FPL Energy
Seabrook Station

FPL Energy Seabrook Station
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July 17, 2003

Docket No. 50-443
NYN-03054

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555-0001

References: North Atlantic letter NYN-02103, Seabrook Station License Amendment Request 02-06, "Revision To Technical Specifications Associated With Reduction of Decay Time for Core Offload," dated October 11, 2002.

Seabrook Station
"Response to Request for Additional Information
Regarding License Amendment Request 02-06"

FPL Energy Seabrook, LLC (FPLE Seabrook) has enclosed herein its response to a request for additional information associated with License Amendment Request (LAR) 02-06. The additional technical information requested by the NRC is with regard to the reanalysis of the spent fuel storage pool thermal hydraulic conditions.

LAR 02-06 proposed a change to the Seabrook Station Technical Specifications 3/4.9.3 "Refueling Operations – Decay Time." Specifically, the proposed change will revise the decay time associated with the movement of irradiated fuel in the reactor vessel from 100 hours to 80 hours. The proposed change is based on reanalysis of the radiological consequences of a limiting design basis Fuel Handling Accident using an 80 hour decay time, and the proposed change is also supported by a reanalysis of the spent fuel storage pool thermal hydraulic conditions with a higher average fuel assembly decay heat.

Should you have any questions concerning this response, please contact Mr. James M. Peschel, Regulatory Programs Manager, at (603) 773-7194.

Very truly yours,

FPL ENERGY SEABROOK, LLC

Gene F. St. Pierre
Station Director

A001

Cc: H. J. Miller, NRC Region I Administrator
V. Nerses, NRC Project Manager, Project Directorate I-2
G. T. Dentel, NRC Senior Resident Inspector

Mr. Donald Bliss, Director
New Hampshire Office of Emergency Management
State Office Park South
107 Pleasant Street
Concord, NH 03301

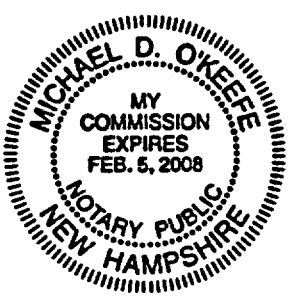
OATH AND AFFIRMATION

I, Gene F. St. Pierre, Station Director of FPL Energy Seabrook, LLC, hereby affirm that the information and statements contained within this response to the Request for Additional Information to License Amendment Request 02-06 are based on facts and circumstances which are true and accurate to the best of my knowledge and belief.

Sworn and Subscribed
before me this
17 day of July, 2003

Michael O'Keefe
Notary Public

Gene F. St. Pierre
Station Director



Enclosure to NYN-03054

Response to Request for Additional Information
Seabrook Station
(TAC NO. MB6612)
Based on a Facsimile Request for Additional Information received May 7, 2003

NRC Request 1:

In the submittal, it is stated that the boil-off rate is 100 gpm and "within make-up capacity." Updated Final Safety Analysis Report (UFSAR) Section 9.1.3.3 states the various make-up sources. What are the rates of spent fuel pool (SFP) cooling make-up from the various make-up sources? Verify that the make-up sources can be aligned and supply water to the SFP in the loss of cooling scenario prior to time to boil (3.28 hours).

FPLE Seabrook Response to Request 1:

UFSAR Section 9.1.3.3 states that " Spent fuel pool makeup water can be obtained from either the refueling water storage tank, Chemical and Volume Control System, demineralized water or the condensate storage tank, as necessary. Makeup to the Spent Fuel Pool can be achieved using a number of sources. The following Table identifies the source of water to be supplied and its capability.

Makeup Source	Flow Capability
CVCS System	> 100 gpm
RWST – Gravity feed	> 100 gpm
Demineralized Water	> 100 gpm
Fire Protection Hose Station #48	> 100 gpm
Reactor Water Makeup System	> 100 gpm

Gravity feed from the Condensate Storage Tank can also be used as a makeup source but most likely would not be sufficient to yield a flow capability of > 100 gpm, due to routing several hundred feet of fire hose to the SFP.

Based on the variety of makeup sources available, there is adequate time to align and supply sufficient water to the SFP in the loss of cooling scenario prior to time to boil (3.28 hours).

NRC Request 2:

In UFSAR Section 9.2.1.1, Service Water System, it is stated that system analysis has been performed to permit continued plant operation up to a maximum ocean temperature of 68.5F. Additionally, the submittal addresses a maximum operating ocean temperature of 65F and administrative controls for an ocean temperature of 63F. Explain how the UFSAR analysis or the plant addresses SFP cooling system operation with ocean temperatures between 65 and 68.5F

FPLE Seabrook Response to Request 2:

As stated in UFSAR Section 9.2.1.1, "during the summer months, extended hot weather combined with ocean current changes can result in minor ocean temperature excursions above the 65°F design temperature threshold. System analysis has been performed to permit continued plant operation up to a maximum ocean temperature of 68.5°F." The time periods that the 65°F ocean temperature is exceeded are infrequent and are of short duration.

Refueling Outages at Seabrook Station are scheduled during the Spring and Fall time periods. During these time frames the maximum ocean temperature is routinely less than 65°F. The SFP Cooling System is capable of cooling a full SFP including the heat load for a full reactor core offload using a design basis ocean temperature of 65°F. A core offload figure plotted against time after shutdown and service water temperature will be developed to control the time that the core offload can be completed. The design basis capability of the SFP Cooling System along with procedural controls will provide assurance that the SFP will operate within its design limits.

NRC Request 3:

Please provide an updated UFSAR analysis of the maximum temperature for an emergency or abnormal offload, given 36 days operation following a refueling outage and a full spent fuel pool.

FPLE Seabrook Response to Request 3:

For Seabrook Station, the full core offload to the spent fuel pool is a normal activity each refueling outage. Therefore, the calculation of the maximum fuel pool temperature has included a single active failure of a spent fuel pool pump for the design basis heat load. Standard Review Plan (SRP) 9.1.3 defines a case to consider (as an abnormal or emergency case) as a full core offload 150 hours after shutdown, plus one refueling load at equilibrium conditions after 36 days decay. We have compared the heat load for the SRP abnormal case to the full core offload after a full cycle of operation and found the SRP case to be less limiting. In both cases, the analysis considers the full core offload fills the remaining storage locations in the pool. Therefore, the maximum temperature for the SRP emergency or abnormal case would be bounded by the normal full core offload (design basis heat load).

NRC Request 4:

In the submittal, it is stated "the acceptance criterion is to maintain the maximum long-term temperature in the concrete wall at or below 200F." American Concrete Institute (ACI) 349-85, "Code Requirements for Nuclear Safety Related Concrete Structures," states that for normal operation or any other long term period, the temperature shall not exceed 150F except for local areas. Explain why 200F is acceptable for the Seabrook Station SFP.

FPLE Seabrook Response to Request 4:

A maximum wall temperature of 200°F was considered to address the potential placement of a freshly discharged fuel assembly in a cell adjacent to the SFP wall. The bases for accepting the higher wall temperature profile was that the temperature is considered localized and short term. In addition, the assessment provided below was prepared to evaluate the effects of higher temperatures on the concrete of the SFP walls.

The research paper "Effects of Moisture Content on the Structural Properties of Portland Cement Concrete Exposed to Temperatures Up to 500°F", found in ACI Publication SP 25, "Temperature and Concrete," addresses the influence of moisture and temperature on changes in the compressive strength, flexural strength, and modulus of elasticity of Portland cement heated at temperatures up to 500°F. The material properties of concrete with free water are affected by elevated temperatures in the range of temperatures greater than 200°F. Free water, which is the result of excess water available in the wet concrete mix not utilized in the hydration process, can be a concern for some structures with temperatures above 200°F. However in the case of the Seabrook Station spent fuel pool concrete structure, more than adequate time (greater than 20 years) has been available for free water to be released from the concrete.

Three findings of the research that apply directly to the Seabrook Station spent fuel pool are:

1) deterioration of the concrete structural properties was considerably worse if the moisture (free water) in the concrete was retained during heating,

2) for concrete that is slowly heated at atmospheric pressure, the primary factor influencing changes in the structural properties is the loss of free water, and

3) partial loss of chemically combined water (dehydration of hydrated cement) occurs above 250°F.

As these findings relate to Seabrook Station: For 1) and 2), little if any free water remains in the spent fuel pool concrete (having more than twenty years to dissipate), therefore the free water / heat interaction can cause no degradation; and 3) spent fuel pool concrete heating will be limited to 200°F which is lower than the temperature at which the partial loss of chemically combined water occurs. Therefore, the 200°F upper bound concrete temperature limit for the spent fuel pool concrete is a temperature at which no deterioration of the concrete material properties may be reasonably expected.

NRC Request 5:

A heat load of 47.791 E6 Btu/hr is stated in the submittal for a full core offload. Clarify if this includes a full SFP or the existing spent fuel assembly population. Also, justify why the higher than design basis heat load (46.88 E6 Btu/hr, as stated in section 9.1.3.1 of the UFSAR) is acceptable.

FPLE Seabrook Response to Request 5:

The design basis heat load of 46.88 E6 Btu/hr corresponds to the heat removal rate of the spent fuel pool cooling system to maintain the pool temperature at 140°F at the design service water temperature of 65°F. The design basis heat load corresponds to a full core offload filling the last remaining storage locations in the spent fuel pool 118.5 hours after shutdown. The quickest time to offload the full core is approximately 32 hours (6 assemblies per hour). If the first assembly is moved at 80 hours after shutdown it is conceivable to offload the full core to the pool at 112 hours after shutdown. The heat load in the pool could therefore be greater than the 46.88 E6 Btu/hr. The 47.791 Btu/hr, stated in the submittal, corresponds to a full core offload filling the last remaining storage locations in the spent fuel pool at 110 hours after shutdown. This higher heat load accounts for the possibility of offloading the full core to an otherwise full pool in shorter than 118.5 hours. The submittal stated that under these conditions Seabrook Station would develop administrative offload procedures to credit lower service water temperatures for decay times less than 118.5 hours.

NRC Request 6:

In FSAR Section 9.1.3.1, it is stated that North Atlantic will evaluate the performance of the SFP cooling system to ensure the SFP temperature will remain below 141F during the full core offload.

a. Clarify if this pre-offload evaluation assumes the heat load of a full SFP or the existing spent fuel assembly population at the time of the offload.

b. The submittal used offload rates in the evaluation. Explain if the pre-off load evaluation includes an offload rate. Explain how the offload rate is ensured such that the SFP temperature limit is not exceeded.

c. The submittal states that administrative limits will be established when the cooling tower is used as the ultimate heat sink, rather than the Atlantic Ocean. Clarify if the pre-off load evaluation uses the actual ultimate heat sink to be used during the offload,

d. Verify that this pre-load evaluation remains part of your licensing basis and will be performed prior to every full core offload.

FPLE Seabrook Response to Request 6:

a. The design basis SFP heat load assumed a full SFP as well as a full core offload completed 125 hours after shutdown. The 125 hours was subsequently reduced to 118.5 hours after core shutdown.

b. The pre-offload evaluation does not use offload rates in the evaluation. The evaluation used the design basis cooling capability of the SFP Cooling System. The offload rate was used to support the License Amendment Request. A core off-load figure plotted against time after shutdown and service water temperature will be used to control the rate at which the core will be offloaded. The off-load rate as well as the administrative controls associated with the temperature of the ultimate heat sink will be included in plant procedures. These administrative controls combined with the cooling capability of the SFP Cooling System will provide assurance that the SFP temperature limit is not exceeded.

c. The SFP Cooling System design basis capability uses the ocean Service Water System as the ultimate heat sink. During the offload time frame the Cooling Tower may be in service functioning as the ultimate heat sink. Procedures will be in place and the work planned, so that the protected train of ocean service water can be rapidly returned to service in the event that the Cooling Tower Service Water System becomes unavailable.

d. The purpose for performing a pre-offload evaluation is to verify, prior to actual core off-load, the SFP temperature will remain within design limits. FPLE Seabrook intends to develop a procedure that will replace the need to perform a cycle specific off-load analysis. The procedure will specify the acceptable time after shutdown that a full core offload can be completed with consideration for the ultimate heat sink temperature. Once the License Amendment is issued FPLE Seabrook will initiate a UFSAR change to remove the requirement to perform a pre-load evaluation prior to every full core offload, thus the requirement will no longer be part of Seabrook Station's licensing basis.