November 30, 2005

Mr. Gene F. St. Pierre, Site Vice President
c/o James M. Peschel
Seabrook Station
PO Box 300
Seabrook, NH 03874

SUBJECT: SEABROOK STATION, UNIT NO. 1 - MEASUREMENT UNCERTAINTY RECAPTURE POWER UPRATE APPLICATION (TAC NO. MC8434)

Dear Mr. St. Pierre:

In a letter dated September 22, 2005, FPL Energy Seabrook, LLC (FPLE) submitted an application requesting to increase the licensed thermal power level for Seabrook Station, Unit No. 1 (Seabrook). The proposed amendment would increase the licensed core power level by 1.7 percent to 3648 megawatts thermal with the installation of the Caldon Leading Edge Flow Measurement (LEFM) CheckPlus™ ultrasonic flow measurement system.

The purpose of this letter is to provide you with the results of the Nuclear Regulatory Commission (NRC) staff's acceptance review of the application and to identify an ongoing generic activity that may potentially impact the review schedule for this license amendment request. Based on the information contained in Regulatory Issue Summary 2002-03, dated January 31, 2002, the NRC staff has determined that FPLE has provided the necessary information for the staff to begin a detailed technical review.

As you are aware, the NRC staff has raised questions related to the validation of the installation of the CROSSFLOW™ ultrasonic flow meter (UFM) system offered by Westinghouse. In resolving these questions, the NRC staff has found that some of the identified issues may not be restricted to the CROSSFLOW™ UFM system. In order to make a final determination on the acceptability of your amendment request, the NRC staff must complete an assessment to determine the applicability of these concerns to the Caldon LEFM CheckPlus™ UFM system. To complete this assessment, the NRC is actively engaging Caldon, including a planned observation of laboratory testing in January 2006.

For your reference, a list of areas identified by the NRC staff for further discussion with regard to the Caldon LEFM system is enclosed. This list is being provided as an informational reference only and does not reflect an official agency position on the Caldon LEFM CheckPlus™ UFM system.

It should be noted that some aspects of this review are not dependent upon the UFM technology and, as such, the NRC staff is continuing to review them. If necessary, we would expect to issue a request for additional information regarding these aspects of the review prior to the end of calender year 2005.

If you have any questions, please contact me at 301-415-2481.

Sincerely,

/RA/

G. Edward Miller, Project Manager
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-443

Enclosure: As stated

cc w/encl: See next page

It should be noted that some aspects of this review are not dependent upon the UFM technology and, as such, the NRC staff is continuing to review them. We expect to issue a request for additional information regarding these aspects of the review prior to the end of calender year 2005.

If you have any questions, please contact me at 301-415-2481.

Sincerely,

/RA/

G. Edward Miller, Project Manager
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-443

Enclosure: As stated

cc w/encl: See next page

DISTRIBUTION:

PUBLIC	OGC
LPL1-2 Reading	ACRS/ACNW
CHolden	PKrohn, RGN-I
DRoberts	GHill (2)
GMiller	HBerkow
CRaynor	TAlexion
QNguyen	

ACCESSION NO.: ML053330007

OFFICE	LPL1-2/PM	DPR/PGCB/LPM	LPL1-2/LA	DSS/SPWB/BC	DPR/PGCB/BC
NAME	GEMiller:eo	TAlexion	CRaynor	JNakoski	CJackson
DATE	11/30/05	11/30/2005	11/30/05	11/30/2005	11/30/2005

OFFICE	LPL1-2/BC
NAME	DRoberts
DATE	11/30/05

OFFICIAL RECORD COPY

Seabrook Station, Unit No. 1

cc:

Mr. J. A. Stall
Senior Vice President, Nuclear and
Chief Nuclear Officer
Florida Power & Light Company
P.O. Box 14000
Juno Beach, FL 33408-0420

Mr. Peter Brann
Assistant Attorney General
State House, Station #6
Augusta, ME 04333

Resident Inspector
U.S. Nuclear Regulatory Commission
Seabrook Nuclear Power Station
P.O. Box 1149
Seabrook, NH 03874

Town of Exeter
10 Front Street
Exeter, NH 03823

Regional Administrator, Region I
U.S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

Office of the Attorney General
One Ashburton Place, 20th Floor
Boston, MA 02108

Board of Selectmen
Town of Amesbury
Town Hall
Amesbury, MA 01913

Ms. Deborah Bell
Federal Emergency Management Agency
Region I
J.W. McCormack P.O. &
Courthouse Building, Room 401
Boston, MA 02109

Mr. Tom Crimmins
Polestar Applied Technology
One First Street, Suite 4
Los Altos, CA 94019

Mr. Stephen McGrail, Director
ATTN: James Muckerheide
Massachusetts Emergency Management Agency
400 Worcester Road
Framingham, MA 01702-5399

Philip T. McLaughlin, Attorney General
Steven M. Houran, Deputy Attorney
General
33 Capitol Street
Concord, NH 03301

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

Mr. M. S. Ross, Managing Attorney
Florida Power & Light Company
P.O. Box 14000
Juno Beach, FL 33408-0420

Mr. Rajiv S. Kundalkar
Vice President - Nuclear Engineering
Florida Power & Light Company
P.O. Box 14000
Juno Beach, FL 33408-0420

James M. Peschel
Regulatory Programs Manager
Seabrook Station
FPL Energy Seabrook, LLC
PO Box 300
Seabrook, NH 03874

Seabrook Station, Unit No. 1

cc:

David Moore
Vice President, Nuclear Operations Support
Florida Power & Light Company
P.O. Box 14000
Juno Beach, FL 33408-0420

Marjan Mashhadi
Senior Attorney
Florida Power & Light Company
801 Pennsylvania Ave., NW Suite 220
Washington, DC 20004

Topical Areas of Concern
Highlighting Flow Profile Considerations
for Plant Ultrasonic Flow Meter Uncertainty Applications

The ultrasonic flow meter (UFM) review may be the critical path for review of power uprate applications that credit an improvement in the determination of feedwater flow rate due to the installation of UFMs. The following topical areas are intended to elaborate on potential issues pertaining to interaction of the UFM with water flowing in feedwater pipes and, specifically, to flow profile considerations. The intent of this draft is to provide a "road map" that identifies typical topics the staff should address in its review.

A complete description of the work accomplished to directly support the use of the UFM in the plant, including the following:

1. Laboratory testing

    1.1 A description of the laboratory test configurations.

    1.2 A description of the analyses conducted to support the laboratory tests.

    1.3 A summarization of the data obtained from each laboratory test that compares the UFM indication with the laboratory test facility flow rate result and provides the correction factor necessary for the UFM to agree with the laboratory test result, including:

        1.3.1 Information on the date and time for each laboratory test;

        1.3.2 Identification of any laboratory tests that were excluded from the results accompanied by the reason for the exclusion.

    1.4 If hydraulic noise is a potential issue for the UFM, then a summary of the results of the noise evaluations should be compiled. It should include the effect of temperature change. It should address whether the effect of noise contamination is a function of location within a plane perpendicular to the pipe. If noise is not a concern, then the conclusion should be justified.

    1.5 A description of the evaluations supporting application of flow laboratory test results to the plant, including:

        1.5.1 Flow profile evaluations including the effect of swirl;

        1.5.2 An evaluation of the potential differences in the flow profile between the flow laboratory tests and the assumed plant installation flow profile for any items that are not addressed by area 2.6, below.

    1.6 A summarization of how the data analysis was performed.

        1.6.1 An evaluation of the uncertainty analysis for the aggregation of the data.

        1.6.2 An evaluation of the uncertainty analysis for relating the data to the plant installation (see area 1.5, above).

1.6.3 Evaluate the uncertainty analysis associated with tracing laboratory testing and plant installation back to NIST standards

2. Plant installation

2.1 A discussion of the flow rate specification for the UFM. For example, is the UFM rated as percent-of-flow rate or as full-scale?

2.2 If flow straighteners were used in any of the testing or are used in the plant installation, then describe any benefits or adverse impacts that flow straighteners may have on the UFM flow indication.

2.3 A complete description of the feedwater pipe from the feedwater pumps to the steam generators.

2.3.1 Reference layout drawings and piping and instrumentation drawings/diagrams.

2.3.2 Identify and describe all hardware that may cause a perturbation of the flow profile. This is to include, but is not limited to, elbows, tees (including instrument tubing connections), valves, changes in pipe diameter, flow straighteners, venturis, heat exchangers, welds, orifices, resistance temperature devices, thermocouples, and changes in pipe roughness (if any).

2.3.3 Identify any paths that may provide flow bypass of the UFM and, if such paths exist, address how potential bypass flow will be addressed.

2.3.4 Identify the location of the UFM instrumentation.

2.4 A description of the process and rationale for selection of the permanent UFM installation location(s).

2.5 A description of each pre-operational plant test configuration including the UFM location and orientation, valve configurations, pump configurations, all flow rate indications, all temperature indications, and all plant characteristics that may provide information to assess UFM performance. A representative set of data should be completely described for one plant test and the remaining plant test results should be described in terms of configuration identification and average values for each flow rate and temperature.

2.6 A comparison and evaluation of the laboratory test configuration(s) to the plant installation for each plant configuration for which the vendor has certified that the UFM meets all application criteria. This should include:

2.6.1 An assessment of changes in flow profile between the laboratory test configuration and the plant installation.

2.6.2 A description of the UFM design features, testing, and operational controls that ensure that changes in flow profile and flow rates that may differ between those assumed during laboratory flow tests and those assumed during the UFM commissioning at the plant are identified and accounted for during the UFM commissioning.

2.6.3 A description of supporting evaluations; including a discussion of the methodologies used (flow laboratory modeling, computational fluid dynamics, insitu testing, or other confirmatory testing) to confirm that a plant-specific UFM installation is adequately represented by an associated flow laboratory configuration. Evaluate the impact the various methodologies may have on plant-specific UFM uncertainties or biases.

2.6.4 A discussion of the contribution to flow uncertainty and bias due to changes in flow profile that were taken for the UFM in moving from the laboratory test configuration(s) to the plant-specific configuration(s).

2.6.5 If noise is an issue, address how the noise in the fluid or pipe is treated. Include how the noise is treated with respect to error indication and allowance for error due to noise. Evaluate design features and plant testing available to identify and correct noise effects during commissioning and subsequent operation. If noise is not a concern, then the conclusion should be justified. (See topic 1.4, above.)

2.6.6 An evaluation of the effect of pipe roughness changes between the laboratory and plant installations.

2.6.7 An examination of the evaluation results.

2.7 Address differences in flow laboratory tests and plant commissioning tests with regard to the duration of data collection and impact on flow indication and uncertainty.

2.8 Address the evaluations/validations performed to establish the UFM operational characteristics such as, but not limited to, the effect of perturbations in plant operation, in-situ calibrations, and to establish the UFM operational limits.

2.9 Review a copy of the vendor's validation report and a copy of the vendor certification(s) regarding the UFM installation in the plant.

3. <u>UFM operation</u>

3.1 A complete description of the methodology by which the UFM performs an error analysis involving changes in flow profile, and how it provides an assessment of error; including the following:

3.1.1 How the UFM recognizes changes in flow profile and how such changes are translated into an error indication and into error reporting.

Understand the variance in measurements associated with determining average velocity and estimate the variance in average velocity determinations.

3.1.2 Understand the UFM design features, in-plant testing, and operational controls that identify changes in flow profile and flow rates from that assumed during commissioning and during operation. Discuss the associated contribution to flow uncertainty taken for the UFM during plant operation. Discuss how, in the case of an abnormal reading, it is possible to distinguish a change in flow from a change in performance of the UFM and provide the background information to support this process. Further, if it is found that the fault is with the UFM, discuss how a recalibration is performed.

3.1.3 Operational limits including control of the plant configuration with respect to the UFM operation.

3.1.4 A complete assessment of the effect of operation at the operational limits of the error band on uncertainty and bias. Include the total uncertainty and bias for the upper- and lower-operational limits and for the nominal operation condition between the limits, and show how the uncertainty and bias associated with off-nominal operation are incorporated into the overall instrument uncertainty and bias.

3.1.5 If the UFM installation provides the capability for cross checking (such as UFM instrumentation in series), then describe the cross checking process. Include a discussion on measurement independence, random uncertainty, and biases with this arrangement. Also, discuss procedures to be implemented should the cross checking capability become inoperable including operation with the associated power uprate.

3.1.6 If feedwater flow is from a common header and individual feedwater line temperatures differ from each other or from the common header temperature, describe the cause of the effect, the potential effect on the UFM indication, instrument uncertainty, and the actions taken to address that effect.

3.2 An evaluation of the control room procedures that address operator interactions with the UFM indication.

3.3 An evaluation of personnel training for UFM maintenance and operation.

3.4 Review operational experience with the UFM at the plant in question.

3.5 An evaluation of any time-dependent plant conditions that might effect the UFM performance (fouling, de-fouling, changes in water chemistry, etc.).

3.6 An examination of available comparisons of the UFM-indicated flow rate with other parameters that provide independent assessments of UFM flow rate or changes in flow rate. Include an uncertainty assessment for the comparison and its impact on UFM uncertainty and power uprate assumptions if this information is used to assess UFM operability, conformance to the plant commissioning performance assumptions, and power uprate status. Include how you process this information via parameter trending and provide trending information.

3.7 An examination of the plants' participation in the UFM Users Group.

3.8 An evaluation of the process for responding to information obtained from the UFM Users Group and from experiences with the UFM in other nuclear power plants.

3.9 Assuming the license amendment request was previously granted, identify and assess any instances where the UFM provided flow rate signals that would have resulted in exceeding licensed thermal power limits. Describe how these instances were identified (independent means or the UFM diagnostic, etc.) and describe changes to procedures, installation, design, or in-plant testing to prevent recurrence.