

**Victoria County Station - Hydrology (Chapter 2.4) Review
Site Audit Information Needs/Audit Results**

Serial No.	FSAR Section	Information Needs	ACTION
1	Electronic Datasets	<p>Provide the following electronic data:</p> <ul style="list-style-type: none"> • Electronic copy of topography map of the site. (docket and RR) • Electronic copy of the topography map of the Guadalupe River watershed. (NRC will confirm USGS website) • Digital elevation of the site and surrounding area including watershed (docket) • Stream network of the Guadalupe River watershed (NRC will confirm at audit) • Land use/land cover of the Guadalupe River watershed (NRC will confirm at audit) • Soil type of the Guadalupe River watershed (NRC will confirm) • HEC-RAS input/output used in Victoria County simulations. (docketed) • Meteorological data from the VCS station, Victoria Regional Airport, Corpus Christi and Galveston stations. (NRC will review at audit) • Electronic copy of the Guadalupe-San Antonio River Basin Water Authority Model (GSA-WAM). (NRC will review at audit) • Electronic copy of the 100-year Low Flow Frequency Analysis for the Guadalupe and San Antonio River. (currently RR) • Electronic copy of the USGS stream flow for the Tivoli, Victoria, and Goliad gaging stations. (RR) • Calculation packages (RR only) <p>Discussion:</p> <ul style="list-style-type: none"> • Electronic topographic data on the e reading room. Staff is requesting topographic information be submitted to the docket for use in developing the SER. • HEC-RAS submitted to docket. • Met data was submitted as a supplement. Two stations were not provided in the supplement. Additional met data should be provided. • Staff will review Met data and determine if this information should be provided on the docket. Precip data for gages listed in FSAR should be provided. • Soil type/land use data will be discussed during 2.4.3. • WAM was used to determine water budget, no safety significance. Staff will verify that no safety related conclusions from model. 	RAI

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		Action: RAI required for information needed on docket	
2	References	<p>Provide a Subject Matter Expert (SME) to discuss the following references used in Chapter 2.4.</p> <ul style="list-style-type: none"> • HDR Flood Study of the Rio Bravo Guadalupe Channel Diversion and Saltwater Barrier Project. • White, W. A., and Calnan, T. R., Sedimentation in Fluvial-Deltaic Wetlands and Estuarine Areas, Texas Gulf Coast, Literature Synthesis, (prepared for the Texas Parks and Wildlife Development, Resources Protection Division), Bureau of Economic Geology, The University of Texas at Austin, 1990. <p>Discussion:</p> <ul style="list-style-type: none"> • HDR Study deals with water rights, not safety related issues. • White study used in developing 2.4.9. This is a publically available document, NRC will obtain its own copy <p>Action: CLOSED</p>	CLOSED
3	2.4.1	<p>Provide a SME to discuss existing and with-project floodplain characteristics</p> <p>Discussion:</p> <ul style="list-style-type: none"> • Clarified flood plain characteristics. Staff will verify source of data in FSAR from FIS report. • No impact to site. <p>Action: CLOSED</p>	CLOSED
4	2.4.2	<p>Provide a SME to discuss the assumptions and approaches used in calculating local runoff and flood, including topics such as on-site water surface elevations during the local intense precipitation</p> <p>Discussion:</p> <ul style="list-style-type: none"> • Staff clarified analysis, no follow-up required 	CLOSED

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		Action: CLOSED	
5	2.4.3	<p>Please provide a SME to discuss the following references:</p> <p>2.4.3-1 U.S. Army Corps of Engineers, <i>Dam Assurance Study on Canyon Lake, Guadalupe Basin, Fort Worth District</i>, with input and output data files for Watershed Run-off Computer Model (WRCM), June 2005.</p> <p>2.4.3-7 U.S. Army Corps of Engineers, <i>Canyon Dam Flood Emergency Plan</i>, Fort Worth District, February 1998.</p> <p>2.4.3-8 Federal Emergency Management Agency, <i>Flood Insurance Study, Victoria County, Texas</i>, Unincorporated Area, November 20, 1998.</p> <p>2.4.3-5 Albert H. Halff Associates, Inc., <i>Dam Break Analysis for Coletto Creek Dam, for Guadalupe-Blanco River Authority</i>, March 1989.</p> <p>Discussion:</p> <ul style="list-style-type: none"> • All references are in RR. • First reference is not publically available • PMP from HMRs, then optimized • HEC-HMS developed based on COE and NWS • Calibrated against COE model • Coletto Creek not included in original model • COE model modified upstream of Canyon Dam and added Coletto Creek • Applicant clarified that the antecedent condition was included in the model and the effects of the antecedent condition did not impact the site. Discussion of PMF antecedent condition in FSAR was unclear. Explanation of antecedent condition was “superimposed” 	RAI

Serial No.	FSAR Section	Information Needs	ACTION
		<p>ACTION:</p> <ul style="list-style-type: none"> • Applicant will submit a SAR revision to SAR pg 2.4.3-12 • Clarification should include additional discussion of initial condition of routing of PMF. • RAI will be issued. 	
6	2.4.3	<p>Provide a SME to discuss HEC-HMS PMF modeling efforts and PMF attributes in the San Antonio River, Guadalupe River, and Coletto Ck. Watersheds as related to the VCS site.</p> <p>Discussion:</p> <ul style="list-style-type: none"> • Applicant determined the losses based on a calibration for a storm hydrograph at a local gage station and conservatively adjusted for PMF analysis. • Staff will verify calibrated models and loss assumptions from models in RR. <p>Provide a SME to discuss HEC-RAS PMF modeling for the Guadalupe River as related to the VCS site.</p> <p>Discussion:</p> <ul style="list-style-type: none"> • No additional comments <p>Action: Staff will verify models. Additional clarification may be needed by RAI.</p>	Open
7	2.4.3	<p>Please provide the VCS HEC-HMS calibration and PMF models, and the HEC-HMR model. (provided by letter to docket)</p> <p>Please provide the VCS HEC-RAS model. (provide by letter to docket)</p> <p>Please provide the Digital Terrain Map for the Guadalupe River (will be provided to docket)</p> <p>Discussion: HEC-HMR and HEC-RAS models already provided to docket by letter. Terrain maps needed for staff review.</p> <p>Action: RAI will be issued under serial no. 1 to include terrain maps.</p>	RAI
8	2.4.3	<p>Please provide annual peak discharge data for USGS gage no. 0818850, San Antonio R. at Goliad, TX and attendant discharge-frequency computations.</p>	RAI and open

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		<p>Discussion:</p> <ul style="list-style-type: none"> • Data is available in Section 2.4.2 • Discharge frequency analysis is provided in calculation in RR (calc number 25352-000-K0C-0009-00002) “PMP on Streams and Rivers” • FIS cross sections were incorporated in dam break model. Additional cross sections were developed by applicant from NED. <p>Action:</p> <ul style="list-style-type: none"> • Applicant will update SAR with discussion of the elevation storage relationship differences and explain conclusion that the “differences are expected to be minor” • NRC will review curve prior to end of audit. • RAI will be issued requesting comparison elevation-storage relationship. • NRC will verify RAS version for changes – import model to current version. 	
9	2.4.4	<p>Please provide a SME to discuss the following references:</p> <p>2.4.4-17 URS Corporation, <i>Bi-Annual Dam Inspection of Coletto Creek Dam</i>, submitted to Guadalupe-Blanco River Authority, August 21, 2003.</p> <p>Discussion:</p> <ul style="list-style-type: none"> • Reference was used to verify PMF and Coletto Creek Dam failure under PMF conditions. Reference was used to preclude the hydrologic failure. <p>Action: CLOSED</p>	CLOSED
10	2.4.4	<p>Please provide a SME to discuss HEC-RAS dam breach modeling.</p> <p>Discussion:</p> <ul style="list-style-type: none"> • Discussion under Serial No. 11 <p>Action: CLOSED</p>	CLOSED

Serial No.	FSAR Section	Information Needs	ACTION
11	2.4.4	<p>Please provide HEC-RAS dam failure models for Canyon Dam and Coletto Ck. Dam.</p> <p>Discussion:</p> <ul style="list-style-type: none"> • Discussion under Serial No. 11 <p>Action: CLOSED</p>	CLOSED
12	2.4.4	<p>Please provide SME to discuss the cooling basin dam breach modeling.</p> <p>Discussion:</p> <ul style="list-style-type: none"> • Half PMP water level in basin is 94 ft. • See Figure 3.1-6 in ER for artist rendering of site layout. Provides additional perspective of site topography. • Duration of outflow hydrograph for breach is 30 minutes. Fig 21 hydrograph is approx. 29 minutes. No recession in water surface elevation- was wave considered in analysis • Outflow hydrograph was peaked for maximum water surface elevation. • Breach section located at area outside of power block • Breach section should be justified • Additional time for outflow hydrograph should be considered as well as wave set-up/run-up <p>ACTION; RAI will be issued requesting information on breach hydrograph, breach location, wave run-up consideration, and initial condition of pool.</p>	RAI
13	2.4.4	<p>Please provide a SME to discuss the potential use of small scale figures that show in detail the cooling basin dam breach model bathymetry (a) over the entire modeling domain and (b) in the vicinity of the power block and west and east breach locations.</p> <p>Discussion:</p> <ul style="list-style-type: none"> • Manning's n selection – sensitivity analysis was performed for values from .025 to .035. Staff believes this is not a conservative. COE guidance(HEC training manual) suggests varying manning to verify WS elevation. 	RAI

Serial No.	FSAR Section	Information Needs	ACTION
		Action: Staff will develop RAI addressing sensitivity of manning's number and dam break WS elevation.	
14	2.4.4	Please provide a SME to discuss the stage and discharge hydrographs at the west cooling basin breach, at the east cooling basin breach, and representative power block locations for the entire duration of each of the following breach width scenarios: 210 meters, 360 meters, and 620 meters. Discussion: <ul style="list-style-type: none"> • Discussion under Serial No. 12 • Applicant ran several scenerios to develop a sensitivity of the water surface elevation to the breach width Action: No RAI needed – CLOSED	CLOSED
15	2.4.4	Provide a SME to discuss the method, data availability, and assumptions used to derive the 100-year lake level of Linn Lake. Discussion: <ul style="list-style-type: none"> • Staff will review FIS Action: CLOSED	CLOSED
17	2.4.6.1 (2 nd Paragraph)	Tsunami Dissipation through the Florida Strait <ul style="list-style-type: none"> • Provide a SME to explain the basis for the statement that the shallow shelf of the Florida Strait would dissipate tsunamis originating from the U.S. Atlantic Margin and Puerto Rico Trench. Action: Request applicant provides additional clarification of the dissipation statement (above) as it applies to all relevant tsunami sources.	RAI

18	2.4.6.1 (3 rd Paragraph)	<p>Gulf of Mexico Landslides</p> <ul style="list-style-type: none"> Provide a SME to discuss why Gulf of Mexico landslides other than the East Breaks slump were intentionally excluded as potential tsunamigenic sources for the PMT, particularly those landslides along the Mississippi Canyon, west Florida Slope/Escarpment, and Campeche Escarpment. <p>Action: Request applicant provides additional information and evaluation of the characteristics of other Gulf of Mexico landslides as it applies to their determination that they do not constitute a PMT source.</p>	RAI
19	2.4.6.1 (7 th Paragraph)	<p>Gulf of Mexico Earthquakes</p> <ul style="list-style-type: none"> Provide a SME to supply a more detailed evaluation of potential earthquakes in the Gulf of Mexico in terms of tsunami source parameters. Also provide a SME to discuss the characterization of Gulf of Mexico seismic sources in FSAR Section 2.4.6.1 differs from that of FSAR Section 2.5.2, specifically FSAR Section 2.5.2.4.3.1 and a $M_{max}=7.2$ contained in FSAR Table 2.5.2-19. <p>Action: Request applicant include in 2.4.6.1 discussion of the differences of the earthquake magnitudes used in 2.4.6.1 and 2.5.2 and why the lower magnitudes are used in regard to tsunami source parameters. Also, provide discussion of the source parameters of recent earthquakes that have occurred in the Gulf of Mexico in regard to tsunami generation.</p>	RAI
20	2.4.6.1 (9 th Paragraph)	<p>Middle-Central America Volcanoes</p> <ul style="list-style-type: none"> Provide a SME to discuss whether Middle and Central America volcanoes near the coast were intentionally excluded as potential tsunamigenic sources for the PMT and if so, why. <p>Action: Request applicant provides information on the location and the tsunamigenic potential of volcanoes near the coast of the Gulf of Mexico in relation to them acting as a PMT source.</p>	RAI
21	2.4.6.2 (Historical Tsunami Record):	<p><u>Paleotsunami deposits</u> Provide an SME to discuss geologic evidence of tsunami deposits.</p>	RAI

	Paleotsunami deposits	<p>Action:</p> <p>Provide information regarding geologic evidence of tsunami deposits at the Victoria County site or at nearby regions, such as from borings or other subsurface information collected by the applicant. Cross-reference with Section 2.5 of the FSAR where applicable. Additionally, indicate whether there are geologically conducive locations for the deposition and preservation of tsunami deposits in the vicinity of the Victoria County site. If such paleo-tsunami evidence exists, indicate how they are distinguished from storm wash-over deposits.</p>	
22	2.4.6.3 (Tsunami Source Generator Characteristics)	<p><u>Cessation of Mississippi Canyon Landslide Activity (FSAR 2.4.6.3 2nd Paragraph)</u></p> <ul style="list-style-type: none"> Provide a SME to discuss evidence supporting the conclusion that Mississippi Canyon Landslide Activity ceased by mid-Holocene time. If this conclusion is erroneous, provide information regarding the tsunami source dimensions and parameters for a Mississippi Canyon landslide event. <p><u>East Breaks Slump Source Parameters (FSAR 2.4.6.3 3rd Paragraph)</u></p> <ul style="list-style-type: none"> Provide a SME to verify that other source parameters for the East Breaks slump are contained in FSAR Reference 2.4.6-1 and supply any independent estimates of the source parameters that the applicant has determined. <p>Action:</p> <p>Request applicant provides clarification on how the mid-Holocene age of the Mississippi Canyon landslide is used, especially in terms of the whether the age is used to exclude the landslide from consideration as a PMT source and if so, why.</p>	RAI
23	2.4.6.3 (Tsunami Source Generator Characteristics)	<p><u>East Breaks Slump Source Parameters (FSAR 2.4.6.3 3rd Paragraph)</u></p> <ul style="list-style-type: none"> Provide a SME to verify that other source parameters for the East Breaks slump are contained in FSAR Reference 2.4.6-1 and supply any independent estimates of the source parameters that the applicant has determined. <p>Action:</p> <p>Request applicant provide updated information, using recently published sources or independent evaluation, on the tsunami source parameters used for the East Breaks slump.</p>	RAI
24	2.4.6.4 (Tsunami Analysis) and 2.4.6.5 (Tsunami Water Levels)	<p><u>Applicability of Currituck Landslide Tsunami/Qualitative Analysis</u></p> <ul style="list-style-type: none"> Provide a SME to justify the use of the Currituck landslide scenario with reference to use a conservative slide velocity for PMT determination and specific propagation characteristics for the Gulf of Mexico. In addition, provide justification for a qualitative tsunami analysis that is not specific to the local geology and tsunami source characteristics, regional bathymetry, and onshore topography/morphology for the Victoria county site. 	RAI

		<p>Action:</p> <p>The determination of the PMT source and its effects at the site should use a site-specific analysis approach. Section C.I.2.4.6.1 of Regulatory Guide 1.206 (RG) provides guidance with respect to the establishment of the probable maximum tsunami (PMT). This includes how the orientation of the site relative to the generating mechanism, shape of the coastline, offshore land areas, hydrography, and stability of the coastal area (proneness of sliding) were considered in the analysis. Specifically, for this site, the applicant should provide a quantitative analysis regarding:</p> <p>Choice of the East Breaks slide as the PMT source over other potential sources. Section C.I.2.4.6.3 of RG 1.206 provides specific guidance with respect to the source characteristics needed to determine the PMT. These characteristics include detailed geo-seismic descriptions of the controlling local and distant tsunami generators, including location, source dimensions, fault orientation, and maximum displacement. Provide these characteristics for seismogenic tsunamis originating in the Caribbean and Gulf of Mexico as used in the analysis. Also provide the location, source volume and dimensions, and maximum displacement information for landslides in the Gulf of Mexico used in the analysis.</p> <p>Propagation of the PMT from the source to the site, using bathymetric, coastline, and topographic information specific to the site. Section C.I.2.4.6.4 of RG 1.206 provides specific guidance with respect to tsunami analysis. This includes providing a complete description of the analysis procedure used to calculate tsunami wave height and period at the site.</p> <p>For completeness, please provide a clear presentation of all equations used, discussion of assumptions inherent in these equations and the associated conservatism, and the procedure to calculate the provided values. Please provide all input data sources, calculation packages, and any associated modeling input files.</p>	
25	<p>2.4.6.4 (Tsunami Analysis) and 2.4.6.5 (Tsunami Water Levels)</p>	<p><u>Elevation Data Near Site</u></p> <ul style="list-style-type: none"> • Provide a SME to discuss the availability of high-resolution topography and bathymetry (e.g., lidar) near the proposed site for tsunami wave modeling. <p>Action: Resolved</p>	CLOSED

26	2.4.6.4 (Tsunami Analysis) and 2.4.6.5 (Tsunami Water Levels)	Saltwater Barrier Response Time <ul style="list-style-type: none"> Provide a SME to discuss inflation time of the saltwater barrier dam relative to the water-level draw down time associated with the PMT. Action: Resolved	CLOSED
27	2.4.7	Provide a SME to discuss an assessment of ice effects and snow melts on floods along Guadalupe River. Discussion: <ul style="list-style-type: none"> Staff will verify database. No safety significance associated with ice and current design plan. Provide explanation of discussion of UHS on page 2.4.7-3. Action: SAR should be updated to clarify. RAI will be issued.	RAI
28	2.4.8	Provide a SME to discuss the cooling basin water budget analysis, including determination of the cooling basin evaporation rates, supporting meteorological data, and drought conditions. Discussion: <ul style="list-style-type: none"> Not safety related information Action: CLOSED	CLOSED
29	2.4.8	Please provide a SME to discuss the cooling basin level pool routing inflow, outflow, and elevation time series results for the PMP event routing. Discussion: <ul style="list-style-type: none"> Not safety related information Action: CLOSED	CLOSED
30	2.4.8	Please provide a SME to discuss the drawings of the cooling basin intake channels and the cooling basin discharge structure and discharge structure outlet channel.	CLOSED

		<p>Discussion:</p> <ul style="list-style-type: none"> • Not safety related information <p>Action: CLOSED</p>	
31	2.4.8	<p>Please provide a SME to discuss the run-up calculations.</p> <p>Discussion:</p> <ul style="list-style-type: none"> • Not safety related information <p>Action: CLOSED</p>	CLOSED
32	2.4.8	<p>Provide a SME to discuss the assumptions, and calculations for sizing of the Cooling Water Reservoir, RWMU requirements, normal maximum operating level, fetch, embankment design, and freeboard.</p> <p>Discussion:</p> <ul style="list-style-type: none"> • Staff requested information regarding freeboard requirements for dams. • Applicant stated that no state requirements but that they design follows the Bureau of Reclamation requirements. <p>Action: Staff will verify. No RAI required - CLOSED</p>	CLOSED
33	2.4.8	<p>Provide a SME to discuss assumptions, and calculations for determination of the Raw Water Makeup System capacity and required diversion from the Guadalupe River.</p> <p>Discussion:</p> <ul style="list-style-type: none"> • Not safety related information <p>Action: CLOSED</p>	CLOSED
34	2.4.9	<p>Provide a SME to discuss site geomorphology and the possibility of channel diversion or avulsions on Guadalupe River.</p> <p>Discussion:</p> <ul style="list-style-type: none"> • Not safety related information 	CLOSED

		Action: CLOSED	
35	2.4.11	Provide a SME to discuss minimum safe shut down. Discussion: <ul style="list-style-type: none"> • Not safety related information Action: CLOSED	CLOSED
36	2.4.11	Provide a SME to discuss assumptions, input, and output of the low flow frequency analysis and supply adequacy during a 100-year drought. Discussion: <ul style="list-style-type: none"> • Not safety related information Action: CLOSED	CLOSED
37	2.4.11	Provide a SME to discuss the debris conditions near the entrance of the intake canal and water flow into the canal. Discussion: <ul style="list-style-type: none"> • Not safety related information Action: CLOSED	CLOSED
38	2.4.11	Provide a SME to discuss assumptions associated with water rights and available water supply on the Guadalupe River as necessary for VCS. Discussion: <ul style="list-style-type: none"> • Not safety related information Action: CLOSED	CLOSED

39	2.4.11	<p>Provide a SME to discuss assumptions for determining that safety related cooling systems for Victoria Station will not rely upon river or stream flow rates or water levels.</p> <p>Discussion:</p> <ul style="list-style-type: none"> • Not safety related information <p>Action: CLOSED</p>	CLOSED
40	2.4.11	<p>Please provide calculations in support of the n-day, 100-year low flow determinations.</p> <p>Discussion:</p> <ul style="list-style-type: none"> • Not safety related information <p>Action: CLOSED</p>	CLOSED
41	2.4.12	<p>Please provide a SME that can detail development of the groundwater flow model, the integration of the previous site model, existing regional (e.g., TWDB GAM) studies and site specific parameters and data, and discuss the model simulations and calibration.</p> <p>Discussion:</p> <ul style="list-style-type: none"> • Open item pending review of modeling calc package is in the reading room. • Open item pending review of Evangeline aquifer analysis to be placed in reading room. • SSAR discussion to be updated based on TWDB GAM model and deep geotechnical borings and any other available site or regional information (RAI). 	OPEN
42	2.4.12.3 (Page 2.4.12-C-2)	<p>Please provide a SME to discuss the assumptions used for conservative modeling of flow such as the assumptions extending to the hydraulic conductivity (Section 2.4.12-C-3.5) and the assumption of a maximum K for clay layers with respect to basin seepage and ground water mounding.</p> <p>Discussion:</p> <ul style="list-style-type: none"> • SSAR discussion to be updated to include conservatism in the selection of parameters for groundwater flow model (RAI). • SSAR discussion to include reference and justification for parameter estimations for hydrogeologic properties (RAI). 	

43	<p>2.4.12 (Figure 2.4.12-C-5)</p>	<p>Please provide a SME to discuss the apparent spatial correlation of residuals and specifically the tendency for the model to under estimate higher observed heads and over estimate lower observed heads.</p> <p>Discussion:</p> <ul style="list-style-type: none"> • SSAR to discuss calibration impacts on gradients, flow paths and transport (RAI). 	RAI
44	<p>2.4.12 (Page 2.4.12-C-7)</p>	<p>Please provide a SME to discuss vertical conductivities from Reference 2.4.12-C-9 used for groundwater flow modeling.</p> <p>Discussion:</p> <ul style="list-style-type: none"> • SSAR to discuss available regional and local analysis and tests for confirmatory information on ratios used for horizontal to vertical conductivity (RAI). 	RAI
45	<p>2.4.12 (Page 2.4.12-C-8)</p>	<p>Please provide a SME to discuss the horizontal and vertical model grid cell sizing and numerical accuracy of the model simulations.</p> <p>Closed.</p>	CLOSED
46	<p>2.4.12 (Page 2.4.12-C-38)</p>	<p>Please provide a SME to discuss how the elevations of the canal, river, creeks and seeps determined as mentioned in Table 2.4.12-C-6 for specification of drains, constant head, and river cells were determined, and the impact of elevation estimates on calibration and postulated pathways.</p> <p>Discussion:</p> <ul style="list-style-type: none"> • SSAR to discuss derivation of elevations used for the canal, river, creeks and seeps (RAI). 	RAI
47	<p>2.4.12 (Page 2.4.12-C-44)</p>	<p>Please provide a figure of the model grid with rows and columns clearly numbered. Figure 2.4.12-C-3 is identified as a cross section through “Model Row 92” with no cross section location information. Also, provide elevation contour maps of the layer surfaces used in the model that delineate data point locations used to derive the surfaces.</p>	OPEN

		<p>Discussion:</p> <ul style="list-style-type: none"> Update SSAR with row/column numbers on a figure of model grid for referencing cross-sections and direction of cross sections (RAI). Open item pending review of calc package. 	
48	<p>2.4.12 (Page 2.4.12-C-70)</p> <p>2.4.12 (Figure 2.4.12-C28)</p>	<p>Please provide a SME to discuss areas where the predicted water levels are above land surface for pre- and post- construction the impacts on calibration and simulations.</p> <p>Discussion:</p> <ul style="list-style-type: none"> Will discuss hydraulic head with (NRC and Bechtel) geotechnical group for technical discussion in particular Dry Kuy Creek at the toe of the cooling basin and in the areas of steep gradients are created by seepage (RAI). 	OPEN
49	<p>2.4.12 (Page 2.4.1-1)</p>	<p>Please provide a SME for discussion of well abandonment and the potential of oil and gas wells that are not properly abandoned may provide a pathway for ground water contamination after filling the basin. Please provide a SME for to discuss efforts to be undertaken to ensure proper well abandonment of all known and unknown wells encountered during basin construction.</p> <p>Discussion:</p> <ul style="list-style-type: none"> Open item pending review of discussion in ER (page 3.9-3). 	OPEN
50	<p>2.4.12 (Page 2.4.12-2)</p>	<p>Please provide a SME to discuss the hydraulic properties of the construction fill.</p> <p>Discussion:</p> <ul style="list-style-type: none"> SSAR to discuss justification and reference for horizontal/vertical hydraulic conductivity (RAI) of fill. 	RAI
51	<p>2.4.12 (Page 2.4.12-4)</p>	<p>Please provide a SME to discuss the confining role or lack thereof for the Burkeville unit and the details required to identify the Burkeville confining unit in the bullets listed on this page regarding the major hydrogeologic units. Also, please provide a SME to discuss the basis of Figure 2.4.12-7 and details of where it appears that the Burkeville confining unit is regionally extensive and may have implications for vertical groundwater movement.</p>	CLOSED

		<p>Discussion:</p> <ul style="list-style-type: none"> • Closed. 	
52	2.4.12 (Page 2.4.12-8 2.4.12-23)	<p>Please provide a SME to discuss, compare and contrast the differences in well drilling techniques and well testing including slug tests, pumping tests and borehole permeable tests. Also, please provide a SME to discuss the role of well construction on the test results, the many orders of magnitude difference in aquifer properties as listed on page 2.4-12-28, the measurement approaches and best values for the site conceptual model, and the impact on the results due to the well construction and aquifer testing procedures.</p> <p>Discussion:</p> <ul style="list-style-type: none"> • SSAR (Section 2.4.12.2.4.3, page 2.4.12-28) to reference Part 5 of application (RAI). • SSAR to discuss field tests, model abstraction strategy and the rationale for estimating parameters within the bounds of the conceptual model (RAI). 	RAI
53	2.4.12 (Page 2.4.12-9)	<p>Please provide a SME to discuss how various site specific hydro-lithologic units are defined, particularly the distinction between the upper shallow and lower shallow aquifer units, and the importance/influence of holes in confining units beneath the footprint of the site and cooling basin.</p> <p>Discussion:</p> <ul style="list-style-type: none"> • SSAR to discuss rationale and references used for development of significant hydro-lithologic unit definitions (RAI). 	RAI
54	2.4.12 (Page 2.4.12-10)	<p>Please provide two site specific, orthogonal cross-sections across the site with the hydro-lithologic units labeled per the table on this page. Also, as applicable, indicate the vertical direction of ground water flow and the potentiometric surface for the hydrologic layers.</p> <p>Discussion:</p> <ul style="list-style-type: none"> • SSAR to include hydrogeologic cross sectional figures with groundwater flow directions (RAI). 	RAI
55	2.4.12 (Page 2.4.12-12)	<p>Please provide a SME to discuss the ground water/surface water interactions in the drainage ditches around the outside of the embankment as described in paragraph 4.</p>	RAI

		<p>Discussion:</p> <ul style="list-style-type: none"> Revise SSAR page 2.4.12-35 to delete last sentence, first paragraph describing embankment drainage ditches, sand drains and relief wells (RAI). 	
56	<p>2.4.12 (Page 2.4.12-21)</p>	<p>Please provide a SME to discuss the connection between river hydrographs, the level in Linn Lake and the water levels measured in wells on the eastern side of the site (OW2348 U/L) and the hydraulic communication postulated on page 2.4.12-22 second paragraph. Also discuss the causal mechanisms for pervasive downward trend in well hydrographs (Figure 2.4.12-17) and if the model is in agreement with the observed vertical gradients.</p> <p>Discussion:</p> <ul style="list-style-type: none"> SSAR discussion will be updated to include explanation of pervasive downward trend in well hydrographs (RAI). 	RAI
57	<p>2.4.12 (Page 2.4.12-34)</p>	<p>Model set up includes the use of a 2-foot thick sediment sand layer across basin (does the layer extend beneath the perimeter dike?)</p> <p>Discussion:</p> <ul style="list-style-type: none"> Closed. 	CLOSED
58	<p>2.4.12 (Page 2.4.12-35)</p>	<p>Please provide a SME to discuss cooling basin seepage particularly the need to “add additional structures (such as drainage ditches, sand drains, and relief wells) if lowering of the groundwater table is required at areas adjacent to the cooling basin”. Also, please provide a SME to discuss the impact of cooling basin relief wells and sand drains on groundwater flow direction, and the adequacy of simulations without berm wells and drains.</p> <p>Discussion</p> <ul style="list-style-type: none"> Closed to Serial No. 55. 	CLOSED
59	<p>2.4.12 (Page 2.4.12-35)</p>	<p>Please provide two orthogonal cross sections (replace or add to Figure 2.4.12-26) of the model grid that approximate the two hydro-stratigraphic cross-sections requested previously for Section 2.4.12, page 2.4.12-9). Please provide simulated post-construction potentiometric surfaces maps at a scale similar to the water table maps presented in Figure 2.4.12-15.</p>	RAI

		<p>Discussion:</p> <ul style="list-style-type: none"> SSAR to include two orthogonal cross sections cross-section figures (RAIs). 	
60	<p>2.4.12 (Page 2.4.12-34/35)</p>	<p>Please provide a SME to discuss the hydraulic conductivity zones used for model layer 1, cooling basin leakage, the bottom of the cooling basin with respect to hydrogeologic strata, and the basin sensitivity simulations. Also provide figure(s) illustrating the conductivity zones used for each model layer utilizing spatially variable values of conductivity for pre- and/or post- construction simulations.</p> <p>Discussion</p> <ul style="list-style-type: none"> Open item pending review of calc package of hydraulic conductivity zones. 	OPEN
61	<p>2.4.12</p>	<p>Please provide a SME to discuss the monitoring equipment, data analysis procedures and documentation of data quality objectives for all stations monitoring groundwater.</p> <ul style="list-style-type: none"> Opening item pending further staff discussion. 	OPEN
62	<p>2.4.12</p>	<p>Please provide a SME to discuss the proposed potable water supply wells to be drilled in the Evangeline aquifer and the potential impact of pumping from this well on vertical gradients and groundwater pathways.</p> <p>Discussion:</p> <ul style="list-style-type: none"> Open item pending review of Evangeline aquifer analysis to be placed in reading room per Serial No. 41. 	OPEN
63	<p>2.4.13 (Page 2.4.13 - 3 thru -5)</p>	<p>Section 2.4.13 is missing a subsection (2.4.13.3.3) and/or is mis-numbered. Please correct.</p> <p>Discussion:</p> <ul style="list-style-type: none"> Closed. 	CLOSED
64	<p>2.4.13 (Page 02.4.13-7)</p>	<p>Please provide a SME to discuss the development of the groundwater transport model, parameters and conservatism.</p>	OPEN/RAI

		<p>Discussion:</p> <ul style="list-style-type: none"> • Open item pending review of available regional values (e.g., WRIR 96-4018) of porosity (RAI). • SSAR to clarify last sentence on page 2.4.13-2. 	
65	2.4.13	<p>Please provide the following calculation packages:</p> <ul style="list-style-type: none"> • Digital copies of groundwater flow model input and output files in native formats with explanations of data and formats. <ul style="list-style-type: none"> ○ Closed. • Digital copies of files used for radionuclide transport analysis in native formats with explanations of data and formats. <ul style="list-style-type: none"> ○ Open pending review of calc package. • Digital copies of input and output files used for the aquifer test analysis with explanations of data and formats. <ul style="list-style-type: none"> ○ Open pending review of calc package. • Digital copies of laboratory distribution coefficient analysis results and a map showing site locations of samples submitted for analysis. <ul style="list-style-type: none"> ○ Open pending review of calc package. 	OPEN
66	2.4.14	<ul style="list-style-type: none"> • Provide a SME to discuss the details concerning technical specifications and emergency operation requirements for NUREG Section 2.4.14. <p>ACTION: Applicant will update FSAR. RAI will be issued</p>	RAI