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10 CFR 50.4
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April 22, 2009

UN#09-210

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Subject: UniStar Nuclear Energy, NRC Docket No. 52-016
Calvert Cliffs Nuclear Power Plant, Unit 3
Transmittal of Schedule for Seismic Analysis and Geotechnical Schedules

Reference: G. Gibson (UniStar) Letter to Document Control Desk (NRC), Response to Request for Additional Information for the Calvert Cliffs Nuclear Power Plant, Unit 3, RAI No. 58, Seismic Design Parameters; RAI No. 63, Seismic Subsystem Analysis; RAI No. 65, Seismic System Analysis, dated March 19, 2009.

As requested by Mr. Joseph Colaccino, Chief, U.S. EPR Projects Branch, this letter provides the schedule for deliverables discussed at the public meeting held on April 17, 2009 regarding the Combined License (COL) application for Calvert Cliffs Nuclear Power Plant (CCNPP) Unit 3. These deliverables are related to: relocation of the makeup water intake structure (MWIS); seismic design and analysis issues; and geotechnical issues.

A listing of the CCNPP Unit 3 Final Safety Analysis Report (FSAR) sections, content, and supporting analyses that will be impacted due to relocation of the MWIS, and the schedule to provide updated FSAR information related to these changes, is provided in Enclosure 1. Enclosure 2 provides a schedule for completing identified analyses in the area of seismic design and analysis to address NRC Requests for Additional Information (RAIs) identified in RAIs 58, 65, and 112. Enclosure 3 provides the schedule for providing applicable COLA update information. Enclosure 4 provides a schedule for completing identified analyses and providing FSAR updates to address information needs in the area of geotechnical engineering.

As discussed during the public meeting, three Phase 2 items will not be completed by the projected conclusion of COLA Phase 2 on December 31, 2009: (1) comparison of the design safe shutdown earthquake (SSE) with the foundation input response spectra (FIRS) and

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certified seismic design response spectra (CSDRS) for the emergency power generation buildings (EPGBs) and essential service water buildings (ESWBs); (2) confirmatory soil structure interaction analyses for the EPGBs, ESWBs, and ultimate heat sink (UHS) MWIS and UHS electrical building (EB); and (3) reconciliation of analyses performed for the UHS MWIS and UHS EB. We respectfully request that these three items be categorized as Open Items in the CCNPP Unit 3 Safety Evaluation Report (SER).

As stated during the public meeting, UniStar is continuing to explore alternatives to accelerate the development and submittal of all the NRC's Phase 1 and Phase 2 information needs. We also expect to hold future meetings to discuss our progress, and request the use of NRC audits to evaluate our methodologies and results. We look forward to working with the NRC Staff to complete Phase 1 by August 15.

As discussed during the public meeting, we also respectfully request that the NRC geotechnical audit be scheduled and conducted in July 2009. We will arrange a meeting in the near future to discuss the information which will be available for review during the audit, and additional information which is being developed.

If there are any questions regarding this transmittal, please contact me at 410-470-4205, or Mr. Michael J. Yox at (410) 495-2436.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on April 22, 2009



Greg Gibson

- Enclosures: 1) Intake Structure Relocation FSAR Impacts and Schedule
2) Seismic Design and Analysis – Analytical Deliverable Schedule
3) Seismic Design and Analysis – COLA Update Deliverable Schedule
4) Geotechnical Deliverable Schedule

cc: John Rycyna, NRC Project Manager, U.S. EPR COL Application
Laura Quinn, NRC Environmental Project Manager, U.S. EPR COL Application
Getachew Tesfaye, NRC Project Manager, U.S. EPR DC Application (w/o enclosure)
Loren Plisco, Deputy Regional Administrator, NRC Region II (w/o enclosure)
Silas Kennedy, U.S. NRC Resident Inspector, CCNPP, Units 1 and 2
U.S. NRC Region I Office

Enclosure 1

Intake Structure Relocation FSAR Impacts and Schedule

Intake Structure Relocation FSAR Impacts and Schedule

FSAR Section	Description	COLA Impact	Deliverable	Date
1.1	Introduction	Figures	COLA Supplement	June 30, 2009
1.2	General Plant Description	Figures	COLA Supplement	June 30, 2009
2.1	Geography and Demography	Figures	COLA Supplement	June 30, 2009
2.2	Nearby Industrial, Transportation and Military Facilities	Figures	COLA Supplement	June 30, 2009
2.4	Hydrologic Engineering	Figures	COLA Supplement	June 30, 2009
2.5.2	Vibratory Ground Motion	Analyses*	COLA Supplement (text), Analytical items available for review	June 30, 2009
2.5.4	Stability of Subsurface Materials and Foundations	Analyses*	COLA Supplement (text), Analytical items available for review	June 30, 2009
2.5.5	Stability of Slopes	Slope Stability Analyses	COLA Supplement (text), Analytical items available for review	June 30, 2009
3.7.1	Seismic Design Parameters	Analyses*	COLA Supplement (text), Analytical items available for review	June 30, 2009
3.7.2	Seismic System Analysis	Analyses*	COLA Supplement (text), Analytical items available for review	June 30, 2009

Intake Structure Relocation FSAR Impacts and Schedule

FSAR Section	Description	COLA Impact	Deliverable	Date
3.7.3	Seismic Subsystem Analysis	Figures	COLA Supplement	June 30, 2009
3.8.4	Other Seismic Category I Structures	Analyses*	COLA Supplement (text), Analytical items available for review	June 30, 2009
3.8.5	Foundations	Analyses*	COLA Supplement (text), Analytical items available for review	June 30, 2009
Appendix 3E4	UHS Makeup Water Intake Structure and UHS Electrical Building	Analyses*	COLA Supplement (text), Analytical items available for review	June 30, 2009
9.2	Water Systems	Hydrology Analyses	COLA Supplement (text), Analytical items available for review	June 30, 2009
9.5	Other Auxiliary Systems (FP)	Figures	COLA Supplement	June 30, 2009
10.4	Other Features of Steam and Power Conversion Systems (CWS)	Figures	COLA Supplement	June 30, 2009

* MWIS relocation material w/exception of geotechnical and civil/structural RAI issues with specific schedules identified in this letter.

Enclosure 2

Seismic Design and Analysis – Analyses Completion Schedule (RAI Sets 58, 65 and 112)

Seismic Design and Analysis – Analytical Deliverable Schedule

FSAR Section	Description	Date	Deliverable
Nuclear Island (NI) Common Basemat Structures			
3.7.1	Definition of Calvert Cliffs design safe shutdown earthquake (SSE) as broad band spectrum (zero period acceleration [ZPA] = 0.15g) to envelope ground motion response spectra (GMRS) per NRC requirements	May 15, 2009	Analytical items available for review
3.7.1	Development of dynamic soil properties compatible to Calvert Cliffs design SSE	May 29, 2009	Analytical items available for review
3.7.1	Development of spectrally matched time histories	May 29, 2009	Analytical items available for review
3.7.1	Comparison of CCNPP Unit 3 design SSE with foundation input response spectra (FIRS) under NI against certified seismic design response spectra (CSDRS)	August 31, 2009	Analytical items available for review
3.7.2	Confirmatory structure soil interaction (SSI) analysis using SASSI code	August 31, 2009	Analytical items available for review
3.7.2	NI and nuclear auxiliary building (NAB) interaction analysis	August 31, 2009	Analytical items available for review
Emergency Power Generation Buildings and Essential Service Water Building (EPGB and ESWB)			
3.7.1	Receipt of structure soil structure (SSSI) motion from NI seismic reconciliation	August 31, 2009	Analytical items available for review
3.7.1	Development of structural backfill (static and dynamic) properties	September 30, 2009	Analytical items available for review
3.7.1	Development of SSI soil profile	December 31, 2009	Analytical items available for review
3.7.1	Development of FIRS	December 31, 2009	Analytical items available for review
3.7.1	Comparison of FIRS against CSDRS and design SSE*	January 29, 2010	Analytical items available for review

Seismic Design and Analysis – Analytical Deliverable Schedule

FSAR Section	Description	Date	Deliverable
3.7.2	Performance of confirmatory SSI analysis using SASSI code**	March 31, 2010	Analytical items available for review
Ultimate Heat Sink Makeup Water Intake Structure and Electrical Building (UHS MWIS and UHS EB)			
3.7.1	Development of static and dynamic soil properties, including structural backfill	September 30, 2009	Analytical items available for review
3.7.1	Development of SSI soil profile	December 31, 2009	Analytical items available for review
3.7.1	Development of FIRS	December 31, 2009	Analytical items available for review
3.7.1	Comparison of FIRS against design SSE	December 31, 2009	Analytical items available for review
3.7.1	Reconciliation of design response spectra with FIRS	January 29, 2010	Analytical items available for review
3.7.2	Performance of SSI analysis using SASSI code **	April 30, 2010	Analytical items available for review
3.7.1/3.7.2	Reconciliation of analysis results with existing analysis***	May 31, 2010	Analytical items available for review

* Potential SER Open Item 1 – confirm FIRS with CSDRS and design SSE

** Potential SER Open Item 2 – perform SSI analysis using SASSI code

*** Potential SER Open Item 3 – reconcile analysis results with existing analysis

Enclosure 3

Seismic Design and Analysis – COLA Update Deliverable Schedule (RAI Sets 58, 65, 112)

Seismic Design and Analysis – COLA Update Deliverable Schedule

RAI	Question	Description of RAI Item	Date	Deliverable
58	03.07.01-1	<ul style="list-style-type: none"> ▪ Justify assumption of rigid basemat in SSI analysis of Nuclear Island including lower bound soil properties (where shear wave velocity is less than 1000fps). 	September 15, 2009	RAI response and applicable COLA Markup
		<ul style="list-style-type: none"> ▪ Identify impacts on the SSI analysis results and on the design of the foundation mat and supported superstructure. 	September 15, 2009	
58	03.07.01-2	<ul style="list-style-type: none"> ▪ Provide figure in the FSAR to depict SSI model of Nuclear Island including the model of subgrade. 	July 15, 2009	RAI partial response and applicable COLA Markup
		<ul style="list-style-type: none"> ▪ State whether or not embedment effects were considered in this analysis and, if not, what is the justification for not including them and what impact could this have on the analysis results. 	September 15, 2009	
		<ul style="list-style-type: none"> ▪ Describe the properties of the structural backfill and how the fill was modeled in the SSI analysis. 	July 15, 2009	
		<ul style="list-style-type: none"> ▪ As the groundwater table is close to the bottom of the basemat, how are groundwater effects treated in the SSI confirmatory analysis. 	July 15, 2009	
		<ul style="list-style-type: none"> ▪ Identify computer codes to perform SSI analysis of NI; provide description of codes, extent of application and basis for validation. 	July 15, 2009	
		<ul style="list-style-type: none"> ▪ Provide similar information on computer codes used in the generation of FIRS for each Category I structure. 	July 15, 2009	
		<ul style="list-style-type: none"> ▪ Provide similar information on computer codes used in seismic analysis in Section 3.7.1, 3.7.2, and 3.7.3. 	July 15, 2009	
58	03.07.01-3	<ul style="list-style-type: none"> ▪ For EPGB and ESWB, provide methodology to calculate FIRS at grade elevation computed from the GMRS which were determined at an elevation 41 ft below grade. 	August 15, 2009	RAI response and applicable COLA Markup
		<ul style="list-style-type: none"> ▪ Describe computer codes, soil column model, and the basis for the shear wave velocity of the structural backfill that supports both the EPGB and ESWB and the impact of this backfill on the development of the FIRS. 	December 31, 2009	

Seismic Design and Analysis – COLA Update Deliverable Schedule

RAI	Question	Description of RAI Item	Date	Deliverable
		<ul style="list-style-type: none"> ▪ Provide in the FSAR the spectra at the foundation level of each structure meeting Appendix S requirements 	February 15, 2010*	
		<ul style="list-style-type: none"> ▪ Provide in the FSAR a comparison of the FIRS at the foundation level of each structure meeting the requirements of Appendix S to the CSDRS provided in the U.S. EPR FSAR. 	February 15, 2010*	
		<ul style="list-style-type: none"> ▪ Provide the basis for not performing confirmatory analysis for the EPGB and ESWB similar to that for NI. 	July 15, 2009	
58	03.07.01-5	<ul style="list-style-type: none"> ▪ For Ultimate Heat Sink Electrical Building, provide and include in the FSAR the horizontal and vertical spectra depicting design spectra envelope. 	August 15, 2009	RAI response and applicable COLA Markup
		<ul style="list-style-type: none"> ▪ Provide in the FSAR a reconciliation of the design response spectrum with the horizontal foundation input response spectra (FIRS) for this structure which meets the minimum requirements of 10 CFR Part 50, Appendix S. 	May 31, 2010*	
		<ul style="list-style-type: none"> ▪ Include a description of how the FIRS are developed including the soil model, soil properties, backfill properties, computer programs and analysis assumptions. 	January 31, 2010*	
58	03.07.01-6	<ul style="list-style-type: none"> ▪ Provide in the FSAR how the design response spectrum and assumed soil properties used in the analysis of the UHS MWIS will be reconciled with the FIRS that meets the requirements of Appendix S and the final soil properties determined from the site final geotechnical studies. 	August 31, 2009	RAI response and applicable COLA Markup
		<ul style="list-style-type: none"> ▪ Include in the FSAR a comparison of the FIRS with the design response spectra used in the analysis. 	January 15, 2009*	
		<ul style="list-style-type: none"> ▪ Include a description of how the FIRS are developed including the soil model, soil properties, computer programs, and analysis assumptions. 	December 31, 2009	
58	03.07.01-7	<ul style="list-style-type: none"> ▪ Provide in the FSAR a discussion of the site-specific spectra that were considered for buried utilities. 	December 31, 2009	RAI response and applicable

Seismic Design and Analysis – COLA Update Deliverable Schedule

RAI	Question	Description of RAI Item	Date	Deliverable
		<ul style="list-style-type: none"> ▪ Provide justification for the use of the EUR soft soil spectrum including possible displacement and velocity differences that may exist with the use of this spectrum as opposed to using a site specific spectrum. 	December 31, 2009	COLA Markup
		<ul style="list-style-type: none"> ▪ Provide a comparison of the EUR soft soil spectrum with appropriate site-specific spectra that are applicable to buried utilities. 	December 31, 2009	
58	03.07.01-10	<ul style="list-style-type: none"> ▪ State explicitly or by reference design ground motion time histories for Nuclear Island, EPGB and ESWB structures. 	September 15, 2009	RAI partial response and applicable COLA Markup
		<ul style="list-style-type: none"> ▪ What are the site specific design ground motions and their bases that apply to these structures? Provide this information in Section 3.7.1.1.2 of the FSAR. 	February 15, 2010*	
65	03.07.02-4	<ul style="list-style-type: none"> ▪ Provide results of SSI analysis for Ultimate Heat Sink Electrical Building that meet the acceptance criteria 4.A.vii of SRP 3.7.1 and acceptance criteria 4 of SRP 3.7.2 using subgrade model of final soil and backfill properties or justify alternative. 	May 31, 2010***	RAI response and applicable COLA Markup
		<ul style="list-style-type: none"> ▪ Include SSSI effects from UHS MWIS. 	May 31, 2010***	
		<ul style="list-style-type: none"> ▪ Reconcile with the results of assumed seismic response and ISRS. 	May 31, 2010***	
65	03.07.02-6	<ul style="list-style-type: none"> ▪ Describe how the SSI analysis for Ultimate Heat Sink Makeup Water Intake Structure (UHS MWIS) performed meets the acceptance criteria 4.A.vii of SRP 3.7.1 or justify alternative 	February 15, 2010**	RAI partial response and applicable COLA Markup
		<ul style="list-style-type: none"> ▪ Provide a figure depicting the soil-structure model used for the seismic analysis 	December 31, 2009	
		<ul style="list-style-type: none"> ▪ Provide the basis for the assumed soil properties and profile used to calculate the frequency independent impedance functions. 	August 15, 2009	
		<ul style="list-style-type: none"> ▪ Provide the method and formulas used to calculate the values of the soil springs under the foundation as well as the lateral soil springs that represent the embedment effects. 	August 15, 2009	

Seismic Design and Analysis – COLA Update Deliverable Schedule

RAI	Question	Description of RAI Item	Date	Deliverable
		<ul style="list-style-type: none"> ▪ State whether the soil properties used in the analysis are strain dependent or simply the low strain values. If these are low strain values, justify their use and quantify the impact of not using strain dependent properties on the results of the analysis. If the soil properties are strain dependent, describe how the final soil properties are determined in the analysis. 	August 15, 2009	
		<ul style="list-style-type: none"> ▪ For large values of Poisson's ratio, the dynamic stiffness and damping are frequency dependent. Provide justification for assuming that the impedance functions of the supporting foundation are frequency independent. 	August 31, 2009	
		<ul style="list-style-type: none"> ▪ Confirm that the control motion is applied at the base of the soil structure analysis model. 	August 31, 2009	
		<ul style="list-style-type: none"> ▪ Provide a reconciliation of the final soil properties and the foundation input response spectra (FIRS) that are based on these properties with the seismic analysis results described in the FSAR. 	January 31, 2010*	
65	03.07.02-12	<ul style="list-style-type: none"> ▪ Provide results of a structure-to-structure interaction analysis between UHS MWIS and EB. 	May 31, 2010***	RAI response and applicable COLA Markup
65	03.07.02-18	<ul style="list-style-type: none"> ▪ Clarify the seismic classification of fire protection tank and building. 	July 15, 2009	RAI partial response and applicable COLA Markup
		<ul style="list-style-type: none"> ▪ Reconcile the U.S. EPR seismic analysis for NAB with the site-specific soil properties and foundation input response spectra (FIRS) 	September 15, 2009	
		<ul style="list-style-type: none"> ▪ Demonstrate in the FSAR that the displacement of this structure relative to the nuclear island common basemat structure is enveloped by the results of the U.S. EPR analysis. 	September 15, 2009	
65	03.07.02-24	<ul style="list-style-type: none"> ▪ Per COLA item 3.7-1, address that the seismic response of the nuclear island common basemat structures, seismic Category II structures, the Nuclear Auxiliary Building and the Radioactive Waste Processing Building is within the parameters of Section 3.7 of U.S. EPR FSAR. 	September 15, 2009	RAI response and applicable COLA Markup

Seismic Design and Analysis – COLA Update Deliverable Schedule

RAI	Question	Description of RAI Item	Date	Deliverable
		<ul style="list-style-type: none"> ▪ Provide a summary for each structure, either directly or by reference, which describes how the COL item is met 	September 15, 2009	
112	03.07.01-11	<ul style="list-style-type: none"> ▪ Provide a definition of site SSE and explain how it meets regulation requirements. 	July 15, 2009	RAI partial response and applicable COLA Markup
		<ul style="list-style-type: none"> ▪ Consistent with the site SSE, provide the FIRS in the free field at the foundation level of each structure meeting the requirements of Appendix S, and describe how each is determined 	September 30, 2009 (NI) January 31, 2010 (EPGB, ESWB)*	
		<ul style="list-style-type: none"> ▪ For the U.S. EPR Certified Design structures, provide a comparison of the results of the site seismic analyses using the FIRS input motion defined at the foundation level of each structure, with the analyses results documented in the U.S EPR FSAR. 	September 30, 2009 (NI) April 15, 2010 (EPGB, ESWB)***	
		<ul style="list-style-type: none"> ▪ For the EPGB and ESWB, describe how the effect of structure-soil-structure interaction has been accounted for in the analysis of these buildings. 	April 15, 2009**	

* Potential SER Open Item 1 – confirm FIRS with CSDRS and design SSE

** Potential SER Open Item 2 – perform SSI analysis using SASSI code

*** Potential SER Open Item 3 – reconcile analysis results with existing analysis

Enclosure 4

Geotechnical Deliverable Schedule

Geotechnical Deliverable Schedule

FSAR Section	Description	Date	Deliverable
Nuclear Island Common Basemat Structures			
2.5.4	Additional borings, testing, and static properties analysis.	June 30, 2009	COLA Supplement (text), Analytical items available for review
2.5.4	Refine foundation pressure, foundation settlement*	October 30, 2009	Analytical items available for review
2.5.4	Refine foundation pressure, foundation settlement*	March 31, 2010	COLA Supplement (text)
Emergency Power Generation Buildings and Essential Service Water Building (EPGB and ESWB)			
2.5.4	RCTS (resonant column torsional shear) supplemental laboratory test results (backfill)	August 31, 2009	Analytical items available for review
2.5.4	Static and dynamic soil properties analysis (backfill)	September 30, 2009	Analytical items available for review
2.5.4	Refined bearing capacity and settlement analysis (backfill)	October 30, 2009	Analytical items available for review
2.5.4	Refined soil column/randomization analysis (backfill)	December 31, 2009	Analytical items available for review
2.5.4	Refined earth pressure and liquefaction analysis (backfill)	January 29, 2010	Analytical items available for review
2.5.4	EPGB and ESWB backfill static and dynamic update	March 31, 2010	COLA Supplement (text)
Ultimate Heat Sink Makeup Water Intake Structure and Electrical Building (UHS MWIS and UHS EB)			
2.5.4	Additional borings, testing, and static analysis, bearing capacity estimate, settlement estimate	June 30, 2009	COLA Supplement (text), Analytical items available for review
2.5.4	RCTS supplemental lab test results	August 31, 2009	Analytical items available for review
2.5.4	Static and dynamic soil properties analysis	September 30, 2009	Analytical items available for review

Geotechnical Deliverable Schedule

FSAR Section	Description	Date	Deliverable
2.5.4	Refined bearing capacity and settlement analysis (backfill)	October 30, 2009	Analytical items available for review
2.5.4	Refined soil column/randomization analysis (backfill)	December 31, 2009	Analytical items available for review
2.5.4	Refined earth pressure and liquefaction analysis (backfill)	January 29, 2010	Analytical items available for review
2.5.4	UHS MWIS and UHS EB additional borings dynamic update	March 31, 2010	COLA Supplement (text)
2.5.5	Slope stability analysis for UHS MWIS	June 30, 2009	Analytical items available for review
2.5.5	Refined slope stability analysis	January 29, 2010	Analytical items available for review
2.5.5	Refined slope stability update	March 31, 2010	COLA Supplement (text)

* Provided by existing information in the CCNPP Unit 3 FSAR. Refinement will include in situ data from additional borings.