associated with the same unit is operable, and restore two CSWPs or three site NSWPs to operable status within 72 hours. Otherwise, be in at least hot shutdown within 12 hours and in cold shutdown within the following 24 hours.

5. With less than two operable site NSWPs, be in at least hot shutdown within 12 hours and in cold shutdown within the following 24 hours.

b. In Operational Conditions 4 or 5:

1. With one operable service water pump, restore at least two service water pumps to operable status within 7 days. Otherwise, suspend all operations that have a potential for draining the reactor vessel.

2. With no operable service water pumps, suspend all operations that have a potential for draining the reactor vessel.

3. With two operable site NSWPs, unless the provisions of action 4 below apply, restore at least one additional NSWP to operable status within 7 days. Otherwise, take the action required by TS 3.8.1.2.

4. With the SWS nuclear header inoperable, operation of both units may continue provided that two NSWPs associated with the opposite unit are operable, nuclear header valves are administratively controlled to ensure adequate cooling water to the EDGs, at least two CSWPs associated with the unit are operable on the conventional header, and vital service header loads are aligned to the conventional header. Restore the nuclear header and three site NSWPs to operable

status within 14 days. Otherwise, take the action required by TS 3.8.1.2.

5. With less than two operable site NSWPs, take the action required by TS 3.8.1.2.

For action a.1, given the provision requiring separate power supplies for two of the remaining operable service water pumps, an additional single failure may cause a loss of SWS functional capability only from a particular configuration of operable service water pumps. Three operable site NSWPs ensure that adequate cooling will be maintained for the EDGs following any single failure. However, assuming that there is one operable NSWP associated with the unit and that the operable CSWP is powered from the same emergency bus as the header isolation valves supplying service water from the nuclear header to the vital service and RHRSW suction headers, a failure of the emergency bus supplying the CSWP and nuclear header isolation valves would result in a loss of service water to the vital service and RHRSW suction headers from the operable NSWP. The nuclear header isolation valves are assumed to be inaccessible for manual operation following a LOCA, and power for remote operation would not be available. The staff determined that other configurations result only in a reduction in the degree of redundancy. In consideration of the low probability of a failure of a specific emergency bus and the general reduction in redundancy while in the pump configuration described above, the proposed 7 day allowed outage time for action a.1 is acceptable.

For action a.2, only two NSWPs are available to support the unit's service water loads. In this configuration, failure of the nuclear header isolation valves or their power supply results in a loss of the functional capability of the SWS to mitigate a LOCA. Due to the greater probability of this failure, a shorter allowed outage time is justified relative to action a.1. However, the probability of these particular failures occurring within a 72 hour period remains acceptably small. Therefore, the proposed allowed outage time is acceptable.

With only two operable site NSWPs as specified in action a.3, an additional single failure of a NSWP may result in inadequate EDG cooling for the first 10 minutes of a design basis event, depending on the initial configuration of the SWS and the temperature of the cooling water. Providing electrical power is available, the capability of the SWS to mitigate the effects of a LOCA remains assured. Since the result of the additional single failure is only an increase in the probability of one or more EDG failures during the 10 minute period during a design basis event before operator action is credited, the staff considers the risk acceptably small to justify the proposed 7 day allowed outage time. The provisions of action b.4 ensure that two NSWPs associated with the operating unit are operable. In this particular configuration, the licensee has demonstrated that adequate EDG cooling can be maintained following an additional single failure. Therefore, the proposed exemption from the provisions of action a.3 for the operating unit is acceptable when the provisions of action b.4 apply to the opposite unit.

The SWS configuration specified in action a.4 is susceptible to the potential failures described in the reviews of action a.1 and action a.3 above. Since these potential failures are both low probability events and affect separate functions of the SWS, the proposed 72 hour allowed outage time is acceptable.

With less than two operable NSWPs, as specified in action a.5, the probability of failure of one or more EDGs due to inadequate cooling is significant. Therefore, prompt action is necessary to place the plant in an operating condition where the need for electrical power is minimal. Similarly, if action has not been completed to correct a deficient condition within the allowed outage time, the plant should be placed in a condition where the need for service water is minimized. Based on these considerations, the staff found the proposed requirement to place the plant in hot shutdown (operational condition 3) within 12 hours and cold shutdown (operational condition 4) within the following 24 hours to be acceptable if less than two site NSWPs are operable or if the required corrective action is not completed within the allowed outage time.

Action b.1 and action b.2 specify actions when the decay heat removal capability of the SWS is degraded. With one operable service water pump, the proposed 7 day allowed outage time is acceptable based on the low probability of failure of the operable service water pump in that seven day period. The proposed action statements require suspension of operations with the potential for draining the reactor vessel in operational conditions 4 and 5 when corrective action to restore a second service water pump to operable status is not completed in the allowed time or when no operable unit service water pumps are available. This action statement is acceptable because the probability that an adequate volume of water will be retained in the reactor vessel for decay heat removal is increased while the SWS is degraded.

Action b.3, action b.4 and action b.5 similarly specify actions when the EDG cooling function of the SWS is degraded. With two operable site NSWP, the proposed 7 day allowed outage time of action b.3 is acceptable based on the low probability of further degradation which would impact the EDG cooling function of the SWS. With the SWS aligned in accordance with the provisions of action b.4, the proposed 14 day allowed outage time is acceptable based on the somewhat greater reliability of the SWS satisfactorily performing the EDG cooling function in that configuration as a result of the administrative control of nuclear header valve positions. If the allowed outage times of action b.3 or action b.4 are not satisfied, or if less than two site NSWPs are operable, the proposed action requires suspension of operations involving irradiated fuel handling, core alterations, positive reactivity changes, or operations having the potential to drain the reactor vessel. This suspension is acceptable in operational conditions 4 and 5 when the EDG cooling function of the SWS is degraded since the probability of electrical power being necessary to support safety system actuation in response to an accident or transient is reduced.

3.3 Other Technical Specification Revisions

With only three operable site NSWPs required by the proposed limiting condition for operation in operational conditions 1, 2, and 3, the capability to automatically transfer the service water supply to the EDG jacket water coolers from one unit's nuclear header to the opposite unit's nuclear header is important. This feature prevents a single failure resulting in a loss of cooling water from disabling one or more EDGs during the first 10 minutes of a design basis event. The licensee determined that the dominant contributor to a loss of EDG cooling is a failure of the primary and backup inlet valves to open on demand from their normally closed positions. Based on this determination, the additional reliance on the service water header transfer feature results in a negligible increase in the probability of a loss of cooling to one or more EDGs. However, in order to enhance the reliability of the transfer logic and backup inlet valve operation, the licensee proposed adding a quarterly functional test of these components to the surveillance requirements of TS 4.7.1.2. Since operation of these components is necessary to ensure the functional capability of the SWS following a design basis single failure, the staff considers a periodic functional test necessary. Therefore, the proposed additional surveillance requirement is acceptable.

The existing surveillance requirement of TS 4.7.1.2.c is entered when the nuclear header of a unit is inoperable. Since the surveillance requirement is required to be performed based on the existence of a degraded system condition, the licensee proposed moving the actions specified by this surveillance requirement to action statement b.4 of TS 3.7.1.2. Because the nature of the required actions is consistent with that of an action statement, the staff concludes that the proposed change is acceptable.

Although the bases for TS 3.7.12 do not require specific staff approval, the staff reviewed the revised bases submitted by the licensee. The staff found the bases to be consistent with the analyses used to support the proposed changes to TS 3.7.1.2. Other changes were found to be purely administrative in nature and are acceptable without further review.

4.0 SUMMARY

The licensee has confirmed by analyses that the BSEP SWS, with recent modifications to the NSWP thrust bearings and RBCCW header isolation valves, is capable of performing its safety function in accordance with the requirements of General Design Criterion 44 of Appendix A to 10 CFR Part 50 when it is aligned in a configuration corresponding to the proposed limiting condition for operation of TS 3.7.1.2. The staff reviewed the supporting analyses and concluded that they provide an acceptable basis for the proposed change. Therefore, the proposed change to the limiting condition for operation of TS 3.7.1.2 is acceptable.

The staff also reviewed the proposed action statements of TS 3.7.1.2 and found the required actions acceptable in mitigating the risk associated with operation of a unit with a partially degraded SWS. The staff concluded that the additional surveillance requirement proposed to periodically test the operation of the EDG service water header transfer logic and backup isolation valve will increase the reliability of this function and ensure that adequate cooling to the EDGs is maintained. Therefore, the addition of the surveillance requirement of TS 4.7.1.2 is acceptable. Movement of the requirements of TS 4.7.1.2.c to TS 3.7.1.2.b.4 is consistent with the nature of the required actions, and is acceptable.

5.0 STATE CONSULTATION

In accordance with the Commission's regulations, the State of North Carolina official was notified of the proposed issuance of the amendment. The State official had no comments.

6.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes the Surveillance Requirements. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (58 FR 16853). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

7.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

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