

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,)	Docket No. 52-016-COL
LLC)	
)	
(Calvert Cliffs Nuclear Power Plant, Unit 3))	

APPLICANTS’ MOTION FOR
SUMMARY DISPOSITION OF CONTENTION 10C

INTRODUCTION

Pursuant to 10 C.F.R. § 2.1205, Calvert Cliffs 3 Nuclear Project, LLC, and UniStar Nuclear Operating Services, LLC (collectively, “UniStar”) file this motion for summary disposition of Contention 10C, which relates to the NRC Staff’s evaluation of energy alternatives in the Calvert Cliffs Nuclear Power Plant Unit 3 (“Calvert Cliffs 3”) Final Environmental Impact Statement (“FEIS”).¹ Summary disposition is warranted on the grounds that the FEIS addressed the issues raised by the Intervenors in Contention 10C and that, as a result, there exists no genuine issue as to any material fact relevant to the contention. Therefore, under the applicable Commission regulations, UniStar is entitled to a decision as a matter of law.²

¹ See 76 Fed. Reg. 29279 (May 20, 2011); “Environmental Impact Statement for the Combined License (COL) for Calvert Cliffs Nuclear Power Plant Unit 3, Final Report,” NUREG-1936 (May 2011) (ADAMS Accession Nos. ML11129A167 and ML11129A179) (“FEIS”).

² Counsel for the Applicants has contacted counsel for the NRC Staff and Joint Intervenors. The NRC Staff reserved judgment on the motion until they have an opportunity to review the motion in its entirety. The Joint Intervenors oppose the motion.

This motion is supported by a Statement of Material Facts as to which UniStar asserts that there is no genuine dispute and the affidavit of Dimitri Lutchenkov, Director, Environmental Affairs and Special Projects, for UniStar Nuclear Energy.

LEGAL STANDARDS FOR SUMMARY DISPOSITION

This proceeding relates to the application for a combined license for Calvert Cliffs

3. The proceeding is governed by the procedures described in Subpart L of 10 C.F.R. Part 2. Subpart L contains certain instructions for filing motions for summary disposition, but directs the Licensing Board to apply the standards of Subpart G, which are set forth in 10 C.F.R. § 2.710(d)(2).³ Under that section, a motion for summary disposition must be granted “if the filings in the proceeding ... together with the statements of the parties and the affidavits, if any, show that there is no genuine issue as to any material fact.”⁴

The party moving for summary disposition bears the burden of demonstrating that there is no genuine issue as to any material fact and that it is entitled to a decision in its favor.⁵ If the movant makes such a showing and that showing is not countered by the opposing party, the Board may summarily dispose of the arguments in question on the basis of the pleadings.⁶ “The opposing party must controvert any [individual] material fact properly set out in the statement of material facts that accompanies a summary disposition motion or the fact will be deemed

³ See 10 C.F.R. § 2.1205(c).

⁴ 10 C.F.R. § 2.710(d).

⁵ *Advanced Medical Systems, Inc.* (One Factory Row, Geneva, Ohio 44041), CLI-93-22, 38 NRC 98, 102 (1993).

⁶ *Id.*

admitted.”⁷ Opponents must “pinpoint[] each of [the] Applicant’s stated material facts which they genuinely dispute and set[] forth the basis for their belief that the facts are not as stated.”⁸

Moreover, the level of factual support necessary to withstand summary disposition is expected to be of a much “higher level” than at the contention filing stage.⁹ “[Q]uotations from or citations to [the] published work of researchers [or experts] who have apparently reached conclusions at variances with the movant’s affiants” will not suffice.¹⁰ Also, submission of expert opinion by an opponent alone does not preclude summary disposition, and parties must “clearly and thoroughly explain the basis for the expert’s opinion.”¹¹ The Licensing Board “must focus on whether the expert opinions are sufficiently grounded upon a factual basis.”¹² As such, the party opposing summary disposition cannot defeat the motion by presenting “subjective belief[s] or unsupported speculation,” or improperly supported expert opinion.¹³

⁷ *Id.* at 102-103.

⁸ *Commonwealth Edison Company* (Braidwood Nuclear Power Station, Units 1 and 2), LBP-86-12, 23 NRC 414, 420 (1986).

⁹ “Rules of Practice for Domestic Licensing Proceedings – Procedural Changes in the Hearing Process; Final Rule,” 54 Fed. Reg. 33168, 33171 (Aug. 11, 1989).

¹⁰ *Carolina Power & Light Co.* (Shearon Harris Nuclear Plant, Units 1 & 2), LBP-84-7, 19 NRC 432, 435-36 (1984).

¹¹ *See Duke Cogema Stone & Webster* (Savannah River Mixed Oxide Fuel Fabrication Facility), LBP-05-04, 61 NRC 71, 80-81 (2005) (“Conflicting expert opinions . . . do not necessarily preclude summary disposition” as “the nonmoving party cannot avoid summary judgment by presenting an unsupported opinion of an expert.”).

¹² *Id.* at 81.

¹³ *Id.* at 80 (quoting *Daubert v. Merrell Dow Pharms., Inc.*, 509 U.S. 579, 589-90 (1993)).

Significantly for the present matter, only material and relevant disputes are sufficient to defeat a motion for summary disposition. As the Commission recently noted:

“Only disputes over facts that might affect the outcome” of a proceeding would preclude summary disposition. “Factual disputes that are . . . unnecessary will not be counted.” . . . At issue is not whether evidence “unmistakably favors one side or the other,” but whether “there is sufficient evidence favoring the non-moving party” for a reasonable trier of fact to find in favor of that party. If the evidence in favor of the non-moving party is “merely colorable” or “not significantly probative,” summary disposition may be granted.¹⁴

Thus, in considering an opposition to the motion, the Board must carefully ascertain not only whether there any genuine factual disputes asserted, but also whether the disputes relate to a material issue — that is, to an issue that would affect the outcome of the proceeding under relevant substantive law. If the opposing party fails to meet this standard, and the moving party has successfully shown that there is no genuine dispute on a material issue of fact, then summary disposition should be granted.

As discussed in admitting Contention 10C, consideration of the present motion is governed by the National Environmental Policy Act (“NEPA”) and related case law. The environmental review mandated by NEPA is subject to a “rule of reason” and, as such, need not include all theoretically possible environmental effects arising out of an action. Nor must the discussion of the impacts be encyclopedic in scope or detail. Instead, a NEPA analysis may be limited to effects which are shown to have some likelihood of occurring¹⁵ and need not include

¹⁴ *Entergy Nuclear Generation Co. & Entergy Nuclear Operations, Inc.* (Pilgrim Nuclear Power Station), CLI-10-11, 71 NRC __, __ (slip op. at 12-13) (Mar. 26, 2010) (internal citations omitted).

¹⁵ *Northern States Power Co.* (Prairie Island Nuclear Generating Plant, Units 1 & 2), ALAB-455, 7 NRC 41, 48, 49 (1978).

an analysis of “remote and speculative” events or impacts.¹⁶ The Commission has also stated that the principal goals of the FEIS are “to force agencies to take a ‘hard look’ at the environmental consequences of a proposed project, and, by making relevant analyses openly available, to permit the public a role in the agency's decision-making process.”¹⁷ And, while NEPA procedural dictates are almost certain to affect the agency’s substantive decision, “it is now well settled that NEPA itself does not mandate particular results, but simply prescribes the necessary process.”¹⁸ Thus, the NRC Staff need not select the alternative with the least environmental impacts, but rather must only include in its NEPA evaluation sufficient information to satisfy one of NEPA’s essential functions — to provide the public and the decision maker with accurate information comparing the proposed action and its alternatives.¹⁹ NRC licensing boards do not sit to “flyspeck” the FEIS or to add minor details or nuances to the analysis. *Hydro Resources, Inc.* (P.O. Box 15910, Rio Rancho, NM 87174), CLI-01-04, 53 NRC 31, 71 (2001).

SCOPE OF CONTENTION 10C

In April 2010, the NRC Staff issued the Draft Environmental Impact Statement (“DEIS”) for the Calvert Cliffs 3.²⁰ Joint Intervenors filed proposed Contention 10 on June 25,

¹⁶ *Nuclear Fuel Servs., Inc.* (Erwin, Tennessee), LBP-05-8, 61 NRC 202, 208 (2005).

¹⁷ *Louisiana Energy Services* (Claiborne Enrichment Center), CLI-98-3, 47 NRC 77, 87 (1998).

¹⁸ *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 350 (1989).

¹⁹ *Calvert Cliffs 3 Nuclear Project LLC and UniStar Nuclear Operating Services LLC* (Calvert Cliffs Nuclear Power Plant, Unit 3), LBP-10-24, __ NRC __, __ (slip op. at 50) (December 28, 2010).

²⁰ *See* 75 Fed. Reg. 20,867 (Apr. 21, 2010); “Environmental Impact Statement for the Combined License (COL) for Calvert Cliffs Nuclear Power Plant Unit 3, Draft Report for

2010, challenging the adequacy of the NRC Staff's analyses of the need for power, energy alternatives, and costs.²¹ Contention 10, as proposed by Joint Intervenors, stated:

The Draft Environmental Impact Statement (DEIS) is inadequate to meet the requirements of 10 CFR 51.71(d) or provide reasonable support for the NRC's decision on issuance of a construction/operating license for the proposed Calvert Cliffs-3 nuclear reactor because its analyses of Need for Power, Energy Alternatives and Cost/Benefit analysis (Chapters 8, 9 and 10) are flawed and based on inaccurate, irrelevant and/or outdated information.²²

Bases

- A. The DEIS's Analysis of Need for Power is Inadequate and Based on Faulty and Outdated Information.
- B. The DEIS's Discussion of Energy Alternatives is Inadequate, Faulty and Misleading.
- C. The DEIS's Discussion of a Combination of Alternatives is Inadequate and Faulty.
- D. The DEIS's Discussion of Costs Both Understates Likely Costs and Disputes Cost Estimates in the Applicants' ER, Calling into Question the ER's discussion of Calvert Cliffs-3 vs. Alternatives.

In LBP-10-24, dated December 28, 2010, the Licensing Board addressed the admissibility of Contention 10 by dividing it into four distinct parts linked to each of the four bases (Contentions 10A-10D). The Licensing Board found that Contentions 10A, 10B, and 10D

Comment," NUREG-1936 (April 2010) (ADAMS Accession Nos. ML101000012 and ML101000013) ("DEIS").

²¹ See "Submission of Contention 10 by Joint Intervenors," dated June 25, 2010 ("Contention 10"). UniStar and the NRC Staff timely filed responses to proposed Contention 10 on July 20, 2010. See "Applicants' Response to Proposed Contention 10," dated July 20, 2010 ("UniStar Response"); "NRC Staff Answer to Joint Intervenors' New Contention 10," dated July 20, 2010 ("NRC Staff Answer").

²² Contention 10 at 1.

were inadmissible. However, the Licensing Board found that Contention 10C, as restated, was admissible.

Contention 10C asserts that Section 9.2.4 of the DEIS, which addressed a combination of alternatives to Calvert Cliffs 3, was inadequate because the NRC failed to correctly address the wind and solar power potential for Maryland or examine the impact of demand-side programs.²³ Specifically, the Intervenors asserted that, while the NRC Staff assumed a contribution from all wind power sources of only 100 MW, the proposed Bluewater Wind project alone would provide 600 MW of power.²⁴ The Intervenors additionally argued that, “[b]y failing to even attempt to quantify potential power from solar photovoltaics, the DEIS has no basis whatsoever for assuming a 75 MW contribution from solar power.”²⁵ Intervenors contended that “a feasible combination of alternatives might well include a considerably smaller natural gas plant than contemplated in the DEIS, along with a much larger contribution from renewable sources of power and demand-side programs.”²⁶

According to the Board, the Intervenors provided sufficient facts to support their claim that there are inaccuracies in the DEIS analysis of the combination alternative and its environmental consequences.²⁷ The Board concluded that the Intervenors had identified facts to show that Maryland may have significant offshore wind potential that the discussion of the

²³ *Id.* at 9.

²⁴ *Id.*

²⁵ *Id.* at 10.

²⁶ *Id.*

²⁷ LBP-10-24 at 51.

combined alternative in the DEIS ignored.²⁸ The Board also found sufficient the Intervenors reference to solar power potential in Maryland, which it contrasted with the lack of an explanation in the DEIS for assuming a contribution of only 75 MW(e) from solar power.²⁹ According to the Board, “Intervenors are simply suggesting that the Staff explore a combination that would include greater contributions from wind and solar power.”³⁰ Therefore, “[t]he NRC Staff would have to revise the alternatives analysis to include more accurate estimates of the potential contribution of wind and solar power to the combined alternative.”³¹ The Board rejected the Intervenors arguments regarding demand-side management.³² The admitted contention was therefore limited to (1) the DEIS’s failure to acknowledge the potential for wind energy production in excess of 100 MW(e); and (2) the DEIS’s failure to discuss the basis for assuming a contribution of only 75 MW(e) from solar power. Ultimately, the Board admitted the revised Contention 10C 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.³³

²⁸ *Id.*

²⁹ *Id.*

³⁰ *Id.* at 54.

³¹ *Id.* at 52.

³² *Id.* at 45 n.81 (declining to consider demand side management in determining the admissibility of Contention 10C and noting that Contention 10C should be understood as limited to the allegations that the combined alternative undervalues the potential contributions of wind and solar power).

³³ *Id.* at 54.

As discussed below, there remains no genuine dispute with respect to the revised Contention 10C that would entitle Intervenors to relief in this proceeding.

UNISTAR IS ENTITLED TO
SUMMARY DISPOSITION ON CONTENTION 10C

UniStar moves for summary disposition of Contention 10C on the grounds that there no longer exists a genuine dispute concerning any facts material to Contention 10C because the NRC Staff has revised its analysis of energy alternatives in the FEIS, eliminated the basis for the dispute underlying the contention, and provided sufficient disclosure to satisfy NEPA as a matter of law.

As noted above, the alleged deficiencies in the DEIS were related to the discussion of a “combination of alternatives” and the relative contribution of wind and solar power to the combination of alternatives assumed in the analysis. Specifically, Contention 10C argued that the DEIS did not consider the offshore wind power potential in Maryland, which was alleged to exceed 100 MW(e) (as evidenced by the Bluewater Wind project), and did not provide a basis for limiting the contribution from solar to 75 MW(e). The FEIS addresses both of these issues and revises the evaluation of the “combination of alternatives” accordingly. In light of the environmental impacts of the combination of energy alternatives, a combination of alternatives is not environmentally preferable to the proposed action. The FEIS further demonstrates that this conclusion would apply even considering a significantly greater contribution from wind or solar power. Thus, there remains no genuine dispute on a material issue of law or fact that would lead to relief in this proceeding.³⁴ The NRC Staff has taken a “hard look” at the environmental

³⁴ “Only disputes over facts that might affect the outcome” of a proceeding would preclude summary disposition. *Pilgrim*, CLI-10-11 at 13.

impacts of various energy alternatives and has complied with NEPA. There is nothing left to litigate with respect to Contention 10C; no further relief could be granted.

A. The NRC Staff Addressed the Subject Matter of Contention 10C in the FEIS

1. *Contribution of Wind Power*

As discussed above, in Contention 10C the Intervenors assert that, while the NRC Staff assumes a contribution from all wind power sources of only 100 MW, the proposed Bluewater Wind project alone would provide 600 MW of power.³⁵ In addition, Intervenors maintain that more power will be produced off the nearby coasts of Delaware and New Jersey, also feeding into the same PJM grid.³⁶ Intervenors also cited the Department of Energy's assessment of offshore wind potential in Maryland to support their argument that the NRC Staff, by relying on the study of wind potential off the coast of Georgia, underestimated Maryland's offshore wind power potential. Thus, according to Intervenors, the DEIS significantly underestimated the potential contribution of wind power to the combined alternative as a source of baseload power. The FEIS has addressed each of these points.

First, the NRC Staff included information in the FEIS regarding wind projects in the region, including the Bluewater Wind Project. The FEIS explains that actual use of wind energy in Maryland on a utility scale is limited to two moderate-sized projects (50 and 70 MW) under construction onshore.³⁷ Offshore, the FEIS explains that the Bluewater Wind Project off the Delaware coast in Federal waters is currently planned to have an installed capacity of 450

³⁵ Contention 10 at 9.

³⁶ *Id.*

³⁷ The Criterion onshore wind project went online in December 2010, and the other onshore wind project, Roth Rock, is expected to be online in December 2011. FEIS at 9-20 to 9-21.

MW(e), which equates to at most 150 to 180 MW(e) using average capacity factors.³⁸ The FEIS also notes that in March 2011, the Department of the Interior (“DOI”) initiated the process to offer the first commercial wind lease under DOI’s “Smart from the Start” Atlantic Offshore Wind program. The FEIS notes that the lease would cover an area off the coast of Delaware, including the area proposed for the Bluewater Wind project. However, no other wind energy projects were identified by the National Renewable Energy Laboratory (“NREL”) off the coast of Maryland or its adjoining States (Delaware and Virginia) in either State or Federal waters.

Second, the NRC Staff included information comparing the wind potential in Maryland to the wind potential off Georgia. According to NREL, Maryland has a somewhat better offshore wind resource than Georgia, suggesting a somewhat higher capacity factor for wind.³⁹ In turn, this suggests that the 20-year levelized cost of electricity could be less for a wind farm off the coast of Maryland than a comparable wind farm off the coast of Georgia. Nevertheless, the conclusions in the Southern/GIT report highlighted in the DEIS would generally apply to a wind farm located offshore of Maryland, based on similarities in the physical and regulatory environments.⁴⁰ The FEIS also reiterates that offshore wind power for Maryland as modeled by the Maryland Public Service Commission does not yield economic benefits.⁴¹

In selecting 100 MW(e) as the contribution from wind power in the combination of alternatives, the FEIS explains that the NRC considered a range of values before selecting the

³⁸ *Id.* at 9-22 to 9-23.

³⁹ *Id.* at 9-22.

⁴⁰ *Id.*

⁴¹ *Id.*

reasonable alternative. For wind power, 450 MW(e) installed capacity equates to, at most, 150 to 180 MW(e). However, in order to provide baseload power, the wind capacity would need to be coupled with a storage mechanism, such as a compressed air energy storage (“CAES”) plant.⁴² Ultimately, the FEIS included 100 MW(e) contribution from a combination of wind and CAES even though generation with storage of this magnitude is not currently proposed, approved, or under construction in Maryland.

The FEIS also considered the result if wind generation coupled with storage was far greater than assumed in the baseline combination alternative. If 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) — in conjunction with a 400 MW(e) CAES plant, the combination of alternatives would still require a 900 MW(e) contribution from natural gas.⁴³ Under this scenario, the impact categorizations in FEIS Table 9-3 would not change, except that impacts to land use and ecology might become LARGE if onshore wind energy is used.⁴⁴ If offshore wind is used, increased impacts to aquatic ecology are likely. In any event, the environmental impacts of this scenario are still greater than the impacts of the proposed action.⁴⁵ Thus, a scenario involving a 400 MW(e) contribution from wind is not environmentally preferable to the proposed action.

⁴² According to the FEIS, this amount of capacity is based simply on the capacity factor of wind. It ignores the fact that there will be periods of low wind that will exceed the storage capacity of the CAES facility, requiring some other source of electrical power to back up the wind/CAES combination.

⁴³ *Id.* at 9-28.

⁴⁴ *Id.* at 9-30.

⁴⁵ *Id.*

Further, although not critical to the ultimate FEIS conclusion regarding environmental preferability, the FEIS makes clear that a 400 MW(e) contribution from wind energy is an unreasonable assumption. For example, the NRC Staff notes that the 400 MW(e) CAES plant postulated in this scenario is larger than any CAES facility in existence worldwide.⁴⁶ And, offshore wind capacity of this magnitude exceeds by a factor of five or more the amount of offshore wind projected by the Department of Energy’s Energy Information Administration (“DOE/EIA”) for the entire United States by the year 2030.⁴⁷ Finally, based on what is known about the limited proposals for onshore and offshore wind in Maryland, this scenario could also not be implemented in time to meet the need for power.⁴⁸

2. *Contribution of Solar Power*

The FEIS also includes information regarding the selection of a 75 MW(e) contribution from solar power in the combination of alternatives. As the FEIS explains, DOE/EIA does not project the addition of any utility-scale solar thermal or solar photovoltaic power in the Mid-Atlantic Council (which includes Maryland) through the year 2035. Thus, the FEIS included a 75 MW(e) contribution even though generation with storage of this magnitude is

⁴⁶ *Id.*

⁴⁷ *Id.*

⁴⁸ Although there may be other offshore wind concepts being pursued, those projects have not advanced beyond speculation and, in any event, still would not provide baseload power in time to meet the need for power addressed in the FEIS. For example, the Atlantic Wind Connection is exploring development of an undersea power grid that could be used to support offshore wind power production. *See Answer to cheap power is blowing in offshore wind: Atlantic Wind Connection sees hundreds of miles of turbines making efficient energy*, dated May 10, 2011 (available online at http://www.msnbc.msn.com/id/42959018/ns/technology_and_science-innovation/). The Atlantic Wind Connection, however, does not include a wind power generation project. A wind power project would need to be developed separately. As discussed in the FEIS, only a few offshore projects, with limited output, are under development in the region.

not currently proposed, approved, or under construction in Maryland. And, relative to the 100 MW(e) contribution used for wind, the FEIS notes that the assumed contribution from solar is smaller based on the marginal solar power potential for large-scale projects in this region. The solar power would also need to be coupled with a storage mechanism, such as CAES, to provide baseload power. However, no utility-scale CAES projects are under development in Maryland (or in the region).⁴⁹

B. There is No Basis for Further Litigation of the FEIS Assessment of the Combination Alternative

Based on the above, there is no basis for further litigation of Contention 10C relative to the potential contribution of wind or solar power to the combination of alternatives. To the extent that Contention 10C revolved around the DEIS's failure to acknowledge the potential for wind energy production in excess of 100 MW(e), the NRC Staff has revised its analysis to (1) address wind potential in Maryland; (2) identify existing and planned wind projects in Maryland, including the Bluewater Wind project and other offshore wind projects in the region, and (3) compare the wind potential in the region to the wind potential off the coast of Georgia. Similarly, to the extent that Contention 10C was based on the DEIS's failure to discuss the basis for assuming a contribution of only 75 MW(e) from solar power, the FEIS included additional information regarding the potential for utility-scale solar thermal or solar photovoltaics power in the mid-Atlantic region through the year 2035. The FEIS also discussed the challenges associated with coupling either wind or solar generation with a storage

⁴⁹ FEIS at 9-21. In fact, only two CAES plants are currently in operation — a 290 MW plant near Bremen, Germany, that began operating in 1978, and a 110-MW plant located in McIntosh, Alabama, that has been operating since 1991. *Id.* Both facilities use mined salt caverns. *Id.*

mechanism, such as CAES, to provide baseload power. Thus, the FEIS provides the factual information and analysis that the Joint Intervenors had alleged was absent from the DEIS.

Clearly, Joint Intervenors may assert that greater contributions from wind or solar power than assumed in the FEIS are desirable or feasible. However, any such dispute related to the potential contribution of wind and solar power to the combination of energy alternatives is not material to the outcome of this proceeding, which involves disclosures of environmental impacts as required by NEPA. The FEIS conclusively demonstrates that the combination of alternatives is not environmentally preferable to the proposed action — even considering a significantly greater contribution from wind or solar power. Because no further refinement of the discussion of wind or solar in the combination of alternatives would lead to the combination of alternatives being environmentally preferable to the proposed action, further litigation would not change the FEIS conclusions. Thus, even if the Board finds that there remain minor disputes on the potential contribution of wind and solar (in conjunction with storage) to the combination of alternatives, those issues are not material to compliance with NEPA.⁵⁰ As the Commission has stated, “[o]nly disputes over facts that might affect the outcome” of a proceeding would preclude summary disposition.⁵¹

The following undisputed material facts establish that UniStar is entitled to judgment on Contention 10C as a matter of law:

⁵⁰ As previously noted, NRC adjudicatory boards do not sit to “flyspeck” the FEIS or to add minor details or nuances to the analysis. *Hydro Resources*, CLI-01-04, 53 NRC at 71. In the present case, the NRC Staff has “come to grips” with the important considerations related to use of wind and solar power as a source of baseload power. *Duke Energy Corp.* (McGuire Nuclear Station, Units 1 & 2; Catawba Nuclear Station, Units 1 & 2), CLI-03-17, 58 NRC 419, 431 (2003).

⁵¹ *Entergy Nuclear Generation Co. & Entergy Nuclear Operations, Inc.* (Pilgrim Nuclear Power Station), CLI-10-11, 71 NRC __, __ (slip op. at 12-13) (Mar. 26, 2010) (internal citations omitted).

- Calvert Cliffs 3 would meet the stated project purpose and need of generating 1600 MW(e) of baseload power.
- A fossil energy source, most likely coal or natural gas, would need to be a significant contributor to any reasonable alternative energy combination that meets the baseload capacity of the project purpose.
- Combinations involving wind and solar power with storage, supplemented with natural gas, are not environmentally preferable to Calvert Cliffs 3.

Each of these undisputed facts is discussed in detail below.

First, the objective of the project is to produce baseload power within the region of interest.⁵² Where, as here, the federal agency is not the sponsor of a project, the NRC may accord substantial weight to an applicant’s goals for the proposed project.⁵³ An applicant’s goals delimit the universe of reasonable alternatives. “Congress did not expect agencies to determine for the applicant what the goals of the applicant’s proposal should be.”⁵⁴ Thus, the NRC need only evaluate energy generation alternatives that are reasonable options for producing baseload power in the region of interest.

Second, any reasonable combination of energy alternatives will necessarily include a significant contribution of power produced by natural gas.⁵⁵ The Intervenors acknowledged as much in Contention 10, recognizing that, even with a greater contribution of

⁵² FEIS at 8-1. The Intervenors have not challenged UniStar’s purpose and need. Thus, the objective of Calvert Cliffs 3 — production of “baseload” power — is not in dispute. Similarly, the use of Maryland as the region of interest is also not in dispute.

⁵³ *Citizens Against Burlington, Inc. v. Busey*, 938 F.2d 190, 197-198 (D.C. Cir. 1991).

⁵⁴ *Id.* at 199.

⁵⁵ Coal could also provide the baseload power needed in the combination of alternatives. However, relative to a coal-fired plant, a natural gas-fired plant would have similar types of emissions, but in lower quantities. FEIS at 9-14. Therefore, using natural gas in the combination of alternatives yields conservative results when compared to other energy alternatives.

wind and solar power, the combined alternative would still include natural gas combined-cycle generating units as a back-up power source when the alternative sources are not able to generate the required amount of baseload power. *See* Contention 10 at 10. Based on the above, there is no dispute that a fossil energy source, most likely natural gas, would need to be a significant contributor to any reasonable alternative energy combination.

Third, in light of the environmental impacts associated with the proposed action and the use of natural gas, no reasonable combination of alternatives will be environmentally preferable to the proposed action. Joint Intervenors have not contested the significance level of the environmental impacts of Calvert Cliffs 3 as described in the ER and DEIS. Nor have the Joint Intervenors contested the significance level of the environmental impacts of using natural gas or using wind and solar in conjunction with CAES to provide baseload power.⁵⁶ As the FEIS explains, even if 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) — in conjunction with a 400 MW(e) CAES plant, the combination of alternatives would still require a 900 MW(e) contribution from natural gas.⁵⁷ Under this scenario, the impact categorizations in Table 9-3 would not change, except that impacts to land use and ecology might become LARGE if onshore wind energy was used.⁵⁸ If offshore wind was used, increased impacts to aquatic ecology would be likely.⁵⁹ Similarly, quadrupling the contribution of solar power would not change the impact

⁵⁶ Because the Joint Intervenors have not challenged the impacts of the discrete generation sources in the DEIS, the environmental impacts associated with the discrete power sources are not in dispute. *See* Table 1, *FEIS Comparison of Energy Alternatives*.

⁵⁷ FEIS at 9-28.

⁵⁸ *Id.* at 9-30.

⁵⁹ *Id.*

categorizations in Table 9-3 except that land use impacts could increase to LARGE due to the low energy density of solar radiation relative to other common energy sources.⁶⁰

In all cases, based on the environmental impacts of a combination alternative involving increased wind or solar, the combination alternative is not environmentally preferable to construction of a new baseload nuclear power generating plant located within UniStar's region of interest.⁶¹ See Table 2, *Comparison of Energy Alternative Combinations*. Any dispute over the specific mix of wind or solar used in the combination of alternatives is not one that would affect the outcome of the NEPA analysis and therefore is not a material issue in this proceeding. As a result, there is no remaining issue to litigate.⁶²

⁶⁰ *Id.* at 9-23 (noting that a large total acreage is needed to gather an appreciable amount of energy from solar power); see also Affidavit of Dimitri Lutchenkov at ¶ 7 (“Lutchenkov Aff.”). In Contention 10B, the Intervenor imply that deploying photovoltaics on rooftops could reduce the land use impacts from solar power generation. Contention 10 at 8. Even assuming, for the sake of argument, that photovoltaics could be deployed on rooftops and that sufficient storage mechanisms were available in conjunction with the photovoltaics to produce baseload power, the environmental impacts of the combination of alternatives still would not change appreciably. Thus, there is no basis for concluding that the combination of alternatives in such a scenario would be environmentally preferable to the proposed action. Lutchenkov Aff. at ¶ 7.

⁶¹ This bounding analysis conservatively presumes that a much larger contribution of wind or solar power to baseload power is reasonable. However, as the FEIS makes clear, production of baseload power using wind or solar technology is neither proven nor available in the region. See NUREG-1555, “Standard Review Plans for Environmental Reviews for Nuclear Power Plants,” Section 9.2.2-4 (Oct. 1999) (noting that to be considered a reasonable alternative, an “energy conversion technology should be developed, proven, and available in the relevant region”). For example, a 400 MW(e) CAES plant is larger than any CAES facility in existence worldwide. Offshore wind capacity of the magnitude considered 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 2030. And, utility-scale solar thermal or solar photovoltaic power in the mid-Atlantic region is not projected through the year 2035. Finally, neither wind nor solar power production could be installed in time to meet the need for power.

⁶² See, e.g., *Luminant Generation Company, LLC* (Comanche Peak Nuclear Power Plant, Units 3 and 4), LBP-11-04, __ NRC __, __ (slip op. at 29) (Feb. 24, 2011) (finding that a

By considering a range of alternatives, including a number of different combinations of energy alternatives, the NRC Staff has met its obligation under NEPA as a matter of law. NEPA does not require an applicant to look at every conceivable alternative, but rather requires only consideration of feasible, non-speculative, reasonable alternatives. And, NEPA does not require the NRC to choose the environmentally preferred alternative.⁶³ Instead, NEPA is primarily procedural, requiring the NRC to take a “hard look” at environmental consequences and alternatives.⁶⁴ Here, the NRC Staff has taken the requisite hard look at the significant environmental considerations associated with energy alternatives and has “come to grips with all important considerations.”⁶⁵ No reasonably foreseeable combination of alternatives is environmentally preferable to the proposed action — even accounting for some uncertainty in the amount of baseload energy that could be produced using wind or solar, in conjunction with energy storage. The FEIS complies with NEPA; no further litigation is necessary. Contention 10C should be resolved by summary disposition as a matter of law.

dispute over the details of transmission congestion in the NEPA review were immaterial because resolution would not change the outcome of the proceeding).

⁶³ In Contention 10C, the Intervenor argue that a combination of alternatives involving a greater contribution from wind or solar power could “quite likely” produce baseload power “at reduced economic cost.” Contention 10 at 10. Cost issues are only relevant if an environmentally preferable alternative is identified. *S.C. Elec. & Gas Co.* (Virgil C. Summer Nuclear Station, Units 2 & 3), CLI-10-1, 71 NRC ___, slip op. at 30-31 (Jan. 7, 2010) *citing Consumers Power Co.* (Midland Plant, Units 1 & 2), ALAB-458, 7 NRC 155, 162 (1978). As explained above, no dispute of material fact exists regarding the FEIS’ conclusion that combinations of solar and wind energy, in conjunction with energy storage methods (including CAES), supplemented with natural gas, are not environmentally preferable to Calvert Cliffs 3. As a result, issues concerning the costs of wind or solar power are also not material.

⁶⁴ *Rochester Gas & Electric Corp.* (Sterling Power Project, Nuclear Unit 1), CLI-80-23, 11 NRC 731, 736 (1980).

⁶⁵ *Exelon Generation Co., LLC* (Early Site Permit for Clinton ESP Site), CLI-05-29, 62 NRC 801, 811 (2005).

CONCLUSION

For the above reasons, the Licensing Board should grant summary disposition of
Contention 10C.

Respectfully submitted,

/s/ signed electronically by
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Tyson R. Smith
Winston & Strawn LLP
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Washington, DC 20006

Carey W. Fleming
UniStar Nuclear Energy, LLC
750 E. Pratt Street
Baltimore, MD 21202

COUNSEL FOR CALVERT CLIFFS 3
NUCLEAR PROJECT, LLC AND
UNISTAR NUCLEAR OPERATING
SERVICES, LLC

Dated at Washington, District of Columbia
this 20th day of June 2011

Table 1: FEIS Comparison of Energy Alternatives⁶⁶			
	Nuclear	Natural Gas	Combination
Land Use	SMALL	SMALL	MODERATE
Air Quality	SMALL	SMALL to MODERATE	SMALL to MODERATE
Water Use and Quality	SMALL	SMALL	SMALL
Ecology	MODERATE	SMALL	MODERATE
Waste Management	SMALL	SMALL	SMALL to MODERATE
Socioeconomics (except Taxes and Economy)	SMALL to MODERATE Adverse	SMALL Adverse	SMALL to MODERATE Adverse
Socioeconomics (Taxes and Economy)	SMALL to LARGE Beneficial	SMALL to MODERATE Beneficial	SMALL to MODERATE Beneficial
Human Health	SMALL	SMALL	SMALL
Historic and Cultural Resources	LARGE	LARGE	LARGE
Environmental Justice	SMALL	SMALL	SMALL

⁶⁶ These impacts are taken from FEIS Table 9-4, *Summary of Environmental Impacts of Construction and Operation of New Nuclear, Coal-Fired, and Natural Gas-Fired Generating Units and a Combination of Alternatives* (at 9-30).

Table 2: Comparison of Energy Alternative Combinations⁶⁷				
	Nuclear	Combination (original)	Combination (more wind)	Combination (more solar)
Land Use	SMALL	MODERATE	MODERATE to LARGE	MODERATE to LARGE
Air Quality	SMALL	SMALL to MODERATE	SMALL to MODERATE	SMALL to MODERATE
Water Use and Quality	SMALL	SMALL	SMALL	SMALL
Ecology	MODERATE	MODERATE	MODERATE to LARGE	MODERATE
Waste Management	SMALL	SMALL to MODERATE	SMALL to MODERATE	SMALL to MODERATE
Socioeconomics (except Taxes and Economy)	SMALL to MODERATE Adverse	SMALL to MODERATE Adverse	SMALL to MODERATE Adverse	SMALL to MODERATE Adverse
Socioeconomics (Taxes and Economy)	SMALL to LARGE Beneficial	SMALL to MODERATE Beneficial	SMALL to MODERATE Beneficial	SMALL to MODERATE Beneficial
Human Health	SMALL	SMALL	SMALL	SMALL
Historic and Cultural Resources	LARGE	LARGE	LARGE	LARGE
Environmental Justice	SMALL	SMALL	SMALL	SMALL

⁶⁷ This summary of impacts for nuclear and the combination alternative are taken from FEIS Table 9-4, *Summary of Environmental Impacts of Construction and Operation of New Nuclear, Coal-Fired, and Natural Gas-Fired Generating Units and a Combination of Alternatives* (at 9-30). The impact summaries for the Combination (more wind) and Combination (more solar) are derived from the FEIS (at 9-30) and the Lutchenkov Aff. at ¶¶ 6-7.

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,)	Docket No. 52-016-COL
LLC)	
)	
(Calvert Cliffs Nuclear Power Plant, Unit 3))	

STATEMENT OF MATERIAL FACTS
REGARDING COMBINATION OF ENERGY ALTERNATIVES

UniStar submits this statement of material facts as to which UniStar contends there remains no genuine issue to be heard.

1. The purpose of UniStar’s requested NRC action is to obtain a COL to construct and operate a baseload electrical generating facility within the State of Maryland with a capacity of 1600 MW(e). FEIS at 1-2, 8-1.
2. The FEIS considers the environmental impacts of discrete power generation sources, a combination of sources, and those power generation technologies that are technically reasonable and commercially viable for producing baseload power. *Id.* at 9-7.
3. The three primary energy sources for generating baseload electric power in the United States are coal, natural gas, and nuclear energy. *Id.*
4. The FEIS considered a combination of energy alternatives in addition to nuclear, coal-fired generation, and natural gas-fired generation.

Natural Gas-Fired Generation

5. For the natural gas alternative, the FEIS assumes that the plant would use combined-cycle combustion turbines. *Id.* at 9-14.
6. Overall, a 1600-MW(e) natural-gas fired plant would cause LARGE adverse impacts to historic and cultural resources, a SMALL to MODERATE beneficial impact on taxes and economy, SMALL to MODERATE impacts on air quality, and SMALL adverse impacts on land use, water use and quality, ecology, waste management, socioeconomics (except

taxes and economy), human health, and environmental justice. *Id.* at Table 9-4; *see also* “Applicants’ Motion for Summary Disposition of Contention 10C,” at Table 1.

Nuclear Generation

7. The adverse environmental impacts of Unit 3 upon land use, air quality, water use and quality, waste management, human health, and environmental justice will be SMALL. FEIS at Table 9-4. Impacts on historic and cultural resources will be LARGE. *Id.* The adverse environmental impacts of Unit 3 upon ecology will be MODERATE. *Id.* Living organisms in and around Unit 3 would be exposed to low-levels of radiation and radiological effluents. *Id.* at 5-63 to 5-65. Exposure from liquid pathways, gaseous pathways, or direct radiation from the station operation would be within the limits specified by NRC and EPA regulations. *Id.* at Tables 5-10 and 5-11. Accordingly, human health impacts and environmental impacts from radiological effluents from Unit 3 would be SMALL. *Id.* at Table 5-20. Similarly, the risk-based radiological impacts of accidents at Unit 3 will be SMALL. *Id.*; *see also* “Applicants’ Motion for Summary Disposition of Contention 10C,” at Table 1.
8. The average capacity factor for a nuclear generation plant in 2008 in the United States was approximately 91.5 percent. FEIS at 9-21.

Wind Power

9. Wind turbines can serve as an intermittent baseload power supply when used in conjunction with energy storage mechanisms, such as pumped hydroelectric or compressed air energy storage (“CAES”). *Id.*
10. Newer wind turbines typically operate at approximately a 36 percent annual capacity factor. *Id.*
11. There are two moderate-sized, utility-scale onshore wind power projects in Maryland under construction. The Criterion onshore wind project went online in December 2010, and the other onshore wind project, Roth Rock, is expected to be online in December 2011. *Id.* at 9-21.
12. There are no approved offshore wind power facilities in Maryland. *Id.*
13. The NRG Bluewater Wind project off the Delaware coast in Federal waters is currently planned to have a capacity of 450 MW(e). *Id.* at 9-22 to 9-23. Using the typical capacity factor for wind power, this installed capacity is equivalent to approximately 162 MW(e).
14. No other wind energy projects were identified by the National Renewable Energy Laboratory (“NREL”) off the coast of Maryland or its adjoining States (Delaware and Virginia) in either State or Federal waters. *Id.* at 9-23.
15. A wind energy facility is not currently a reasonable alternative to construction of a 1600-MW(e) nuclear power generation facility that would be operated as a baseload plant within UniStar’s region of interest. *Id.*

Solar Power

16. Solar energy can be converted to electricity using solar thermal technologies or photovoltaics. *Id.*
17. Solar radiation has a low energy density relative to other common energy sources. Consequently, a large total acreage is needed to gather an appreciable amount of energy. *Id.*
18. Typical solar-to-electric power plants require 5 to 10 acres for every MW of generating capacity. *Id.*
19. Approximately 8000–16,000 acres would be needed for a hypothetical 1600-MW(e) solar power plant. *Id.* at 9-23 to 9-24.
20. The largest operational solar thermal plant is the 310-MW Solar Energy Generating System located in the Mojave Desert in Southern California. *Id.* at 9-23.
21. For a large solar plant to be practical as a means of providing baseload power, a means to store large quantities of energy, such as CAES, is needed. *Id.* at 9-24.
22. DOE/EIA does not project the addition of any utility-scale solar thermal or solar photovoltaics power in the Mid-Atlantic Council (which includes Maryland) through the year 2035. *Id.*
23. Solar energy facilities are not currently a reasonable alternative to construction of a 1600-MW(e) nuclear power generation facility that would be operated as a baseload plant within UniStar’s region of interest. *Id.*

Energy Storage

24. A CAES plant consists of motor-driven air compressors that use off-peak electricity to compress air into an underground storage medium. During high electricity demand periods, the stored energy is recovered by releasing the compressed air through a combustion turbine to generate electricity. *Id.* at 9-21.
25. A CAES plant requires suitable geology such as an underground cavern for energy storage. *Id.*
26. Only two CAES plants are currently in operation. A 290 MW plant near Bremen, Germany began operating in 1978. A 110-MW plant located in McIntosh, Alabama has been operating since 1991. Both facilities use mined salt caverns. *Id.*
27. A 268-MW CAES plant coupled to a wind farm, the Iowa Stored Energy Park, has been proposed for construction near Des Moines, Iowa. The facility would use a porous rock storage reservoir for the compressed air. *Id.*

28. Other pilot, demonstration, prototype, and research projects involving CAES have been announced including projects in California, New York, and Texas. *Id.*
29. The Department of Energy's Energy Information Administration is not projecting any growth in pumped storage capacity through 2030. *Id.*

Combination of Alternatives

30. NEPA does not require an applicant to look at every conceivable alternative, but rather requires only consideration of feasible, non-speculative, reasonable alternatives. *See, e.g.,* NUREG-1555, Section 9.2.2. There are many possible combinations of energy alternatives that could satisfy a need for baseload power.
31. According to NUREG-1555, Section 9.2.2, if the proposed project is intended to supply baseload power, a competitive alternative would also need to be capable of supplying baseload power.
32. The FEIS considered a combination of energy alternatives consisting of the following: 1200 MW(e) of natural gas combined-cycle generating units at the Calvert Cliffs site; 25 MW(e) from hydropower; 75 MW(e) from solar power; 100 MW(e) from biomass sources, including municipal solid waste; 100 MW(e) from conservation and demand-side management programs (beyond currently plans); and 100 MW(e) from wind power. *Id.* at 9-28.
33. In light of the project goal of producing baseload power, a fossil energy source, most likely coal or natural gas, will be a significant contributor to any reasonable alternative energy combination. *Id.*
34. The wind and solar power would need to be coupled with a storage mechanism such as CAES to provide baseload power. *Id.*
35. For wind power, 100 MW(e) equates to at least 250 to 300 MW(e) of installed capacity(a), in conjunction with a 100 MW(e) CAES plant. *Id.*
36. There is marginal solar power potential for large-scale projects in the mid-Atlantic region. *Id.*
37. For both wind and solar, the contributions to the combination of alternatives — 100 MW(e) for wind and 75 MW(e) for solar — were included in the combination of alternatives even though generation with storage of this magnitude is not currently proposed, approved, or under construction in Maryland or the region. *Id.*
38. The environmental impacts associated with the construction and operation of the preceding combination of energy alternatives are SMALL for water use and quality, human health, and environmental justice. The impacts are SMALL to MODERATE for air quality, waste management, and socioeconomics (except taxes and economy). The environmental impacts are MODERATE for land use and ecology and LARGE for historic and cultural resources. The impacts on socioeconomics (taxes and economy) are

SMALL to MODERATE beneficial. FEIS at Table 9-3; *see also* “Applicants’ Motion for Summary Disposition of Contention 10C,” at Table 1.

39. Even if wind contribution (with storage) 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, the combination alternative would still require 900 MW(e) from natural gas. FEIS at 9-28.
40. A 900 MW(e) CAES plant is larger than any such facility worldwide. *Id.*
41. 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 2030. *Id.* at 9-30.
42. Wind power generation of this magnitude cannot be developed in time to meet the need for power described in Chapter 8 of the FEIS. *Id.* As NUREG-1555 notes, to be a potentially competitive alternative, the capacity should be available within the timeframe determined for the proposed project.
43. With a fourfold increase in the contribution of wind, the impact categorizations would not change, except (1) for onshore wind, impacts to land use and ecology might become LARGE; and (2) for offshore wind, increased impacts to aquatic ecology are likely (i.e., could change from MODERATE to MODERATE to LARGE). *Id.*; *see also* “Applicants’ Motion for Summary Disposition of Contention 10C,” at Table 2.
44. A combination of alternatives that includes a significant increase in wind production, in conjunction with energy storage, is not clearly preferable to construction of a new baseload nuclear power generating plant located within UniStar’s region of interest.
45. Even if solar contribution (with storage) was quadrupled to 300 MW(e) of baseload power, with a 300 MW(e) CAES plant, the combination alternative would still require 1000 MW(e) from natural gas.
46. With a fourfold increase in the contribution of solar, the impact categorizations would not change except that land use impacts could increase from MODERATE to MODERATE to LARGE due to the low energy density of solar radiation relative to other common energy sources. *See* “Applicants’ Motion for Summary Disposition of Contention 10C,” at Table 2; Lutchenkov Aff. at ¶ 7.
47. A combination of alternatives that includes a significant increase in solar production, in conjunction with energy storage, is not clearly preferable to construction of a new baseload nuclear power generating plant located within UniStar’s region of interest.
48. As NUREG-1555, Section 9.2.3, explains, cost data is only relevant for alternatives deemed to be environmentally preferable to the proposed action. There are no environmentally preferable alternatives relative to the proposed action.

/s/ signed electronically by _____

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Washington, DC 20006

COUNSEL FOR CALVERT CLIFFS 3
NUCLEAR PROJECT, LLC AND
UNISTAR NUCLEAR OPERATING
SERVICES, LLC

June 20, 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,) Docket No. 52-016-COL
LLC)
)
(Calvert Cliffs Nuclear Power Plant, Unit 3))

AFFIDAVIT OF DIMITRI LUTCHENKOV IN
SUPPORT OF SUMMARY DISPOSITION ON CONTENTION 10C

I, Dimitri Lutchenkov, do hereby state as follows:

1. I am currently employed as the Director, Environmental Affairs and Special Projects, for UniStar Nuclear Energy, LLC (“UniStar”). In my position at UniStar I have responsibility for the environmental aspects of the Calvert Cliffs 3 licensing reviews, including preparation of the Environmental Report (“ER”) and development of responses to NRC Requests for Additional Information (“RAIs”). This affidavit is prepared in support of summary disposition on Contention 10C, which relates to the discussion of the combination of energy alternatives in the Draft Environmental Impact Statement for Calvert Cliffs 3 (“DEIS”). A statement of my professional qualifications is attached.
2. I have reviewed the discussion of energy alternatives in Section 9.3 of the DEIS, including the NRC Staff’s analysis of the potential for wind, solar, and a combination of energy alternatives to provide the 1600 MW(e) of baseload power that would meet UniStar’s stated project purpose and need. I have also reviewed the corresponding sections of the Final Environmental Impact Statement (“FEIS”) for Calvert Cliffs 3.

3. The FEIS correctly notes that the three primary energy sources for generating baseload electric power in the United States are coal, natural gas, and nuclear energy. The FEIS considers the environmental impacts of those discrete power generation sources, as well as a combination of energy alternatives. In light of the project goal of producing baseload power, I agree with the FEIS conclusion that a fossil energy source, most likely coal or natural gas, will be a significant contributor to any reasonable alternative energy combination.
4. For a large solar plant or wind facility to be practical as a means of providing baseload power, a means to store large quantities of energy, such as compressed air energy storage (“CAES”), is needed. A CAES plant consists of motor-driven air compressors that use off-peak electricity to compress air into an underground storage medium. During high electricity demand periods, the stored energy is recovered by releasing the compressed air through a combustion turbine to generate electricity. A CAES plant requires suitable geology such as an underground cavern for energy storage. I am not aware of any existing or planned CAES plants in Maryland or the nearby region.
5. The specific combination of energy alternatives evaluated in the FEIS consisted of the following: 1200 MW(e) of natural gas combined-cycle generating units at the Calvert Cliffs site; 25 MW(e) from hydropower; 75 MW(e) from solar power; 100 MW(e) from biomass sources, including municipal solid waste; 100 MW(e) from conservation and demand-side management programs (beyond current plans); and 100 MW(e) from wind power. This specific combination of alternatives considered in the FEIS is not environmentally preferable to Calvert Cliff 3.

6. The conclusion (*i.e.*, that a combination of alternatives is not environmentally preferable) is not sensitive to even large changes in the relative contribution of wind and solar to the combination of alternatives. Under a scenario involving a 400 MW(e) wind contribution to the combination of alternatives, the impact categorizations would not change, except that impacts to land use and ecology might become LARGE if onshore wind energy is used, and, if offshore wind is used, increased impacts to aquatic ecology are likely. Given the environmental impacts of significantly increasing wind production to 400 MW(e), a combination of alternatives that includes a significant increase in wind production, in conjunction with energy storage, is not clearly preferable to construction of a new baseload nuclear power generating plant located within UniStar's region of interest.
7. Similarly, even if solar contribution (with storage) was quadrupled to 300 MW(e) of baseload power, the combination alternative would still require 1000 MW(e) from natural gas. With a fourfold increase in the contribution of solar, the impact categorizations would not change except that land use impacts could increase from MODERATE to MODERATE to LARGE due to the low energy density of solar radiation relative to other common energy sources. Even if photovoltaics could be deployed on rooftops and sufficient storage mechanisms were available in conjunction with the photovoltaics to produce baseload power, the environmental impacts of the combination of alternatives still would not change appreciably. Given the environmental impacts of significantly increasing solar production to 400 MW(e), a combination of alternatives that includes a significant increase in solar production, in conjunction with energy storage, is not clearly

preferable to construction of a new baseload nuclear power generating plant located within UniStar's region of interest.

8. The two alternative combinations (more wind, more solar) presume that a much larger contribution of wind or solar power to a combination of alternatives providing baseload power is reasonable. However, production of baseload power using wind or solar technology, in conjunction with energy storage (*e.g.*, CAES), is neither proven nor available in the region.
9. Based on the assessment of the environmental impacts of a range of reasonable energy alternatives, combinations involving wind and solar power with storage, supplemented with natural gas, are not environmentally preferable to Calvert Cliffs 3 — even considering the potential for significant increases in the contributions of wind and solar. Cost data is only relevant if one of the alternatives is deemed to be environmentally preferable to the proposed action.
10. I hereby certify under penalty of perjury that the foregoing is true and complete to the best of my knowledge, information, and belief.

Executed in accord with 10 C.F.R. § 2.304(d),

/s/ Dimitri Lutchenkov
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(410) 470-5524
Dimitri.Lutchenkov@unistarnuclear.com

Dated at Baltimore, Maryland
this 20th day of June 2011

DIMITRI LUTCHENKOV

9408 Parsley Drive
Ellicott City, MD 21042
410-696-2570

Years of Experience: 33

Professional History

UniStar Nuclear Energy, Director Environmental Affairs, 2008 - Present
Constellation Energy, Project Director, 2006 – 2008
El Paso Corporation, Project Manager, 2001 – 2006
MPR Associates, Inc., Principal, 1979 - 2001

Expertise

- Nuclear licensing and federal/state/local permitting management
- Management and engineering of nuclear electric power facilities, fossil (oil/gas/coal) boiler units, large to small diesel generators, gas turbines (frame and aeroderivative), and hydroelectric facilities
- Management of large multidisciplinary programs both domestic and international
- Management of domestic and international fleet of power plants including oversight of commercial, procurement, maintenance, technical, and environmental aspects of the projects
- Construction management of various magnitude of projects from \$50k to \$1B both domestic and international
- Spearheaded establishment of a regional office in Houston TX for MPR Associates, Inc. with focus on commercial management, project management and business development/marketing
- Management of utility QA/QC, outage maintenance planning, fuels analysis, procurement, and standard welding program development
- Exceptional writing and verbal skills to facilitate communication of complex issues vertically up or down organizational hierarchy in a clear succinct manner to management, legal, commercial, industry experts, staff, and construction or operations personnel

Professional Experience

UniStar Nuclear Energy – Director Environmental Affairs
Baltimore, MD

As Director of the Environmental Affairs Group lead the management of Part 3, the Environmental Report (ER), of the Combined Operating License Application (COLA) and the management of all of the associated federal (e.g., US Army Corps, EPA, US Fish and Wildlife), state (e.g., Public Service Commission, Department of Environment, PPRP, SHPO) and local agencies (e.g., county, township, city) permits required to construct and operate all of UniStar's U.S. EPR projects within project budget and schedule parameters. Manage team of licensing engineers, permitting project managers and subject matter experts (SMEs) and contractors in various disciplines including but not limited to aquatic ecology, terrestrial ecology, noise, traffic socioeconomics, and hydrology. Manage the Licensing interface with the NRC and the US EPR Design Certification vendors to ensure submittal of information is consistent with the need for timely review and issue resolution. Negotiate and status NRC Part 3 review schedules in support of the overall COLA schedule milestones.

DIMITRI LUTCHENKOV

Constellation Energy – Project Director

Baltimore, MD

As Project Director led the development and construction of the Brandon Shores Air Quality Control System (AQCS). This nearly \$1B retrofit project was the largest undertaking for CEG in over a decade. Managed the project from early Phase 1 design (conceptual design) through final design. Managed prosecution of all permitting required to construct and operate the facility. Managed the negotiation and execution of all major procurement and services contracts including BOP EPC, material handling EPC, stack EPC and scrubber EPC. Managed the negotiation and execution of long-term contract with the county government for use of the effluent from an adjacent water treatment facility. Managed project staff of 20 including project controls, finance, engineering, contracts & procurement, and legal. Managed construction work force of over 500 people from mobilization/groundbreaking to completion of all major foundations and topping off of stack.

El Paso Merchant Energy Group - Project Manager

Houston, TX

Project management of international fleet of power plants (>20 units comprised of coal boiler, gas turbine, diesel, and hydro) in southern cone (South America, Central America and Caribbean). Scope of work included oversight of commercial, procurement, maintenance, technical, and environmental aspects of the projects. As a member of the plant betterment group managed multiple modification, upgrade and conversion projects. Initiated and develop conceptual designs and directed design engineering contractors to final design. Conducted design reviews, develop specifications, bid documents, and performed bid evaluations. Developed project schedules and budgets. Managed development and negotiation of contracts. Performed contractor evaluation and selection. Provided on-sight project oversight. Developed scope and managed contractors for emissions and performance testing.

MPR Associates, Inc. - Principal

Alexandria, VA/Houston, TX

Started as an engineering technician providing engineering support and managing in-house IT system while continuing education for engineering degree. Steadily progressed to principal (owner/partner) and lead engineer.

Spearheaded the establishment of a regional office in Houston, TX while continuing to manage multiple projects in areas of new plant development, acquisition due diligence, plant betterment and reliability and international and domestic Y2K program for El Paso International and Tennessee Gas Pipeline for over 50 facilities. Personally conducted site evaluations of several assets in South America and the UK while concurrently managing over 20 technical personnel covering other assets. Provided seamless communication and reporting between legal, commercial management, upper management, and industry experts leading to prudent/cost effective corrective action. As a result, avoided multimillion dollar commercial impacts and potential legal actions while minimizing cost of the program.

Managed program development for pressure vessel tube life expectancy, steam turbine overhaul periodicity, rotor inspection periodicity, and spot market coal procurement for client utility. Managed QA/QC program that included outage scope planning (including equipment replacement), defining NDE scope, review and disposition of NDE findings, and evaluating contractor qualifications for client utility.

DIMITRI LUTCHENKOV

Provided project and consulting support to numerous clients with fossil-fired facilities, gas turbines and nuclear power facilities, and U.S. Navy in the following areas:

- Feasibility studies, development and evaluation of capital projects, design reviews, bid reviews, contractor evaluation, and evaluation of water chemistry control.
- Unit-specific standard weld procedures application guide.
- Configuration management control, black start capability, evaluated design basis criteria, included documenting and evaluating (for licensing basis) of SRP, docket, safety evaluation, FSAR, and licensing correspondence as well as evaluation of standard plant design concept at numerous nuclear generating facilities.

Power plant material condition assessments and life extension, turbine water induction protection, steam turbine maintenance procedures, finite element stress and thermal analysis, heat balance analysis, cost benefit analysis, and waterwall tube design.

Education

Darden School of Business/Constellation Energy, Certificate Program Transitional Leadership, 2008
University of Maryland, B.S., Mechanical Engineering, 1983
University of Maryland, B.A., Russian, 1978

Publications

Authored or co-authored proprietary reports associated with a variety of projects
“UniStar Fleet Experience with Environmental Siting and Licensing”, Presentation to American Nuclear Society 2009 Utility Working Conference, August 2-6, 2009

Languages

Cultural and professional native bilingual fluency in English and Russian

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,) Docket No. 52-016-COL
LLC)
)
(Calvert Cliffs Nuclear Power Plant, Unit 3))

CERTIFICATE OF SERVICE

I hereby certify that copies of “APPLICANTS’ MOTION FOR SUMMARY DISPOSITION OF CONTENTION 10C,” “STATEMENT OF MATERIAL FACTS ON WHICH NO GENUINE DISPUTE EXISTS,” and, “AFFIDAVIT OF DIMITRI LUTCHENKOV IN SUPPORT OF SUMMARY DISPOSITION OF CONTENTION 10C” in the captioned proceeding have been served via the Electronic Information Exchange (“EIE”) this 20th day of June 2011, which to the best of my knowledge resulted in transmittal of the foregoing to the following persons:

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