NRR-PMDAPEm Resource

From: Hall, Victor
Sent: Monday, March 23, 2015 1:49 PM
To: david.distel@exeloncorp.com
Cc: Wiebe, Joel; Shams, Mohamed
Subject: RESEND: Request for Additional Information: Braidwood Flooding Hazard Reevaluation Report (TAC Nos. MF3895 and MF3896)
Attachments: Braidwood RAIs Rev4.docx

David,
I am re-sending to correct typographical errors (changed LaSalle to Braidwood). Thanks! Also, one of key guys cannot support a call this week. How does next week (week of March 30th) look?
Thanks,
-Vic

From: Hall, Victor
Sent: Monday, March 23, 2015 12:13 PM
To: david.distel@exeloncorp.com
Cc: Wiebe, Joel; Shams, Mohamed
Subject: Request for Additional Information: Braidwood Flooding Hazard Reevaluation Report (TAC Nos. MF3895 and MF3896)

Mr. Distel,

By letter dated March 12, 2014, Exelon Generation Company LLC (the licensee) submitted its flood hazard reevaluation report (FHRR) for LaSalle County Station, Units 1 and 2 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML14079A427). By e mail dated June 18, 2014, the U.S. Nuclear Regulatory Commission (NRC) staff provided a request for additional information (RAI) regarding the above referenced FHRR (ADAMS Accession No. ML14169A545). The licensee responded to this RAI by letter dated July 14, 2014 (RS-14-194) (ADAMS Accession No. ML14293A599).

The staff determined that the attached RAI is necessary to complete its assessment of the licensee's FHRR. Please contact me if you would like clarification on the attached RAI. If no clarification is necessary, the NRC requests that Exelon provide a response, or a schedule to provide a response, within 30 days of this e-mail. The NRC staff has determined that no security-related or proprietary information is contained herein.

Thank you,
-Vic

Victor Hall
Senior Project Manager
Japan Lessons Learned Division
Office of Nuclear Reactor Regulation
301-415-2915

Hearing Identifier: NRR_PMDA
Email Number: 1971

Mail Envelope Properties (Victor.Hall@nrc.gov20150323134800)

Subject: RESEND: Request for Additional Information: Braidwood Flooding Hazard Reevaluation Report (TAC Nos. MF3895 and MF3896)
Sent Date: 3/23/2015 1:48:33 PM
Received Date: 3/23/2015 1:48:00 PM
From: Hall, Victor

Created By: Victor.Hall@nrc.gov

Recipients:
"Wiebe, Joel" <Joel.Wiebe@nrc.gov>
Tracking Status: None
"Shams, Mohamed" <Mohamed.Shams@nrc.gov>
Tracking Status: None
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Tracking Status: None

Post Office:

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MESSAGE	1699	3/23/2015 1:48:00 PM
Braidwood RAIs Rev4.docx	37164	

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

Request for Additional Information
Fukushima Lessons Learned Flood Hazard Reevaluation Report
BraidwoodGenerating Station, Units 1 and 2 (TAC Nos. MF3895 and MF3896)

By letter dated March 12, 2014, Exelon Generation Company LLC (the licensee) submitted its flood hazard reevaluation report (FHRR) for BraidwoodGenerating Station, Units 1 and 2 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML14079A427). By e-mail dated June 18, 2014, the U.S. Nuclear Regulatory Commission (NRC) staff provided a request for additional information (RAI) regarding the above referenced FHRR (ADAMS Accession No. ML14169A545). The licensee responded to this RAI by letter dated July 14, 2014 (RS-14-194) (ADAMS Accession No. ML14293A599). The staff determined that additional information, as requested below, is necessary to complete its assessment of the licensee's FHRR.

RAI 1: Section 3.1 – Effects of Local Intense Precipitation (LIP)

Background: Section 3.1.1.1 "Local Precipitation" of the FHRR states: "The site-specific study for the LIP at BGS is performed for the calculation BRW-13-FUK-0170." That calculation package shows that HydrometeorologicalReport (HMR) 52 was used to calculate the 1-hour 1-mi^2 LIP depths of 17.8 inches. This is the same depth as calculated for the current licensing basis, as described in Subsection 2.2.1, "Effects of Local Intense Precipitation," of Section 2.2 "Current Design Basis," of the FHRR. Also FHRR Table 4.1 "Summary of Licensing Basis and External Flooding Study Parameters," indicates that HMR 51 and HMR 52 were used for the LIP calculations.

Request: Provide clarification of the use of HMR 51 and HMR 52 methods for the reevaluated LIP analysis at Braidwood Generating Station (BGS) and a confirmation that site-specific LIP analysis was not intended to be used.

RAI 2: Section 3.1 – Effects of LIP

Background: Several cells of the FLO-2D output files (e.g., TIME.OUT, VELTIMEFP.OUT) have large time step modifications, maximum velocities of over 20 ft/s, and maximum flow depths of 13.5 and 18.5 feet for the terrain of the respective cell (e.g., cells 39299 and 34167).

Request:Examine, and correct if needed, step modifications, maximum velocities over 20 ft/s, and flow depths in the FLO-2D models. If revised or additional modeling is necessary, provide electronic versions of any associated modeling input and output files.

RAI 3: Section 3.1 – Effects of LIP

Background:The staff compared aerial imagery and the shape files created by the FLO-2D software using geographical information system (GIS software) to verify that site features (e.g., buildings, drainage systems, and paved surfaces) have been properly modeled in the Local Intense Precipitation (LIP) analysis.

Request:Justify the following assumptions in the FLO-2D model, which appear to be non-conservative. If revised or additional modeling is necessary, provide electronic versions of any associated modeling input and output files.

- Many vehicle security barriers are modeled as levees (i.e., concrete blocks) in FLO-2D. However, the spacing of the modeled concrete blocks differs from the spacing of the barriers observed in the aerial photographs. The modeled flow could be less conservative since the modeled blocks might not impede flow as might be expected by the actual vehicle barriers.
- The aerial photographs show seven similar rectangular structures located east of the containment buildings, which appear to be portable trailers. One of these structures is modeled as a barrier to flow while the other six are not. The licensee noted that portable trailers should not be modeled as barriers to flow, therefore the modeling appears inconsistent.
- The model ofan apparent drainage ditch in the parking lot on the south side of the site appears to completely impede flow.

RAI 4: Section 3.1 – Effects of LIP- Event Duration and Distribution

Background: The FHRR presents a LIP flood reevaluation for a one-hour, front-loaded probable maximum precipitation (PMP) event using HMRs 51 and 52. This approach may not capture the potentially most conservative and bounding flood condition resulting from precipitation events of different magnitude, duration, and timing.

Request: Provide justification that the LIP analysis presented in the FHRR is bounding in terms of warning time, flood depth, and flood duration. This justification can include sensitivity analysis of LIP event duration to consider localized (one square mile) PMP events up to 72 hours in duration (e.g., 1-, 6-, 12-, 24-, 48-, 72-hour PMPs)and various rainfall distributions (e.g., center-loaded and others in addition to a front-loaded distribution). The evaluations could identify potentially bounding scenarios with respect to flood height, event duration, and associated effects.Provide electronic versions of any associated modeling input and output files for the sensitivity runs.

RAI 5: Section 3.5 - Dam Assessment and Failure - Sensitivity of dam failure timing to the downstream peak flow at the site

Background: The failure of a potentially critical dam, the Braidwood cooling pond dam, was simulated in the HEC-HMS model assuming that the dam fails at the peak water surface elevation in its reservoir (peak pool elevation). However, the peak flow resulting from a dam failure at the peak pool elevation might not be coincident with the peak flow from the Mazon River watershed when both of them are routed to the downstream location near the site. The coincident dam failure and peak river flow could result in higher flood elevations at the site.

Request:Perform a sensitivity analysis of the flood elevation at the site based upon the timing of the dam failure and peak flow for Mazon River. Include flow and water surface elevation hydrographs of inputs and response from the sensitivity analyses as well as a discussion of the methods and results. Also include a discussion of the degree of conservatism of the original analysis as well as the sensitivity analyses. Provide an electronic copy of input and output files used for the analyses.

RAI 6: Section 3.4 Probable Maximum Storm Surge (PMSS) and Seiche – Fetch height

Background:Subsection 3.4.2.1 “Storm Surge,” states that “The determination of storm surge height was calculated using equations derived in an article in the Journal of Research of the National Bureau of Standards, ‘Wind Tides in Small Closed Channels’ by Garbis H. Keulegan (Keulegan). The two equations used to determine the PMSS, wind and pressure surge setup respectively, are a function of the wind speed, critical wind speed, depth of water and fetch length. The fetch is the longest straight line length in one direction at a certain elevation spanning the pond.” However, the calculations appear to not have multiplied the fetch lengthper the Keulegan equations:

Surge Depth=Factor x Fetch Length x Function(Wind Speed,Depth of Water)

This would result in a lower surge setup on the cooling pond based on the parameters and conditions at the site.

Request:Verify that the fetch length was appropriately applied in the cooling pond surge calculations, and provide any revised calculations, if needed. Provide a discussion of the use of the Keulegan equations based on the probable maximum storm surge parameters and conditions at the site.