August 31, 2006

Administrative Judge Paul B. Abramson, Chair
Atomic Safety and Licensing Board Panel
U.S. Nuclear Regulatory Commission
Mail Stop: T-3F23
Washington, D.C. 20555-0001

Administrative Judge David L. Hetrick
8740 East Dexter Drive
Tucson, AZ 85715

Administrative Judge Anthony J. Baratta
Atomic Safety and Licensing Board Panel
U.S. Nuclear Regulatory Commission
Mail Stop: T-3F23
Washington, D.C. 20555-0001

In the Matter of
EXELON GENERATION COMPANY, LLC
(Early Site Permit for Clinton ESP Site)
Docket No. 52-007-ESP

Dear Administrative Judges:

In its Order of August 17, 2006, the Board instructed the Staff to produce a table explaining how certain facts and technical conclusions referenced in specific subsections of the Staff's Final Safety Evaluation Report (FSER) relate to the Staff's conclusions regarding the subject matter of those subsections. In particular, the Board requested that the table provide this explanation with respect to Sections 2.4, 2.5, 13.3.1, and 13.3.3.11 of the FSER. The Staff has enclosed with this letter the table responding to the Board's Order.

Sincerely,

/RA/
Ann P. Hodgdon
Counsel for the NRC Staff

Enclosures: As stated

cc w/o encls:

Janet Marsh Zeller
Stephen P. Frantz, Esq.
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Staff Response to Board Order of August 17, 2006: Response to Amended Inquiry 88

Board's Amended Inquiry 88: With respect to the Sub-Sections addressing "Hydrologic Engineering" 2.4, "Geology, Seismology, and Geotechnical Engineering" 2.5, "Significant Impediments to the Development of Emergency Plans" 13.3.1, and "Protective Response" 13.3.3.11 of the FSER, the Staff shall deliver to the Board, not later than August 31, a table indicating each fact or technical conclusion referred to in a subsection of the FSER entitled "Technical Information in the Application" which was not expressly referred to in the succeeding subsection entitled "Technical Evaluation" and explaining (a) whether or not that fact or technical conclusion was verified, and if not, why not[1], and (b) how, if at all, that fact or conclusion undergirds (and the role that fact plays in the logic of) the Staff's conclusion regarding the matter subject of that subsection. To the extent that such fact(s) or conclusion(s) play no such role, Staff may so indicate, but should also indicate briefly the reason that fact is recited.

[1]To the extent such facts are taken by the Staff to be true on the basis that they are in the nature of an affirmation or declaration under oath by the Applicant, to shorten the response a general notation may be used (i.e. "affirmation") rather than spelling out this reason.

Section	**Fact or Technical Conclusion**	**a) verified, or not verified (why not?)** / **b) how that fact or conclusion undergirds the Staff's conclusion regarding the matter subject of that section**
2.4.1.1	[pg. 2-56; para. 3] The construction of an earthen dam, 1200 feet (ft) downstream from the confluence of the North Fork of Salt Creek with Salt Creek, formed Clinton Lake.	a) Affirmation; not verified b) Precise location of Clinton Dam did not have an effect on Staff's evaluation in the SER.
2.4.1.1	[pg. 2-56; para. 3] Clinton Lake has two arms, one on Salt Creek and the other on the North Fork of Salt Creek.	a) Affirmation; verified by Staff (Fig. 2.4-1) b) This fact resulted in Staff's selection of the rainfall-runoff model to use in SER Section 2.4.3.3 (seven subbasin + lake model).
2.4.1.1	[pg. 2-56; para. 3] These arms extend 14 miles and 8 miles, respectively, upstream from the dam.	a) Affirmation; verified by Staff (Fig. 2.4-4)

		b) This fact resulted in Staff's selection of the rainfall-runoff model to use in SER Section 2.4.3.3 (seven subbasin + lake model).
2.4.1.1	[pg. 2-56; para. 3] The top elevation of the dam is 711.8 ft mean sea level (MSL), with a crest width of 22.8 ft.	a) Affirmation; not verified by Staff
		b) Top elevation of the dam was used in Staff's preliminary and bounding routing of the PMF through the Clinton Lake in SER Section 2.4.3.3. The crest width had no influence on Staff's evaluation.
2.4.1.1	[pg. 2-57; para. 1] The water intake for CPS Unit 1 is located on the North Fork of Salt Creek.	a) Affirmation; verified by Staff during site visit (Fig. 2.4-3)
		b) This fact helped establish the overall layout and functioning of the current CPS plant as well as that of the proposed ESP facility.
2.4.1.1	[pg. 2-57; para. 1] Unit 1 is discharged into the Salt Creek arm through a 3.4-mile-long discharge flume.	a) Affirmation; verified by Staff during site visit (Fig. 2.4-1 and 2.4-3)
		b) This fact helped establish the overall layout and functioning of the current CPS plant as well as that of the proposed ESP facility.
2.4.1.1	[pg. 2-57; para. 1] The hot discharge then travels through Clinton Lake to the North Fork of the Salt Creek arm.	a) Affirmation; verified by Staff during site visit (Fig. 2.4-2)
		b) This fact helped establish the overall layout and functioning of the current CPS plant as well as that of the proposed ESP facility.
2.4.1.1	[pg. 2-57; para. 1] Excess heat, which causes the water temperature to rise above the ambient equilibrium temperature, is primarily transferred from the lake's surface to the atmosphere through sensible, long-wave radiation and latent heat flux of evaporation.	a) Affirmation; verified by Staff during site visit (Fig. 2.4-2)
		b) This fact helped establish the overall layout and functioning of the current CPS plant as well as that of the proposed ESP facility.
2.4.1.1	[pg. 2-58; para. 1] The submerged dam is located approximately 1 mile west of the CPS intake structure.	a) Affirmation; verified by Staff during site visit (Fig. 2.4-3)

		b) This fact helped establish the overall layout and functioning of the current CPS plant as well as that of the proposed ESP facility.
2.4.1.1	[pg. 2-58; para. 1] The top of the submerged dam is at elevation 675 ft MSL.	a) Affirmation; not verified by Staff
		b) This fact was used in Staff's analysis of reservoirs and low water in SER Sections 2.4.8.3 and 2.4.11.3.
2.4.1.1	[pg. 2-58; para. 1] A baffle dike divides the submerged UHS pond in approximately equal halves.	a) Affirmation; verified by Staff during site visit (Fig. 2.4-3)
		b) This fact helped establish the overall layout and functioning of the current CPS plant as well as that of the proposed ESP facility.
2.4.1.1	[pg. 2-58; para. 1] The top of the baffle dike is at an elevation of 676 ft MSL.	a) Affirmation; not verified by Staff
		b) This fact helped establish the overall layout and functioning of the current CPS plant as well as that of the proposed ESP facility.
2.4.1.1	[pg. 2-58; para. 1] The UHS surface area at the design water surface elevation of 675 ft MSL is 158 ac with a total volume of 1067 acre-feet (ac-ft) or 46.62 million cubic feet (ft^3).	a) Affirmation; not verified by Staff
		b) This fact was used in Staff's analysis of excess water capacity in the submerged UHS pond in SER Section 2.4.8.3.
2.4.1.1	[pg. 2-58; para. 2] The intake for CPS Unit 1 is located on the submerged UHS pond.	a) Affirmation; verified by Staff during site visit (Fig. 2.4-3)
		b) This fact helped establish the overall layout and functioning of the current CPS plant as well as that of the proposed ESP facility.
2.4.1.1	[pg. 2-58; para. 2] During emergency operation, CPS Unit 1 UHS discharges into the submerged UHS pond downstream (i.e., south) of the baffle, allowing mixing and heat exchange to the atmosphere to occur before the discharge reaches the intake.	a) Affirmation; verified by Staff during site visit (Fig. 2.4-3)
		b) This fact helped establish the overall layout and functioning of the current CPS plant as well as that of the proposed ESP facility.

2.4.1.1	[pg. 2-59; para. 3] The location of the ESP facility's normal and UHS intake structures is approximately 65 ft south of the existing CPS intake structures.	a) Affirmation; not verified by Staff b) This fact helped establish the overall layout and functioning of the proposed ESP facility.
2.4.1.1	[pg. 2-60; para. 3] The ground water beneath the ESP site occurs in upper glacial deposits (Wisconsinan) and in the underlying Illinoian and Kansan tills.	a) Affirmation; verified by Staff using USGS Groundwater Atlas b) This fact was used in Staff's analysis of groundwater behavior in SER Section 2.4.12.
2.4.1.1	[pg. 2-60; para. 3] The applicant stated that, since these deposits are regional and not limited to any specific area within the ESP site, no specific coordinates delineate the aquifers underlying the ESP site.	a) Affirmation; verified by Staff using USGS Groundwater Atlas b) This fact was used in Staff's analysis of groundwater behavior in SER Section 2.4.12.
2.4.1.1	[pg. 2-60; para. 3] The applicant provided measured water levels at the ESP site obtained from borings and piezometers recently installed at the ESP site.	a) Affirmation; not verified by Staff b) Staff had no way to independently verify measurements made by the Applicant at the site. Staff relied on Applicant's assertions as they are made under oath and affirmation. This fact was used by Staff to establish seasonal variation of groundwater levels at and near the ESP site.
2.4.1.1	[pg. 2-60; para. 5] 677 ft MSL is the minimum required for continued supply of normal cooling water for power generation.	a) Affirmation; not verified by Staff b) Staff had no way to independently verify measurements made by the Applicant at the site. Staff relied on Applicant's assertions as they are made under oath and affirmation. This fact was used in Staff's analysis of low water in SER Sections 2.4.8.3 and 2.4.11.3.

2.4.1.1	[pg. 2-61; para. 1] The applicant found that water surface elevations in Clinton Lake did not fall to an elevation of 677 ft MSL, even with both the CPS Unit 1 and the ESP facility operating at 100-percent power.	a) Affirmation; verified by Staff b) Staff's independent analysis of water budget in SER Sections 2.4.8.3 and 2.4.11.3 verified this assertion.
2.4.1.1	[pg. 2-61; para. 4] There are no recent or pending permits for recreational or water supply dams upstream of Clinton Lake.	a) Affirmation; not verified by Staff b) Staff relied on Applicant's assertion which is made under oath and affirmation that the fact is based on Applicant's discussions with Illinois Department of Natural Resources (IDNR), Office of Water, Division of Water Resources Management, Dam Safety Section. This fact was used in Staff's analysis of future water demand in the Clinton Lake watershed in SER Sections 2.4.8.3 and 2.4.11.3.
2.4.1.1	[pg. 2-61; para. 5] No reservoirs or dams upstream or downstream from Clinton Lake exist that could affect the availability of water to Clinton Lake.	a) Affirmation; verified by Staff b) Staff verified Applicant's assertion using USGS topographical maps and found that Applicant's assertion was incorrect. Staff's RAI 2.4.1-3 addressed this issue.
2.4.1.1	[pg. 2-61; para. 5] The applicant identified four recreational dams, two on the North Fork of Salt Creek upstream of Clinton Lake and two downstream of Clinton Lake.	a) Affirmation; verified by Staff b) Staff verified Applicant's assertion using USGS topographical maps and found that Applicant's assertion was correct. This fact was used in Staff's assessment of maximum flood water levels at the ESP site in SER Sections 2.4.2.3, 2.4.3.3, and 2.4.4.3.

2.4.1.1	[pg. 2-61; para. 5] The applicant also stated that, because these dams were constructed for recreational purposes and have only limited storage capacities, water is not withdrawn from the watershed.	a) Affirmation; verified by Staff
		b) Staff disagreed with the Applicant in its assertion that "water is not withdrawn from the watershed." This fact did not affect Staff's analysis of maximum water levels during the PMF event at the ESP site described in SER Sections 2.4.2.3 and 2.4.3.3.
2.4.1.1	[pg. 2-61; para. 5] The applicant also noted that the portion of Salt Creek downstream from Clinton Lake is not a likely candidate for changes that would result in additional demand, since the flow in the creek is often low for long periods of time.	a) Affirmation; not verified by Staff
		b) Staff relied on Applicant's assertion made under oath and affirmation that there is only limited development planned in the watershed for the foreseeable future. This fact was used in Staff's analysis of low water in SER Sections 2.4.8.3 and 2.4.11.3.
2.4.1.1	[pg. 2-62; para. 1] The applicant further stated that the land upstream of Clinton Lake and the CPS submerged UHS pond is currently used primarily for agriculture.	a) Affirmation; verified by Staff during site visit
		b) This fact was used to establish the overall land use in the Clinton Lake watershed and was used in Staff's independent assessment of runoff generation parameters for rainfall-runoff analysis during the PMF event in SER Section 2.4.3.3.
2.4.1.1	[pg. 2-62; para. 1] The maximum expected sediment load to the tributaries originates in early spring when soils are exposed and planting has not yet begun.	a) Affirmation; verified by Staff
		b) This fact was used to establish sediment generation processes in the Clinton Lake watershed.
2.4.2.1	[pg. 2-72; para. 2] No landslides are documented for DeWitt County.	a) Affirmation; not verified by Staff
		b) This fact was used by Staff in its assessment of landslide-generated tsunami-like waves in SER Section 2.4.6.3.

2.4.2.1	[pg. 2-72; para. 2] According to the Illinois State Geological Survey map of classified known landslides in Illinois, landslide potential at the ESP site is low and hillslopes near the ESP site on Clinton Lake have been very stable for the past 30 years.	a) Affirmation; not verified by Staff
		b) This fact was used by Staff in its assessment of landslide-generated tsunami-like waves in SER Section 2.4.6.3.
2.4.2.1	[pg. 2-72; para. 4] The proposed plant site drains to the southeast.	a) Affirmation; not verified by Staff
		b) This fact does not directly affect Staff's evaluation since the site grading is expected to change substantially during construction of the ESP facility. According to COL Action Item 2.4-4, the CP or COL applicant should demonstrate that flooding from local intense precipitation at the ESP site is discharged to the Clinton Lake without reliance on any active drainage system components.

2.4.2.1	[pg. 2-72; para. 4] There are no significant internally drained areas that might result in accumulation of stormwater during local intense precipitation.	a) Affirmation; not verified by Staff b) This fact does not directly affect Staff's evaluation since the site grading is expected to change substantially during construction of the ESP facility. According to COL Action Item 2.4-4, in SER Section 2.4.2.3, the CP or COL applicant should demonstrate that flooding from local intense precipitation at the ESP site is discharged to the Clinton Lake without reliance on any active drainage system components.
2.4.2.1	[pg. 2-72; para. 5] The nominal grade elevation of 735 ft MSL provides more than 20 ft of elevation difference for drainage between the site grade and maximum flood water elevation in Clinton Lake.	a) Affirmation; verified by Staff b) This fact was used in Staff's independent assessment that the ESP site was safe from flooding during the PMF in SER Section 2.4.3.3.
2.4.2.1	[pg. 2-73; para. 3] The maximum water surface elevation (excluding the effects of coincident wind, storm surge, and seiche activity) that could be expected for Clinton Lake is 709.8 ft MSL. This elevation is based on flood calculations using a cumulative PMP depth of 27.8 in.	a) Affirmation; verified by Staff b) This fact was verified in Staff's independent evaluation of PMP and consequent PMF in the Clinton Lake watershed as described in SER Section 2.4.3.3. Staff's conclusion that the ESP site is safe from flooding during the PMF is based on this fact.
2.4.3.1	[pg. 2-80; para. 5] The watershed drainage area is 296 mi^2.	a) Affirmation; verified by Staff (Fig. 2.4-4) b) This fact was used in Staff's evaluation of the PMF as described in SER Section 2.4.3.3.
2.4.3.1	[pg. 2-80; para. 5] The applicant estimated a total precipitation of 25.2 in. during the 48-hour PMP storm.	a) Affirmation; verified by Staff

		b) Staff disagreed with the Applicant because the Applicant used HMR 33 to estimate the PMP. In response to Staff's RAI 2.4.2-1, the Applicant revised its PMP estimate according to recommendations of HMR 51 and 52. The revised PMP agreed with Staff's independent estimates. Staff used its own independent PMP estimate in subsequent estimation of the PMF as described in SER Section 2.4.3.3.
2.4.3.1	[pg. 2-80; para. 6] Soils in approximately 90 percent of the drainage area of the Clinton Lake watershed belong to Flanagan silt loam, Drummer clay loam, and Huntsville loam, which are classified in SCS soil group B.	a) Affirmation; not verified by Staff
		b) This fact did not directly affect Staff's conclusions. Staff relied on its own independent estimate of soil loss rates to assess the range of variation in the PMF water surface elevations in Clinton Lake. The range of soil loss rates used by the Staff bounded the Applicant's proposed estimate that the Applicant confirmed from the USACE.
2.4.3.1	[pg. 2-82; para. 2] The applicant stated that the operation of the ESP facility would not impact the potential for flooding at the existing dam or at the plant site.	a) Affirmation; verified by Staff
		b) This fact did not directly affect Staff's conclusions. The ESP facility or its operation is expected to alter a very small area within the Clinton Lake watershed and thus will not affect the flooding at the existing dam. According to COL Action Item 2.4-4, in SER Section 2.4.2.3, the CP or COL applicant should demonstrate that flooding from local intense precipitation at the ESP site is discharged to the Clinton Lake without reliance on any active drainage system components.

2.4.3.1	[pg. 2-82; para. 2] The applicant suggested that the use of any wind speed for the purpose of estimating wave runup effects on PMF water surface elevation would be inconsequential. The applicant stated that it retained the use of the 40-mph wind speed in the ESP SSAR analysis to be consistent with the CPS USAR. Using ANSI/ANS-2.8-1992, the applicant determined that a wind speed of 52 mph should be used to estimate wave runup coincident with the PMF water surface elevation.	a) Affirmation; verified by Staff b) Staff disagreed with the Applicant on its use of 40-mph wind for estimation of wave runup. The Applicant revised its wave runup analysis to use the wind speed recommended in ANSI/ANS-2.8-1992 as suggested by the Staff. This fact was used to determine highest water surface elevation in the Clinton Lake during the PMF due to combined effects of the PMP and wind-generated waves.
2.4.3.1	[pg. 2-82; para. 3] The applicant stated that it performed screening analyses to conservatively estimate the impact of a 52-mph wind speed on wave runup.	a) Affirmation; verified by Staff b) This fact was used to determine highest water surface elevation in the Clinton Lake during the PMF due to combined effects of the PMP and wind-generated waves.
2.4.3.1	[pg. 2-82; para. 3] The applicant estimated new wave heights of 3.81 ft for significant (33-percent probability) waves and 6.39 ft for maximum (1-percent probability) waves.	a) Affirmation; verified by Staff b) This fact was used to determine highest water surface elevation in the Clinton Lake during the PMF due to combined effects of the PMP and wind-generated waves.
2.4.3.1	[pg. 2-82; para. 3] These new wave heights are 0.94 ft and 1.58 ft greater than those estimated in the SSAR, which were based on a 40-mph wind speed.	a) Affirmation; verified by Staff b) This fact was used to determine highest water surface elevation in the Clinton Lake during the PMF due to combined effects of the PMP and wind-generated waves.

2.4.3.1	[pg. 2-82; para. 3] The applicant concluded that these increases are not significant because of a more than 20-ft difference in ESP site grade and the PMF water surface elevation in Clinton Lake.	a) Affirmation; verified by Staff b) This fact was used to determine highest water surface elevation in the Clinton Lake during the PMF due to combined effects of the PMP and wind-generated waves.
2.4.3.1	[pg. 2-83; para. 2] The applicant estimated the precipitation losses based on soil and land use data for the watershed. The most conservative estimate of hydrostatic flood elevation, due to the PMF based on results of the applicant's HEC-HMS analysis for the different synthetic unit hydrographs and conceptual layouts considered, was 709.8 ft MSL.	a) Affirmation; verified by Staff b) This fact was used to determine highest water surface elevation in the Clinton Lake during the PMF.
2.4.3.1	[pg. 2-83; para. 3] The applicant estimated a maximum coincident wave runup of 6.4 ft based on calculations using the USACE's ACES version 1.07 code with a wind velocity of 52 mph.	a) Affirmation; verified by Staff b) This fact was used to determine highest water surface elevation in the Clinton Lake during the PMF due to combined effects of the PMP and wind-generated waves.
2.4.3.1	[pg. 2-83; para. 3] The applicant also estimated a probable maximum surge of 0.3 ft based on a wind velocity of 100 mph.	a) Affirmation; verified by Staff b) Staff verified this fact in SER Section 2.4.5.3. This fact was used to determine maximum water surface elevation during the PMF event in Clinton Lake.
2.4.4.1	[pg. 2-94; para. 3] The applicant stated that no other dams exist either upstream or downstream of Clinton Dam.	a) Affirmation; verified by Staff

		b) Staff verified Applicant's assertion using USGS topographical maps and found that Applicant's assertion was incorrect. Staff's RAI 2.4.1-3 addressed this issue. This fact was used in Staff's assessment of maximum flood water levels at the ESP site in SER Sections 2.4.2.3, 2.4.3.3, and 2.4.4.3.
2.4.4.1	[pg. 2-94; para. 3] The applicant also indicated that failure of Clinton Dam will not result in a loss of water from the submerged UHS pond.	a) Affirmation; not verified by Staff b) This fact was used to conclude that the water stored in the submerged UHS pond will be available even after a complete loss of the Clinton Dam. Staff relied on Applicant's assertion in the SAR that the UHS dam is a safety-related structure and is designed, maintained, and operated as such.
2.4.5.1	[pg. 2-99; para. 4] The applicant stated in Revision 0 of SSAR Section 2.4.5 that there are no large bodies of water near the ESP site where significant storm surges and seiche can occur. The applicant also stated that Clinton Lake is not large enough to develop surge and seiche conditions more critical than the PMF condition.	a) Affirmation; verified by Staff b) Staff verified this fact in SER Section 2.4.5.3 by carrying out an independent and bounding estimation of wind setup. This fact was used to determine maximum water surface elevation during the PMF event in Clinton Lake.
2.4.6.1	[pg. 2-104; para. 5] In Revision 3 of the SSAR, the applicant's analysis considered the effects of a lake tsunami caused by a hillslope failure, which was a maximum tsunami height at 0.4 ft. Based on the elevation of the ESP site, the applicant concluded that landslide-induced tsunamis do not pose a risk to the site.	a) Affirmation; verified by Staff b) Staff's independent assessment of hillslope failure-generated tsunami-like waves did not indicate a threat to the ESP site. This fact was not used in Staff's conclusions.

2.4.7.1	[pg. 2-108; para. 3] The gauge is located approximately 12 miles downstream from the Clinton Dam.	a) Affirmation; verified by Staff
		b) This fact did not have a direct influence on Staff's conclusion except that the streamflow conditions at the Rowell gauge are considered indicative of those near the ESP site.
2.4.7.1	[pg. 2-108; para. 3] The applicant reported intermittent ice effects during the winter months.	a) Affirmation; verified by Staff
		b) This fact did not have a direct influence on Staff's conclusions regarding ice formation in the Clinton Lake. The Staff's analysis described in SER Section 2.4.7.3 evaluated worst winters on record.
2.4.7.1	[pg. 2-108; para. 4] The applicant stated that the wintertime PMP depth in February is 13.8 in., 11.4 in. less than the 48-hour PMP depth for August of 25.2 in.	a) Affirmation; not verified by Staff
		b) Staff did not verify the winter PMP depth in February as reported by the Applicant since there is no current guidance from NOAA regarding estimation of seasonal PMP for areas greater than 10 mi^2 in size. Staff combined the effects of an ice-dam collapse generated flood with the PMF and concluded that it would not result in flooding at the ESP site. This fact was not used directly in Staff's conclusions.
2.4.7.1	[pg. 2-108; para. 4] The applicant concluded that the effects of an ice jam flood in combination with a wintertime PMF on the water surface in Clinton Lake would be less than that resulting from the summertime PMF.	a) Affirmation; not verified by Staff
		b) To bound the Applicant's assertion, Staff combined the effects of an ice-dam collapse generated flood with the PMF and concluded that it would not result in flooding at the ESP site.

2.4.7.1	[pg. 2-108; para. 5] The applicant estimated the average thickness of the ice sheet that could form on the surface of Clinton Lake as 10 in., neglecting the heat discharged into the lake during operation of any station units.	a) Affirmation; verified by Staff b) This was the Applicant's initial submission. Staff disagreed with the Applicant's estimate. This issue was addressed by Staff's RAI 2.4.7-2. The Staff's conclusion was based on final ice thickness estimated by the Applicant after resolution of RAI 2.4.7-2 and DSER Open Item 2.4-9 as described in SER Section 2.4.7.3.
2.4.7.1	[pg. 2-108; para. 5] The design water level of the UHS is 675 ft MSL, and the inlet to the CPS screenhouse is at elevation 670 ft MSL.	a) Affirmation; not verified by Staff b) Staff relied on Applicant's assertion in the SAR. This fact was used to determine the effects of an ice sheet formation in Clinton Lake on the proposed intake structure of the ESP facility.
2.4.7.1	[pg. 2-108; para. 6] The applicant stated that low-flow conditions resulting from ice jams on streams upstream of the ESP site will not affect the UHS because of its submerged conditions.	a) Affirmation; verified by Staff b) Staff agreed with the Applicant that ice jams would not last for sufficient durations to cause low flows that may affect the submerged UHS pond. This fact was used to determine availability of the water stored in the submerged UHS pond during low-flow conditions in SER Section 2.4.8.3.
2.4.7.1	[pg. 2-109; para. 3] The applicant stated that the bottom concrete slab of the CPS intake structure is located at an elevation of 657.5 ft MSL, and the intake extends from an elevation of 670 ft MSL to an elevation of 697 ft MSL.	a) Affirmation; not verified by Staff b) Staff relied on Applicant's submission in the SAR. This fact was used to determine potential blockage of the ESP intake during ice sheet formation on the surface of Clinton Lake.

2.4.7.1	[pg. 2-110; para. 2] The applicant stated that the CPS water intake is designed to avoid obstruction from surface ice and accumulation of frazil ice by circulating waste heat through a warming line back to the inlet of the screenhouse.	a) Affirmation; not verified by Staff
		b) Staff relied on Applicant's submission in the SAR. This fact was used to determine potential blockage of the ESP intake during frazil formation in Clinton Lake near the proposed ESP facility intake.
2.4.7.1	[pg. 2-110; para. 2] The applicant stated that the CPS plant has not experienced operational problems because of frazil ice accumulation in the intake.	a) Affirmation; not verified by Staff
		b) Staff relied on Applicant's submission in the SAR. This fact was used to determine potential blockage of the ESP intake during frazil formation in Clinton Lake near the proposed ESP facility intake.
2.4.7.1	[pg. 2-110; para. 5] No ice formation currently occurs in the discharge channel when the CPS Unit 1 is operating.	a) Affirmation; not verified by Staff
		b) Staff relied on Applicant's submission in the SAR. This fact was not used in Staff's conclusions.
2.4.7.1	[pg. 2-110; para. 5] The capacity of the discharge channel is approximately 3058.3 cfs or 1.37 million gpm at a discharge velocity of 1.5 feet per second (fps).	a) Affirmation; not verified by Staff
		b) Staff relied on Applicant's submission in the SAR. This fact was not used in Staff's conclusions. **It was included for the purpose of completeness in describing the contents of the Application.**
2.4.7.1	[pg. 2-110; para. 5] The discharge from CPS Unit 1 is approximately 445,000 gpm of warm cooling water during the winter months.	a) Affirmation; not verified by Staff
		b) Staff relied on Applicant's submission in the SAR. This fact was not used in Staff's conclusions. **It was included for the purpose of completeness in describing the contents of the Application.**

2.4.7.1	[pg. 2-110; para. 6] The applicant concluded that it did not expect jamming and clogging of the discharge channel because of icing.	a) Affirmation; not verified by Staff b) Staff relied on Applicant's submission in the SAR. This fact was not used in Staff's conclusions. **It was included for the purpose of completeness in describing the contents of the Application.**
2.4.7.1	[pg. 2-111; para. 1] The applicant stated that the thickness of ice cover is a small percentage of the intake height, and warming water used to prevent formation of frazil ice will retard the formation of an ice cover in the immediate area of the intake trash racks or screens.	a) Affirmation; not verified by Staff b) Staff relied on Applicant's submission in the SAR. This fact was not used in Staff's conclusions. **It was included for the purpose of completeness in describing the contents of the Application.**
2.4.7.1	[pg. 2-111; para. 2] The applicant stated that Clinton Lake is used as a source of makeup water for the ESP facility's UHS cooling towers and not as a heat sink.	a) Affirmation; verified by Staff b) This fact was used to establish the functions performed by Clinton Lake and the submerged UHS pond.
2.4.7.1	[pg. 2-111; para. 3] Ice thickness calculations were carried out for the period 1902 through 2001.	a) Affirmation; verified by Staff b) Staff verified Applicant's statement using its submission in response to RAI 2.4.7-2 and DSER Open Item 2.4-9. This fact was used by Staff in its evaluation of Applicant's submission regarding ice sheet thickness estimation on the surface of Clinton Lake.
2.4.7.1	[pg. 2-112; para. 5] The applicant estimated that approximately 326 ac-ft of liquid water would be displace by a 27.0 in ice sheet settling down on the UHS pond in the event of complete loss of the main dam.	a) Affirmation; verified by Staff b) This fact was used to establish the adequacy of liquid water stored in the submerged UHS pond.

2.4.7.1	[pg. 2-112; para. 5] The applicant also estimated that an excess capacity of 395 ac-ft is normally available.	a) Affirmation; verified by Staff in SER Section 2.4.8.3 b) Staff's independent estimate of excess liquid water storage capacity in the submerged UHS pond was different than that of the Applicant (318-319 ac-ft) as described in SER Section 2.4.8.3. This fact was used to establish the adequacy of the storage capacity of the submerged UHS pond for the proposed ESP facility. The difference between Staff's and Applicant's estimates did not change Staff's conclusion.
2.4.7.1	[pg. 2-112; para. 5] Since the evaporation of water from the pond would be negligible in presence of complete ice cover, the applicant estimated that the net change would result in essentially the same excess capacity of liquid water in the UHS pond.	a) Affirmation; verified by Staff in SER Section 2.4.8.3 b) This fact was used to establish the adequacy of the storage capacity of the submerged UHS pond for the proposed ESP facility.
2.4.7.1	[pg. 2-112; para. 5] The applicant concluded that the UHS liquid water capacity is sufficient to support the combined emergency operation of CPS and the ESP facilities.	a) Affirmation; verified by Staff in SER Section 2.4.8.3 b) This fact was used to establish the adequacy of the storage capacity of the submerged UHS pond for the proposed ESP facility.
2.4.8.1	[pg. 2-127; para. 7] The dam, a homogeneous earthfill dam with a maximum height of 65 ft above the bed of Salt Creek, is 3040 ft long.	a) Affirmation; not verified by Staff

		b) During the site visit Staff viewed above-surface structures and features. Staff performed a visual inspection; no attempt was made to make any specific measurements. The Clinton Lake Dam was determined by Staff not to be a safety-related structure. The water impounded by Clinton Lake Dam is critical to the normal heat sink but not the UHS. Therefore, Staff did not attempt to verify facts specific to Clinton Lake Dam. Characteristics of the lake and dam were used by Staff in its independent assessment of the water surface elevation resulting from PMF. See SER Section 2.4.3.3.
2.4.8.1	[pg. 2-127; para. 7] The top of the dam is at an elevation of 711.8 ft MSL.	a) Affirmation; not verified by Staff
		b) During the site visit Staff viewed above-surface structures and features. Staff performed a visual inspection; no attempt was made to make any specific measurements. The Clinton Lake Dam was determined by Staff not to be a safety-related structure. The water impounded by Clinton Lake Dam is critical to the normal heat sink but not the UHS. Therefore, Staff did not attempt to verify facts specific to Clinton Lake Dam. Characteristics of the lake and dam were used by Staff in its independent assessment of the water surface elevation resulting from PMF. See SER Section 2.4.3.3.
2.4.8.1	[pg. 2-127; para. 7] Both the upstream and downstream faces of the dam have side slopes of 3:1 (horizontal to vertical).	a) Affirmation; not verified by Staff

		b) During the site visit Staff viewed above-surface structures and features. Staff performed a visual inspection; no attempt was made to make any specific measurements. The Clinton Lake Dam was determined by Staff not to be a safety-related structure. The water impounded by Clinton Lake Dam is critical to the normal heat sink but not the UHS. Therefore, Staff did not attempt to verify facts specific to Clinton Lake Dam. Characteristics of the lake and dam were used by Staff in its independent assessment of the water surface elevation resulting from PMF. See SER Section 2.4.3.3.
2.4.8.1	[pg. 2-127; para. 7] The upstream face has an 18-in. thick riprap for protection against erosion from a 50-mph wind wave on the normal pool level of the lake.	a) Affirmation; not verified by Staff
		b) During the site visit Staff viewed above-surface structures and features. Staff performed a visual inspection; no attempt was made to make any specific measurements. The Clinton Lake Dam was determined by Staff not to be a safety-related structure. The water impounded by Clinton Lake Dam is critical to the normal heat sink but not the UHS. Therefore, Staff did not attempt to verify facts specific to Clinton Lake Dam. Characteristics of the lake and dam were used by Staff in its independent assessment of the water surface elevation resulting from PMF. See SER Section 2.4.3.3.
2.4.8.1	[pg. 2-127; para. 7] On the downstream face, seeded topsoil provides protection against erosion from rainfall. An 18-in.-thick riprap is also provided.	a) Affirmation; not verified by Staff

		b) During the site visit Staff viewed above-surface structures and features. Staff performed a visual inspection; no attempt was made to make any specific measurements. The Clinton Lake Dam was determined by Staff not to be a safety-related structure. The water impounded by Clinton Lake Dam is critical to the normal heat sink but not the UHS. Therefore, Staff did not attempt to verify facts specific to Clinton Lake Dam. Characteristics of the lake and dam were used by Staff in its independent assessment of the water surface elevation resulting from PMF. See SER Section 2.4.3.3.
2.4.8.1	[pg. 2-128; para. 1] At the toe of the dam, for protection against tailwater erosion, there is an 18-in.- thick riprap designed for 50-mph wind acting on a 100-year tailwater flood level.	a) Affirmation; not verified by Staff
		b) During the site visit Staff viewed above-surface structures and features. Staff performed a visual inspection; no attempt was made to make any specific measurements. The Clinton Lake Dam was determined by Staff not to be a safety-related structure. The water impounded by Clinton Lake Dam is critical to the normal heat sink but not the UHS. Therefore, Staff did not attempt to verify facts specific to Clinton Lake Dam.
2.4.8.1	[pg. 2-128; para. 2] The applicant estimated the PMF level in Clinton Lake to be 708.8 ft MSL and the maximum level, corresponding to wave runup acting on the PMF level, to be 711.95 ft MSL.	a) Affirmation; verified by Staff in SER Section 2.4.3.3

		b) This was Applicant's initial submission regarding PMF water surface elevation based on a PMP determined from HMR 33. The Applicant revised this PMF water surface elevation estimate in response to Staff's RAI 2.4.2-1 and DSER Open Item 2.4-5 to correspond to its revised PMP estimated from HMR 51 and 52. Staff's verification of this fact is described in SER Section 2.4.3.3. This fact was used in establishing the dryness of the proposed ESP site during the PMF event.
2.4.8.1	[pg. 2-128; para. 2] The top of the dam is at a slightly lower elevation of 711.8 ft MSL.	a) Affirmation; not verified by Staff
		b) During the site visit Staff viewed above-surface structures and features. Staff performed a visual inspection; no attempt was made to make any specific measurements. The Clinton Lake Dam was determined by Staff not to be a safety-related structure. The water impounded by Clinton Lake Dam is critical to the normal heat sink but not the UHS. Therefore, Staff did not attempt to verify facts specific to Clinton Lake Dam. Characteristics of the lake and dam were used by Staff in its independent assessment of the water surface elevation resulting from PMF. See SER Section 2.4.3.3.

2.4.8.1	[pg. 2-128; para. 2] The applicant estimated that the duration for which wave action on a PMF level would lead to overtopping of the dam as 2.5 hours.	a) Affirmation; not verified by Staff b) During the site visit Staff viewed above-surface structures and features. Staff performed a visual inspection; no attempt was made to make any specific measurements. The Clinton Lake Dam was determined by Staff not to be a safety-related structure. The water impounded by Clinton Lake Dam is critical to the normal heat sink but not the UHS. Therefore, Staff did not attempt to verify facts specific to Clinton Lake Dam. Characteristics of the lake and dam were used by Staff in its independent assessment of the water surface elevation resulting from PMF. See SER Section 2.4.3.3.
2.4.8.1	[pg. 2-128; para. 2] The applicant stated that this overtopping would occur in the form of a fine spray and that this spray falling on the downstream face of the dam would not result in any significant damage to the dam.	a) Affirmation; not verified by Staff b) During the site visit Staff viewed above-surface structures and features. Staff performed a visual inspection; no attempt was made to make any specific measurements. The Clinton Lake Dam was determined by Staff not to be a safety-related structure. The water impounded by Clinton Lake Dam is critical to the normal heat sink but not the UHS. Therefore, Staff did not attempt to verify facts specific to Clinton Lake Dam. Characteristics of the lake and dam were used by Staff in its independent assessment of the water surface elevation resulting from PMF. See SER Section 2.4.3.3.

2.4.8.1	[pg. 2-128; para. 3] The service spillway is designed to pass the design flood of 100-year recurrence interval with a water surface elevation of 697 ft MSL in the lake.	a) Affirmation; not verified by Staff
		b) During the site visit Staff viewed above-surface structures and features. Staff performed a visual inspection; no attempt was made to make any specific measurements. The Clinton Lake Dam was determined by Staff not to be a safety-related structure. The water impounded by Clinton Lake Dam is critical to the normal heat sink but not the UHS. Therefore, Staff did not attempt to verify facts specific to Clinton Lake Dam. Characteristics of the lake and dam were used by Staff in its independent assessment of the water surface elevation resulting from PMF. See SER Section 2.4.3.3.
2.4.8.1	[pg. 2-128; para. 3] The service spillway, located on the west abutment of the dam, is an uncontrolled concrete ogee semicircular in plan, with a crest length of 175 ft and a crest elevation of 690 ft MSL.	a) Affirmation; not verified by Staff
		b) During the site visit Staff viewed above-surface structures and features. Staff performed a visual inspection; no attempt was made to make any specific measurements. The Clinton Lake Dam was determined by Staff not to be a safety-related structure. The water impounded by Clinton Lake Dam is critical to the normal heat sink but not the UHS. Therefore, Staff did not attempt to verify facts specific to Clinton Lake Dam. Characteristics of the lake and dam were used by Staff in its independent assessment of the water surface elevation resulting from PMF. See SER Section 2.4.3.3.
2.4.8.1	[pg. 2-128; para. 3] The height of the concrete ogee is 10 ft.	a) Affirmation; not verified by Staff

		b) During the site visit Staff viewed above-surface structures and features. Staff performed a visual inspection; no attempt was made to make any specific measurements. The Clinton Lake Dam was determined by Staff not to be a safety-related structure. The water impounded by Clinton Lake Dam is critical to the normal heat sink but not the UHS. Therefore, Staff did not attempt to verify facts specific to Clinton Lake Dam. Characteristics of the lake and dam were used by Staff in its independent assessment of the water surface elevation resulting from PMF. See SER Section 2.4.3.3.
2.4.8.1	[pg. 2-128; para. 3] Water is discharged from the ogee through an 80-ft-wide concrete chute into a stilling basin.	a) Affirmation; not verified by Staff
		b) During the site visit Staff viewed above-surface structures and features. Staff performed a visual inspection; no attempt was made to make any specific measurements. The Clinton Lake Dam was determined by Staff not to be a safety-related structure. The water impounded by Clinton Lake Dam is critical to the normal heat sink but not the UHS. Therefore, Staff did not attempt to verify facts specific to Clinton Lake Dam. Characteristics of the lake and dam were used by Staff in its independent assessment of the water surface elevation resulting from PMF. See SER Section 2.4.3.3.
2.4.8.1	[pg. 2-128; para. 3] A discharge canal conveys the water discharged from the ogee from the stilling basin to the main channel of Salt Creek.	a) Affirmation; verified by Staff during site visit

		b) During the site visit Staff viewed above-surface structures and features. Staff performed a visual inspection; no attempt was made to make any specific measurements. The Clinton Lake Dam was determined by Staff not to be a safety-related structure. The water impounded by Clinton Lake Dam is critical to the normal heat sink but not the UHS. Therefore, Staff did not attempt to verify facts specific to Clinton Lake Dam. Characteristics of the lake and dam were used by Staff in its independent assessment of the water surface elevation resulting from PMF. See SER Section 2.4.3.3.
2.4.8.1	[pg. 2-128; para. 3] Riprap extends for 80 ft downstream from the stilling basin as protection against erosion.	a) Affirmation; not verified by Staff
		b) During the site visit Staff viewed above-surface structures and features. Staff performed a visual inspection; no attempt was made to make any specific measurements. The Clinton Lake Dam was determined by Staff not to be a safety-related structure. The water impounded by Clinton Lake Dam is critical to the normal heat sink but not the UHS. Therefore, Staff did not attempt to verify facts specific to Clinton Lake Dam. Characteristics of the lake and dam were used by Staff in its independent assessment of the water surface elevation resulting from PMF. See SER Section 2.4.3.3.
2.4.8.1	[pg. 2-128; para. 3] Peak discharge through the service spillway corresponding to the 100-year flood is 11,450 cfs, and that corresponding to the PMF is 33,200 cfs.	a) Affirmation; not verified by Staff

		b) During the site visit Staff viewed above-surface structures and features. Staff performed a visual inspection; no attempt was made to make any specific measurements. The Clinton Lake Dam was determined by Staff not to be a safety-related structure. The water impounded by Clinton Lake Dam is critical to the normal heat sink but not the UHS. Therefore, Staff did not attempt to verify facts specific to Clinton Lake Dam. Characteristics of the lake and dam were used by Staff in its independent assessment of the water surface elevation resulting from PMF. See SER Section 2.4.3.3.
2.4.8.1	[pg. 2-128; para. 4] The applicant stated that it used the 100-year flood water level in the lake as the basis for determining the crest elevation of the auxiliary spillway.	a) Affirmation; not verified by Staff
		b) During the site visit Staff viewed above-surface structures and features. Staff performed a visual inspection; no attempt was made to make any specific measurements. The Clinton Lake Dam was determined by Staff not to be a safety-related structure. The water impounded by Clinton Lake Dam is critical to the normal heat sink but not the UHS. Therefore, Staff did not attempt to verify facts specific to Clinton Lake Dam.

2.4.8.1	[pg. 2-128; para. 4] The auxiliary spillway functions only during floods greater than the 100-year flood.	a) Affirmation; not verified by Staff b) During the site visit Staff viewed above-surface structures and features. Staff performed a visual inspection; no attempt was made to make any specific measurements. The Clinton Lake Dam was determined by Staff not to be a safety-related structure. The water impounded by Clinton Lake Dam is critical to the normal heat sink but not the UHS. Therefore, Staff did not attempt to verify facts specific to Clinton Lake Dam.
2.4.8.1	[pg. 2-128; para. 4] The crest of the auxiliary spillway is at an elevation of 700 ft MSL to allow the 100-year flood to discharge entirely through the service spillway.	a) Affirmation; not verified by Staff b) During the site visit Staff viewed above-surface structures and features. Staff performed a visual inspection; no attempt was made to make any specific measurements. The Clinton Lake Dam was determined by Staff not to be a safety-related structure. The water impounded by Clinton Lake Dam is critical to the normal heat sink but not the UHS. Therefore, Staff did not attempt to verify facts specific to Clinton Lake Dam.

2.4.8.1	[pg. 2-128; para. 5] The auxiliary spillway is located to the east of the dam.	a) Affirmation; verified by Staff during site visit
		b) During the site visit Staff viewed above-surface structures and features. Staff performed a visual inspection; no attempt was made to make any specific measurements. The Clinton Lake Dam was determined by Staff not to be a safety-related structure. The water impounded by Clinton Lake Dam is critical to the normal heat sink but not the UHS. Therefore, Staff did not attempt to verify facts specific to Clinton Lake Dam. Characteristics of the lake and dam were used by Staff in its independent assessment of the water surface elevation resulting from PMF. See SER Section 2.4.3.3.
2.4.8.1	[pg. 2-128; para. 5] The auxiliary spillway is of the open-cut type.	a) Affirmation; not verified by Staff
		b) During the site visit Staff viewed above-surface structures and features. Staff performed a visual inspection; no attempt was made to make any specific measurements. The Clinton Lake Dam was determined by Staff not to be a safety-related structure. The water impounded by Clinton Lake Dam is critical to the normal heat sink but not the UHS. Therefore, Staff did not attempt to verify facts specific to Clinton Lake Dam. Characteristics of the lake and dam were used by Staff in its independent assessment of the water surface elevation resulting from PMF. See SER Section 2.4.3.3.
2.4.8.1	[pg. 2-128; para. 5] The auxiliary spillway has a crest length of 1200 ft and a crest elevation of 700 ft MSL.	a) Affirmation; not verified by Staff

		b) During the site visit Staff viewed above-surface structures and features. Staff performed a visual inspection; no attempt was made to make any specific measurements. The Clinton Lake Dam was determined by Staff not to be a safety-related structure. The water impounded by Clinton Lake Dam is critical to the normal heat sink but not the UHS. Therefore, Staff did not attempt to verify facts specific to Clinton Lake Dam. Characteristics of the lake and dam were used by Staff in its independent assessment of the water surface elevation resulting from PMF. See SER Section 2.4.3.3.
2.4.8.1	[pg. 2-128; para. 5] The applicant estimated peak discharge through the auxiliary spillway during the PMF as 102,800 cfs.	a) Affirmation; not verified by Staff
		b) During the site visit Staff viewed above-surface structures and features. Staff performed a visual inspection; no attempt was made to make any specific measurements. The Clinton Lake Dam was determined by Staff not to be a safety-related structure. The water impounded by Clinton Lake Dam is critical to the normal heat sink but not the UHS. Therefore, Staff did not attempt to verify facts specific to Clinton Lake Dam. Characteristics of the lake and dam were used by Staff in its independent assessment of the water surface elevation resulting from PMF. See SER Section 2.4.3.3.
2.4.8.1	[pg. 2-128; para. 5] The maximum water velocity at the crest is 14 ft/s.	a) Affirmation; not verified by Staff

		b) During the site visit Staff viewed above-surface structures and features. Staff performed a visual inspection; no attempt was made to make any specific measurements. The Clinton Lake Dam was determined by Staff not to be a safety-related structure. The water impounded by Clinton Lake Dam is critical to the normal heat sink but not the UHS. Therefore, Staff did not attempt to verify facts specific to Clinton Lake Dam. Characteristics of the lake and dam were used by Staff in its independent assessment of the water surface elevation resulting from PMF. See SER Section 2.4.3.3.
2.4.8.1	[pg. 2-128; para. 5] The crest control section of the auxiliary spillway is 25 ft wide and consists of asphalt concrete.	a) Affirmation; not verified by Staff
		b) During the site visit Staff viewed above-surface structures and features. Staff performed a visual inspection; no attempt was made to make any specific measurements. The Clinton Lake Dam was determined by Staff not to be a safety-related structure. The water impounded by Clinton Lake Dam is critical to the normal heat sink but not the UHS. Therefore, Staff did not attempt to verify facts specific to Clinton Lake Dam. Characteristics of the lake and dam were used by Staff in its independent assessment of the water surface elevation resulting from PMF. See SER Section 2.4.3.3.
2.4.8.1	[pg. 2-128; para. 5] To protect the crest against scouring, concrete cutoffs and riprap are provided upstream and downstream of the crest.	a) Affirmation; not verified by Staff

		b) During the site visit Staff viewed above-surface structures and features. Staff performed a visual inspection; no attempt was made to make any specific measurements. The Clinton Lake Dam was determined by Staff not to be a safety-related structure. The water impounded by Clinton Lake Dam is critical to the normal heat sink but not the UHS. Therefore, Staff did not attempt to verify facts specific to Clinton Lake Dam. Characteristics of the lake and dam were used by Staff in its independent assessment of the water surface elevation resulting from PMF. See SER Section 2.4.3.3.
2.4.8.1	[pg. 2-128; para. 6] The lake outlet works are located on the west abutment of the dam.	a) Affirmation; verified by Staff during site visit
		b) During the site visit Staff viewed above-surface structures and features. Staff performed a visual inspection; no attempt was made to make any specific measurements. The Clinton Lake Dam was determined by Staff not to be a safety-related structure. The water impounded by Clinton Lake Dam is critical to the normal heat sink but not the UHS. Therefore, Staff did not attempt to verify facts specific to Clinton Lake Dam.

2.4.8.1	[pg. 2-128; para. 6] The lake outlet works are located 160 ft east of the service spillway.	a) Affirmation; not verified by Staff
		b) During the site visit Staff viewed above-surface structures and features. Staff performed a visual inspection; no attempt was made to make any specific measurements. The Clinton Lake Dam was determined by Staff not to be a safety-related structure. The water impounded by Clinton Lake Dam is critical to the normal heat sink but not the UHS. Therefore, Staff did not attempt to verify facts specific to Clinton Lake Dam.
2.4.8.1	[pg. 2-128; para. 6] The primary function of the lake outlet works is to release a minimum flow of 5 cfs downstream of the dam.	a) Affirmation; not verified by Staff
		b) During the site visit Staff viewed above-surface structures and features. Staff performed a visual inspection; no attempt was made to make any specific measurements. The Clinton Lake Dam was determined by Staff not to be a safety-related structure. The water impounded by Clinton Lake Dam is critical to the normal heat sink but not the UHS. Therefore, Staff did not attempt to verify facts specific to Clinton Lake Dam.

2.4.8.1	[pg. 2-128; para. 6] The lake outlet works consist of a submerged concrete intake, a 36-in.-diameter entrance pipe, a control house with three sluice gates, and a 48-in.-diameter outlet pipe, which terminates at the spillway stilling basin.	a) Affirmation; not verified by Staff
		b) During the site visit Staff viewed above-surface structures and features. Staff performed a visual inspection; no attempt was made to make any specific measurements. The Clinton Lake Dam was determined by Staff not to be a safety-related structure. The water impounded by Clinton Lake Dam is critical to the normal heat sink but not the UHS. Therefore, Staff did not attempt to verify facts specific to Clinton Lake Dam.
2.4.8.1	[pg. 2-128; para. 6] The crest of the intake structure for the outlet works is at an elevation of 686 ft MSL, with an inlet diameter of 84 in. transitioning to a 36-in.-diameter throat.	a) Affirmation; not verified by Staff
		b) During the site visit Staff viewed above-surface structures and features. Staff performed a visual inspection; no attempt was made to make any specific measurements. The Clinton Lake Dam was determined by Staff not to be a safety-related structure. The water impounded by Clinton Lake Dam is critical to the normal heat sink but not the UHS. Therefore, Staff did not attempt to verify facts specific to Clinton Lake Dam.

2.4.8.1	[pg. 2-128; para. 6] A trash rack and a vortex breaker are provided at the inlet.	a) Affirmation; not verified by Staff
		b) During the site visit Staff viewed above-surface structures and features. Staff performed a visual inspection; no attempt was made to make any specific measurements. The Clinton Lake Dam was determined by Staff not to be a safety-related structure. The water impounded by Clinton Lake Dam is critical to the normal heat sink but not the UHS. Therefore, Staff did not attempt to verify facts specific to Clinton Lake Dam.
2.4.8.1	[pg. 2-128; para. 6] The sluice gates regulate the downstream releases.	a) Affirmation; not verified by Staff
		b) During the site visit Staff viewed above-surface structures and features. Staff performed a visual inspection; no attempt was made to make any specific measurements. The Clinton Lake Dam was determined by Staff not to be a safety-related structure. The water impounded by Clinton Lake Dam is critical to the normal heat sink but not the UHS. Therefore, Staff did not attempt to verify facts specific to Clinton Lake Dam.

2.4.8.1	[pg. 2-128; para. 6] The gates are manually operated from the top of the control house.	a) Affirmation; not verified by Staff
		b) During the site visit Staff viewed above-surface structures and features. Staff performed a visual inspection; no attempt was made to make any specific measurements. The Clinton Lake Dam was determined by Staff not to be a safety-related structure. The water impounded by Clinton Lake Dam is critical to the normal heat sink but not the UHS. Therefore, Staff did not attempt to verify facts specific to Clinton Lake Dam.
2.4.8.1	[pg. 2-129; para. 2] The UHS pond consists of a submerged pond behind a submerged dam constructed across the North Fork of Salt Creek.	a) Affirmation; verified by Staff during site visit (Fig. 2.4-3)
		b) UHS features were not visually inspected by the Staff. The Staff included the statement as part of the description of the overall site configuration.
2.4.8.1	[pg. 2-129; para. 2] This submerged dam is located 1 mi west of the CPS Unit 1 screenhouse.	a) Affirmation; verified by Staff during site visit (Fig. 2.4-3)
		b) UHS features were not visually inspected by the Staff. The Staff included the statement as part of the description of the overall site configuration.
2.4.8.1	[pg. 2-129; para. 2] The top of the submerged dam is at an elevation of 675 ft MSL; its top width is 30 ft and its length is 2350 ft.	a) Affirmation; not verified by Staff
		b) UHS features were not visually inspected by the Staff. The Staff included the statement as part of the description of the overall site configuration.
2.4.8.1	[pg. 2-129; para. 2] The submerged dam consists of homogeneous compacted backfill material, and both of its faces have a side slope of 5:1 (horizontal to vertical).	a) Affirmation; not verified by Staff
		b) UHS features were not visually inspected by the Staff. The Staff included the statement as part of the description of the overall site configuration.

2.4.8.1	[pg. 2-129; para. 2] A 2-ft-thick compacted soil-cement layer covers the top and both faces of the submerged dam.	a) Affirmation; not verified by Staff b) UHS features were not visually inspected by the Staff. The Staff included the statement as part of the description of the overall site configuration.
2.4.8.1	[pg. 2-129; para. 3] The top of the baffle dike within the submerged UHS pond is at an elevation of 676 ft MSL.	a) Affirmation; not verified by Staff b) UHS features were not visually inspected by the Staff. The Staff included the statement as part of the description of the overall site configuration.
2.4.8.1	[pg. 2-129; para. 3] A 3-ft-thick compacted soil-cement layer covers the dike. The baffle dike is 3300 ft long.	a) Affirmation; not verified by Staff b) UHS features were not visually inspected by the Staff. The Staff included the statement as part of the description of the overall site configuration.
2.4.8.1	[pg. 2-129; para. 4] The applicant analyzed the flow conditions over the submerged UHS dam using the level-pool routing procedure and estimated water surface elevations upstream and downstream of the submerged UHS dam. The applicant estimated maximum velocities at the crest and at the toe of the submerged UHS dam to be 3.8 and 11.8 fps, respectively, 43 hours after the main dam breach. The maximum velocity estimated on the face of the baffle dike is 1.2 fps.	a) Affirmation; not verified by Staff b) The Applicant, in a revision to its original submission, excluded details regarding the UHS dam and flow velocities over it based on its contention that this is an unnecessary detail for the ESP facility. Staff's evaluation determined that the UHS dam is a safety-related structure both for the ESP facility as well as for the existing CPS Unit 1. As such, the UHS dam is designed, maintained, and operated as a safety-related structure. **The Staff conclusion regarding the ESP facility did not use this fact.**

2.4.8.1	[pg. 2-129; para. 5] The applicant also estimated velocities over the submerged UHS dam and the baffle dike during a PMF event with the lake level at the 100-year drought elevation of 682.3 ft MSL. Estimates of these maximum velocities over the submerged UHS dam and the baffle dike are 2.1 and 2.6 fps, respectively.	a) Affirmation; not verified by Staff
		b) Integrity of the UHS baffle dike is a concern for the “once-through” cooling design of the CPS UHS. The baffle dike integrity is not a concern for the closed-cycle mechanical draft UHS towers of the ESP facility. The ESP facility draws makeup water from the UHS pond for the cooling tower which then provides water for safety-related cooling.
2.4.8.1	[pg. 2-129; para. 6] The applicant concluded that during both scenarios, the main dam breach and the occurrence of a PMF with the lake at the 100-year drought elevation, the compacted soil-cement layer would protect the submerged UHS dam and the baffle dike.	a) Affirmation; not verified by Staff
		b) Integrity of the UHS baffle dike is a concern for the “once-through” cooling design of the CPS UHS. The baffle dike integrity is not a concern for the closed-cycle mechanical draft UHS towers of the ESP facility. The ESP facility draws makeup water from the UHS pond for the cooling tower which then provides water for safety-related cooling.

2.4.8.1	[pg. 2-129; para. 7] The applicant stated that the discharge flume was designed to carry a maximum flow of 3057 cfs that would be discharged from CPS Unit 1 and the abandoned CPS Unit 2. The applicant stated that, because of the abandonment of CPS Unit 2, current flow in the discharge flume is only 50 percent of its design capacity.	a) Affirmation; not verified by Staff
		b) During the site visit Staff viewed above-surface structures and features. Staff performed a visual inspection; no attempt was made to make any specific measurements. The only safety function of the discharge canal is to remove blowdown water from the UHS cooling towers of the ESP facility. Based on visual inspection, Staff determined that the discharge canal has adequate capacity to manage the small blowdown flowrate.
2.4.8.1	[pg. 2-129; para. 8] The discharge flume is located to the east of the plant area and runs due east towards Clinton Lake.	a) Affirmation; not verified by Staff
		b) During the site visit Staff viewed above-surface structures and features. Staff performed a visual inspection; no attempt was made to make any specific measurements.

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<tr><td rowspan="2">2.4.8.1</td><td rowspan="2">[pg. 2-130; para. 1] The applicant stated that the discharge point of the flume into Clinton Lake provides an effective cooling surface area of 3650 ac in Clinton Lake. The flume has a bottom width of 120 ft, a side slope of 3:1 (horizontal to vertical), a total length of 3.4 miles and a nonscouring design velocity of 1.5 fps). The minimum freeboard of 3.8 ft is provided in the flume. A 6-in.-thick crushed stone layer covers the side slopes of the flume for protection against erosion from wind wave action, and riprap on the lakeside of the embankment fill protects against erosion resulting from wind wave action in the lake.
Two drop structures are provided along the flume to adapt it to ground topography and to prevent scouring in the flume. Both drop structures are 70 ft wide. One drop structure is designed for an 18-ft drop, and the second is designed for a 26-ft drop.</td><td>a) Affirmation; not verified by Staff</td></tr>
<tr><td>b) During the site visit Staff viewed above-surface structures and features. Staff performed a visual inspection; no attempt was made to make any specific measurements.

The only safety function of the discharge canal is to remove blowdown water from the UHS cooling towers of the ESP facility. Based on visual inspection, Staff determined that the discharge canal has adequate capacity to manage the small blowdown flowrate.</td></tr>
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2.4.8.1	[pg. 2-130; para. 4] The applicant stated that it periodically measures the volume in the submerged UHS pond and recently measured it to be 1022 ac-ft. The applicant stated that, if the CPS UHS 30-day minimum design volume of 849 ac-ft were subtracted from the recently measured volume of the submerged UHS pond, the remaining available volume would be 173 ac-ft, which is 86 ac-ft greater than that required for the ESP facility. The applicant concluded that the current CPS submerged UHS pond has sufficient capacity to serve both CPS Unit 1 and to provide makeup for the new nuclear unit(s).	a) Affirmation; not verified by Staff b) UHS features were not visually inspected by the Staff. COL Action Item 2.4-10 involves a monitoring program to ensure that adequate capacity in the UHS pond is available at all times.

2.4.8.1	[pg. 2-130; para. 5] The design surface area of the CPS submerged UHS pond at a water surface elevation of 675 ft MSL is approximately 150 ac. The applicant stated that the as-built surface area of the submerged UHS pond at a water surface elevation of 675 ft MSL is 158 ac, slightly larger than the design surface area. The applicant stated that a 0.5-ft reduction in the water surface elevation of the submerged UHS pond would be expected if a volume of 87 ac-ft, equal to the 30-day ESP facility UHS makeup water requirement, were withdrawn. The applicant concluded that the design heat dissipation capacity of the CPS submerged UHS pond would be maintained while accounting for the ESP facility UHS makeup water requirements.	a) Affirmation; not verified by Staff b) UHS features were not visually inspected by the Staff. COL Action Item 2.4-10 requires a monitoring program to ensure that adequate capacity in the UHS pond is available at all times.
2.4.8.1	[pg. 2-131; para. 1] The analysis indicated that the maximum allowable UHS outlet temperature of 95°F for CPS will not be exceeded with an initial submerged UHS pond volume of 590 ac-ft and an initial submerged UHS pond water temperature ranging from 84 to 95°F.	a) Affirmation; not verified by Staff b) Since the Applicant could not provide the LAKET model, Staff did not consider results derived from it in arriving at any of its conclusions.

2.4.8.1	[pg. 2-131; para. 3] The applicant stated that the existing intake structure is located such that it draws water from the deeper part of the lake.	a) Affirmation; not verified by Staff b) This fact merely describes a feature of the site as it exists.
2.4.8.1	[pg. 2-131; para. 4] The applicant stated that the submerged UHS pond for the CPS is designed to provide sufficient water and cooling capacity to safely shut down two 992-MWe boiling water reactors (BWR) units and maintain the plant in the shutdown condition for a period of 30 days. The minimum submerged UHS pond design volume of 849 ac-ft accounts for the minimum cooling capacity of 590 ac-ft to meet the 95°F service water inlet maximum temperature, the fire protection requirement of 3 ac-ft, a loss in capacity because of sedimentation from a 100-year flood of 35 ac-ft, and a loss in capacity because of sedimentation from liquefaction of 221 ac-ft. Currently, the CPS consists of a single 1138.5-MWe facility. The applicant concluded that the minimum submerged UHS pond design volume of 849 ac-ft, based on two 992-MWe BWR units, is sufficient for the single existing 1138.5-MWe CPS facility.	a) Affirmation; not verified by Staff b) The information provided by the Applicant for the height of the UHS pond dam and the capacity of the pond were used in the Staff's determination. The height was the basis of the conclusion that the UHS pond utilization would not be excessively frequent or sudden. The capacity was the basis to assess if adequate cooling water was available. UHS features were not visually inspected by the Staff.

2.4.8.1	[pg. 2-131; para. 5] The applicant stated that the CPS conducts annual surveys as part of the submerged UHS pond sedimentation monitoring program, and it also monitors sediment accumulation after a major flood passes through the cooling lake. The Monitoring Program Reports 20-23 (1998-2002) indicate that, immediately following the dredging in 1991, the volume of the submerged UHS pond was 1054 ac-ft and, in 2001, the volume declined to 1022 ac-ft because of sedimentation.	a) Affirmation; not verified by Staff
		b) The information provided by the Applicant for the height of the UHS pond dam and the capacity of the pond was used in the Staff's determination. The height was the basis of the conclusion that the UHS pond utilization would not be excessively frequent or sudden. The capacity was the basis to assess if adequate cooling water was available. UHS features were not visually inspected by the Staff.
2.4.8.1	[pg. 2-132; para. 1] The applicant estimated that a minimum volume of 935 ac-ft in the submerged UHS pond would be available for the existing CPS unit, assuming none of the ESP facility's UHS-required water, equal to 87 ac-ft, is returned to the submerged UHS pond. The applicant concluded that this scenario allows for a reserve volume of 86 ac-ft for sediment accumulation based on the 2001 measured volume of the submerged UHS pond.	a) Affirmation; not verified by Staff
		b) The information provided by the Applicant for the height of the UHS pond dam and the capacity of the pond was used in the Staff's determination. The height was the basis of the conclusion that the UHS pond utilization would not be excessively frequent or sudden. The capacity was the basis to assess if adequate cooling water was available. UHS features were not visually inspected by the Staff.

2.4.8.1	[pg. 2-132; para. 2] The applicant stated that the estimated annual sedimentation amount is 5 ac-ft. The applicant also stated that, while dredging should occur based on volume measurements of the submerged UHS pond, the new dredging threshold of 936 ac-ft would be expected to result in dredging at least once every 23 years.	a) Affirmation; not verified by Staff
		b) The information provided by the Applicant for the height of the UHS pond dam and the capacity of the pond was used in the Staff's determination. The height was the basis of the conclusion that the UHS pond utilization would not be excessively frequent or sudden. The capacity was the basis to assess if adequate cooling water was available. UHS features were not visually inspected by the Staff.

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<tr>
<td rowspan="2">2.4.8.1</td>
<td rowspan="2">[pg. 2-132; para. 3] The applicant stated that the relationship between the surface area and the volume of the submerged UHS pond based on the design and as-built data found in the September 1975 and April 1985 modeling indicates that the immediate reduction in existing volume by 87 ac-ft would result in a decrease of the water level in the submerged UHS pond of approximately 0.5 ft.

The applicant stated that this change in water level would not significantly impact the surface area. The applicant estimated that the new surface area would remain the same or larger than the design surface area, indicating that the heat rejection capacity of the submerged UHS pond would be maintained. The applicant also stated that, according to Section 9.2.5.3 of the CPS USAR, the total heat rejection to the submerged UHS pond over 30 days following an emergency shutdown of the CPS unit would be less than that assumed during the design of the UHS. The applicant concluded that the original modeling of the UHS is still applicable for the new proposed conditions.</td>
<td>a) Affirmation; not verified by Staff</td>
</tr>
<tr>
<td>b) The information provided by the Applicant for the height of the UHS pond dam and the capacity of the pond were used in the Staff's determination. The height was the basis of the conclusion that the UHS pond utilization would not be excessively frequent or sudden. The capacity was the basis to assess if adequate cooling water was available.

UHS features were not visually inspected by the Staff.</td>
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2.4.8.1	[pg. 2-133; para. 2] The applicant stated that it used the normal lake water surface elevation of 690 ft MSL as the starting water surface elevation during the drawdown evaluation. The applicant obtained lake stage-storage relationship information from the CPS ER based on the original lake volume of 74,200 ac-ft at normal lake water surface elevation. The applicant estimated Inflow into the lake on a monthly basis by multiplying the rainfall runoff, expressed as a depth, by the watershed area. Outflow from the lake was assumed to consist of downstream discharge, net lake evaporation minus lake precipitation, forced evaporation resulting from existing plant operation, seepage loss, and cooling water consumed by the ESP facility. The applicant assumed the downstream discharge through the dam to be a minimum of 5 cfs when the lake level was at or below the 690 ft MSL spill elevation. The drought analysis did not allow the lake level to exceed 690 ft. MSL. The analysis did allow the discharge to be greater than 5 cfs, if inflow would increase the lake level above the spillway elevation of 690 ft MSL. The CPS USAR provided data on net lake evaporation minus lake	a) Affirmation; not verified by Staff b) The information provided by the Applicant for the height of the UHS pond dam and the capacity of the pond were used in the Staff's determination. The height was the basis of the conclusion that the UHS pond utilization would not be excessively frequent or sudden. The capacity was the basis to assess if adequate cooling water was available. Staff did an independent bounding assessment to assess if the reliance on the UHS due to low water would be frequent or sudden.

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<tr>
<td rowspan="2">2.4.8.1</td>
<td rowspan="2">[pg. 2-133; para. 3] The initial forced evaporation data were based on two 992-Mwe BWR plants operating at a 70-percent load factor. Forced evaporation is defined as the additional evaporation resulting from an increase in lake water temperature caused by the discharge of cooling water to the lake from the once-through cooling system for the two original plants. The applicant subsequently revised the forced evaporation rate for the two originally proposed plants to estimate the rate for the single, uprated existing CPS unit. The CPS Unit 1 was uprated from its original 992-MWe rating to 1138.5 MWe in 2002. The applicant divided the forced evaporation rate from the CPS USAR by 0.7 to obtain the forced-evaporation rate for a 100-percent load factor. The applicant then divided the resulting forced-evaporation rate by two because only one of the two originally planned units was constructed. This new forced evaporation rate was again adjusted for the plant uprate by multiplying by a factor of 1.147 (1138 divided by 992).</td>
<td>a) Affirmation; not verified by Staff</td>
</tr>
<tr>
<td>b) The information provided by the Applicant for the height of the UHS pond dam and the capacity of the pond were used in the Staff's determination. The height was the basis of the conclusion that the UHS pond utilization would not be excessively frequent or sudden. The capacity was the basis to assess if adequate cooling water was available.

Staff did an independent bounding assessment to assess if the reliance on the UHS due to low water would be frequent or sudden.</td>
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</table>

2.4.8.1	[pg. 2-133; para. 4] The applicant stated that it had recently checked the forced-evaporation rates for the original 992-MWe plant operating at a 100-percent load factor. Forced and natural evaporation occur simultaneously as the circulating cooling water flows through the cooling loop. To differentiate between the amounts of natural and forced evaporation, the applicant determined the equilibrium temperature of the lake on a monthly basis using monthly meteorologic data over the period of record.	a) Affirmation; not verified by Staff
	The applicant stated that the equilibrium temperature is the temperature of water in the lake about 1 ft below the surface, where the heat input to the lake is exactly balanced by the heat output from the lake. The applicant stated that the equilibrium temperature is determined by performing a heat balance for solar heat gain, heat loss by convection, evaporative cooling, and radiant heat transfer from the water to the surroundings. The amount of natural evaporation is determined based on the equilibrium temperature.	b) Staff did an independent bounding assessment to assess if the reliance on the UHS due to low water would be frequent or sudden.

2.4.8.1	[pg. 2-133; para. 5] The applicant stated that it developed a model based on the method of Langhaar to determine the amount of forced evaporation.	a) Affirmation; not verified by Staff
		b) Staff did an independent bounding assessment to assess if the reliance on the UHS due to low water would be frequent or sudden.
2.4.8.1	[pg. 2-133/134] The model was validated based on its agreement with the results of an earlier study by Edinger. The applicant then applied the model to simulate the cooling lake for each month using monthly average climatic conditions over the period of record. The applicant stated that the evaporation estimated by this-model was the total, or the sum of natural and forced evaporation. Forced evaporation was the difference between the total and previously estimated natural evaporation.	a) Affirmation; not verified by Staff
		b) Staff did an independent bounding assessment to assess if the reliance on the UHS due to low water would be frequent or sudden.

2.4.8.1	[pg. 2-134; para. 2] The applicant stated that the analysis for the existing CPS unit and the ESP facility assumed a 100-percent load factor during their respective operations. It was assumed that each design drought would begin in January of the first year. Seepage loss was assumed to be 0.5 percent of the lake capacity per month. The applicant carried out the drawdown calculations on a monthly time step. EGC calculated a net volume gain or loss by subtracting losses and adding gains to the initial lake volume for each month to obtain the initial lake volume for the next month. The applicant used the lake stage-surface area and stage-volume relationship from the CPS ER to estimate lake water surface elevation and area for the next month. It then repeated these calculations for the 50-year and the 100-year drought.	a) Affirmation; not verified by Staff
		b) Staff did an independent bounding assessment to assess if the reliance on the UHS due to low water would be frequent or sudden.

2.4.8.1	[pg. 2-134; para. 6] The applicant stated that, according to soil surveys of Illinois, early spring rains in areas where soil is exposed because of farming can cause extensive erosion when the soil surface is partially frozen leading to greater runoff. The applicant stated that the highest 24-hour PMP occurs in the summer and fall (June through September), with the monthly PMP value ranging from 24.4 to 31.2 in. The applicant reasoned that the occurrence of the PMP would not be coincident with the conditions for maximum runoff.	a) Affirmation; not verified by Staff
		b) The information provided by the Applicant for the height of the UHS pond dam and the capacity of the pond were used in the Staff's determination. The height was the basis of the conclusion that the UHS pond utilization would not be excessively frequent or sudden. The capacity was the basis to assess if adequate cooling water was available.
2.4.8.1	[pg. 2-135; para. 2] The applicant stated that, in addition to the storage requirements for cooling purposes and fire water supply, the submerged UHS pond was designed to account for sedimentation. The design of the submerged UHS pond considered sediment inflow from liquefaction and an associated loss in capacity of 221 ac-ft, fire water storage capacity of 3 ac-ft, minimum cooling water capacity of 590 ac-ft required to meet the 95°F shutdown service water inlet temperature, and loss in capacity of 35 ac-ft from sedimentation resulting from a 100-year flood.	a) Affirmation; not verified by Staff
		b) The information provided by the Applicant for the height of the UHS pond dam and the capacity of the pond were used in the Staff's determination. The height was the basis of the conclusion that the UHS pond utilization would not be excessively frequent or sudden. The capacity was the basis to assess if adequate cooling water was available.

2.4.8.1	[pg. 2-135; para. 3] In Revision 4 of the SSAR, the applicant stated that the probable maximum flood water surface elevation is 709.8 ft MSL.	a) Affirmation; not verified by Staff b) The Clinton Lake Dam was determined by Staff not to be a safety-related structure. The water impounded by Clinton Lake Dam is critical to the normal heat sink but not the UHS. Therefore, Staff did not attempt to verify facts specific to Clinton Lake Dam.
2.4.9.1	[pg. 2-144; para. 2] The applicant stated that, based on topographic characteristics and geologic features of the drainage basin, landslides that might lead to blockage of streamflow into Clinton Lake are not possible.	a) Affirmation; verified by Staff during site visit b) This fact was used to understand the overall topography and geology near the ESP site in regard to landslides.
2.4.9.1	[pg. 2-144; para. 2] The applicant also noted that, as discussed in SSAR Section 2.4.7, the history of ice jam formation does not indicate streamflow diversion during the winter months.	a) Affirmation; verified by Staff b) Staff used data and streamflow conditions from USGS gauge at Rowell to evaluate historical ice-jam formation in Clinton Lake watershed. This fact was not used directly by Staff. Staff's analysis used a bounding approach as described in SER Section 2.4.9.3.
2.4.9.1	[pg. 2-144; para. 3] The applicant further stated that its examination of the topographic maps of Salt Creek and the North Fork of Salt Creek did not reveal evidence of natural channel diversions, such as oxbow lakes or broad, well-developed floodplains.	a) Affirmation; verified by Staff b) This fact was used by Staff to understand the tendency of meandering in the Clinton Lake watershed. This fact was not used directly by Staff. Staff's analysis used a bounding approach as described in SER Section 2.4.9.3.
2.4.9.1	[pg. 2-144; para. 4] The applicant stated that the creeks and streams in the watershed generally occur in well-defined valleys.	a) Affirmation; verified by Staff during site visit

		b) This fact was used by Staff to understand the tendency of meandering in the Clinton Lake watershed. This fact was not used directly by Staff. Staff's analysis used a bounding approach as described in SER Section 2.4.9.3.
2.4.9.1	[pg. 2-144; para. 4] Any diversion of water out of these valleys into an adjacent drainage basin would require sufficient energy to overcome the topography and cut a new drainage channel.	a) Affirmation; verified by Staff
		b) This fact was used by Staff to understand the tendency of meandering in the Clinton Lake watershed. This fact was not used directly by Staff. Staff's analysis used a bounding approach as described in SER Section 2.4.9.3.
2.4.10.1	[pg. 2-146; para. 5] SSAR Section 2.4.3.6 estimated the design-basis flood elevation at the ESP site to be 713.8 ft MSL.	a) Affirmation; verified by Staff
		b) This was Applicant's initial submission regarding PMF water surface elevation based on a PMP determined from HMR 33 and coincident wind waves. The Applicant revised this PMF water surface elevation estimate in response to Staff's RAI 2.4.2-1 and DSER Open Item 2.4-5 to correspond to its revised PMP estimated from HMR 51 and 52. Staff's verification of this fact is described in SER Section 2.4.3.3. This fact was used in establishing the dryness of the proposed ESP site during the PMF event.

2.4.10.1	[pg. 2-147; para. 3] In response to RAI 2.4.10-1, the applicant stated that the CPS USAR considered the 40-mph overland wind speed to act on the PMF water surface elevation.	a) Affirmation; verified by Staff
		b) Staff disagreed with the Applicant on its use of 40-mph wind for estimation of wave runup. The Applicant revised its wave runup analysis to use the wind speed recommended in ANSI/ANS-2.8-1992 as suggested by the Staff. This fact was used to determine highest water surface elevation in the Clinton Lake during the PMF due to combined effects of the PMP and wind-generated waves.
2.4.10.1	[pg. 2-147; para. 3] The applicant also stated that the design of the circulating water screenhouse for the CPS Unit 1 considered a 48-mph overland wind speed coincident with the PMF water surface elevation.	a) Affirmation; verified by Staff
		b) Staff disagreed with the Applicant on its use of 48-mph wind for estimation of wave runup. The Applicant revised its wave runup analysis to use the wind speed recommended in ANSI/ANS-2.8-1992 as suggested by the Staff. This fact was used to determine highest water surface elevation in the Clinton Lake during the PMF due to combined effects of the PMP and wind-generated waves.
2.4.10.1	[pg. 2-147; para. 5] In Revision 4 of the SSAR, the applicant stated that the maximum hydrostatic PMF water surface elevation is 709.8 ft MSL and, combined with other effects, the maximum water level of Clinton Lake near the ESP facility is 716.5 ft MSL.	a) Affirmation; verified by Staff
		b) This fact was used to specify the highest water surface elevation at the ESP site for which the Applicant must provide flooding protection to any safety-related SSC that may be exposed to flooding.

2.4.11.1	[pg. 2-149; para. 6] The applicant stated that the original CPS drawdown analysis evaluated the ability of Clinton Lake to provide cooling tower(s) makeup water to the ESP facility in addition to meeting the cooling water requirements of the existing CPS Unit 1.	a) Affirmation; not verified by Staff
		b) Staff relied on Applicant's submission in the SAR. This fact helped establish the overall layout and functioning of the current CPS plant as well as that of the proposed ESP facility.
2.4.11.1	[pg. 2-149; para. 6] The applicant stated that the previous forced-evaporation rate estimate was based on heat rejection from CPS.	a) Affirmation; not verified by Staff
		b) Staff relied on Applicant's submission in the SAR. This fact helped establish the overall layout and functioning of the current CPS plant as well as that of the proposed ESP facility.
2.4.11.1	[pg. 2-149; para. 6] In the ESP facility evaluation, the applicant adjusted this estimate by (1) dividing the original estimate by two, since only one of the two units originally planned was constructed, (2) dividing by 0.7 to conservatively adjust the forced-evaporation rate for a 100-percent load factor, and (3) multiplying by 1.2 to conservatively adjust for the additional heat load caused by the power uprate of the existing CPS Unit 1.	a) Affirmation; verified by Staff
		b) This fact was used to estimate the forced evaporation from Clinton Lake due to heat rejection from CPS Unit 1. Staff's analysis of low-flow considerations used a different, bounding approach as described in SER Section 2.4.11.3, in which this fact was not used.

2.4.11.1	[pg. 2-149; para. 7] The applicant stated that the new drawdown analysis performed for the ESP facility determined that the quantity of water available for cooling tower(s) makeup during a 50-year drought would be 15,808 gpm, and the quantity available during a 100-year drought would be 10,222 gpm. These available water quantities would maintain the water surface elevation in Clinton Lake at or above the CPS minimum required water surface elevation of 677 ft MSL while both the CPS Unit 1 and the ESP facility were in operation.	a) Affirmation; not verified by Staff b) Staff's analysis of low-flow considerations used a different, bounding approach as described in SER Section 2.4.11.3, in which this fact was not used.
2.4.11.1	[pg. 2-150; para. 1] The applicant stated that the available water quantity during drought conditions would be sufficient to provide makeup water for both the safety and nonsafety cooling systems' cooling towers for some of the reactor designs being considered for the site which use wet cooling. The applicant stated that the bounding reactor plant cooling system makeup demand would require the use of a wet/dry cooling tower for a turbine plant's cooling systems to reduce either the evaporation rate or the heat discharge to the lake, so that the demand would not exceed the available water supply from Clinton Lake.	a) Affirmation; not verified by Staff b) Staff's analysis of low-flow considerations used a different, bounding approach as described in SER Section 2.4.11.3, in which this fact was not used.

2.4.11.1	[pg. 2-150; para. 2] The applicant stated that surges, seiches, or tsunami conditions were not likely to occur in Clinton Lake or the submerged CPS UHS pond because no large body of water exists near the ESP site. Therefore, the applicant concluded that these conditions would not produce or affect low-water conditions at the ESP site.	a) Affirmation; verified by Staff b) Staff's analysis of low-flow considerations used a different, bounding approach as described in SER Section 2.4.11.3, in which this fact was not used.
2.4.11.1	[pg. 2-150; para. 3] The applicant stated that it evaluated the effects of drought on water surface elevations in Clinton Lake to determine whether the operation of the existing CPS plant would be sustained during dry periods. This analysis established a minimum water surface elevation of 677 ft MSL in Clinton Lake for the safe operation of the CPS plant.	a) Affirmation; not verified by Staff b) Staff's analysis of low-flow considerations used a different, bounding approach as described in SER Section 2.4.11.3, in which this fact was not used.
2.4.11.1	[pg. 2-150; para. 4] The applicant stated that the drawdown analysis for the ESP site accounted for inflows generated from direct rainfall and storm runoff, normal evaporation, forced evaporation caused by plant cooling and resulting in increased lake water temperature, seepage losses, and a minimum discharge from the dam for downstream flow requirements.	a) Affirmation; not verified by Staff b) Staff's analysis of low-flow considerations used a different, bounding approach as described in SER Section 2.4.11.3, in which this fact was not used.

2.4.11.1	[pg. 2-150; para. 4] This drought analysis was based on the existing, uprated CPS, which consists of one 1138.5 MWe BWR operating at 100-percent load, as well as on the PPE value for ESP plant consumption.	a) Affirmation; verified by Staff
		b) Staff's analysis of low-flow considerations used a different, bounding approach as described in SER Section 2.4.11.3, in which this fact was not used.
2.4.11.1	[pg. 2-150; para. 5] The applicant stated that the results of the drawdown analysis established the minimum lake water surface elevation during 50- and 100-year droughts as 685 ft MSL and 681.4 ft MSL, respectively.	a) Affirmation; not verified by Staff
		b) Staff's analysis of low-flow considerations used a different, bounding approach as described in SER Section 2.4.11.3, in which this fact was not used.
2.4.11.1	[pg. 2-151; para. 2] The applicant stated that the makeup water requirements range from 250 gpm during normal operation up to a maximum of 700 gpm during a normal shutdown.	a) Affirmation; not verified by Staff
		b) Staff's analysis of low-flow considerations used a different, bounding approach as described in SER Section 2.4.11.3, in which this fact was not used.
2.4.11.1	[pg. 2-151; para. 2] The total makeup water requirement for postaccident shutdown and cooldown for a 30-day period is approximately 21.4 million gallons or an average makeup requirement of 495.2 gpm over the 30-day period.	a) Affirmation; verified by Staff
		b) Staff's analysis of low-flow considerations used a different, bounding approach as described in SER Section 2.4.11.3, in which this fact was not used.

2.4.11.1	[pg. 2-151; para. 4] The applicant stated that the submerged UHS pond has sufficient water storage capacity for shutdown operation of the CPS, as well as providing makeup water for the ESP facility shutdown for a period of at least 30 days and beyond, if necessary.	a) Affirmation; verified by Staff in SER Section 2.4.8.3 b) Staff's analysis of low-flow considerations used a different, bounding approach as described in SER Section 2.4.11.3, in which this fact was not used.
2.4.11.1	[pg. 2-151; para. 4] The amount of water that would be evaporated to provide postaccident shutdown cooling is 2.87 million ft^3.	a) Affirmation; not verified by Staff b) Staff's analysis of low-flow considerations used a different, bounding approach as described in SER Section 2.4.11.3, in which this fact was not used.
2.4.11.1	[pg. 2-151; para. 6] The applicant stated that the original design of the submerged UHS pond was based on the heat load from the shutdown of one CPS unit under LOCA conditions and one CPS unit under LOOP conditions, with a total integrated heat load of 180,455 x 10^6 BTU for 30 days. The heat load from the single, uprated CPS unit is 99,973 x 10^6 BTU for 30 days under LOCA or LOOP conditions.	a) Affirmation; not verified by Staff b) Staff's analysis of low-flow considerations used a different, bounding approach as described in SER Section 2.4.11.3, in which this fact was not used.
2.4.11.1	[pg. 2-151; para. 6] The applicant estimated that this value is approximately 55 percent of the CPS submerged UHS pond design heat load, thereby indicating that considerable margin is available.	a) Affirmation; not verified by Staff b) Staff's analysis of low-flow considerations used a different, bounding approach as described in SER Section 2.4.11.3, in which this fact was not used.

2.4.11.1	[pg. 2-152; para. 3] The applicant stated that it monitors the submerged UHS pond for sediment accumulation periodically and after a major flood passes through Clinton Lake.	a) Affirmation; not verified by Staff
		b) Staff relied on Applicant's submission in the SAR. According to COL Action Item 2.4-10, stated by the Staff in SER Section 2.4.8.3, the COL applicant must determine the dredging requirement of the submerged UHS pond to maintain it as a safety-related facility.
2.4.11.1	[pg. 2-152; para. 4] The applicant stated that the excess available water on an annual average basis after satisfying CPS consumptive demand is 1,300 ac-ft/month (9,500 gpm) during the 100-year drought event and 2,000 ac-ft/month (15,100 gpm) during the 50-year drought event.	a) Affirmation; not verified by Staff
		b) Staff's analysis of low-flow considerations used a different, bounding approach as described in SER Section 2.4.11.3, in which this fact was not used.
2.4.12.1	[pg. 2-157; para. 3] Local ESP site conditions are consistent with the regional conditions.	a) Affirmation; not verified by Staff
		b) The Staff did not rely on this fact to reach its conclusion. COL Action Item 2.4-13 states the CP or COL applicant will need to undertake additional geotechnical characterization.

2.4.12.1	[pg. 2-157; para. 4] The alluvium, composed of varying amounts of clay, silt, sand, and gravel, is located within floodplains around stream corridors. In locations where the alluvium contains relatively thick lenses of sand and gravel, it can represent a viable water-bearing aquifer. Water in the alluvium is generally unconfined. Borings in the vicinity where the submerged CPS UHS pond is now located recorded alluvial deposits from 6 ft to 48 ft.	a) Affirmation; not verified by Staff
		b) The Staff did not rely on these facts to reach its conclusion. COL Action Item 2.4-13 states the CP or COL applicant will need to undertake additional geotechnical characterization.

2.4.12.1	[pg. 2-157; para. 5] A thick layer of glacial drift and outwash underlies much of the region. The total thickness of the glacial drift and outwash ranges from less than 50 ft to more than 400 ft. This stratum of Wisconsinan-aged, Illinoian-aged, and Kansan-aged deposits is composed of heterogeneous mixtures of clay, silt, sand, and gravel. Drift material is dominated by clayey silts or silty clays, whereas outwash materials are dominated by sand and gravel. Water in the drift and outwash is generally confined. Regional ground water movement is dominated by flow through unconsolidated glacial outwash in glacial bedrock valleys, such as the Mahomet Bedrock Valley, the axis of which lies near the ESP site. The glacial outwash provides the source of much of the ground water supply used regionally. At the ESP site, glacial drift and outwash occur a few feet below the surface. Based on strata exposed during excavation of the CPS facility arid borings conducted for the CPS facility and the ESP application, the applicant identified the depth and thicknesses of the Wisconsinan, Illinoian, and Kansan strata. [Remainder	a) Affirmation; not verified by Staff
		b) The Staff did not rely on these facts to reach its conclusion. COL Action Item 2.4-13 states the CP or COL applicant will need to undertake additional geotechnical characterization.

2.4.12.1	[pg. 2-157; para. 6] The bedrock beneath the glacial drift and outwash is Pennsylvanian-aged shale, siltstone, limestone, and underclay. Valleys in the bedrock formed by geologic processes and filled with glacial drift and outwash are significant hydrogeologic structures throughout the region. Water in the bedrock formations is under confined conditions.	a) Affirmation; not verified by Staff b) The Staff did not rely on these facts to reach its conclusion. COL Action Item 2.4-13 states the CP or COL applicant will need to undertake additional geotechnical characterization.
2.4.12.1	[pg. 2-157; para. 7] The dominant source of ground water for regional water use is from the glacial outwash in bedrock valleys. Based on the CPS USAR, the applicant stated that 65 percent of public ground water supplies are pumped from the Mahomet Bedrock Valley aquifer. Within 15 miles *[pg. 2-158]* of the site, alluvial aquifers provide the public water supply only for Heyworth. No public water supply within the 15-mile radius of the proposed site uses bedrock wells.	a) Affirmation; not verified by Staff b) The Staff did not rely on these facts to reach its conclusion. COL Action Item 2.4-13 states the CP or COL applicant will need to undertake additional geotechnical characterization.

2.4.12.1	[pg. 2-158; para. 2] The applicant stated that the inundation of Salt Creek and the North Fork of Salt Creek resulted in changes to the local water table, with ground water flowing toward Clinton Lake. The presence of Clinton Lake's relatively stable pool elevation represents an important boundary condition in describing the flow of ground water in the upper strata from the ESP site towards the lake.	a) Affirmation; not verified by Staff b) The Staff did not rely on these facts to reach its conclusion. COL Action Item 2.4-13 states the CP or COL applicant will need to undertake additional geotechnical characterization.
2.4.12.1	[pg. 2-158; para. 3] The applicant used one of these permeability estimates with its associated porosity and the water table gradient near the ESP site to estimate the velocity in the upper aquifer to be 2.5×10^{-3} feet per day (ft/d).	a) Affirmation; not verified by Staff b) The Staff did not rely on these facts to reach its conclusion. COL Action Item 2.4-13 states the CP or COL applicant will need to undertake additional geotechnical characterization.
2.4.13.1	[pg. 2-164; para. 5] In the two paragraphs comprising SSAR Section 2.4.12, the applicant stated that it is extremely unlikely that effluents can move out of facilities containing liquid radioactive wastes because of the high water table elevation. The applicant's position is that the high water table results in an inward-directed hydraulic gradient that would allow ground water into the facility but not out of the facility.	a) Affirmation; not verified by Staff b) The Staff did not rely on these facts to reach its conclusion. Permit Condition 4 precludes any and all accidental releases.

2.4.13.1	[pg. 2-164; para. 6] The applicant identified the closest surface water withdrawal for drinking water purposes to be 242 miles downstream at Alton, Illinois.	a) Affirmation; not verified by Staff b) This fact in SER Section 2.4.13.1 was not used by the Staff. Permit Condition 4 precludes any and all accidental releases.
2.4.15.1.1	[pg. 2-169; para. 6] In SSAR Section 3.2.1.2, the applicant stated that the flow from the normal cooling system to the cooling towers would be 1,200,000 gpm. This slow rate reflects the recirculation of water within the cooling system. Water would be withdrawn from Clinton Lake to make up for water lost from evaporation and to limit the concentration of impurities in the cooling water. The applicant stated that the cooling tower blowdown would normally be 12,000 gpm, with a maximum of 49,000 gpm.	a) Affirmation; not verified by Staff b) Normal heat sink has no safety-related function. Staff did not verify any of the normal heat sink parameters. The Staff did not use the facts in SER Section 2.4.15.1.1 to reach its conclusion. Staff's analysis was based on bounding estimations regarding whether reliance on UHS may be frequent or sudden.
2.4.15.1.1	[pg. 2-169; para. 7] The applicant stated that the maximum NPHS load during normal operation would be 15.08×10^9 Btu per hour (Btu/h), with a maximum discharge temperature of 100 °F. The staff had intended to identify these values as DSER) Permit Conditions 3.2-1 and 3.2-2. Section 2.4.15.1.3 of this SER provides a more detailed discussion of this issue.	a) Affirmation; not verified by Staff b) Normal heat sink has no safety-related function. Staff did not verify any of the normal heat sink parameters. Staff's analysis was based on bounding estimations regarding whether reliance on UHS may be frequent or sudden, not on the facts recited in 2.4.15.1.1

2.4.15.1.1	[pg. 2-169; para. 8] The discharge temperature is based on a design approach of 15 °F and a maximum wet bulb temperature of 85 °F. The applicant stated that a wet bulb temperature of 77.2 °F would only be exceeded 1 percent of the time and that the maximum wet bulb temperature is 84.7 °F.	a) Affirmation; not verified by Staff b) Normal heat sink has no safety-related function. Staff did not verify any of the normal heat sink parameters. Staff's analysis was based on bounding estimations regarding whether reliance on UHS may be frequent or sudden, not on the facts recited in 2.4.15.1.1.
2.4.15.2.1	[pg. 2-173; para. 2] The applicant stated that the maximum discharge flow from the UHS cooling system to the cooling towers would be 26,125 gpm during normal operation and 52,250 gpm during shutdown. This flow rate reflects the recirculation of water within the cooling system, Water would be withdrawn from Clinton Lake to make up for water lost from evaporation and to limit the concentration of impurities in the cooling water. The applicant stated that the cooling tower evaporation rate would normally be 411 gpm, with a maximum of 700 gpm.	a) Affirmation; not verified by Staff b) This fact was used by Staff to estimate excess liquid water capacity within the submerged UHS pond as described in SER Section 2.4.8.3.
2.4.15.2.1	[pg. 2-173; para. 3] The applicant stated that the maximum UHS load during normal operation would be $225x10^{6}$ Btu/h and $411.4x10^{6}$ Btu/h during shutdown, with a maximum discharge temperature of 95 °F in both cases.	a) Affirmation; not verified by Staff b) This fact was not used by Staff to estimate excess liquid water capacity within the submerged UHS pond as described in SER Section 2.4.8.3.

2.4.15.2.1	[pg. 2-173; para. 4] The applicant indicated that the UHS pond is a submerged pond created by a submerged dam across the North Fork of Salt Creek downstream of the plant intake. This submerged pond maintains adequate capacity for 30 days of UHS operation in case the Clinton Lake Dam fails. This UHS pond would be shared with the existing CPS Unit 1. A baffle in the UHS pond is part of the UHS system design for the existing unit. In response to RAI 3.2.2-2, the applicant stated that the maintenance of the integrity of the UHS baffle is not required for the ESP facility's UHS operation.	a) Affirmation; verified by Staff b) This fact was used by Staff to determine the adequacy of the safety-related functions of the submerged UHS pond with respect to the proposed ESP facility.
2.5.1.1	[pg. 2-177; para. 2] ESP site is located within 700 feet of the CPS site.	a) Verified by Staff on site visit. b) Proximity of ESP and CPS sites used to justify the earlier geologic investigations performed for the CPS site as a starting point for ESP investigations.
2.5.1.1	[pg. 2-178; para. 2] Specifics within description of regional physiography surrounding ESP site.	a) Verified by Staff - consensus knowledge within geologic community b) Description is a necessary part of overall geologic characterization of site. Staff concluded that Applicant provided adequate description. (pg. 2-199; para. 4)
2.5.1.1	[pg. 2-178; para. 3] Specifics within description of geologic history and stratigraphy.	a) Verified by Staff - consensus knowledge within geologic community b) Description is a necessary part of overall geologic characterization of site. Staff concluded that Applicant provided adequate description. (pg. 2-199; para. 4)

2.5.1.1	[pg. 2-178; para. 4] Specifics within description of regional structural geology.	a) Verified by Staff - consensus knowledge within geologic community b) Description is a necessary part of overall geologic characterization of site. Staff concluded that Applicant provided adequate description. (pg. 2-199; para. 4)
2.5.1.1	[pg. 2-179; para. 1] Specifics within description of regional tectonic setting.	a) Verified by Staff - consensus knowledge within geologic community b) Description is a necessary part of overall geologic characterization of site. Staff concluded that Applicant provided adequate description. (pg. 2-199; para. 4)
2.5.1.1	[pg. 2-179; para. 2] ESP site lies within a compressive midplate stress province.	a) Verified by Staff - consensus knowledge within geologic community b) Description is a necessary part of overall tectonic characterization of site. Staff concluded that Applicant provided adequate description. (pg. 2-199; para. 4)
2.5.1.1	[pg. 2-182; para. 2] Peru monocline may be a reactivated Paleozoic structure.	a) Staff verified that geologic feature accounted for in PSHA b) Fact used by Staff to ensure that this geologic feature is accounted for by being within one of the major seismogenic source zones in the site region (northern portion of Central IL source) and used in PSHA. Staff concurred with Applicant's approach of using areal seismic source zones rather than characterizing individual faults or features. (pg. 2-198; para. 3)

2.5.1.1	[pg. 2-182; para. 3] Du Quoin monocline and related Centralia fault zone are considered potential source for paleo-earthquake.	a) Staff verified that geologic feature accounted for in PSHA
		b) Fact used by Staff to ensure that these geologic features are accounted for by being within one of the major seismogenic source zones in the site region (part of Wabash Valley-Southern IL source) and used in PSHA. Staff concurred with Applicant's approach of using areal seismic source zones rather than characterizing individual faults or features. (pg. 2-198; para. 3)
2.5.1.1	[pg. 2-182; para. 4] Waterloo-Dupo anticline may be the seismic source for paleoliquefaction features in eastern MO.	a) Staff verified that geologic feature accounted for in PSHA
		b) Fact used by Staff to ensure that this geologic feature is accounted for by being within one of the major seismogenic source zones in the site region (included in EPRI-SOG source zones) and used in PSHA. Staff concurred with Applicant's approach of using areal seismic source zones rather than characterizing individual faults or features. (pg. 2-198; para. 3)
2.5.1.1	[pg. 2-182; para. 5] Recent seismicity associated with Farmington anticline-Avon block structure.	a) Staff verified that geologic feature accounted for in PSHA
		b) Fact used by Staff to ensure that these geologic features are accounted for by being within one of the major seismogenic source zones in the site region (part of Wabash Valley-Southern IL source) and used in PSHA. Staff concurred with Applicant's approach of using areal seismic source zones rather than characterizing individual faults or features. (pg. 2-198; para. 3)
2.5.1.1	[pg. 2-182; para. 7] Centralia fault zone activity and association with Du Quoin monocline.	a) Staff verified that geologic feature accounted for in PSHA

		b) Facts used by Staff to ensure that these geologic features are accounted for by being within one of the major seismogenic source zones in the site region (part of Wabash Valley-Southern IL source) and used in PSHA. Staff concurred with Applicant's approach of using areal seismic source zones rather than characterizing individual faults or features. (pg. 2-198; para. 3)
2.5.1.1	[pgs. 2-182-183; para. 8] St Louis fault possible candidate for paleoliquefaction features and association with Waterloo-Dupo anticline.	a) Staff verified that geologic feature accounted for in PSHA
		b) Fact used by Staff to ensure that this geologic feature is accounted for by being within one of the major seismogenic source zones in the site region (included in EPRI-SOG source zones) and used in PSHA. Staff concurred with Applicant's approach of using areal seismic source zones rather than characterizing individual faults or features. (pg. 2-198; para. 3)
2.5.1.1	[pg. 2-183; para. 1] Possible activity of Ste Genevieve fault zone	a) Staff verified that geologic feature accounted for in PSHA
		b) Fact used by Staff to ensure that this geologic feature is accounted for by being within one of the major seismogenic source zones in the site region (included in EPRI-SOG source zones) and used in PSHA. Staff concurred with Applicant's approach of using areal seismic source zones rather than characterizing individual faults or features. (pg. 2-198; para. 3)

2.5.1.1	[pg. 2-183; para. 3] Activity of Fluorspar Area fault complex	a) Staff verified that geologic feature accounted for in PSHA
		b) Fact used by Staff to ensure that this geologic feature is accounted for by being within one of the major seismogenic source zones in the site region (part of Wabash Valley-Southern Illinois source) and used in PSHA. Staff concurred with Applicant's approach of using areal seismic source zones rather than characterizing individual faults or features. (pg. 2-198; para. 3)
2.5.1.1	[pg. 2-183; para. 4] Applicant only considered CGL to be potential Quaternary feature.	a) Verified by Staff - consensus knowledge within geologic community
		b) St. Charles and South-Central lineaments, although not active seismogenic features, are encompassed by Wabash Valley -Southern Illinois source. Staff concurred with Applicant's approach of using areal seismic source zones rather than characterizing individual faults or features. (pg. 2-198; para. 3)
2.5.1.1	[pg. 2-183; para. 5] Activity of CGL	a) Staff verified that feature accounted for in PSHA
		b) Fact used by Staff to ensure that this geologic feature is accounted for by being within one of the major seismogenic source zones in the site region (part of Wabash Valley-Southern Illinois source) and used in PSHA. Staff concurred with Applicant's use of areal seismic source zones rather than characterizing individual faults or features. (pg. 2-198; para. 3)
2.5.1.1	[pg. 2-186; para. 2] Source model for New Madrid seismic zone.	a) Staff verified general assumptions of model
		b) Staff concurred with model's prediction of seismic activity rates for New Madrid seismic zone. (pg. 2-250; para. 1)

2.5.1.1	[pg. 2-186; para. 3] Structure of New Madrid seismic zone.	a) Verified by Staff - consensus knowledge within geologic community
		b) Fact used by Staff to ensure that areal source zone for New Madrid encompasses each of the fault segments within the zone.
2.5.1.1	[pg. 2-188; para. 2] Occurrence interval of New Madrid Earthquakes shortened to 500 years from 3000 years.	a) Staff verified with recent (past 5-6 years) paleoliquefaction studies
		b) Fact used as input to PSHA calculation. Staff conclusions regarding modeling of New Madrid earthquakes provided in Sec 2.5.2.3 (pg. 2-247 to 250; para. 2).
2.5.1.1	[pg. 2-188, 189; para. 3, 1] Repeated large earthquakes, based on paleoliquefaction evidence, in Wabash Valley-So. Illinois.	a) Staff verified with recent paleoliquefaction studies.
		b) Fact used as input to PSHA calculation. Staff conclusions regarding modeling of Wabash Valley earthquakes provided in Sec 2.5.2.3 (pg. 2-250; para. 3). Staff conclusions regarding accuracy of paleoliquefaction analyses provided in Sec 2.5.1.3 (pg. 2-198; para. 2-3).
2.5.1.1	[pg. 2-190; para. 2] Seismic activity in the central Illinois basin and lack of association of Springfield earthquake with geologic structure.	a) Staff verified with recorded earthquakes and paleoliquefaction study.
		b) Staff concluded that Applicant conservatively modeled central Illinois basin as a large areal source zone meaning that earthquakes are equally likely to occur anywhere within zone. (pg 2-196; para 3)

2.5.1.1	[pg. 2-192; para. 1] Paleoliquefaction features on streams near ESP site cannot be tied to a distinct earthquake or seismic source.	a) Affirmation b) Despite lack of source for paleoliquefaction features, Staff concluded that Applicant conservatively modeled central Illinois basin as a large areal source zone meaning that earthquakes are equally likely to occur anywhere within zone (pg 2-196 and 198; para 3 and 2). The Central Illinois source zone surrounds the ESP site.
2.5.1.1	[pg. 2-193; para. 1] Specifics within description of ESP site physiography.	a) Verified by Staff, by site visit and consensus knowledge within geologic community b) Description is a necessary part of overall geologic characterization of site. Staff concluded that Applicant provided adequate description. (pg. 2-200; para. 2)
2.5.1.1	[pg. 2-193; para. 2] Specifics within description of ESP site stratigraphy.	a) Verified by Staff, by site visit and consensus knowledge within geologic community b) Description is a necessary part of overall geologic characterization of site. Staff concluded that Applicant provided adequate description. (pg. 2-200; para. 2)
2.5.1.1	[pg. 2-193; para. 3] Specifics within description of ESP site structural geology.	a) Verified by Staff, by site visit and consensus knowledge within geologic community b) Description is a necessary part of overall geologic characterization of site. Staff concluded that Applicant provided adequate description. (pg. 2-200; para. 2)

2.5.1.1	[pg. 2-193; para. 4] Specifics within description of ESP site ground water conditions.	a) Verified by Staff, by site visit and consensus knowledge within geologic community
		b) Description is a necessary part of overall geologic characterization of site. Staff concluded that Applicant provided adequate description. (pg. 2-200; para. 2)
2.5.1.1	[pg. 2-194; para. 1] No susceptibility to karst development in DeWitt county.	a) Verified by Staff, by site visit and consensus knowledge within geologic community
		b) Description is a necessary part of overall geologic characterization of site. Staff concurred with Applicant's reasoning and concluded that Applicant provided adequate description. (pg. 2-200; para. 2)
2.5.1.1	[pg. 2-194; para. 2] No potential for mine subsidence at the ESP site.	a) Affirmation
		b) Description is a necessary part of overall geologic characterization of site. Staff concurred with Applicant's reasoning and concluded that Applicant provided adequate description. (pg. 2-200; para. 2)
2.5.1.1	[pg. 2-194; para. 3] Natural gas production does not pose hazard to ESP site.	a) Affirmation
		b) Description is a necessary part of overall geologic characterization of site. Staff concurred with Applicant's reasoning and concluded that Applicant provided adequate description. (pg. 2-200; para. 2)

2.5.1.1	[pg. 2-194; para. 4] Recreation area will not be impacted by ground water extraction activities at the ESP site.	a) Affirmation
		b) Description is a necessary part of overall geologic characterization of site. Staff concurred with Applicant's reasoning and concluded that Applicant provided adequate description. (pg. 2-200; para. 2)
2.5.1.1	[pg. 2-194; para. 5] Landsliding would not extend to ESP site.	a) Verified by Staff via site visit
		b) Description is a necessary part of overall geologic characterization of site. Staff concurred with Applicant's reasoning and concluded that Applicant provided adequate description. (pg. 2-200; para. 2)
2.5.2.1	[pg. 2-203; para. 4] Applicant indicated that the update of info. on structural features showed that general structural picture remains the same.	a) Verified by Staff - consensus knowledge within geologic community
		b) Description is a necessary part of overall geologic characterization of site. Staff concurred with Applicant's reasoning and concluded that Applicant provided adequate description. (pg. 2-246; para. 3)
2.5.2.1	[pg. 2-208; para. 1] At present, moderate size prehistoric earthquakes in central Illinois basin cannot be clearly associated with any geologic structure and no seismicity trends for region.	a) Verified by Staff - consensus knowledge within geologic community and by review of seismicity maps.
		b) Despite lack of source for paleoliquefaction features, Staff concluded that Applicant conservatively modeled central Illinois basin as a large areal source zone meaning that earthquakes are equally likely to occur anywhere within zone (pg 2-246; para 3). The Central Illinois source zone surrounds the ESP site.

2.5.2.1	[pg. 2-209; para. 1] After comparing the three attenuation models used for the original EPRI-SOG study with the new EPRI ground motion study, the applicant concluded that the recent median ground motion models are generally consistent with 2 of the 3 older models.	a) Verified by Staff by examination of SER Figure 2.2-2 in Appendix B. b) Despite consistency of 2 of 3 older models; Applicant used updated EPRI attenuation models. Consequently, the Staff focused its review on new attenuation models. (pg. 2-253; para. 2)
2.5.2.1	[pg. 2-210; para. 1] Updates to seismic sources and attenuation models result in significant change in overall seismic hazard at ESP site.	a) Verified by Staff - consensus knowledge within geologic community b) Staff concurred with Applicant's decision and reviewed in detail updates to seismic sources and ground motion.
2.5.2.1	[pg. 2-210; para. 3] Applicant assumed that earthquake ruptures on New Madrid faults rupture along entire length of fault, and closest approach of the fault to ESP site used as distance parameter.	a) Affirmation b) Staff concurred with Applicant's decision. Fact used by Staff to ensure that areal source zone for New Madrid encompasses each of the fault segments within the zone.
2.5.2.1	[pg. 2-213; para. 1] Hard rock conditions exist at ESP site at a depth of several thousand feet or more below surface.	a) Verified by Staff - consensus knowledge within geologic community b) Fact used by Staff to ensure that Applicant incorporated variability in its site subsurface model (i.e., depth to bedrock one of the variables).
2.5.2.1	[pg. 2-213; para. 4] Applicant assumed Vp/Vs ratios of 1.73 and 2 to model depths to hard rock of 1900 ft and 3000 ft.	a) Verified by Staff - commonly used range of Vp/Vs ratios b) Fact used by Staff to ensure that Applicant incorporated variability in its site subsurface model (i.e., depth to bedrock one of the variables).

2.5.2.1	[pg. 2-216; para. 1] Applicant used earthquake time histories from NUREG/CR-6728 for site response analysis.	a) Affirmation b) Fact used by Staff to ensure that ground motion used for site response analysis has a sufficient time duration and matches appropriate controlling earthquake spectra.
2.5.2.1	[pg. 2-216; para. 2] Description of site response analysis.	a) Affirmation b) Description used by Staff to ensure that Applicant used standard procedures for site response analysis.
2.5.4.1	[pg. 2-279; para. 1] Applicant stated that the boundaries between each of the soil layers is relatively horizontal and each layer is consistent in thickness and content.	a) Affirmation b) Description used by Staff to determine if further soil exploration was necessary to characterize site subsurface.
2.5.4.1	[pg. 2-287; para. 1] Details of suspension logging for P- and S-wave velocities.	a) Affirmation b) Description used by Staff to ensure that Applicant followed acceptable procedures and methods. Staff observed site geotechnical explorations prior to submittal of ESP application and documented its observations in a trip report.
13.3.1.1	[pg. 13-2; paras. 1-3] “In Section 2.3, ... the reports conclusions.”	a) Affirmation b) These paragraphs support the conclusion regarding the identification of physical characteristics unique to the proposed site. (pg. 13-13, para. 3)
13.3.1.1	[pg. 13-2; paras. 4 and 5] “Section 2.2.1, ... expects minimal impacts.”	a) Affirmation b) These paragraphs support the conclusion regarding maps, routes and boundaries within the plume exposure pathway EPZ. (pg. 13-13; para. 4)
13.3.1.1	[pgs. 13-4 and 5; para. 1 on pg. 13-4 through the first complete paragraph on pg. 13-5] “Section 2.3.2, ... remain valid.”	a) Affirmation b) These paragraphs support the conclusion regarding the number of people to be evacuated. (pg. 13-13; para. 5)

13.3.1.1	[pgs. 13-5 through 13-10; paras. 2 through the first complete paragraph on pg. 13-10.] “The ETE analysis ... remain in place.”	a) Affirmation
		b) These paragraphs support the conclusion regarding the road network in the area of the proposed site, analyzed travel times, and the transport-dependent population. (pg. 13-4; para. 6)
13.3.1.1	[Pgs. 13-10 through 13-11; para. 1 through the first complete para. on pg. 13-11] “Table 4.1, ...valid (see table 2.3.5.)”]	a) Affirmation
		b) These paragraphs support the conclusion related to numerical time estimates. (Pg. 13-13; para. 7)
13.3.1.1	[pg. 13-11; para. 3] “Section 2.1 .....this relocation.”	a) Affirmation
		b) This paragraph supports the conclusion related to other factors associated with the availability of outdoor recreational facilities. (pg. 13-13; para. 1)
13.3.1.1	[pg. 13-11; last para.] “In Section 2.4, ... ESP application.”	a) Affirmation
		b) This paragraph supports the conclusion related to other factors that could pose a significant impediment to the development of an emergency plan. (Pg. 13.3; para. 2)
13.3.3.11.1	[pgs. 13-45 and 46; bottom para. through first complete paragraph] “Figure 2.2-1, ... affect the site personnel.”	a) Affirmation
		b) These paragraph support the conclusion related to alternative evacuation routes for onsite individuals. (Pg. 13-59; full para. 3)

13.3.3.11.1	[pg. 13-46; para. 2] "Section 10.1.6, ...protective action recommendations."	a) Affirmation b) This paragraph supports the conclusion related to a mechanism for recommending protective actions. (Pg. 13-59; para. 4)
13.3.3.11.1	[pgs13-46 and 47; para. 3 through 4] "Section 6.0, ... Illinois (west of EGC ESP site)."	a) Affirmation b) These paragraphs support the conclusion related to vicinity maps. (Pg. 13-59; para. 5)
13.3.3.11.1	[Pg. 13-47; para. 5] "Sections 2.1....estimating populations."	a) Affirmation b) This paragraph supports the conclusion related to the general assumptions and methods for estimating populations." (Pg. 13-59; para. 6)
13.3.3.11.1	[Pgs. 13-47;para. 6] "The applicant... NETVAC."	a) Affirmation b) This paragraph supports the conclusion related to the model used to develop ETEs. (Pg. 13-59; para. 7)
13.3.3.11.1	[Pgs. 13-47 and 48; paras. 7 through 2] "The 1993 ETE... within the EPZ."	a) Affirmation b) These paragraphs support the conclusion related to the number of permanent residents and those without automobiles. (Pg. 13-60; para. 1)
13.3.3.11.1	[Pgs 13-48 and 49; paras. 3 through 3] "Section 3.3,... Apple and Pork Festival."	a) Affirmation b) These paragraphs support the conclusion related to transient populations. (Pg. 13-60; para. 2)
13.3.3.11.1	[Pgs. 13-49 and 50; paras. 4 through 3] "The 1993 ETE ...up to 15 students."	a) Affirmation b) These paragraphs support the conclusion related to special facility populations. (Pg. 13-60; para. 3)
13.3.3.11.1	[Pgs. 13-50 and 51; paras. 4 through 3] "Section 5.1, ... no major differences."	a) Affirmation b) These paragraphs support the conclusion related to areas and zones within the plume exposure EPZ. (Pg. 13-60; paras. 5 through 8)
13.3.3.11.1	[Pg. 13-51; para. 4] "Figure 1.2 ... on the map."	a) Affirmation

		b) This paragraph supports the conclusion related to evacuation routes. (Pg. 13-60, para. 8)
13.3.3.11.1	[Pgs. 13-51 and 52; paras. 5 through the top of the page] "Section 4.0 ...business district."	a) Affirmation
		b) These paragraphs support the conclusion related to evacuation route capacity. (Pg. 13-60; para. 9)
13.3.3.11.1	[Pg. 13-52; para. 1] "Section 6.0 ...NUREG-0654/FEMA/REP-1."	a) Affirmation
		b) This paragraph supports the conclusion related to total evacuation times. (Pg. 13-60 and 61; bottom of page to the top of the next page.)
13.3.3.11.1	[Pg. 13-52; paras. 2 through 4] "Sections 2.2 and 2.3 ... transport-dependent residents."	a) Affirmation
		b) These paragraphs support the conclusion related to assumptions that underlie the time estimates. (pg. 13-61 para. 1)
13.3.3.11.1	[Pg. 13-52 and 53; paras. bottom of page to top of next page] "Section 5.4 ...transport-dependent residents."	a) Affirmation
		b) These paragraphs support the conclusion related to methods of computing total evacuation time. (Pg. 13-61; para. 2)

13.3.3.11.1	[Pg. 13-53; para. 1] “The NETVAC ...each time step.”	a) Affirmation b) This paragraph supports the conclusion related to the means of mobilizing equipment and manpower to aid in evacuation. (Pg. 13-61; paras. 3 and 4)
13.3.3.11.1	[Pg. 13-53; Para. 2] “Figure 5.1 ... Attachment C.”	a) Affirmation b) This paragraph supports the conclusion related to the maximum times evacuation times for each sector. (Pg. 13-61; para. 5)
13.3.3.11.1	[Pgs. 53 and 54; paras. 3 through the top of the next page] “In RAI 13.3-16 ...of the ETE.”	a) Affirmation b) These paragraphs support the conclusion related to the confirmation of evacuation. (Pg. 13-61; para. 6)
13.3.3.11.1	[Pgs. 13-54 and 55; paras. 1 through 2] “Figures 2.2-1 ... discusses evacuation.”	a) Affirmation b) These paragraphs support the conclusion related to maps related to evacuation. (PG. 13-61; para. 7)
13.3.3.11.1	[Pg. 13-55; paras. 3 through 6] “Section 5C ...school students.”	a) Affirmation b) These paragraphs support the conclusion related to persons whose mobility may be impaired. (Pg. 13-61; last line.)
13.3.3.11.1	[Pgs. 13-55 and 56; paras. at the bottom of the page through paragraph 1 on the next page] “Section 1E(4) ...administer KI.”	a) Affirmation b) These paragraphs support the conclusion related to the means for using KI for emergency workers and institutionalized persons. (Pg. 13-62: first bullet)
13.3.3.11.1	[Pg. 13-56; paras. 2 and 3] “Section 1E(4) ... impaired population.”	a) Affirmation b) These paragraphs support the conclusion related to proposed means of evacuation. (Pg. 13-62; second bullet)
13.3.3.11.1	[Pg. 13-56; para 4] “Appendix D ... routes.”	a) Affirmation b) This paragraph supports the conclusion related to a potential relocation center. (Pg. 13-62; third bullet)

13.3.3.11.1	[Pg. 13-56; para. 5] "In RAI 13.3-13(f) ... similar functions."	a) Affirmation b) This paragraph supports the conclusion related to State and local governments' concept for using traffic capacities. (Pg. 13-62; para. 3)
13.3.3.11.1	[Pgs. 13-56 and 57; para. 6 through 1) "Section 1E(4) ... points in the EPZ."	a) Affirmation b) These paragraphs support the conclusion related to control and access to evacuated areas. (Pg. 13-62; fourth bullet)
13.3.3.11.1	[Pgs. 13-57; paras. 2 and 3] "Section 3A(6) ... application references."	a) Affirmation b) These paragraphs support the conclusion related to potential impediments. (Pg. 13-62; fifth bullet)
13.3.3.11.1	[Pgs.13-57 and 58; paras. 4 through the top of page 58] "In RAI 13.3-13(g), ...protective action recommendations."	a) Affirmation b) This paragraph supports the conclusion related to the State and local governments' concept for using ETE for implementing protective measures. (Pg. 13-62; para. 3)
13.3.3.11.1	[Pg. 13-58; paras. 1 through 4] "Section 1E(5)(b), ... congregate care shelters."	a) Affirmation b) This paragraph supports the conclusion related means for registering and monitoring evacuees. (Pg. 13-63; para. 5)