CCNPP3COLA PEmails

From: Wilson, Anthony
Sent: Monday, November 21, 2011 10:39 AM
To: Quinn-Willingham, Laura; Kugler, Andrew
Cc: Kirkwood, Sara; Cort, Katherine A; Parkhurst, Mary Ann; Chapman, Elaine G; Gendelman, Adam
Subject: RE: NRC Staff Rebuttal
Attachments: NRC000046.pdf; NRC Staff Rebuttal Statement of Position Filed 11-18-11.pdf; NRC000043 NRC Staff Testimony.pdf; NRC000044.pdf; NRC000045.pdf; image001.gif

For your files.

Anthony C. Wilson, Esq.
United States Nuclear Regulatory Commission
Attorney / Office of the General Counsel
New Reactor Programs
Phone: 301 415-3699(o)
202 590-0040 (c)

Email: Anthony.Wilson@nrc.gov

From: Wilson, Anthony
Sent: Monday, November 21, 2011 10:24 AM
To: Quinn-Willingham, Laura; Kugler, Andrew
Cc: Kirkwood, Sara; Cort, Katherine A; Parkhurst, Mary Ann; Chapman, Elaine G; Gendelman, Adam
Subject: Applicant's Rebuttal

See attached.

Anthony C. Wilson, Esq.
United States Nuclear Regulatory Commission
Attorney / Office of the General Counsel
New Reactor Programs
Phone: 301 415-3699(o)
202 590-0040 (c)

Email: Anthony.Wilson@nrc.gov

Hearing Identifier: CalvertCliffs_Unit3Cola_Public_EX
Email Number: 2775

Mail Envelope Properties (2C5246E2C48F77418DF2EE22F3C7DE971014030E7A)

Subject: RE: NRC Staff Rebuttal
Sent Date: 11/21/2011 10:39:07 AM
Received Date: 11/21/2011 10:39:12 AM
From: Wilson, Anthony

Created By: Anthony.Wilson@nrc.gov

Recipients:
"Kirkwood, Sara" <Sara.Kirkwood@nrc.gov>
Tracking Status: None
"Cort, Katherine A" <Katherine.Cort@pnnl.gov>
Tracking Status: None
"Parkhurst, Mary Ann" <maryann.parkhurst@pnnl.gov>
Tracking Status: None
"Chapman, Elaine G" <elaine.chapman@pnnl.gov>
Tracking Status: None
"Gendelman, Adam" <Adam.Gendelman@nrc.gov>
Tracking Status: None
"Quinn-Willingham, Laura" <Laura.Quinn-Willingham@nrc.gov>
Tracking Status: None
"Kugler, Andrew" <Andrew.Kugler@nrc.gov>
Tracking Status: None

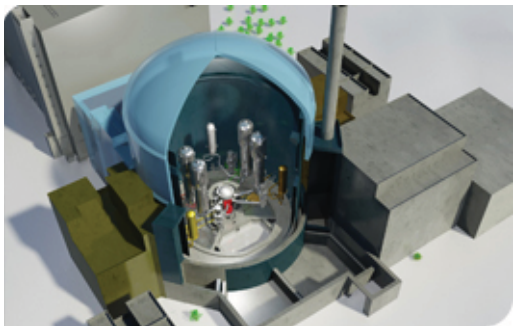
Post Office: HQCLSTR02.nrc.gov

Files	**Size**	**Date & Time**
MESSAGE	942	11/21/2011 10:39:12 AM
NRC000046.pdf	568516	
NRC Staff Rebuttal Statement of Position Filed 11-18-11.pdf	112314	
NRC000043 NRC Staff Testimony.pdf	396937	
NRC000044.pdf	322309	
NRC000045.pdf	644335	
image001.gif	4268	

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

NRC000046
Filed 11/18/2011

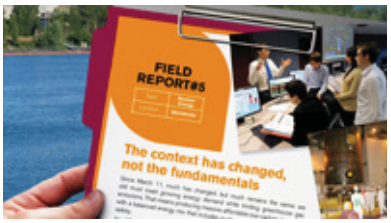
EPR™ REACTOR: THE VERY HIGH POWER REACTOR (1,650 MWE)



Safety and operational performance are the key strengths of the EPR™ reactor. This pressurized water model is also the first generation III+ reactor to be deployed on an international scale, being built in three different countries.

Contact us regarding this solution

FIELD REPORT #5: NUCLEAR ENERGY



Since March 11, the energy context has changed but not fundamentals: produce a safe and affordable electricity to meet the growing energy demand.
Find out how AREVA helps customers achieve their objectives for safe and profitable plant operation, as well as long-term public acceptance.

Read the Field Report

The EPR™ reactor has an electrical production capacity of more than 1650 MWe, which places it among **the most powerful reactors in the world**. A direct descendant of previous models manufactured by AREVA, the EPR™ pressurized water reactor is based on **tried-and-tested technologies and principles**. It is classified as a generation III+ reactor due to the level of safety obtained and the economic savings that it achieves in relation to the earlier models.

From a safety point of view, the EPR™ reactor ensures an unequalled safety level thanks to a drastic reduction of the probability of severe accidents as well as of their consequences on the environment. In addition, it is particularly resistant to external incidents (airplane crashes, etc.).

Economically, it achieves an unrivalled level **of competitiveness** because electricity production costs are **reduced by 10%,** compared with current plants. It also produces less waste.

It is currently under construction in **Finland** (Olkiluoto), in **France** (Flamanville) and in **China** (2 units in Taishan), and is currently undergoing certification in the **United States** and the **United Kingdom.**

SAFETY, COMPETITIVENESS, FLEXIBILITY

Safety

Unrivalled level of safety: Resistance to plane crashes and seismic vibrations; quadruple safety device redundancy; core meltdown risk further reduced and minimization of the consequences from such an accident thanks to a special compartment isolating the molten core.

Active and passive safety systems : designed as an extension of the Konvoi (Siemens) and N4 (AREVA) reactors, the EPR™ reactor combines active and passive safety systems to increase safety and provide better process control over plant operation

Competitiveness

High power: The power output of the EPR™ reactor originates from the size of its larger core, which is capable of holding more fuel, and its advanced nuclear steam supply system comprising 4 primary coolant loops.

Reduced operating costs: Reduction in fuel consumption and easier system maintenance.

Maximized electrical production through reliable components, proven technologies and maintenance during operation, permitting shorter unit outages.

Environmental protection: Reduction in fuel consumption per kWh and production of long-life waste products (-15%), through improved thermal efficiency and uranium utilization.

An unrivalled experience on large projects: AREVA is the only manufacturer to benefit from 40 years continuous experience in the design and construction of nuclear power plants; there are three programs for construction of EPR™ plants underway, enabling AREVA to gather unrivalled experience; almost all primary circuit components are designed and manufactured by AREVA.

Innovation for performance

Two innovations contribute to the EPR™ reactor's high thermal efficiency:

Steam generators with an axial economizer provide increased steam pressure and noticeably increase the reactor's thermal efficiency. This components were developed and tested in the N4 type reactors.

A neutron reflector surrounding the core reduces fuel consumption by limiting neutron leakage. It increases the lifespan of the reactor pressure vessel by limiting its irradiation and its embrittlement.

Service life: 60 years

Flexibility

Load follow: between 60 and 100% nominal output, the EPR™ reactor can adjust it power output at a rate of 5% nominal power per minute at constant temperature, preserving the service life of the components and of the plant.

A **varied choice of fuels**: An EPR™ power plant can operate with uranium enriched up to 5%, reprocessed uranium or MOX fuel (in variable proportions according to customer needs and up to 100%).

Irradiation cycle: fuel cycle length possibility between 12 and 24 months, for better management of a power plant fleet.

November 18, 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 REBUTTAL STATEMENT OF POSITION

Pursuant to 10 C.F.R. §§ 2.337(g)(2) and 2.1207(a)(1), and the Atomic Safety and Licensing Board's (Board) June 24, 2011 revised scheduling order,[1] the United States Nuclear Regulatory Commission staff ("Staff" or "NRC Staff") hereby submits its Rebuttal Statement of Position and Prefiled Rebuttal Testimony, together with supporting Affidavits and Exhibits, regarding admitted Contention 10C. For the reasons discussed below and in the rebuttal testimony filed herewith, as well as for the reasons stated in the Staff's Initial Statement of Position and Prefiled Direct Testimony (Ex. NRC000004) (NRC Staff Direct Testimony), the Joint Intervenors'[2] Contention 10C lacks merit and the Board should find in favor of the NRC Staff.

---

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

[2] 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.

BACKGROUND

On October 21, 2011, Calvert Cliffs 3 Nuclear Project, LLC and UniStar Nuclear Operating Services, LLC (collectively, Applicant),[3] Joint Intervenors, and the NRC Staff each filed direct testimony and exhibits. The Applicants and NRC Staff also filed Initial Statements of Position.[4] 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. On October 28, 2011, Joint Intervenors filed the "Testimony of Scott Sklar, President of the Stella Group, Ltd., on Contention 10" (Ex. JNT000001). A revised version of Mr. Sklar's testimony with page numbers was filed on November 17, 2011 (Ex. JNTR00001) (Sklar Direct Testimony). A 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.[6]

DISCUSSION

I. Legal Standards

As more fully set forth in NRC Staff's Initial Statement of Position, the contention at issue in this proceeding arises under the National Environmental Policy Act (NEPA), and the NRC's regulations that implement NEPA. *See* 42 U.S.C. § 4321 (2006); 10 C.F.R. Part 51.

---

[3] The original combined license 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.

[4] *See* Unistar Initial Statement of Position on Contention 10C (October 21, 2011); NRC Staff Initial Statement of Position on Contention 10C (October 21, 2011).

[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] NRC Staff Initial Statement of Position on Contention 10C at 2-5.

Under NEPA, the NRC is required to take a "hard look" at the environmental impacts of a proposed action, as well as reasonable alternatives to that action. *See Louisiana Energy Servs. L.P.* (Claiborne Enrichment Center), CLI-98-3, 47 NRC 77, 87-88 (1998). This "hard look" is tempered by a "rule of reason" that requires agencies to address only impacts that are reasonably foreseeable – not remote and speculative. *See, e.g., Long Island Lighting Co.* (Shoreham Nuclear Power Station, Unit 1), ALAB-156, 6 AEC 831, 836 (1973). "NEPA does not call for certainty or precision, but an *estimate* of anticipated (not unduly speculative) impacts." *Louisiana Energy Servs., L.P.* (National Enrichment Facility), CLI-05-20, 62 NRC 523, 536 (2005) (emphasis in original). Further, "NEPA gives agencies broad discretion to keep their inquiries within appropriate and manageable boundaries." *Louisiana Energy Services, L.P.*, 47 NRC at 103 (internal citation omitted).

With respect to the alternatives analysis, NEPA does not require a detailed discussion of alternatives deemed remote and speculative or whose effects cannot be readily ascertained. *Vermont Yankee Nuclear Power Corp. v. NRDC*, 435 U.S. 519, 551 (1978) (quoting *NRDC v. Morton*, 458 F.2d 827, 837–38 (1972)). "Common sense also teaches us that the 'detailed statement of alternatives' cannot be found wanting simply because the agency failed to include every alternative device and thought conceivable by the mind of man." *Vermont Yankee* at 551. As also noted in the *Vermont Yankee* case, "the concept of 'alternatives' is an evolving one, requiring the agency to explore more or fewer alternatives as they become better known and understood." *Id*. at 552-53.

Whether an alternative is remote and speculative must be decided by the agency "in light of the facts then available to it" and an agency action cannot be found to be arbitrary and capricious based upon later facts. *Id*. at 554 (quoting *ICC v. Jersey City*, 322 U.S. 503, 514 (1944)). "An agency's consideration of alternatives is sufficient if it considers an appropriate range of alternatives, even if it does not consider every available alternative." *Headwaters, Inc. v. Bureau of Land Management, Medford Dist.*, 914 F.2d 1174, 1181 (9th Cir. 1990).

In considering alternatives under NEPA, an agency must "take into account the needs and goals of the parties involved in the application." *Private Fuel Storage, LLC* (Independent Spent Fuel Storage Installation), CLI-04-22, 60 NRC 125, 146 (2004). When considering alternatives, the Commission has held that it is appropriate to consider the stated purposes of the project and the needs of the Applicant. *See USEC Inc.* (American Centrifuge Plant), CLI-06-10, 63 NRC 451, 467 (2006) (in which the Commission stated that the intervenor "erroneously appears to assume that the NEPA analysis of 'alternatives' should ignore the stated purposes of the project and the Applicant's needs."). Finally, NEPA does not require an agency to "explore every extreme possibility which might be conjectured. Rather, we view NEPA's requirement as one of considering alternatives as they exist and are likely to exist." *Carolina Environmental Study Group v. United States*, 510 F.2d 796, 801 (D.C. Cir. 1975) (*Carolina Environmental Study Group)*.

In challenging the Staff's environmental review, intervenors must identify, with some specificity, the alleged deficiencies in the Staff's NEPA analysis. *See Hydro Resources, Inc.* (Albuquerque, NM), CLI-99-22, 50 NRC 3, 13 (1999). While there may be mistakes in the EIS, mistakes that are not significant or material do not indicate that the Staff's NEPA review was inadequate. *See Exelon Generation Co.* (Early Site Permit [ESP] for Clinton Site), CLI-05-29, 62 NRC 801, 811 (2005) (*Clinton ESP*) ("[I]n an NRC adjudication, it is Intervenors' burden to show the "significance and materiality" of mistakes in the EIS). The Staff's NEPA analysis is adequate unless the Staff "has failed to take a 'hard look' at significant environmental questions – i.e., the Staff has unduly ignored or minimized pertinent environmental effects." *Duke Energy Corp.* (McGuire Nuclear Station, Units 1 & 2; Catawba Nuclear Station, Units 1 & 2), CLI-03-17, 58 NRC 419, 431 (2003) (discussing what an intervenor must allege, with adequate support, to litigate a NEPA claim). The Commission has held: "Boards do not sit to 'flyspeck' environmental documents or to add details or nuances. If the ER (or EIS) on its face comes to grips with all important considerations nothing more need be done." *Clinton ESP* at 811 (quoting *System*

Energy Resources, Inc. (Early Site Permit for Grand Gulf Site), CLI-05-4, 61 NRC 10, 13 (2005)).

II. NRC Staff Rebuttal Summary

NRC Staff witnesses Andrew J. Kugler and Katherine A. Cort have provided rebuttal testimony regarding the Applicant's and the Joint Intervenors' direct testimony with respect to Contention 10C. *See* Prefiled Rebuttal Testimony of Andrew J. Kugler and Katherine A. Cort Regarding Environmental Contention 10C (Ex. NRC000043) (NRC Staff Rebuttal Testimony).[7] Specifically, the NRC Staff's rebuttal witnesses respond to the Joint Intervenors' witness, Mr. Scott Sklar, who asserts that the combination of energy alternatives presented in the final "Environmental Impact Statement for the Combined License (COL) for Calvert Cliffs Nuclear Power Plant Unit 3" (Exs. NRC000003A and NRC000003B) (FEIS) should have been based on the theoretical potential of renewable energy resources, such as wind and solar, rather than on the reasonably foreseeable contributions from these resources. Additionally, NRC Staff rebuttal witnesses respond to one of the Applicant's witnesses, Septimus Van der Linden, who asserts that "the FEIS combination of energy alternatives is speculative, at least to the extent that it relies on the availability of CAES [compressed air energy storage]." Direct Testimony of UniStar Witnesses Dimitri Lutchenkov, Stefano Ratti, and Septimus Van Der Linden (UniStar Direct Testimony) at 60-61, nos. 73 and 74 (Ex. APL000001).

As discussed below: 1) using reasonably foreseeable contributions of a resource, and not just a consideration of a resource's theoretical potential, is the correct approach to use in a NEPA analysis; 2) in a NEPA analysis, the discussion of resource "potential" alone does not equate to a technically feasible and commercially exploitable electric generation resource in the

[7] NRC Staff's Rebuttal testimony is also supported by three additional exhibits; the list of NRC Staff exhibits is contained in NRC Staff Attachment 1. In the NRC Staff Rebuttal Testimony, each question and answer is consecutively numbered, and citations to testimony in this pleading are to answer numbers.

region of interest within the timeframe of the proposed project; and, 3) the reliance on CAES in the combination of energy alternatives was not speculative. *See* NRC Staff Rebuttal Testimony at 1-2, no. 2; at 4, no. 6; at 15-16, no. 21 (Ex. NRC000043).

III. Contention 10C Lacks Merit and Should be Resolved in Favor of NRC Staff

1. Joint Intervenors' Reliance on the Theoretical Potential of a Resource is Inconsistent With the Analysis Required By NEPA

Witness Sklar in his Direct Testimony states that:

> [t]he 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.

Sklar Direct Testimony at 3-4, no. 4 (JNTR00001). Witness Sklar also states that: ". . . the potential contribution of wind power to Maryland and the PJM grid is significantly and substantially larger than [the wind contribution reflected in the FEIS]." *Id.* at 6, no. 6. Later, Witness Sklar states that "[w]ith these projects [Bluewater Wind projects proposed in Maryland and Delaware] 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 [sic] FEIS." *Id.* at 8, no. 7. But the maximum theoretical potential of a resource by itself is not the proper approach to determine the contributions of a resource to the combination of energy alternatives considered in a NEPA analysis; rather, as discussed above, the NRC Staff must consider what is reasonably foreseeable. *See Shoreham* at 836.

In developing the combination of energy alternatives, the "Review Team considered alternatives that are 'reasonably foreseeable' as opposed to theoretically possible or maximally possible." NRC Staff Rebuttal Testimony at 3, no. 6 (Ex. NRC000043); *see also* NRC Staff Direct Testimony at 16-18, nos. 18-20 (Ex. NRC000004). In developing the FEIS, the Review Team did not use a value for wind energy, or any other energy source in the combination of

energy alternatives, based on what was theoretically possible. Rather, the Review Team used a value based on what it determined was reasonably foreseeable in the region of interest and in the timeframe of the proposed project. NRC Staff Rebuttal Testimony at 3, no. 6 (Ex. NRC000043). Further, the Review Team did not speculate concerning the achievement of theoretical maximums (i.e., converting "potential" into reality) for individual energy technologies. Rather, the Review Team struck a balance between the limited implementation successes for energy technologies such as wind and solar, and the potential of those resources in Maryland. *Id.* at 3-4.

The FEIS addressed how much of each resource's potential is likely to be developed into energy generating facilities that would be available to meet the purpose and need of the proposed project in the required timeframe. The NRC staff's approach was what NEPA requires – a review of reasonable alternatives. Conversely, the approach advocated by the Joint Intervenors – based on examining the theoretical maximum potential of an alternative technology – is inconsistent with the analysis NEPA requires. *Shoreham* at 836.

2. NRC Staff's Inclusion of CAES Was Not Speculative

Applicant Witness Van der Linden in his testimony states that, for both the wind and solar components of the combination of energy alternatives, the NRC Staff's inclusion of these resources is speculative, at least to the extent that they rely on the availability of CAES. UniStar Direct Testimony at 60-61, nos. 73-74 (Ex. APL000001). For the reasons set forth below, the use of CAES in the combination of energy alternatives was not speculative, but was a reasonable inclusion.

Witness Van der Linden does not rule out the possibility of CAES; rather, he indicates that he does not consider its use to be likely in Maryland in the foreseeable future. UniStar Direct Testimony at 55-56, no. 68. (Ex. APL000001). However, because the possibility of CAES in Maryland cannot be ruled out, and in order to allow the inclusion of wind and solar resources in the combination of energy alternatives as base load power, the Review Team included a

CAES component in the combination of energy alternatives. NRC Staff Rebuttal Testimony at 15-16, no. 21 (Ex. NRC000043); NRC Staff Direct Testimony at 38, no. 46 (Ex. NRC000004). The NRC Staff does not consider there to be any real conflict between the factual information in its FEIS and testimony, and the factual information supporting the testimony of Witness Van der Linden. While the availability of appropriate formations is uncertain, there is some information available that at least does not rule out the possibility. *See, e.g.,* Succar and Williams 2008 at 17-20 (Ex. NRC000040).

Therefore, the NRC Staff does not consider the use of CAES to be speculative in the combination of energy alternatives. The inclusion of CAES was part of the approach taken by the NRC Staff to minimize the environmental impacts of the combination of energy alternatives. NRC Staff Rebuttal Testimony at 13-15, no. 21 (Ex. NRC000043); NRC Staff Direct Testimony at 38, no. 46 (Ex. NRC000004). The Staff's use of CAES in the combination of energy alternatives was reasonable for the purposes of developing an alternative that would compare most favorably with the proposed action.

3. Joint Intervenors' Testimony Offers Arguments Outside the Scope of Contention 10C

The Board has twice[8] rejected Joint Intervenor arguments to admit their claims concerning baseload power, the region of interest, demand side management, and costs of construction. In its August 26, 2011 Order, the Board rejected the Joint Intervenors' proposed amendment to admitted Contention 10C. The Board held that:

> While those arguments all tangentially relate to the potential desirability of the proposed combined alternative, they fail to address the adequacy of the wind and solar power contribution estimates in the FEIS, and thus are outside the scope of Contention 10C.

---

[8] *Calvert Cliffs 3 Nuclear Project, LLC and UniStar Nuclear Operating Services, LLC* (Calvert Cliffs Nuclear Power Plant, Unit 3) (*Calvert Cliffs 3*) Order (Ruling on Intervenors' Proposed New Contention 10), LBP-10-24, 72 NRC __, slip op. at 1 (December 28, 2010); *Calvert Cliffs 3* Memorandum and 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).

August 26 Order at 22. The Joint Intervenors, in the Sklar Direct Testimony, attempt to again raise some of these arguments. Further, the Joint Intervenors have raised additional issues in their direct testimony that are likewise beyond the scope of the contention. These claims need not be, and have not been, addressed by NRC Staff in its rebuttal testimony. *See Southern Nuclear Operating Co.*, (Early Site Permit for Vogtle ESP Site), CLI-10-05, 71 NRC 90, 100 (2010) (issues not within the scope of the admitted contention are irrelevant to the proceeding). The NRC Staff will address such arguments in forthcoming filings.

CONCLUSION

As set forth above, in the NRC Staff Rebuttal Testimony, NRC Staff Direct Testimony, and affiliated Exhibits, the NRC Staff examined reasonable alternatives within the range dictated by the nature and scope of the Applicant's proposal and the NRC Staff developed purpose and need statement in preparing the Calvert Cliffs, Unit 3 FEIS. As noted above, "the concept of 'alternatives' is an evolving one, requiring the agency to explore more or fewer alternatives as they become better known and understood." *Vermont Yankee*, 435 U.S. at 552-53. As set forth herein, NRC Staff, in developing the FEIS, evaluated an array of energy alternatives, including traditional sources (such as natural gas) and evolving sources (such as wind, solar, biofuels, and others). Additionally, NRC Staff evaluated a combination of energy alternatives that included reasonable contributions from wind and solar power, coupled with CAES. Finally, NRC Staff analyzed alternatives "as they exist and are likely to exist" consistent with the holding in *Carolina Environmental Study Group* at 801. Thus, while there are not radical differences between the facts underlying the Staff and Joint Intervenors' positions, the approach described by the Joint Intervenors ignores the NEPA requirement that alternatives be reasonable; theoretical maximum potentials are not properly considered reasonable alternatives.

Further, while both the Applicant and Joint Intervenors have provided competing approaches to the Staff's chosen approach to the combination of energy alternatives, courts and the Commission have held that an agency is free to select its own methodology, so long as that

methodology is reasonable. *See Entergy Nuclear Generation Co. and Entergy Nuclear Operations, Inc.* (Pilgrim Nuclear Power Station), CLI-10-11, 71 NRC __, slip op. at 37 (March 26, 2010) *citing Town of Winthrop v. FAA*, 535 F.3d 1, 11-13 (1st Cir. 2008). Also, to determine compliance with NEPA, the Board does not determine which of the parties' calculations or methodology is the best or most precise; "[t]here is no NEPA requirement to use the best scientific methodology, and NEPA should be construed in the light of reason if it is not to demand virtually infinite study and resources." *Pilgrim* at 37 (internal citations and quotation marks omitted). Nor does NEPA call for certainty or precision. *Louisiana Energy Servs. L.P*, CLI-05-20, 62 NRC at 536. Boards do not sit to flyspeck environmental documents or add details or nuance; if the EIS comes to grips with all important considerations, nothing more need be done. *Clinton ESP* at 811. Contention 10C is without merit and the Board should find in favor of the NRC Staff.

Respectfully submitted,

/Signed (electronically) by/
Anthony C. Wilson
Counsel for NRC Staff
U.S. Nuclear Regulatory Commission
Mail Stop O-15 D21
Washington, DC 20555-0001
(301) 415-3699
Anthony.Wilson@nrc.gov

Executed in accord with 10 C.F.R. § 2.304(d)
Adam S. Gendelman
Counsel for NRC Staff
U.S. Nuclear Regulatory Commission
Mail Stop O-15-D21
Washington, DC 20555-0001
(301) 415-8445
adam.gendelman@nrc.gov

Dated at Rockville, Maryland
this 18th day of November, 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 SERVICES, LLC	)	Docket No. 52-016-COL
	)	
	)	
(Calvert Cliffs Nuclear Power Plant, Unit 3)	)	

CERTIFICATE OF SERVICE

I hereby certify that copies of the NRC Staff's Rebuttal Statement of Position, NRC Staff Attachment 1 (Rebuttal Exhibit List), and Exhibits NRC000043 through NRC000046 been served upon the following persons by Electronic Information Exchange this 18th day of November, 2011:

Administrative Judge
Ronald M. Spritzer, Chair
Atomic Safety and Licensing Board Panel
Mail Stop: T-3F23
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
E-mail: rms4@nrc.gov

Administrative Judge
Gary S. Arnold
Atomic Safety and Licensing Board Panel
Mail Stop: T-3F23
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
E-mail: gxa1@nrc.gov

Administrative Judge
William W. Sager
Atomic Safety and Licensing Board Panel
Mail Stop: T-3F23
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
E-mail: wws1@nrc.gov

Office of Commission Appellate Adjudication
Mail Stop O-16C1
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
E-mail:OCAAmail@nrc.gov

Office of the Secretary
ATTN: Docketing and Service
Mail Stop: O-16C1
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
E-mail: HEARINGDOCKET@nrc.gov

David A. Repka, Esq.
Tyson R. Smith, Esq.
Emily J. Duncan, Esq.
Winston & Strawn LLP
1700 K St. NW
Washington, DC 20006
E-mail: drepka@winston.com
E-mail: trsmith@winston.com
E-mail: ejduncan@winston.com

Public Citizen
Allison Fisher, Energy Organizer
215 Pennsylvania Avenue, SE
Washington, DC 20003
E-mail: afisher@citizen.org

Carey W. Fleming, Esq.
UniStar Nuclear Energy, LLC
750 E. Pratt Street
Baltimore, MD 21202
E-mail: Carey.Fleming@constellation.com

Southern MD CARES
June Sevilla, Spokesperson
P.O. Box 354
Solomons, MD 20688
E-mail: qmakeda@chesapeake.net

Nuclear Information and Resource Service
Michael Mariotte, Executive Director
6930 Carroll Avenue, Suite 340
Takoma Park, MD 20912
E-mail: nirsnet@nirs.org

Brent A. Bolea, Assistant Attorney General
M. Brent Hare, Assistant Attorney General
State of Maryland
Office of the Attorney General
Maryland Energy Administration and
Power Plant Research Program of the
Department of Natural Resources
1623 Forest Drive, Suite 300
Annapolis, MD 21403
E-mail: BBolea@energy.state.md.us
E-mail: bhare@energy.state.md.us

Beyond Nuclear
Paul Gunter, Director
6930 Carroll Avenue, Suite 400
Takoma Park, MD 20912
E-mail: paul@beyondnuclear.org

/Signed (electronically) by/
Adam S. Gendelman
Counsel for NRC Staff
U.S. Nuclear Regulatory Commission
Mail Stop O-15 D21
Washington, DC 20555-0001
(301) 415-8445
Adam.Gendelman@nrc.gov

November 18, 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
SERVICES, LLC	)	
	)	
(Calvert Cliffs Nuclear Power Plant, Unit 3)	)	
	)	
	)	

PREFILED REBUTTAL TESTIMONY OF ANDREW J. KUGLER AND KATHERINE A. CORT
REGARDING ENVIRONMENTAL CONTENTION 10C

Q1. Please state your names.

A1a. [AJK][1] My name is Andrew J. Kugler.

A1b. [KAC] My name is Katherine A. Cort.

Q2. What is the purpose of your rebuttal testimony?

A2. [AJK, KAC] The purpose of this testimony is to respond to the "Testimony of Scott Sklar, President of the Stella Group, Ltd., on Contention 10" (October 28, 2011; refiled on November 17, 2011) (Ex. JNTR00001) ("Sklar Direct Testimony"), submitted by the Nuclear Information and Resource Service, Beyond Nuclear, Public Citizen and Southern Maryland Citizens' Alliance for Renewable Energy Solutions (collectively, "Joint Intervenors") and the direct testimony submitted by Calvert Cliffs 3 Nuclear Project, LLC and UniStar Nuclear Operating Services, LLC (collectively, "Applicant"), "Direct Testimony of UniStar Witnesses

[1] In this testimony, the identity of the witness who supports each numbered paragraph is indicated by the notation of his or her initials in brackets.

Dimitri Lutchenkov, Stefano Ratti, and Septimus Van der Linden" (October 21, 2011) (Ex. APL000001) ("UniStar Direct Testimony") concerning Contention 10C.

Specifically, the NRC Staff will address the Joint Intervenors' assertion, which is repeated throughout their testimony, that the combination of energy alternatives presented in the Final Environmental Impact Statement for the Combined License (COL) for Calvert Cliffs Nuclear Power Plant Unit 3 (FEIS) (Exs. NRC000003A and NRC000003B) should have been based on the potential of energy resources such as wind and solar, rather than on the reasonably foreseeable contributions from these resources. The Review Team's approach used reasonably foreseeable contributions of a resource, and not just a consideration of a resource's theoretical potential. This is the proper approach for a NEPA analysis.

Q3. Have you previously submitted testimony concerning Contention 10C in this proceeding?

A3. [AJK, KAC] Yes. Our direct testimony was provided in the "Prefiled Direct Testimony of Andrew J. Kugler and Katherine A. Cort Concerning Environmental Contention 10C" (October 21, 2011) (Ex. NRC000004) ("NRC Staff Direct Testimony"). Statements of our professional qualifications were filed as exhibits NRC000005 and NRC000006.

Q4. Are you familiar with the Joint Intervenors' direct testimony concerning Contention 10C, the "Sklar Direct Testimony" (Ex. JNTR00001)?

A4. [AJK, KAC] Yes.

Q5. Are you familiar with the direct testimony submitted by the Applicant concerning Contention 10C, the "UniStar Direct Testimony" (Ex. APL000001)?

A5. [AJK, KAC] Yes.

Joint Intervenor Testimony

Q6. A position that appears throughout the Sklar Direct Testimony is that the contribution of a resource such as wind or solar to the combination of energy alternatives in the FEIS should have been based on the theoretical potential of the resource. Does the NRC Staff

agree?

A6. [AJK, KAC] The NRC Staff disagrees that using the theoretical potential of a resource is by itself the proper approach to determine the contributions of that resource to a combination of energy alternatives considered in a NEPA analysis in an FEIS.

Mr. Sklar states this position throughout his testimony. For example, he states that "[t]he 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." Sklar Direct Testimony at 4, no. 4[2] (JNTR00001). Also, he states that ". . . the potential contribution of wind power to Maryland and the PJM grid is significantly and substantially larger than [the wind contribution reflected in the FEIS]." *Id.* at 6, no. 6. And that "[w]ith these projects alone [two wind projects proposed in Maryland and Delaware], 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 [sic] FEIS." *Id.* at 8, no. 7. However, in all of these cases, Mr. Sklar is speaking about the theoretical, maximum potential of the resource and not about the likely development of that resource for electrical generation in the proposed project timeframe.

As discussed in the NRC Staff Direct Testimony, in developing the combination of energy alternatives, the Review Team considered alternatives that are "reasonably foreseeable" as opposed to theoretically possible or maximally possible. The "Review Team did not use a value for wind energy, or any other energy source in the combination of energy alternatives, based on what was theoretically possible. Rather, the Review Team used a value based on what it determined was reasonably foreseeable in the region of interest and in the timeframe of

[2] In each of the parties' direct testimony, questions and answers are consecutively numbered. Citations to testimony in this testimony are to answer numbers.

the proposed project; . . . [t]he Review Team did not speculate concerning the achievement of theoretical maximums (i.e., converting 'potential' into reality) for individual energy technologies. Rather, the Review Team struck a balance between the limited implementation successes for energy technologies such as wind and solar, and the potential of those resources in Maryland." NRC Staff Direct Testimony at 16-18, nos. 18-20 (Ex. NRC000004).

In the NRC Staff's Direct Testimony, we also noted that "the Review Team relied on reliable sources of information to inform its review. In addition to Federal sources (such as the DOE [U.S. Department of Energy] and its National Laboratories), the Review Team also considered information unique to the State of Maryland." NRC Staff Direct Testimony at 26, no. 32 (Ex.NRC000004). In a NEPA analysis, the discussion of resource "potential" alone does not equate to a technically feasible and commercially exploitable electric generation resource in the region of interest within the timeframe of the proposed project. *See* NRC Staff Direct Testimony at 17-18, no. 20 (Ex. NRC000004).

The theoretical amount of energy potentially available from various sources (coal, natural gas, nuclear, and renewables) far exceeds the need in Maryland. However, the EIS must address the question of how much of each resource's theoretical potential is likely to be developed into energy generating facilities that would be available to meet the purpose and need of the proposed project within the proposed project timeframe. This is a fundamental difference between the approach favored by Mr. Sklar, and the approach used by the Review Team in the FEIS. The Review Team's approach was based on the requirements of NEPA, and NRC requirements and guidance (*see e.g.,* Exs. NRC000008, NRC000009, NRC000010). Thus, while there does not appear to be significant disagreement between the NRC Staff and the Joint Intervenors' conclusions about the theoretical potential of renewable resources in Maryland, that potential by itself is not sufficient for a NEPA analysis of reasonable alternatives, including the formulation of the combination of energy alternatives.

Q7. In a number of places in his testimony, the Joint Intervenors' expert, Mr. Sklar,

discusses the potential of the wind and solar resources in and around Maryland, indicating that the FEIS did not give credit for this potential. Sklar Direct Testimony, e.g., at 3-4, nos. 3-5; at 5-6, no. 6; at 19, no. 10 (Ex. JNTR00001)). What is the NRC Staff's view on Mr. Sklar's position that the FEIS did not give sufficient credit to wind and solar potential in Maryland?

A7. [AJK, KAC] The NRC Staff does not agree with Mr. Sklar's position. The Review Team considered the potential for both wind and solar energy in the FEIS, moderated by a consideration of the likelihood that these resources would actually be developed into generating facilities. FEIS at 9-22 to 9-24 (Ex. NRC000003A). When it developed the combination of energy alternatives, the Review Team included reasonably foreseeable contributions from renewable energy sources, such as wind and solar. Indeed, "[t]he approach used to develop a combination of energy alternatives included the maximum contribution from renewable sources that could be reasonably expected within the region of interest and within the timeframe of the proposed project. In doing so, the size of the contribution from natural gas generation was minimized." NRC Staff Direct Testimony at 5, no. 7 (Ex. NRC000004). The NRC Staff's approach of using reasonably foreseeable contributions of a resource, and not just a consideration of a resource's theoretical potential, is the correct approach in a NEPA analysis, as discussed above.

Q8. Mr. Sklar states on page 8 of his testimony that the proposed Bluewater Wind project off the coast of Maryland, at an installed capacity of 600 MW(e), "would itself provide four times the amount of wind power initially examined in the FEIS." Is this statement correct?

A8. [AJK, KAC] No. As stated in the FEIS at 9-28 (Ex. NRC000003A), and as correctly noted elsewhere in the Joint Intervenors' testimony (Sklar Direct Testimony at 5, no. 6 (Ex. JNTR00001)), the 100 MW(e) wind contribution included in the combination of energy alternatives would involve an installed capacity of 250 to 300 MW(e). A 600 MW(e) capacity wind facility with a capacity factor range of 30 to 40 percent could provide, at most, 180 to 240 to MW(e), roughly twice (not four times) the amount of wind power considered in the

combination of energy alternatives. But based on this project's lack of significant progress in the leasing/permitting process, the Bluewater Wind Project off the coast of Maryland was not considered reasonably foreseeable, and thus was not included in the combination of energy alternatives. *See* NRC Staff Direct Testimony at 27-28, no. 33 (Ex. NRC000004).

Q9. The Joint Intervenors' expert, Mr. Sklar, states that another offshore wind project, NRG Bluewater Wind "has received approval to build" its proposed project off the coast of Delaware. Sklar Direct Testimony at 8, no. 7 (Ex. JNTR00001). Is this statement correct?

A9. [AJK] No. The subject project has received an Interim Policy Lease from the Bureau of Ocean Energy Management (BOEM). BOEM 2011 (Ex. NRC000044). But this lease has a five-year-term and provides no subsequent commercial rights. The subject project has not received all of the approvals necessary for construction, and the project webpage provides no clear timeline for the completion of the permitting process. NRG Bluewater Wind 2011 (Ex. NRC000045). In discussing this project, the Joint Intervenors' own exhibit states that "the timing of construction remains uncertain." Ex. JNT000006 at 3.

Q10. How does NRC Staff respond to Mr. Sklar's testimony that the FEIS "discounts solar photovoltaics entirely"? Sklar Direct Testimony at 9, no. 8 (Ex. JNTR00001).

A10. [AJK, KAC] The statement is incorrect; the Review Team did not discount solar photovoltaics. In the combination of energy alternatives, all of the contribution from solar power would be from solar photovoltaics. Also, the Review Team discussed solar photovoltaics in Section 9.2.3.3 of the FEIS at 9-23 to 9-24. (Ex. NRC00003A)

As discussed in the NRC Staff Direct Testimony at 33-36, nos. 38-43 (Ex. NRC000004), the only additions to solar power in Maryland that are expected within the timeframe of the proposed project are solar photovoltaics. *See also* DOE/EIA 2011b (Ex. NRC000022). Therefore, all of the 270 MW(e) of installed solar capacity (75 MW(e) baseload equivalent) evaluated in the combination of energy alternatives in the FEIS would be in the form of solar photovoltaics.

Q11. The Joint Intervenors' expert, Mr. Sklar, states on page 9 of his testimony (Sklar Direct Testimony, no. 8 (Ex. JNTR00001)), that the solar carve-out in the Maryland Renewable Portfolio Standard (RPS) means "approximately 250 MW of power must be generated from solar power by that date [2022]," and that this value is far in excess of the 75 MW(e) in the Review Team's combination of energy alternatives in the FEIS. What is the NRC Staff's view regarding this statement?

A11. [AJK, KAC] It is not clear to the NRC Staff if the 250 MW referred to in Mr. Sklar's testimony is installed capacity or average power output. Because the preceding sentence in Mr. Sklar's testimony discusses generating capacity, the NRC Staff believes that Mr. Sklar was referring to generating capacity. However, we will address both possible interpretations.

The 75 MW(e) included in the FEIS combination of energy alternatives is the baseload equivalent power output for solar. As discussed in the NRC Staff's Direct Testimony at 35, no. 42 (Ex. NRC000004), this value is based on a DOE/EIA (U.S. Department of Energy/Energy Information Administration) projection of an installed capacity in Maryland of about 270 MW(e) by 2035. The 270 MW(e) installed capacity is higher than the 250 MW(e) installed capacity apparently referred to by Mr. Sklar. Furthermore, the NRC Staff notes that the 75 MW(e) baseload equivalent value derived from the 270 MW(e) installed capacity is conservatively high on two counts. First, the NRC Staff used the high end of possible capacity factors for solar power at 25 percent. Actual capacity factors in Maryland for solar photovoltaic facilities are more likely to be less than 20 percent. Second, the NRC Staff's value of 75 MW(e) is slightly higher than the baseload equivalent value of 68 MW(e) derived from the DOE/EIA projections, giving some credit for higher than predicted development. *See* NRC Staff Direct Testimony at 35-36, no. 42 (Ex. NRC000004).

If Mr. Sklar intended to state the average power output of solar would be 250 MW(e), the NRC Staff notes that this is inconsistent with July 2011 projections from the State of Maryland.

In the Long-Term Electricity Report for Maryland (LTER) prepared for the Maryland Department of Natural Resources, Power Plant Research Program, the estimated generation by solar power in 2022 (the year being used by the Joint Intervenors) will be about 720 GWh. Ex. APL000005 at 3-21. This equates to an average generation rate of 82 MW(e), which is in reasonable agreement with the 75 MW(e) value in the FEIS, but substantially less than the 250 MW(e) value apparently suggested by Mr. Sklar, if he was referring to average power output. Therefore, the NRC Staff maintains that its use of the 75 MW(e) value as the average power output for the solar contribution to the combination of energy alternatives is reasonable.

Q12. The Joint Intervenors' expert, Mr. Sklar, states on page 9 of his testimony (Sklar Direct Testimony, no. 8 (Ex. JNTR00001)) that the amount of solar generation needed to meet the Maryland RPS is "likely to be greatly exceeded." What is the NRC Staff's view regarding this statement?

A12. [AJK, KAC] This statement is not supported by any factual basis. Authoritative sources such as DOE/EIA and the State of Maryland (Exs. NRC000022 and NRC000016) have indicated that significant growth in this resource within the timeframe of the proposed project is not likely. *See also* NRC Staff Direct Testimony at 33, no. 38 (Ex. NRC000004). The LTER also forecasts that actual installations of solar facilities will be within the bounds of the RPS. Specifically, it states that "while a significant amount of new solar capacity is assumed to be installed, the LTER assumes that only 50 percent of the Tier 1 solar requirement will be met by 2022. Thus the input assumption is that there is sufficient solar capacity to meet the Maryland RPS through 2018. For years after 2018, a portion of the solar power requirement is assumed to be satisfied through Alternative Compliance Payments[3]." Ex. APL000005 at 3-21.

Q13. Mr. Sklar references "Energy Self-Reliant States" on page 10 of his testimony (Sklar Direct Testimony, no. 9 (Ex. JNTR00001)) to support a claim that Maryland can meet 40

[3] An Alternative Compliance Payment is a penalty that is paid when a utility does not obtain enough renewable energy certificates to meet the RPS.

percent of its energy needs from land-based renewable energy resources. Does the potential discussed in this report contradict the Review Team's discussions in the combination of energy alternatives in the FEIS?

A13. [AJK, KAC] No. NRC Staff does not consider there to be any real conflict between its FEIS and Mr. Sklar's testimony regarding the maximum renewable resource potential in Maryland. The potential of each energy resource was considered by the Review Team in the evaluation of that resource in the FEIS Section 9.2 (Ex. NRC00003A). However, the contribution of renewable sources to the combination of energy alternatives did not represent the theoretical maximum potential, but rather reflected a reasonably foreseeable contribution of baseload equivalent power to meet the purpose and need of the proposed action in the timeframe of the proposed project. *See* NRC Staff Direct Testimony at 16-19, nos. 18-22 (Ex. NRC000004). As previously discussed, the NRC Staff's approach of using reasonably foreseeable contributions of a resource, and not just a consideration of a resource's potential, is the correct method in a NEPA analysis.

Q14. On page 12 of his testimony (Sklar Direct Testimony, no. 9 (Ex. JNTR00001)), Mr. Sklar states that over 2000 existing facilities throughout the PJM grid area[4] qualify for the RPS. The testimony further states that "[t]here is ample supply of current out-of-state resources to supply Maryland's RPS need through 2019, without constructing a single in-state facility." Did the Review Team consider all qualifying renewable facilities throughout the PJM grid area as part of its evaluation of the combination of energy alternatives?

A14. [AJK, KAC] No. In accordance with the Environmental Standard Review Plan (ESRP; NRC000008), the Review Team focused its evaluation on the region of interest, which was Maryland for the FEIS. For the combination of energy alternatives, the Review Team did

[4] The PJM grid area includes all or parts of Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia and the District of Columbia.

not include any resources outside the region of interest. *See* NRC Staff Direct Testimony at 14, no. 15 (Ex. NRC000004).

Q15. Mr. Sklar states on page 13 of his testimony (Sklar Direct Testimony, no. 9 (Ex. JNTR00001)) that the cost of solar power has been dropping sharply over the past few years and is now competitive with other forms of electricity generation. Did the Review Team consider the cost of solar power to determine its contribution to the combination of energy alternatives in the FEIS?

A15. [KAC] Although the Review Team generally considered the current cost of power generating technologies in order to determine whether or not the technologies were commercially exploitable in the region of interest, in order to determine the likely contribution of renewable resources to the combination of energy alternatives, the Review Team primarily relied on projections of growth of renewable resources from DOE's Annual Energy Outlook (Ex. NRC000022) and the Maryland Public Service Commission's (MPSC) Ten-Year Plan (Ex. NRC000016). In order to estimate the future contributions from various generation technologies, DOE/EIA utilizes the National Energy Modeling System, which represents a slate of technologies, their capital and operating costs, their availability and capacity factors, financial structure and subsidies, the time to construct the facility, the utilization of the facility, and expected future cost changes, including fuel input for fossil and nuclear facilities (Ex. NRC000021). Thus, the costs of each technology have been included in the forecasting models from which the Review Team derived its contributions to the combination of energy alternatives.

Q16. On pages 14 and 15 of his testimony (Sklar Direct Testimony, no. 9 (Ex. JNTR00001)), Mr. Sklar states the expectation that installed solar capacity in Maryland will exceed the 75 MW(e) used in the combination of energy alternatives by the time the proposed Calvert Cliffs Unit 3 would be built. What is the NRC Staff's view regarding this statement?

A16. [AJK, KAC] As discussed above, the 75 MW(e) in the combination of energy alternatives is the baseload equivalent power output for solar. The installed capacity for solar

generating facilities would be considerably higher – at least 270 MW(e), to achieve this value. Therefore, the NRC Staff does not see a conflict between its projection for installed capacity of solar power in Maryland and this statement of Mr. Sklar.

Q17. On page 15 of his testimony (Sklar Direct Testimony, no. 9 (Ex. JNTR00001)), Mr. Sklar contends that transmission line losses associated with solar power production were not considered in the EIS calculations. Did the Review Team consider such transmission line losses in the FEIS?

A17. [KAC] The Review Team did not directly consider the impacts of transmission line losses in its evaluation of energy alternatives, as transmission losses are an imbedded cost inherent with all forms of dispatchable electricity generation.[5] Although any form of onsite distributed power generation would be associated with lower line losses when serving the site on which it is located, this form of generation would encounter line losses similar to centralized baseload generation if it is dispatched to the grid. In its evaluation of solar power in Section 9.2.3 of the FEIS (Ex. NRC00003A), the Review Team concluded that, individually, solar power could not meet the purpose and need of the proposed project. Based on this conclusion, the cost of solar power, including transmission line losses, was not considered by the Review Team. A detailed comparison of technology costs would only be considered for an alternative energy source that was both feasible and environmentally preferable. *See* ESRP at 9.2.3-1 (Ex. NRC000008).

As previously discussed, the cost of generation is considered in the projections of both the DOE/EIA (Ex. NRC000022) and the MPSC (Ex. NRC000016) that were used by the Review Team in developing the contributions of the renewable resources in the combination of energy alternatives in the FEIS. Lower (or no) line losses would be a small advantage for end-use solar

[5] The Review Team did consider the environmental impacts associated with transmission line construction and maintenance for various generation technologies, including wind and solar, as part of the evaluation of the combination of energy alternatives. FEIS Section 9.2.4 at 9-29 (Ex. NRC000003A).

power facilities. However, the other factors that currently affect the viability of this resource (e.g., cost of installation, intermittent operation) overwhelm that minor advantage. The MPSC concluded "that the overall economics of solar remain negative, but could improve if technology progresses much faster than contemplated in the report and various financial incentives continue over the long term." MPSC 2008b (Ex. NRC000023). Therefore, the issue of line losses would not have had any effect on the results of the Review Team's analysis of the combination of energy alternatives.

Q18. On pages 17 to 18 of his testimony (Sklar Direct Testimony, no. 10 (Ex. JNTR00001)), Mr. Sklar states that the proposed Calvert Cliffs Unit 3 will not really be a baseload plant because of its status as a merchant plant. What is the NRC Staff's opinion regarding this statement?

A18. [AJK,KAC] Mr. Sklar claims that the proposed new nuclear unit, as a merchant plant, will only operate "to the extent that there are willing power purchasers for its electricity." Sklar Direct Testimony at 17, no. 10 (Ex. JNTR00001). Mr. Sklar implies that, because of this, the new unit may not be a baseload generator. The NRC Staff agrees that a merchant plant must find willing buyers for its power output. This differentiates merchant plants from those operated by regulated utilities with a service territory – which in essence represents a captive market. But because of deregulation in some states, a number of existing nuclear power plants are merchant plants, including the two existing units at the Calvert Cliffs site. These units continue to be operated in a baseload manner because their cost of generated electricity is competitive. The MPSC issued Calvert Cliffs Unit 3 a Certificate of Public Convenience and Necessity (CPCN) fully aware that the proposed Calvert Cliffs Unit 3 would be a merchant plant. Among its conclusions, the MPSC found that (1) Unit 3 would constitute a new large source of power that would be of benefit to the citizens and the State of Maryland, (2) Unit 3 would be a welcome source of baseload power designed to run continuously, which would help peak period congestion on transmission lines within Maryland to the benefit of the public, and (3) Unit 3

would have a positive effect on the reliability and stability of the electric system and would be a beneficial power source for Maryland and the electric grid in general. *See* MPSC2009a at 2 to 3 (Ex. NRC000014) affirming the Proposed Order of the Hearing Examiner at 52 to 53 (Ex. NRC000015). Therefore, it is reasonable to assume that proposed Unit 3 would be operated as a baseload plant.

Q19. On pages 17 to 18 of his testimony (Sklar Direct Testimony, no. 10 (Ex. JNTR00001)), Mr. Sklar states that the proposed Calvert Cliffs Unit 3 "could not be expected to achieve a high capacity factor for some years" and questions whether it "could ever achieve a high capacity factor" and thus could not be considered a baseload plant. What is the NRC Staff's view regarding this statement?

A19. [AJK] Mr. Sklar argues that the new nuclear unit will not provide baseload power because it "will not operate 24/7/365." Sklar Direct Testimony at 18, no. 10 (Ex. JNTR00001). If that were truly the definition of a baseload plant, no facility, regardless of energy source, would ever meet the definition. However, as discussed in the NRC Staff's Direct Testimony at 13, no. 13 (Ex. NRC000004)), baseload plants "typically have annual load capacity factors that exceed 75%, but usually are more like 90% to 98%." *See also* Hynes 2009 (Ex. NRC000013). The average capacity factor for existing nuclear power facilities in the U.S. is over 90 percent, which includes periodic refueling and maintenance outages. Therefore the argument that the new unit cannot be baseload because it cannot operate all the time is without merit.

Mr. Sklar argues that the new unit is likely to have a lower capacity factor than existing units when it starts up, with this situation continuing "for some years." Sklar Direct Testimony at 17-18, no. 10 (Ex. JNTR00001). The primary reason given by Mr. Sklar is the Applicant's use of a new reactor design that has not been operated "anywhere in the world at this point." *Id.* at 18, no. 10. The NRC Staff agrees that it is reasonable to assume that the new unit will not immediately achieve the same high capacity factor that reactors with greater operating experience have achieved. In the report referenced by Mr. Sklar (JNT000019), the authors

discuss capacity factors for new nuclear facilities, stating that "[t]he estimated capacity factor risk is greatest in the first year of operation. It [the risk] then quickly declines over the next couple of years, after which it is approximately constant." *Id.* at 3. In addition, industry organizations such as the Nuclear Energy Institute and the Institute for Nuclear Power Operations work to ensure that lessons learned at one facility are incorporated by other facilities. The maturation of the nuclear industry has led to the high capacity factors currently achieved by operating facilities. There are also four EPR plants being built worldwide that are expected to become operational before Calvert Cliffs Unit 3. *See* Ex. NRC000046. Lessons learned from early operations of these units would be available to a new EPR unit at Calvert Cliffs. Considering all of this information, it is reasonable to expect that Calvert Cliffs Unit 3 will be able to operate as a baseload plant.

Q20. On page 19 of his testimony (Sklar Direct Testimony, no. 10 (Ex. JNTR00001), Mr. Sklar states that distributed wind and solar, along with other renewables and increased energy efficiency "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." He also states that these sources are "far more able to meet Maryland's, and the entire mid-Atlantic's, electricity needs that [sic] is given credit for in the Calvert Cliffs-3 FEIS and can provide needed power on a much more flexible basis." *Id.* What is the NRC Staff's view regarding these statements?

A20. [AJK, KAC] The NRC Staff does not see factual support in Mr. Sklar's testimony for these broad claims. Mr. Sklar references a single report that argues for higher penetrations of renewable generation through a variety of distributed sources over a wide geographic area. But, as in other cases, the report (Ex. JNT000018[6]) discusses what the potential of these

[6] During the NRC Staff's search to access the final, published version of the manuscript of "The Nuclear Illusion" by A.B. Lovins and Imran Sheikh (Ex. JNT000018), identified as "*Ambio* Nov 08 preprint, dr 18, 27 May 2008, DRAFT subject to further peer review/editing," the Staff learned that this manuscript was not published by *AMBIO* nor, according to its publisher, is it currently in press at *AMBIO*.

resources might be, as opposed to what is likely to actually be built.[7] As previously stated, the NRC Staff maintains that its NEPA analysis should not be based on what might be theoretically possible. Rather, the NRC Staff's analysis should be, and was based on, what is likely to be done in the region of interest in the timeframe of the proposed project.

APPLICANT TESTIMONY

Q21. An Applicant witness, Mr. Septimus Van der Linden, in his testimony states that for both the wind and solar components of the combination of energy alternatives, the NRC Staff's inclusion of these resources is speculative, at least to the extent that it relies on the availability of compressed air energy storage (CAES). UniStar Direct Testimony at 60-61, nos. 73-74 (Ex. APL000001). Does the NRC Staff agree with Mr. Van der Linden's statement?

A21. [AJK, KAC] Mr. Van der Linden presents information regarding the potential for CAES storage in various geological formations. He presents his view that suitable geological formations, such as solution-mined caverns and natural reservoirs, are either not present in Maryland or that their development is unlikely in the foreseeable future. He concludes in his responses to Questions 73 and 74 that "the FEIS combination of energy alternatives is speculative, at least to the extent that it relies on the availability of CAES." UniStar Direct Testimony at 60-61 (Ex. APL000001). The NRC Staff does not consider there to be any real conflict between the factual information in its FEIS and testimony, and the factual information supporting the testimony of Mr. Van der Linden. However, the NRC Staff does not consider the use of CAES to be speculative in the combination of energy alternatives.

In its direct testimony, the NRC Staff discussed proposals for CAES facilities in the U.S. and noted that none of the proposals is for a facility in Maryland, and it is unclear that such a facility could be sited in the State of Maryland (i.e., that appropriate geological formations exist

[7] The report does not address the cost of such an approach, which would be appreciable. If four different sources are used (e.g., wind, solar photovoltaic, wave, and tidal current), enough of each must be installed to account for the intermittency of the others, unless a fossil-fueled back-up source is also included. In any case, the high level of redundancy would drive costs very high.

in the State). NRC Staff Direct Testimony at 38, no. 46 (Ex. NRC000004). While the availability of appropriate formations is uncertain, there is some information available that at least does not rule out the possibility. *See, e.g.,* Succar and Williams 2008 at 17-20 (Ex. NRC000040).

Mr. Van der Linden does not rule out the possibility of CAES; rather, he indicates that he does not consider its use to be likely in Maryland in the foreseeable future. UniStar Direct Testimony at 55-56, no. 68 (Ex. APL000001). However, because the possibility of CAES in Maryland cannot be ruled out, and in order to allow the inclusion of wind and solar resources in the combination of energy alternatives as baseload power, the NRC Staff reasonably considered the use of CAES in the FEIS. *See* NRC Staff Direct Testimony at 38, no. 46 (Ex. NRC000004). But even without CAES, the combination of energy alternatives could still be developed, with slightly greater environmental impacts,[8] by removing CAES from the alternative and including a somewhat larger natural gas facility whose additional output could be cycled up and down to "smooth" the output of the wind and solar resources. This approach would have been more conventional. But the inclusion of CAES was part of the approach taken by the Review Team to minimize the environmental impacts of the combination of alternatives. *See* NRC Staff Direct Testimony at 38, no. 46 (Ex. NRC000004).

In conclusion, the NRC Staff acknowledges the bases behind Mr. Van der Linden's testimony regarding CAES, but maintains that the reliance on CAES in the combination of energy alternatives was reasonable for the purposes of developing an alternative that would compare most favorably with the proposed action.

[8] The only notable difference between the Staff's approach in the FEIS and the use of a larger natural gas facility without CAES for the combination of energy alternatives would have been somewhat higher air emissions because the CAES plant develops a portion of its output from the stored energy in the compressed air. But the difference would not have been large enough to change any of the impact characterizations in Table 9-3 of the FEIS (Ex. NRC000003A).

Q22. Does this conclude your rebuttal testimony?

A22. [AJK, KAC] Yes. We would reiterate that Mr. Sklar's approach does not rely upon radically different factual bases than those used by the NRC Staff. However, Mr. Sklar incorrectly uses a resource's theoretical potential by itself to inform the contribution to the combination of energy alternatives, whereas the NRC Staff's approach, based on NEPA, and NRC requirements and guidance, considered what was reasonably foreseeable to meet the purpose and need of the proposed project.

November 18, 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 SERVICES, LLC	)	Docket No. 52-016
	)	
(Combined License Application for Calvert Cliffs Unit 3)	)	

AFFIDAVIT OF ANDREW J. KUGLER CONCERNING PREFILED REBUTTAL TESTIMONY OF ANDREW J. KUGLER AND KATHERINE A. CORT REGARDING ENVIRONMENTAL CONTENTION 10C

I, Andrew J. Kugler, do declare under penalty of perjury that my statements in the "Prefiled Rebuttal Testimony of Andrew J. Kugler and Katherine A. Cort Concerning Environmental Contention 10C" and my statement of professional qualifications (Exhibit NRC000005) are true and correct to the best of my knowledge and belief.

Executed in Accord with 10 CFR § 2.304(d)

Andrew J. Kugler
Senior Environmental Project Manager
Division of Site and Environmental Reviews
Office of New Reactors
U.S. Nuclear Regulatory Commission
Mail Stop T7-E30
Washington, DC 20555-0001
(301) 415-2828
Andrew.Kulger@nrc.gov

Executed at Rockville, MD
this 18th day of November 2011

November 18, 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 SERVICES, LLC	)	Docket No. 52-016
	)	
(Combined License Application for Calvert Cliffs Unit 3)	)	

AFFIDAVIT OF KATHERINE A. CORT CONCERNING PREFILED REBUTTAL TESTIMONY OF ANDREW J. KUGLER AND KATHERINE A. CORT REGARDING ENVIRONMENTAL CONTENTION 10C

I, Katherine A. Cort, do declare under penalty of perjury that my statements in the "Prefiled Rebuttal Testimony of Andrew J. Kugler and Katherine A. Cort Concerning Environmental Contention 10C" and my statement of professional qualifications (Exhibit NRC000006) are true and correct to the best of my knowledge and belief.

Executed in Accord with 10 CFR § 2.304(d)

Katherine A. Cort
Staff Scientist
Pacific Northwest National Laboratory
Battelle Memorial Institute
U.S. Department of Energy
Mail Stop K6-05
Richland, WA 99352
(509) 372-4374
Katherine.Cort@pnnl.gov

Executed at Rockville, MD
this 18th day of November 2011

NRC000044
Filed 11/18/2011

Cape Wind Project

The Bureau has issued a commercial lease to Cape Wind Associates, LLC (CWA) for the right to construct and operate an offshore wind facility located in Federal waters 4.7 miles offshore Cape Cod, Massachusetts. The project area is located on Horseshoe Shoal in Nantucket Sound. The project consists of 130, 3.6 megawatt wind turbine generators with the capacity to produce about 468 megawatts.

Interim Policy Projects

The interim policy was announced in November 2007 before the issuance of the final regulations in April 2009. The interim policy allowed for limited leasing and was designed for resource data collection and technology testing activities. The interim policy leases have a five year term and provide no subsequent commercial rights. In June 2009, the BOEM offered a total of five leases, four in New Jersey and one in Delaware. Four of the offered leases were executed on November 1, 2009.

- Executed Interim Policy Leases
  - OCS-A 0472 – Deepwater Wind LLC
  - OCS-A 0473 – Fishermen's Energy of New Jersey LLC
  - OCS-A 0474 – Bluewater Wind Delaware LLC
  - OCS-A 0475 – Bluewater Wind New Jersey Energy LLC

- Decision Memorandum on Issuance of OCS Limited Leases Under the Interim Policy Offshore Delaware and New Jersey
- Environmental Assessment for Issuance of Leases for Wind Resource Data Collection on the OCS Offshore Delaware and New Jersey
- Interim Policy Proposed Projects

NRG Bluewater Wind

- Home
- About Us
- About Offshore Wind
- Current Projects
  - Delaware
    - Overview
    - Wind Park
    - **Process & Timeline**
    - Get the Facts
    - How You Can Help
  - New York
  - New Jersey
  - Maryland
  - New England
- Contact us

Process & Timeline

Building a new power resource requires the oversight and involvement of dozens of local, state and Federal agencies. There is a state-mandated process that must be followed by any prospective energy supplier — bidding, testing, planning, permitting, public outreach and analysis. To help learn about and follow this long and sometimes complex process, we've assembled a timeline and highlighted milestones of key interest:

Delaware Requests Stable-Priced, Clean, Renewable Energy:

KeyMilestones	Date	
House Bill #74	July 2005	Delaware's Renewable Portfolio Standard signed into law, requiring that 10% of the state's electricity come from renewable sources by the year 2018.
House Bill #6 passes	May 2006	Delaware's legislature mandates that Delmarva must utilize energy from a plant located in Delaware, and to give preference to a project which best provides stable-priced power and uses renewable sources.
Delmarva issues Request for Proposals in response to HB #6	Nov 2006	Please see complete details at the Public Services Commission
Proposal development	Aug-Dec 06	Potential suppliers, including both fossil fuel-based resources and renewable resources, like Bluewater Wind, prepare their proposals

Bluewater Wind Prepares Its Proposal In Response:

KeyMilestones	Time Frame	
Planning begins	Summer 2006	Feasibility studies begun, including preliminary environmental reviews, wind assessments, oceanographic studies, etc.
Design begins	Fall 2006	Foundation options explored, engineering begun, turbine lay-out determined, etc.
Public outreach	On-going	Meetings with stakeholders will continue through-out the entire project process.
Proposal Review	Dec06 - Spring 08	Several Delaware agencies - Public Service Commission, Energy Office, Management and Budget, and the Controller General's office - review bids along with Delmarva to select project to be constructed.
Contract Awarded	Summer 08	Power Purchase Agreement between Delmarva and project company is finalized;

Based upon the bid outcome, NRG Bluewater Wind is moving forward with...

Permitting And Environmental Verification, Final Design:

KeyMilestones	Time Frame	
Verify engineering studies	12-24 months from signing contract	All feasibility studies must be verified, tested and finalized
Complete environmental Impact studies	12-24 months after signing contract	Exhaustive, site-specific studies are analyzed
Obtain final permits	12-24 months from signing contract	Dozens of state, local and federal agencies are involved; view list
Community outreach	On-going	Public meetings held by state agencies take place, along with information sessions sponsored by NRG Bluewater Wind

Construction & Installation

KeyMilestones	Time Frame	
Finalize engineering design	6-12 months	As additional data on the sea floor and waves become available from further on-site studies, the foundation and tower design is finalized.
Construction & installation	12-36 months	Assembling turbine components begins on-shore. As tower foundations are completed, turbines are installed and brought online to maximize efficiency and begin delivering wind energy electricity to Delaware quickly.
Community outreach	On-going	NRG Bluewater Wind continues information sessions to keep the public informed of progress and address any questions that come up during construction.

Operations, Maintenance And Decommissioning:

KeyMilestones	Time Frame	
Maintenance	On-going	Wind turbines require minimal upkeep, typically less than 48 hours per year. A small operations center at a nearby port facility is utilized.
Decommissioning	Before construction begins, firm provisions are made for decommissioning at the end of the project's useful life-approximately 25 years	During the planning process and as a permitting requirement, provisions are put in place to remove the turbines at the end of their useful life, regardless of who owns the turbines at that time.

Local Authorities

- To be participant in NEPA/State review
- Municipalities with potential visible impacts
- Local communities transited by onshore cable route
- Building permits as required

State Regulations, Permits & Approvals

- DNREC- State Environmental Review (associated with NEPA)
- Coastal Zone Act Status Decision
- Coastal Zone Act Permit
- Coastal Federal Consistency Certification
- Subaqueous lands permits and leases
- Wetlands permit
- Section 401 Water Certification
- NPDES Storm Water Permit
- Air Quality Permits
- DNREC- Div. of Fish and Wildlife
- DNREC- Div of Parks and Recreation
- Beach Preservation Act of 1972
- Delaware PSC
- DE River Basin Commission
- DE Heritage Commission
- DE Economic Development Office
- DE Energy Office
- DelDOT

Federal Regulations and Reviews

- Energy Policy Act 2005
- Coastal Zone Management Act of 1972
- Rivers and Harbors Acts of 1890 and 1899

- Clean Water Act of 1977
- Navigation and Navigable Waters
- Federal Aviation Administration
- National Environmental Policy Act
- Archaeological and Historic Preservation Act of 1974
- Fish and Wildlife Coordination Act of 1958
- Endangered Species Act of 1973
- Estuary Protection Act
- Marine Protection, Research, and Sanctuaries Act
- US Coast Guard
- Marine Mammal Protection Act
- Magneson-Stevens Conservation and Management Act
- Migratory Bird Treaty Act
- Abandoned Shipwreck Act
- Approval for Private Aids to Navigation


U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment