NEXTera ENERGY
POINT BEACH

December 10, 2010

NRC 2010-0170
10 CFR 50.90

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

Point Beach Nuclear Plant, Units 1 and 2
Dockets 50-266 and 50-301
Renewed License Nos. DPR-24 and DPR-27

License Amendment Request 261
Extended Power Uprate
Response to Request for Additional Information

References: (1) FPL Energy Point Beach, LLC letter to NRC, dated April 7, 2009, License Amendment Request 261, Extended Power Uprate (ML091250564)

NextEra Energy Point Beach, LLC (NextEra) submitted License Amendment Request (LAR) 261 (Reference 1) to the NRC pursuant to 10 CFR 50.90. The proposed amendment would increase each unit's licensed thermal power level from 1540 megawatts thermal (MWt) to 1800 MWt, and revise the Technical Specifications to support operation at the increased thermal power level.

During a teleconference with NextEra on November 16, 2010, NRC staff determined that additional information is required to enable the staff's continued review of the request. Enclosure 1 provides the NextEra response to the NRC staff's request for additional information.

This letter contains no new Regulatory Commitments and no revisions to existing Regulatory Commitments.

The information contained in this letter does not alter the no significant hazards consideration contained in Reference (1) and continues to satisfy the criteria of 10 CFR 51.22 for categorical exclusion from the requirements of an environmental assessment.

In accordance with 10 CFR 50.91, a copy of this letter is being provided to the designated Wisconsin Official.

I declare under penalty of perjury that the foregoing is true and correct.
Executed on December 10, 2010.

Very truly yours,

NextEra Energy Point Beach, LLC

Larry Meyer
Site Vice President

Enclosure

cc: Administrator, Region III, USNRC
Project Manager, Point Beach Nuclear Plant, USNRC
Resident Inspector, Point Beach Nuclear Plant, USNRC
PSCW

ENCLOSURE 1

NEXTERA ENERGY POINT BEACH, LLC
POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2

LICENSE AMENDMENT REQUEST 261
EXTENDED POWER UPRATE
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

During a teleconference with NextEra Energy Point Beach, LLC (NextEra) on November 16, 2010, the NRC staff determined that additional information is required to enable the Containment and Ventilation Branch to complete the review of License Amendment Request (LAR) 261, Extended Power Uprate (EPU) (Reference 1). The following information is provided by NextEra in response to the NRC staff's request for additional information.

Containment and Ventilation Branch Request

In accordance with the requirements of Section (b)(2) of 10 CFR 50.44 as related to combustible gas control for currently licensed reactors, confirm that the PBNP containment has the capability of ensuring a mixed atmosphere following a Loss-of-Coolant Accident at EPU conditions. Summarize the PBNP containment design that support this assessment.

NextEra Response

Hydrogen is primarily generated by the zirconium-water reaction that occurs due to the high cladding temperatures while the core is uncovered prior to reflood following a loss of coolant accident (LOCA) with delayed initiation of the emergency core cooling system. The hydrogen generated will escape from the reactor vessel via the breakpoint accompanied by steam generated from residual water in the reactor vessel during core heatup. Thus the hydrogen source could originate in any of the areas through which the main reactor coolant piping is routed (i.e., primarily the reactor cavity or the steam generator, reactor coolant pump and pressurizer cubicles). The other post-LOCA sources of hydrogen (i.e., radiolytic decomposition of the post-accident emergency cooling solutions and corrosion of metals by solutions used for emergency cooling or containment spray) are long-term and have a significantly lower hydrogen generation rate, and are dispersed throughout containment.

The assessment performed for Point Beach Nuclear Plant (PBNP) to demonstrate a mixed atmosphere in the Unit 1 and 2 containments following a LOCA at EPU conditions takes into consideration the layout and arrangement of the containment internal structures, and active and passive mixing mechanisms. Active mechanisms include air circulation via the containment air recirculation cooling (VNCC) system through the various containment compartments and areas, and mixing promoted by momentum transfer due to the spray droplets resulting from operation of the PBNP containment spray (CS) system. Passive mechanisms include natural convection flows within the containment atmosphere and molecular diffusion.

The internal design of the PBNP Unit 1 and 2 containments allows air to circulate freely. The volume above the operating floor, which comprises the majority of the containment net free volume, does not have significant barriers to obstruct mixing. Cubicles and compartments within the containment are provided with openings near the top as well as bottom to allow air circulation. The pressurizer cubicle does not have an opening in the bottom, but is supplied by air via the VNCC system. The basement at El. 8' and the floors at El. 24', El. 46' and El. 66' are connected to each other through stairway openings and through the 3" wide annular gap between the outer containment wall and the floors, and the floor openings in El. 66' and El. 46' to access the reactor vessel head lay down area at El. 24'.

The VNCC system consists of four containment fan cooler (CFC) units, and a common duct distribution system designed to promote good mixing of containment air and ensure distribution throughout the containment outside the primary shield wall. The cooled air is circulated upward from the lower primary compartments, through the steam generator compartments, reactor coolant pump cubicle and pressurizer cubicle to the operating floor level. Air that has risen to the containment dome is drawn by the fans through two branch ducts at the highest point in the center of containment and are routed through ductwork that follow the contour of the containment dome on opposite sides of the containment. All four air handling units discharge into a common ring header, thus no space in the containment is dependent on a single air handling unit for cooling and ventilation. Since all containment areas are interconnected via structural openings it is expected that containment air is essentially well mixed in the containment volume. An approximate turnover rate of four containment volumes per hour is estimated considering the minimum air flow rate of 67,000 cubic feet per minute (cfm) from two of four CFC units operating, and an approximate containment net free volume of 10^6 ft^3.

The reactor cavity is not covered by the VNCC system. However, two ventilation exhaust pathways (each with a 17.25" inner diameter (ID), provided for the non-safety related ventilation system that services the reactor cavity), as well as the eight instrument wells (each with a 7" ID), connect the reactor cavity to the refueling cavity during normal operations and accidents. In addition, it is expected that should a break occur in the reactor cavity, the insulation in the annular space around each of the four reactor coolant pipes that penetrate the primary shield wall will be displaced due to the force of the LOCA blowdown thus creating vent paths into the areas adjacent to the reactor cavity underneath the steam generator cubicles. The reactor coolant pipe penetration sleeve ID is 45.26" versus a pipe outer diameter (OD) of 32.26".

Along with the VNCC system, forced convection in the PBNP containment atmosphere will also be generated by the CS system. The spray will induce mixing by imparting momentum to the containment atmosphere. In addition, steam condensation and cooling of the containment atmosphere by the sprays will result in flow to low pressure regions. The nozzles and headers are so oriented as to provide spray coverage of 58% of the containment free volume. The CS system flow rate is a minimum of 1070 gpm during the injection phase (t=0 hours to approximately t=60 minutes), and 900 gpm during the recirculation phase (approximately t=80 minutes to approximately t=5 hours 20 minutes following the start of the accident). The concentration of hydrogen gas is expected to be nearly uniform in the containment volume above the operating floor at El. 66' since the "effective" spray coverage fraction above the operating floor is expected to be nearly 1.0 taking into consideration the high mixing rate expected between the sprayed and unsprayed regions due to the high percentage of spray coverage (> 58%) and the wide open configuration with very few obstructions to mixing. Additional mixing is expected in the volume below El. 66' due to partial spray coverage provided via openings such as those provided in the steam generator and pressurizer cubicles.

Natural convection flows within the PBNP containment atmosphere will be developed due to the break effluent resulting from core heat-up and subsequent generation of steam and hydrogen. Buoyancy forces will cause the released steam to rise. This upward steam flow will generate containment mixing. Natural convection due to density differences (buoyant effects) is another source of mixing in the containment atmosphere. Gas flow occurs whenever there is a temperature difference between the wall and the bulk atmosphere. The presence of large heat sinks in the containment, such as internal walls, together with localized heat sources, such as hot equipment surfaces, will be expected to set up large-scale natural circulation cells. These circulation cells will help decrease any stratification that may occur in areas with the absence of jet induced or forced convection flows. Molecular diffusion is another mechanism that would provide mixing within the containment following a postulated LOCA. Diffusion occurs due to concentration gradients. The highly diffusive property of hydrogen facilitates its dispersion in containment. While the rate of diffusion is too slow to result in mixing of large containment volumes in short times by itself, molecular diffusion would add to the other mixing processes previously discussed.

In summary, the PBNP assessment demonstrates that the containment design allows air to circulate freely, and that passive mechanisms such as convective mixing in conjunction with active systems such as containment spray and operation of the VNCC system ensure a mixed atmosphere inside containment thus precluding accumulation of a combustible or explosive mixture within a compartment or cubicle.

<u>References</u>

(1) FPL Energy Point Beach, LLC letter to NRC, dated April 7, 2009, License Amendment Request 261, Extended Power Uprate (ML091250564)