July 11, 2011

MEMORANDUM TO: Jeffrey Cruz, Branch Chief
AP1000 Projects Branch 1
Division of New Reactor Licensing
Office of New Reactors

FROM: David Misenhimer, Project Manager **/RA/**
AP1000 Projects Branch 1
Division of New Reactor Licensing
Office of New Reactors

SUBJECT: TRIP REPORT – MAY 24-25, 2011, SITE VISIT FOR THE COMBINED LICENSE APPLICATION AT THE TURKEY POINT NUCLEAR PLANT, UNITS 6 AND 7

This report summarizes the staff's May 24-25, 2011, site visit related to the geological, seismic, and geotechnical review of the combined license (COL) application for the Turkey Point Nuclear Plant, (TPNPP) Units 6 and 7. By letter dated June 30, 2009, as supplemented by letters dated August 7, 2009, September 3, 2010 and December 21, 2010, Florida Power and Light (FP&L) submitted its application to the U.S. Nuclear Regulatory Commission (NRC) for a COL for two AP1000 advanced passive pressurized water reactors pursuant to 10 CFR Part 52. The NRC staff is performing a detailed review of this application to enable the staff to reach a conclusion on the safety of the proposed application.

The purpose of the visit was to acquaint the review staff with the nuclear station site, drill cores, dissolution features, and calculation packages. Enclosure 1 provides a list of attendees. Enclosure 2 is the agenda used during the visit.

During the site visit the following activities were completed:

1. A tour and demonstration of the Underground Injection Control drill site. This well is currently an exploratory well not far from the nuclear island for the proposed Units 6 and 7. The well will be converted to an underground injection well after completion, inspection, and testing. FPL and contractors provided a tour and answered NRC staff questions.

2. A tour of the general plant site to observe the general plant layout including the proposed centerline locations of the reactor buildings, site extension, relative location to Units 3 and 4, and components of the Turkey Point canal system (cooling water system).

3. An examination of drill cores from selected intervals of various bore holes completed on the nuclear island. The staff focused on the Key Largo Formation and Fort Thompson Formation cores. The nuclear island foundations for Units 6 and 7 will bear on concrete backfill placed on the Key Largo formation. The staff did not examine any core from the Miami Limestone since that formation will be entirely removed during excavation.

The Fort Thompson Formation is located immediately below the Key Largo formation. The staff visually examined a set of rock cores from borings within the nuclear island footprint. These boreholes include B-730, B-704DH, B-701DH and B-703 from Unit 7 and B-629, B-604DH, B-601DH and B-606 from Unit 7. Specific runs within these boreholes were examined based on low rock quality designation and low recovery.

4. A tour of circular dissolution features with distinct vegetation near Units 6 and 7 and along the interceptor canal road, near western plant boundary.

On May 25, 2011, the staff met with the FP&L's staff and their consultants at the Keys Gate Golf and Country Club to review the seismology and geotechnical engineering calculation packages. The staff reviewed the following calculation packages:

- **Report #: 25409-102-V14-CY06-00007-002,** 'Seismic Source Characterization for Cuba and the North America –Caribbean plate boundary Region'
- **Report #: 25409-000-K0C-0000-00010,** 'Recurrence Calculations for the Cuba Areal Source zone'
- **Report #: 254-102-V14-HPYK-00039,** 'Rock Seismic Hazard base calculations for Turkey Point (TP)
- **Report #: 25409-102-V14-HPYK-00040,** 'De-aggregation of 10-4, 10-5, 10-6 rock seismic hazard for TP site'
- **Report #: 25409-102-V14-HPYK-00046,** 'Recommended horizontal and vertical surface GMRS'
- **Report #: 25409-000-K0C-0000-00028,** 'Site Response analyses and strain compatible properties'
- **Report #: 25409-000-K0C-0000-00009,** Crustal attenuation model for Caribbean Sources'
- **Report #: 25409-102-V14-HPYK-00044-003**, 'HF and LF Horizontal Spectra'
- **Report #: 25409-000-K0C-0000-00034,** 'Sensitivity Study of Caribbean Attenuation Models'
- **Report#: 25409-000-K0C-0000-00024,** 'Stochastic Simulation of Attenuation Relationship for the Caribbean crustal seismic sources'
- **Report#: 25409-000-K0C-0000-00007,** 'Probability of completeness by magnitude / time intervals'
- **Report#. 25409-102-V14-HPYK-00012,** 'Sensitivity Analysis on updated seismicity for TP'

- **Report#: 25409-000-K0C-0000-00015,** 'COL Bearing Capacity and Settlement Analysis'

- **Report#: 25409-000-K0C-0000-00017,** 'Liquefaction Analysis of Soils'

- **Report#: 25409-000-K0C-0000-00018,** 'COL Static and Seismic Lateral Earth Pressures'

The staff asked the applicant to explain where relevant information could be found in the calculation packages. These included the following:

1. Safety significance of the Mechanically Stabilized Earth wall proposed around the plant's perimeter to raise the power block finish grade elevation approximately 26 feet.

2. Liquefaction potential analysis performed by the applicant. The staff asked the applicant to clarify if the 25 feet of structural backfill was considered in the analysis and what input motions were used to calculate the Cyclic Stress Ratio.

3. Bearing Capacity Calculations – The staff reviewed the assumptions and the procedure used to calculate bearing capacity of structures.

4. Settlement Analysis calculations – The staff reviewed the applicant's methodology and assumptions used to calculate settlements, compared high strain and strain compatible settlements and clarified if the 25 feet of structural backfill, as well as adjacent structures, were considered in the analysis.

5. Static and Seismic Lateral earth pressures calculations – The staff reviewed if the 500 psf surcharge considered in the analysis accounted for the weight of adjacent structures. The staff reviewed Ostadan's procedure used to calculate at-rest lateral earth pressure.

6. SSHAC Level 2 documentation for the Caribbean seismic sources and the attenuation model

7. Seismic source models used in Turkey Point Nuclear Plant (TPNPP) final safety analysis report (FSAR) Subsection 2.4.6 and 2.5.2

8. Clarification on which seismic sources used which ground motion attenuation models

9. Updates to the FSAR based on an earlier commitment made by the applicant

The applicant provided access to their calculations packages via an electronic reading room.

Docket Nos.: 52-040 and 52-041

CONTACT: David Misenhimer, NRO/DNRL/NWE1
301-415-659

Enclosures:
As stated

cc: Bill Maher
Florida Power & Light Company
700 Universe Boulevard
Juno Beach, FL 33408

The applicant provided access to their calculations packages via an electronic reading room.

Docket Nos. 52-040 and 52-041

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ADAMS ACCESSION NUMBER: ML111881052

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List of Attendees – Turkey Point Units 6 and 7 NRC Site Visit

Location: Turkey Point Nuclear Plant Site, Homestead, Florida

May 24-25, 2011

Name	Affiliation
Anstey, Ron	Bechtel Power Corporation (Bechtel)
Briggs, Stephanie	WLA
Burski, Ray	FPL
Candelario, Luissette	NRC
Childress, Tom	FPL
Cook, Christopher	NRC
Comar, Manny (via phone)	NRC
Cunliffe, John	Bechtel
Davie, John	Bechtel
Davis, Greg	Bechtel
Fenster, Dave	Bechtel
Franzone, Steve	FPL
Hartleb, Ross	WLA
Jacobs, Paul	FPL
Lindvall, Scott	WLA
Litehiser, Joe	Bechtel
Maher, Bill	FPL
Mann, Dr. Paul (via phone)	TAG – University of Texas
Misenhimer, Dave	NRC
Ostadan, Farhang (via phone)	
Paine, Elizabeth	FPL
Seber, Dogan	NRC
Stepp, Dr. Carl	TAG -Earthquake Hazards Solutions
Stieve, Alice	NRC
Stovall, Scott	NRC
Toledo, Meralis Plaza	NRC
Vega, Frankie G.	NRC
Witt, Jessica	Bechtel
Xi, Zuhan	NRC
Yamrus, Bob	Bechtel

Tuesday – May 24, 2011

TIME	PRESENTATION / ACTIVITY	LEAD
8:00	NRC Staff Arrival at TPNPP Site	
8:30	Welcome & Introductions – TPP Logistics & Safety	Applicant
8:45	Site Safety Brief, Site Overview	Applicant
9:15	Agenda/Site audit objectives/purpose	Manny Comar DAVID MISENHIMER
9:30	Break	
9:45	Site Tour • Local Geologic Features • Rock core samples • Muck and silt cores that would include the Holocene geologic record • Surficial solution pits	Applicant
1:00	LUNCH	
2:00	Site Tour (Cont.)	Applicant
TBD	END OF DAY - Strategy/Requests/Logistics for Wednesday	All

Wednesday – May 25, 2011

TIME	PRESENTATION / ACTIVITY	LEAD
8:00	NRC Staff Arrival at TPNPP Site	
8:00	Review Calculation packages	NRC Staff
10:00	Break	
10:15	Review Calculation Packages (cont)	NRC Staff
12:00	Lunch	
1:00	Review Calculation Packages (cont)	NRC Staff
TBD	END of Day	ALL