PMLevyCOLPEm Resource

From: Anderson, Brian
Sent: Friday, April 23, 2010 3:27 PM
To: 'robert.kitchen@pgnmail.com'; 'david.waters@pgnmail.com'; 'tillie.wilkins@pgnmail.com'
Cc: PMLevyCOLPEm Resource
Subject: DRAFT RAIs - SRP sections 2.4.3, 2.4.5, 2.4.12, 2.4.13 - Levy County Units 1 and 2 Combined License Application
Attachments: LNP Draft RAI 4631 - 2.4.13.doc; LNP Draft RAI 4628 - 2.4.3.doc; LNP Draft RAI 4629 - 2.4.5.doc; LNP Draft RAI 4630 - 2.4.12.doc

Importance: High

Attached are four draft RAIs related to SRP sections 2.4.3, 2.4.5, 2.4.12, and 2.4.13 for the Levy County Units 1 and 2 Combined License Application. Please let me know if you would like to schedule a conference call to discuss this RAI.

Thank you,
Brian

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Hearing Identifier: Levy_County_COL_Public
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Subject: DRAFT RAIs - SRP sections 2.4.3, 2.4.5, 2.4.12, 2.4.13 - Levy County Units 1 and 2 Combined License Application
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Files	**Size**	**Date & Time**
MESSAGE	428	4/23/2010 3:26:33 PM
LNP Draft RAI 4631 - 2.4.13.doc	33786	
LNP Draft RAI 4628 - 2.4.3.doc	32250	
LNP Draft RAI 4629 - 2.4.5.doc	32250	
LNP Draft RAI 4630 - 2.4.12.doc	35322	

Options
Priority: High
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Request for Additional Information No. 4631
Levy County, Units 1 and 2
Progress Energy Florida, Inc.
Docket No. 52-029 and 52-030
SRP Section: 02.04.13 - Accidental Releases of Radioactive Liquid Effluents in Ground and Surface Waters
Application Section: FSAR Section 2.4

QUESTIONS for Hydrologic Engineering Branch (RHEB)

02.04.13-***

FSAR section 2.4.12.1.2 states that "Based on limited downhole geophysical testing and monitoring of drilling fluid losses at the LNP site, the most productive interval of the Upper Floridan aquifer appears to be at depths of approximately 30 to 60 m (100 to 300 ft.) bgs." 60 m would be equivalent to about 200 ft. Clarify this apparent discrepancy regarding the depth of the most productive interval of the Upper Floridan aquifer.

02.04.13-***

Provide a discussion of the degree of conservatism in the transport analysis included in FSAR Section 2.4.13, including discussion of the following.

1. The hydraulic conductivity value applied in the transport analysis as addressed in RAI 2.4.12-22.
2. The effective porosity values applied in the transport analysis as addressed in RAI 2.4.12-23.
3. The assumption that the released contamination is evenly distributed over an aquifer thickness of 250 ft. Clarify the value of aquifer thickness used in the calculations by including it in FSAR Table 2.4.13-203.
4. The groundwater head gradient applied in the transport analysis, considering that a more conservative value for the groundwater gradient than that used in the transport analysis is indicated by the baseline 2007 potentiometric surface map for the Upper Floridan aquifer presented in the recalibrated version of the DWRM2 groundwater flow model (|TMEM-123|). This potentiometric map is based on a more extensive well network that includes LNP site wells.

Request for Additional Information No. 4628
Levy County, Units 1 and 2
Progress Energy Florida, Inc.
Docket No. 52-029 and 52-030
SRP Section: 02.04.03 - Probable Maximum Flood (PMF) on Streams and Rivers
Application Section: FSAR Section 2.4

QUESTIONS for Hydrologic Engineering Branch (RHEB)

02.04.03-***

In response to staff's RAI 2.4.3-03, the applicant stated that application of a UH to predict runoff from the surface of a reservoir is acceptable. However, the UH theory is used to describe the time distribution of surface runoff at the outlet produced by a constant and uniform rainfall excess event over a watershed. The time delay and attenuation in discharge compared to the rainfall excess event occurs because of the physical obstruction to overland flow over the surface of the watershed. Within the watershed, overland flow also accumulates into channels and streams. Both of these characteristics (overland flow and presence of channels and streams) are not present when considering runoff from the surface of a lake or reservoir. Therefore, a UH is not an appropriate tool to describe its response to a rainfall event. The staff requests that the applicant provide a rainfall-runoff response function that is appropriate for the surface of Lake Rousseau, or justify its exclusion.

In response to staff's RAI 2.4.3-03, the applicant includes text quoted from Sivapalan et al. (2002). That same reference (Sivapalan et al., 2002) also states the following, which the applicant did not include in its response: "On the other hand, Robinson et al. [1995], using numerical simulations, showed that nonlinearity at small scales is dominated by the hillslope response, that nonlinearity at large scales is dominated by channel network hydrodynamics, and that nonlinearity does not really disappear at any scale." This statement appears to contradict the applicant's assertion that the response of the Withlacoochee River Basin can be considered linear. The staff requests that the applicant provide UHs that are appropriately representative of overland flow and runoff generation conditions in the basin and conservative in predicting the discharge in the Withlacoochee River at the time a PMP event is likely to occur, or justify their exclusion.

References: Sivapalan, M., C. Jothiyangkoon, and M. Menabde, "Linearity and nonlinearity of basin response as a function of scale: Discussion of alternative definitions," Water Resources Research, Vol. 38, No. 2, 1012, 10.1029/2001WR000482, 2002.

Request for Additional Information No. 4629
Levy County, Units 1 and 2
Progress Energy Florida, Inc.
Docket No. 52-029 and 52-030
SRP Section: 02.04.05 - Probable Maximum Surge and Seiche Flooding
Application Section: FSAR Section 2.4

QUESTIONS for Hydrologic Engineering Branch (RHEB)

02.04.05-***

In response to staff's RAI 2.4.5-05, the applicant stated that the extrapolation equation that was used to estimate PMSS at the LNP site is based on National Oceanic and Atmospheric Administration National Weather Service's Sea, Lake and Overland Surges from Hurricanes (SLOSH) modeling results for hurricanes of Categories 1 through 5 in the Gulf of Mexico near the LNP site. Through independent confirmatory analysis, the staff determined that the Probable Maximum Storm Surge (PMSS) water surface elevations obtained by using the extrapolation procedure described by the applicant may be conservative, but does not appear to provide hydrodynamic basis that captures the complex interaction of the storm surge and inland topography within the equation.

Provide the following information: (a) an analysis of the PMSS event using a technically sound and conservative approach such as those predicted by a storm surge model (e.g., SLOSH) with input from appropriate Probable Maximum Hurricane scenarios, (b) an estimate of sea level rise and the reasons why the use of historical estimations of sea level rise (SLR) is more conservative than current climatic predictions, and (c) if factored into the PMSS analysis (i.e., application of margins), a detailed description of the process for determining uncertainty estimations, or justify the exclusion of this information.

Request for Additional Information No. 4630
Levy County, Units 1 and 2
Progress Energy Florida, Inc.
Docket No. 52-029 and 52-030
SRP Section: 02.04.12 - Groundwater
Application Section: FSAR Section 2.4

QUESTIONS for Hydrologic Engineering Branch (RHEB)

02.04.12-***

The transmissivity of the upper Floridan aquifer estimated from pumping test responses of wells in the vicinity of LNP Units 1 and 2 ranged from 4000 to 53,000 ft2/d (PEF 2009| ML0921509601L-0363 -RAI response letter NPD-NRC-2009-177|). This is equivalent to a hydraulic conductivity range of 16 to 212 ft/d assuming an aquifer thickness of 250 ft. The map in Figure 10 of the revised DWRM2 groundwater flow model (338884-TMEM-123) shows an upper Floridan aquifer transmissivity range of 7920 to 50,000 ft2/d from model calibration over the flow path between the hypothetical release site and the receptor locations. Provide a discussion of how the calculated seepage velocity reported in FSAR Table 2.4.12-212 and RAI supplemental response NPD-NRC-2009-177, which is based on a horizontal hydraulic conductivity of 54.4 ft/d, represents a conservative estimate, or justify its exclusion.

02.04.12-***

The use of a homogeneous porous media conceptual model for the Upper Floridan Aquifer results in a relatively high estimated effective porosity being applied for seepage velocity calculations reported in FSAR Table 2.4.12-212. Calculation of seepage velocity in FSAR Table 2.4.12-212 uses an effective porosity of 0.15 based on values published in textbooks and the "Groundwater Protection and Siting Ordinance" of Hernando County, Florida. Site-specific measurements of effective porosity at the LNP site at the scale of the transport calculation do not appear to have been provided by the applicant. Published information indicates that there is a possibility of preferential groundwater flow through fractures or solution cavities in the Upper Floridan aquifer in western Florida (|USGS WSP-2475 and USGS WRIR 93-4171|). The "shallow" tracer test at the Old Tampa Well Field (|USGS WRIR 93-4171|) was conducted in the upper 90 feet of the Upper Floridan aquifer over a distance of 200 feet and resulted in an estimated effective porosity of 0.003 based on the early arrival of the tracer. The short travel time and low effective porosity was attributed to secondary aquifer porosity caused by fractures in the limestone. Another tracer test in the Upper Floridan aquifer near Port Malabar resulted in an estimated effective porosity of 0.05 (Burklew 1989). Although the matrix porosity is greater, potential transport through secondary porosity features could result in faster travel times and less decay of radionuclides before reaching an offsite well. Provide a discussion of how an effective porosity of 0.15 represents a conservative value for use in the seepage velocity calculation, or justify its exclusion.

References:
USGS WSP-2475: Knochenmus, Lari A., and Robinson, James L. 1996. Descriptions of anisotropy and heterogeneity and their effect on ground-water flow and areas of contribution to public supply wells in a karst carbonate aquifer system. U.S. Geological Survey Water-Supply Paper 2475, 46 p.

USGS WRIR 93-4171: Robinson, J. L. 1995. Hydrogeology and results of tracer tests at the old Tampa well field in Hillsborough County, with implications for wellhead-protection strategies in west-central Florida. U.S. Geological Survey Water-Resources Investigations Report 93-4171, 63 p.

Burklew 1989: Burklew, Lori M. 1989. Characterization of the Upper Floridan Aquifer System, Including Field Dispersivity Tests and Analytical Modeling, in the Vicinity of Port Malabar, Florida. Masters Thesis. University of Florida, Gainesville, FL.

02.04.12-***

Provide a discussion of the effects of alterations to the groundwater flow system, including the effects of storm water runoff caused by the new structures and facilities. In addition, discuss how these will impact groundwater levels near the safety-related SSCs with respect to the DCD site parameter on maximum groundwater elevation.