March 23, 2004

MEMORANDUM TO: Darrell J. Roberts, Acting Chief, Section 2
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

FROM: Lee A. Licata, Project Manager, Section 2 ***/RA/***
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

SUBJECT: SEABROOK STATION, DRAFT REQUEST FOR ADDITIONAL INFORMATION (TAC NO. MC1097)

The attached draft request for information (RAI) was transmitted on March 24, 2004, to Mr. Michael O'Keefe of FPL Energy, LLC(the licensee). This draft RAI was transmitted to facilitate the technical review being conducted by NRR and to support a conference call with the licensee to discuss the RAI.

This RAI is related to the licensee's amendment request for Seabrook Station (Seabrook) dated October 6, 2003. The proposed amendment would revise Seabrook's Technical Specifications for full implementation of an alternate source term.

Review of the RAI would allow the licensee to determine and agree upon a schedule to respond to the RAI. This memorandum and the attachment do not convey or represent an NRC staff position regarding the licensee's request.

Docket No. 50-443

Attachment: Draft RAI

March 23, 2004

MEMORANDUM TO: Darrell J. Roberts, Acting Chief, Section 2
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

FROM: Lee A. Licata, Project Manager, Section 2 ***/RA/***
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

SUBJECT: SEABROOK STATION, DRAFT REQUEST FOR ADDITIONAL INFORMATION (TAC NO. MC1097)

The attached draft request for information (RAI) was transmitted on March 24, 2004, to Mr. Michael O'Keefe of FPL Energy, LLC(the licensee). This draft RAI was transmitted to facilitate the technical review being conducted by NRR and to support a conference call with the licensee to discuss the RAI.

This RAI is related to the licensee's amendment request for Seabrook Station (Seabrook) dated October 6, 2003. The proposed amendment would revise Seabrook's Technical Specifications for full implementation of an alternate source term.

Review of the RAI would allow the licensee to determine and agree upon a schedule to respond to the RAI. This memorandum and the attachment do not convey or represent an NRC staff position regarding the licensee's request.

Docket No. 50-443

Attachment: Draft RAI

DISTRIBUTION

PUBLIC	DRoberts	SLaVie	RDenning
PDI-2 Reading	LLicata	VNerses	

ACCESSION NO.: ML040850162

OFFICE	PDI-2/PM	PD1-2/PM	SPSB-C/SC
NAME	LLicata	VNerses	RDenning (Concurrence received via email
DATE	3/23/2004	3/23/04	3/22/2004

OFFICIAL RECORD COPY

DRAFT REQUEST FOR ADDITIONAL INFORMATION

RELATED TO ALTERNATE SOURCE TERM AMENDMENT REQUEST

SEABROOK STATION

DOCKET NO. 50-443

By letter dated October 6, 2003, FPL Energy Seabrook, LLC (Seabrook or the licensee) submitted an amendment request for Seabrook. The proposed amendment would revise Seabrook's Technical Specifications for full implementation of an alternate source term (AST).

The U.S. Nuclear Regulatory Commission (NRC) staff has reviewed the information the licensee provided that supports the proposed amendment and requests the following additional information to clarify the submittal. If you believe that the requested information has previously docketed, please provide an specific reference to the document where the information may be found.

1. Regarding the proposed technical specification change in the definition of "dose equivalent I-131." Seabrook uses the thyroid dose as the basis of the proposed change. This definition finds use in the Reactor Coolant System (RCS) and secondary specific activity technical specifications. The purpose of those technical specifications is to control the actual specific activities to levels less than those which would exceed the initial assumptions made in the radiological consequence analyses. Previously, those analyses determined whole body and thyroid doses, consistent with the dose guidelines in 10 CFR 100.11. However, with the proposed implementation of the Alternate Source Term (AST), the total effective dose equivalent (TEDE) criteria supercede the whole body and thyroid dose. The staff has not required licensees to revise this definition. Since you have proposed a change, please provide a justification for the use of thyroid dose conversion factors when the effective factors provided in Federal Guidance Report (FGR) 11 Table 2.1 would be more appropriate.

2. For the gaseous and waste system failure events, Seabrook proposes to use the current licensing basis criterion of a "small fraction of the guidelines." The staff did not address these two events in Regulation Guide (RG) 1.183 since these events are not likely to result in core damage. Therefore, no AST-specific dose criteria were provided. Nonetheless, the staff notes that the Standard Review Plan Sections 15.7.1 and 15.7.2, and 15.7.4 impose acceptance criteria from Branch Technical Position 11-5. These in turn derive from 10 CFR Part 20 rather than Part 100. The staff's original Safety Evaluation Report (SER) does not appear to address the radiological consequences of these events. Please provide a specific reference to a document that indicates that the staff accepted these criteria as part of the Seabrook licensing basis. Please briefly describe the basis of the Seabrook Offsite Dose Calculation Manual (ODCM) controls that limit the content of these tanks. Please explain any significant differences between these basis and the acceptance criteria you are proposing in this License Amendment Request (LAR).

ATTACHMENT

3. With regard to control room emergency ventilation actuation, Seabrook has assumed a 30 second delay in actuation for all analyzed accidents. In §1.6.3, Seabrook states that this actuation is based on high radiation being detected in the remote air supply piping. On page 20 of 94, it is stated that for the Lost of Coolant Accident (LOCA), a containment (CNMT) high pressure signal actuates isolation, and that 30 seconds are provided for diesel generator start time and damper actuation and positioning time. Please explain how the assumed 30-second delay is conservative for all accidents, considering the response considerations identified by FPL, but also how the time for the input activity to ramp up to the alarm set point level and the impact of differences in accident-specific radionuclide effluent mixes on monitor response are considered.

4. Regarding the control room unfiltered inleakage assumptions:

   a. For those events in which the 20-cfm door leakage is not assigned to a particular infiltration point, is the value included in the inleakage values shown in Table 1.6.3-1?

   b. In its GL 2003-01 response, Seabrook reported preliminary results for the Seabrook inleakage testing. Please confirm that the final test results are bounded by the minimum inleakage assumption shown in Table 1.6.3-1.

5. Regarding Table 1.8.2-1, the staff is of the opinion that only the 0-2 hour exclusion area boundary (EAB) X/Q value has applicability to the radiological consequence calculations that determine the worst two-hour EAB dose. If the values for time periods beyond two hours were used in the analysis of the worst two-hour dose, please explain how the values were used and why this approach should be considered acceptable.

6. Regarding the LOCA analysis:

   a. In §2.1.2.4, Seabrook states that they are assuming an aerosol deposition rate of 0.1 hr^{-1}, based on Industry Degraded Core Rulemaking Program (IDCOR) Technical Report 11.3. RG 1.183 Regulatory Position 3.4 identifies NUREG/CR-6189 is an acceptable approach. Since this parameter is somewhat dependent on plant parameters, the staff's prior approval of 0.1 hr^{-1} for another licensee may not be relevant to Seabrook. Please provide a Seabrook-specific justification for your proposed deviation of this guidance.

   b. Regarding §§2.1.2.11, .12, 15, please confirm the staff's understanding that §2.1.2.11 and §2.1.2.12 apply to 40 percent of L_a leakage and that the draw down does not change the 60 percent bypass assumption.

   c. Regarding §2.1.2.15, what is the basis of the 40-60 split in CNMT leakage?

   d. Regarding §§2.12.19 through 2.1.2.22, the staff cannot find FPL's treatment of emergency core cooling system (ECCS) leakage acceptable without additional supporting justifications for the following deviations from guidance:

- Regulatory Position 5.3 states that "with the exception of iodine, all radioactive materials in the recirculating liquid are assumed to be retained in liquid phase." Seabrook has stated that "with the exception of the non-particulate iodines, all radioactive materials in the recirculating liquid are assumed to be retained in liquid phase."

- Regulatory Positions 5.4 and 5.5 provide that the flashing fraction is to be based on the fraction of the total iodine in the liquid. Seabrook proposes that 100% of the non-particulate iodine becomes airborne, but none of the particulate iodine becomes airborne.

- Regulatory Position 5.6 states that the radioiodine available for release is assumed to be 97 percent elemental and 3 percent organic. Seabrook states that the temperature and pH history of the sump and refueling water storage tank (RWST) are considered in determining the chemical form of iodine.

The staff structured these regulatory positions to be deterministic and conservative in order to compensate for the lack of research into iodine speciation beyond the CNMT, and the uncertainties of applying laboratory data to the post-accident environment of the plant. Regulatory Position 5.5 does state that a smaller flash fraction could be justified based on the actual sump pH history and area ventilation rates. The staff believes that Seabrook has not provided sufficient data for the staff to find its proposed treatment of ECCS leakage adequately conservative: Please provide a quantitative justification for your assumptions including, but not limited to, the following information:

1) A full description of the iodine speciation analysis that supports your assumptions, including methodology, assumptions, input data.

2) A discussion of how the iodine speciation may change as the CNMT sump water is circulated through the ECCS components and piping and out to the RWST.

3) A discussion of the impact of all possible post-accident liquid inputs to the RWST, including the possible post-accident refilling of the RWST with other sources of water.

4) A discussion on how the iodine speciation might change as the ECCS leakage is sprayed out of a leak, or streams across a floor into a building sump.

e. On Page 20 of 94, the basis for the air flow rate is provided. Please address the following:

1) The air flow is based on the average daily temperature swing of 18.2 degrees. This temperature swing appears low for a summer day. Please

explain how this value was determined and why it should be considered adequately conservative.

2) Was evaporation of the RWST water considered as a contributor to the air flow rate?

3) Since the iodine partition is the ratio of the vapor pressures of the iodine in the liquid and gas phases in the RWST, please discuss the impact of tank pressure changes associated with diurnal temperature swings.

4) As noted above in Question 6d, the staff questions the iodine fraction value.

f. On Page 21 of 94, a mixing rate of two turnovers per hour is assumed. Regulatory Position 3.3 provides this as a default assumption, if adequate flow exists between these two regions. Please briefly describe the basis for assuming that this flow will exist between the sprayed and unsprayed region.

g. On Page 21 of 94, the maximum decontamination factor (DF) for elemental and particulate iodines are discussed. Please explain how the initial maximum airborne iodine concentration in the containment was determined for this determining DF.

h Table 2.1-1 identifies the CNMT enclosure draw down time for the LOCA as 4.5 minutes (270 seconds). Table 2.6-1 identifies the draw down time for the rod control cluster assembly (RCCA) ejection accident as 360 seconds. Appendix A of the Seabrook Updated Final safety Analysis Report (UFSAR) states that filtration credit is not assumed for the first eight minutes. Please explain the differences in these values. What is the value of the acceptance criteria for surveillance testing of this system safety function?

i. Section 2.1.2.13 addresses Regulatory Position 4.3 and states that the CNMT enclosure emergency air cleaning system is capable of maintaining a negative pressure with respect to high wind speeds. UFSAR sections 6.5.1.1 and 6.5.1.3 are cited. UFSAR Section 6.5.1.3 states “The calculated wind speed that would initiate building exfiltration is 17 miles per hour. At this or at a higher wind velocity, any exfiltration will be adequately dispersed.” Please explain the basis of this conclusion. What is meant by adequately dispersed? What is the 95-percentile wind speed at Seabrook? What impact does this wind speed have on the time to reach 0.25 inch water gage (WG)?

j. The Seabrook UFSAR provides an analysis of the consequences of post-accident hydrogen venting as a backup to the redundant hydrogen recombiners. This analysis was not addressed in the submittal. Is it Seabrook intent’s to remove this analysis from the licensing basis? If not, why was this component of the LOCA not addressed in the license amendment request?

7. Regarding to the main steam line break analysis, Table 2.3-1 lists an RCS mass of 539,037 lbm. Table 2.3-4 lists an RCS mass of 505,000 lbm. Table 2.6-1 lists a minimum RCS mass of 434,000 lbm and a maximum mass of 539,037 lbm. While the staff understands why minimum and maximum values may be used to maximize doses, it is not clear why the RCS mass assumed in establishing the iodine appearance rate was assumed to be 505,000 lbm. Please explain the basis of this assumption.

8. With regard to the steam generator tube rupture analysis:

   a. Regarding to the steam generator tube rupture analysis, Table 2.4-1 lists an RCS mass of 539,037 lbm. Table 2.4-4 lists an RCS mass of 505,000 LBM. Table 2.6-1 lists a minimum RCS mass of 434,000 lbm and a maximum mass of 539,037 lbm. While the staff understands why minimum and maximum values may be used to maximize doses, it is not clear why the RCS mass assumed in establishing the iodine appearance rate was assumed to be 505,000 lbm. Please explain the basis of this assumption.

   b. In §2.4.2.12, Please clarify the phrase " . . . without flashing for all steam generators. . . ." as used in the first bullet. The use of "all" appears to be in conflict with the second bullet.

   c. The Table 1.8.1-3 entry for steam generator tube rupture (SGTR) uses language different from that for the main steam line break (MSLB), locked rotor, or RCCA ejection events. It appears that this difference in language provides for the factor of five plume rise reduction to be applied to noble gas releases for the entire eight-hour release duration rather than 2.5 hours. If this is Seabrook's intent, please provide a justification for this assumption.

9. With regard to the RCCA ejection analysis:

   a. Please respond to Questions 6a through 6c and 6h in the context of the RCCA ejection event.

   b. Please confirm the staff's understanding that the 0.375 percent fuel centerline melt is referenced to the entire core and not only that fraction of the core that exceeds departure from nucleate boiling (DNB).

10. Regarding to the letdown line break analysis, Table 2.7-4 lists an RCS mass of 505,000 lbm. Table 2.7-1 lists a minimum RCS mass of 434,000 lbm and a maximum mass of 539,037 lbm. While the staff understands why minimum and maximum values may be used to maximize dose, it is not clear why the RCS mass assumed in establishing the iodine appearance rate was assumed to be 505,000 lbm. Please explain the basis of this assumption.

11. Table 2.9-1 refers to non-existent Tables 2.10-2 and 2.10-3. Please confirm the staff's understanding that Table 2.9-2 is the intended reference.