PMTurkeyCOLPEm Resource

From: Comar, Manny
Sent: Saturday, July 10, 2010 12:31 PM
To: TurkeyCOL Resource
Subject: FW: Update on 3/22-24 Hydrology Audit Venue & Logistics
Attachments: TP_Site_Audit_Agenda2.doc; Turkey Point Hydrologic Safety Site Audit Information Needs FINAL (2).doc

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From: Ahn, Hosung
Sent: Thursday, March 11, 2010 8:19 AM
To: Ahn, Hosung; Comar, Manny; Raione, Richard
Subject: RE: Update on 3/22-24 Hydrology Audit Venue & Logistics

Manny,

We modified agenda and info table. Please use this latest version.

Hosung

From: Ahn, Hosung
Sent: Wednesday, March 10, 2010 4:48 PM
To: Comar, Manny; Raione, Richard; Kugler, Andrew; Snyder, Amy
Subject: RE: Update on 3/22-24 Hydrology Audit Venue & Logistics

Manny,

Revised agenda and info need table are attached. We still like to start at 8am.

Hosung

From: Comar, Manny
Sent: Wednesday, March 10, 2010 3:56 PM
To: Ahn, Hosung; Raione, Richard; Kugler, Andrew; Snyder, Amy
Subject: FW: Update on 3/22-24 Hydrology Audit Venue & Logistics

FYI

From: Orthen, Richard [mailto:Richard.Orthen@fpl.com]
Sent: Wednesday, March 10, 2010 10:25 AM
To: Comar, Manny
Subject: Update on 3/22-24 Hydrology Audit Venue & Logistics

Manny,

We have confirmed the venue for the audit interactions at:

Keys Gate Golf and Country Club
2300 Palm Drive

Homestead, FL 33035
305-230-0362

http://www.keysgategolf.com/

Our team will be staying at the Hampton Inn (below)
Hampton Inn & Suites Miami-South/Homestead
2855 N.E. 9th Street
Homestead, Florida 33033
305-257-7000

The hotel and meeting space are very close (about 2 miles); directions below:

Directions from Hampton Inn to Keys Gate Golf Club

The FPL group will plan to arrive by 8:30 each morning of the audit (as you requested, we will plan to start a half-hour later than the agenda time). Refreshments will be available all day and lunch will be catered.

Please let me know if you have any questions about this.

Thanks.

Rick

Hearing Identifier: TurkeyPoint_COL_Public
Email Number: 187

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Subject: FW: Update on 3/22-24 Hydrology Audit Venue & Logistics
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From: Comar, Manny

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"TurkeyCOL Resource" <TurkeyCOL.Resource@nrc.gov>
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Agenda

Topic: Hydrology Safety Site Audit for Turkey Point COLA

Purpose: (1) To acquaint the NRC/Contractor reviewers with the site and hydrologic interfaces; (2) To discuss safety-related hydrologic issues with the applicant; and (3) To audit other relevant documents and calculation packages.

Date: March 22 (Monday) ~ 24 (Wednesday), 2010

Place: **Keys Gate Golf and Country Club** http://www.keysgategolf.com/
2300 Palm Drive
Homestead, FL 33035
305-230-0362

Attendee: NRC reviewers and contractors, applicant's staff and their consultants (See attached table)

Schedule:

Date	Time	Surface Water	Groundwater
March 22, Monday	8 am – 9:45 am	1) Opening (NRC): 10 minutes 2) Introduction/ Safety Orientation (FPL): 20 minutes 3) Presentation on Deep Well Injection and Radial Collector Wells: 60 minutes 4) Audit Instruction (NRC): 15 minutes	
	10 am - Noon	Site Visit	
	Noon – 1pm	Lunch Break	
	1 pm – 2 pm	Discussion on FSAR 2.4.6 (Tsunami)	Discussion on FSAR 2.4.12 and 2.4.13
	2 pm – 5 pm	Discussion on FSAR 2.4.1 through 2.4.5	
	5 pm – 5:15 pm	Summary Discussion	
March 23, Tuesday	8 am – Noon	Discussion on FSAR 2.4.1 through 2.4.5	Discussion on FSAR 2.4.12 and 2.4.13
	Noon – 1pm	Lunch Break	
	1pm – 5pm	Discussion on FSAR 2.4.7 through 2.4.11	Discussion on FSAR 2.4.12 and 2.4.13
	5pm – 5:15 pm	Summary Discussion	
March 24, Wednesday	8 am – Noon	Discussion on FSAR 2.4.14, 2.4.1.15, and remaining issues	Discussion on FSAR 2.4.12 and 2.4.13
	Noon – 1pm	Lunch Break	
	1pm – 5pm	Discussion on (1) ER/EIS Issues, and (2) Safety and Environmental Interfacing Issues.	

Attachment A. Places to See During the Site Visit

- Proposed plant site
- Major water management and cooling canals
- Proposed deep well injection and collector well sites
- Major surface and groundwater monitoring sites
- Open excavation to examine the near-surface geology for tsunami deposits

Attachment B. Attendees (Tentative)

Agency	Name	Role	Remark
A. License Reviewers			
1) NRC PM			
	Manny Comer	Chapter PM	
	Amy Snyder	Backup PM	
	Andy Kugler	Env. PM	
2) NRC Hydrologist			
	Richard Raione	Branch Chief	
	Hosung Ahn	Reviewer (Lead)	
	Nebiyu Tirenuh	Reviewer	
	Mohammad Haque	Reviewer	
	Henry Jones	Reviewer	
3) NRC RES			
	Joseph Kanney	Backup reviewers	
4) ORNL			
	Melanie Mayes	Reviewer	
	~~David Watson~~	~~Reviewer~~	
	~~Anthony Armstrong~~	~~Reviewer~~	
	Ellen Smith	Reviewer	
	Vince Neary	Reviewer	
5) PNNL			
	Robert Bryce	Backup reviewers	
	Lance Vail	Backup reviewers	
	Paul Thorne	Backup reviewers	
	Rochelle Labiosa	Backup reviewers	
6) USGS			
	Eric Geist	Reviewer	
	Jason Chaytor	Reviewer	
7) Texas A&M U.	Patrick Lynett	Reviewer	
B. Applicant			
1) FPL			
2) Bechtel			
3)			

Site Safety Audit Information Needs for Turkey Point COLA

ID #	FSAR Section	Discipline	Information Needs	Reviewer	Applicant Response	NRC Response
1.	**General**	Hydrology	Provide for review electronic or hard copies of the following references from Turkey Points Units 6 & 7 FSAR: Section 2.4.1: 201, 207, 210, 217, 224; Section 2.4.2: 207, 213, 214; Section 2.4.3: 201, 203; Section 2.4.5: 202, 209; Section 2.4.11: 201, 202, 203; Section 2.4.12: 203, 208, 214, 216, 223, 227, 230, 233, 238, 249; Appendix 2CC: 2, 3, 5, 8, 17, 20; Section 2.4.13: 201, 202. (Note that a few of these items, notably two of the items listed from Section 2.4.2, are published books that are available in many libraries. The only reason to request them is to ensure that they are docketed and made available to the public, if that is a concern for the NRC.)	EDS		
2.	**2.4 – General (but mostly 2.4.1)**	Hydrology	Provide a subject matter expert (SME) to discuss and clarify the use and consistency between the various elevation datums, including NAVD 88, NGVD 29, the Turkey Point Units 6 & 7 DCD reference datum, mean sea level (MSL), and tidal datums such as “mean low water” (used, for example, on FSAR p. 2.4.5-5) as used in reference to gage measurements at Virginia Key and the Miami Harbor Entrance (RG 1.59). The FSAR indicates that at Virginia Key NAVD 88 is 1.6 ft higher than NGVD 29 -- discuss the validity of using this same conversion factor throughout the region (for example, at Lake Okeechobee).	EDS		
3.	**2.4.2**	Hydrology	Provide an SME to discuss the basis for estimating probable maximum precipitation (PMP) at the Turkey Point site, including the application to south Florida of the southernmost values given in NWS Hydro-meteorological Report No. 51 (HMR 51) and the use of NWS Hydro-meteorological Report No. 52 (HMR 52). Also discuss the basis for using HMR 52 to extend the data to shorter time periods, and the influence of additional rainfall data compiled in the years since HMR 51 and HMR 52 were published.	EDS		
4.	**2.4.2**	Hydrology	Provide an SME to discuss the modeling approach (including its conservatism) used to evaluate the	EDS/VN		

Site Safety Audit Information Needs for Turkey Point COLA

ID #	FSAR Section	Discipline	Information Needs	Reviewer	Applicant Response	NRC Response
			probable maximum flooding on-site due to locally intense precipitation, including selection of methods, assumptions about initial conditions and boundary conditions (such as water level in canals outside of site walls), approach to generation of peak flows using the Rational Method, the rationale for the determination of HEC-RAS model options, and values for Manning's roughness coefficient and other input parameters.			
5.	**2.4.2**	Hydrology	Provide an SME to discuss the modeling approach and assumptions for the sheet flow analysis used to predict the maximum depth from the safety structures in the power block (same types of topics as for PMF in the swales).	EDS/VN		
6.	**2.4.2**	Hydrology	Provide an SME to discuss the hydrologic and hydraulic analyses and provide for review calculation packages for the hydrologic and hydraulic analyses done to evaluate probable maximum flooding due to locally intense precipitation.	EDS/VN		
7.	**2.4.2**	Hydrology	Provide an SME to clarify the legend and labeling on Fig. 2.4.2-203. The legend does not correspond with flow path arrows, and about half of the subbasins lack flow path arrows. The modeled outlets for each subbasin are not clearly marked, and lines need to be drawn delineating the hydraulic length used in the concentration time calculation.	VN		
8.	**2.4.2**	Hydrology	Provide an SME to discuss the HEC-RAS modeling and make available for review HEC-RAS model files for PMF flows in the four modeled swales.	VN		
9.	**2.4.2**	Hydrology	Provide an SME to clarify the location of River Station 0, the downstream boundary cross-section for each of the four HEC-RAS models in Fig. 2.4.2-204. Also, provide tabulated cross-sectional information for River Station 0 similar to what is provided in Table 2.4.2-210.	VN		
10	**2.4.2**	Hydrology	Provide for discussion and review profile sections across the entire site that correspond to HEC-RAS	VN		

Site Safety Audit Information Needs for Turkey Point COLA

ID #	FSAR Section	Discipline	Information Needs	Reviewer	Applicant Response	NRC Response
			sections in the two swales modeled in the north portion of the site, i.e. 800 (IN6) and 600 (2N3)			
11	**2.4.2**	Hydrology	Provide an SME to discuss the rationale (including its conservatism) for the peak discharge allocation percentage to each cross-section (Table 2.4.2-214).	VN		
12	**2.4.2**	Hydrology	Provide an SME to discuss the validity of assuming critical depth for the downstream boundary condition for each of the four HEC-RAS models. This implies a free overfall condition at the outlet (perimeter walls) of each of the four modeled swales.	VN		
13	**2.4.2**	Hydrology	Provide an SME to discuss whether additional cross-sections were added by interpolation and the discuss details of the interpolation, e.g. spacing, number of added sections.	VN		
14	**2.4.2**	Hydrology	Provide an SME to discuss the cross-sections in Fig. 2.4.2-204 and their limitation to portions of the swale as opposed to the full width of the swale.	VN		
15	**2.4.2**	Hydrology	Provide an SME to discuss and clarify the legends of the HEC-RAS cross-sections (such as Figure 2.4.2-209), including the meaning of the shading colors (gray and blue).	EDS/VN		
16	**2.4.2**	Hydrology	Provide an SME to discuss an approach for assessing combined flooding events for Turkey Point Units 6&7, as described in NRC Regulatory Guide 2.4.2. The section “Combined Events Criteria” in that Regulatory Guide states: “The staff reviews the worst flooding at a site that may result from a reasonable combination of individual flooding mechanisms. Some or all of these individual mechanisms could be less severe than their worst-case occurrence but the combination may exceed the most severe flooding effects from the worst-case occurrence of any single mechanism.”	EDS		
17	**2.4.3**	Hydrology	Provide an SME to discuss the justification for the conclusion (FSAR page 2.4.3-2) that canal flooding would not influence the flood levels above the estimated probable maximum hurricane level.	EDS		
18	**2.4.4**	Hydrology	Provide an SME to discuss the justification for the	EDS		

Site Safety Audit Information Needs for Turkey Point COLA

ID #	FSAR Section	Discipline	Information Needs	Reviewer	Applicant Response	NRC Response
			stated conclusion that any flow that might reach Units 6 & 7 from failure of Herbert Hoover Dam would be very shallow and would not be a source of flooding for the safety-related facilities.			
19	**2.4.5**	Hydrology	Provide an SME to discuss the basis for estimating (1) initial rise (also called forerunner or sea level anomaly) and (2) expected sea-level rise over the life of the plant. Based on historical records, sea level is stated to have risen at a rate of 0.78 ft per century in the local area (Turkey Point Units 6&7 FSAR page 2.4.5-6). Provide an SME to discuss the various processes and phenomena that have combined to produce this net change in sea level, how this value was used in estimating initial rise and expected future sea-level rise, and why it is considered to be appropriate for safety analyses to use 1.0 ft as a nominal long-term sea level adjustment for the future. Discuss how potential sea-level rise due to potential future climate change is accounted for in this analysis.	EDS		
20	**2.4.5**	Hydrology	FSAR Subsection 2.4.5.1 states that the PMH parameters were established from the historical hurricane from 1851 to 1977 and that these parameters are sufficiently conservative as they include those of the active hurricane period from 1945 to 1970. However, the central pressures of Andrew and Katrina are relatively low. Discuss the potential effects of recent hurricane events after 1977 on these PMH parameters.	EDS/VN		
21	**2.4.5**	Hydrology	Provide an SME to discuss the sensitivity of SLOSH modeling results to the Turkey Point site's location within the curvilinear grid used in the Biscayne Bay implementation of the SLOSH model (the site is near the periphery of the model grid for Biscayne Bay; therefore, the boundary condition and the grid shape could affect the simulation results).	EDS		
22	**2.4.5.2.2.5**	Hydrology	Provide an SME to explain why making a 20% adjustment for uncertainty in the SLOSH results	EDS		

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			makes it unnecessary also to account for the 2.6% effect of probable maximum hurricane (PMH) size on storm surge. The statement and justification in this section are not clear.			
23	**2.4.5**	Hydrology	Provide an SME to discuss the changes made in SLOSH to apply the model to this analysis.	EDS		
24	**2.4.5**	Hydrology	Provide for review the SLOSH input, typical output, and calculation packages.	EDS		
25	**2.4.5**	Hydrology	Provide an SME to discuss the large uncertainty in SLOSH modeling (described in Turkey Point Units 6&7 FSAR Section 2.4.5.2.2.5) and possible opportunities to reduce this uncertainty.	EDS		
26	**2.4.5**	Hydrology	Discuss (i) the potential beach erosion by hurricane, (ii) the hurricane wave forces (both static and dynamic) and their effects on design and operation of safety-related facilities, (iii) the fragility of the retaining wall structure (Turkey Point Units 6&7 FSAR pg. 2.4.6-1) with regard to forces specific to hurricane waves, and (iv) the effects of retaining wall on wave run-up – The submerged wall could rise surge level.	HA		
27	**2.4.5.3.2**	Hydrology	Provide an SME to discuss the approach used to estimate the height, period, and run-up of wind waves, including identification of the specific procedures from the Coastal Engineering Manual that used. Also provide the calculation packages for review.	EDS		
28	**2.4.6.1.1 & 2.4.6.1.7**	PMT	Provide a subject matter expert (SME) to discuss how the continental shelf is defined. Is the applicant including the deeper Blake Plateau erosional bench (600-800 m deep) with the narrow continental shelf (<150 m deep)?	EG/JC/PL		
•	**2.4.6.1.1 & 2.4.6.1.5**	PMT	Supply evidence to show that the impact of landslide generated tsunamis along a coastline is considerably reduced away from the main axis of the slide (FSAR pg. 2.4.6-2). For U.S. Atlantic Margin landslides that the applicant identifies (including mass movements along the Blake Escarpment), supply evidence of their propagation, runup, and inundation characteristics at	EG/JC/PL		

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			the Turkey Point site, given the specific offshore physiography of the southern U.S. Atlantic Margin. In addition, what is the corresponding runup value at the Turkey Point site from an estimated 3.5 m offshore amplitude at the latitude of Palm Bay, FL for a Caribbean earthquake tsunami source (FSAR pg., 2.4.6-7)?			
29	**2.4.6.1.1**	PMT	Provide a subject matter expert (SME) to discuss potential landslide tsunami sources local to the Turkey Point site along the western edge of the Bahama Platform, the Florida Straits, Cay Sal Bank, and off the northern coast of Cuba.,	EG/JC/PL		
30	**2.4.6.1.3**	PMT	Provide a subject matter expert (SME) to discuss potential landslide tsunami sources off the carbonate platform edge north of Puerto Rico.	EG/JC/PL		
31	**2.4.6.1.6**	PMT	Provide a subject matter expert (SME) to discuss whether tsunami water levels at the Turkey Point site were estimated from mid-plate earthquakes occurring along the U.S. Atlantic Margin.	EG/JC/PL		
32	**2.4.6.2**	Tsunami Deposit	Provide a subject matter expert (SME) to discuss available geologic records of "seismic paleotsunami deposits" at the Turkey Point site (e.g., borings/coring/trenching) and how they would be distinguished from non-seismic tsunami and hurricane overwash deposits. Are there geologically conducive locations for the deposition and preservation of tsunami deposits at the Turkey Point site or nearby regions?	EG/JC/PL		
33	**2.4.6.3**	Tsunami Source	(Oblique Earthquake Slip Angles): Provide a subject matter expert (SME) to discuss the expected variation in vertical deformation of the sea floor with respect to the earthquake slip angle.	EG/JC/PL		
34	**2.4.6.4**	Tsunami Analysis	(1) Provide justification for a qualitative tsunami analysis specific to the Turkey Point site (FSAR pg. 2.4.6-13). (2) Provide a subject matter expert (SME) to discuss the availability of high-resolution topography and	EG/JC/PL		

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			bathymetry (e.g., lidar) near the proposed site for tsunami wave modeling.			
35	**2.4.6.5**	Tsunami Water Levels	(1) Provide a subject matter expert (SME) to discuss the procedure for determining tsunami water levels at the Turkey Point site from offshore tsunami amplitudes, including how a runup amplification factor of 2 is determined (FSAR pg. 2.4.6-16). (2) Provide an SME to clarify whether tsunami water levels from the Hispaniola fault segment of the northern Caribbean subduction zone (not included in FSAR Reference 211) were estimated.	EG/JC/PL		
36	**2.4.6.6**	Breakwater Influences	(1) Provide a subject matter expert (SME) to discuss the effect of refraction and focused propagation through and into the natural and artificial channels (e.g., dredged navigation channel) within Biscayne Bay on nearshore tsunami propagation. (2) Discuss (i) the tsunami wave forces (both static and dynamic) and their consequences on the design and operation of safety-related facilities, (ii) the fragility of the retaining wall structure (FSAR pg. 2.4.6-1) with regard to forces specific to tsunami waves. (3) Discuss the propagation times and durations of critical tsunami events as this information are needed for preparing emergency procedures and probabilistic risk assessment.	EG/JC/PL/HA		
37	**2.4.9**	Hydrology	Provide an SME to discuss the uncertainty related to future shoreline changes, including (1) the potential for sea-level rise due to future climate change to increase the rate of shoreline change and (2) the potential for erosion or inundation of the barrier islands that currently help to protect the site of Units 6&7 from wave action.	EDS		
38	**2.4.9**	Hydrology	Provide an SME to discuss the influence of coastal protection structures, dredging, and other human	EDS		

Site Safety Audit Information Needs for Turkey Point COLA

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			activities on the stability of the shoreline in the vicinity of the site of Units 6&7.			
39	**2.4.9 (also 2.4.14)**	Hydrology	It is stated that Units 6&7 retaining wall structure has a top of wall elevation varying from 20 feet to 21.5 feet NAVD 88 (Turkey Point Units 6&7 FSAR page 2.4.9-3). Provide an SME to discuss how the retaining wall design handles hurricane surge up to the probable maximum storm surge and coincidental wave run-up condition, which is calculated to be at elevation 24.8 feet NAVD 88.	EDS		
40	**2.4.12**	Hydrology	Provide for review all input/output computer files used for modeling the Biscayne aquifer in the vicinity of Turkey Point and beyond to simulate the localized effects of steady-state, constant-density groundwater flow, the effects of construction dewatering, the effects of construction of Units 6 & 7 (site grade increase and use of cut-off walls for groundwater control), and the operation of the radial collector wells.	MM/AA		
41	**2.4.12.1, 2.4.12.2**	Hydrology	Discuss subsurface lithology in terms of figures found in Section 2.5 (Figures 2.5.1-203 – 2.5.1-210), showing multiple cross sections (e.g., N-S, E-W) of the subsurface geology and hydrology, including lithologies, thicknesses, and depths, based on site-specific investigations and consistent with the current COL, the existing site license, and/or other local resources. Provide an SME to discuss the subsurface geology and hydrology in terms of this figure. Clarify the use of different formation terminology that is found in other reports, such as the Dames and Moore (1971) investigation and the MacTec investigation.	MM		
42	**2.4.12.1.3.2**	Hydrology	The statement “The top of the Hawthorn Group occurs at approximately -100 to -200 feet mean sea level (MSL) in the vicinity of the site” (Turkey Point Units 6&7 FSAR page 2.4.12-6) references a USGS Water Resources Investigation for the Floridan aquifer system in Southeastern Florida. Provide site-specific and refined information from sources such as might	MM		

Site Safety Audit Information Needs for Turkey Point COLA

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			be found in Section 2.5 (Figures 2.5.1-203 – 2.5.1-210), the existing site license, and/or local groundwater/wastewater investigations to understand the spatial distribution (depth and thickness) of the Hawthorn Group.			
43	**2.4.12.1.3.1**	Hydrology	Turkey Point Units 6&7 FSAR states that the base of the surficial (Biscayne) aquifer is defined by a significant change in hydraulic conductivity, while Fig. 2.4.12-204 suggests that a change in gamma log signature defines the lithologic boundary between the surficial aquifer and the confining unit. Provide an SME to discuss and explain which criteria is used and why.	MM		
44	**2.4.12.1.3.3**	Hydrology	Provide an SME to describe the extent to which the Ocala Limestone is present below the site, and its characteristics.	MM		
45	**2.4.12.1.3.3**	Hydrology	"The Upper Floridan aquifer is 200 feet thick in the vicinity of the TP plant." Provide borehole information such as might be found in Section 2.5 (Figures 2.5.1-203 – 2.5.1-210), to support the thickness and distribution of the Upper Floridan, e.g. but not limited to, the aquifer production wells mentioned in Turkey Point Units 6&7 FSAR Section 2.4.12.1.5.3.	MM		
46	**2.4.12.1.3.3**	Hydrology	"In many places the middle confining unit is divided into upper and lower units separated by the Avon Park permeable zone." Provide an SME to discuss whether the confining unit itself is separated into upper and lower confining units with a more permeable Avon Park separating them, and/or if the Avon Park consists of multiple low permeability units and a more permeable unit. Provide site-specific or proximal data to support this discussion in addition to the regional USGS report (Reference 206).	MM		
47	**2.4.12.2.4.3**	Hydrology	Turkey Point Units 6&7 FSAR page 2.4.12-29 states, "The base of the middle confining unit is encountered at a depth of approximately 2460 feet in a well (MDS-I12) drilled in southeastern Miami-Dade County, 230	MM		

Site Safety Audit Information Needs for Turkey Point COLA

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			feet below the top of the Oldsmar Formation," but Fig. 2.4.12-202 shows the top of the Lower Floridan (and base of confining unit) at a depth of 2400 feet and the top of the Oldsmar Formation at a depth approximately 3100 feet. Describe and provide site-specific data, such as from the current investigation, the existing site license, and/or local groundwater/wastewater investigations to refine the spatial distribution (depth and thickness) of the Oldsmar Formation and the relationship with the Lower Floridan aquifer. Provide an SME to discuss the data and analysis.			
48	**2.4.12.2.4.3**	Hydrology	Clarify if "the zones that contain highly transmissive dolomite with cavernous porosity are found in the upper to middle part of the Oldsmar Formation in southeastern Florida" (Turkey Point Units 6&7 FSAR page 2.4.12-29) are equivalent to the "boulder zone" into which the wastewater will be injected.	MM		
49	**2.4.12.2.4.3**	Hydrology	Turkey Point Units 6&7 FSAR page 2.4.12-29 states that "The base of the middle confining unit is encountered at a depth of approximately 2460 feet in a well (MDS-I12) drilled in southeastern Miami-Dade County, 230 feet below the top of the Oldsmar Formation." This statement seems inconsistent with Fig. 2.4.12-202 which shows the top of the Lower Floridan (and base of confining unit) at a depth of 2400 feet, but the top of the Oldsmar Formation at a depth of maybe 3100 feet. Provide an SME to discuss the placement of the Oldsmar Formation in southeastern Florida.	MM		
50	**2.4.12.2.1.3**	Hydrology	Provide for review a figure with better scale and clarity to understand the relative location of the collector wells which are difficult to see on Fig. 2.4.12-218.	MM		
51	**2.4.12.2.1.3**	Hydrology	Provide an SME to discuss the use of the Boulder Zone for Class I injection wells, whether all 90 Class I wells inject into the Boulder Zone, and provide the source(s) of information on this topic.	MM		

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52	**2.4.12.2.1.3**	Hydrology	Provide an SME to discuss the chemical composition of the "plant wastewater" or "treated liquid radioactive waste" from Units 6 & 7 which is proposed for deep well injection.	AA		
53	**2.4.12.2.2.1**	Hydrology	Provide an SME to discuss the Upper and Lower Surficial aquifer with additional lines of evidence to support the theory of an upward gradient in the surficial aquifer other than the limited < one year sampling event. Describe the effects of seasonality (wet season/dry season), the effects of climatic variation (extreme drought or extreme wet years), and the effects of global/regional climatic change that might occur in the lifetime of the plant.	MM/AA		
54	**2.4.12.2.2.2**	Hydrology	Provide an SME to discuss the circulation through the surficial aquifer including the influence of the middle confining unit as inferred from the modeling investigation in Appendix 2CC.	MM		
55	**2.4.12.2.4**	Hydrology	Turkey Point Units 6&7 FSAR page 2.4.12-22 states "The Boulder Zone packer tests listed in Table 2.4.12-206 (data from the Miami Dade Water and Sewer Authority (MDWASD)) show transmissivities lower than those reported for other regional testing of the Boulder Zone," e.g., hydraulic conductivities shown in Table 2.4.12-205 (from Reference 237, a regional EPA report). Table 2.4.12-206 shows transmissivities of the Boulder Zone to be <100 ft^2/d, while Table 2.4.12-205 shows hydraulic conductivity of the Boulder Zone to be 6500 ft/d (where thickness is 500 feet resulting in transmissivity of 3 million ft^2/d). Provide an SME to discuss which estimates were used in your calculations and modeling, the basis for choosing these estimates, and how uncertainties were considered in your calculations and modeling.	MM		
56	**2.4.12.2.4**	Hydrology	Turkey Point Units 6&7 FSAR page 2.4.12-22 states that "The depths given on the table [Table 2.4.12-206] suggest that the tests were performed in the interval between the top of the Lower Floridan aquifer and the	MM		

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			top of the Boulder Zone as determined from cross section Y-Y in Reference 206." Page 2.4.12-16 of the FSAR states that the Boulder Zone is located between 2000-3400 feet in depth and its thickness is 700 feet. Provide an SME to discuss the basis for suggesting that the tests in Table 2.4.12-206 by the Miami Dade Water and Sewer District (MDWASD) were not in the Boulder Zone, and provide values from any additional tests available to you that were performed by MDWASD or other agencies, such as but not limited to the additional test by MDWASD in which hydraulic conductivity was 4250 feet/d (discussed on p.2.4.12-30).			
57	**2.4.12.2.4**	Hydrology	Provide an SME to discuss the "weighting averages" of hydrogeologic properties in Table 2.4.12-205 in the context of subsurface flow modeling and how these values compare to the actual measured values and values reported in other studies conducted in southern Florida.	AA		
58	**2.4.12.3.2**	Hydrology	Provide an SME to discuss the potential for upward migration of injectate at Turkey Point considering upward migration has been detected into the USDW at 3 injection well locations in southern Florida and in an additional 7 injection well locations upward migration has been detected but below USDW. Discuss the injection rates and chemical/physical properties of injectate associated with injection wells where upward migration has been detected.	MM/AA		
59	**2.4.12.3.2**	Hydrology	Please provide a clearer description of the location of the Turkey Point injection wells (total of 12 proposed) in the boulder zone and the subsurface stratigraphy at the location. Discuss the basis of determining the location and spacing of the injection wells. Provide an SME to discuss the Turkey Point injection well stratigraphy in comparison to injection wells sites in South Florida where upward migration has been detected.	AA		

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60	**2.4.12.4**	Hydrology	Provide an SME to discuss the monitoring program and the kind of physical and/or water quality changes that the plan will detect in the Biscayne aquifer.	MM		
61	**2.4.12.4**	Hydrology	Provide an SME to discuss the types of geochemical monitoring of the Floridan aquifer that will be conducted according to the underground injection control regulations (Chapter 62-528 FAC). Describe the conceptual pathway and timeframe from an observed monitoring incident (upgradient migration) to shutdown.	MM/AA		
62	**2.4.12, Appendix 2CC**	Hydrology	Provide clear figures to replace those in Appendix 2CC. All figures are blurry and writing contained in them is illegible.	MM		
63	**2.4.12, Appendix 2CC**	Hydrology	Provide an SME to discuss the location and operation of the radial collector wells, and the effects on local/regional groundwater flow patterns as inferred from groundwater modeling.	MM		
64	**2.4.12.5, Appendix 2CC**	Hydrology	Provide an SME to discuss and describe the changes to the current site configuration due to the backfill, and the location of the ground surface and the water table after the changes to site grade as inferred from groundwater modeling. Discuss the characteristics of the fill material and the hydrostatic loading at the site under normal and extreme conditions.	MM		
65	**2.4.12.2CC 5.2.1**	Hydrology	Although sensitivity analyses were conducted with various vertical hydraulic conductivities, there is no mention of varying the horizontal hydraulic conductivities in the subsurface modeling. Provide an SME to discuss the absence of information on variability of horizontal hydraulic conductivity.	AA		
66	**2.4.12.2CC 5.2.2**	Hydrology	Provide an SME to discuss the revised shoreline impact on modeling of radial collector wells as the assumptions increase the percentage of flow originating from Biscayne Bay to 95 percent.	AA		
67	**2.4.12.5**	Hydrology	Provide an SME to discuss the mechanics, monitoring, and expectations of the dewatering system that is needed during construction, including	MM		

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			the plans for disposing of the dewatered water.			
68	**2.4.12.2CC**	Hydrology	Provide an SME to discuss the sensitivity analysis of assumptions/parameters in the groundwater modeling effort specifically for: the assumption that cooling canals are in steady state (need reference), horizontal hydraulic conductivities, dewatering simulations considering failure of cut-off walls and cut-off wall properties, and the selection of WEL package for simulating horizontal well dewatering as opposed to other methods within MODFLOW such as the drain package (DRN) or the multi-node well package (MNW).	AA		
69	**2.4.13.1.1**	Hydrology	Provide an SME to discuss the basis of 0.12/0.25 used to adjust the failed fuel rate from the design basis to a conservatively bounding value for this analysis.	MM		
70	**2.4.13.1.2**	Hydrology	Provide an SME to discuss the design basis for the 19' of concrete fill and 3' thick side walls with respect to migration following an accidental release of effluent holding tank liquids.	MM/AA		
71	**2.4.13.1.2.1**	Hydrology	Provide an SME to discuss how the L31E Canal and the western interceptor ditch influence groundwater quality west of the canals in the upper portion of the surficial aquifer. Describe how the water level is monitored and/or what controls pumping of water into the western canals to maintain the freshwater hydraulic gradient. Describe how boundary conditions and steady-state groundwater flow are represented in the shallow subsurface flow modeling.	MM/AA		
72	**2.4.13.1.3**	Hydrology	Provide an SME to discuss the source (i.e., a Table or Figure in Section 2.4.12.2.4) of the hydraulic parameters used in the radioactive release scenario.	MM		
73	**2.4.13.1.3.1**	Hydrology	The radioactive release scenario appears to show all radionuclides are below the ECL considering only decay in Table 2.4.13-202. Provide an SME to discuss the uncertainties in this approach and the need for subsequent scenarios.	MM		

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74	**2.4.13.1.3.2**	Hydrology	Provide an SME to discuss the dilution factor attributed to 4 billion gallons of water in the cooling canals in relation to influencing shallow subsurface modeling, water and radionuclide residence time in the canal, and radionuclide release transport modeling.	MM/AA		
75	**2.4.13.1.3.2**	Hydrology	The contribution of tritium from the accidental release is determined to be negligible compared to the existing tritium concentrations in the canals. Provide an SME and documentation to discuss if this tritium concentration is below the ECL.	MM		
76	**2.4.13.1.3.3**	Hydrology	Provide an SME to discuss factors that might have produced the range in distribution coefficients (K_d) in Table 2.4.13-204. Add a citation for the source of this data and the methods used to derive the data.	MM/AA		
77	**2.4.13.1.3.3**	Hydrology	Provide an SME to discuss and explain whether the geometric mean or the lowest measured distribution coefficients (K_d) (from Table 2.4.13-204) were used in the simulation considering decay and adsorption.	MM		
78	**2.4.13.1.3.4**	Hydrology	Provide the input parameters used in the RESRAD modeling and the list of output results.	AA		
79	**2.4.13.1.3.4**	Hydrology	Provide an SME to discuss and describe how the non-default value of 25% for fish, based on likelihood that a fisherman would also fish outside of the contaminated area, and that fish are not confined to the contaminated area, is the most conservative approach.	MM		
80	**11.2.3.5**	Radioactive waste management	Provide an SME to discuss the transport modeling for the off-site hypothetical water supply well located in Boulder Zone presented in this section (9776 ft NW of proposed injection wells; off FPL property). Provide information and assumptions associated with modeling the travel time for the injectate to reach the off-site receptor well for comparison to MODFLOW and RESRAD modeling assumptions presented in FSAR Sections 2.4.12 and 2.4.13 .	AA		