

NRR-PMDAPEm Resource

From: Wang, Alan
Sent: Wednesday, December 11, 2013 11:29 AM
To: SEITER, JEFFERY ALAN; Ward, Steven
Cc: Ahn, Hosung; Burkhardt, Janet
Subject: Grand Gulf Nuclear Station Request for Additional Information Regarding Flooding Hazard (TAC MF1102)

Jeff and Steve,

By letter dated March 11, 2013 (ML13071A457), Entergy Operation, Inc. provided their reevaluated flood hazard report in response to Enclosure 2 of the March 12, 2012, Fukushima Lessons-Learned 50.54(f) letter. To complete its review, the NRC staff requests additional information as noted below. The NRC staff request that to insure a timely review that this information be submitted within 30 days of receipt of this email.

RAI No. 3.1-1, Design Basis Flood Hazard:

NRC staff noted that the current design basis flood levels, which are identical to the current licensing basis levels listed on the Table 4.1-1 of the FHRR, are different from the design basis flood levels used in structural and flood protection analyses listed on the Table 3.4-1 of the FSAR (2012). Therefore the licensee is requested to clarify the current design basis flood levels described in the Section 2.2 of FHRR with those provided in the FSAR.

RAI No. 3.2-2, LIP Flooding:

Section 3.1.2.1.2 of the FHRR describes that the culverts modeled in FLO-2D were conservatively assumed to be 50-percent blocked either by adopting a half of the diameter for the Culvert #1 or by reducing the depth-discharge relationships for other culverts. The licensee is requested to provide an explanation of how a 50-percent reduction in the depth-discharge relationship represents a 50-percent blockage in a culvert. Also, provide a description of the culvert features (e.g., diameter, slope, invert elevation, roughness condition, upstream/downstream conditions, etc.) and how these culverts were modeled in the CulvertMaster calculation and FLO-2D in the local intense precipitation flood analyses.

RAI No. 3.2-3, LIP Flooding:

The licensee is requested to provide high resolution, digital versions of Figures 3.1-2 through 3.1-5 of the licensee's FHRR. Also, provide a detailed digital map showing the location of hydraulic structures (e.g., culverts, channels, levees/barriers, etc.) that were used in the FLO-2D modeling in the local intense precipitation flood analyses.

RAI No. 3.2-4, LIP Flooding:

The licensee is requested to provide (1) a description of the methods used to construct grid-based elevation input in FLO-2D from point-based elevation measurements, (2) a brief description of the likely magnitude of the errors (e.g., measurement and interpolation errors) associated with these grid-based elevations, and (3) a discussion of the related uncertainty associated with the onsite flood level estimations.

RAI No. 3.2-5, LIP Flooding:

The licensee is requested to discuss how the vehicle barrier system was incorporated in the FLO-2D modeling in the local intense precipitation analyses.

RAI No. 3.2-6, LIP Flooding:

The licensee is requested to provide electronic versions of the input files used for the FLO-2D modeling in the local intense precipitation analyses.

RAI No. 3.3-1, River and Stream Flooding:

The licensee is requested to provide the relationship between Manning's roughness coefficient (n-value) and observed land cover used for the FLO-2D modeling in the Stream A and Stream B flood analyses.

RAI No. 3.3-2, River and Stream Flooding:

The licensee is requested to provide electronic versions of the input files for HEC-HMS and HEC-RAS models in the river and stream flooding analyses.

RAI No. 3.3-3, River and Stream Flooding:

NRC staff noted that the licensee did not address all potential Bayou Pierre basin flooding mechanisms except the river flooding caused by probable maximum precipitation. Staff's review of the FHRR noted that the Bayou Pierre basin may have the potential to flood the Grand Gulf nuclear plant facilities if the divide between Bayou Pierre and the plant site is eroded or the Bayou Pierre River downstream from the site would potentially become blocked by a landslide. Therefore, the licensee is requested to provide an analysis of the potential effects of Bayou Pierre floods on the Grand Gulf nuclear plant facilities considering combinations of appropriate flood causing mechanisms, including probable maximum precipitation, dam failure, channel migrations and divisions, and landslide blockage on the Bayou Pierre basin.

RAI No. 3.3-4, River and Stream Flooding:

The licensee addressed local intense precipitation flooding in Section 3.1 of the FHRR and PMP-induced river floods on Stream A and Stream B on Section 3.2 of the FHRR: However the FHRR did not analyze a combined flooding event of the three flood-causing mechanisms. A combined event of local intense precipitation flooding and floods on Stream A and Stream B could occur because (1) the two stream basins and the onsite drainage area are adjacent each other and small enough to apply a single probable maximum precipitation scenario, and (2) the onsite drainage could be affected by floods on Stream A and Stream B as the invert elevations of onsite drainage culverts discharging to the streams are lower than the estimated flood levels on Stream A and Stream B. Therefore, the licensee is requested to provide an analysis of the local intense precipitation flooding associated with PMP-based floods on both Stream A and Stream B to determine a potentially larger onsite flood hazard. The licensee also is requested to provide electronic versions of the input files used for hydrologic simulations, if any, in relation to this RAI.

RAI No. 4.0-1, Integrated Assessment:

(1) The NRC staff noted from the Table 4.1-1 of the FHRR that the reevaluated site flood levels exceed the corresponding design basis flood levels, triggering an Integrated Assessment. Therefore, the licensee is requested to confirm that an integrated assessment will be submitted within two years of the submittal of the FHRR. The licensee should also clarify which flood hazard mechanisms will be included in the Integrated Assessment.

(2) The March 12, 2012, 50.54(f) letter, Enclosure 2, requests the licensee to perform an integrated assessment of the plant's response to the reevaluated hazard if the reevaluated floods hazard is not bounded by the current design basis. The licensee is requested to provide the applicable flood event duration parameters (see definition and Figure 6 of the Guidance for Performing an Integrated Assessment, JLD-ISG-2012-05) associated with mechanisms that trigger an Integrated Assessment. This includes (as applicable) the warning time the site will have to prepare for the event, the period of time the site is inundated, and the period of time necessary for water to recede off the site for the mechanisms that are not bounded by the current design basis. The licensee is also requested to provide a basis for the flood event duration parameters. The basis for warning time may include information from relevant forecasting methods (e.g., products from local, regional, or national weather forecasting centers).

RAI No. 4.0-2, Integrated Assessment:

The March 12, 2012, 50.54(f) letter, Enclosure 2, requests the licensee to perform an integrated assessment of the plant's response to the reevaluated hazard if the reevaluated flood hazard is not bounded by the current design basis. The licensee is requested to provide a brief summary of the flood height and associated effects (as defined in Section 9 of JLD-ISG-2012-05) that trigger an Integrated Assessment. This includes the following quantified information for each mechanism (as applicable):

- Flood height
- Wind waves and runup
- Hydrodynamic loading, including debris,
- Effects caused by sediment deposition and erosion (e.g., flow velocities, scour),
- Concurrent site conditions, including adverse weather,
- Groundwater ingress, and
- Other pertinent factors.

This RAI was discussed with Mr. [Jeff Seiter](#) on [December 9, 2013](#), and it was agreed that a response would be provided within 30 days of receipt of this email. If circumstances result in the need to revise the requested response date, please contact me at (301) 415-1445 or via e-mail at Alan.Wang@nrc.gov.

Alan Wang
Project Manager (Grand Gulf Nuclear Station)
Nuclear Regulatory Commission
Division of Operating Reactor Licensing
Alan.Wang@NRC.gov
Tel: (301) 415-1445
Fax: (301) 415-1222

Hearing Identifier: NRR_PMDA
Email Number: 949

Mail Envelope Properties (C0A338EE37A11447B136119705BF9A3F02045E0B8FD3)

Subject: Grand Gulf Nuclear Station Request for Additional Information Regarding
Flooding Hazard (TAC MF1102)
Sent Date: 12/11/2013 11:28:31 AM
Received Date: 12/11/2013 11:28:00 AM
From: Wang, Alan

Created By: Alan.Wang@nrc.gov

Recipients:

"Ahn, Hosung" <Hosung.Ahn@nrc.gov>
Tracking Status: None
"Burkhardt, Janet" <Janet.Burkhardt@nrc.gov>
Tracking Status: None
"SEITER, JEFFERY ALAN" <jseiter@entergy.com>
Tracking Status: None
"Ward, Steven" <sward1@entergy.com>
Tracking Status: None

Post Office: HQCLSTR02.nrc.gov

Files	Size	Date & Time
MESSAGE	8530	12/11/2013 11:28:00 AM

Options

Priority: Standard
Return Notification: No
Reply Requested: No
Sensitivity: Normal
Expiration Date:
Recipients Received: ZZZ