North Atlantic

SEABROOK STATION UNIT 1

Facility Operating License NPF-86
Docket No. 50-443

License Amendment Request No. 95-02
TEMPERATURE LIMIT FOR REACTOR COOLANT SYSTEM (RCS)
OXYGEN CONTROL

This License Amendment Request is submitted by North Atlantic Energy Service Corporation pursuant to 10CFR50.90. The following information is enclosed in support of this License Amendment Request:

- Section I - Introduction and Safety Evaluation for Proposed Changes
- Section II - Markup of Proposed Changes
- Section III - Retype of Proposed Changes
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- Section V - Proposed Schedule for License Amendment Issuance and Effectiveness
- Section VI - Environmental Impact Assessment

Sworn and Subscribed
to before me this
7th day of June, 1995

Susan J. Mercier
Notary Public

Bruce L. Drawbridge
Executive Director - Nuclear Production

I. Introduction and Safety Evaluation for Proposed Changes

A. Introduction

The purpose of License Amendment Request (LAR) 95-02 is to propose changes to the Seabrook Station Technical Specifications to revise the footnote to Surveillance Requirement 4.4.7 and increase the temperature limit at which reactor coolant oxygen levels are determined by sampling and analysis from 180°F to 250°F.

Dissolved oxygen contributes to stress corrosion cracking of reactor coolant system materials and to general corrosion of system and fuels materials. These effects are reduced to a point of little concern at temperatures less than 250°F and operating controls need not be implemented until the coolant exceeds this temperature. Dissolved oxygen is controlled during plant heat-up by the use of venting or vacuum filling followed by the use of hydrazine for residual oxygen scavenging.

LAR 95-02 proposes a revision to Technical Specification 3/4.4.7, and associated Table 3.4-2. The Limiting Condition for Operation (LCO) for the chemistry limits listed in Table 3.4-2, Reactor Coolant System Chemistry Limits, apply "at all times." However, the footnote to Table 3.4-2 states that the dissolved oxygen limits do not apply with a T_{avg} less than or equal to 180°F. Similarly, the footnote to surveillance requirement 4.4.7 states that sample and analysis for dissolved oxygen is not required with T_{avg} less than or equal to 180°F. The proposed revision increases raises the temperature requirement to 250°F.

The proposed Technical Specification change revises the temperature limit at which RCS oxygen must be maintained within specified limits. During startup operations oxygen scavenging by hydrazine is initiated at reactor coolant temperatures between 180°F and 225°F. This startup operation is of relatively short duration and thus no significant corrosion or stress corrosion cracking of materials in contact with the reactor coolant containing a higher concentration of dissolved oxygen would occur in such a short amount of time.

The changes are consistent with Standard Westinghouse Technical Specifications and other plants of similar size and vintage. These plants include Millstone Station Unit 2 (DPR-65) and Unit 3 (NPF-49), Wolf Creek (NPF-42), Callaway (NPF-30), Vogtle Unit 1 (NPF-68) and Unit 2 (NPF-81), Diablo Canyon Unit 1 (DPR-80) and Unit 2 (DPR-82), Virgil C. Summer (NPF-16), Byron Unit 1 (NPF-37) and Unit 2 (NPF-66),and McGuire Unit 1 (NPF-9) and Unit 2 (NPF-17).

B. Safety Evaluation for Proposed Changes

The purpose of the temperature limit for Reactor Coolant System (RCS) oxygen control is to minimize the corrosive effect at high temperatures on RCS components. Dissolved oxygen at elevated temperatures can lead to stress corrosion cracking, as well as general corrosion of RCS components. However, industry guidance and practice indicate that these mechanisms do not prevail at temperatures below 250°F. Similarly, Westinghouse assigned an upper temperature limit of 250°F in its primary chemistry manual. The basis for this limit is two-fold: (1) the corrosive effect of oxygen below 250°F is negligible, and (2) the reaction rate of hydrazine with oxygen is greatly enhanced at higher temperatures.

Currently, Surveillance Requirement 4.4.7 of the Seabrook Technical Specifications requires that reactor coolant system oxygen levels be within specified limits at temperatures greater than 180°F.

North Atlantic is proposing to revise Surveillance Requirement 4.4.7 by raising the temperature limit at which RCS oxygen levels must be maintained within specified limits to 250°F. This change is consistent with current industry guidelines and practices and will provide operational flexibility when returning the plant to service from cold shutdown conditions.

The proposed change to Surveillance Requirement 4.4.7 of the Seabrook Technical Specifications does not alter the design, function, or method of performing the function of any component, system, or structure described in the Updated safety Analysis Report (UFSAR). The change reflects a move toward standard industry practices in the area of chemically removing oxygen from the RCS during plant startups from a cold condition. This process utilizes existing systems and their components as described in the UFSAR.

The following sections of the Seabrook Station UFSAR are applicable to this proposed change. Section 5.2 outlines Seabrook Station's measures employed to provide and maintain the integrity of the reactor coolant pressure boundary for the plant's design lifetime. Materials of construction are specified to minimize corrosion and erosion and to provide a structural system boundary throughout the life of the plant. Section 5.2.3.2a describes Seabrook Station's chemistry specifications of the reactor coolant. Specifically, this section describes how hydrazine is added to the reactor coolant system following cold conditions as an oxygen scavenging agent. The hydrazine addition is stopped at 180°F because of the rapid decomposition at this temperature. Table 5.2-5 describes the reactor coolant chemistry specifications for all modes of plant operation. Section 5.2.3.2d describes actions taken to prevent intergranular attack of stainless steel. The three conditions which must be present which allow intergranular attack are: 1) and aggressive environment, e.g., an acidic aqueous medium containing chlorides or oxygen, 2) a sensitized steel, and 3) a high temperature. If any of these three conditions are not present, intergranular attack will not occur. Normally, with the reactor at power, the elimination of conditions 1 and 2 are used to prevent intergranular attack on wrought stainless steel components. However, with the reactor in a cold condition this intergranular attack is eliminated by the low temperature maintained. Corrosion mechanisms due to oxygen on RCS and related system materials are negligible below 250°F. The above sections of the UFSAR are not affected by the proposed changes to the Technical Specifications.

Chapter 15 of the UFSAR documents the analyses of design bases accidents (DBA) at Seabrook Station. Any scenario or previously analyzed accident that results in offsite dose were evaluated as part of this analysis. The accident analyses contained in Chapter 15 are not affected by the proposed changes to the Technical Specifications.

Technical Specification Bases 3/4.4.7 (Chemistry) states:

> *The limitations on Reactor Coolant System chemistry ensure that corrosion of the Reactor Coolant System is minimized and reduces the potential for Reactor Coolant System leakage or failure due to stress corrosion. Maintaining the chemistry within the Steady-State Limits provides adequate corrosion protection to ensure the structural integrity of the Reactor Coolant System over the life of the plant. The associated effects of exceeding the oxygen, chloride, and fluoride limits are time and temperature dependent. Corrosion studies show that operation may be continued with contaminant concentration levels in excess of the Steady-State Limits, up to the Transient Limits, for the specified limited time intervals without having a significant effect on the structural integrity of the Reactor Coolant System. The time interval permitting continued operation within*

the restrictions of the Transient Limits provides time for taking corrective actions to restore the contaminant concentrations to within the Steady-State Limits.

The Surveillance Requirements provide adequate assurance that concentrations in excess of the limits will be detected in sufficient time to take corrective action.

This statement is consistent with the proposed change to Surveillance Requirement 4.6.1.2.a, therefore this basis is not affected. No other Technical Specification Bases address the temperature limit at which reactor coolant system oxygen levels must be maintained within specified limits.

II. Markup of Proposed Changes

See attached markup of proposed changes to Technical Specifications.