CCNPP3COLA PEmails

From: Arora, Surinder
Sent: Thursday, April 08, 2010 7:13 AM
To: Biggins, James
Cc: CCNPP3COL Resource
Subject: FW: Replace attachments- CC3 FSAR- NRC/Steckel-request action on plausible active earthquake fault 1.25 miles or closer, south of CCNPP-Docket 52-016

FYI.

From: Steckel, James
Sent: Tuesday, April 06, 2010 4:55 PM
To: J Sevilla
Cc: Arora, Surinder; Colaccino, Joseph; Burnell, Scott
Subject: RE: Replace attachments- CC3 FSAR- NRC/Steckel-request action on plausible active earthquake fault 1.25 miles or closer, south of CCNPP-Docket 52-016

Ms. Seillva,

I am writing to acknowledge receipt of the geotechnical and potential fault information you provided concerning the proposed Calvert Cliffs Nuclear Power Plant Unit 3. The information was forwarded to the appropriate NRC technical staff for consideration. When our Safety Evaluation Report is issued it will be available to the public in ADAMS and you will have the opportunity to read the NRC's Section 2.5.4 analysis and safety determination. Opportunities for public involvement in the safety review of a combined license application include the public availability of the application, requests for additional information and responses, and the staff's Safety Evaluation Report, as well as public meetings held with the Applicant and public meetings held by the Advisory Committee on Reactor Safeguards which conducts an independent review of the application. Additional information about the application and the staff's review is available on the NRC website at http://www.nrc.gov/reactors/new-reactors/col.html. I would like to express appreciation for your involvement in the process.

Thank you,

Jim Steckel

From: J Sevilla [mailto:qmakeda@chesapeake.net]
Sent: Monday, March 29, 2010 2:52 AM
To: Steckel, James
Cc: Arora, Surinder; larsencurt@msn.com; dspowars@usgs.gov; Peter Saar; Peter Vogt; Paul Gunter; Michael Mariotte; Allison Fisher
Subject: Replace attachments- CC3 FSAR- NRC/Steckel-request action on plausible active earthquake fault 1.25 miles or closer, south of CCNPP-Docket 52-016
Importance: High

To: James Steckel, NRC
From: June Sevilla
Subject: **Request NRC action on Plausible Active Earthquake Fault (and Liquefaction) at Calvert Cliffs** - scientific information for CC3 FSAR consideration, Docket No. 52-016
SRP Section: 02.05.04 - Stability of Subsurface Materials and Foundations
Application Section: 2.5.4

Please replace the attachments with this version to avoid confusion. Filenames and document headings only were edited to reflect documents as NRC appeal to CC3 FSAR. Included as an additional attachment is an addendum to Dr. Peter Vogt's appeal, to address liquefaction at Calvert Cliffs. Dr Vogt provided me with the liquefaction information after reading the initial email I sent you, below. The original string of email messages (below) remain valid and unchanged. There are 5 attachments in this email:

Attachment 1 - Dr. Peter Vogt's original appeal to PSC CPCN 9127 in 2009 (PSC dismissed appeal for non-party status)
Attachment 2 - Email trail showing authors/ownership of attached documents
Attachment 3 - Dr. Susan Kidwell's paper identifying earthquake fault at Calvert Cliffs, ca. 1997
Attachment 4 - Dr. Curt Larsen's corroborating analysis of Dr. Vogt's findings, sent to Calvert County BOCC 2/23/10
Attachment 5 - Dr. Peter Vogt's addendum of Liquefaction Potential at Calvert Cliffs (actual occurrence at Scientist Cliffs observed by Dr. Vogt) sent to June Sevilla 3/28/10

Once again, I would like to reiterate that I am a Party/Intervenor to the NRC proceedings for Docket 52-016, but in the spirit of cooperation and good faith, I am appealing to NRC Staff to consider in the CC3 FSAR, this email string and the 5 attachments herewith.

Public safety regarding building a nuclear power plant on a site with a plausible active fault at Calvert Cliffs, just 1 1/4 miles of CCNPP and possibly closer, plus actual occurrence of liquefaction at Calvert Cliffs compels immediate investigation as part of the NRC's review of the FSAR.
Thank you for your consideration and I look forward to working with you and others at NRC regarding immediate resolution of these issues.
Sincerely,
June Sevilla
(301-351-3161)

----- Original Message -----

From: J Sevilla
To: james.steckel@nrc.gov
Cc: Allison Fisher ; Michael Mariotte ; Paul Gunter ; Peter Vogt ; Peter Saar ; dspowars@usgs.gov ; larsencurt@msn.com ; Surinder.Arora@nrc.gov
Sent: Sunday, March 28, 2010 12:08 AM
Subject: CC3 FSAR- NRC/Steckel-request action on plausible earthquake fault 1.25 miles or closer, south of CCNPP-Docket 52-016

To: James Steckel, NRC
From: June Sevilla
Subject: Request NRC action on Plausible Earthquake Fault at Calvert Cliffs - scientific information for CC3 FSAR consideration, Docket No. 52-016
SRP Section: 02.05.04 - Stability of Subsurface Materials and Foundations
Application Section: 2.5.4

Jim,
The attached documents regarding a plausible earthquake fault near CCNPP are pertinent to the soil and foundation infrastructure upon which Calvert Cliffs Unit3 is to be built. Since our discussion during the March 17th tele-conference was about the FSAR, you indicated that my forwarding this fault information to you, would include your passing on the information to the appropriate NRC staff as well as consider them in your analysis of the areas within your jurisdiction before the FSAR is released. Since the plausible fault a.k.a "Moran's Landing Fault" was discovered at Calvert Cliffs just

1 1/4 miles south of CCNPP, with possibility of the fault running much closer to CC3, it warrants immediate investigation and consideration in the FSAR for CC3.

When I brought up this subject during public comment discussion, NRC staff admitted that liquefaction is a siesmic consideration. This is also reflected in your meeting agenda, per NRC email below, where two sections specifically address liquefaction and seismic issues in particular. Item 02.05.04-14, Section 2.5.4.8 is of great concern since it states that "*liquefaction is not a concern for this site*", possibly because to the best of my knowledge, Moran's Landing Fault was neither recognized nor considered in CC3's application whatsoever. Your agenda included:

"02.05.04-14 : Section 2.5.4.8 presents liquefaction potential analysis results and concludes that liquefaction is not a concern for this site. However, the data also show that the upper soil layer (Terrace Sand) does have some potential for liquefaction. Since seismic Category I electrical duct banks and pipes will be located at shallow depths, please discuss the liquefaction potential of soil where these components will be located."

"Section 2.4.12.5, please discuss the impact of using higher ground water level on site seismic response, SSI, settlement and lateral earth pressure analyses."

Currently with the Department of Geophysical Sciences, University of Chicago, Dr. Susan Kidwell's site research and paper (attached) discovered the Calvert Cliffs geological anomaly in 1997, but it was the keen eyes of a local geologist, Dr. Peter Vogt who brought up this concern to the Maryland Public Service Commission (PSC) by submitting his report during the CPCN 9127 proceedings. However, since Dr. Vogt was not a party to that CPCN, the PSC customarily dismissed the submission and stated that this matter is under NRC jurisdiction, under safety. Recently, UniStar has applied for CPCN under Case 9218 and I am a Party /Intervenor to that PSC case as well as to these NRC proceedings for CC3, Docket 52-016.

Instead of litigating this issue as a Contention with the ASLB at this juncture, in good faith, I am presenting this plausible fault concern to the NRC through you, to consider the impacts as it affects CC3's FSAR.

Please copy me on your forwarding email to the other NRC staffs with responsibility on this issue and let me know who else I may follow through on this matter at NRC. I am also requesting to be informed on what actions you may take on this fault information as it affects your area of responsibility.

By way of background on new developments, Moran's Landing Fault at Calvert Cliffs was more recently reviewed by another local geologist, Dr. Curt Larsen, at the request of Calvert County Commissioner Susan Shaw. Dr. Larsen corroborated Dr. Vogt's analysis of Dr. Kidwell's mapping that the fault is plausible. I have also included Dr Larsen's analysis and communications between those three scientists and myself to show the "trail" of the source documents.

These fault documents were also submitted by myself to the PSC as a Party to CPCN 9218, under the parameters of the current proceeding with PSC. However, the SAFETY and SITING considerations that are under NRC purvey, impact to the parameters and assumptions used for soil and stability of the CC3 power block, piping connectivity to cooling towers, among other considerations, will be affected by the earthquake fault findings. Four documents relevant to this "Moran's Landing Fault" are attached herewith for your investigation and consideration. <u>Public safety regarding building a nuclear power plant on a site with a plausible fault at Calvert Cliffs, just 1 1/4 miles of CCNPP and possibly closer, compels immediate investigation as part of the NRC's review of the FSAR</u>. Dr. Vogt's recommendations on the conduct of the fault investigation are reasonable and

can be easily investigated through USGS. Dr. Vogt's recommended expert on Coastal Plain faulting is Dr David Powars at USGS dspowars@usgs.gov (804-261-2619).

Thank you for your consideration and I look forward to hearing from you.
June Sevilla
(c) 301-351-3161
Attachments: Kidwell 1997 paper
Vogt 2009 appeal to PSC CPCN9127
Larsen review of Vogt findings and Kidwell paper (also submitted to PSC 9218)
email trail of earthquake fault documents (also submitted to PSC 9218)

>>>>>>>>>>>>>>>> below was the agenda for the March 17th teleconference:

Subject: DRAFT RAI No. 218 RGS1 4332
Sent Date: 2/19/2010 2:39:19 PM
Received Date: 2/19/2010 2:39:22 PM
From: Arora, Surinder

Created By: Surinder.Arora@nrc.gov

Recipients:
"CCNPP3COL Resource" <CCNPP3COL.Resource@nrc.gov>
Tracking Status: None
"Karas, Rebecca" <Rebecca.Karas@nrc.gov>
Tracking Status: None
"Wang, Weijun" <Weijun.Wang@nrc.gov>
Tracking Status: None
"Colaccino, Joseph" <Joseph.Colaccino@nrc.gov>
Tracking Status: None
"Steckel, James" <James.Steckel@nrc.gov>
Tracking Status: None
"Biggins, James" <James.Biggins@nrc.gov>
Tracking Status: None
"Vrahoretis, Susan" <Susan.Vrahoretis@nrc.gov>
Tracking Status: None
"Hair, Christopher" <Christopher.Hair@nrc.gov>
Tracking Status: None
"'Poche, Robert'" <Robert.Poche@constellation.com>
Tracking Status: None
"'cc3project@constellation.com'" <cc3project@constellation.com>
Tracking Status: None

Post Office: HQCLSTR01.nrc.gov

Files Size Date & Time
MESSAGE 642 2/19/2010 2:39:22 PM
DRAFT RAI 218 RGS1 4332.doc 44538

Options
Priority: Standard
Return Notification: No

Reply Requested: Yes
Sensitivity: Normal
Expiration Date:
Recipients Received:

1

Request for Additional Information No. 218 (eRAI 4332) DRAFT

2/19/2010

Calvert Cliffs Unit 3 UniStar

Docket No. 52-016
SRP Section: 02.05.04 - Stability of Subsurface Materials and Foundations
Application Section: 2.5.4

QUESTIONS for Geosciences and Geotechnical Engineering Branch 1 (RGS1)

02.05.04-3

Section 2.5.4.5.2 indicates that most Category I structures will be founded on the top of Stratum IIb cemented sand layer. In Section 2.5.4.2.1.3, the layer IIb is further divided into three sublayers: silty sand layer with SPT N value greater than 20; clayey sand layer with N value smaller than 20; and poorly-graded sand to silty sand layer with N value greater than 20. The shear wave velocity of the layer IIb shows great variation, ranging from 560 to 3,970 ft/s. In addition, the shear strength property of the IIb is only based on very limited laboratory test results (one triaxial test for sublayer IIb-1 and two tests for sublayer IIb-2). Because the properties of the load-bearing layer IIb directly affect the foundation stability, the applicant is requested to explain how specific soil parameters for this layer were incorporated into relevant calculations (such as bearing capacity, settlement, SSI and GMRS), and discuss how the soil shear strength property for this layer was characterized based on limited testing results. In addition, describe how the variability was accounted for in the soil parameters for layer IIb in the above analyses.

02.05.04-4

Section 2.5.4.5.2 presents information on the planned extent of excavation and fills to be placed in and around the Category 1 structures and indicates that the extent of excavation will be based on the observation of actual conditions at the time of the excavation. The applicant is requested to describe the procedures that will be used by field investigators to judge if in-situ soils are to be left in place.

02.05.04-5

Section 2.5.4.5.2 indicates that the excavations will be backfilled with compacted structural fill to the foundation level or, if necessary, lean concrete will be placed as a leveling mat. Since the lean concrete will be used directly underneath the Category 1 structures, please describe the properties of the concrete (such as strength and shear wave velocity), and the criteria that will be used to determine where the lean concrete leveling mat should be used. In addition, describe the controls to ensure that the concrete fill can provide adequate support of both static and dynamic loadings for the foundation.

02.05.04-6

Section 2.5.4.2.5.8 presents the low strain dynamic properties for the backfill soil and indicates that the shear wave velocity for the backfill below the EPGB is about 900 fps. This velocity is lower than the minimum shear velocity (1,000 fps) specified in the U.S.

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EPR standard design and thus was identified as a departure in this COL application. In addition, the minimum shear wave velocity definition was also revised in the latest U.S. EPR standard design, which no longer uses the "best estimate" concept. Please update the corresponding ITAAC to reflect the changes of the DCD and the departure. In addition, please refer the NRC's August 7, 2009 letter to NEI regarding the NRC staff position and standard wording for backfill ITAAC under Category I structures.

02.05.04-7

Section 2.5.4.5.3 states that structural fill will be compacted to a minimum 95 percent of its maximum dry density, and within 3 percent of its optimum moisture content, based on the Modified Proctor Compaction test procedure. Section 2.5.4.5.3 further states that the in-place density and moisture content testing frequency will be a minimum of one test per 10,000 square feet fill placed. Please justify whether the backfill field density test parameter (one test for every 10,000 ft2) is adequate by itself without specifying other controls or procedures, such as no lift should be more than 8 inches in thickness and a routine acceptance control test should be conducted for at least every 200 cubic yards of compacted backfill material in critical areas

02.05.04-8

Section 2.5.4.2.2.2 states that dolomite or calcite was identified as the cementing agent for the sand soil layer and the absence of dolomite or calcite in certain parts of the layer might be due to low pH groundwater. Since most of the Category I structures will be founded on the cemented sand, please discuss the possible soil strength reduction caused by the low pH ground water entering the cemented sand layers, and subsequently breaking the soil particles bond.

02.05.04-9

Section 2.5.4.2.5.2 summarizes chemical test results and concludes that "all natural soils at the site will be considered aggressive to concrete, requiring protection if placed within these soils." Since many Category I structures with concrete foundation will be built on Stratum IIb soil, please provide information on what measures will be taken to protect the concrete and if those measures will meet other design requirements, such as sliding coefficient parameter defined in the U.S. EPR standard design.

02.05.04-10

Table 2.5-58 referred in Section 2.5.4.2.5.7 provides the sliding coefficient for each stratum with values ranging from 0.35 to 0.45. Since the U.S. EPR FSAR Tier II Section 2.5.4.3 "Foundation Interfaces" requires that a COL applicant will confirm that the site soils have sliding coefficient of friction equal to at least 0.7, please explain why lower than the standard design values were used in this application and evaluate the effect of lower sliding coefficients on structure sliding stability.

02.05.04-11

Section 2.5.4.2.5.8, which provides low strain dynamic properties for the subsurface materials at the site, as well as for the backfill soil used, states that the groundwater level is at an approximate depth of 16 ft for the powerblock area. Once the construction is finalized, the expected depth of the groundwater is 30 ft due to new drainage patterns.

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Also, Section 2.5.10.2.2 states that the post-construction groundwater elevation in the powerblock area was assumed at El. 55 ft for the settlement analysis, which is about 28 ft below grade surface (El. 83 ft). However, it is stated in Section 2.4.12.5 that the maximum pre-construction groundwater level is currently at or slightly above the proposed grade level in the nuclear island area, while post-construction groundwater level ranges from approximately 6 ft to 16 ft below ground surface. Since ground water level will affect the stability of site subsurface materials, foundations, structures and slopes, please explain the discrepancy of post-construction ground water levels provided in Section 2.4.12.5 and Section 2.5.4. If the post–construction groundwater level is as stated in Section 2.4.12.5, please discuss the impact of using higher ground water level on site seismic response, SSI, settlement and lateral earth pressure analyses.

02.05.04-12

Section 2.5.4.2.5.9 described states that "detailed description of the RCTS curve fitting process is provided in the report "Reconciliation of EPRI and RCTS Results, Calvert Cliffs Nuclear Power Plant Unit 3" (Bechtel, 2007), and is included as COLA Part 11J." Although the Bechtel report describes how the strain dependent properties were developed for Strata 1, IIa, IIb, IIc and III soils, there is no discussion for the backfill. Please describe how the strain dependent properties for backfill soil, which are presented in Figure 2.5-172, were developed.

02.05.04-13

Sections 2.5.4.5.4 and 2.5.4.10.2.2 indicate that monitoring program specifications for foundation rebound (heave) and settlement will be developed during the detailed design stage of the project. Since foundation rebound and settlement are expected at the site, and estimated differential settlement of the reactor building will exceed the standard design criterion, please provide a detailed description of the monitoring program including all basic elements, such as the settlement monitoring bench marks, locations of instruments, monitoring and recording frequency, and evaluation of the magnitude of rebound and settlement during and after excavation and construction.

02.05.04-14

Section 2.5.4.8 presents liquefaction potential analysis results and concludes that liquefaction is not a concern for this site. However, the data also show that the upper soil layer (Terrace Sand) does have some potential for liquefaction. Since seismic Category I electrical duct banks and pipes will be located at shallow depths, please discuss the liquefaction potential of soil where these components will be located.

02.05.04-15

Section 2.5.4.10.1 states that three cases were considered during bearing capacity calculations. For the general case, the bearing capacity equation for homogeneous soil was used by applying weighted average values of soil parameters in the analysis, with the weight factors based on the relative thickness of each stratum within a specific depth. For the case of a footing supported on a dense sand stratum over a soft clay stratum, Meyerhof's model (Meyerhof, et al., 1978) was used to estimate ultimate static bearing capacity. Since the results of the bearing capacity analysis were controlled by the models, assumptions and parameters, the applicant is requested to:

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1. Provide details on how the weight factors were determined for all subsurface soil strata;

2. Clarify and justify if soil compressibility was considered during the analysis since a clayey sand layer (Layer IIb2) is presented;

3. Discuss whether the dimension of a structure will affect the analysis results for footing supported on a dense sand stratum overlying on a soft clay stratum, because the Meyerhof model is based on the assumption that one dimension of the rectangular foundation is much larger than the other. Also, please clarify why the equation of qult presented in page 2-1252 is different from Meyerhof's equation by a factor of 2.

02.05.04-16

1. Please verify that in the last paragraph of page 2-1247, "Only data points in the upper layers resulted in FOS >1.1" should be " … FOS <1.1."

2. Please verify that the term N' used in equation for qult, (page 2-1251), and Ng in the note should be Ng.

3. Please verify that in equation term notes (page 2-1252), qu should be qult.

Hearing Identifier: CalvertCliffs_Unit3Cola_Public_EX
Email Number: 1268

Mail Envelope Properties (B46615B367D1144982B324704E3BCEED21A9565A96)

Subject: FW: Replace attachments- CC3 FSAR- NRC/Steckel-request action on plausible active earthquake fault 1.25 miles or closer, south of CCNPP-Docket 52-016
Sent Date: 4/8/2010 7:12:30 AM
Received Date: 4/8/2010 7:12:33 AM
From: Arora, Surinder

Created By: Surinder.Arora@nrc.gov

Recipients:
"CCNPP3COL Resource" <CCNPP3COL.Resource@nrc.gov>
Tracking Status: None
"Biggins, James" <James.Biggins@nrc.gov>
Tracking Status: None

Post Office: HQCLSTR01.nrc.gov

Files	**Size**	**Date & Time**
MESSAGE	22137	4/8/2010 7:12:33 AM

Options
Priority: Standard
Return Notification: No
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