Docket file

50-443

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

October 13, 1995

Mr. Ted C. Feigenbaum
Senior Vice President
and Chief Nuclear Officer
North Atlantic Energy Service Corporation
Post Office Box 300
Seabrook, NH 03874

Dear Mr. Feigenbaum:

SUBJECT: FACILITY OPERATING LICENSE NPF-86: CHANGE TO TECHNICAL SPECIFICATION BASES SECTION 3/4.9.1 REFUELING BORON CONCENTRATION (TAC M93712)

By letter dated September 20, 1995, North Atlantic Energy Services Corporation (North Atlantic) informed the staff of the Nuclear Regulatory Commission (staff) of changes that have been made, pursuant to the provisions of 10 CFR 50.59, to the Seabrook Station Unit No. 1 (Seabrook) Technical Specification (TS) Bases 3/4.9.1, Boron Concentration. The purpose of the TS Bases changes is to provide enhanced bases utilizing Standard Technical Specifications for Westinghouse Plants, NUREG-1431, Revision 1, dated April 7, 1995. In addition, the Bases changes also provide clarification of the limitations on positive reactivity changes in ACTION statements for TS 3.9.1 applicable in MODE 6.

Bases Section 3/4.9.1 has been expanded to provide a detailed description of the purpose of the boron concentration limits in the refueling mode including discussions of (1) the regulatory requirements, (2) the method of flooding the refueling canal and cavity and the acceptability of utilizing the refueling water storage tank for this purpose, (3) applicable safety analyses, (4) the acceptability of adding water to the refueling volumes that is lower in temperature, (5) the utilization of the Residual Heat Removal System in the refueling mode, (6) the bases for the boron concentration TS limits, (7) the conditions under which core alterations or positive reactivity conditions can and shall not continue, and (8) actions to be taken when the boron concentration does not satisfy the Limiting Condition for Operation (LCO).

North Atlantic, in expanding this TS bases section, generally followed the Bases discussion contained in NUREG-1431, Revision 1 related to boron concentration in the refueling mode. The changes also include a discussion related to the acceptability of using lower temperature water from the refueling water storage tank to flood the refueling cavity and canal and explicit guidance with regard to actions to be taken in the event the boron concentration does not satisfy the LCO requirements.

The Basis change enhances significantly TS Bases Section 3/4.9.1 by replacing the previously existing bases information with descriptive matter that is consistent with that contained in the improved Standard Technical Specifications for Westinghouse Plants (NUREG-1431, Revision 1). In addition, supplemental information providing guidance and interpretation of requirements related to certain plant specific aspects of this TS section has been added. This information is consistent with regulatory guidance and requirements.

DF01 1/1

The staff has reviewed the changes and finds that the enhanced Basis is consistent with the guidance and intent of the Standard Technical Specifications for Westinghouse Plants, NUREG-1431. Therefore, the staff has no objection to the changes made by North Atlantic pursuant to 10 CFR 50.59.

Enclosed is a copy of revised Bases pages B 3/4 9-1 through B 3/4 9-4.

Sincerely,

Original signed by:

Albert W. De Agazio, Sr. Project Manager
Project Directorate I-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket No. 50-443
Serial No. SEA-95-023

Enclosures: As stated

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Albert W. De Agazio

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SEABROOK STATION, UNIT NO. 1

TECHNICAL SPECIFICATION BASES

Replace the following pages of Appendix A, Technical Specification Bases with the attached pages as indicated. The revised pages contain vertical lines indicating the areas of change. Overleaf and overflow pages have been provided.

Remove	Insert
B 3/4 9-1	B 3/4 9-1
B 3/4 9-2	B 3/4 9-2
B 3.4 9-3*	B 3/4 9-3*
B 3.4 9-4*	B 3/4 9-4*

3/4.9.1 BORON CONCENTRATION

The limit on the boron concentrations of the Reactor Coolant System (RCS), the refueling canal, and the refueling cavity during refueling ensures that the reactor remains subcritical during MODE 6. Refueling boron concentration is the soluble boron concentration in the coolant in each of these volumes having direct access to the reactor core during refueling.

The soluble boron concentration offsets the core reactivity and is measured by chemical analysis of a representative sample of the coolant in each of the volumes. Plant procedures ensure the specified boron concentration in order to maintain an overall core reactivity of $k_{eff} \leq 0.95$ during fuel handling, with control rods and fuel assemblies assumed to be in the most adverse configuration (least negative reactivity) allowed by plant procedures.

GDC 26 of 10 CFR 50, Appendix A, requires that two independent reactivity control systems of different design principles be provided. One of these systems must be capable of holding the reactor core subcritical under cold conditions. The Chemical and Volume Control System (CVCS) is the system capable of maintaining the reactor subcritical in cold conditions by maintaining the boron concentration.

The reactor is brought to shutdown conditions before beginning operations to open the reactor vessel for refueling. After the RCS is cooled and depressurized and the vessel head is unbolted, the head is slowly removed to form the refueling cavity. The refueling canal and the refueling cavity are then flooded with borated water from the refueling water storage tank through the open reactor vessel by gravity feeding or by the use of the Residual Heat Removal (RHR) System pumps.

The pumping action of the RHR System in the RCS and the natural circulation due to thermal driving heads in the reactor vessel and refueling cavity mix the added concentrated boric acid with the water in the refueling canal. The RHR System is in operation during refueling (see LCO 3.9.8.1, "Residual Heat Removal (RHR) and Coolant Circulation High Water Level," and LCO 3.9.8.2, "Residual Heat Removal (RHR) and Coolant Circulation--Low Water Level") to provide forced circulation in the RCS and assist in maintaining the boron concentrations in the RCS, the refueling canal, and the refueling cavity above the COLR limit.

During refueling operations, the reactivity condition of the core is consistent with the initial conditions assumed for the boron dilution accident in the accident analysis and is conservative for MODE 6. The boron concentration limit specified is based on the core reactivity at the beginning of each fuel cycle (the end of refueling) and includes an uncertainty allowance.

The required boron concentration and the plant refueling procedures that verify the correct fuel loading plan (including full core mapping) ensure that the k_{eff} of the core will remain ≤ 0.95 during the refueling operation. Hence, at least a 5% $\Delta k/k$ margin of safety is established during refueling.

BASES

During refueling, the water volume in the spent fuel pool, the transfer canal, the refueling canal, the refueling cavity, and the reactor vessel form a single mass. As a result, the soluble boron concentration is relatively the same in each of these volumes.

Continuation of CORE ALTERATIONS or positive reactivity additions (including actions to reduce boron concentration) is contingent upon maintaining the unit in compliance with the LCO.

Transferring water to the RCS, refueling cavity, refueling canal, transfer canal or spent fuel pool that is lower in boron concentration is acceptable provided that the boron concentration is greater than the refueling boron concentration requirement. Likewise, transferring water to the RCS, refueling cavity, refueling canal, transfer canal or spent fuel pool that is lower in temperature (down to the operability requirements of the RWST in MODE 6; 50 DEG F) than the water contained in those volumes is also acceptable. These minimum requirements for boron concentration and water temperature are also applicable to other MODE 6 Technical Specification ACTIONS that limit operations involving positive reactivity additions to ensure that the reactor remains subcritical and an adequate shutdown margin is maintained.

Suspension of CORE ALTERATIONS and positive reactivity additions shall not preclude moving a component to a safe position. In addition to immediately suspending CORE ALTERATIONS or positive reactivity additions, boration to restore the concentration must be initiated immediately.

In determining the required combination of boration flow rate and concentration, no unique Design Basis Event must be satisfied. The only requirement is to restore the boron concentration to its required value as soon as possible. In order to raise the boron concentration as soon as possible, the operator should begin boration with the best source available for unit conditions.

Once actions have been initiated, they must be continued until the boron concentration is restored. The restoration time depends on the amount of boron that must be injected to reach the required concentration.

3/4.9.2 INSTRUMENTATION

The OPERABILITY of the Source Range Neutron Flux Monitors ensures that redundant monitoring capability is available to detect changes in the reactivity condition of the core.

3/4.9.3 DECAY TIME

The minimum requirement for reactor subcriticality prior to movement of irradiated fuel assemblies in the reactor vessel ensures that sufficient time has elapsed to allow the radioactive decay of the short-lived fission products. This decay time is consistent with the assumptions used in the safety analyses.

BASES

3/4.9.4 CONTAINMENT BUILDING PENETRATIONS

The requirements on containment building penetration closure and OPERABILITY ensure that a release of radioactive material within containment will be restricted from leakage to the environment. The OPERABILITY and closure restrictions are sufficient to restrict radioactive material release from a fuel element rupture based upon the lack of containment pressurization potential while in the REFUELING MODE.

3/4.9.5 COMMUNICATIONS

The requirement for communications capability ensures that refueling station personnel can be promptly informed of significant changes in the facility status or core reactivity conditions during CORE ALTERATIONS.

3/4.9.6 REFUELING MACHINE

The OPERABILITY requirements for the refueling machine ensure that: (1) refueling machine will be used for movement of drive rods and fuel assemblies, (2) each hoist has sufficient load capacity to lift a drive rod or fuel assembly, and (3) the core internals and reactor vessel are protected from excessive lifting force in the event they are inadvertently engaged during lifting operations.

3/4.9.7 CRANE TRAVEL - SPENT FUEL STORAGE AREAS

The restriction on movement of loads in excess of the nominal weight of a fuel and control rod assembly and associated handling tool over other fuel assemblies in the storage pool ensures that in the event this load is dropped: (1) the activity release will be limited to that contained in a single fuel assembly and (2) any possible distortion of fuel in the storage racks will not result in a critical array. This assumption is consistent with the activity release assumed in the safety analyses.

3/4.9.8 RESIDUAL HEAT REMOVAL AND COOLANT CIRCULATION

The requirement that at least one residual heat removal (RHR) loop be in operation ensures that: (1) sufficient cooling capacity is available to remove decay heat and maintain the water in the reactor vessel below 140°F as required during the REFUELING MODE, and (2) sufficient coolant circulation is maintained through the core to minimize the effect of a boron dilution incident and prevent boron stratification.

The requirement to have two RHR loops OPERABLE when there is less than 23 feet of water above the reactor vessel flange ensures that a single failure of the operating RHR loop will not result in a complete loss of residual heat removal capability. With the reactor vessel head removed and at least 23 feet of water above the reactor pressure vessel flange, a large heat sink is available for core cooling. Thus, in the event of a failure of the operating RHR loop, adequate time is provided to initiate emergency procedures to cool the core.

BASES

3/4.9.9 CONTAINMENT PURGE AND EXHAUST ISOLATION SYSTEM

The OPERABILITY of this system ensures that the containment vent and purge penetrations will be automatically isolated upon detection of high radiation levels within the containment. The OPERABILITY of this system is required to restrict the release of radioactive material from the containment atmosphere to the environment.

3/4.9.10 and 3/4.9.11 WATER LEVEL - REACTOR VESSEL and STORAGE POOL

The restrictions on minimum water level ensure that sufficient water depth is available to remove 99% of the assumed 10% iodine gap activity released from the rupture of an irradiated fuel assembly. The minimum water depth is consistent with the assumptions of the safety analysis.

3/4.9.12 FUEL STORAGE BUILDING EMERGENCY AIR CLEANING SYSTEM

The limitations on the Fuel Storage Building Emergency Air Cleaning System ensure that all radioactive material released from an irradiated fuel assembly will be filtered through the HEPA filters and charcoal adsorber prior to discharge to the atmosphere. Operation of the system with the heaters operating for at least 10 continuous hours in a 31-day period is sufficient to reduce the buildup of moisture on the adsorbers and HEPA filters. The OPERABILITY of this system and the resulting iodine removal capacity are consistent with the assumptions of the safety analyses. ANSI N510-1980 will be used as a procedural guide for surveillance testing.

3/4.9.13 SPENT FUEL ASSEMBLY STORAGE

Restrictions on placement of fuel assemblies of certain enrichments within the Spent Fuel Pool is dictated by Figure 3.9-1. These restrictions ensure that the K_{eff} of the Spent Fuel Pool will always remain less than 0.98 assuming the pool to be flooded with unborated water. The restrictions delineated in Figure 3.9-1 and the action statement are consistent with the criticality safety analysis performed for the Spent Fuel Pool as documented in the FSAR.

3/4.9.14 NEW FUEL ASSEMBLY STORAGE

Restrictions on placement of fuel assemblies of certain enrichments within the New Fuel Storage Vault is dictated by Specification 3/4.9.14. These restrictions ensure that the K_{eff} of the New Fuel Storage Vault will always remain less than 0.95 assuming the area to be flooded with unborated water. In addition, these restrictions ensure that the K_{eff} of the New Fuel Storage Vault will always remain less than 0.98 when aqueous foam moderation is assumed. The restrictions delineated in Specification 3/4.9.14 and the action statement are consistent with the criticality safety analysis performed for the New Fuel Storage Vault as documented in the FSAR.