UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

August 2, 2012

Mr. Jon A. Franke
Vice President
Crystal River Nuclear Plant (NA2C)
ATTN: Supervisor, Licensing and
Regulatory Programs (NA1B)
15760 W. Power Line Street
Crystal River, FL 34428-6708

SUBJECT: CRYSTAL RIVER UNIT 3 NUCLEAR GENERATING PLANT – REQUEST FOR ADDITIONAL INFORMATION FOR EXTENDED POWER UPRATE LICENSE AMENDMENT REQUEST (TAC NO. ME6527)

Dear Mr. Franke:

By letter dated June 15, 2011, as supplemented by letters dated July 5, 2011; August 11, 2011 (two letters); August 18 and 25, 2011; October 11 and 25, 2011; December 15, 2011 (two letters); December 21, 2011; January 5, 2012 (two letters); January 19, 2012 (two letters); January 31, 2012; March 19, 2012; March 22, 2012; April 4, 2012 (two letters); April 12, 2012; April 16, 2012; April 26, 2012, and June 18, 2012; Florida Power Corporation, doing business as Progress Energy Florida, Inc., submitted a license amendment request for an extended power uprate to increase thermal power level from 2609 megawatts thermal (MWt) to 3014 MWt for Crystal River Unit 3 Nuclear Generating Plant.

The U.S. Nuclear Regulatory Commission staff is reviewing the submittal and has determined that additional information is required to complete its evaluation. This request was discussed with Mr. Dan Westcott of your staff on July 18, 2012, and it was agreed that a response to the enclosed request for additional information would be provided within 45 days from the date of this letter.

If you have any questions regarding this matter, I can be reached at 301-415-1564.

Sincerely,

Siva P. Lingam

Siva P. Lingam, Project Manager
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-302

Enclosure:
Request for Additional Information

cc w/encl: Distribution via Listserv

REQUEST FOR ADDITIONAL INFORMATION

REGARDING EXTENDED POWER UPRATE TO INCREASE THERMAL POWER LEVEL

FROM 2609 MEGAWATTS THERMAL TO 3014 MEGAWATTS THERMAL

CRYSTAL RIVER UNIT 3 NUCLEAR GENERATING PLANT

DOCKET NO. 50-302

By letter dated June 15, 2011 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML112070659), as supplemented by letters dated July 5, 2011; August 11, 2011 (two letters); August 18 and 25, 2011; October 11 and 25, 2011; December 15, 2011 (two letters); December 21, 2011; January 5, 2012 (two letters); January 19, 2012 (two letters); January 31, 2012; March 19, 2012; March 22, 2012; April 4, 2012 (two letters), April 12, 2012, April 16, 2012, April 26, 2012, and June 18, 2012 (ADAMS Accession Nos. ML112010674, ML11228A032, ML11234A051, ML11234A427, ML11242A140, ML112860156, ML113040176, ML11354A232, ML11354A233, ML11361A460, ML12011A035, ML12030A209, ML12024A300, ML12024A301, ML120330114, ML12081A293, ML12086A107, ML12097A183, ML12097A246, ML12107A216, ML12114A002, ML12118A498, and ML121730557, respectively), Florida Power Corporation (the licensee), doing business as Progress Energy Florida, Inc., submitted a license amendment request for an extended power uprate (EPU) to increase thermal power level from 2609 megawatts thermal (MWt) to 3014 MWt for Crystal River Unit 3 Nuclear Generating Plant (Crystal River 3 or CR-3). In order to complete its review of the above documents, the Nuclear Regulatory Commission (NRC) staff requests additional information originating from our Nuclear Performance and Code Review Branch (SNPB) related to boric acid precipitation and loss-of-coolant accident (LOCA):

SNPB REQUEST FOR ADDITIONAL INFORMATION

SNPB-1

Please provide the following information for the CR-3 Nuclear Steam Supply System (NSSS):

a. Volume of the lower plenum, core and upper plenum below the bottom elevation of the hot leg, each identified separately. Volume in the downcomer below the bottom of the discharge leg. Also provide heights of these regions.

b. Loop friction and geometry pressure losses from the core exit through the steam generators to the inlet nozzle of the reactor vessel. Also, provide the locked rotor reactor coolant pump (RCP) k-factor. Please provide the mass flow rates, flow areas, k-factors, and coolant temperatures for the pressure losses provided (upper plenum, hot legs, steam generators (SGs), suction legs, RCPs, and discharge legs). Please include the reduced SG flow areas due to plugged tubes. Please also provide the loss from each of the intact cold legs through the annulus to a single broken cold leg. Please also provide the equivalent loop resistance in feet/gallons per minute^2 (ft/gpm^2).

c. Number of vent valves, flow areas and geometric k-factor. Elevation and diameter of the vent valves.

d. Friction and geometric total resistance from the top of the core through the vent valves to the discharge leg. Please also provide the equivalent resistance for this path in ft/gpm^2.

e. Capacity and boron concentration of the refueling water storage tank and core flood tanks.

f. Capacity of the condensate storage tank.

g. Boric acid concentration versus time for the limiting large break.

h. Flushing flow rate at the time of switch to simultaneous injection.

i. High pressure safety injection runout flow rate.

j. Please provide the limiting top skewed and bottom skewed axial power shapes (axial peaking factor versus axial position). Please provide a numerical table of this information.

k. Bottom elevation of the suction leg horizontal leg piping.

l. Top elevation of the cold leg at the RCP discharge.

m. Top elevation of the core (also height of core).

n. Bottom elevation of the downcomer.

SNPB-2

What is the sump temperature versus time following recirculation initiation and how does this impact precipitation? Is the boric acid concentration in the vessel below the precipitation limit based on the minimum sump temperature at the time the switch to simultaneous injection is performed? Please explain.

SNPB-3

Are there high concentrate boric acid storage tanks in the CR-3 NSSS? If so, please provide the boric acid concentration and volume of the tanks. Please also provide the maximum flow rate of the tanks into the reactor coolant system.

SNPB-4

Please explain how boric acid precipitation is prevented for all small break loss-of-coolant accidents (SBLOCAs).

SNPB-5

Please provide the boric acid concentration versus time for the limiting large break loss-of-coolant (LBLOCA) and the limiting SBLOCA?

SNPB-6

Please provide the detailed results and write-up with accompanying plots, tables of key inputs/assumptions, and table of key event timings for the spectrum of breaks comprising the LBLOCA and SBLOCA spectrum analyses at EPU conditions.

SNPB-7

Please identify the limiting conditions assumed for boric acid precipitation calculations for the limiting LBLOCA and SBLOCA analyses.

SNPB-8

Since the steam flow rate due to core boil-off leaving the two-phase surface in the inner vessel during a LOCA contains boric acid, please demonstrate that boric acid crystals do not collect on the vent valves sufficiently to reduce this flow area or increase the resistance for this path to a break in the cold leg. What is the reduction in flow area assumed in the boric acid precipitation analysis?

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ADAMS Accession No: ML12202A060

OFFICE	LPL2-2/PM	LPL2-2/LAit	LPL2-2/LA	SNPB/BC	LPL2-2/BC (A)	LPL2-2/PM
NAME	SLingam	CDorsey	BTully (JBurkhardt for)	AMendiola (LWard for)	JQuichocho	SLingam
DATE	08/01/12	08/01/12	08/01/12	08/01/12	08/02/12	08/02/12

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