CCNPP3COLA PEmails

From: Quinn, Laura
Sent: Tuesday, November 02, 2010 4:47 PM
To: Kropp, Roy K; Nash, Harriet
Cc: Parkhurst, Mary Ann; Lopas, Sarah
Subject: FYI Letter from Corps to UniStar requesting responses to DEIS/Public Notice comments
Attachments: ML1030202643.pdf

FYI

Hearing Identifier: CalvertCliffs_Unit3Cola_Public_EX
Email Number: 1564

Mail Envelope Properties (C83F2A0B5439F4498515234E2F1771100307A6C042)

Subject: FYI Letter from Corps to UniStar requesting responses to DEIS/Public Notice comments
Sent Date: 11/2/2010 4:46:43 PM
Received Date: 11/2/2010 4:46:00 PM
From: Quinn, Laura

Created By: Laura.Quinn@nrc.gov

Recipients:
"Parkhurst, Mary Ann" <maryann.parkhurst@pnl.gov>
Tracking Status: None
"Lopas, Sarah" <Sarah.Lopas@nrc.gov>
Tracking Status: None
"Kropp, Roy K" <Roy.Kropp@pnl.gov>
Tracking Status: None
"Nash, Harriet" <Harriet.Nash@nrc.gov>
Tracking Status: None

Post Office: HQCLSTR02.nrc.gov

Files	**Size**	**Date & Time**
MESSAGE	5	11/2/2010 4:46:00 PM
ML1030202643.pdf	6549801	

Options
Priority: Standard
Return Notification: No
Reply Requested: No
Sensitivity: Normal
Expiration Date:
Recipients Received:

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, U.S. ARMY CORPS OF ENGINEERS
P.O. BOX 1715
BALTIMORE, MD 21203-1715

OCT 14 2010

REPLY TO
ATTENTION OF

Operations Division

Mr. Dimitri Lutchenkov
Director, Environmental Affairs
Unistar Nuclear Energy
750 East Pratt Street
Baltimore, Maryland 21202

Dear Mr. Lutchenkov:

This is in reference to Department of the Army permit application CENAB-OP-RMS (CALVERT CLIFFS 3 NUCLEAR PROJECT, LLC/UNISTAR NUCLEAR OPERATIONS SERVICES, LLC)2007-08123-M01 to perform site preparation activities and construction supporting facilities at the site of a proposed nominal generation station (Unit #3) at Calvert Cliffs, Calvert County, Maryland.

In response to our public notice dated April 26, 2010, we received comments from the National Marine Fisheries Service and from Ms. June Sevilla regarding the proposed work, copies enclosed.

It is requested that you review this correspondence and provide any comments or rebuttals that you may wish to make within 30 days of the date of this letter. If no response is received within that timeframe, your application will be considered withdrawn.

A copy of this letter will be furnished to Nuclear Regulatory Commission, Maryland Department of the Environment and the National Marine Fisheries Service. If you have any questions regarding this matter, please call Mr. Woody Francis at 410-962-5689.

Sincerely,

Kathy Anderson

Kathy B. Anderson
Chief, Maryland Section Southern

Francis, Woody NAB02

From:	J Sevilla [qmakeda@chesapeake.net]
Sent:	Friday, July 09, 2010 3:58 PM
To:	CalvertCliffsCOLAEIS@nrc.gov; Quinn, Laura; Francis, Woody NAB02; james.steckel@nrc.gov; Surinder.Arora@nrc.gov
Cc:	Peter Saar; Peter Vogt; Michael Mariotte; Allison Fisher; Paul Gunter; Bruce Gordon; Chris Bush; William Johnston; fabiada@yahoo.com; Timothy Flaherty; harold thornburg
Subject:	June Sevilla submission to DEIS (DRAFT NUREG 1936) and FSAR - #1 of 3 emails
Attachments:	June 26 2010 ltr-Kidwell-Sevilla-FSAR Rev 6 analysis.pdf
Importance:	High

TO: NRC - NUREG 1936 DEIS Staff Reviewers
NRC - FSAR Staff
NRC- Geological and Geotechnical Staff
US Army Corps of Engineers - Woody Francis
Laura Quinn - NRC
James Steckel - NRC

From: June Sevilla in behalf of self and Southern Maryland CARES

This is the 1st of 3 emails submitted for consideration and ACTION, both on the DEIS and FSAR components of CCNPP Unit 3's application with NRC and USACE. This attachment also contains the enclosure of 2 of the 11 exhibits (Exhibit 4, 4a and 7) referred to in other documents forthcoming as part of this series of submissions (due to file size).

Attached is Dr. Susan Kidwell's scientific analysis of CCNPP Unit 3's FSAR Rev 6, in form of letter to me, June Sevilla, since she is my subject matter expert witness. Dr. Kidwell's scientific review and analysis of the latest revision of FSAR impacts decisions made in the DEIS because the conclusions drawn by NRC Staff and the US Army Corps of Engineers were based on geologic and geotechnical information which have been misrepresented by the Applicant in their FSAR, which also contains errors and omissions that affect not only the FSAR, but the DEIS likewise.

Please forward this information to all other NRC staff and US gov't agencies reviewing the DEIS and FSAR.

Thank you,

June Sevilla
301-351-3161
P.O. Box 354
Solomons, MD 20688

5750 South Kenwood Avenue
Chicago, IL 60637

Ms. June Sevilla
Lusby, MD

June 26, 2010

RE: Comments on CCNPP Unit 3 FSAR Rev 6 Section 2.5 "Geology, Seismology, and Geotechnical Engineering"

Dear June,

I have now had a chance to read the full text of the relevant section (2.5) of the FSAR Rev.6, which your detailed instructions permitted me to find on the NRC website. The report clearly states that Lettis Associates did make two reconnaissance visits to the site, including an aerial reconnaissance by fixed-wing aircraft to look for relevant geomorphic features (p. 2-1051), and the FSAR includes an unpublished LiDAR-based slope map of the area (Fig. 2.5-26, p. 2-1390). The report conclusions are otherwise based on a (quite complete) review of the published literature on the immediate area and larger region. A large portion of material in the report apparently dates to an investigation commissioned by Bechtel during construction of the original plant in the 1970's. There is no mention that Lettis Associates conducted any new field analyses such as boreholes, trenches, or seismic profiles to test any tectonic features that have been postulated in the literature, including the one at Moran Landing postulated in my 1997 JSR paper (Kidwell 1997). The detail of the current FSAR on other points suggests that any new original data like this would have been described in detail had it been generated by Lettis Associates or others.

<u>RE the postulated fault at Moran Landing and associated folding in the Conoy Cliffs:</u>

This fault is closer to the CCNPP than any others postulated and is thus of greatest concern. The FSAR authors ("they") agree with my published work that the basal contact of Pliocene and Quaternary age gravels in the upper part of the Cliffs is variable in elevation because it is erosional in nature, and that this interval includes multiple erosional channel forms. They also acknowledge some variation in elevation of beds within the generally tabular Miocene-age strata per my 1997 cross-section, but think that those changes are not convincingly tectonic given changes of similar magnitude that I documented elsewhere in the Calvert Cliffs (Section 2.5.1.1.4.4.4.8, p. 2-1096; and again on p. 2-1118).

That is a fairly conservative interpretation of the field evidence and scientifically fine -- as you know, I didn't draw the postulated fault onto my diagram for reasons of similar scientific conservatism, even though my text is explicit that a fault is postulated in that location. I could not find evidence that the change in elevation of the entire stack of Miocene units across the Moran Landing valley and the dip reversal evident within Conoy Cliffs could be attributed to (paleo)erosion alone, unlike most other features in the Calvert Cliffs, where detailed examination revealed truncation of underlying beds, pinchout of infilling units, and/or biostratigraphic corroboration of a gap in the record. On the other hand, no fault plane is exposed in outcrop –it must be inferred, because the likely position of the fault plane lies where a modern valley intersects the Bay shoreline. My solution was to clearly postulate the fault in the text but simply leave a suggestive gap in the figured cross-section itself where the fault seemed to lie. I continue to believe now, as I did when writing the 1997 paper, that a definitive answer to the fault hypothesis for the Moran Landing/Camp Conoy features will require an explicit test using new analytic methods. It will not emerge if analysis is limited (as the FSAR is) to a reconsideration of existing evidence or a re-analysis of available outcrops, even by neotectonic specialists. Given the clearly erosional and thus irregular elevation of the base of the post-Miocene record, the evidence – pro or con – the extension of this fault up thru the Quaternary will likely remain ambiguous.

I was quite surprised that the FSAR would cite, as an argument against tectonic origin, the failure of workers from previous decades ever having observed these features (p. 2-1118). By that argument, there should be no scientific discoveries. It would disallow the physical reality of the erosional channels in the Plio-Quaternary part of the record – never reported in the literature until my 1997 paper, but which the FSAR authors accept– and would disallow the reality of lateral changes in dip (elevation) evident within the basically tabular Miocene record, which they also seem to accept (p. 2-1117-1118). The coarse stratigraphic resolution and wide spacing of control points (logs, boreholes) of other authors' figures reprinted in the FSAR would not allow detection of any but the largest magnitude offsets, and thus it should not be surprising that features as spatially fine as a fault plane and associated folds would not be detected. The Figures in general are difficult to follow as evidence – none have captions identifying the original source, which is not always clear in the text citation, several key cross-sections seem to be missing, and the numbering system is confused in cross-referencing figures. For example, the map Fig. 2.5-32 indicates the existence of four cross-sections relevant to evaluating the postulated Moran Landing fault. The longest is B-B', which the map key indicates is provided in Figs. 2.5-28, -29 and -30. Fig.2.5-30 is the cross-section from Fig. 2 of my 1997 JSR paper – it is incorrectly positioned on map Fig. 2.5-32 well inland from the cliff-faces where it was actually measured, and has also been modified by coloring and insertion of new location labels, which is not acknowledged. Fig. 2.5-28 is not a cross-section but a lithologic map key, and Fig. 2.5-29 is a map locating seismic reflection lines but does not present the actual (cross-sectional) seismic data (and these data do not seem to be provided in other figures). The cross-section in Fig. 2.5-39, which is labeled as E-E' and has quite dense spatial control, is not positioned on map Fig. 2.5-32 and so I am at a loss to evaluate it – other than pointing out that all of the stratigraphic contacts other than the base of the Upland Deposits are densely covered with ?- marks, indicating poor control on bed elevations. Fig. 2.5-43 presents a cross-section labeled as E-E', with the key sending the reader to map "Fig. 2.5-32 and -33" for its geographic location – but there is no E-E' trend provided on map fig. 2.5-32 and Fig. 2.5-33 is not a map, and so presumably they mean the map in Fig. 2.5-34! The cross-section itself (E-E' in fig. 2.5-43, running SE from CCNPP in Fig. 2.5-34) only extends halfway to Moran Landing, is constructed using only five shallow and widely spaced boreholes, and dashes in all stratigraphic contacts including the base of the Upland Deposits, acknowledging poor stratigraphic as well as spatial control on geologic anatomy. Cross-sections C-C' and D-D' on map Fig. 2.5-32 are presumably those in Figs. 2.5-41 and -42, but I am not sure. If so, based on their positioning in map Figure 2.5-32, they also do not extend sufficiently far south to intersect with the postulated Moran Fault unless the fault plane has a very shallow and northward dip (unlikely). I have not been able to locate the cross-sectional drawing denoted A-A' in map Fig. 2.5-32.

Thus, of the cross-sectional figures presented as evidence, only one (from my 1997 paper) has a map position, length, and spatial and stratigraphic control sufficient to test for faults and associated folds. The FSAR states (p. 2-1118) "Multiple key stratigraphic markers provide evidence for the *absence* of Miocene-Pliocene faulting and folding beneath the site." (my stress). This statement would be difficult to support with the evidence provided. It is instead contradicted by the one cross-section they provide that has the stratigraphic resolution and density of control points required to test for faults and associated folds (the cross-section from my 1997 paper).

Concerning the apparent lack of other published observations on structural warping (p. 2-1118), Gernant (1970, Maryland Geological Survey, Report of Investigations No. 12) also detected the notable change in dip of Miocene strata within the Conoy Cliffs and also attributed it to folding (see Encl 1: Gernant's Figure 4, p.10, included below). This is one published paper missed in the FSAR review, albeit directly relevant. [The one outcrop photograph provided in the FSAR (Fig. 2.5-44) is a highly oblique view of the same Conoy Cliffs, taken from a large distance, that will minimize the viewers ability to appreciate the feature. It concerns me that this might have been the only perspective FSAR authors had, other than perhaps a highly foreshortened view from the narrow beach at the base of the Conoy Cliffs.] Genant and I both recognized the involvement of folding in the creation of the reversed dip of Choptank Formation beds within the Conoy Cliffs, despite the erosional nature of the stratigraphic discontinuity surface(s) that define those beds. (Paleo)erosion is commonly localized in areas of relative uplift (regardless of whether uplift is antecedent/inherited, syn-depositional, or post-depositional). The erosional nature of some of the bed contacts that Gernant and I traced is thus not mutually exclusive with the existence of structural warping as a contributing – or even a primary – control on observed changes in bed elevation, contrary to the implication of the FSAR (e.g.. p. 2-1095, "undulations typically represent erosional features…"). My 1997 paper is explicit that, although some variation in elevation of beds (more precisely, discontinuity surfaces) within the larger Calvert Cliffs are entirely erosional in nature (representing incised channels), changes in elevation near the CCNPP and some others appear to instead be structural warps, at least in part (1997 JSR paper, p. 324). That assessment reflects an explicit rejection of the hypothesis of erosion. In fact the lack of any sedimentary response to the relative (paleo)high on the south side of Moran Landing– St Marys beds do not thin or become coarser over it -- argues that the offset in elevation here is post-depositional (notice the continuity of facies tracts within SM units that can be traced across the postulated fault plane in my 1997 cross-section). The FSAR authors seem to be broadly skeptical of changes in bed elevation as evidence of structural features (e.g., in also rejecting McCartan and others' postulated monoclines, p. 2-1093, -1095, -1116, -1199, etc.) and to be unattuned to using sedimentologic/ stratigraphic evidence for growth faulting and folding. I, too, would not use it as definitive evidence. However, I would expect an explicit testing of faults hypothesized on this basis using more definitive methods (dedicated boreholes, trenches, seismic profiling) before rejecting it, especially when placement of a public facility was an issue.

Re LiDAR evidence :

Figure 2.5-26 (p. 2-1390) provides one new kind of data relevant to the existence of these features. However, the discussion of it in the FSAR is cursory and I disagree with their reading of it. The LiDAR shows several clear linear features of low slope running across the Calvert peninsula in ~NE orientations, including one extending directly SW from Moran Landing (such as might be expected on the up-thrown side of a fault plane or its propagated fold). That low-slope lineament coincides with a linear topographc high, visible in conventional topographic maps. Moreover, even more so than on topographic maps, the LiDAR highlights the many suspiciously long linear segments of streams in three oriented sets (NE as the postulated fault, NW perpendicular to the postulated fault, and oblique; see below, Encl 2a and 2b, Sevilla's exhibit 4 from PSC 9218-Kidwell testimony). All of these features deserve a critical quantitative analysis by a tectonic geomorphologist, given the notably non-dendritic appearance of drainage locally and regionally.

Recommendation:

I would be the first to state that the stratigraphic anatomy of the outcropping MD Miocene is subtle and complex, as one might expect in such a thin record (only ~10 meters of sedimentary record per million years) – that is in fact the primary message of my 1997 JSR paper. All three Miocene formations (Calvert, Choptank, and St. Marys) include several erosional disconformities, regional dips are very low, and the unlithified nature of the sediments makes them poor candidates for capturing the kinds of ancillary structural evidence (like joints) that is usually available to evaluate tectonic deformation. In addition, the overlying Pliocene and Quaternary strata – whose deformation is critical to testing recent movement – are difficult-to-date gravels and sands arranged in intersecting channel forms, making folding and faulting especially difficult to detect. This is all the more reason that the "hard look" required by the NRC would seem in this case to require new dedicated analyses to test explicitly for the postulated structural features rather than rely on the patchwork of existing evidence. New analyses would include dedicated boreholes or trenches aimed to penetrate the postulated fault plane (vertical boreholes directly over the plane or slant boreholes, rather than vertical boreholes at some distance) and high-resolution seismic reflection profiles of nearby deposits of undoubted Quaternary age that would have been originally flat-lying (e.g., muds within the modern Chesapeake Bay). There is no evidence in the FSAR Rev. 6 that Lettis Associates or others have performed any of this new scientific work on the postulated Moran Landing fault.

For the record, I offer these opinions only as an interested citizen with past scientific experience in the Calvert Cliffs region. I have no current scientific interest in Maryland geology other than as an area of occasional student fieldtrips, and would decline any offer of becoming involved in new analyses because my scientific interests now lie elsewhere. New analyses also require a different set of skills and equipment.

All the best,

Susan M. Kidwell

William Rainey Harper Professor
Department of Geophysical Sciences
University of Chicago

(Enclosures)

Encl 1 – Gernant's Fig 4, page 10 of 1970 Maryland Geological Survey, Report of Investigations No. 12:

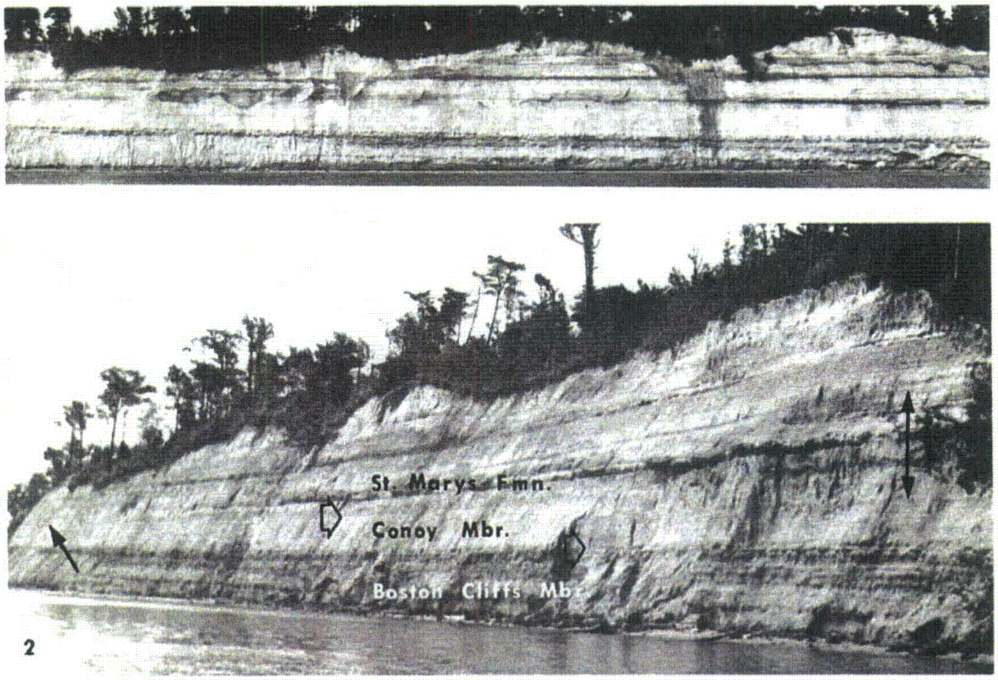


Figure 4: (Different perspectives of same cliff section.) Calvert Cliffs at Camp Conoy Y. M. C. A. Good view of unconformable relationships around Choptank-St. Marys boundary. Type area for Conoy Member. Double-headed arrow on right of lower photo shows thickness of St. Marys at north end of Conoy Cliff not present at south end of Conoy Cliff. Single-headed arrow at left marks Choptank-St. Marys unconformity.

Close examination of the formational contact at locality 67-71 (fig. 5) reveals this to be a surface of erosion. The upper Choptank member is abnormally thin, being only a little over 4 feet thick. Within 500 feet southeast this unit is 8 to 9 feet thick, as can be seen in figure 6. Figure 5 shows the broadly but deeply undulating formation boundary. It also shows the "basal sand" of the St. Marys filling lows in this undulating surface.

STRATIGRAPHIC NOMENCLATURE

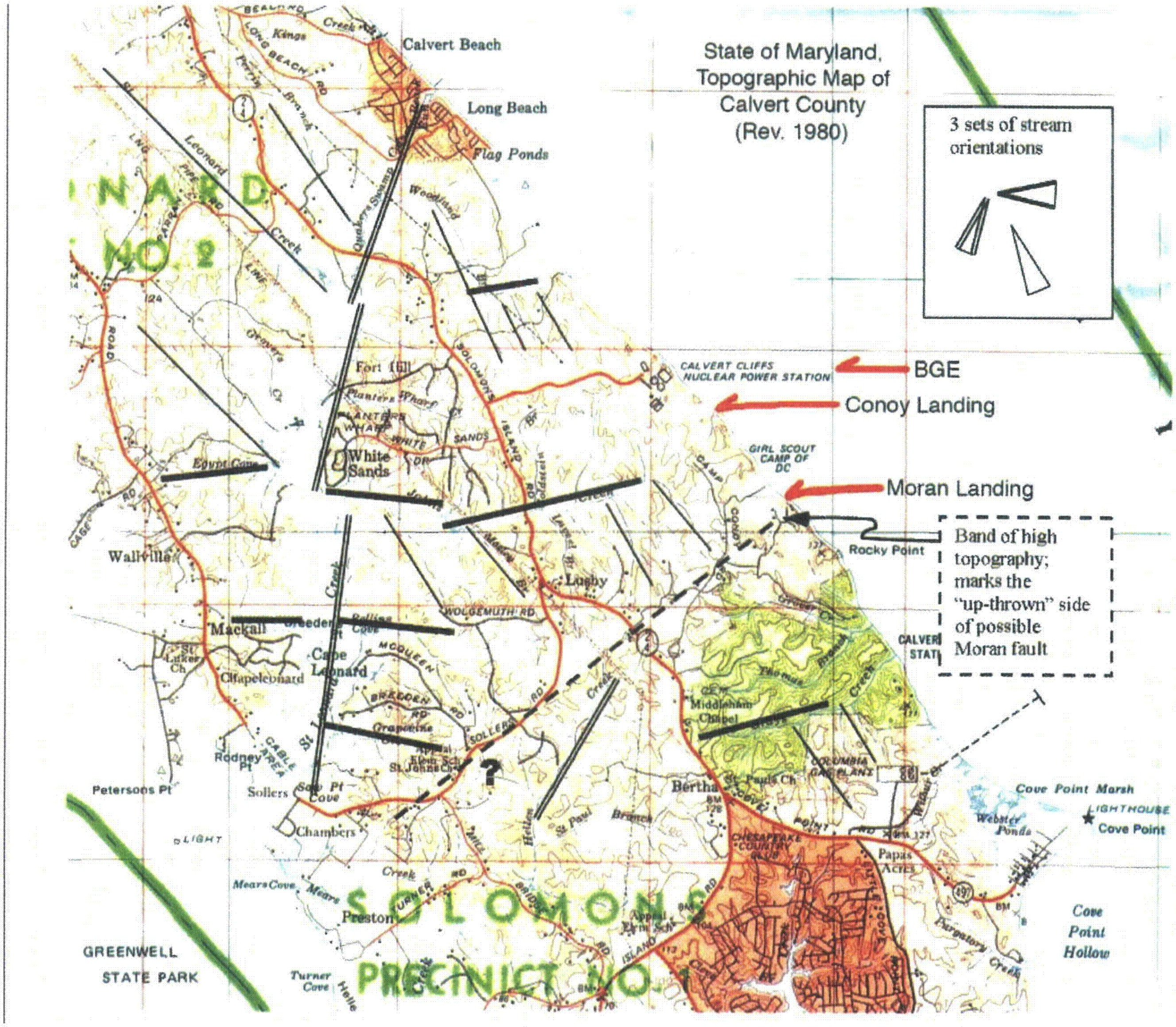
Within the Chesapeake Group of Maryland, Shattuck (1904, pp. *lxix-lxxxvi*) recognized and delineated 24 sub-divisions or "zones". The Choptank consists of "zones 16" through "zone 20". Each "zone" was defined on the basis of lithologic characteristics and the relative quantity of fossil shells, not by the occurrence of particular species. As such, each "zone" is a rock stratigraphic unit (Krumbein & Sloss, 1963, p. 625).

The five subdivisions of the Choptank as recognized by Shattuck are redefined, named, and given type sections in the discussion below.

SUBDIVISIONS OF THE CHOPTANK FORMATION

Calvert Beach Member.—This member corresponds to "zone 16" of Shattuck and lies at the base of the Choptank (fig. 6). The type section, here designated, is the low bluff in the Calvert Cliffs at Calvert Beach, Maryland ((fig. 7,8) ; also see locality 67-65 in Appendix I for detailed description of the type section). The sediments vary from dusky green to dusky blue, rarely yellowish-brown to dark brown, very muddy to slightly muddy, fine sand to very fine sand. The nature of the lower contact is not clear (see previous discussion) but can be described as subtle (fig. 2,3). The location of the upper contact is difficult to fix because of its gradational character. Inasmuch as the overlying bed is defined in part as a major shell bed, the contact has been placed at the base of the first major influx of shells (fig. 2). Sedimentary structures included in this member are small scour and fill structures (fig. 3), burrows (fig. 7,8), sand stringers and lenses (fig. 2), localized low-angle planar cross laminations, and irregular bedding laminations. In general, macro-

Encl 2a – Sevilla Exhibit # 4, PSC CPCN Case No. 9218 testimony – Kidwell:



Encl 2b – Sevilla Exhibit # 4, PSC CPCN Case No. 9218 testimony – Kidwell:

Using an existing topographic map of Calvert County, MD:

1. Many streams have suspiciously long straight stretches and make approximately right-angled turns, which is typical of terrains where there is an underlying structural (tectonic) control on drainage.
2. This contrasts with the "dendritic" (root-like) pattern that typifies terrains lacking any structural control on the weakness of the underlying rocks.

3. Tenured and experienced geologists Dr. Susan Kidwell, Dr. Peter Vogt, and Dr. Curt Larsen concur that in this part of Calvert County there is
   a. a set of stream segments with a basically East-West orientation (indicated by bold solid lines on map; for example, Johns Creek, which heads east toward the southern end of CCNPP property),
   b. a second set of stream segments having a South-Southwest orientation (doubled-lines; for example, St Leonard Creek and its overland extension to Long Beach), and
   c. a third set of mostly minor streams having a South-Southeast orientation (many fine solid lines).
4. The "overlaid stream line segments" on the topographical map have been positioned slightly east or north of the relevant stream so as not to obscure the trace of the stream on the map or the labels providing the stream names.
5. The bold dashed line on the map, running Northeast - Southwest, marks a band of topographically high land that extends from the Calvert Cliffs over to the Patuxent River:
   a. It begins under the Moran property and
   b. coincides with Sollers Road for a considerable stretch and in the direction of the mouth of Mears Cove on the Patuxent River.
   c. This dashed line does not mark the trace of the postulated Moran Fault, but rather the topographic high running land along the edge of the "up-thrown" block. The fault line would be located on the <u>north side</u> of this dashed line within the order of a quarter mile.
6. The location of the CCNPP Unit 3 Cooling Tower, when measured relative to the dashed line is about a half mile northwest of the dashed line; even lying closer to the postulated Moran Landing Fault (less than a half mile).
7. (**Sevilla Exhibit 7**) Dr. Robert Gernant, in the 1970 publication of the Maryland Geological survey, "Report of Investigations No, 12", page 10, Figure 4, published his picture of Calvert Cliffs at "Camp Conoy, YMCA" because he noticed the unusual tilt of the beds in that area of Calvert Cliffs. Dr Gernant's picture is the north cliff view of the same area labeled by Dr. Kidwell in her 1997 JSR study, page 324, Figure 2, as "Conoy Landing"(**Sevilla Exhibits 5 and 6**).
8. Dr. Gernant's publication in 1970 led Dr. Kidwell to examine very carefully Calvert Cliffs especially at the Conoy Landing area, because of the unusual tilt of the beds downwards towards the north. This tilt contrasts the usual tilt of beds downwards towards the south. The significance of this unusual northward tilt is that the beds have been arched slightly by deformation. Such "folding" of the beds is commonly associated with faults.
9. There are thus 3 kinds of evidence suggesting a plausible fault: a) contrast in elevation of beds between north and south sides of "Moran Landing" (underscored in Dr. Vogt's mark-up of Dr. Kidwell's 1997 Fig. 2; b) arching of beds at Conoy Cliff, as diagramed in Kidwell's Figure 2 and as evident in part of Dr. Gernant's Figure 4 in 1970; and c) unpublished 2010 observation by Drs. Kidwell and Vogt of the topographic features as suggested by the line of topographically high land and orientation of the streams as corroborated in part by Dr. Larsen (page 1 this Sevilla Exhibit 4).

Francis, Woody NAB02

From: J Sevilla [qmakeda@chesapeake.net]
Sent: Friday, July 09, 2010 4:31 PM
To: CalvertCliffsCOLAEIS@nrc.gov; Quinn, Laura; Francis, Woody NAB02; james.steckel@nrc.gov; Surinder.Arora@nrc.gov
Cc: Peter Saar; Peter Vogt; Michael Mariotte; Allison Fisher; Paul Gunter; Bruce Gordon; Chris Bush; William Johnston; fabiada@yahoo.com; Timothy Flaherty
Subject: June Sevilla submission to DEIS (DRAFT NUREG 1936) and FSAR - #2 of 3 emails
Attachments: Sevilla Submission to CC3 DEIS-FSAR-Q&A - Dr S Kidwell-April 19-2010.pdf; Sevilla-Exhibit 7a-Gernant1970-CoverPage.pdf; Sevilla Exhibit 6-Kidwell 1997 JSR-Moran fig 2 vogt and fig 4.jpg; Sevilla Exhibit 3-Bio Kidwell_ Susan PhD- April2010.pdf; Sevilla Exhibit 9-PVogt CV and Recommendation for Moran Fault testing CC3.pdf; Sevilla-Exhibit 1- Google Earth-Moran to CCNPP SK 4-16.pdf; Sevilla-Exhibit 2- CC3 site map with markers relating to Google Earth image.jpg; Sevilla Exhibit 8-Powars 2010 GSA abstract.pdf

Importance: High

TO: NRC - NUREG 1936 DEIS Staff Reviewers
NRC - FSAR Staff
NRC- Geological and Geotechnical Staff
US Army Corps of Engineers - Woody Francis
Laura Quinn - NRC
James Steckel - NRC

From: June Sevilla in behalf of self and Southern Maryland CARES

This is the 2nd of 3 emails submitted for consideration and ACTION, both on the DEIS and FSAR components of CCNPP Unit 3's application with NRC and USACE. This attachment is the Q&A conducted between June Sevilla and Dr. Susan Kidwell at the PSC 9218 Evidentiary Hearing, April 19, 2010. Also attached are the Exhibits referred to in the Q&A. This Q&A should be used in conjunction with Dr. Susan Kidwell's scientific analysis of CCNPP Unit 3's FSAR Rev 6, in form of letter to me, June Sevilla, submitted in the 1st email.

Dr. Kidwell's scientific review and analysis of the geological conditions at CCNPP as reflected in this Q&A and in her analysis of CC3 FSAR Rev 6, impacts decisions made in the DEIS because the conclusions drawn by NRC Staff and the US Army Corps of Engineers were based on geologic and geotechnical information which have been misrepresented by the Applicant in their FSAR, which also contains errors and omissions that affect not only the FSAR, but the DEIS likewise.

Please forward this information to all other NRC staff and US gov't agencies reviewing the DEIS and FSAR.

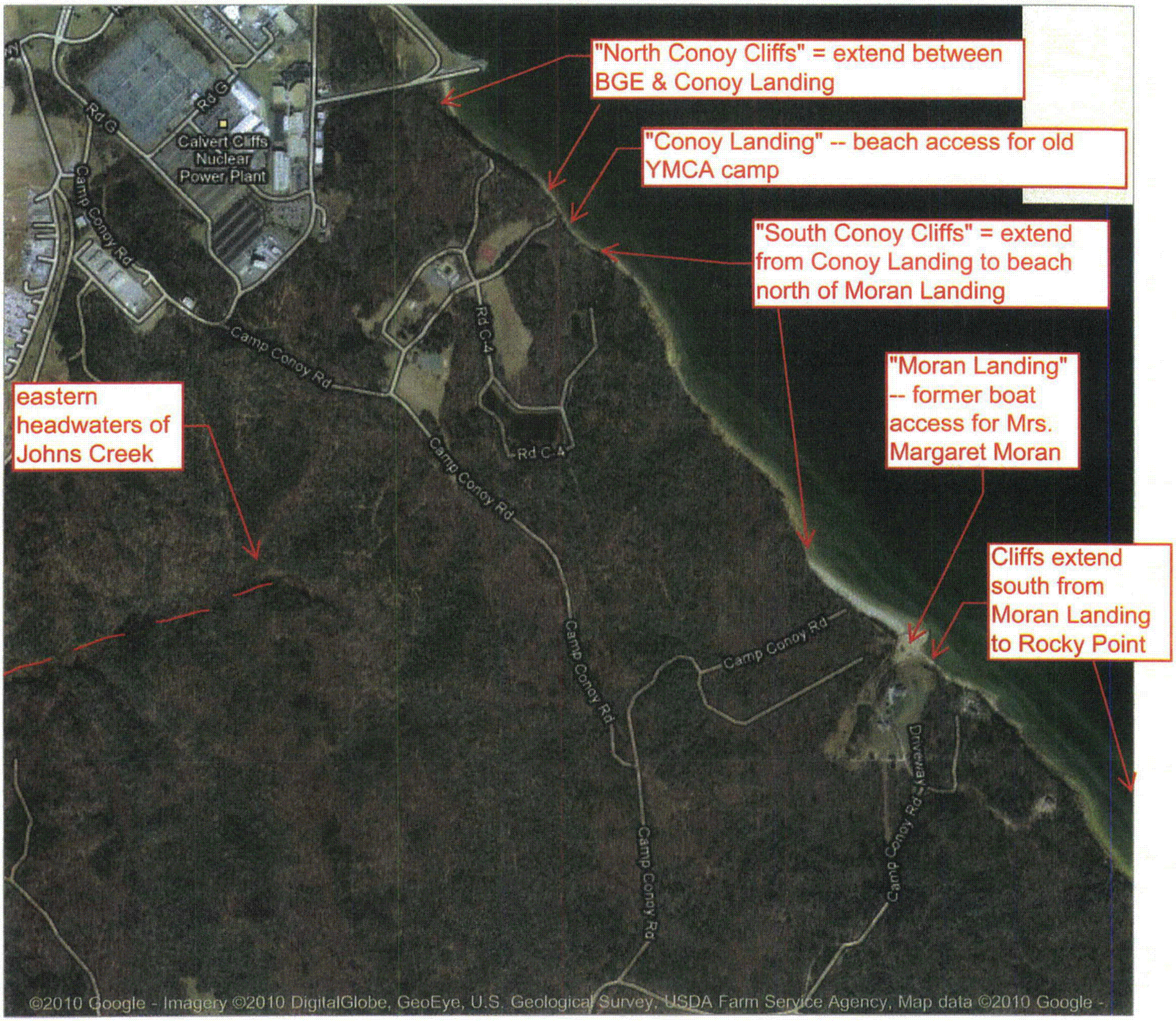
Thank you,

June Sevilla
301-351-3161
P.O. Box 354
Solomons, MD 20688

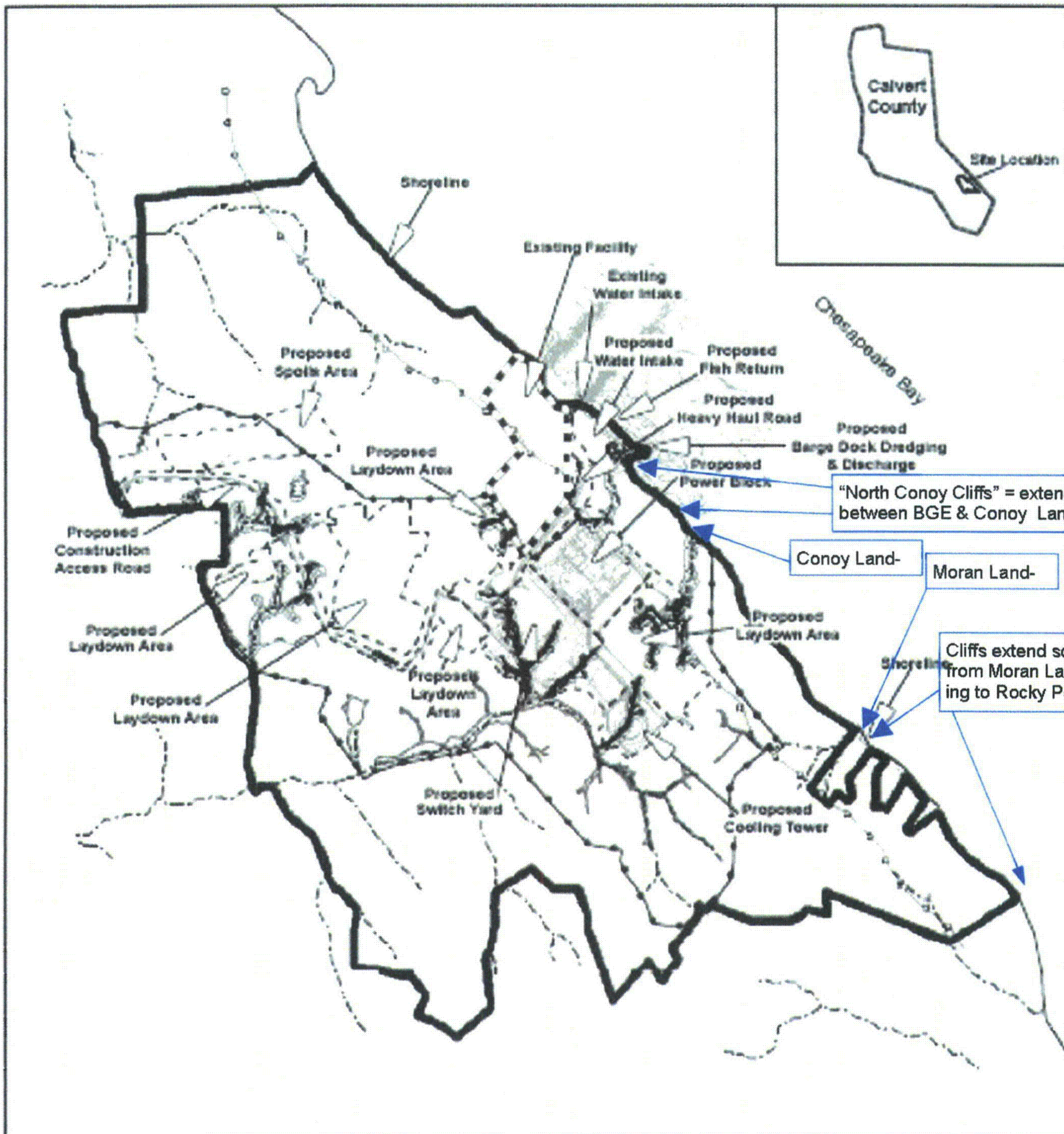
Google maps Address

To see all the details that are visible on the screen,use the "Print" link next to the map.

Get Directions My Maps Print Send Link



April 19, 2010 **PSC 9218** **Sevilla Exhibit 2**



PURPOSE: PLANT EXPANSION DATUM: (NGVD 29) PROJECT LATITUDE/LONGITUDE: 38.424133 -76.441598 N	CONCEPT SITE PLAN SCALE IN FEET 0 2,000 4,000 Feet	CALVERT CLIFFS NUCLEAR POWER PLANT IN: PATUXENT / WEST CHESAPEAKE BAY COUNTY OF: CALVERT STATE: MD APPLICATION BY: CALVERT CLIFFS 3 NUCLEAR PROJECT, LLC AND UNISTAR NUCLEAR OPERATING SERVICES LLC DATE: 5/09/08 REV1 7/14/08

BIOGRAPHICAL SKETCH: SUSAN M. KIDWELL, PHD — APRIL 2010

Degrees

College of William & Mary	Geology	B.S. 1976 Highest Honors
Yale University	Geology & Geophysics	M.S. 1978, Ph.D. 1982

Appointments

William Rainey Harper Professor (2003-present), Professor (1994), Associate Professor (with tenure; 1988), Assistant Professor (1985), Department of the Geophysical Sciences, Committee on Evolutionary Biology, and the College, University of Chicago

Assistant Professor (1981-1985), Adjunct Asst Prof (1985-87), Dept. Geosciences, University of Arizona

Distinctions

2004 Fellow Paleontological Society, 2003 appointed William Rainey Harper Professor (Univ Chicago), 2002 elected fellow American Academy of Arts & Sciences, 2000 Edward Allday Lectureship Univ Texas, 1999 Quantrell Prize for Excellence in Undergraduate Teaching, 1996 Schuchert Award of Paleontological Society, 1994-1996 Distinguished Speaker Paleontological Society, 1986-1991 NSF Presidential Young Investigator; Keynote lectures 1992 Geologische Verinigung "Sealevel Change" (Stuttgart), 2001 Internatl Conf Paleobiogeography & Paleoecology (Piacenza), 2001 International Assoc Sedimentologists (Davos), 2002 Internl Conference on Taphonomy (Valencia); 2001 *Discover Magazine* Science Story of the Year for Jackson et al. "Historical overfishing and the Recent collapse of coastal ecosystems"

Publications with geological details on Calvert Cliffs (of more than 70 total peer-reviewed pubs)

Kidwell, S.M., 1982. Stratigraphy, Invertebrate Taphonomy and Depositional History of the Miocene Calvert and Choptank Formations, Atlantic Coastal Plain, 514 p. PhD Dissertation, Yale University, Dept. Geology & Geophysics.

Kidwell, S.M., 1984. Outcrop features and origin of basin margin unconformities in the lower Chesapeake Group (Miocene), Atlantic Coastal Plain. In J.S. Schlee, ed., Interregional Unconformities and Hydrocarbon Accumulation. American Association of Petroleum Geologists Memoir 36:37-56.

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Other papers using data or insights from the Calvert Cliffs:

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Kidwell, S.M., and T. Aigner, 1985. Sedimentary dynamics of complex shell beds: Implications for ecologic and evolutionary patterns. In U. Bayer and A. Seilacher, eds., Sedimentary and Evolutionary Cycles. Berlin: Springer-Verlag, 382-395.

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Kidwell, S.M., and P.J. Brenchley, 1996. Evolution of the fossil record: thickness trends in marine skeletal accumulations and their implications. In Evolutionary Paleobiology: Essays in Honor of James W. Valentine (D. Jablonski, D.H.Erwin, and J.H. Lipps, eds.), Univ. Chicago Press, p. 290-336.

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Some Examples of other work

Kidwell, S.M., 2001. Preservation of species abundance in marine death assemblages. Science 294: 1091-1094.

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Lötze, H.K., H.S. Lenihan, B.J. Bourque, R. Bradbury, R.G. Cooke, M. Kay, S.M. Kidwell, M.X. Kirby, C.H. Peterson, J.B.C. Jackson, 2006. Depletion, degradation, and recovery potential of estuaries and coastal seas worldwide. Science 312: 1806-1809.

Kidwell, S.M., 2007. Discordance between living and death assemblages as evidence for anthropogenic ecological change. Proceedings of the National Academy of Science USA 104(45): 17701-17706. [Commentary by J.P. Smol, 2007. Marine sediments tell it like it was. PNAS USA104: 17563-64]

Kidwell, S.M., 2009. Evaluating human modifiation of shallow marine ecosystems: mismatch in composition of molluscan living and time-averaged death assemblages, p. 113-139. In G.P. Dietl and K.W. Flessa, eds., Conservation Paleobiology: Using the Past to Manage for the Future. Paleontological Society Papers Vol. 15.

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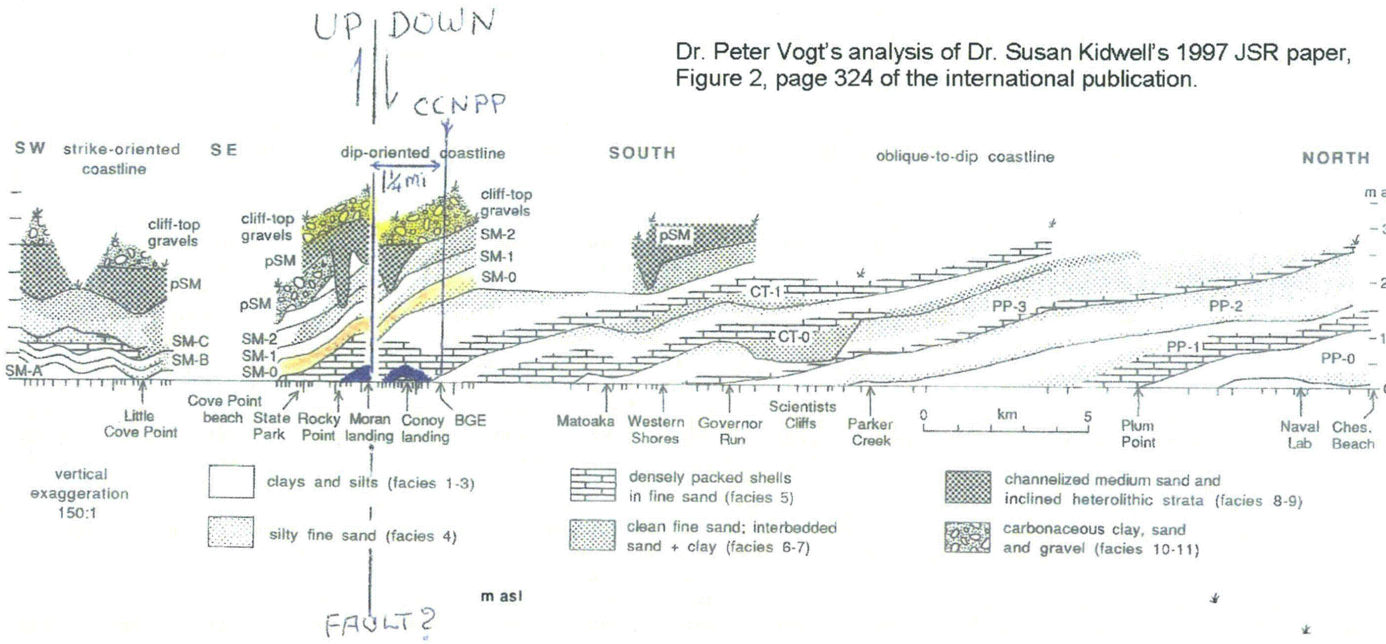
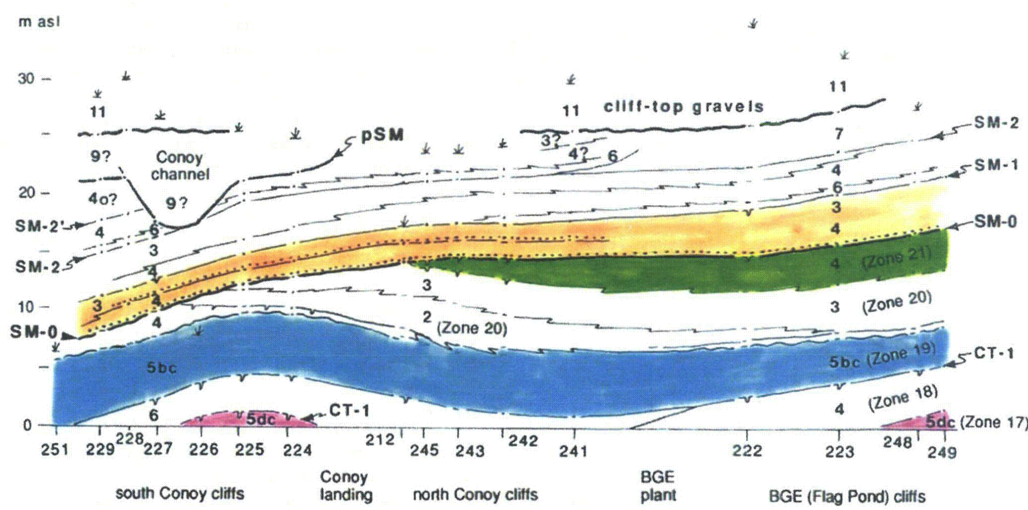
April 19, 2010 **PSC 9218** **Sevilla EXHIBIT 6**

Dr. Peter Vogt's analysis of Dr. Susan Kidwell's 1997 JSR paper, Figure 2, page 324 of the international publication.



Figures 2 and 4, from Dr. Susan Kidwell's 1997 JSR (Journal of Sedimentary Research) internationally published paper titled:

"Anatomy of Extremely Thin Marine Sequences Landward Of A Passive-Margin Hinge Zone: Neogene Calvert Cliffs Succession, Maryland, USA"



MARYLAND GEOLOGICAL SURVEY

Kenneth N. Weaver, Director

REPORT OF INVESTIGATIONS NO. 12

PALEOECOLOGY OF THE CHOPTANK FORMATION (MIOCENE) OF MARYLAND AND VIRGINIA

by

Robert E. Gernant

1970

Below is an abstract of a technical presentation at the symposium of the Geological Society of America, by professional geologists who have done work in the Mid Atlantic Coastal Plain.

The evidence of geological faults in the Potomac River Valley and Central Chesapeake Bay Region underscores that faults are known in the region and are under active investigation. This is a topic of ongoing research among professional geologists.

Recent published discussions of definite or probable faulting in the region:

Dedicated symposium at the March 2010 meeting of the Geological Society of America in Baltimore (published in Geological Society of America Abstracts with Programs, Vol. 42, No. 1):
T3. Tectonic Significance of Buried Terranes of the Atlantic and Gulf Coastal Plains

Talks included:
EVIDENCE FOR BASEMENT-ROOTED COASTAL PLAIN FAULTS IN THE POTOMAC RIVER VALLEY AND CENTRAL CHESAPEAKE BAY REGION

By POWARS, David S.1, HORTON, J. Wright Jr1, HARRISON, R.W.2, SCHINDLER, J. Stephen2, and NEWELL, Wayne L.3, (1) U.S. Geological Survey, MS926A National Center, Reston, VA 20192, dpowars@visuallink.com, (2) U.S. Geological Survey, MS926A National Center, Reston, VA 20192, (3) U. S. Geological Survey, MS926A National Center, Reston, VA 20192

Marine and land-based seismic, core, and borehole data along the Atlantic Coastal Plain of the Potomac River Valley and central Chesapeake Bay reveal numerous faults that vertically offset the top of crystalline basement by 6 to 80 m, and most of these faults offset the overlying coastal-plain sediments from ~1 to 30 m. Many Cretaceous and Cenozoic high-angle reverse faults, normal faults, and folds are rooted in early Mesozoic and Paleozoic NE-trending fault zones that underlie this part of the coastal plain and produce horst and graben structures that coincide with interpreted basement structures and terrane boundaries. Many faults dip NW, a few strike NW, and some dip SE. The Stafford fault system (SFS) is a series of en echelon, NW dipping, high-angle reverse faults having vertical offsets up to 61 m, a subsidiary dextral component, and right-oblique as well as down-dip striations. The western part of the SFS coincides with the Spotsylvania high-strain zone, that separates the Chopawamsic and Goochland terranes, and locally coincides with the Fall Zone. A map of top of the crystalline basement suggests a ~30 km northward extension of the Stafford fault system (SFS) into Washington, D.C. and similar maps of the Tertiary suggest several faults are between the SFS and the Brandywine fault zone (BFZ), a closely spaced series of NW and SE dipping, high-angle reverse and normal faults. The BFZ coincides with the western boundary fault of the Taylorsville Triassic basin and the eastern margin of the Goochland terrane. Marine seismic data along the Potomac River and across the Chesapeake Bay reveal faults with similar styles and displacements from the SFS eastward to mouth of the Potomac River. Beneath Chesapeake Bay, the faults appear to be less abundant and have smaller vertical displacements across a gravity low interpreted as a granite pluton. Another concentration of faults coincides with the Sussex terrane boundaries. Recurrent Cretaceous and Tertiary fault movements in the coastal plain are evident from upward-decreasing offsets (top of basement up to 80 m, top of Paleocene up to 30 m). The latest movements produced small offsets (1-7 m) of Pliocene and Pleistocene terrace deposits, affected the distribution and preservation of stratigraphic units, and have modern geomorphic surficial expression.

Note: Dr. Vogt attended this symposium and spoke with Dave Powers and suggested he be asked to be involved in evaluating the postulates Moran Landing Fault feature. Dave Powars sounded interested and ready to do so!

Excerpt from Vogt PSC 9127 Appeal draft 31 May 09
Recommendation by Dr. Vogt for verifying the postulated Moran Landing Fault
is concurred by Dr. Susan Kidwell

SUMMARY OF APPEAL: The appellant notes that PSC CCNPP report and all previous reports/studies, dealing with possible risks to CCNPP, especially the proposed third reactor, have failed to note the probable presence of a potentially active earthquake fault which intersects the Calvert Cliffs 1 ¼ mile south of CCNPP, and is likely to pass closer to CCNPP. This is the only such structure known along the entire Calvert Cliffs. Appellant strongly recommends delaying any permit until geological mapping by experts demonstrates said fault is real (not mapping errors), and if so demonstrated, that boreholes with sediment cores be taken on land, and seismic chirp profiling conducted offshore, to determine the strike (map trend) and dip (incline) of the fault, and its history of activity.

BACKGROUND FOR APPEAL: Among the risks that have to be evaluated at proposed and present sites of nuclear power plants are the risks from shaking from earthquakes. Most earthquakes are caused by failure (rupture) of the earth's crust or upper mantle along faults; occasionally they are associated with volcanic eruptions and very rarely, including the very greatest, by comet or asteroid impacts. Even though the reactor containment structure may be engineered to withstand a major earthquake, coolant pipes with small defects (e.g. bad welds) may break, or alarm systems triggered, and in areas such as Calvert Cliffs where earthquakes are rare, power plant employees fooled into an inappropriate response.

RECOMMENDATION: Given the possibility, or even probability, that a significant neotectonic structure ,"Moran's Landing Fault?"—a post-Miocene and potentially active earthquake-generating fault that offsets the strata exposed in the Calvert Cliffs such that the land on the south side has moved up relative to the north side- passes within 1 ¼ mile or less of the Calvert Cliffs Nuclear Power Plant, and that past CCNPP risk assessments—including the 2009 preliminary PSC report-- have failed to take this potentially seismically active (with high-frequency accelerations due to fault proximity) structure into account, this appeal recommends the following:

1) **No permit should be issued by PSC until detailed geological mapping, by experts, of the cliff exposures for at least several hundred meters on either side of the Moran's Landing area can discriminate with certainty between the "neotectonic fault" interpretation (considered more likely) and the "mapping errors" interpretation (considered less likely).** If (but only if) mapping errors are demonstrated, this appeal is groundless.

2) **In the event the Moran's Landing Fault (MLF?) is demonstrated to be real, no permit should be issued before a A) series of shallow (several hundred meters depth) boreholes have been placed, with core recovery and analysis, to determine the strike (trend) and dip (incline) of the fault, and of its offset history (when it was active, with an estimate of how often on average a fault offset occurred); and B) as a minimum a seismic 'chirp' profiler grid survey (similar to those conducted further north; see Vogt et al., 2000ab) be conducted in the Chesapeake Bay in the area where the putative MLF? would extend in the subbottom**. The chirp profiler could reveal evidence (or lack thereof) for offset of young sediment strata. The nearshore (with a mile or so of the cliffs) unconsolidated sediments range in age from a few thousand years (at most, a mile out) to zero (at the beach and in the shallow subbottom), so any offset of such strata along a fault would increase the odds of a new rupture in the future. It would also be helpful to **deploy a small array of seismometers for several months to detect any local, low-magnitude activity, below the threshold felt by humans or detected by regional networks.**

Excerpt from Vogt PSC 9127 Appeal draft 31 May 09
Recommendation by Dr. Vogt for verifying the postulated Moran Landing Fault
is concurred by Dr. Susan Kidwell

APPPENDIX : CREDENTIALS OF APPELLANT AND DISCLAIMERS, and GEOLOGICAL REFERENCES: The following is an abbreviated Curriculum Vitae, with selected publications. Disclaimer: The appellant is speaking as a geoscientist and long-time (40 year) Calvert County resident for himself only, and in no way on behalf of any institution or employer with whom he is or has been associated. While a geophysicist by profession, the appellant does not claim specialized expertise in the fields of earthquake seismology nor in engineering applications of such knowledge. While the appellant is familiar with the geology of the Calvert Cliffs, he defers to Prof. Susan Kidwell, University of Chicago, as the geologist most knowledgeable in this field, having herself mapped the geology exposed in the Calvert Cliffs. The primary basis for this appeal is the apparent break in continuity (suggesting an earthquake fault) mapped by Prof. Kidwell (Kidwell, 1997) at just one locality along the entire cliffs: the site she labels as Moran's Landing, about 1 ¼ miles south of the BG&E/Constellation CEG nuclear power plant and proposed site of third reactor. Publications cited in this appeal are prefaced by an asterisk (*).

1) Curriculum Vitae and selected publications by appellant

Home Address:
3555 Alder Rd.
Port Republic, MD 20676

Phone: 410-586-0067
EMAIL: ptr_vogt@yahoo.com

Education:

PhD (Oceanography) Univ. of Wisconsin, Madison	1968
MA (Oceanography) Univ. of Wisconsin, Madison	1965
BS (Science; Geophysics; "With Honor"), Caltech	1961

Von Karman Scholarship 1957-61
US Fulbright Scholarship, Univ. Innsbruck, Austria (Glaciology) 1962-63

Professional Positions:

Currently (2009): Research Associate, Smithsonian Institution; Adjunct Professor, Horn Point Environmental Laboratory ; Professional Researcher, Marine Science Inst., Univ. California at Santa Barbara

Marine Geophysicist, US Naval Oceanographic Office	- 1967-1975
Marine Geophysicist, Naval Research Laboratory	- 1976-2004
Sabbatical, Univ. Oslo, Norway	- 1978-1979

Professional Awards:
Within Navy:
Henry Kaminski Award, Research Society of America, 1971
(US Naval Oceanographic Office)
Alan Berman Research Publication Award, 1980, 1986, 1995
(Naval Research Laboratory)

Excerpt from Vogt PSC 9127 Appeal draft 31 May 09
Recommendation by Dr. Vogt for verifying the postulated Moran Landing Fault
is concurred by Dr. Susan Kidwell

Academia:
Fellow, Geological Society of America, 1973
Honorary Doctorate, Univ. Bergen, Norway, 2000
Foreign Member, Norwegian Academy of Science and Letters, 2000
Distinguished Alumni Award, Univ. of Wisconsin, 2003

Publications: over 150 authored or coauthored, and peer-reviewed professional publications, starting 1965. Those excerpted below demonstrate appellant's geoscience research publication history in the Chesapeake Bay, the western North Atlantic Ocean, global synthesis including seismicity, and geology of Calvert County, including the Calvert Cliffs.

Estuarine Processes & Gassy sediments: Chesapeake Bay

Hagen, R.A. and **Vogt, P.R.,** 1999, Seasonal variability of shallow biogenic gas in Chesapeake Bay, Mar. Geol., 158, 75-88.

***Vogt, P.R.**, Halka, J.P., Hagen, R.A. and Cronin, T., 2000, Geophysical environment in Chesapeake Bay: *Marion-Dufresne* Sites MD99-2205, 2206 and 2208, in Cronin, T., ed., Initial Report on IMAGES V Cruise of the *Marion-Dufresne* to the Chesapeake Bay June 20-22, 1999, USGS Open File Report 00-306, p.18-31.

***Vogt, P.R.,** Czarnecki, M. and Halka, J.P., 2000, *Marion-Dufresne* Coring in Chesapeake Bay: Geophysical Environments at Sites MD99-2204 and 2207, in: Cronin, T., ed., Initial Report on IMAGES V Cruise of the *Marion-Dufresne* to the Chesapeake Bay June 20-22, 1999, USGS Open File Report 00-306, p. 32-39.

Halka, J.P.,**Vogt, P.R.,** Colman, S.M. and Cronin, T.M., 2000, Geophysical Environment: Site MD99-2209, in: Cronin, T., ed., Initial Report on IMAGES V Cruise of the *Marion-Dufresne* to the Chesapeake Bay, June 20-22, 1999, USGS Open File Report 00-306, p. 40-48.

Colman, S.M., Baucom, P.C., Bratton, J.F., Cronin, T.M., McGeehin, J.P., Willard, D., Zimmerman, A.R. and **Vogt, P.R.,** 2002, Radiocarbon dating, chronologic framework, and changes in accumulation rates of Holocene estuarine sediments from Chesapeake Bay, Quat. Res., 57, 58-70.

Shah, A.J., Brozena, J., **Vogt, P.**, Daniels, D., and Plescia, J., 2005, New surveys of the Chesapeake Bay impact structure suggest melt pockets and target-structure effect, Geology, 33, 417-420, doi:10.1130/G21213.1

Cronin, T.M., **Vogt, P.R**., Willard, D.A., Thunell, R., Halka, J., Berke, M., and Pohlman, J., 2007, Rapid sea level rise and ice sheet response to 8,200-year climate event, Geophys. Res. Lett., L20603, doi:10.1029/2007GL031318

Synthesis and Review

Vogt, P.R. and Tucholke, B.E., eds., 1986, The Western North Atlantic Region, v. M of The Geology of North America, Geol. Soc. Amer., Boulder.

Vogt, P.R. and Tucholke, B.E., 1989, North Atlantic Ocean Basin; Aspects of geologic structure and evolution: An overview, in Palmer, A. et al., eds., v. A. of The Geology of North America, p.53-80.

Excerpt from Vogt PSC 9127 Appeal draft 31 May 09
Recommendation by Dr. Vogt for verifying the postulated Moran Landing Fault
is concurred by Dr. Susan Kidwell

Regional and Global Charts:

Simkin, T., Unger, J.,Tilling, R.I., **Vogt, P.R.** and Spall, H., 1994, This Dynamic Planet—World map and interpretations of volcanoes, earthquakes, plate tectonics and bolide impact craters, Second Edition, US Geological Survey (Chart).

*Simkin, T., Tilling, R.I., **Vogt, P.R.,** Kirby, S., Kimberly, P. and Stewart, D., 2006, This Dynamic Planet, Third Edition (chart and website), US Geological Survey Geologic Investigations Series, Map I-2800

Local (Southern Maryland) geology:

***Vogt, P.R.** and Eshelman, R., 1987, Maryland's Cliffs of Calvert: A fossiliferous record of Mid-Miocene inner shelf and coastal environments, in: Roy, D.C., ed., Geological Society of America Centennial Field Guide-Northeastern Section, v.5, Geol. Soc. Amer., p.9-14.

***Vogt, P.R.,** 1991, Estuarine stream piracy: Calvert County, US Atlantic Coastal Plain, Geology, 19, 41-44.

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2) OTHER PUBLICATIONS RELATED TO THIS APPEAL:

*Kidwell, S.M., 1997, Anatomy of extremely thin marine sequences landward of a passive-margin hinge zone; Neogene Calvert Cliffs succession, Maryland, USA, Jour. Sedimentary Research, 67(2), 322-340.

*Zoback, M.L., Nishenko, S.P., Richardson, R.M., Hasegawa, H.S., and Zoback, M.D., 1986, Mid-plate stress, deformation, and seismicity, in **Vogt, P.R**. and Tucholke, B.E., The Western North Atlantic Region, v. M in The Geology of North America, Geol. Soc. Amer., Boulder, p.297-312.

4/19/10 - Dr. Susan Kidwell, Expert ORAL Testimony, PSC 9218 EVIDENTIARY HEARING

Questions were asked by June Sevilla of Dr. Susan Kidwell as expert witness. Note that this testimony is a condensed version and more focused on the Moran Landing Fault Line that is suspected to traverse CCNPP property on the south side starting at Moran Landing and heading west, towards Mears Cove, crossing Route 4 and aligning with Sollers Road.

The CC3 power block and USEPR reactor is within a mile of this suspected fault line. The CCNPP Unit 3 CWS Cooling Tower, a massive concrete structure, 177 ft tall and diameter of 528 ft, is to be located less than half a mile from the suspected Moran Landing Fault line. Three independent lines of scientific evidence point to the viability of the earthquake fault on CCNPP property, but were totally ignored by the CC3 FSAR. Based on Dr. Kidwell's review of the CC3 FSAR Rev 6, there are glaring errors and inconsistencies in the FSAR. It appears also that there is a cover-up of the scientific evidence in the FSAR, which has far reaching effects that would negatively affect conclusions made on the DEIS, on public safety, on public water supply, and on the reliability of CC3 as a source of electrical power to the grid.

Three separate scientific evidence specific to Calvert Cliffs and CCNPP property were ignored in the DEIS (Draft Nureg 1936) and in the FSAR Rev 6 for CC3:

1. Although Dr. Susan Kidwell's 1997 JSR paper on Calvert Cliffs was used as reference by the writers of the CC3 FSAR, her concerns on drainage patterns and the possibility of a fault, emphatically expressed by her personally to the CCNPP consultant during an hour-long interview on this same subject, was totally ignored in the FSAR Rev 6.
2. Corroborating evidence of the possible fault on Calvert Cliffs almost directly below the power plant (1970 Maryland Geological Survey, Robert Gernant's Report of Investigations No. 12) was totally omitted from consideration in the FSAR and DEIS.
3. Preferred orientation of straight stream segments (NOT dendritic) indicative of faults, a basic and obvious geological condition when viewed from topographical maps was totally ignored.

Questions were asked by June Sevilla of Dr. Susan Kidwell as expert witness:

Q. Please state your name and where you live.
A. Susan Kidwell, I live in Chicago, Illinois.

Q. Dr. Kidwell, are you familiar with PSC case 9218 as it relates to Air Quality?
A. Yes, I had a chance to look over the information on what supports the Prevention of Serious Deterioration of Air Quality for the proposed Calvert Cliffs Unit 3.

Q. Are you familiar with where UniStar has indicated the location of the Calvert Cliffs 3 CWS Cooling Tower as shown in this document? (**Exhibit 2-UniStar's Concept Site plan**)
A. YES. It is located in the southern part of the BGE Calvert Cliffs Nuclear Power Plant property, close to the BGE property line with the private land that was previously owned by Mrs. Margaret Moran. I used Google Earth to locate the points in **Exhibit 2** and relate them to the points in **Exhibit 1**.
(**Exhibit 1-Google Earth CCNPP to Moran Landing, ca. 2010**) The blue arrows in Exhibit 2 correspond with the red arrows in Exhibit 1 to gain a topographical perspective of the cliffs and the plant when viewed from above. Topographically, the CWS cooling tower location is situated near a 3-pronged stream that drains to the Chesapeake Bay and it is also near the eastern end of Johns Creek, which drains in a fairly straight line westward to St. Leonard Creek.

(J Sevilla: Let the record show that Dr. Kidwell's description of the CWS tower location and streams are also reflected in PPRP's submission to this hearing, ERD Figure 2-1 on page 2-3)

Q. Dr Kidwell, why is the location of the CWS Cooling Tower significant? (referring to Exhibit 1 and Exhibit 2)
A. Based on my own work and discussions with other geologists, it is in an area where a series of unusual geological features occur. These features include surprising changes in the elevation of beds above sea level between the existing BGE plant and the Moran property, and a tendency for streams in the general region to have fairly straight paths.

(J Sevilla -Please note on the record that Dr Kidwell's reference to BGE is also reference to the Calvert Cliffs Nuclear Power Plant where Unit 3 is to be built.)

Q. With regards to the CWS Tower location in Exhibit 2 (CC3 Concept Site Map): Why is the directional line of St. John's Creek important? (*see red dotted line*, Exhibit 1-Google Earth image of CCNPP in 2010)
A. Straight streams are very unusual – streams usually show a random branching pattern on maps, with small streams branching off of larger streams like a series of branching roots. When you see a map pattern where a large number of streams have fairly long straight stretches, with turns at fairly sharp angles into other straight stretches, you begin to suspect that the drainage pattern is being controlled by some underlying pattern of weakness in the rocks. I have interpreted the Calvert County Topographical map and made markings to show stream segments to indicate this underlying pattern of weakness in the rocks.

Exhibit 4 and 4a:: *Topographical map of Calvert County used by Dr. Kidwell in her 1997 paper was overlaid by Dr. Kidwell with stream segment orientations. This stream-oriented map(Exhibit 4) and its accompanying explanation(Exhibit 4a) are enclosures in Dr. Kidwell's June 26, 2010 analysis of the CC3 FSAR Rev 6*)

Q. Dr. Kidwell, how do you know this underlying pattern of weakness in the rocks to be factual?
A. Stream patterns on maps are one of the standard methods used to evaluate a region for possible faults, joints – which are simple cracks in the earth -- or other structural deformation of underlying rocks. These features create lines or bands of weakness in the rock that are easier for water to erode, and that's why streams follow these lines. A consistent map pattern, with one, two or three preferred orientations of stream segments, indicate the kind and direction of tectonic stress that the region is under.

Q. Susan, is that a professional opinion?
A. YES, it's a basic method of field geology that students are taught.

Q. Susan, what is your profession?
A. I am a geologist specializing in the geology of layered sedimentary rocks, and the William Rainey Harper Professor in the Dept of Geophysical Sciences at the University of Chicago. I advise graduate students in our doctoral program in sedimentary geology and paleoecology, and also teach undergraduates in sedimentary geology and field methods.
(**Exhibit 3**- BIO of Dr. Kidwell)

Q. Dr. Kidwell How come you are familiar with this area?
A. My doctoral dissertation research was a detailed analysis of the anatomy and origin of the Miocene-age sedimentary record in Maryland and Virginia. The exposures of Miocene sediments in the Calvert Cliffs were a major focus of my work, and I continued working of the Cliffs post-doctorally. I am also familiar with the Cliffs and the Bay because my grandparents bought property in the area in the late 1920s and so, like my parents, I grew up visiting Calvert County.

Q. Dr. Kidwell, did you publish work in this area that is particular to the area covering Calvert Cliffs Nuclear Power Plant?

A. YES, here is a copy of my publication (**Exhibit 5: 1997 JSR** titled, "Anatomy of Extremely Thin Marine Sequences Landward of a Passive-Margin Hinge Zone"). As illustrated in **Exhibit 1** (Google earth image) and **Exhibit 2**, the Concept Site Plan for Calvert Cliffs Unit 3, I have labeled cliff locations that correspond to figures in my 1997 JSR paper.

Note 1- Dr. Kidwell's 1997 JSR paper (**Exhibit 5**) was one of four attachments already submitted by June Sevilla to NRC, c/o James Steckel, on April 7, 2010, ADAMS # ML 101140123.) This JSR paper, the orientation of stream segments and drainage patterns in the CCNPP area were discussed in detail between Dr. Kidwell and John Baldwin of Lettis and Associates, one of the contractors hired by CCNPP for the CC3 project. This paper was acknowledged and used selectively by the writers of the CC3 FSAR. Rev 6 of the CC3 FSAR was analyzed by Dr. Kidwell and her report was submitted in form of letter to June Sevilla dated June 26, 2010, submitted to NRC and USACE July 9, 20101, for inclusion and ACTION in the DEIS and the FSAR)

Q. What is a JSR and what does the title of you paper mean in layman terms?
A. JSR is shorthand for the Journal of Sedimentary Research, which is one of the leading peer-reviewed technical journals in the subject, published by the non-profit Society for Sedimentary Geology. The paper describes the thickness, grain size, fossil content, and tilt of beds within the Cliffs – that's the anatomy part, just as you would study the anatomy of the human body. The journal accepted the paper for publication because it considers the nature of extremely thin sedimentary records – most geologists focus on thick records of sedimentary accumulation, but all of these eventually thin to feather edges. The Miocene strata of southern Maryland are the extremely thin landward edge of deposits from the Miocene sea that used to cover this area. These deposits are only about one-tenth as thick as similar age beds found offshore under the Atlantic continental shelf..

Q. What was the purpose of your 1997 JSR paper?
A. I was investigating whether the very thin Miocene layers in the Cliffs were simply miniaturized versions of thick records found offshore, like an edition of a history book that retains all of the text but has been reprinted on extremely thin paper and with a paperback. Alternatively it was possible that it was thin because portions had been omitted (like missing chapters in a book) or because the last, youngest part had been truncated (like chopping off the last set of chapters from a book) or perhaps because it was condensed into a qualitatively different form (like an abridged, Readers Digest version of a history book). I was not looking for any structural complications in the sedimentary record, and so was surprised when my measurements of beds detected features just south of the BGE indicator in my JSR Figure 2 on page 324 and also illustrated much clearer in (**Exhibit 6**) that suggested a possible fault. The suspected fault would lie in the topographically low area between Rocky Point and the BGE plant, as indicated by the "white area" on Figure 2 of my JSR paper .

Q. Your 1997 JSR paper titled, "Anatomy of Extremely Thin Marine Sequences Landward of a Passive-Margin Hinge Zone" contains Figure illustrations, specifically Figure 2 on page 324 and Figure 4 on pages 330-331. Would you please explain what those illustrations are? (**Exhibit 6**)
A. They show various cross-sectional views of the Calvert Cliffs – that is, they are diagrams of what you would see if you were standing slightly offshore on the Bay and looking at the Cliff face. The illustration at the top half of the page is a colored version of the same Figure 2 on page 324 of my JSR paper, marked up by a respected colleague, Dr. Peter Vogt. Dr Vogt and I discussed the fault location personally and I concur that he has the trace of the possible fault located correctly, at Moran Landing, with the correct motion of blocks on either side, and has the CCNPP correctly positioned at my label BGE. Dr. Vogt has "darkened" in a bed at the base of the CT-1 sequence, which obscures the pattern denoting sedimentary type for that bed, but this "darkening" was to accentuate the features supporting the fault interpretation. Figure 4 is simply a more detailed view of bed relations north (part B) and south (part A) of Moran Landing.

Q. What about the beds here suggest a fault?
A. What's suspicious is that sedimentary layers measured in cliffs on the south side of this gap in the topography appear to be at a higher elevation in cliffs on the north point side of the low area. All of the beds seem to be offset upward, which suggests later structural modification, such as a fault where rocks on the southern side are "up-thrown" relative to those on the northern side.

Q. Are there other features in this area that make you suspicious of a fault?
A. Yes. **Exhibit 7**: 1970 Maryland Geological Survey, Report of Investigations No. 12, "Paleoecology of the Choptank Formation (Miocene) of Maryland and Virginia", by Robert E. Gernant. Gernant's Figure 4 on page 10 is a picture of Calvert Cliffs at Conoy Landing indicates that on the northern, BGE side of this gap a series of beds at the base of the cliffs are arched up. This kind of feature, which we call a fold, is very unusual in the coastal plain. It reflects some degree of bending of rocks and does not form without tectonic stress. Folds are commonly associated with faults in areas under compression, so this is consistent with rocks to the south being shifted upward relative to rocks to the north.

(**Exhibit 7 and 7a** I personally scanned this picture of the Calvert Cliffs from the 1970 Maryland Geological Survey Report of Investigation Number 12, which was written by Dr. Robert Gernant. This photograph of the stretch of cliffs just south of the existing BGE plant shows part of the fold structure in my diagram. You can see that layers in the lower part of the cliff are tilted in such a way that they have a higher elevation in the southern (left) end of the cliffs than they have at the northern (right) end of the Cliffs. Throughout the rest of the Calvert Cliffs, beds tilt only downward toward the south (left), never upward like those here. Dr Gernant was sufficiently struck by this that it became one of the few photographs included in his report and he described it as a structural fold. Back on my Figure 2, you see how I have diagramed this fold in these beds, which is very localized, and that these beds resume the usual regional southward tilt once you are on the south side of the suspected fault.

Note 2, Exhibit 7: - Gernant's picture of Calvert Cliffs on page 10 of the 1970 MGS report is an enclosure in Dr. Kidwell's analysis of CC3 FSAR Rev 6 and her report was submitted in form of letter to June Sevilla dated June 26, 2010, submitted to NRC and USACE July 9, 2010, for inclusion and ACTION in the DEIS and the FSAR) Exhibit 7a is the cover sheet of the 1970 MGS report authored by Robert Gernant

Q. Are there any other features that are suspicious?
A. Yes. The final set of suspicious features are the many straight segments of streams in this region, which Dr. Vogt and Dr. Curt Larson, a retired geologist from the US Geological Survey, have also noticed and concur with. In consultation with Dr Vogt, we have sketched in the patterns that we find striking, using the Maryland Geological Survey Topographic Map of Calvert County as the base map (Exhibit 4- topographical map with stream segment markings is an enclosure in Dr. Kidwell's FSAR Rev 6 analysis). There are three sets of preferred orientation of stream segments. One is an East-West directed set, shown in bold solid black lines. Johns Creek is an example. A second set trends South-Southeast, which is almost perpindicular to the first set, and is shown using the double-lines. St. Leonard Creek is an example. The third set are mostly smaller streams and have a distinct but intermediate orientation (fine solid lines). These fine lines probably coincide with simple joints in the underlying rock – that is cracks in the earth and thus zones of weakness that streams seek out – but not necessarily cracks along which blocks of rock have moved differentially.

Q. What is the heavy dashed black line across the map?
A. That marks a persistent band of high elevation that runs across Calvert County, from Mrs Moran's former property at the southern edge of the BGE property, southwestward toward the Patuxent River. Sollers Road is built along this high land, in part. Given the evidence for a possible fault along the Moran/BGE property line, the folding in the Conoy Cliffs, and the offset elevation across the gap in the

cliffs, Dr Vogt and I wonder if this band of high land provides evidence for how the edge of the up-thrown block extends back into the County. This is our testable hypothesis.

Q If this Moran Landing feature turned out to be a fault, would it be unique?
A No. Faulting is known in the Virginia and Maryland Coastal Plains and in fact this was the theme of a special symposium at the meeting of the Geological Society of America in Baltimore last month. Dr David Powars of the US Geological Survey gave one of the talks at the meeting last month specifically about faults in Virginia, along the Potomac River, and in the central Chesapeake Bay that have remained active up into very recent time **(Exhibit 8)**

Q. What is your recommendation to verify this plausible Moran Landing Fault Line?
A. To determine the direction and extent of the plausible fault line, I concur with Dr. Peter Vogt's recommendation as stated in **Exhibit 9**

Q. Dr. Kidwell, has anyone connected with Calvert Cliffs Nuclear Power Plant ever contacted you about your 1997 JSR paper?
A. YES, a few years back, a consultant, John Baldwin of William Lettis and Associates in California, contacted me specifically about my 1997 paper. Our approximately one-hour phone discussion was about the postulated fault at Moran Landing and possible structural control of drainage patterns in Southern Maryland.

Q. Did you ever get feedback from that phone interview? Any studies, or sampling or paper?
A. No.

Q. Dr Kidwell, based on your analysis, what can you say about the location of the CC3 CWS Cooling Tower?
A. The CC3 CWS Cooling Tower is located approximately less than half a mile from the postulated Moran Landing Fault.

Francis, Woody NAB02

From: J Sevilla [qmakeda@chesapeake.net]
Sent: Friday, July 09, 2010 7:36 PM
To: CalvertCliffsCOLAEIS@nrc.gov; Quinn, Laura; Francis, Woody NAB02; james.steckel@nrc.gov; Surinder.Arora@nrc.gov
Cc: Peter Saar; Peter Vogt; Michael Mariotte; Allison Fisher; Paul Gunter; Bruce Gordon; Chris Bush; William Johnston; fabiada@yahoo.com; Timothy Flaherty
Subject: June Sevilla submission to DEIS (DRAFT NUREG 1936) and FSAR - #3 of 3 emails
Attachments: JuneSevilla - Input to DEIS 070910.pdf

Importance: High

TO: NRC - NUREG 1936 DEIS Staff Reviewers
NRC - FSAR Staff
NRC- Geological and Geotechnical Staff
US Army Corps of Engineers - Woody Francis
Laura Quinn - NRC
James Steckel - NRC

From: June Sevilla in behalf of self and Southern Maryland CARES

This is the 3rd of 3 emails submitted for consideration and ACTION, both on the DEIS and FSAR components of CCNPP Unit 3's application with NRC and USACE. The attached document covers issues related to the other 2 emails as well as additional issues on water quality, water resources, air quality and noise.

All 3 email submissions should be considered in total as they are inter-related.

Please forward this information to all other NRC staff and US gov't agencies reviewing the DEIS and FSAR.

Thank you,

June Sevilla
301-351-3161
P.O. Box 354
Solomons, MD 20688

July 09, 2010

To: NRC - NUREG 1936 DEIS Staff Reviewers
NRC - FSAR Staff
NRC- Geological and Geotechnical Staff
US Army Corps of Engineers - Woody Francis
Laura Quinn - NRC
James Steckel - NRC

From: June Sevilla on behalf of self and So. MD CARES

RE: **INPUT TO DEIS**

There are many issues that impact the decisions drawn from DEIS. These issues which I am submitting cover geological, water quality, air quality, desalination plant, and noise calculations as they affect our environment and public safety. Until these issues are adequately investigated and resolved, the DEIS for CC3 contains errors and omissions caused by the Applicant and the pressures exerted on gov't agencies to grant permits even if the scientific evidence and reports show otherwise.

June Sevilla DEIS input #1:
Dr. Susan Kidwell's expert scientific analysis of the Applicant's FSAR Rev 6 is part of this submission which has relevant and critical impact to the decisions made in this Draft NUREG-1936 (DEIS). Please review Dr. Kidwell's expert scientific analysis of the Applicant's FSAR Rev 6 and all related documentation submitted today, July 9, 2010, including analysis done by Dr. Peter Vogt, another expert geologist who has collaborated with Dr. Kidwell and Dr. Curt Larsen, another local tenured geologist. Dr. Vogt's and Dr. Larsen's submissions were previously submitted to NRC via my (3/29/10) email to James Steckel, recorded by NRC on 04/07/10, ADAMS # ML 101140123. Another submission by Dr. Vogt on PROOF OF SOIL LIQUEFACTION at Calvert Cliffs area was submitted to NRC via my email to James Steckel on 05/04/10, ADAMS # ML 101460467.

The geological conditions in CCNPP property have been misrepresented by the Applicant in their FSAR and cover-ups have been discovered as apparent, by outside volunteer scientific sources. We are appealing to the NRC and to the USACE to take seriously this geologic condition and drainage by demanding that the Applicant conduct scientifically recommended steps (investigation and testing to determine the depth and direction of the Moran Landing

Fault Line) so that appropriate actions may be taken to ensure the public safety and the safety of ground and surface water resources.

Complacency and *ignoring readily discernible warning signs* caused the United States to go to war with the bombing of Pearl Harbor on December 7, 1941 and for the loss of lives during the 9-11 terrorist attacks on the twin towers of the World Trade Center and the Pentagon. As heinous as the consequences are of these historic events, they were man-made catastrophes. So what would be our defense against the forces of nature, like an earthquake or soil liquefaction because of fractures and inherent weakness in the soil beneath CCNPP, when this condition is exacerbated by massive structures and man-made hazards at Ground Zero? Common sense counsels us that scientific INVESTIGATION AND TESTING of the plausibly active fault site is the absolutely prudent first step in the PREVENTION of potential catastrophes, especially when such geological condition is the critical geological foundation ***upon which*** **the proposed construction of a nuclear power plant**, and a yet uncertified *double reactor* at that, is being authorized by the Nuclear Regulatory Commission, Maryland State agencies, and the US Army Corps of Engineers.

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June Sevilla DEIS input #2:

The comment below was given to the NRC several months ago. Yet, the current version (Rev 6) of the CC3 FSAR that addresses these geological issues reflects the same unacceptable condition without additional investigation and appropriate testing. To my knowledge, the NRC has not required the Applicant, UniStar, to conduct the required bore hole and other tests to determine the depth and direction of the Moran Landing Fault Line, as recommended by Drs. Kidwell and Vogt. The ***drainage patterns in CCNPP property where this fault line traverses on the south side***, would not require an earthquake for the radioactive and non-radioactive effluents to leak into the aquifers that supply public drinking water, which is within the scope of the DEIS. Even *without an earthquake* (emphasis added), irreversible damage to the state's water supplies will occur through *cooling water irradiation contamination*, because of the fractures in the soil, even if just a slight shift of the soil foundation beneath CCNPP were to occur, considering the drainage patterns. How will CC3 supply electricity to the grid when the soil supporting the cooling water piping network and the CWS Cooling Tower, were to liquefy and damage the cooling water system because the soil was weak to begin with? Prevention of such catastrophic consequences are possible, if proper testing, validation, and other measures are undertaken regarding this undesirable and unsafe geological condition at the CCNPP site .

The NRC response that this issue is being addressed in the SER is not apparent to this writer's knowledge. In fact, it appears that the NRC has accepted the "armchair" analysis that the Applicant has presented in the FSAR and based on Dr Susan Kidwell's expert analysis of FSAR Rev 6 (which is part of this DEIS and FSAR submission), there is evidence that the <u>**Applicant has done a clever cover-up this geological condition** that has far reaching effects both in public safety and environmental impacts covered in this DEIS</u>.

Draft NUREG-1936 (DEIS), Appendix D April 2010 p. D-42, D-43:

6. Comments Concerning Geology

Comment: Careful mapping of the Miocene-aged sediment layers outcropping along the Calvert Cliffs has been done and published subsequent to the construction of the existing power plant in the mid-1970s. This new mapping shows--more accurately than was known before– he layers to be gently dipping (tilted) down to the southeast, and not disrupted by faults—except at one site, located about 1 mile south of the Calvert Cliffs Nuclear Power Plant, just north of Rocky Point. At this place along the cliffs, the layers appear to be offset a couple meters—that is, the layers are not continuous. The offset is such that the layers to the south are higher than those on the north. Detailed geological examination is needed to prove that the offset is not due to mapping errors--unlikely--, and, if a fault is indicated, boreholes will be needed to establish its strike (trend) and dip. (**0019-35** [Mariotte, Michael])

Response: *The EIS will contain a short description of local geology. Geotechnical and seismic issues are addressed in Chapter 2.5 [Section 2.8] of the staff's Safety Evaluation Report.*

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<u>**June Sevilla DEIS input #3**</u>:

The US Army Corps of Engineers relies upon facts and evidence presented by the Applicant and if the Applicant's input such as geologic conditions and drainage patterns are presented with errors and omissions, and in this case of CC3, a clever cover-up and misrepresentation of the scientific evidence (see Dr. Kidwell's expert scientific analysis included in this submission to NRC and USACE), then the conclusions made by USACE are based upon erroneous information, therefore cannot be relied upon to issue any permit without further investigation and review of the appropriate test results, after these investigations and testing have been conducted by the Applicant.

Draft NUREG-1936 DEIS Appendix J, p.J-9

basins; optimizing the switchyard; and refining the wetland delineation (UniStar 2008). Decision options available to the Corps (which embraces all of the applicant's alternatives) are issue the permit; issue with modifications or conditions; or deny the permit.

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June Sevilla DEIS input #4:

According to Draft NUREG-1936 DEIS Appendix D, p. D-43:

7. Comments Concerning Water Resources

Comment: What will be done with the salt and other minerals extracted by the desalination plant? Returning these to the bay will have a disturbing effect on the salinity and ecology of the area. (**0006-4** [Baummer, Thomas])

Response: *Water quality impacts of operation of the plant will be evaluated by the staff and described in Chapter 5 of the EIS. This assessment will include consideration of the impacts of the effluents from the desalination system and its effect on aquatic ecology.*

The Applicant to date, has not presented sufficient details regarding the Desalination System, other than an initial study done several years ago which I located on the MD PSC website when the Applicant applied for CPCN 9127. UniStar has systematically and incrementally increased their demand for ground water use and that UniStar would use water from the desalination plant during the 5th year of construction. John Grace, the Chief of the Source Protection and Appropriations Division, which is part of the Maryland Department of the Environment Water Management Administration (MDE WMA) has granted a six year extension to UniStar on their permit to draw water from the already oversubscribed Aquia aquifer (normal is 2 years). UniStar's piece meal process of increasing ground water drawdown and demands for inordinately long extensions on their permit is an excessive bending over backwards by gov't agencies for a merchant plant that is also asking for federal loan guarantees at taxpayer expense. Currently, there are already HIGH LEVELS OF ARSENIC in the Aquia aquifer in 9 counties in Maryland (Coastal Western and Eastern shores), which has affected the water quality for the public water supply and the private residence wells of those residents like myself whose drinking and potable water supply comes from the Aquia. Aside from high arsenic levels, our residential wells could run dry for those of us who are at, or near sea level when we, the people, are competing with a privileged merchant plant like CCNPP Unit 3. The water demands of the residents and the current condition of the Aquia aquifer (low levels and continually decreasing, hence, also results in the high levels of arsenic) which I draw my potable well water supply is already oversubscribed TODAY; so how can the water quality and public potable water supply environmental impact be adequately assessed by the DEIS when UniStar's permit is still valid years from now and the water resources for the public are already low today and decreasing?

<u>According to USGS Scientific Investigations Report 2007-5249: "Effects of Withdrawals on Ground-Water Levels in Southern Maryland and the Adjacent Eastern Shore, 1980-2005"</u>:

"Ground-water-level trends since 1980 in major Coastal Plain aquifers such as the Piney Point-Nanjemoy, Aquia, Magothy, upper Patapsco, lower Patapsco, and Patuxent were compared to water use and withdrawal data. Potentiometric surface maps show that most of the declines in ground-water levels can be directly related to effects from major pumping centers. There is also evidence that deep drawdowns in some pumped aquifers may be causing declines in adjacent, unpumped aquifers.

Water-level hydrographs of many wells in Southern Maryland show linear declines in levels year after year, instead of the gradual leveling-off that would be expected as the aquifers equilibrate with pumping. A continual increase in the volumes of water being withdrawn from the aquifers is one explanation for why they are not reaching equilibrium. Although reported ground-water production in Southern Maryland has increased somewhat over the past several decades, the reported increases are often not large enough to account for the observed water-level declines."

So how can the DEIS address the public ground water resource has "no significant impact":

a) when a major water user such as CC3 is granted the amount and time latitude that it has been permitted even when the scientific reports already prove that the Aquia aquifer is already oversubscribed and that Units 1 and 2 already employ arsenic removal equipment at CCNPP premises and the wells for CC3 are also being equipped with heavy duty arsenic removal equipment?
b) when the Applicant's Desalination Plant documents are incomplete and that desalination will not be used until the 5th year of construction?
c) and the impact to water resources regarding CC3 permits span an inordinate amount of time into the future?

See Applicant submission on Desalination Plant and surrebuttal testimony of John Grace at:
http://webapp.psc.state.md.us/Intranet/Casenum/CaseAction_new.cfm?RequestTimeout=500?
(enter case number 9127)

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June Sevilla DEIS input #5:

To protect the public, air quality and water quality have requirements that must be met. However, the bottom line Legislative guidelines which were enacted to protect the public are being negotiated away at the behest of and advantage of the Applicant. In the case of CC3, salinity of the Chesapeake Bay water was tested by the Applicant for the Desalination Plant and found to be 20 ppm, yet the salinity or Total Dissolved Solids (TDS) for computation of Air Quality for the Bay cooling water for the CWS Cooling Tower was negotiated by the Applicant to be less than actual (17.5 ppm) This lower salinity value is estimated as opposed to the actual test results, which allows the Applicant to obtain the necessary "numbers" to meet air quality calculations for PM (especially PM2.5). This lower and estimated value affects Air Quality calculations and dispersion of air effluents because the amount of PM2.5 is under estimated. See below for some of the relevant sections in the DEIS:

Draft NUREG-1936 DEIS , p. 3-28:

3.4 Operational Activities

The operational activities considered in the review team's environmental review are those associated with structures that interface with the environment, as described in Section 3.2.2. Examples of operational activities are withdrawing water for the cooling system, discharging blowdown water and sanitary effluent, and discharging waste heat to the atmosphere. Safety activities within the plant are discussed by the applicant in the FSAR portion of its application (UniStar 2009b) and are reviewed by the NRC as part of its safety evaluation report (SER) (in progress).

Affected Environment

Draft NUREG-1936 2-20 April 2010

Regional Chesapeake Bay temperature and salinity data are collected by participants in the CBP, which is a regional partnership that includes Maryland, Pennsylvania, Virginia, the District of Columbia (DC), the EPA, and citizen advisory groups. The CBP oversees monitoring at selected locations throughout the Bay. The CBP monitoring location CB4.4 is closest to the Unit 3 site and is due east of the site. In 2005, the CBP measured water temperature extremes at location CB4.4 with a minimum and maximum of 35.1 and 85.3°F, respectively (UniStar 2009a). On a seasonal basis, the average temperature varied from 42.7°F in winter to 75.4°F in summer. Salinity extremes varied from 4.42 to 22.18 ppt.

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<u>June Sevilla DEIS input #6</u>:

MD Department of the Environment does not consider coordinated impact of dust and noise between construction phase and operational phase when computing impact to public health on PM, PM2.5.

NOISE Calculations and impact to public health when CC3 is in Operation:

The Applicant only conducted Leaf-on/Leaf-off scenarios in determining noise levels and the clearing of forests and shrubs which help alleviate noise were not considered in the calculations. Furthermore, the Applicant used only the CWS Cooling Tower noise as basis for these calculations. Noise from the ESWS Cooling Towers were not included in the study. All these omissions renders INCOMPLETE, the entire NOISE submission by the Applicant. See CPCN 9127 Noise submission of Applicant. http://webapp.psc.state.md.us/Intranet/Casenum/CaseAction_new.cfm?RequestTimeout=500? (enter case number 9127)

Draft NUREG-1936, p. 4-50

4.4.1 Physical Impacts

Construction and preconstruction activities can cause temporary and localized physical impacts such as noise, odors, vehicle exhaust, and dust. Vibration and shock impacts are not expected because of the strict control of blasting and other shock-producing activities. This section addresses potential impacts that may affect people, buildings, and roads.

4.4.1.1 Workers and the Local Public

The land surrounding the Calvert Cliffs site is zoned for a combination of light industrial, farm, forest, and residential uses, and is bounded by the Chesapeake Bay and to the west by forested land. No significant industrial or commercial facilities other than the Calvert Cliffs site exist or are planned in the vicinity. The recreational areas closest to the plant include the Flag Ponds Nature Park to the north and the Calvert Cliffs State Park to the south, both of which are adjacent to the plant site. Most construction and preconstruction activities take place during the work week and most visitors use these parks on weekends. Also, the heavy forest cover of the large Calvert Cliffs site itself is expected to buffer many effects of traffic, noise, and dust, and therefore the increase in these attributes from construction and preconstruction activities is not expected to significantly affect either Flag Ponds or Calvert Cliffs State Park (UniStar 2009a).