Exelon.
Generation

NP-11-0007
February 10, 2011

10 CFR 52, Subpart A

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Subject: Exelon Nuclear Texas Holdings, LLC
Victoria County Station Early Site Permit Application
Hydrology Audit Information Needs Response
NRC Docket No. 52-042

In response to the NRC information needs requests identified during the NRC Hydrology Audit conducted on November 30, 2010 and December 1, 2010, Exelon is providing responses to the following NRC Information Needs (INH) Items:

INH No. 5 (SSAR Section 2.4.3)
INH No. 19 (SSAR Section 2.4.6.1)
INH No. 27 (SSAR Section 2.4.7)
INH No. 55 (SSAR Section 2.4.12)

If any additional information is needed, please contact David J. Distel at (610) 765-5517.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 10th day of February, 2011.

Respectfully,

Marilyn C Kray

Marilyn C. Kray
Vice President, Nuclear Project Development

Attachments:
1. INH No. 5 Response
2. INH No. 19 Response
3. INH No. 27 Response
4. INH No. 55 Response
5. Summary of Commitments

cc: USNRC, Director, Office of New Reactors/NRLPO (w/Attachments)
✓ USNRC, Project Manager, VCS, Division of New Reactor Licensing (w/Attachments)
USNRC Region IV, Regional Administrator (w/Attachments)

D087
NRO

Information Needs Item No. 5:

NRC Request:

Please provide a SME to discuss the following references:

2.4.3-1 U.S. Army Corps of Engineers, Dam Assurance Study on Canyon Lake, Guadalupe Basin, Fort Worth District, with input and output data files for Watershed Run-off Computer Model (WRCM), June 2005.

2.4.3-7 U.S. Army Corps of Engineers, Canyon Dam Flood Emergency Plan, Fort Worth District, February 1998.

2.4.3-8 Federal Emergency Management Agency, Flood Insurance Study, Victoria County, Texas, Unincorporated Area, November 20, 1998.

2.4.3-5 Albert H. Halff Associates, Inc., Dam Break Analysis for Coleto Creek Dam, for Guadalupe-Blanco River Authority, March 1989.

Response:

During the Hydrology Audit held on November 30, 2010, the discussion on the four references as listed in the NRC request was completed with no follow up action on them. However, the NRC requested that Exelon submit additional discussion and revision to SSAR page 2.4.3-12, paragraph four, to describe analysis assumptions, starting conditions, analysis approach, and initial condition of routing of PMF and also to clarify use of the word "superimposed" in discussion of antecedent condition.

As indicated in SSAR 2.4.3.1, Revision 0, a storm equivalent to 40 percent of the 72-hour PMP ending 3 days before the start of the 72-hour PMP, with a 6-day lag time between the starts of the two storms, is considered as the antecedent storm per ANSI 2.8-1992 (SSAR Reference 2.4.3-22). The estimated 40 percent PMF and the full PMF hydrographs at the site are provided in SSAR Figures 2.4.3-26 and -27, respectively, which show that the hydrograph from the full PMF peaks on day 5 at about 06:00 hours with flow rate of approximately 1,123,300 cfs (31,808 m^3/s). In addition, the corresponding flow rate for the 40 percent PMF, at 06:00 hours on day 11 (day 5 + 6 days of lag time) is approximately 40,000 cfs (1133 m^3/s). Because the flow contribution from the 40 percent PMF is small compared to the flow from the full PMF (less than 4 percent), the PMF at the site was estimated based on the full PMP only.

In response to this NRC request, the ninth paragraph of SSAR Subsection 2.4.3.4 (page 2.4.3-12), Revision 0, will be revised in a future ESPA revision as follows:

~~The PMF hydrograph is superimposed onto the hydrograph for the 40 percent PMP, with the start of day 1 of the PMF at the start of day 7 of the 40 percent PMF; i.e., the PMF hydrograph lagged 3 full days after the cessation of the 40 percent 72-hour PMP. Note that the PMF at VCS peaks at approximately 06:00 hours on day 5 with a flow rate of approximately 1,123,300 cfs (31,808 m^3/s) (Figure 2.4.3-27). From the 40 percent PMP hydrograph (Figure 2.4.3-26), the flow rate at approximately 06:00 hours in day 11 is estimated to be approximately 40,000 cfs (1133 m^3/s).~~ Figure 2.4.3-27 indicates that the PMF hydrograph at VCS peaks at approximately 06:00 hours on day 5 with a flow rate of approximately 1,123,300 cfs (31,808 m^3/s). The corresponding flood flow rate of the antecedent storm at the time when the PMF peaks near the site, i.e., at 06:00 hours on day 11 of the 40 percent PMF hydrograph is estimated to be 40,000 cfs (1133 m^3/s), as shown in Figure 2.4.3-26. This indicates that the 40 percent PMP would add less than 4 percent to the PMF peak discharge. Therefore, ~~it is concluded that~~ the antecedent storm of 40 percent PMP is not included in the PMF peak discharge estimate because it has no significant impact on the flood flow. ~~would not significantly increase the PMF peak discharge near the project site. It is not necessary to superimpose the two flood hydrographs together to arrive at the PMF peak discharge.~~

In addition, the first sentence of the tenth paragraph of SSAR Subsection 2.4.3.4 (page 2.4.3-12), Revision 0, will be revised in a future ESPA revision as follows:

Using the starting reservoir water levels at the four reservoirs resulting from the 40 percent PMP runs, as shown in Table 2.4.3-25, the resulting PMP flood peak discharges of the Guadalupe River at the Canyon Dam, Gonzales, Cuero, and Victoria near the VCS site are depicted in Table 2.4.3-26.

Associated ESPA Revision:

The ninth paragraph of SSAR Subsection 2.4.3.4 (page 2.4.3-12), Revision 0, will be revised in a future ESPA revision as follows:

~~The PMF hydrograph is superimposed onto the hydrograph for the 40 percent PMP, with the start of day 1 of the PMF at the start of day 7 of the 40 percent PMF; i.e., the PMF hydrograph lagged 3 full days after the cessation of the 40 percent 72-hour PMP. Note that the PMF at VCS peaks at approximately 06:00 hours on day 5 with a flow rate of approximately 1,123,300 cfs (31,808 m^3/s) (Figure 2.4.3-27). From the 40 percent PMP hydrograph (Figure 2.4.3-26), the flow rate at approximately 06:00 hours in day 11 is estimated to be approximately 40,000 cfs (1133 m^3/s).~~ Figure 2.4.3-27 indicates that the PMF hydrograph at VCS peaks at approximately 06:00 hours on day 5 with a flow rate of approximately 1,123,300 cfs (31,808 m^3/s). The corresponding flood flow rate of the antecedent storm at the time when the PMF peaks near the site, i.e., at 06:00 hours on day 11 of the 40 percent PMF hydrograph is estimated to be 40,000 cfs (1133 m^3/s), as shown in Figure 2.4.3-26. This indicates that the 40 percent PMP would add less than 4 percent to the PMF peak discharge. Therefore, ~~it is concluded that~~ the antecedent storm of 40 percent PMP is not included in the PMF peak discharge estimate because it has no significant impact on the flood flow. ~~would not significantly increase the PMF peak discharge near the project site. It is not necessary to superimpose the two flood hydrographs together to arrive at the PMF peak discharge.~~

The first sentence of the tenth paragraph of SSAR Subsection 2.4.3.4 (page 2.4.3-12), Revision 0, will be revised in a future ESPA revision as follows:

Using the starting reservoir water levels at the four reservoirs resulting from the 40 percent PMP runs, as shown in Table 2.4.3-25, the resulting PMP flood peak discharges of the Guadalupe River at the Canyon Dam, Gonzales, Cuero, and Victoria near the VCS site are depicted in Table 2.4.3-26.

Information Needs Item No. 19:

NRC Request:

Provide a SME to supply a more detailed evaluation of potential earthquakes in the Gulf of Mexico in terms of tsunami source parameters. Also provide a SME to discuss the characterization of Gulf of Mexico seismic sources in FSAR Section 2.4.6.1 differs from that of FSAR Section 2.5.2, specifically FSAR Section 2.5.2.4.3.1 and a Mmax=7.2 contained in FSAR Table 2.5.2-19.

Response:

Based on discussions during the NRC hydrology audit, the following response clarifies the differences in earthquake magnitudes as requested by INH 19. The earthquake that occurred in the Gulf of Mexico on September 10, 2006 had the largest magnitude of any recorded historic event. The moment magnitude (M_W) is reported as 5.8 and the body wave magnitude is 6.1 (m_b) (SSAR, Rev. 0, Section 2.5.2.1.4). This corresponds with the magnitude of 5.8 reported in SSAR Section 2.4.6.1. As reported in SSAR Section 2.4.6.1, the U.S. Geological Survey concluded that earthquakes of this magnitude are unlikely to produce a destructive tsunami. Because the Gulf of Mexico is an intraplate region, it does not contain crustal plate boundaries along which potential tsunamigenic earthquakes might occur.

In addition to reporting earthquake magnitudes based on calculations from seismic recordings, SSAR Section 2.5.2 documents earthquake magnitudes reported in multiple earthquake catalogs used to develop the updated earthquake catalog for the Victoria County ESP Application (SSAR Section 2.5.2.1), which is used for the site-specific probabilistic seismic hazard analysis (SSAR Section 2.5.2.4). As part of the site specific seismic hazard analysis, Exelon followed the guidance provided by the NRC in Regulatory Guide 1.208 to update the characterization of the seismic source zones developed by the six Earth Science Teams for their comprehensive study for the EPRI-Seismic Owners Group. SSAR Table 2.5.2-19 shows the maximum earthquake magnitude (M_{max}) distributions and weights from the EPRI-SOG model and the updated model for the Victoria County ESP that incorporates post-1989 seismicity. The M_{max} 7.2 reported for the Dames and Moore and Weston Geophysical Teams represents the upper bound of a probability distribution calculated by Exelon following the methodologies used by those expert teams for their 1989 study; as such, these upper bound M_{max} values cannot be compared with actual earthquake magnitudes.

Associated ESPA Revision:

To provide additional clarification, the seventh paragraph of SSAR Section 2.4.6, Rev. 0, will be revised in a future ESPA revision as follows:

Earthquakes within the Gulf of Mexico were also recorded with epicenters located within the North American plate boundaries. Such "midplate" earthquakes are less common than earthquakes occurring on faults near plate boundaries (Reference 2.4.6-5). Severe earthquakes from this region occurring in the past 3 decades had the epicenters within the Mississippi Canyon/Fan province west of the Florida Escarpment. The most severe earthquake occurred on September 10, 2006 with an earthquake magnitude of 5.8. The second most significant earthquake in the region in recent time occurred on February 10, 2006 with a magnitude of 5.2. The United States Geological Survey (USGS) concluded that earthquakes of this magnitude are unlikely to produce any destructive tsunami (Reference 2.4.6-5). The earthquake magnitudes cited above are based on calculations from seismograph recordings (seismograms). These types of instrumental magnitudes are documented in Subsection 2.5.2.1 (earthquake catalog) and differ from upper bound estimates of probability distributions such as maximum magnitudes (M_{max} 7.2) reported on Table 2.5.2-19.

Information Needs Item No. 27:

NRC Request:

Provide a SME to discuss an assessment of ice effects and snow melts on floods along Guadalupe River.

Response:

During the Hydrology Audit held on November 30, 2010, NRC requested the applicant to provide additional discussion and revision to SSAR Section 2.4.7.3, paragraph 3, to clarify that the UHS storage facilities, if needed, would provide a source of cooling water specifically for the UHS.

In response to this NRC request, paragraph 3 of SSAR Section 2.4.7.3, Rev. 0, will be revised as follows:

The UHS storage facilities would provide a source of cooling water for the UHS cooling tower, if needed, to maintain the plant in a safe mode. The design of the UHS would consider the potential presence of up to 5 inches (12.7 centimeters) of surface ice sheet formation.

Associated ESPA Revision:

Paragraph 3 of SSAR Section 2.4.7.3, Rev. 0, will be revised in a future ESPA revision as follows:

The UHS storage facilities would provide a source of cooling water for the UHS cooling tower, if needed, to maintain the plant in a safe mode. The design of the UHS would consider the potential presence of up to 5 inches (12.7 centimeters) of surface ice sheet formation.

Information Needs Item No. 55:

NRC Request:

Please provide an SME to discuss the ground water/surface water interactions in the drainage ditches around the outside of the embankment as described in paragraph 4 (of page 2.4.12-12).

Response:

The following information is provided in response to this information need, based upon discussions during the NRC hydrology audit. The use of drainage ditches was included to address seepage through the embankment structures and is evaluated elsewhere in the SSAR; however, use of other structures (such as sand drains and relief wells) has not been evaluated and was only included in Subsection 2.4.12 to represent examples of other design considerations to address seepage. To eliminate confusion, the reference to sand drains and relief wells is being removed from page 2.4.12-35.

Associated ESPA Revision:

Paragraph 1 on SSAR Page 2.4.12-35, Rev. 0, will be revised in a future ESPA revision to read:

Another impact of cooling basin seepage would be to raise groundwater levels beneath the power block. Figure 2.4.12-27 presents a simulated potentiometric surface map in model layer 2 (geotechnical Sand 1) in the power block area. The map indicates that groundwater levels are predicted to rise after filling the cooling basin. However, the permeable backfill around the power block buildings provides a pathway for vertical flow to bypass the underlying clay layers and enter the more permeable sands of the Lower Shallow aquifer. The maximum predicted groundwater elevation in the power block area is at approximately 85 feet. Figure 2.4.12-28 presents the simulated potentiometric surface surrounding the cooling basin in layer 2. ~~The design of the cooling basin may include additional structures (such as drainage ditches, sand drains, and relief wells) if lowering of the groundwater table is required at areas adjacent to the cooling basin.~~

ATTACHMENT 5

SUMMARY OF REGULATORY COMMITMENTS

(Exelon Letter to USNRC, NP-11-0007, dated February 10, 2011)

The following table identifies commitments made in this document. (Any other actions discussed in the submittal represent intended or planned actions. They are described to the NRC for the NRC's information and are not regulatory commitments.)

COMMITMENT	COMMITTED DATE	COMMITMENT TYPE	
		ONE-TIME ACTION (Yes/No)	Programmatic (Yes/No)
Exelon will revise the VCS ESPA SSAR Section 2.4.3 to incorporate the change shown in the enclosed response to the following NRC Information Needs Request: INH No. 5 (Attachment 1)	Revision 1 of the ESPA SSAR and ER planned for no later than March 31, 2012	Yes	No
Exelon will revise the VCS ESPA SSAR Section 2.4.6 to incorporate the change shown in the enclosed response to the following NRC Information Needs Request: INH No. 19 (Attachment 2)	Revision 1 of the ESPA SSAR and ER planned for no later than March 31, 2012	Yes	No
Exelon will revise the VCS ESPA SSAR Section 2.4.7.3 to incorporate the change shown in the enclosed response to the following NRC Information Needs Request: INH No. 27 (Attachment 3)	Revision 1 of the ESPA SSAR planned for no later than March 31, 2012	Yes	No
Exelon will revise the VCS ESPA SSAR Section 2.4.12 to incorporate the change shown in the enclosed response to the following NRC Information Needs Request: INH No. 55 (Attachment 4)	Revision 1 of the ESPA SSAR planned for no later than March 31, 2012	Yes	No