April 16, 2009

MEMORANDUM: Joseph Colaccino, Chief
EPR Projects Branch
Division of New Reactor Licensing
Office of New Reactors

FROM: John Rycyna, Senior Project Manager ***/RA/***
EPR Projects Branch
Division of New Reactor Licensing
Office of New Reactors

SUBJECT: TRIP REPORT – FEBRUARY 24 - 25, 2009, GEOLOGY-RELATED SITE VISIT IN SUPPORT OF THE CALVERT CLIFFS COMBINED LICENSE APPLICATION

This report summarizes NRC travel to Lusby, Maryland during the period of February 24-25, 2009, to review UniStar's application for a COLA at the Calvert Cliffs. The morning of February 24, the staff met with the applicant at the Calvert Cliffs site for a tour of the site. Key geological features of the site and surrounding area were examined.

On February 25, the staff continued to meet with the applicant's staff and their consultants. All data information needs were discussed. The individuals participating in the various meetings are listed in Enclosure 1. In Enclosure 2 the technical details of the audit are described. Enclosure 3 contains the audit agenda and information needs. The audit was completed on February 25, 2009.

Docket Nos.: 52-016

CONTACT: John Rycyna, NRO/DNRL/NARP
(301) 415-4122

Enclosures:
As stated

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As stated

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ADAMS ACCESSION NO. ML090990086 NRO-002

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DATE	04/13/09	04/13/09	04/13/09	04/16/09

*See Previous Concurrence Page **OFFICIAL RECORD COPY**

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February 24 – 25, 2009 Site Visit to Lusby, MD
To Discuss Geology
Calvert Cliffs Combined License Application
Attendance List

Name	**Organization**
Rebecca Karas	NRC/NRO/DSER/RGS
Richard Rivera-Lugo	NRC/RES/DE/SGSEB
Robert Roche	NRC/RES/DE/SGSEB
Sarah Gonzalez	NRC/NRO/DSER/RGS
Alice Stieve	NRC/NRO/DSER/RGS
Weijun Wang	NRC/NRO/DSER/RGS
Rus Wheeler	USGS
Oliver Boyd	USGS
Randy Cox	University of Memphis
Steve Horton	University of Memphis
John Rycyna	NRC/NRO/DNRL/NARP
Darrell Gardner	AREVA-NP
Nasser Massoudi	Bechtel
Joe Libehiser	Bechtel
Dave Fenster	Bechtel
John Baldwin	William Lettis & Assoc.
Robert Givler	William Lettis & Assoc.
Michael Wysock	UniStar
Mutiu Ayoola	AREVA
Mike Peal	UniStar
Wayne Massie	UniStar
Lee Rabidern	Bechtel
Martin Owens	AREVA
Michael Yox	UniStar
Robin McGuire	Risk Engineering
Mark Hunter	UniStar

TRIP REPORT GEOLOGY-RELATED SITE VISIT

The first day of the site audit visit consisted of an all day geology field trip to five specific locations within the 25 mile site radius. These locations were selected to illustrate geologic field relations for stratigraphy and possible neotectonic structures that initiated RAIs from the NRC staff.

The staff viewed Moran's Landing, which is a cliff exposure of Chesapeake Group Coastal Plain sediments on the western shore of the bay about five miles south of the existing CCNPP units. The NRC staff also examined the sedimentary sequence in the cliffs from the Choptank formation, through St. Mary's Formation to the very top Upland sequence. The next field stop was to observe the geometry of an under fit stream in a relict valley that was left hanging at the cliff face. The Barge landing at CCNPP was the third field stop of the day. This cliff exposure is close to the planned location of the new unit, and thus, provides a geologic cross section that is representative of the geology beneath the base mat. The final field stop was to see the repeat of the stratigraphy of the Barge Landing cliff face in the stream cuts.

The NRC seismology and geotechnical staff also reviewed several calculations in the seismology and geotechnical areas and examined jar samples from some of the borings. The staff discussed with Unistar and its contractors some of the RAIs, as well as potential RAI topics. The applicant also presented some of the data and maps used to support the technical conclusions in the application and planned RAI responses.

The staff also requested electronic data from the applicant related to its site response input data and results. The applicant stated that it would provide this data in the form of a supplement. In addition, the NRC staff participated in a phone call with Unistar's seismic instrumentation expert in order to discuss the applicant's RAI responses for Chapter 3.7.4. As a result of this phone call discussion, the applicant intends to supplement its response to RAI 19, Question 3.7.4-1, with additional details regarding its operating basis earthquake.

In addition, NRC staff discussed issues and concerns related to the following topics with Unistar's geotechnical engineering contractor: (1) Details of the liquefaction analysis; (2) Development of the additional site investigation plan; (3) Development of the laboratory test plan; (4) Properties of the backfill; (5) Limited number of lab tests for the load bearing layer; (6) Discrepancy between the foundation dimension used in analysis and specified in the DCD; (7) Ground water elevation used in the analysis; (8) Effect of larger differential settlement on piping system, adjacent structures, and internal equipment; (9) Lack of dynamic bearing capacity evaluation; and (10) Small factor of safety obtained from pseudo-static slope analysis. The applicant provided some explanation and clarification related to staff's questions and also intends to respond to staff's RAIs once they have been issued. The applicant also committed to provide the site liquefaction potential analysis data to NRC staff for its confirmatory analysis.

The applicant described their plans for supplementing the application after all of the soil and backfill testing is completed, and any affected analyses are revised. The staff explained that this supplement is necessary for completion of Phase 1 of the COL review for Section 2.5.

In summary, based on various discussions with the applicant during the site audit visit, the applicant intends to provide the staff with electronic versions of the following data: (1) Input response spectra used in the site response calculations; (2) Base-case Shear-wave velocity profile and uncertainties; (3) Base case shear modulus reduction and damping curves and uncertainties; (4) All site response amplification factors; and (5) Data used in the liquefaction analysis. In addition, with respect to FSAR Section 3.7.4, the applicant stated that it intends to supplement its response to RAI 19, Question 3.7.4-1, with additional details regarding its operating basis earthquake.

Agenda and Information Needs for the Calvert Cliffs Site Geology Audit

Day 1 (02/24/09)

General Unit 3 site tour

Visit the exposures at Moran Landing. These exposures are discussed in FSAR Section 2.5.1.1.4.4.4.8 (page 2.5-54).

View any available exposures of the area or vicinity stratigraphy. There appears to be some deeply cut stream valleys that might expose local stratigraphy in-situ.

View the following core borings: B-301, and B-401 and possibly others.

Day 2 (02/25/09)

Geology

Please provide subject matter expert(s) to discuss the following:

View and discuss the seismic profiles related to the Hillville fault zone (i.e., the seismic profile St-M-1 and the profile of Hansen (1978) if different) and any marine profiles that might have crossed the offshore projection of the Hillville fault.

View the LiDAR data for the site vicinity at a scale that is readable, perhaps with GIS and other layers of interest such as geology, stream courses, and site facilities.

FSAR Section 2.5.1 document revisions: figures, organization, references

Site Geology (vicinity and area) including a discussion of the Chesapeake Group Formation.

Evidence for or against extended crust and buried Mesozoic basins beneath the Plant

Discuss tectonic structures in the site area and vicinity, specifically Cenozoic and younger structures. In addition, please discuss all available evidence for the Hillville fault.

Seismology

Please provide subject matter expert(s) to discuss the following:

The parameters of FSAR Equations 2.5-1, 2.5-2, and 2.5-3 with respect to the updated seismicity catalog

How the deaggregations were performed (FSAR Section 2.5.2.4.6)

How the different EPRI EST hazard curves and deaggregations were combined in the final hazard calculations

Characterization of the Central Virginia Seismic Zone (including probability of activity and maximum magnitude)

Dames and Moore EST source zones probability of activity (i.e., Zones 41, 53, 47 and 4).

The significance of the New Madrid Seismic Zone at the site

Site response (model, inputs, and results)

Development of the horizontal and vertical GMRS

Geotechnical

Please provide subject matter expert(s) to discuss the following:

Details of the liquefaction analysis

Development of the site investigation plan (i.e., maximum boring depth, locations of the borings, subsurface uniformity concern, field tests.)

Development of the laboratory test plan (i.e., type of tests, number of test samples.)

Determination of the shear-wave velocity profiles (i.e., methods used to measure shear-wave velocity, method used to combine the measurements from different methods when developing the shear-wave velocity profiles.)

Seismic Instrumentation

Please provide subject matter expert(s) to discuss the applicant's RAI responses

Day 3 (02/26/09)

Continuation of discussions (if necessary)