

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 INITIAL STATEMENT OF POSITION

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October 21, 2011

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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 scheduling order,¹ the United States Nuclear Regulatory Commission staff ("Staff" or "NRC Staff") hereby submits its Initial Statement of Position and Direct Testimony, together with supporting Affidavits and Exhibits, regarding admitted Contention 10C.

As set forth in the Staff's Initial Statement of Position, Direct Testimony, and Exhibits, the FEIS has examined reasonable alternatives within the range dictated by the nature and scope of the proposal and has rigorously explored and objectively evaluated those reasonable alternatives. Accordingly, Contention 10C is without merit, as the Staff reasonably estimated solar and wind contributions in its combination of energy alternatives, and the Board should find in favor of the Staff.

¹ Order (Revising Initial Schedule) at 3 (June 24, 2011) (unpublished).

BACKGROUND

On July 13, 2007, UniStar Nuclear Development, LLC on behalf of Constellation Generation Group, LLC and UniStar Nuclear Operating Services submitted part of their application for a combined license (COLA) for one U.S. EPR pressurized water reactor to be located adjacent to the existing Calvert Cliffs Nuclear Power Plant (CCNPP), Units 1 and 2, near Lusby, Calvert County, Maryland. *UniStar Nuclear LLC*; Notice of Receipt and Availability of Part of an Application for a Combined License, 72 Fed. Reg. 45,832 (Aug. 15, 2007).²

On September 26, 2008, the NRC issued a notice of hearing and opportunity to intervene. Calvert Cliffs 3 Nuclear Project, LLC, and UniStar Nuclear Operating Services, LLC Notice of Hearing and Opportunity To Petition for Leave To Intervene and Order Imposing Procedures for Access to Sensitive Unclassified Non-Safeguards Information and Safeguards Information for Contention Preparation on a Combined License for the Calvert Cliffs Nuclear Power Plant 3, 73 Fed. Reg. 55,876 (Sept. 26, 2008). On November 19, 2008, multiple entities jointly filed a petition to intervene in the proceeding proffering seven contentions. See Petition to Intervene in Docket No. 52-016, Calvert Cliffs-3 Nuclear Power Plant Combined Construction and License Application at 5 (Nov. 19, 2008) (Petition).

On March 24, 2009, the Atomic Safety and Licensing Board admitted the petitioners as parties to this proceeding, collectively referred to as "Joint Intervenors," and admitted three contentions. *Calvert Cliffs 3 Nuclear Project, LLC, and UniStar Nuclear Operating Services, LLC* (Combined License Application for Calvert Cliffs Unit 3), LBP-09-04, 69 NRC 170, 190-196, *aff'd in relevant part*, CLI-09-20, 70 NRC 911, 918-21 (2009).

² 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 (collectively, Applicants).

On April 13, 2010, NRC Staff issued NUREG-1936, *Environmental Impact Statement for the Combined License (COL) for Calvert Cliffs Nuclear Power Plant Unit 3, Draft Report for Comment* (April 2010) (DEIS).³ On June 25, 2010, the Joint Intervenors submitted Contention 10, challenging the adequacy of the DEIS with respect to the need for power, energy alternatives, and the relative costs and benefits of the proposed new nuclear unit. Submission of Contention 10 by Joint Intervenors at 1 (June 25, 2010) (Intervenors' Original Contention 10). NRC Staff and the Applicants opposed the admission of this contention. NRC Staff Answer to Joint Intervenors' New Contention 10 (July 20, 2010); Applicants' Response to Proposed Contention 10 (July 20, 2010).

In an order issued on December 28, 2010, the Board reformulated and admitted one part of proposed Contention 10, concerning combination of alternatives, as Contention 10C, and rejected each of the Intervenors' other challenges to the DEIS for failure to meet the contention admissibility requirements in 10 CFR § 2.309(f)(1) and (f)(2). *Calvert Cliffs 3 Nuclear Project, LLC, and UniStar Nuclear Operating Services, LLC* (Combined License Application for Calvert Cliffs Unit 3), LBP-10-24, 72 NRC __, __ (Dec. 28, 2010) (slip op. at 1, 20, 38, 44, 54, 62). Contention 10C challenged the DEIS's wind and solar power contribution estimates as inadequate. As admitted, Contention 10C reads as follows:

The 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.

Id.

On May 20, 2011, Staff issued the Final Environmental Impact Statement (FEIS) for the proposed project. See 76 Fed. Reg. 29,279 (May 20, 2011); NUREG-1936, *Environmental*

³ The DEIS is contained in two volumes. Volume 1 (ML101000012) includes Chapters 1 - 10. Volume 2 (ML101000013) includes Appendices A through M.

Impact Statement for the Combined License for Calvert Cliffs, Nuclear Power Plant Unit 3, Final Report (May 2011) (ADAMS Accession Nos. ML11129A167 and ML11129A179).

On June 20, 2011, Applicants moved for summary disposition of Contention 10C on the grounds that the FEIS addressed the issues raised by the Intervenors in Contention 10C; the Applicants argued that no genuine issue remains as to any material fact relevant to the contention. See Applicant's Motion for Summary Disposition of Contention 10C (June 20, 2011) (Applicants' Motion). On July 11, 2011, NRC Staff filed an answer to Applicant's Motion in which it did not oppose Applicant's Motion for Summary Disposition of Contention 10C. See NRC Staff's Response to Applicants' Motion for Summary Disposition (July 11, 2011). Joint Intervenors did not file a response to the Applicants Motion.⁴

Also on June 20, 2011, the Joint Intervenors filed a "Submission of Amended Contention 10C" in which they, among other things, sought to update the original bases of Contention 10C to reflect additional arguments concerning the FEIS. See Submission of Amended Contention 10C by Joint Intervenors (June 20, 2011) (Joint Intervenors' Submission). On July 15, 2011, NRC Staff filed its response to the Joint Intervenors' Submission. See NRC Staff Answer to Joint Intervenors' Amended Contention 10C (July 15, 2011). In its response, NRC Staff did not oppose the proposed change of reference from DEIS to FEIS in contention 10C, but opposed the Joint Intervenors' Submission in all other respects for failure to meet the contention admissibility requirements in 10 C.F.R. § 2.309(f)(1) and (f)(2).

On August 26, 2011, the Licensing Board issued a decision that denied the Applicants' Motion for Summary Disposition, and denied admission of the Joint Intervenors' amended

⁴ The Board, in its Memorandum and Order of August 26, 2011, considered the Joint Applicants' arguments made in its June 20, 2011 "Submission of Amended Contention 10C" in ruling on the Applicant's Motion. *Memorandum and Order (Denying Summary Judgment of Contention 10C, Denying Amended Contention 10C, and Deferring Ruling on Contention 1)* at 5, n.21 (Aug. 26, 2011) (unpublished) (Aug. 26, 2011 Order).

contention.⁵ The Licensing Board directed the parties to proceed to evidentiary hearing according to the Board's Revised Initial Scheduling Order on Contention 10C.

DISCUSSION

I. Legal Standards

The contention at issue in this proceeding arises under the National Environmental Policy Act (NEPA), and the NRC's regulations that implement that statute. See 42 U.S.C. § 4321 (2006); 10 C.F.R. Part 51. NEPA requires that an agency prepare an Environmental Impact Statement (EIS) for major Federal action that significantly affect the quality of the human environment. 42 U.S.C. § 4332(2)(C). The NRC has determined that the Issuance of a COL is an action that requires an EIS. 10 C.F.R. § 51.20.

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.* (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 Servs., L.P.*, CLI-98-3, 47 NRC at 103 (internal citation omitted).

With respect to alternatives analysis, NEPA does not require a detailed discussion of alternatives deemed remote and speculative or whose effects cannot be readily ascertained.

⁵ Aug. 26, 2011 Order at 32.

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.

Id. at 551 As 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) (*Private Fuel Storage, LLC*). 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) (*USEC Inc.*) (in which the Commission stated that intervenor “erroneously appears to assume that the NEPA analysis of ‘alternatives’ should ignore the stated purposes of the project *and the Applicant’s needs.*”) (emphasis added). Finally, decisions on alternatives may deal with circumstances “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) (“[I]n an NRC adjudication, it is Intervenor’s 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.” See *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) (“*Duke Energy Corp.*”). As the Commission has stated, “[o]ur 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*, CLI-05-29, 62 NRC at 811 (quoting *System Energy Resources, Inc.* (Early Site Permit for Grand Gulf Site), CLI-05-4, 61 NRC 10, 13 (2005)).

Finally, “in an adjudicatory hearing, to the extent that any environmental findings by the Presiding Officer (or the Commission) differ from those in the FEIS, the FEIS is deemed modified by the decision.” *Hydro Resources, Inc.* (Rio Rancho, NM), CLI-01-4, 53 NRC 31, 53 (2001). The hearing process serves the public participation purposes of NEPA because it allows for “more rigorous public scrutiny” of an EIS than “circulation for comment.” See *id.* at 53 (quoting *Philadelphia Electric Co.* (Limerick Generating Station, Units 1 and 2), ALAB-819, 22 NRC 681, 707 (1985)).

II. NRC Staff Witnesses for Contention 10C

The “Prefiled Direct Testimony of Laura M. (Quinn) Willingham Sponsoring NUREG-1936 into the Hearing Record” (Exhibit NRC000001) sponsors the introduction of the Staff’s

FEIS into the record of this proceeding as required by 10 C.F.R. § 2.337(g).⁶ The remaining testimony presents the opinions of staff witnesses for Contention 10C. For Contention 10C, the panel of witnesses consists of Andrew J. Kugler and Katherine A. Cort. They have authored the “Prefiled Direct Testimony of Andrew J. Kugler and Katherine A. Cort Regarding Contention 10C” (Ex. NRC000004) (NRC Staff Testimony).⁷

Andrew J. Kugler and Katherine A. Cort have provided testimony regarding the Staff’s position with respect to Contention 10C. NRC Staff Testimony at A1.⁸ NRC Staff Testimony presents the opinions of two qualified witnesses and demonstrates, as set forth below, that the FEIS prepared by the Staff to meet its obligations under NEPA includes an adequate discussion of a combination of energy alternatives. *Id.* NRC Staff rigorously explored and objectively evaluated 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. The Staff concluded that there are no environmentally preferable alternatives to the proposed action with respect to energy alternatives. NRC Staff Testimony at A35; see *a/so* FEIS at 9-28 (NRC000003A).

III. The Energy Alternatives Discussion in the FEIS is Adequate

A. The Board Should Find for Staff on Contention 10C

1. NRC Staff Examined Technically Feasible and Commercially Viable Energy Alternatives in the Region of Interest

In preparing the FEIS, NRC Staff assessed the environmental impacts of technically feasible and commercially exploitable energy alternatives that would be available in Maryland,

⁶ Volume 1 (ML11049A000) can be found in Ex. NRC000003A, Volume 2 (ML11129A179) can be found at Ex. NRC000003B.

⁷ NRC Staff’s testimony is also supported by numerous exhibits, The list of NRC Staff exhibits is contained in NRC Staff Attachment 1.

⁸ In the Staff’s testimony, each question and answer is consecutively numbered, and citations to testimony in this pleading are to answer numbers.

the region of interest, able to meet the purpose and need of the project within the timeframe of the proposed project, and would contribute to the projected demand for electrical energy. NRC Staff Testimony at A10. Consistent with the environmental standard review plan, the NRC Staff determined that given that the proposed project is intended to supply baseload power, a competitive alternative would also need to be capable of supplying baseload power. NRC 2007 ESRP 9.2.2 at 3 (Ex. NRC0000008); *see also Private Fuel Storage, LLC* at 146 (finding that “it is appropriate to consider the stated purposes of the project”); *USEC Inc.* at 467 (rejecting intervenor assertion that the NEPA analysis of ‘alternatives’ should ignore the stated purposes of the project).

In developing reasonable alternative energy sources, NRC Staff relied upon the insights of the U.S. Department of Energy (DOE), as the agency responsible for energy planning in the U.S, as a reliable source for future predictions and market analyses. NRC Staff did not assume that each individual energy technology would be able to reach its theoretical maximum potential. Rather, NRC Staff struck a balance between the limited implementation successes for energy technologies such as wind and solar and the potential of the resource. The resulting combination of energy alternatives represents what NRC Staff concluded could be reasonably be achieved within the region of interest and the timeframe of the proposed project. NRC Staff Testimony at A18.

2. NRC Staff Evaluated Combinations of Energy Alternatives

NRC Staff considered a combination of energy alternatives that included the maximum contribution from renewable sources that would be reasonably foreseeable, within the region of interest, and within the timeframe of the proposed project. In doing so, NRC Staff minimized to the extent feasible the size of the contribution from natural gas generation. NRC Staff Testimony at A48. To determine the contribution of wind power to the combination energy alternatives, NRC Staff primarily relied on U.S. DOE’s Annual Energy Outlook National

Renewable Energy Laboratory (NREL) 2010 report related to large-scale off-shore wind in the United States, and the Maryland Public Service Commission's (MPSC) Ten-Year Plan. (Ex. NRC000016). NRC Staff Testimony at A34. For the ReliabilityFirst Corporation/East region which includes Maryland,⁹ DOE/EIA projects a growth of 420 MW(e) of on-shore wind capacity and 200 MW(e) of offshore wind capacity between 2010 and 2035. DOE/EIA 2011b (Ex. NRC000022). NRC Staff conservatively assumed that Maryland accounts for a third of this growth, which would equate to about 210 MW(e). NRC Staff Testimony at A34. Using 34 percent for the capacity factor of wind, this 210 MW(e) of wind capacity equates to about 71 MW(e) of baseload capacity. The NRC Staff value of 100 MW(e) in the combination of energy alternatives is reasonable in comparison to the DOE/EIA projection. While the data from EIA are projections, based on the limited wind development in Maryland, it would be unreasonable to expect large-scale development of this resource within the timeframe of the proposed project, and thus it is appropriate to not include a larger wind contribution to the combination of energy alternatives discussion, and not include a further discussion of wind in the FEIS. *Id.* NEPA does not require a detailed discussion of the environmental effects of alternatives put forward in comments when these effects cannot be readily ascertained and the alternatives are deemed only remote and speculative possibilities. *Vermont Yankee Nuclear Power Corp. v. NRDC*, 435 U.S. 519, 551 (1978) (quoting *NRDC v. Morton*, 458 F.2d 827, 837–38 (1972)). Decisions on alternatives may deal with them “as they exist and are likely to exist.” *Carolina Environmental Study Group v. United States*, 510 F.2d 796, 801 (D.C. Cir. 1975). Accordingly, NRC Staff has satisfied its burden with respect to wind resources in the combination of energy alternatives.

⁹ The ReliabilityFirst Corporation/East region is formerly the Mid-Atlantic Area Council. ReliabilityFirst Corporation is one of eight regional electric reliability councils that sets and enforces electric reliability standards. Maryland is in the ReliabilityFirst Corporation territory. RFC 2011 (Ex. NRC000020).

NRC Staff developed contributions to the combination of alternatives from energy sources that it determined to be possible contributors; wind, solar, hydropower, biomass (including municipal solid waste), and conservation and demand-side management programs. For the combination of energy alternatives, the NRC Staff considered which of these sources to include and what amount they could contribute. While any number of options and variations is theoretically possible, NRC Staff selected those alternative energy sources that are available in Maryland, and at levels of contribution that the Staff reasonably expects could be achieved to meet the purpose and need of the project within the timeframe of the proposed project. NRC Staff Testimony at A17. In keeping with NEPA principles, NRC Staff established a reasonable combination of energy alternatives to meet the purpose and need for the proposed project and that is not inconsistent with energy plans and planning documents for Maryland. *Id.*, see also MPSC 2009b (Ex. NRC000016); MPSC 2007 (Ex. NRC000017).

With respect to wind and solar power, NRC Staff, as set forth below, concluded that if wind and solar power were utilized as energy alternatives, the alternatives would need to be coupled with a storage mechanism such as compressed air storage system (“CAES”) to provide baseload power. NRC Staff Testimony at A44. Specifically, Staff determined that the largest feasible contribution from wind power would be 100 MW(e). NRC Staff Testimony at A34. For wind power, 100 MW(e) equates to at least 250 to 300 MW(e) of installed capacity¹⁰ coupled with a 100 MW(e) CAES plant. The contribution from solar power was assumed to be smaller based on the marginal solar power potential for large-scale projects in the Maryland region. NRC Staff Testimony at A48; FEIS at 9-28 (NRC00003A). The alternate energy sources, including wind and solar, added up to a baseload equivalent of 400 MW(e). NRC Staff allocated the remaining 1200 MW(e) of baseload needed to non-renewable energy sources - coal or

¹⁰ Note that this amount of capacity is based simply on the capacity factor of wind. It ignores the fact that there will be extended periods of low wind that will exhaust the stored energy capacity of the CAES facility, requiring some other source of electrical power to back up the wind/CAES combination.

natural gas. Of the two, NRC Staff determined that natural gas resulted in the least environmental impacts. NRC Staff Testimony at A25.

NRC Staff considered a scenario in which the wind contribution was quadrupled to 400 MW(e) of baseload power, equivalent to an installed capacity of at least 1000 to 1200 MW(e) with a 400-MW(e) CAES plant. NRC Staff concluded that, under this scenario, the combination alternative would require 900 MW(e) from natural gas-fired plant in order to meet the target generation capacity of 1600 MW(e). NRC Staff Testimony at A35; FEIS at 9-28 to 9-30 (Ex. NRC000003A). Staff determined that the CAES plant in this scenario would be larger than any such facility worldwide and offshore wind capacity of this magnitude exceeds by a factor of five or more the amount of offshore wind projected by DOE/EIA for the entire United States by the year 2030¹¹ (Ex. NRC000022). Under this scenario, the impact categorizations in Table 9-3 in the FEIS (Ex. NRC00003A) would not change, except that impacts to land use and terrestrial ecology might become LARGE if onshore wind energy is used. If offshore wind is the energy source, then increased impacts to aquatic ecology, aesthetics and recreation (as a minimum) would occur from the building and operation of the turbines. NRC Staff Testimony at A35; FEIS at 9-28 to 9-30 (Ex. NRC00003A).

There is utility-scale wind energy in Maryland; but there are only two moderate-sized projects (50 MW(e) and 70 MW(e), and they are both onshore projects. Gestamp 2011 (Ex. NRC000025); Constellation 2010 (Ex. NRC000026). No Maryland wind projects are approved for offshore locations. The first of the two operating wind projects in Maryland, the 70 MW(e) Criterion onshore wind project, went online in December 2010. The other, the 50 MW(e) onshore Roth Rock project, went online in July 2011 (Ex. NRC000025). The NRG Bluewater Wind project off the nearby Delaware coast in Federal waters is currently planned to have a

¹¹ NRC Staff found that the DOE/EIA projection for offshore wind power has not changed in the Annual Energy Outlook 2011. DOE/EIA 2011 (Ex. NRC000012).

capacity of 450 MW(e). NRC Staff Testimony at A32. Joint Intervenors expressed a concern that NRC Staff had not included the Bluewater Wind project off the coast of Maryland in the FEIS. Joint Intervenors 2011 at 4. The NREL report (2010) does not include the Bluewater Wind project in Maryland in the list of projects that have advanced permitting because that project has not made any significant progress in the leasing/permitting process, which has lasted over 10 years in the case of the Cape Wind offshore wind project off the coast of Cape Cod, Massachusetts. See US ACE 2011 (Ex.NRC000030). Thus, the Staff did not consider the Bluewater Wind project in Maryland to be reasonably foreseeable and did not include it in its combination alternative analysis. See *Private Fuel Storage, LLC* at 146; *USEC Inc.* at 467; NRC Testimony at A33.

NRC Staff concluded that it is unlikely that a project such as the Bluewater Wind project in Maryland, that has not made any significant progress in the leasing/permitting process, could be operational within the timeframe of the proposed project. NRC Staff Testimony at A32.

The Review Team reviewed the Wind Technologies Market Report (DOE/EERE 2011 (Ex. NRC00029)), which found, consistent with the 2010 NREL report, that: "To date, no offshore projects have been installed in the United States, and the emergence of a U.S. offshore wind power market still faces many challenges. Perhaps most importantly, the projected near-term costs of offshore wind energy remain high. Additionally, though political support exists for offshore wind energy in some quarters, planning, siting, and permitting can be challenging, as demonstrated in the long history of the Cape Wind project. Competing uses of offshore waters and public concerns can complicate the process and, despite recent progress in clarifying the permitting procedures in federal waters, uncertainties in federal and state permitting processes remain."

Id.

NRC Staff notes that the MPSC considered the development potential for wind power in Maryland in a 2008 report (MPSC 2008b (Ex. NRC000023)) and concluded the economic benefits from renewable sources remain uncertain and challenging. MPSC found that onshore wind yields net economic benefits, albeit on a small scale. Additionally, MPSC found that, offshore wind, as modeled in the report, does not yield economic benefits. FEIS at 9-20 (Ex. NRC00003A). NRC Staff concluded that offshore wind would not significantly contribute to the

combination of energy alternatives in the timeframe of the proposed project. NRC Staff Testimony at A33.

In evaluating the potential contribution of solar power in the combination of energy alternatives, NRC Staff first considered the likelihood that there would be additions of solar generating capacity in Maryland. DOE/EIA predicts 0 MW(e) for utility solar capacity between 2010 and 2035 in the Region that includes Maryland, and the addition of 810 MW(e) of end-use solar capacity (all photo-voltaic, or PV) in that region over the same period. DOE/EIA 2011b (Ex. NRC000022); NRC Staff Testimony at A42. End-use facilities are typically of small size because they are only designed to meet a specific local need. Assuming that Maryland accounts for roughly a third of the region, additions of end-use solar capacity in Maryland by 2035 would be about 270 MW(e). According to DOE/EIA, an average solar capacity factor ranges from 18 to 25% in the U.S. DOE/EIA 2010b (Ex. NRC000010). Using 25% for simplicity, the 270 MW(e) of capacity equates to about 68 MW(e) of baseload capacity. Typical solar-to-electric power plants require 5 to 10 acres for every MW(e) of generating capacity. NRC Staff Testimony at A42; FEIS at 9-23 (Ex. NRC00003A). Using this number, the 270 MW(e) (75 MW(e) baseload equivalent) solar contribution would impact 1350 to 2700 acres of land and associated terrestrial resources. A larger solar contribution would impact a correspondingly larger land area. The NRC Staff concluded that a value of 75 MW(e) in the combination of energy alternatives is reasonable in comparison to the DOE/EIA projection. *Id.*

Staff concluded, based upon its extensive review of the viability of the energy production technologies within the region of interest, a 100 MW(e) wind and 75 MW(e) solar baseload equivalent contribution to the combination of energy alternatives were reasonable. NRC Staff Testimony at A42. The range of alternatives considered by the NRC Staff in making the aforementioned determination in the FEIS need not, and did not, extend beyond those alternatives reasonably related to the purposes of the project. *See Private Fuel Storage, LLC; see USEC Inc.*

3. NRC Staff Evaluated Storage Resources

NRC Staff evaluated alternative energy resource combinations together with storage that included the maximum contribution from renewable sources that would be reasonably foreseeable within the region of interest and within the timeframe of the proposed project. Specifically, NRC Staff considered wind or solar power “in conjunction with energy storage mechanisms such as pumped hydroelectric or CAES, or another readily dispatchable power source, such as hydropower, might serve as a means of providing baseload power.” As stated in Section 9.2.3.2 of the FEIS (Ex. NRC00003A), a pumped storage or other hydroelectric facility is highly unlikely based on the DOE/EIA projection for pumped storage (Ex. NRC000022) and the low potential for new hydroelectric development in Maryland. Conner and Francfort 1997 (Ex. NRC000042).

NRC Staff evaluated CAES facilities. FEIS Section 9.2.3.2 (Ex. NRC00003A). To date one facility was built in 1978 (290 MW(e), in Germany) and another in 1991 (110 MW(e), in Alabama). Additionally, NRC Staff considered a current proposal for a 268 MW(e) CAES plant coupled to a wind farm in Iowa, and other proposals in various stages of development in the U.S. *Id.* None of the proposals are for a facility in Maryland, and it is unclear that such a facility could be sited in the State of Maryland. *Id.* NRC Staff found no evidence that any company has made any proposal for a CAES facility in Maryland. NRC Staff Testimony at A46. ESRP 9.2.2 (NRC 2007 (Ex. NRC000008)) states that the “energy conversion technology should be developed, proven, and available in the relevant region.” Staff concluded that including a large CAES facility in Maryland would be speculative and not within the reasonable range of alternatives to be considered in the staff’s NEPA analysis, based on the history and current state of CAES development. *Id.* NRC Staff concluded that a large CAES facility, beyond the 175 MW(e) assumed in the combination of energy alternatives, was not a reasonable alternative. *Id.* NRC Staff’s NEPA analysis and the resulting FEIS adequately addressed the

alternatives, and combination of alternatives, and circumstances thereof as they exist and are likely to exist. See *Carolina Environmental Study Group*, 510 F.2d at 801.

CONCLUSION

As set forth in the NRC Staff Direct Testimony, Affidavits, and Exhibits, and as summarized herein, the NRC Staff in preparing the FEIS examined reasonable alternatives within the range dictated by the nature and scope of the Applicant's proposal and the NRC Staff's developed purpose and need statement. As noted "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, and biofuels). Additionally, NRC Staff evaluated a combination of energy alternatives that included reasonable contributions from wind and solar 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*. Moreover, consistent with the requirements of NEPA, in conducting its analysis the NRC Staff has taken a hard look at significant environmental questions, and did not unduly ignore or minimize pertinent environmental effects. See *Duke Energy Corp.*

NRC Staff concluded that none of the proposed energy alternatives or combination of alternatives identified by Staff would be environmentally preferable to the proposed action. Specifically, none of the energy alternatives identified: (1) were capable of meeting the purpose and need of the project; (2) were in the region of interest; (3) could meet the timeframe of the proposed project; and (4) were environmentally preferable to the proposed project.

Accordingly, Joint Intervenors' Contention 10C is without merit and the Board should find in favor of the NRC Staff.

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 21st day of October, 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 NRC Staff Initial Statement of Position, NRC Staff Attachment 1 (Exhibit List), and Exhibits NRC000001 through NRC000042, including direct prefiled testimony and supporting affidavits (exhibits NRC000001 and NRC000004) have been served upon the following persons by Electronic Information Exchange this 21st day of October, 2011:

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