Henry Jones

From: Eric L. Geist [egeist@usgs.gov]
Sent: Wednesday, October 01, 2008 6:17 PM
To: Henry Jones
Subject: RE: Re: Levy County FSAR and site audit

Dear Henry,
Thank you for this explanation -- this is very helpful to us....Eric

All of the safety related structures are located at the plant site (50 ft MSL). The AP1000 has a passive emergency cooling system that requires no power but storage tanks, gravity and the atmosphere for the ultimate heat sink.

The AP1000 units will use a recirculating cooling water system, and waste heatwill be dissipated by a series of mechanical draft cooling towers, which will draw makeup cooling water from the Cross Florida Barge Canal (CFBC). This canal

extends west about 11.9 km (7.4 mi.) from the Inglis Lock at Lake Rousseau to the Gulf of Mexico.

The intake structure will be located approximately 11.1 km (6.9 mi.) from the Gulf of Mexico on the berm that forms the north side of the canal and within 0.8 km (0.5 mi.) of the Inglis Lock. The waters in the CFBC downstream of the lock vary in salinity seasonally and with tidal influences; however, when the intake is operational, it is anticipated that the makeup water to the cooling towers will be seawater drawn from shallow, near-shore Gulf waters. Freshwater sources will

not be used for cooling tower makeup at LNP. Cooling tower blowdown, including residual waste heat, will be transported in two pipelines (one for each unit) from the LNP. The blowdown lines will run south to the CFBC and then west along the northern edge of the bypass canal. They will then cross the bypass canal just north of CREC, run south, and discharge into the CREC discharge canal and ultimately into the Gulf of Mexico.

The AP1000 reactor coolant system (RCS) is designed to effectively remove or enable removal of heat from the reactor during all modes of operation, including normal shutdown and accident conditions, as described in the Westinghouse

Electric Company, LLC, AP1000 Design Control Document for the certified design as amended (DCD). Therefore, the intake and blowdown pipes and Makeup Water Pumphouse are **non-safety related** structures. The ponds around the plant are storm drainage ponds to store/redirect rainfall to the cooling towers for additional evaporation makeup and/or redirect to drainage ditches, etc.

The following links provide a picture presentation of the AP1000 emergency cooling system:

http://www.ap1000.westinghousenuclear.com/ap1000_safety.html

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http://www.ap1000.westinghousenuclear.com/ap1000_psrs_pccs.html

I hope the above helps.

Henry

From: Eric L. Geist [mailto:egeist@usgs.gov]
Sent: Friday, September 26, 2008 12:45 PM
To: Henry Jones
Subject: Fwd: Re: Levy County FSAR and site audit

Dear Henry,

In reviewing the FSAR Section 2.4.6 for Levy County, we had some questions regarding the proposed cooling system. In particular, we are not sure what parts of the cooling system (e.g., makeup water pumphouse and blowdown pipeline) are considered safety-related structures, systems, and components (SSC) according to the tsunami Standard Review Plan (NUREG-0800). I am forwarding to you David Twichell's message below with his questions highlighted in red. Thanks for any assistance you can give...Eric

To: "Eric L. Geist" <egeist@usgs.gov>
Cc: bjaffe@octopus.wr.usgs.gov,
Jason Chaytor <jchaytor@usgs.gov>,
plynett@tamu.edu,
Sam Johnson <sjohnson@octopus.wr.usgs.gov>,
Uri Ten Brink <utenbrink@usgs.gov>
Subject: Re: Levy County FSAR and site audit
From: David C Twichell <dtwichell@usgs.gov>
Date: Fri, 26 Sep 2008 09:05:46 -0400

Eric,

I have read the Levy COunty FSAR, and, as Uri pointed out, it is remarkably repetative. It also is just a literature search with little assessment of the impact of tsunamis on the Gulf of Mexico. For example, Table 2.4.6-202 summarizes tsunami events affecting the Caribbean. Why isn't it tsunami events affecting the Gulf of Mexico? Additionally, they report the runups presumably from near the source area. The Krakatau volcanic eruption reports a runup of 35 m (at least I assume the heights are in meters although it isn't stated in the table), but it certainly wasn't that high in the GOM. The table in its present form is somewhat misleading.

I think the discussion of the importance of landslides is incomplete. To dismiss the one paper that has attempted to predict the height of the tsunami because it is published in a meeting proceedings rather than a refereed journal seems weak - the same reasoning was used for the South Texas Project, and it

didn't work there. It seems that it would be appropriate for them to at least summarize the size and distribution of other landslides in the Gulf of Mexico. Is the East Breaks failure the largest? Are there others, because of their location, that could potentially be more damaging than the East Breaks one? It will be interesting to see what Pat's and your work on the Mississippi Canyon and Florida Slope failures comes up with.

The citation from our work on page 2.4-50 seems to avoid the question at hand. There is no mention of the large failures form the canyon/fan province, and the discussion of the carbonate province just touches on the escarpment itself. The failures that originated in the Mississippi Canyon probably are the largest that occurred in the Gulf, and they aren't mentioned. The failures on hte slope above the Florida Escarpment are the largest in hte carbonate province, and they aren't mentioned.

The site itself is 12.5 m above sealevel, so the chances of its being affected by a tsunami seem unlikely. Having looked at figures 1.1-201 and 2.4.1-202 there is mention of a Makeup Water Pumphouse several kilometers from the plant site on the Cross Florida Barge Canal. **What does the Makeup Water Pumphouse do? Is it critical to the safety of the plant? What is its elevation? If it is in an area that potentially could be flooded by a storm or tsunami, how is it protected? There also is a Blowdown Pipe that connects with the Crystal River Energy Complex. What does it do, and if it is damaged does it affect the safe operation of the plant?**

How does the cooling system for the plant work? Figure 2.4.1-205 shows a bunch of ponds around the plant. Are these ponds associated with the cooling system or do they do something else? On page 2.4-49 there is mention of a recent earthquake in the GOM causing seiches in swimming pools in Florida. Would seiches in these ponds (regardless of their purpose) be a problem with flooding the plant? **I looked through some of the earlier chapters to try to get an understanding of how this plant is to operate (ie. with a cooling reservoir like South Texas or with intake pipes like Calvert Cliffs). I couldn't find much, and some of these questions may not be relevant once the operation of the system is explained.**

In the 3rd paragraph on p. 2.4-58 it is stated that "Though impacts will vary because of nearshore propagation and runup effects, we can estimate the maximum runup height at 2.0 m (3 x .65 m ~ 2m)." How was the runup estimate from this 0.65 m tsunami calculated?

In section 2.4.6.6, on Hydrography and Harbor or Breakwater Influences, where are all of the structures that are needed for the safe operation of the plant? If everything is contained at the plant site, then this probably is true, but if the Makeup water pumphouse and blowdown pipeline are part of the safety system, then this may not be the case.

Many of these comments, if appropriate, will need to be formulated into questions. Some of my comments may indicate my lack of understanding on how the plant is to operate in which case they should be dropped. Hopefully at least some of them are helpful though.

Dave

David Twichell

U. S. Geological Survey
Quissett Campus
384 Woods Hole Road
Woods Hole, MA 02543-1598

Phone (direct): 508-457-2266
Phone (general): 508-548-8700
Fax: 508-457-2310
E-mail: dtwichell@usgs.gov