December 9, 2011

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
CALVERT CLIFFS 3 NUCLEAR PROJECT,	)	
LLC, and UNISTAR NUCLEAR OPERATING	)	Docket No. 52-016-COL
SERVICES, LLC	)	
	)	
(Calvert Cliffs Nuclear Power Plant, Unit 3)	)	

NRC STAFF MOTION *IN LIMINE* TO EXCLUDE PORTIONS OF THE JOINT INTERVENORS' DIRECT AND REBUTTAL TESTIMONY, EXHIBITS, AND PORTIONS OF THE JOINT INTERVENORS' REBUTTAL STATEMENT OF POSITION

Pursuant to 10 C.F.R. §§ 2.337(g)(2), 2.1207(a)(1), and 2.323, and the Atomic Safety and Licensing Board's (Board) June 24, 2011 revised scheduling order,[1] as modified,[2] the U. S. Nuclear Regulatory Commission staff ("Staff" or "NRC Staff") hereby submits its Motion *In Limine* to Exclude Portions of the Joint Intervenors'[3] Direct and Rebuttal Testimony, Exhibits, and Portions of the Joint Intervenors' Rebuttal Statement of Position.

Counsel for the NRC Staff contacted the Applicant[4] and Joint Intervenors in an effort to resolve the issues raised in this motion. The Joint Intervenors agree to four redactions in their

[1] Order (Revising Initial Schedule) at 3 (June 24, 2011) (unpublished).

[2] Order (Granting Unopposed Motion to Withdraw Written Testimony Filed October 21, Submit Expert Testimony by October 28, and Extend Other Relevant Deadlines by One Week; and Providing Additional Instructions to Intervenors Regarding the Re-Filing of Testimony and Exhibits) (October 25, 2011) (unpublished)

[3] Nuclear Information and Resource Service, Beyond Nuclear, Public Citizen and the Southern Maryland Citizens' Alliance for Renewable Energy Solutions, collectively, are referred to as Joint Intervenors.

[4] The original COL applicants were Constellation Generation Group, LLC and UniStar Nuclear Operating Services, LLC. The application was revised by letter dated August 1, 2008, which among other things changed the applicants to Calvert Cliffs 3 Nuclear Project, LLC and UniStar Nuclear Operating Services, LLC.

direct testimony and one in their rebuttal testimony, as indicated below. They otherwise do not agree with the motion. The Applicant takes no position on the motion.

BACKGROUND

On October 21, 2011, the Applicant, Joint Intervenors, and the NRC Staff each filed direct testimony and exhibits. The Applicant and NRC Staff also filed Initial Statements of Position. Joint Intervenors did not file an Initial Statement of Position. On October 24, 2011, Joint Intervenors filed a motion seeking to withdraw and replace their October 21, 2011 testimony.[5] The motion was unopposed. The Board granted the motion on October 25, 2011.[6] On October 28, 2011, Joint Intervenors filed their Direct Testimony.[7]

On November 17, 2011, the Joint Intervenors filed revised direct testimony to include page numbers (Ex. JNTR00001; Sklar Direct Testimony), as directed by the Board. The Joint Intervenors also filed rebuttal testimony, exhibits, and a rebuttal statement of position[8]. On November 18, 2011, the Applicant and NRC Staff filed rebuttal statements of position, as well as rebuttal testimony and exhibits. On December 5, 2011, the Joint Intervenors filed revised rebuttal testimony with an exhibit marking and page numbers[9] (Sklar Rebuttal Testimony). A

[5] Motion to Allow Joint Intervenors to Withdraw Written Testimony of October 21, 2011 on Contention 10, to Submit Expert Testimony by October 28, 2011, and to Extend Other Relevant Deadlines by One Week (October 24, 2011)

[6] Order (Granting Unopposed Motion to Withdraw Written Testimony Filed October 21, Submit Expert Testimony by October 28, and Extend Other Relevant Deadlines by One Week; and Providing Additional Instructions to Intervenors Regarding the Re-Filing of Testimony and Exhibits) (October 25, 2011) (unpublished)

[7] Testimony of Scott Sklar, President of the Stella Group, Ltd., on Contention 10 (October 28, 2011) (Ex. JNT000001).

[8] Joint Intervenors Statement of Position (In Rebuttal), November 17, 2011 (dated November 18, 2011) (Joint Intervenor Rebuttal Statement of Position).

[9] While captioned "JNT 000030," following the Board's September 22, 2011 Order (Providing Directions on Pre-Filed Evidentiary Material) at 2-4, the Staff believes this exhibit should be captioned "Ex. JNTR00030," and will refer to it as such.

complete discussion of the relevant procedural history prior to the filing of direct testimony by the parties can be found in the Staff's Initial Statement of Position.[10]

DISCUSSION

The Joint Intervenors, in their testimony, exhibits, and rebuttal statement of position, raise several issues that are outside the scope of the admitted contention, or otherwise inadmissible in this proceeding.

I. Legal Standards

Evidence that may be admitted in this proceeding must be relevant, material, reliable and not unduly repetitious. 10 C.F.R. § 2.337(a). Irrelevant or immaterial portions of an admissible document should be excluded to the extent practicable. *Id*. Furthermore, any portion of written presentations or responses to written questions may, by motion or *sua sponte,* be stricken by the Board if it "is irrelevant, immaterial, unreliable, duplicative, or cumulative." 10 C.F.R. § 2.319(d). Finally, a board's decision should only rely on information that is included in the record. *See Pacific Gas & Electric Co*. (Diablo Canyon Nuclear Power Plant, Units 1 & 2), ALAB-580, 11 NRC 227, 230 (1980) (stating that "it is a statutory requirement that the adjudicatory decisions of this Commission stand or fall on the basis of the record on which they rest"). Thus, unsupported statements and conclusions should be excluded or afforded no weight because they are not helpful to the trier of fact.

II. Testimony, Exhibits, and Argument to be Excluded

The material submitted by Joint Intervenors that is outside the scope of this hearing, and that therefore should be stricken from the hearing record, can be placed into one of six broad categories: 1) energy production outside the region of interest, 2) alternatives other than wind or solar, 3) back-up power, 4) alleged violations of the Maryland Renewable Portfolio Standard, 5) project uncertainty and timeframe, and 6) evidentiary/admissibility issues. In addition to the

[10] NRC Staff Initial Statement of Position on Contention 10C (October 21, 2011).

discussion below, the Staff has attached tables and in-line markups of the proposed removals.[11] Those removal requests with which the Joint Intervenors agree appear in italics both in this document and in the attached tables (NRC Staff Attachments 1 and 3). In the in-line markups of the Sklar Direct Testimony (NRC Staff Attachment 2) and Sklar Rebuttal Testimony (NRC Staff Attachment 4), those removal requests with which the Joint Intervenors agree appear in green strikeout, rather than red.

A. Region of Interest

"The purpose and need for the proposed NRC action is to provide for additional large baseload electrical generating capacity within the State of Maryland." Environmental Impact Statement for the Combined License (COL) for Calvert Cliffs Nuclear Power Plant Unit 3, Final Report (FEIS) (Ex. NRC000003A) at 1-9. Thus, the Joint Intervenors' discussion of electric generation potential outside of Maryland cannot inform a reasonable alternative, as it would, by definition, be outside the purpose and need of the proposed action.

Contention 10C[12] does not contest the NRC Staff-developed purpose and need statement, but rather, argues that given the purpose and need of the proposed project, that the combination of energy alternatives under-represents contributions from wind and solar power. Thus, the discussion of power generation outside Maryland can be relevant to consideration of the admitted contention insofar as a party believes that that information relates to generation

[11] NRC Staff Attachment 1 is a table which lists each requested removal in the Sklar Direct Testimony (Ex. JNTR00001) and a summary of the reason or reasons why the language should be removed. NRC Staff Attachment 2 is an in-line markup of the Sklar Direct Testimony showing the requested changes. NRC Staff Attachment 3 is a table which lists each requested removal in the Sklar Rebuttal Testimony (Ex. JNTR00030) and the reasons why that language should be removed; NRC Staff Attachment 4 is an in-line markup of the Sklar Rebuttal Testimony. Likewise, NRC Staff Attachments 5 and 6, respectively, are the table of proposed removals and justifications and the in-line markup of the Joint Intervenors' Rebuttal Statement of Position. NRC Staff Exhibit 7 is a table of the exhibits that the Staff proposes to exclude in their entirety, and the reasons for their exclusion.

[12] As restated by the Board, Contention 10C alleges that "[t]he DEIS discussion of a combination of alternatives is inadequate and faulty. By selecting a single alternative that under-represents potential contributions of wind and solar power, the combination alternative depends excessively on the natural gas supplement, thus unnecessarily burdening this alternative with excessive environmental impacts. *See* Order (Ruling on Intervenors' Proposed New Contention 10), LBP-10-24, slip op. at 46 (December 28, 2010) (December 28 Order).

capacity within Maryland. But information about generation outside of Maryland is not within scope of this hearing to the extent that it is used to challenge the purpose and need statement, or where no connection is made between potential capacity outside of Maryland and generation within the State. Therefore, the following Joint Intervenor testimony and arguments should be stricken:

1. Sklar Direct Testimony (Ex. JNTR00001)

    a. Page 3, Line 18; Page 4, Line 1. The Joint Intervenors allege the FEIS to be inadequate, in part, because it does not adequately consider the potential contribution of alternatives for the surrounding PJM grid to power surrounding states. This is outside the scope of this proceeding, as discussed above, because the uncontested purpose and need of the proposed action is the construction of additional large baseload generation in Maryland.

    b. Page 5, Line 4. Reference to the PJM grid in discussing renewable power generation.

    c. Page 6, Line 4. Reference to the PJM grid in discussing potential wind power generation.

    d. *Page 6, Lines 8-10. Use of "gross wind resource" statistic whose scope is unclear, but clearly beyond Maryland.*

    e. *Page 6, Lines 16-18. Cumulative reference to wind potential of Maryland combined with surrounding states.*

    f. Page 20, Line 11. Reference to PJM service area's need for power.

    g. Page 20, Line 17. Reference to PJM electrical supply.

2. Joint Intervenor Rebuttal Statement of Position

    a. Page 3, Line 20; Page 4, Line 1. In the carryover sentence, the Joint Intervenors allege the EIS fails to capture the alternative energy potential of the PJM service area.

    b. Page 18, Lines 8-12. Joint Intervenors challenge the need for power for the proposed action (despite their expert stating that

he does not contest the NRC Staff view on the future need for electricity on page 20 of his direct testimony, Ex. JNTR00001); Joint Intervenors also challenge the purpose and need of the proposed project to generate electricity in Maryland. Both of these statements are outside the scope of this proceeding and should be stricken.

B. Alternatives Other Than Wind and Solar

In several places, the Joint Intervenors attempt to contest the NRC Staff's FEIS analyses of energy sources other than wind and solar. The Board has twice rejected these and similar arguments.[13] The admitted contention concerns the alleged under-representation of wind and solar contributions to the combination of energy alternatives. Thus, evidence and arguments concerning biomass, marine power, demand-side management and energy efficiency, or any types of renewable generation, other than wind and solar, are outside the scope of this proceeding. Therefore, the following Joint Intervenor testimony should be stricken:

1. Joint Intervenor Direct Testimony (Ex. JNTR00001)

    a. *Page 3, Line 18. Incorrect reference to biomass and marine power as part of the scope of the admitted contention.*

    b. *Page 5, Lines 6-9. Discussion of biomass, marine, free flow hydropower, wave, tidal, and ocean generation sources*.

    c. Page 19, Lines 10-11. Discussion of other renewable energy sources and energy efficiency.

    d. Page 20, Lines 11-14. Discussion of energy efficiency.

2. Sklar Rebuttal Testimony

    a. Page 4, Lines 12-15. Discussion of renewables other than wind or solar.

    b. Page 5, Lines 7-12. Discussion of other renewables.

    c. Page 6, Lines 11-14. Discussion of Maryland biomass, water, and waste heat capacity.

[13] *See* December 28 Order; *see also* Order (Denying Summary Judgment of Contention 10C, Denying Amended Contention 10C, and Deferring Ruling on Contention 1) at 24 (Aug. 26, 2011) (unpublished) (August 26 Order),

d. *Page 6, Lines 14-17. Discussion of biogas generation.*

C. Back-Up Power

The Joint Intervenors, in their direct testimony and in their Rebuttal Statement of Position, argue that Calvert Cliffs 3 would not operate as a baseload plant for, among other reasons, a lack of back-up power. While the Staff discussed baseload power in its testimony to help explain its methodology for the alternatives analysis, and for the combination of energy alternatives in particular, the Joint Intervenors' discussion of back-up power for the proposed nuclear plant is beyond the scope of this proceeding, which concerns the alleged under representation of wind and solar energy in the combination of energy alternatives, not the availability of back-up power for the proposed nuclear plant. Therefore, the following testimony and argument should be stricken:

1. Sklar Direct Testimony

   a. Page 18, Lines 12-19; Page 19, Lines 1-2. Discussion of the lack of back-up power for the proposed nuclear plant.

   b. Page 19, Line 13. Reference to the proposed nuclear plant's lack of back-up power.

2. Joint Intervenor Rebuttal Statement of Position

   a. Page 16, Lines 1-2. Reference to the proposed nuclear plant's lack of back-up power.

D. Alleged Violations of the Maryland Renewable Portfolio Standard

Both in their testimony and arguments, Joint Intervenors make repeated reference to the Maryland Renewable Portfolio Standard (MRPS) as a basis for why the Staff has under-represented the wind and solar contributions in the combination of energy alternatives. While the MRPS appears nowhere in the bases for contention as admitted, *see* Submission of Contention 10 by Joint Intervenors (June 25, 2010), Joint Intervenors now claim that because Maryland law requires that 20% of Maryland's electricity be generated from renewable energy sources by 2022, that the Staff's combination of energy alternatives would violate Maryland law.

Joint Intervenors argue that the NRC Staff's determined solar contribution to the combination of energy alternatives was so low that it "assume[s] that Maryland's Renewable Portfolio Standard law . . . will not be complied with," Joint Intervenor Rebuttal Statement of Position at 9, but on the other hand Joint Intervenors assert that "[t]he [M]RPS, however, has defined renewables broadly and included facilities located in the PJM grid area plus one state . . . . There is ample supply of current out-of-state resources to supply Maryland's RPS need through 2019, without constructing a single in-state facility." Sklar Direct Testimony at 12. The MRPS provides various avenues that generators may use to meet the standard, of which building wind and solar facilities in Maryland are only two. *See* Ex. APL000005 at 3-19 to 22.

The Joint Intervenors' discussion of the MRPS' requirements and renewable energy development incentives, and what impact these requirements and incentives might have on projected solar and wind development in Maryland, is within the scope of this proceeding. But their arguments alleging non-compliance with Maryland law are outside the scope of this proceeding and outside NRC adjudicatory jurisdiction. Longstanding Commission precedent provides that "the NRC's adjudicatory process [is] not the proper forum for investigating alleged violations that are primarily the responsibility of other Federal, state, or local agencies." *PPL Susquehanna, LLC.* (Susquehanna Steam Electric Station, Units 1 and 2 Power Uprate Proceeding), CLI -07-25, 66 NRC 101 at 105 *citing Hydro Resources, Inc.* (2929 Coors Road, Suite 101, Albuquerque, NM 87120), CLI-98-16, 48 NRC 119, 121-22 (1998). If a generator violates Maryland law, then that utility would face repercussions with Maryland authorities. Such claims are not properly heard in this proceeding. Therefore, the following arguments should be stricken:

1. Joint Intervenor Rebuttal Statement of Position

    a. Page 6, Lines 6-8. Incorrect claim that NRC Staff assumed in its FEIS the violation of the MRPS.

    b. Page 9, Lines 12-15. Incorrect claim that both the Applicant and NRC Staff assume the violation of the MRPS.

c. Page 9, Lines 16-17; Page 10, Lines 1-8. Discussion of solar development strictly in terms of compliance with MRPS and alleged EIS failure to assume MRPS compliance.

d. Page 13, Line 10. Incorrect claim that wind power generation in Maryland is mandated by the MRPS.

E. Project Uncertainty and Timeframe

Joint Intervenors argue extensively in their rebuttal statement of position that the uncertainty concerning whether the proposed nuclear plant will be built, and when it would be built, should somehow be compared with the uncertainty of proposed renewable energy projects. The admitted contention concerns the NRC Staff's evaluation of solar and wind power in the combination of energy alternatives in the FEIS. The Joint Intervenors' speculation about when or if the proposed nuclear unit will be built is outside the scope of the admitted contention.[14] Therefore, the following arguments should be stricken:

1. Joint Intervenor Rebuttal Statement of Position

a. Page 10, Lines 12-20 and n. 11; Page 11, Lines 1-14. Claim of ambiguity in Applicant and NRC Staff understanding of project timeframe and perceived future challenges in the licensing process, as well as reference to another contention.

b. Page 12, Lines 3-4. Claim that the proposed nuclear plant is as speculative as certain proposed wind projects.

F. Evidentiary/Admissibility Issues

There are several exhibits that do not comply with NRC evidentiary standards; they are discussed in turn, below.

[14] The current projected timeframe for completion of construction of the proposed plant changed from December 31, 2015 to December 31, 2017, in a 2010 update to the application. Given the timeframes that the Staff used in its predictions in the combination of energy alternatives, its conclusions were not affected by this change. *See* NRC Staff Direct Testimony at 13, n. 4 (Ex. NRC000004).

Unsponsored Exhibits

1. Exhibits JNT000010 and JNT000011

These two exhibits contain information that could be relevant to this proceeding, depending upon precisely the purpose for which they are cited. But they are not sponsored in Joint Intervenor testimony or any other document. They were filed as exhibits, but without reference. Their relevance to this proceeding therefore is unclear. Consistent with 10 CFR § 2.337, which requires that evidence be relevant and material, these exhibits should be stricken in their entirety.

2. Exhibits JNT000021 through JNT000025

These exhibits have in common the fact that they are referenced only in the Joint Intervenors' Rebuttal Statement of Position. They are not sponsored in any sworn testimony. An expert opinion is only admissible if the witness is competent to give an expert opinion and adequately states and explains the factual basis for the expert opinion. *Duke Cogema Stone & Webster* (Savannah River Mixed Oxide Fuel Fabrication Facility), LBP-05-04, 61 NRC 71, 81 (2005). Therefore, as the Joint Intervenors' Rebuttal Statement of Position is not an appropriate vehicle for the introduction of either factual evidence or expert testimony, each of these exhibits should be stricken in their entirety.[15]

Unreliable Exhibits

3. Exhibit JNT000024

This exhibit, which is also referenced above insofar as it is not sponsored by any testimony, but only by the Joint Intervenors' Rebuttal Statement of Position, is an article discussing baseload power plants from the website Wikipedia. The authors of this article and their credentials are unknown, and therefore this exhibit is likewise unreliable and inadmissible.

[15] Exhibit JNT000023 is also inadmissible according to the Joint Intervenors, who note that "[a]lthough this letter [regarding the NRC Staff's foreign ownership, control, or domination determination] is not directly related to Contention 10 and this statement of position, we are entering it as an exhibit for reference," in their Rebuttal Statement of Position at 11, n. 12.

Therefore, the Staff moves that the following exhibit and argument be stricken:

a. Exhibit JNT000024 in its entirety

b. Joint Intervenor Rebuttal Statement of Position

i. Page 22, Lines 1-4 and n. 25. This is a quotation from the subject Wikipedia article.

III. CONCLUSION

For the reasons discussed above, the Staff moves that the identified portions of the Joint Intervenors' testimony, exhibits, and arguments be excluded.

Respectfully submitted,

/Signed (electronically) by/
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Executed in accord with 10 C.F.R. § 2.304(d)
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Dated at Rockville, Maryland
this 9th day of December, 2011

REQUIRED CERTIFICATION UNDER 10 CFR § 2.323(b)

I certify that I have made a sincere effort to contact the other parties in this proceeding, to explain to them the factual and legal issues raised in this motion, and to resolve those issues, and I certify that my efforts have been unsuccessful. The Applicant takes no position on the motion; the Joint Intervenors do not agree with all aspects of the motion.

/Signed (electronically) by/
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Dated at Rockville, Maryland
this 9th day of December, 2011

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
CALVERT CLIFFS 3 NUCLEAR PROJECT,	)	
LLC, and UNISTAR NUCLEAR OPERATING	)	Docket No. 52-016-COL
SERVICES, LLC	)	
	)	
(Calvert Cliffs Nuclear Power Plant, Unit 3)	)	

CERTIFICATE OF SERVICE

I hereby certify that copies of the NRC Staff Motion *In Limine* to Exclude Portions of the Joint Intervenors' Direct and Rebuttal Testimony, Exhibits, and Portions of the Joint Intervenors' Rebuttal Statement of Position, Required Certification Under 10 CFR § 2.323(b), and NRC Staff Attachments 1 through 7, have been served upon the following persons by Electronic Information Exchange this 9th day of December, 2011.

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NRC STAFF ATTACHMENT 1

Sklar Direct Testimony (Ex. JNTR00001)

(Exclusions with which the Joint Intervenors agree appear in italics.)

Testimony To Be Excluded	Reason For Exclusion
Page 3, Line 18	*Alternative energy source discussion other than wind or solar. Incorrectly states the scope of the contention to concern biomass and marine power.*
Page 3, Line 18; Page 4, Line 1	Joint Intervenors allege the FEIS to be inadequate, in part, because it does not adequately consider the potential contribution of alternatives for the surrounding PJM grid to power surrounding states. This is outside the scope of the admitted contention, where the uncontested purpose and need is the construction of additional large baseload generation in Maryland.
Page 5, Line 4	Reference to the PJM grid in discussing renewable power generation.
Page 5, Lines 6-9	*Discussion of energy sources other than wind and solar, here biomass, marine, freeflow hydropower, wave, tidal, and ocean generation sources.*
Page 6, Line 4	Reference to the PJM grid in discussing wind power generation
Page 6, Lines 8-10	*Use of "gross wind resource" statistic whose scope is unclear, but clearly beyond Maryland.*
Page 6, Lines 16-18	*Cumulative reference to wind potential of Maryland combined with surrounding states*.
Page 18, Lines 12-19; Page 19, Lines 1-2	Discussion of the lack of back-up power for the proposed nuclear plant.
Page 19, Lines 10-11	Discussion of non-wind, non-solar renewable energy sources and energy efficiency.

Testimony To Be Excluded	Reason For Exclusion
Page 19, Line 13	Reference to the proposed nuclear plant's lack of back-up power
Page 20, Line 11	Reference to PJM service area's need for power.
Page 20, Lines 11-14	Discussion of energy efficiency.
Page 20, Line 17	Reference to PJM electrical supply.

JNTR00001
11/18/11

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of Docket No. 52-016

Calvert Cliffs-3 Nuclear Power Plant
Combined Construction and License Application

TESTIMONY OF SCOTT SKLAR, PRESIDENT OF THE STELLA GROUP, LTD., ON CONTENTION 10

Q.1. Please state your name and describe your professional qualifications to give this testimony.

My name is Scott Sklar and I am The President of The Stella Group, Ltd. which is a strategic technology optimization and policy firm for clean distributed energy users and companies, with a focus on system standardization, modularity, and web-enabled diagnostics. I am also an Adjunct Professor at the George Washington University teaching a unique multidisciplinary sustainable energy course. On November 4, 2010 Secretary Locke approved my appointment to the Department of Commerce Renewable Energy and Energy Efficiency Advisory Committee (RE&EEAC).. I facilitate a specialized energy security series through National Defense University and have many projects with the US Department of Defense,

Sseurity and intelligence agencies on technologies and risk, as well as optimizing renewable energy and energy efficiency.

I started my energy career serving as a military and energy aide to Senator Jacob K Javits (NY) on his Washington personal and Committee staff for nine years, and cofounded the Congressional Solar caucus in the mid-1970's where most of the renewable energy legislation first was passed by the US Congress as a result of the first and second oil embargos..

I serve on the Boards of Directors of three national non-profits: Business Council for Sustainable Energy (climate change), Renewable Energy Policy Project (energy analysis), and The Solar Foundation. I also serve as Steering Committee Chairman of the Sustainable Energy Coalition, composed of the 20+ national energy efficiency and renewable energy industry organization, advocacy groups, think tanks, and environmental groups.

I have coauthored two books, *"The Forbidden Fuel: A History of Power Alcohol*," published in 1985 which was updated and re-released in 2010 by University of Nebraska Press, and a *"Consumer Guide to Solar Energy"* first published in 1998 and is in its third publishing.

My professional qualifications are attached to this testimony as JNT000002.

Q.2. Please explain why you were unable to file your testimony as scheduled on October 21, 2011.

My mother had a major stroke and was in transfer to The Jefferson for rehabilitation therapy; her situation prevented me from submitting this input within the time constraints as required.

Q.3. What documents or information have you reviewed to prepare your testimony?

I have reviewed the NRC Staff's Draft and Final Environmental Impact Statements for Calvert Cliffs 3 (Exhs. APL000050 and NRC00003A). I have also reviewed the filings and decisions in this proceeding that relate to Contention 10C. In addition, I have reviewed documents and studies regarding the status of existing and planned wind and solar projects in Maryland and the region as well as wind and solar potential in Maryland and the region.

Q.4. What is the purpose of your testimony?

The purpose of my testimony is to discuss my views on Joint Intervenors Contention 10, which argues that the Environmental Impact Statement for the proposed Calvert Cliffs-3 nuclear reactor does not adequately consider the potential contribution of solar, wind, ~~biomass and marine power~~ to Maryland ~~and the surrounding PJM grid~~

~~which allocates power to Maryland and surrounding states~~ as alternatives to the proposed Calvert Cliffs-3 nuclear reactor.

Q.5. Why do you believe that the Environmental Impact Statement prepared for the proposed Calvert Cliffs-3 nuclear reactor does not adequately consider the potential contribution of solar and wind power to Maryland and the larger PJM grid that services Maryland with electricity?

I wish to point out that Contention 10, as admitted by the Atomic Safety and Licensing Board, is essentially a contention of omission—that the Applicants, in preparation of their Environmental Report, and the NRC staff, in preparation of their Final Environmental Impact Statement, which is based in part upon the Applicants' Environmental Report, have not adequately considered the potential contribution of of renewable energy-generated electric power as an alternative to construction of the Calvert Cliffs-3 nuclear reactor.

As a contention of omission, the burden is on the Applicants and the NRC staff to show that they have indeed met the requirements of the National Environmental Policy Act and that the Final Environmental Impact Statement does, in fact, adequately consider the potential contributions of wind and solar power as alternatives to Calvert Cliffs-3.

As Joint Intervenors showed in their initial contention and have continued to demonstrate in documents submitted during discovery during this proceeding, Applicants and NRC staff have consistently understated the potential contributions of solar and wind power to Maryland ~~and the larger PJM grid~~, thus leading to a skewed portrait of those potential contributions.

~~I also wish to emphatically point out that all the renewable energy resources should be considered in an EIS profile of options, including baseload renewables sustainable biomass electric power and marine power (freeflow hydropower, wave, tidal, and ocean currents).~~

Q.6. In Section 9.2.4, in which the Final Environmental Impact Statement (FEIS) for Calvert Cliffs-3 examines a combination of alternatives that might be cost-effective, does the FEIS understate the potential contribution of wind power to Maryland and the PJM grid that services Maryland?

Yes. The FEIS assumes, in its discussion of alternatives to Calvert Cliffs-3, a contribution of only 100 MW of wind power, and notes that this would equal approximately 250-300 MW of installed capacity.[1]

[1] FEIS for Calvert Cliffs-3, NUREG-1936, May 2011, p. 9-28 (NRC 00003A)

Further down the same page, the EIS argues that quadrupling the amount of possible wind power, to 400 MW (installed capacity of 1000-1200 MW) would not materially change its assessment.

However, the potential contribution of wind power to Maryland ~~and the PJM grid~~ is significantly and substantially larger than that.

Q.7. What is the real potential contribution of wind power to Maryland and the PJM grid that services Maryland?

~~The US Department of Energy states that the "gross wind resource" (prior to siting and other restrictions) is estimated to be more than 4,000 Gigawatts out to 50 nautical miles.~~

According to National Renewable Energy Laboratory "*Large-Scale Offshore Wind Power in the United States,*" Maryland itself has 53.8 Gigawatts of offshore wind potential for areas up to 50 nautical miles from shore with average wind speeds 7 m/s or greater at 90 - m elevation.[2] Even accounting for wind's lower capacity factor, this would equal about 10 Calvert Cliffs-3 reactors, and is clearly many times more than the wind contribution contemplated by the FEIS. ~~Total potential for the four nearby mid-Atlantic states (Maryland, Delaware, New Jersey, Virginia) is 262.6 GW.~~

[2] JNT000003

The U.S. Department of Interior, a crucial partner with primary jurisdiction over offshore wind projects in federal waters, announced a 'Smart from the Start' initiative in November 2010 to facilitate siting, leasing, construction of new wind and marine energy projects. One goal is "to fully harness the economic and energy benefits of the Nation's vast Atlantic wind potential…"[3] DOI plans to expedite the leasing framework for Atlantic wind by: identifying "wind energy areas" (WEAs) in the Atlantic, as well as Facilitating information gathering from key agencies regarding environmental and geophysical attributes and other uses of WEAs. DOE plans to assemble information in publicly available format for potential investors and applicants, and for use of BOEMRE[4] in evaluating lease sales in WEAs.

Besides the NREL report, a University of Delaware study also examined Maryland's offshore wind power potential.[5] This study pre-dates the NREL Offshore Resource report by a few months, however it is more site specific.

Page 11 describes the process used in assessing wind resources and how that translates into power production. The method used is a quick and dirty method in wind resource assessment and typically developers will fund an AWS Truepower or Second Wind company to do a more thorough analysis for deploying turbines.

[3] JNT000004
[4] Bureau of Ocean Energy Management, Regulation and Enforcement (formerly MMS)
[5] APL000010

The table on page 19 states that using existing, proven technology in shallow waters (0-35 m), there is potential to install 14,625 MW of capacity, generating 4,982 MW on average, under the given assumptions. This too is far greater (more than10 times greater) than the potential contribution for wind power provided in the FEIS.

That there is substantial real interest in developing this potential is well documented. NRG Bluewater Wind already has proposed a 600 MW wind farm off the coast of Maryland.[6] This single project, which would tap wind resources more than 12 miles from land, would itself provide four times the amount of wind power initially examined in the FEIS, and ½ or more of the amount the FEIS argues would not change its assessment.

In addition, Bluewater Wind has received approval to build a 450 MW wind farm off the coast of Delaware and is proposing to build another 350 MW off the coast of New Jersey, both of which would feed into the PJM grid that services Maryland. With these projects alone, which only scratch the surface of potential offshore wind power in Maryland and the region, the wind power produced would exceed that considered in the Calvert Cliff-3 FEIS.

The tremendous potential for offshore wind in Maryland and the mid-Atlantic can also be seen in the October 2010 announcement by Google and GoodEnergies that they have established a consortium in a $5 billion transmission backbone to bring

[6] JNT000005

offshore wind in the region to the shore.[7] Such large investments in transmission are not made to transmit small amounts of electricity.

Q.8. In Section 9.2.4, in which the Final Environmental Impact Statement (FEIS) for Calvert Cliffs-3 examines a combination of alternatives that might be cost-effective, does the FEIS understate the potential contribution of solar power to Maryland and the PJM grid that services Maryland?

Yes, the FEIS assumes a contribution of only 75 MW from solar power, and discounts solar photovoltaics entirely. This may be due to an apparent misconception about the nature of "baseload" power and the ability of solar photovoltaics to provide reliable electric power.

The FEIS assumption of 75 MW of solar power ignores Maryland state law, which mandates that a minimum of 2% of the state's generating capacity be provided from solar power by 2022. This 2% minimum itself means that approximately 250 MW of power must be generated from solar power by that date.

However, this minimum amount is likely to be greatly exceeded.

Q.9. What is the real potential contribution of solar power to Maryland and the PJM grid that services Maryland?

[7] JNT000006

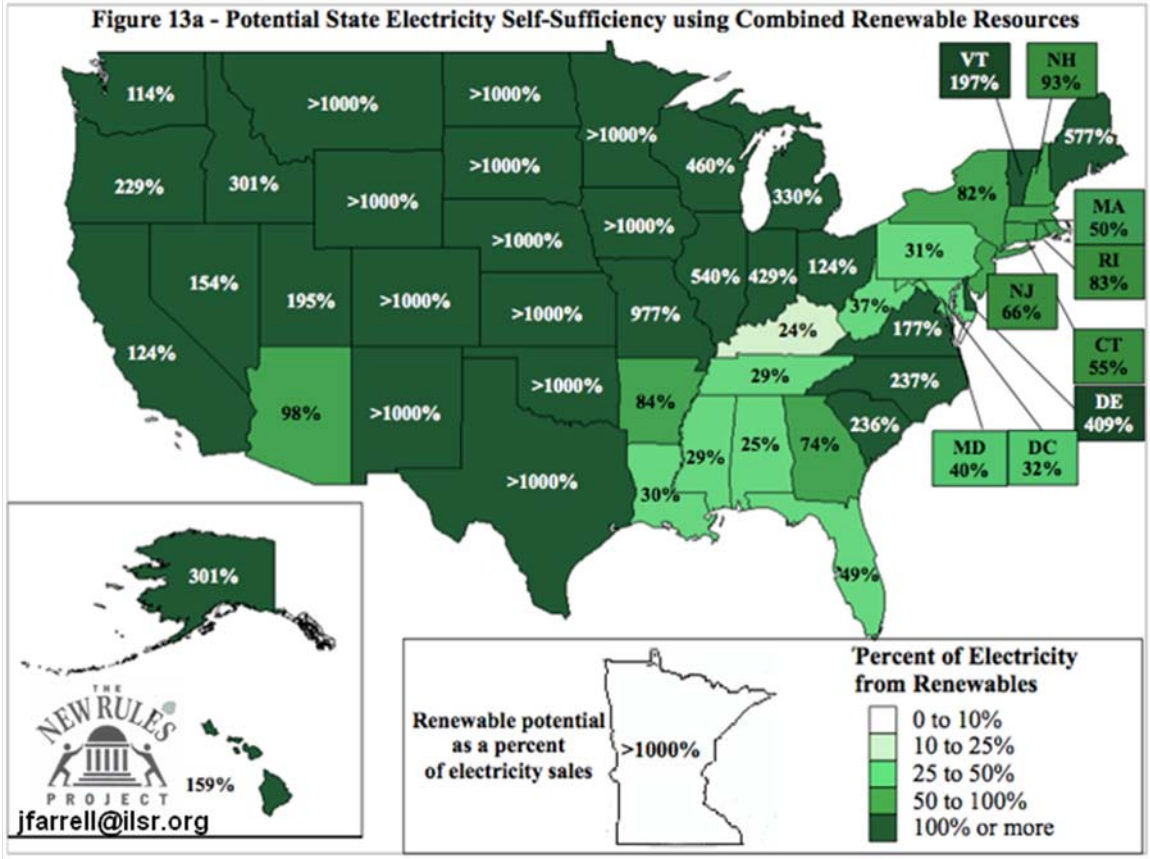
Maryland can meet 40 percent of its energy needs from land-based renewable energy resources, according to a report from The Institute for Local Self Reliance released in October 2009, authored by John Farrell, titled, "*Self Reliant States*."[8]

Following is an excerpt from the Executive Summary Conclusion:

"All 36 states with either renewable energy goals or renewable energy mandates could meet them by relying on in-state renewable fuels. Sixty-four percent could be self-sufficient in electricity from in-state renewables; another 14 percent could generate 75 percent of their electricity from homegrown fuels. Indeed, the nation may be able to achieve a significant degree of energy independence by harnessing the most decentralized of all renewable resources: solar energy. More than 40 states plus the District of Columbia could generate 25 percent of their electricity just with rooftop PV. In fact, these data may be conservative. The report does not, for example, estimate the potential for ground photovoltaic arrays – although it does estimate the amount of land needed in each state to be self-sufficient relying on solar – even though common sense suggests that this should dwarf the rooftop potential..... It is at the local level that new technologies like smart grids, electric vehicles, distributed storage, and rooftop solar will have their major impact."

[8] JNT000007

A map from the report is excerpted below. Note that this map and the estimate that Maryland could provide 40% of its power from renewable resources does not include any contribution from offshore wind for Maryland. In a brief August 16, 2011 update posted on the Institute's website, the authors take note of the University of Delaware study cited above and conclude that Maryland could generate 107% of its power needs from in-state and offshore renewable resources.



In a 2007 study, Energy Transition Report Prepared for Governor Martin O'Malley, "Maryland enacted a Renewable Portfolio Standard (RPS) in 2004. This law, the lowest RPS of any state that has one, requires 2.5% (and increasing to 7.5% by 2020) of the state's electricity to come from renewables. The RPS, however, has defined renewables broadly and included facilities located in the PJM grid area plus one state. This wide geographic area, particularly with the ever expanding size of PJM, has resulted in over 2000 existing facilities qualifying for the Maryland RPS. There is ample supply of current out-of-state resources to supply Maryland's RPS need through 2019, without constructing a single in-state facility."[9]

The Maryland 2010 Outlook states that Maryland's Renewable Portfolio Standard (RPS) requires that 20% of Maryland's electricity be generated from renewable energy sources by 2022, including 2% from solar energy. Maryland has made remarkable progress toward achieving the peak demand reduction target set by EmPOWER Maryland. Utilities have committed to reduce peak demand by 1,933 MW in 2011 and by 2,850 MW in 2015. If realized, these reductions will, in fact, surpass the EmPOWER Maryland target. Maryland is working actively to promote renewable energy generation within the State. Grants to residential consumers for solar, wind, and geothermal heat pumps have soared from a few hundred last year to over a thousand expected to be awarded in fiscal year 2010. The Clean Energy

[9] JNT000008

Production Tax Credit offers a State income tax credit for electricity generated from qualified renewable sources. The State and the University of Maryland announced a long term power purchase agreement with four developers to jumpstart commercial scale renewable energy production, including on-shore wind, offshore wind, and solar. The State has also launched a technical study in 2009 of the potential for offshore wind and released a Request for Expressions of Interest and Information (RFI) from wind energy developers interested in developing wind energy generation facilities in Maryland's offshore waters. Maryland also spearheaded a Mid-Atlantic Off-Shore Wind Memorandum of Understanding (MOU) with Virginia and Delaware to work collaboratively to develop our shared coastal resources.[10]

The cost of solar power, particularly photovoltaics, has been dropping sharply over the past few years. A 2010 report titled *Solar and Nuclear Costs—The Historic Crossover* compares the declining costs of solar photovoltaics to the rising estimated costs of nuclear power and concludes that for North Carolina—which has only slightly better solar potential than Maryland[11]—solar became cheaper than nuclear in 2010 and the trendlines indicate that the cost gap will only widen.[12]

As the costs for solar photovoltaics are now competitive, and in many cases already cheaper than other forms of electricity generation, it is rational and logical to assume that more and more large electricity end-users will install solar PV systems

[10] JNT000009
[11] See JNT000016
[12] JNT000012 see especially chart on page 3.

in Maryland, as Perdue,[13] General Motors,[14] and the Washington Redskins[15] are doing or already have done in Maryland.

A March 2010 study by SolarTown shows huge potential for solar in Maryland.[16] It concluded that over 450 million square feet of roof space would be suitable for solar panels in the State of Maryland. The space that is available for solar panels would add over 5,000 megawatts of capacity to the State—far, far greater than the 75 MW credit granted in the FEIS. SolarTown estimates that if solar energy systems on the roof space eligible on these homes were installed, 24% of the residential needs of the State would be met.

Recent experience shows that this kind of potential is quickly becoming reality. For example, see the attached list of recently completed projects of just two regional solar companies, Sun Edison and Standard Solar, provided to this author directly from the companies.[17] These total 16,422 KW, or 16.4 MW in Maryland (including PJM states Delaware, New Jersey, Pennsylvania, and Washington DC, these two companies alone recently have installed 43,110 KW, or 43.1 MW). This indicates that a potential solar photovoltaic contribution of well above 75 MW is well within reach, particularly given the rapidly declining costs of this technology. Indeed, it is likely that the 75 MW threshold of the FEIS will be exceeded before Calvert Cliffs-3

[13] NRC000037
[14] NRC000038
[15] JNT000020
[16] JNT000013

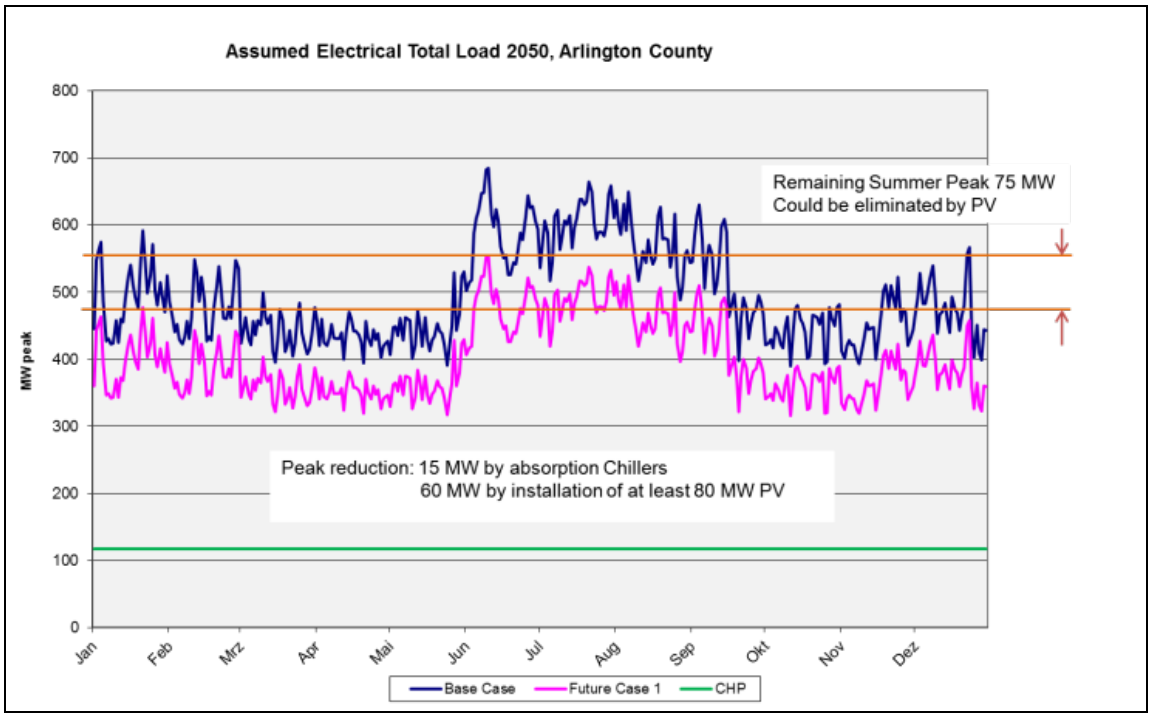
[17] JNT000014 and JNT 000015

could even be licensed and its reactor design certified, much less built and operating.

The best value solar can achieve is reducing the midday energy loads which are the highest cost power and when most people, businesses and institutions use electricity. The chart below from Arlington County, VA, just across the Potomac River from Maryland, plots electric power contributions from solar photovoltaics and combined heat and power.

Line losses are also not considered in the EIS calculations/ The Analytics of Valuing Time-Varying Solar PV Power. Assuming the solar PV power is both produced and consumed at the end-user's site, the value of that power is the cost of the alternative technology for delivering electricity to the end user: the marginal cost of central station generation adjusted for the electricity losses in the transmission and distribution of the power. In a competitive wholesale electricity market, the market price at any point in time will reflect the marginal cost of generation in that hour. Transmission and distribution line losses also vary over time. The standard engineering approximation of these losses is that they are proportional to the square of the flow on the lines. Actual losses in transmission and distribution to any one specific end user will, of course, vary with the location of the generation and end user on the grid. In aggregate, about 7% of power generation in the electricity grid is dissipated through line losses in the transmission and distribution system.[18]

[18] JNT000017



Solar photovoltaics can conservatively offset 1 GW of midday electric power and offshore wind power can easily meet 500 MW of early evening through early morning electric power. These are conservative estimates and these offset the Calvert Cliffs reactor without radioactive waste or concerns on nuclear terrorism. Combined heat and power, landfill gas and biomass electric, and marine energy (freeflow hydropower, wave, tidal, and ocean currents) can easily provide 3 GW of electric power in Maryland at prices under that of nuclear power.

Q.10. Can solar and wind power provide "baseload" power?

An underlying fallacy of the EIS and Applicants' Environmental Report is that technologies like solar and wind power cannot provide "baseload" power and thus should be substantially discounted as to their potential contribution to the electrical needs of a state or region.

This line of argument may have been relevant some years ago; it is much less relevant in 2011. The notion of "baseload" power has changed radically from the late 20th century.

It is stated that Calvert Cliffs-3 is intended to be a "baseload" power plant. However, because of electricity deregulation, the operators of Calvert Cliffs-3 can only sell their electricity to those entities that wish to purchase power from Calvert Cliffs-3. This reactor could only be a "baseload" power source to the extent that there are willing power purchasers for its electricity.

Moreover, as a merchant plant in a deregulated marketplace proposed by a company (UniStar Nuclear) that operates no other power plants of any kind, it is disingenuous to rely upon the "baseload" power argument in the context of Calvert Cliffs-3. The best nuclear power plants typically achieve slightly above 90% capacity factors. Nuclear reactors must periodically shut down, usually for weeks at a time,

for refueling and routine maintenance. Major maintenance typically requires additional shutdown. In addition, there appears to be a learning curve in using new technology and new reactor designs: historically, new nuclear reactors typically average far less than 90% capacity. For example, in 1985, not long after several large new reactors came online, the average U.S. capacity factor of nuclear reactors was only 58%. [19]

History suggests that Calvert Cliffs-3, which is to use a reactor design that has not operated anywhere in the world at this point, could not be expected to achieve a high capacity factor for some years. Since there is no experience or data for this reactor design, it is, in fact, unknown whether Calvert Cliffs-3 could ever achieve a high capacity factor.

~~In the case of a reactor operated by a major utility, back-up power supplies are typically available and used when necessary to provide electricity when reactors are closed for refueling or maintenance. In the case of Calvert Cliffs-3, this operator has no back-up power—other than from the general grid—available whatsoever. In that sense, Calvert Cliffs-3, as a stand-alone plant with no available back-up source of power, can not possibly meet a hypothetical standard of a "baseload" power source. It cannot and will not operate 24/7/365. And if the general grid has sufficient power to supply the 1600 MW that Calvert Cliffs-3 could (given sufficient power purchase~~

[19] JNT000019

~~agreements) provide when operating, then the question re-arises about need for the plant.~~

Conversely, smaller distributed power sources, such as wind and solar, typically require less backup power and suffer less downtime for maintenance (and, of course, none for refueling). Moreover, while the sun is not out at night, it does in fact rise every morning. And solar thermal plants, using hot heat-transfer oil or molten salt as heat storage, do operate well into darkness. Similarly, while it may not be windy 24/7/365 in any given location, wind does, in fact, blow somewhere at all times. As such, a power system based on distributed "intermittent" renewables ~~(along with other renewables such as sustainable biomass) and increased energy efficiency as sought by Maryland's Empower Maryland Act~~, could in fact provide electricity more reliably than a large reactor with an average or below average capacity factor ~~and no back-up power supply whatsoever~~.[20] And reliability is the true goal of "baseload" power.

The simple reality is that wind and solar power, especially coupled with modern grid practices, is far more able to meet Maryland's, and the entire mid-Atlantic's, electricity needs that is given credit for in the Calvert Cliffs-3 FEIS and can provide needed power on a much more flexible basis.

[20] See discussion *How do the competitors' reliability compare with nuclear power's?* pp21-26 of JNT000018 for further explanation of how renewable energy technologies can provide reliable power, and can, in fact, provide power more reliably than supposedly "baseload" nuclear reactors.

In Conclusion

In the context of the FEIS, substantial contribution can also be granted to natural gas (although Joint Intervenors believe no such contribution is necessary). Indeed, Joint Intervenors believe and argue that natural gas should be considered only a back-up power source to renewable power generation (instead of the other way around), which can, and we predict will, meet the needs of Maryland in the time frame in which the proposed Calvert Cliffs-3 reactor would operate. While such back-up power may be needed on occasion, it will be the power of last resort, rather than of first resort.

Joint Intervenors do not contest Applicants and NRC staff views on the future need for electricity in Maryland ~~and the PJM service area, although we believe aggressive energy efficiency programs, such as those instituted by the state of Maryland, and ongoing technological improvements in energy efficiency can and will reduce electricity demand more than given credit for in the FEIS.~~

The FEIS for the proposed Calvert Cliffs-3 nuclear reactor does not adequately recognize the potential—we believe nearly certain—contributions wind and solar power can and will make to Maryland's ~~and the PJM's~~ electrical supply and thus its discussion of a Combination of Alternatives to Calvert Cliffs-3 fails to provide a legally-defensible picture of the situation. As such, the FEIS must be rejected as

written and must be re-researched, re-written, and re-submitted before the proposed Calvert Cliffs-3 nuclear reactor can be considered for licensing.

NRC STAFF ATTACHMENT 3

Sklar Rebuttal Testimony (Ex. JNTR00030)

(Exclusions with which the Joint Intervenors agree appear in italics.)

Testimony To Be Excluded	**Reason For Exclusion**
Page 4, Lines 12-15	Discussion of renewables other than wind or solar.
Page 5, Lines 7-12	Discussion of renewables other than wind or solar.
Page 6, Lines 11-14	Discussion of Maryland biomass, water, and waste heat capacity.
Page 6, Lines 14-17	*Discussion of biogas generation.*

JNT 000030

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of Docket No. 52-016

Calvert Cliffs-3 Nuclear Power Plant
Combined Construction and License Application

REBUTTAL TESTIMONY OF SCOTT SKLAR, PRESIDENT OF THE STELLA GROUP, LTD., ON CONTENTION 10

Q.1. Please state your name and describe your professional qualifications to give this testimony.

My name is Scott Sklar and I am The President of The Stella Group, Ltd. which is a strategic technology optimization and policy firm for clean distributed energy users and companies, with a focus on system standardization, modularity, and web-enabled diagnostics. My professional qualifications were submitted October 28, 2011 as JNT000002.

Q.2. What documents or information have you reviewed to prepare your testimony?

In addition to the documents reviewed in preparing my initial testimony, I have reviewed the testimony of NRC staff and Applicants filed October 21, 2011, and additional documents cited below and being submitted as exhibits with this rebuttal testimony.

Q.3. Do you agree with NRC staff and Applicants testimony that the EIS for the proposed Calvert Cliffs-3 nuclear power plant adequately considers the potential for solar power as a source for electricity in Maryland?

Emphatically not. As shown in my initial testimony, the EIS dramatically understates the potential for solar power in Maryland.

Globally, solar power is growing rapidly. Analysts at CleanTechnica, for example, state that new solar PV installations more than doubled from 2009-2010, from 7.1 GW of new solar PV in 2009 to 15.6 GW in 2010.[1] A similar growth rate is eminently feasible for Maryland.

As pointed out in my initial testimony, Maryland state law requires that 20% of the state's electrical generation come from renewables by 2022. At least 2%, or approximately 250 MW(e) of functional capacity, of that must be generated by solar power. This type of government incentive is key to solar development. As noted recently by Rhone Resch, President of the Solar Energy Industries Association,

"Germany, for example, has yearly sunlight similar to Anchorage, Alaska, but has more than ten times the installed solar PV capacity of the entire American desert southwest.

Why?

It is because Germany made the use of PV a top priority in its national energy policy years ago, giving generous government incentives for individuals and businesses to install and use their own systems. Since the United States federal government has

[1] JNT000026

yet to implement a comprehensive national policy that provides long-term market signals for solar and other renewables, as it did for oil, coal and gas this past century, the solar industry's growth today tends to concentrate in states whose legislatures have enacted policies and programs that attract solar investment….

For example, the Garden State, New Jersey, has less sunlight than other places in the United States (NM, AZ, CO), but it offers solar energy incentives for residential systems that can pay for themselves in as little as three years. As previously mentioned, the state is second only to California in the amount of solar installed."[2]

While Maryland could, should, and still may do more to encourage solar development, by adopting a Renewable Portfolio Standard with a clear minimum carve-out for solar generation, Maryland has taken the kind of step necessary to encourage speedy and large solar power development in the state. And Maryland certainly has greater solar potential, per acreage, than either Germany or New Jersey.

Q.3. Do you agree with NRC staff and Applicants testimony that the EIS for the proposed Calvert Cliffs-3 nuclear power plant adequately considers the potential for wind power as a source for electricity in Maryland?

Again, emphatically not. The projections in the EIS for anemic wind power growth in Maryland fly in the face of present-day reality. Wind is the fastest growing electricity source in the United States and is second only to natural gas in absolute growth in terms of megawattage installed.

[2] JNT000029

For example, according to the Rocky Mountain institute, the most well known analytical non-profit on energy efficiency, renewable energy and micropower, "In 2009, wind and other renewables accounted for 42.2 percent of all new U.S. generating capacity, while gas accounted for 43.3 percent and coal for only 12.6 percent. The U.S. installed 10 GW of windpower in 2009 alone—nearly twice the 6 GW of coal added during the entire decade of 2000–2009."[3]

The rapid growth of wind power is occurring for similar reasons as the rapid growth in solar power: it is cost-effective, reliable, and government policies, such as Maryland's Renewable Portfolio Standard (RPS), provide incentives for its deployment.

As documented in my original testimony of October 28, Maryland has substantial wind resources and there is serious interest in developing these resources. ~~While other renewable resources, such as biomass electric (based on biodegradable wastes, only, not incineration) can and should play a part in meeting the requirements of the RPS,~~ it is inconceivable that wind will not become the leading component of the RPS mix.

Q.3. Do you agree with NRC staff and Applicants testimony that the EIS for the proposed Calvert Cliffs-3 nuclear power plant indicates that solar and wind

[3] JNT000027. We note that new nuclear power plants have accounted for zero new capacity in the U.S. since 2000.

power cannot provide "baseload" power and thus cannot serve as effective alternatives to the proposed Calvert Cliffs-3 reactor?

No. As discussed in my original testimony, the notion that Calvert Cliffs-3 itself would be an effective "baseload" power plant for Maryland is questionable at best. While solar and wind power can be intermittent power sources, off-shore wind has an extremely high capacity factor of around 40% and solar electric production has a high-degree of generation--matching the midday electric load. ~~Coupled with other renewables scarcely examined in the EIS, such as biopower including landfill gas, marine energy including tidal, wave, ocean currents and thermal, and of course, combined heat and power (using waste heat of off industrial processes to generate electricity), it is certainly possible for renewables to provide the functional equivalent of "baseload" power—a reliable supply of electricity.~~

In a March 2010 study, Dr. John Blackburn, Ph.D., Professor of Economics Emeritus, Duke University, used North Carolina (close to Maryland) daily and seasonal load data, adjusted for improvements in efficiency, and joining it to measured and estimated wind and solar data for North Carolina. As he notes, the partition of wind and solar, which together make up 76 percent of the annual generation in his model is not optimized; rather an initial assumption was made that wind and solar would contribute equal amounts. This report shows that with modest amounts of resources such as hydropower (both normal and pumped storage), some natural gas generation, and some purchased power, loads can be met even at times of low

renewable supply.[4]

I also point again to the paper "The Nuclear Illusion," by the Rocky Mountain Institute's Amory Lovins and Imran Sheikh, quoted by Joint Intervenors in their Rebuttal Statement of Position, which explains how "renewables' electrical supplies will be *more* reliable than current arrangements." (emphasis in original)[5]

Conclusion

Maryland has the rooftop and parking lot area to meet conservatively half of the output of a 1600 MW nuclear reactor with solar photovoltaics during the days on a fairly consistent basis. Wind, including onshore and offshore, can also meet conservatively half of a 1,600 MW output of the proposed Calvert Cliffs-3 reactor on a fairly consist3nt basis. ~~The State of Maryland has ample biomass electric (based on biodegradable wastes, only, not incineration), water energy technologies, and waste heat to meet a 1,600 MW load 24 hours a day--and thus can "firm" the solar and wind output.~~

~~These technologies and applications can provide electric power at levelized costs, and except for solid resource biogas plants have no wastes, and those wastes are economic coproducts including animal feed, fertilizer, building materials and road-bedding.~~

[4] JNT000028
[5] JNT000018

The benefits of small, more agile, generation is being seriously endorsed in a third of the United States by the Public Utility Commissions, and we urge the NRC to take into account the changing marketplace, the advanced of commercial technologies in the renewable energy and high-value energy efficiency arena in their considerations.

NRC STAFF ATTACHMENT 5

Joint Intervenor Rebuttal Statement of Position

Argument To Be Excluded	Reason For Exclusion
Page 3, Line 20; Page 4, Line 1	In the carryover sentence, the Joint Intervenors allege the EIS fails to capture the alternative energy potential of the PJM service area.
Page 6, Lines 6-8	Incorrect claim that NRC Staff assumed in its FEIS the violation of the MRPS.
Page 9, Lines 12-15	Incorrect claim that both the Applicant and NRC Staff assume the violation of the MRPS.
Page 9, Lines 16-17; Page 10, Lines 1-8.	Discussion of solar development strictly in terms of compliance with MRPS and alleged EIS failure to assume MRPS compliance.
Page 10, Lines 12-20 and n. 11; Page 11, Lines 1-14	Claim of ambiguity in Applicant and NRC Staff understanding of project timeframe and perceived future challenges in the licensing process, as well as reference to another contention.
Page 12, Lines 3-4	Claim that the proposed nuclear plant is as speculative as certain proposed wind projects.
Page 13, Line 10	Incorrect claim that wind power generation in Maryland is mandated by the MRPS.
Page 16, Lines 1-2	Back-up power discussion outside the scope of the admitted contention.
Page 18, Lines 8-12.	Does not concern power generation in Maryland, the Region of Interest. Joint Intervenors also challenge the need for power and purpose and need for the proposed action; both outside the scope of the admitted contention.
Page 22, Lines 1-4.	This is a quotation from a Wikipedia article.

NRC STAFF ATTACHMENT 6

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of

Docket No. 52-016

Calvert Cliffs-3 Nuclear Power Plant
Combined Construction and License Application

JOINT INTERVENORS STATEMENT OF POSITION (IN REBUTTAL)

Michael Mariotte
Nuclear Information and Resource Service
Designated representative for Joint Intervenors

November 18, 2011

I. BACKGROUND

Joint Intervenors accept the background to this proceeding as presented by NRC Staff in the NRC Staff Initial Statement of Position of October 21, 2011.

We add only that Joint Intervenors did not present an Initial Statement of Position with our filing of expert testimony and exhibits on October 28, 2011, since we believed our position was encompassed in Contention 10C. However, we do now present this Joint Intervenors Statement of Position to accompany the filing of our rebuttal testimony and exhibits.

We also are filing at this time a sworn affidavit from our expert witness Scott Sklar for our initial testimony (and for today's rebuttal testimony) and are resubmitting that initial testimony as JNTR000001 to reflect that we have added page numbers, as requested by this ASLB. No changes other than the date, exhibit number and page numbers have been made to this testimony first filed on October 28, 2011.

II. LEGAL STANDARDS

Joint Intervenors generally accept the legal standards as presented by NRC Staff in the NRC Staff Initial Statement of Position of October 21, 2011 and of Applicants in Unistar Initial Statement of Position on Contention 10C of October 21, 2011.

We agree that under NEPA, an agency must "consider the stated purposes of the project and the needs of the Applicant."[1] We point out, however, that consideration does not mean blind acceptance. An Applicant that offers stated purposes that cannot be fulfilled is entitled only to consideration of those purposes, not reliance upon them, to meet NEPA's requirements of consideration of alternatives.

For example, hypothetically speaking, an application that states the purpose of its proposed project is to provide 2,000 MW of electricity to a region, but proposes a project capable of producing only 1,000 MW of electricity, would be absurd on its face, and the applicant would not be entitled to any particular deference or undue consideration of its stated purpose. In this situation, a discussion of alternatives would be required to focus on alternatives to the 1,000 MW the project could actually produce rather than the 2,000 MW stated as the purpose.

In the case of Calvert Cliffs-3, the difference between the stated purpose of the Applicants and the reality of the situation is more nuanced than the hypothetical example, but is relevant to this Contention, as discussed in Section IV below.

We also note that Joint Intervenors have never suggested that the EIS include remote or speculative events, nor that the consideration of alternatives include all possible alternatives and/or combination of alternatives, nor that the ASLB should "flyspeck" the EIS. Rather, Joint Intervenors have consistently argued that the particular combination of alternatives chosen by the NRC Staff for examination in the EIS greatly understates the potential (we would argue nearly certain) contributions wind and solar power can and will contribute to Maryland ~~and the PJM~~

[1] NRC Staff Initial Statement of Position of October 21, 2011, page 6

~~service area~~ in the coming years. This understatement leads to an inaccurate conclusion about the environmental impacts of the likely combination of alternatives to Calvert Cliffs-3, and thus to an inaccurate finding that Calvert Cliffs-3 presents the least environmental impact. Such an inaccurate finding strikes at the heart of the purpose of NEPA, which is to provide an impartial, accurate assessment of the impacts of the proposed project and its alternatives.

III. THE COMBINATION OF ALTERNATIVES ANALYZED IN THE EIS IS INADEQUATE AND THE ASLB SHOULD FIND IN FAVOR OF JOINT INTERVENORS

A. Overview

The issues raised in Contention 10C mirror a larger societal debate over the nature and future of our energy and electricity generation systems. To oversimplify, on one side are those, such as Applicants and apparently NRC Staff, who believe in what Joint Intervenors describe as a 20th Century energy model that relies on large, centralized power stations powered by traditional fuels such as coal and uranium. On the other side are those, including Joint Intervenors, who believe that technological advances and cost reductions in renewable energy now allow our energy future to be more secure, as well as safer, cleaner and more affordable through increased energy efficiency and new power provided by a mix of generally smaller-scale (sometimes even micro-scale) and distributed renewable energy sources.

Which of these two visions of our energy future will "win out" is of course, unknown at this point. And it is more likely than not that for the relatively near future, these two visions will need to co-exist.

Such a stark contrast in our energy choices would not have been an issue during the first generation of nuclear reactor construction: the renewable technologies simply were not economically or technologically capable of providing a meaningful contribution to our energy supplies 30-40 years ago. That they are today, however, suggests that an EIS—conducted for any energy project—must consider a much greater reliance on these technologies than may have been the case in the past.

In the context of this proceeding and this contention, however, it is important to note that neither the ASLB nor the EIS need take a position on which of these two visions (or shades of gray between them) should or will prevail. Outside forces, include economics, politics, consumer behavior, corporate choices, and more, will make the actual determination of our energy future.

But while the EIS need not choose an energy future or advocate for a particular energy policy, it is required to take a hard look at feasible energy alternatives and their environmental impacts. In this case, the EIS has underestimated the potential (likely) contribution of solar and wind power, and has further exacerbated this underestimation by accepting, uncritically and without examination, the Applicants' stated purpose of providing a traditional concept of "baseload" power, leading to an even more substantial underestimation of the potential contribution of environmentally preferable solar and wind power as alternatives.

B. Solar Power

As pointed out in Joint Intervenors' expert testimony,[2] Maryland state law requires that solar power produce 2% of Maryland's electricity by 2022, or approximately 250 MW. This requirement is, of course, a floor, not a cap. And this requirement is already more than three times higher than the EIS considers in its discussion on combination of alternatives.[3]

~~The NRC Staff position then, assumes that Maryland law will not be complied with. We believe an assumption from a federal agency that a state law will not be complied with provides a dangerous precedent. It is, in fact, reasonable to assume that state law will be complied with.~~

We note that Applicants' expert testimony also suggests that solar power in Maryland will fall short of the goals of Maryland law, but at least that testimony does finally acknowledge that "In terms of installed capacity, the LTER high renewables scenario forecasts that there will be 785 MW of additional solar capacity by 2020 (approximately 120 MW(e)), 1068 MW by 2022 (160

[2] JNTR00001, page 9

[3] It is important to compare apples to apples. The NRC staff argues that end-use solar capacity in Maryland is expected to be about 270 MW by 2035 (page 14 of NRC Staff Initial Statement of Position). The staff then argues that this equates to about 68 MW of "baseload" capacity because of solar's current 18-25% capacity factor (Applicants argue solar's capacity factor is even lower). However, the intent of Maryland's Renewable Portfolio Standard law is not to simply achieve 2% of nameplate capacity, it is to achieve 2% of electrical generation from solar power by 2022. Thus, assuming NRC staff is correct in its statement of solar capacity factor (we believe technological improvements are making solar capacity factor somewhat higher), then Maryland law would require approximately 1,000 MW of solar to be in place by 2022, providing approximately 250 MW of reliable electricity. For purposes of this position statement, when referring to megawattage, we are referring to electricity production rather than nameplate capacity.

MW(e)), and 1158 MW by 2030 (174 MW(e)).”[4]

While Applicants’ testimony considers the high renewables scenario “speculative,” that is difficult to understand since that position appears to be based on a faulty understanding of the economics of solar power—especially compared to the economics of Calvert Cliffs-3.

As we pointed out in our testimony and in exhibit,[5] solar power costs have now crossed a line and have become cheaper than nuclear power in the mid-Atlantic region. Applicants’ testimony actually offhandedly admits this, pointing out that in 2011 solar PV panels have dropped to $1/watt (or $1,000/kw) which equates to less than $3,000/kw installed for utility scale systems, compared to $8,000/kw just seven years ago.[6] Industrial scale PV systems have similarly dropped in price, as have consumer-scale systems.[7] Moreover, solar power has no fuel costs and extremely low operating and maintenance costs, making its economics even more attractive.

The new economics of solar power are the main reason a major utility like NRG Energy intends to direct 85% of its investment over the next three years into large-scale solar projects. But looking to the future beyond that, NRG Energy chief David Crane told financial analysts recently that, "The distributed, residential [solar power] is going to end up swamping the big-scale projects."[8]

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[4] APL000001, page 38
[5] JNT000016 and JNT 000012
[6] APL000001, page 32
[7] We note that even the $6,000/kw figure stated in Applicants testimony for rooftop consumer solar systems is economically competitive with per/kw costs of Calvert Cliffs-3—and cost estimates for solar continue to decline while cost estimates for nuclear (and real-life experience of EPR construction in Finland, France and China) continue to rise.
[8] JNT000021

NRG Energy recently abandoned its plans to build new nuclear reactors in Texas because of uncertainty over federal loan guarantees and a recognition that the project would not be economically competitive with other energy sources. Similarly, James Rowe, CEO of Exelon, the nation's largest nuclear utility, recently called Calvert Cliffs-3 "utterly uneconomic" and said it is "almost inconceivable" that former UniStar Nuclear partner Constellation Energy would re-enter the Calvert Cliffs-3 project.[9] While Mr. Rowe was primarily comparing Calvert Cliffs-3 costs to those of natural gas, it is telling that high-profile nuclear power executives believe nuclear power to be no longer economic compared to the alternatives.

Indeed, in the unlikely event the Calvert Cliffs-3 project actually proceeds to construction, the result is likely to be increased demand for consumer level rooftop solar power in the region as a hedge to protect against the higher electricity prices power from this reactor would generate.

Thus, Joint Intervenors argue that far from being speculative, the "high renewables scenario" is actually the more likely outcome.

While the EIS need not endorse this scenario, it is reasonable to expect the EIS to examine this scenario, especially given that Maryland law requires not only 2% solar, but 20% of electricity generation from renewables overall by 2022, or about 2,500 MW (far more than Calvert Cliffs-3 could supply), most of which is expected to come from wind power.

NRC Staff argues that a larger contribution of solar power would impact a larger land area, implying that the environmental impact of this larger contribution might be greater than stated in

[9] JNT000022

the EIS. However, because much of the projected increase in solar power in Maryland is expected to be rooftop solar, the impact on land is unlikely to be significant.

C. Wind Power

NRC staff argues in favor of the EIS position that 100 MW of wind power, representing 400 MW of installed capacity, is appropriate to consider for the combination of alternatives (although NRC also argues that quadrupling this capacity would essentially make no difference to the EIS analysis).

Applicants, in their testimony and initial position statement, project a particularly dismal future for wind power, and argue that only 21 MW of new wind power can be expected in Maryland.

Neither NRC staff nor Applicants provide a clear time frame for these projections (i.e. whether this is over the next 5 years, 10 years, 20 years?).

~~As is the case for their discussion of solar power, both NRC staff and Applicants apparently assume that Maryland's Renewable Portfolio Standard law, which requires 20% of the state's electricity to be generated by renewable resources (2% by solar power) by 2022[10], will not be complied with.~~

As noted above, 20% of the state's electricity is on the order of 2,500 MW. ~~Assuming that solar power does indeed meet its 2% requirement (which neither NRC staff nor Applicants assume),~~

[10] JNT000009

then that leaves about 2250 MW that must be generated from other renewable resources. If this generation does not come from wind – and Maryland is blessed with extremely significant wind power potential – then what other technologies could be used to meet the requirements of this law? One would expect that the EIS would identify and examine the environmental impacts of whatever these other technologies might be, but it does not (the EIS does provide for small amounts of hydropower and biomass power, but not nearly enough to meet state law).

Joint Intervenors believe that a federal EIS cannot simply ignore state law and assume that a state law will not be complied with as a means of supporting the federal agency's preferred assertions.

Both NRC staff and Applicants dismiss the proposed Bluewater Wind offshore wind project for Maryland (and other Bluewater Wind projects proposed for the PJM service area which feeds into Maryland) on the grounds that the permitting process for this project is likely to be slow. Neither NRC staff nor Applicants place this projection into a definable time frame (for example, NRC staff argues it is unlikely it "could be operational within the timeframe of the proposed project [Calvert Cliffs 3]" without indicating the timeframe it expects Calvert Cliffs 3 could be operational.[11] Applicants say it is "unlikely to be completed in the foreseeable future," without any indication of how far into the future Applicants can see.

This reliance on the projected slow pace of permitting for the Bluewater Wind project, which by itself would produce more wind power than projected in the EIS, is particularly disingenuous given that it already has been more than four years (since summer 2007) since initial license application papers were filed for the project at hand – Calvert Cliffs 3 – and given that the EPR

[11] NRC Staff Initial Statement of Position, page 13

~~design for this project has not received design certification and is not expected to for at least another 18 months and perhaps longer, and given that NRC staff already has informed the Applicants they are not even eligible to receive a construction/operating license for this reactor project,[12] and given that as recently as July 7, 2011, Applicants argued in oral hearing for an essentially unlimited time frame to complete this current proceeding.~~

~~In short, there is no evidence and little reason to believe that Bluewater Wind could not receive approval before Calvert Cliffs-3 can receive approval – if indeed Calvert Cliffs-3 ever can receive a construction/operating license. And wind projects, whether offshore as many are in Europe, or onshore, typically take far less time to construct than do nuclear projects. Indeed, the history of construction of the EPR reactor design chosen by Applicants in Finland (currently five years behind schedule and 100% overbudget) and France (currently three years behind schedule and approximately 50% overbudget) suggests that the EIS should be looking at a timeframe of around 2025 for alternatives to Calvert Cliffs-3 – more than enough time to permit and build several offshore wind projects.~~

Moreover, as we noted in our expert testimony[13], in September 2010 the Department of Interior, recognizing the slow pace of permitting offshore wind projects in the U.S., began a new program to accelerate that process, a program that should benefit all Bluewater Wind projects.

We might also note that Bluewater Wind is owned by NRG Energy, a major U.S. company with substantially more experience in permitting of U.S. projects than the Applicants of Calvert

[12] NRC determination letter of April 8, 2011, JNT 000023. Although this letter is not directly related to Contention 10 and this statement of position, we are entering it as an exhibit for reference.
[13] JNTR00001, page 7

Cliffs-3, which have no experience in permitting of (or, for that matter, building) U.S. power projects of any kind.

~~Surely, Calvert Cliffs-3 at this point must be considered at least as speculative a venture as Bluewater Wind's proposed mid-Atlantic projects.~~

In addition, while we do not argue that an EIS must delve into the world of fantasy or pure speculation, neither is there a requirement that the discussion of a combination of alternatives must examine only certain or approved projects. The purpose of this discussion in the EIS is to examine potential and perhaps environmentally preferable alternatives to the proposed project, not to simply tally up alternatives already underway.

The decision to exclude the Bluewater Wind project from the EIS is arbitrary and seems to have been done to support the agency's pre-determined conclusions rather than to take a "hard look" at realistic alternatives to Calvert Cliffs-3.

As we noted in our expert testimony[14], the actual potential for offshore wind for Maryland far exceeds that of the single Bluewater Wind project and is some 10 times larger than granted by the EIS and at least three times larger than the entire Calvert Cliffs-3 project. There is little reason to believe there would be no interest in harnessing this pollution-free, fuel cost-free resource and, as noted in our testimony and acknowledged in Applicants' testimony,[15] the Atlantic Wind Connection project is composed of serious companies with serious resources and

[14] Ibid, pages 7-8
[15] APL000001, page 28

is intended to transmit 7,000 MW of offshore wind power directly into the PJM grid that services Maryland (with a significant portion of that power being generated off Maryland's coast). Applicants dismiss this project again because it is "very early in the development process." Given the factors cited above, Joint Intervenors argue that it is basically no earlier in the development process than Calvert Cliffs-3.

We also note at this point that while NRC staff and the EIS appear to ascribe an approximately 25% capacity factor for offshore wind, Applicants' testimony agrees with Joint Intervenors that offshore wind capacity factors are generally in the 35-40% range, which by itself would result in a 10% or so larger potential for wind power than granted in the EIS.[16]

The vast potential for wind power in Maryland is clear, ~~is mandated by state law~~, can be brought online in a reasonably competitive time frame with Calvert Cliffs-3 and significant amounts probably even before Calvert Cliffs-3 could be brought online, and is greatly underestimated in the EIS.

This underestimation leads to an inaccurate conclusion in the EIS about the environmental impacts of alternatives to Calvert Cliffs, and must be corrected.

D. Baseload Power

Applicants have stated in their application and throughout this proceeding that their purpose in wanting to build and operate Calvert Cliffs-3 is to provide "baseload" electric power in

[16] APL000001, page 12

Maryland.[17] They argue, in their testimony and initial statement of position, that renewables such as solar and wind cannot provide such baseload power, and certainly not without large-scale energy storage systems, which they argue will not be ready for utility-scale use for another decade or more.[18]

For their part, NRC staff have uncritically accepted Applicants' stated baseload power purpose, and have made similar arguments about the inability of renewables to supply such power.

As stated above, Joint Intervenors agree that the EIS must consider the Applicants' stated purpose. However, as we also state, such consideration need not connote blind acceptance.

In this instance, there are several factors that suggest Calvert Cliffs-3 would or could provide only limited baseload power for Maryland--if any baseload power at all for Maryland; and that renewables could, in fact, provide a reliable equivalent to the amount of baseload power Calvert Cliffs-3 would provide for Maryland.

1. Calvert Cliffs-3 cannot be viewed as a true baseload power plant

Traditionally, baseload power plants provided steady electricity to a wide swath of customers serviced by an electric utility. For example, Wikipedia defines a baseload power plant as "an energy plant devoted to the production of baseload supply. Baseload plants are the production facilities used to meet some or all of a given region's continuous energy demand, and produce

[17] Most recently this is stated in the first sentence (including footnote) of page 14 of Applicants' Initial Statement of Position
[18] See, for example, page 24 of Applicants' Initial Statement of Position

energy at a constant rate, usually at a low cost relative to other production facilities available to the system." Wikipedia also notes that "For a typical power system, the rule of thumb is that the base load power is usually 35-40% of the maximum load during the year."[19]

In typical electricity distribution systems of the past, utilities have operated a mix of baseload and peak load power plants, to ensure reliable electricity supplies to consumers. When one baseload power plant is down for maintenance/refueling etc., the difference is typically made up by use of other baseload power plants or increased use of peak load power plants.

The advent of deregulation and the decoupling of electricity generation and distribution in much of the U.S., including Maryland, is changing the nature of baseload power.

As argued in our testimony,[20] Calvert Cliffs-3 will not and cannot operate as a traditional baseload power plant. As a merchant facility in a deregulated electricity market, power from Calvert Cliffs-3 would only be used by those who choose to purchase it. Typically, these would be large, bulk purchasers of power, rather than individual consumers. In some cases power purchasers would indeed be utilities, with large numbers of customers, seeking to diversify their baseload power supply. In other cases, large power purchasers are typically large industrial users of power.

But because the Applicants are not a utility, and have no other generating assets whatsoever, Calvert Cliffs-3 must be seen as only a partial baseload facility. It cannot produce power on a

[19] JNT000024
[20] JNTR000001, pp 17-19

constant basis because it must close periodically for refueling and maintenance~~, and the Applicants cannot provide any backup power when this occurs.~~ Moreover, as pointed out in our testimony, nuclear reactors, especially in their early years of operation typically have relatively low capacity factors (and this is especially true of new design reactors and Calvert Cliffs-3 is of a design that has never operated before anywhere in the world).

This is not to say that the power Calvert Cliffs-3 would produce is without value, nor do we argue that it could not produce reliable power during those times when it is operating. Rather, it is to argue that the amount of renewable power needed to be considered in terms of alternatives to Calvert Cliffs-3 is not as great as the EIS indicates.

The EIS attempts, in its discussion of alternatives, to replace the full 100% potential output of Calvert Cliffs-3, or 1600 MW. But Calvert Cliffs-3 cannot produce 1600 MW at all times, and the Applicants have no ability to make up for what it cannot produce. For the first few years of operation, it is reasonable to assume, given the history of nuclear generation, that Calvert Cliffs-3 would only achieve a modest capacity factor, say 60% or about 960 MW. Thus, in the context of the EIS discussion of alternatives, the needed renewables alternatives would need equal only 960 MW, rather than 1600 MW, at least for some years. This is significant because much of the rationale consistently given by NRC staff and Applicants in defense of the current discussion of alternatives in the EIS is that renewable technologies are early in the development process, or are unlikely to be operational in a relatively short time frame and so on. Instead, the time frame in which renewables have to be able to compete with or replace Calvert Cliffs-3 output may be longer than the EIS at this point envisions.

2. Calvert Cliffs-3 has no customers in Maryland and has made no commitments to sell power in Maryland

A merchant baseload power plant that has few or no customers at all may well be capable of providing baseload power, but if no one is buying the power then it does not serve the purpose of a baseload power plant.

In this case, Applicants currently have no customers at all, and certainly none in Maryland. While presumably Applicants would not proceed with construction of Calvert Cliffs-3 without considerable confidence that customers would materialize, Applicants have made no commitment to provide power within Maryland.

This Board rejected Joint Intervenors argument that the appropriate region of interest for this Contention is the PJM service area of which Maryland is a part, and Applicants continue to argue that Maryland is, in fact, their region of interest. While we continue to believe that the entire PJM area is a more appropriate region of interest for this facility, since Maryland is not an island unto itself, it is also true that Applicants cannot have it both ways. Applicants cannot argue that Maryland is their region of interest and at the same time fail to acknowledge that they have made no commitment to limit the sale of power to Maryland, nor even to sell power within Maryland at all. The amount of baseload power the alternatives examined in the EIS must produce to provide an equal alternative to the output of Calvert Cliffs-3 going to Maryland may well be zero.

As the Applicants' own Environmental Report states, "CCNPP-3 will operate as a baseload, merchant independent power producer. The power produced will be sold on the wholesale market without specific consideration to supplying a traditional service area or satisfying a reserve margin objective."[21]

In other words, Applicants explicitly reject the notion that the intent of Calvert Cliffs-3 is to provide baseload power solely to Maryland. Rather, Applicants intend to sell power to whoever will buy it, wherever they are.

~~This may make sense as a business proposition – in fact, current projections indicate that power from Calvert Cliffs-3 is probably not even needed in Maryland in the next decade or so. In context of the EIS discussion of alternatives, however, it calls into serious issue the notion that the combination of alternatives produced in Maryland must equal the 1600 MW theoretical output of Calvert Cliffs-3 in the near term.~~

If only a fraction of the power from Calvert Cliffs-3, or perhaps none at all, is intended to provide baseload power in Maryland, it becomes difficult for Joint Intervenors to understand how the EIS insists that a combination of renewables cannot provide a valid alternative to Calvert Cliffs-3. There is, in fact, no basis for the assumption that a combination of alternatives equating to 1600 MW is actually necessary as an alternative to Calvert Cliffs-3.

[21] Applicants Environmental Report, Rev. 7, Chapter 9, page 9-26

Since the EIS does not even attempt to examine the issue of how much power Calvert Cliffs-3 might provide to Maryland, its insistence that 1600 MW of alternatives is required rings hollow. This is the problem with blind acceptance of the stated purpose of Applicants. In this case, the stated purpose conflicts with the Applicants' own statements.

3. Solar and wind power can provide the functional equivalent of baseload power

Both NRC staff and Applicants make similar arguments: solar and wind power are intermittent by their very nature, and thus cannot provide "baseload" power, especially without electricity storage systems such as CAES, which are still in the developmental stage. Thus, little if any credit can be given to solar and wind power as alternatives to Calvert Cliffs-3.

Joint Intervenors reject these arguments. They hearken back to the 20th century notion that only large centralized power plants can provide "baseload" power, and also, in the present instance, fail to acknowledge that the amount of "baseload" power that might need to be provided as an alternative to Calvert Cliffs-3 is unknown and may, as the discussion above indicates, may be as low as zero if the region of interest is defined—as Applicants would have us define it—as Maryland.

We should be clear that Joint Intervenors agree that solar and wind power, individually, are intermittent sources of electricity generation. Solar power clearly is of greatest value during the day, when the sun is out. Wind power, conversely, tends to be of the greatest value during the night, when winds blow hardest. Occasionally, a long period of cloudy days can disrupt the

efficiency of solar power system (though modern solar systems continue to generate electricity during cloudy days) and in theory, at least, long periods without wind would reduce the capacity factor of wind power (although while the wind may not be blowing in any given location 24 hours a day 7 days a week, it is always blowing somewhere, often not far away, and a properly distributed wind power system can provide constant reliable power).

We disagree with NRC staff and Applicants, however, on their role as providers of reliable electricity—which, after all, is the goal of "baseload" electrical power, especially when considered in the context of modern electrical distribution systems.

And, in the context of the EIS, we strenuously disagree that solar and wind power can make only the nominal contributions to the electricity mix that the EIS contemplates. There are several reasons we take this position.

a. Modern electricity distribution systems can already handle the intermittent nature of solar and wind power and continue to improve in their ability to do so

In our initial testimony, Joint Intervenors pointed to a 2008 paper *The Nuclear Illusion*, which discusses the use of renewable energy technology as "baseload" power. It is worthwhile to consider a few passages from this paper:

"The word "baseload" is often misused to describe the power plants that big economies supposedly need. But in utility load-dispatch parlance, "baseload" doesn't mean big, steadily

operating, or dispatchable; it means plants that generate electricity at the lowest *operating* cost, so they're dispatched whenever available, supplemented as needed by costlier-to-run plants. (Thus any renewable generator is run as a baseload resource because it has almost no operating cost. Its capital cost, which must be paid whether it runs or not, is irrelevant to this calculus.) As explained below, no sensible criterion requires a given power plant to be big nor to run steadily, since many small plants, even variable ones, can add up to big and reliable supply—as they increasingly do in competitive power systems that allow them."[22]

"Recent University of Kassel field experiments have confirmed that just integrated wind, photovoltaics, and biogas generation could reliably provide *all* German electricity. The north German state of Schleswig-Holstein, which got 39% of its 2007 electricity from windpower, now aims for 100% by 2020, as it already achieves in windy months."[23]

"Research is increasingly showing that if we properly diversify renewable energy supplies in type and location, forecast the weather (as hydropower and windpower operators now do), and integrate renewables with existing demand- and supply-side resources on the grid, then renewables' electrical supplies will be *more* reliable than current arrangements. That is, such a renewable-based power system, even if solar and wind form a large fraction of supply, will generally need *less* storage and backup capacity than we've *already* installed and paid for to cope with the intermittency of large thermal stations—which fail unpredictably, for long periods, in billion watt chunks."[24]

[22] JNT000018 Page 31
[23] Ibid, Page 23
[24] Ibid, Page 24

~~The Wikipedia discussion of baseload power makes a similar observation, "Whilst historically large power grids have had base load power plant to exclusively meet the base load, there is no specific technical requirement for this to be so. The baseload can equally well be met by the appropriate quantity of intermittent power sources and peaking power plant."~~[25]

In other words, contrary to the assumptions of the EIS, a properly managed electricity grid can not only handle the intermittent nature of solar and wind power, such a system can actually be more reliable than a large centralized nuclear plant, which can suddenly be brought off-line by any number of factors and cause a sudden plunge of 1,000 or more Megawatts of electricity to be taken off the grid. For example, during Hurricane Irene in August 2011, one of the two existing large Calvert Cliffs nuclear reactors suddenly shut down because a piece of aluminum siding was blown into the electrical switchyard, shorting it out.[26] Such a sudden loss of a large amount of power simply would not occur in a more decentralized system of smaller power plants feeding into the grid. And yet the grid handled this sudden shutdown, indicating that the grid is certainly capable of handling the much smaller variations that might be caused by periods of variable wind, low solar capacity, and the like.

b. Rooftop solar power accomplishes the goal of "baseload" power, yet tends to reduce electrical demand

The EIS presumption that large amounts of backup storage capacity would be needed for solar and wind power also fails to take into account the fact the most new solar power generation in

[25] ~~JNT000024~~
[26] JNT000025

Maryland is expected to be at the micro level—rooftop solar that provides electricity for a single end-user rather than the larger grid.

Such generation, which often does entail a small amount of excess power fed back into the larger grid, is generally at the business/consumer level, often the individual household level. This type of local generation not only typically does not require large amounts of backup power (the power is most generated when most needed, during hot summer days), but modest amounts can be stored in batteries rather than utility-scale facilities (as demonstrated biannually by student groups on the National Mall, who hold a competition to build self-sufficient solar-powered houses that must also generate sufficient additional electricity—in this region--to charge all-electric cars daily). Such generation rarely shows up in utility models of generation capacity because its main effect at the utility level is to reduce electricity demand.

So while, for example, 200 MW of consumer household solar power generation would barely even register at the utility level in terms of generation (since only a small fraction of that would be excess power sold back to the grid), the fact remains that this would cause a 200 MW net drop in power demand for a utility. Functionally, this is the same as adding 200 MW of capacity through any fuel source. The EIS for Calvert Cliffs-3 provides zero credit for this type of solar electricity generation even though, on a practical level, this type is the most likely in Maryland to substantially change electricity needs in the state. As we note above, installation of this type of solar power is likely to accelerate at the consumer level if high-priced power plants like Calvert Cliffs-3 actually threaten to come on-line.

IV. CONCLUSION

The ASLB should rule in favor of Joint Intervenors on Contention 10C and order that the EIS for Calvert Cliffs-3 be re-written to reflect the environmental impacts of a more realistic portrayal of a combination of alternative, and pollution-free, renewable energy sources as an alternative to construction of Calvert Cliffs-3.

Respectfully submitted,

This 17th day of November 2011

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CERTIFICATE OF SERVICE

It is our understanding that all on the Calvert Cliffs-3 service list are receiving this motion through the submission I am making on November 17, 2011 via the EIE system.

JOINT INTERVENORS STATEMENT OF POSITION (IN REBUTTAL)

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NRC STAFF ATTACHMENT 7

Joint Intervenor Exhibits

Exhibit To Be Excluded	Reason For Exclusion
JNT000010	Unsponsored or referenced exhibit.
JNT000011	Unsponsored or referenced exhibit.
JNT000021	Exhibit only referenced in Joint Intervenor Rebuttal Statement of Position, unsponsored in any testimony.
JNT000022	Exhibit only referenced in Joint Intervenor Rebuttal Statement of Position, unsponsored in any testimony.
JNT000023	Exhibit only referenced in Joint Intervenor Rebuttal Statement of Position, unsponsored in any testimony. In their Rebuttal Statement of Position, Joint Intervenors concede this exhibit to be outside the scope of the admitted contention.
JNT000024	Exhibit only referenced in Joint Intervenor Rebuttal Statement of Position, unsponsored in any testimony. Exhibit also inadmissible due unreliability. This exhibit is an article from the website Wikipedia.
JNT000025	Exhibit only referenced in Joint Intervenor Rebuttal Statement of Position, unsponsored in any testimony.