May 7, 2002

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

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION RELATED TO THE STAFF'S REVIEW OF SEVERE ACCIDENT MITIGATION ALTERNATIVES FOR ST. LUCIE UNITS 1 AND 2 (TAC NOS. MB3407 and MB3411)

Dear Mr.Stall:

The U.S. Nuclear Regulatory Commission (NRC) staff has reviewed Florida Power and Light Company's analysis of severe accident mitigation alternatives (SAMAs), submitted as part of the application for license renewal for the St. Lucie Plant, Units 1 and 2. The staff has identified areas where additional information is needed to complete its review. Enclosed are the staff's requests for additional information (RAIs).

As discussed with your staff, we request that you provide your responses to these RAIs within 60 days of the date of this letter in order to support an accelerated review schedule. If you have any questions, please contact me at (301) 415-1191.

Sincerely,
Original Signed By: JRTappert
for Michael T. Masnik, Senior Project Manager
License Renewal & Environmental Impacts Program
Environmental Section
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Docket No. 50-335 and 50-389
Enclosure: As stated

cc w/encl: See next page

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OFFICE	RLEP/ES	SC:SPSB	SC:RLEP	PD:RLEP
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DATE	5/3/02	5/6/02	5/7/02	5/7/02

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Request for Additional Information Related to the Analysis of Severe Accident Mitigation Alternatives (SAMAs) for St. Lucie Units 1 and 2

1. The SAMA analysis appears to be based on the current version of the "living" PSA model for internal events, which is a modification to the original Individual Plant Examination (IPE) that was reviewed by the U. S. Nuclear Regulatory Commission (NRC). Please provide the following:

   a. the date and/or version of the PSA used for the SAMA analysis, and a description of the internal and external peer review of the level 1, 2, and 3 portions of this PSA,

   b. a description of the major differences between the PSA and the IPE, including the plant and/or modeling changes that have resulted in the new core damage frequency (CDF) and release frequencies,

   c. a breakdown of the internal event CDF for each unit by initiating event, specifically, Loss of Offsite Power (LOOP), General Transients, Station Blackout, ATWS, Loss-of-Coolant Accidents (LOCAs), Interfacing System LOCA (ISLOCA), and Steam Generator Tube Rupture (SGTR), and other internal events initiators (please specify). Also, confirm the total of 2.99×10^{-5} per reactor year for Unit 1, and 2.44×10^{-5} per reactor year, for Unit 2, respectively.

   d. the specific reasons for the major differences in the total CDF for the two units. This should include the reasons for the differences in the CDF due to SGTR and ISLOCA initiators. (The information provided in Appendix E, e.g., Section E.1.1, is not complete for the purpose of this review.)

   e. an estimate of the uncertainties associated with the calculated core damage frequency (e.g., the mean and median CDF estimates and the 5th and 95th percentile values of the uncertainty distribution).

   f. a breakdown of the population dose (person-rem per year) by containment release mode in the following form:

	Fraction of Population Dose	
Containment Release Mode	**Unit 1**	**Unit 2**
SGTR (Late and Early)		
Interfacing Systems LOCAs		
Early containment failure		
Late containment failure		
No containment failure		

ENCLOSURE

g. an explanation of the differences in the SGTR1 and SGTR2 (“late” and “early”) release modes, and the reasons for the low release magnitudes and the absence of tellurium releases for these release modes. In addition, please provide, separately, the contribution of hydrogen and CO combustion to early and late containment failure probability.

h. a list of key equipment failures and human actions that dominate CDF and population dose (or alternatively, the large early and late release frequencies), and have the greatest potential for reducing the risk of severe accidents at St. Lucie Units 1 and 2, along with the results of any supporting importance analyses (e.g., Fussel-Vesely and/or risk reduction importance measures).

2. Risk analyses at other commercial nuclear power plants indicate that <u>external events</u> could be large contributors to core damage and the overall risk to the public. It is recognized that the methods used for the St. Lucie IPEEE do not provide numerical estimates of the CDF contributions from seismic and fire initiators. In view of the fact that the characteristics of the internal and external events scenarios are, in general, considerably different, please demonstrate, through sound PRA arguments and considering the uncertainties in the PSA results, that by doubling the internal events CDF, one can reliably bound the risk of core damage due to all initiators at St. Lucie.

3. In Section 4.15.3, FPL indicates that the top 100 cut sets of the Level 1 PSA update were examined to identify the important contributors to plant risk. What is the total percentage contribution of the 100 cut sets to CDF?

4. In Section 4.15.3.2, FPL indicates that some SAMAs are more quickly evaluated by examining (through importance measures) the contribution of specific components or human actions to the CDF. Please explain how and what importance measures were utilized in the SAMA identification and elimination processes, and what SAMAs, if any, were identified or eliminated from such processes. If not explicitly used to identify SAMAs, please perform and provide the results of supplementary analyses (based on the latest version of the PSA) confirming that the set of SAMAs considered in the St. Lucie ER address all risk significant contributors identified through plant-specific importance analyses.

5. In Appendix E.2, FPL states that for the SECPOP90 code, the county data file was updated to circa 1999 for the nine Florida counties within 50 miles of the plant. Please provide a brief explanation as to how higher economic areas such as resort areas are reflected in the analysis.

6. Based on a review of the SAMAs considered by FPL, the staff requires the following additional information regarding specific SAMAs:

   a. SAMA 59 - Provide justification that other alternatives to fuel cells were also considered (such as additional batteries, or backup diesel- or gas-powered generators). Please indicate what the cost estimates and benefits are for such alternatives.

b. SAMA 90 - Provide a description of which penetrations constitute the dominant contributors to ISLOCA risk, and whether some subset of these lines can be tested at an increased frequency without the need for significant hardware modifications, thereby deriving some of the benefit without the large cost of adding or modifying test lines and instrumentation.

c. SAMA 108 - Provide an explanation of the following:

   i) how AFW is controlled manually given a loss of DC power, i.e., without instrumentation,
   ii) how operator action is represented in the PSA, including human error probability values.
   iii) the extent that AFW performance could be improved by this SAMA.

d. SAMAs 71, 75, 76 - FPL states that the CDF contribution of a loss of grid is 16.2%, giving an estimated benefit of $224K. Please describe the accident sequence for a loss of grid, and whether there are lower cost alternatives that could provide a comparable reduction in CDF.

e. SAMA 85 - Provide an explanation of why Unit 1, which has new design steam generators, yields a greater benefit than Unit 2 for the NoSGTR case, especially when FPL indicates that there is not a need for 100% inspection of the Unit 1 tubes.

f. SAMA 118 - FPL indicates that failures of High Pressure Safety Injection (HPSI) contribute 18% to CDF and a total benefit of $249K for elimination of all HPSI failures (see Table 4.15-2, page 4.15-23). Earlier in the same table (see page 4.15-16) for SAMA 13, the estimated benefit from eliminating all HPSI failures is $279K. Details for this particular case (elimination of HPSI) have not been provided. Due to the apparent inconsistency, please provide details (averted costs) commensurate with those provided in Tables E.4-3 and E.4-4.

g. SAMA 145 - Based on the description, no benefit was predicted for RCS depressurization. Please explain the modeling assumptions for this SAMA. If this is due to the fact that depressurization was not modeled in the PSA, please provide an estimate of the benefit if depressurization was modeled.

h. SAMA 160 - The calculated benefit is estimated to be approximately $490K. However, the estimated cost has not been provided. Please provide an estimated cost for this SAMA, and the net value when considering a 7% (basecase) and 3% (sensitivity) discount rate.

7. NUREG/BR-0184 states that the impact of a three-percent (3%) discount rate should be assessed as a sensitivity analysis. FPL indicates that this was done, but that no SAMAs became cost-beneficial as a result. Please provide the results of the sensitivity analysis for each of the 6 cost cases evaluated in Appendix E.4.

8. In Appendix E.1, FPL indicates that a design change was implemented at Unit 2 that increased the calculated probability of ISLOCA while reducing the probability of pressure locking of the shutdown cooling isolation valves (which would prevent the use of shutdown cooling), and that this change was risk neutral or positive overall. In Appendix E.4, FPL develops the NoISLOCA case to determine the benefit to be obtained from reducing ISLOCAs. In Table E.4-4, the total benefit is estimated to be approximately $490K for Unit 2 (approximately twice the benefit as in Unit 1). In light of this sizeable benefit, please explain how the design change has affected this case, i.e., what is the increase in CDF and risk due to the design change, and why a further design change to reduce ISLOCA risk is not justified for Unit 2.

9. A licensee for another CE plant identified the following six SAMAs as potentially cost beneficial. These SAMAs or equivalents were not addressed in the SAMA analyses submitted for the St. Lucie plant.

   a. Modify procedures to conserve or prolong the inventory in the refueling water storage tank during SGTRs, including procedures to refill the tank
   b. Add accumulators or implement training on refueling water storage tank bubblers and recirculation valves in order to prevent a premature recirculation actuation signal and ECCS pump damage due to inadequate net postive suction head
   c. Add capability for steam generator level indication during a station blackout using a portable 120V AC generator
   d. Provide a 480V AC power supply to open the power-operated relief valve and reduce the potential for temperature-induced SGTR, and high pressure melt ejection
   e. Add capability to flash the field on the emergency diesel generator (using a portable generator) to enhance station blackout event recovery
   f. Add manual steam relief capability and associated procedures to provide an alternate cooldown path to increase the capability of the plant to cope with ISLOCAs, SGTRs, and long-term station blackouts

   Please provide a brief explanation regarding the applicability/feasibility of these SAMAs for the St. Lucie plant. Also, SAMA 21 in the St. Lucie evaluation (“Create procedure and operator training enhancements in support-system failure sequences, with emphasis on anticipating problems and coping”) was deemed cost beneficial at the other CE plant; however, FPL eliminated it from further consideration because the SAMA had been implemented or the intent was met. Please explain how this SAMA was implemented or how the intent of this SAMA was met.