

**UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION**

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of

Docket No. 52-016

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

**PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW
REGARDING JOINT INTERVENORS CONTENTION 10C**

Joint Intervenors hereby submit our proposed findings of fact and conclusions of law regarding Contention 10C.

Introduction

Joint Intervenors' Contention 10C asserts that the Environmental Impact Statement (EIS) for the Calvert Cliffs-3 Nuclear Power Plant contains an inadequate analysis of the potential contribution of solar and wind power as alternatives to Calvert Cliffs-3. Specifically, Joint Intervenors assert that the EIS understates the potential, and even likely, amount of solar and wind power that will be available as alternatives to Calvert Cliffs-3 under the Combination of Alternatives scenario. This understatement in turn leads to a faulty analysis of the environmental impact of the combination of alternatives scenario as compared to Calvert Cliffs-3.

Testimony and Exhibits

We admitted, without objection, prefiled and rebuttal written testimony from Scott Sklar, principal of the Stella Group with thirty years of experience in renewable energy, solar and wind power issues, representing Joint Intervenors. We heard several hours of oral testimony from Mr. Sklar on January 27, 2012. We found Mr. Sklar's testimony to be credible and compelling.

We admitted prefiled and rebuttal written testimony from Stefano Ratti, Dimitri Lutchenkov, and Septimus van der Linden for the Applicants and Andy Kugler and Katherine Cort for the NRC Staff and heard oral testimony from these witnesses on January 26, 2012.

We admitted numerous documents into evidence submitted by all parties.

Findings of Fact

Solar and Wind Potential and Feasibility

The Combination of Alternatives section of the Environmental Impact Statement for Calvert Cliffs-3¹ states: "The review team assumed the following as its reasonable alternative: 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 what is currently planned); and 100 MW(e) from wind power."

The EIS added on the same page, "The review team also considered the result if wind generation coupled with storage was far greater than it assumed. If the wind contribution was quadrupled to

¹ NUREG-1936, May 2011, page 9-28

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. Note that the CAES plant in this scenario is larger than any such facility worldwide.”

As admitted by this board, Contention 10C states: “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.”

Through exhibits and testimony, Joint Intervenors demonstrated that there are substantial potential solar and wind resources available in Maryland. For example, Joint Intervenors cited a National Renewable Energy Laboratory (NREL) study which projects 53.8 Gigawatts (53,800 Megawatts) of offshore wind energy available for Maryland.² Intervenors also cited a SolarTown study which projects 5,000 MW of rooftop solar availability for Maryland³ and offered Mr. Sklar’s expert estimate of an additional 5,000 MW of available capacity in solar photovoltaic parking lot installations, both of which would be added to a list of solar projects already underway or recently installed in Maryland (for example, at major firms like Perdue, General Motors, and FedEx Stadium, among others).⁴ Joint Intervenors and Mr. Sklar also cited a study from the Institute for Local Self Reliance that found that 40% of Maryland’s electricity needs

² JNT000003

³ JNTR00013

⁴ For example, JNT000014, JNT000015, JNT000020

could be met by renewable solar, onshore wind and biomass resources; and more than 100% of current electricity needs when offshore wind is included.⁵

Having shown the tremendous potential for solar and wind in Maryland, Joint Intervenors acknowledged that feasible and economical solar and wind power capacity in the necessary time frame is far lower than the potential—but is still far higher than the NRC’s EIS scenario.

For example, rather than relying on the NREL study, Mr. Sklar cited an Abell Foundation study submitted by Applicants⁶ as being more realistic about the feasible capacity for wind power in the state. But Mr. Sklar’s testimony argued a more conservative estimate than even that study, “And I had a lower estimate in my mind, and it's -- I'm being a little more conservative, but I see that there's 3,470 megawatts of wind potential in offshore wind that is likely to be financed because it's closer to the shore, and it's closer to potential interconnection hubs.”⁷

Similarly, Mr. Sklar discounted 30% of the SolarTown’s 5,000 MW of solar rooftop potential simply on aesthetic grounds—some people just won’t want solar on their rooftops regardless of its advantages.⁸

Joint Intervenors also pointed out in briefs, exhibits, and expert testimony that the amount of solar and wind power contemplated by the EIS is far lower than is legally mandated by Maryland’s Renewable Portfolio Standard (RPS), which requires that 20% of Maryland’s electric

⁵ JNT000007

⁶ APL000010

⁷ Transcript, page 603.

⁸ Transcript, page 570

generating capacity be obtained by renewable energy sources by 2022 (approximately 2500 MW of output), at least 2% of which must be generated by solar power (approximately 250 MW of output, or about three times the 75 MW of solar power considered by the EIS).⁹

Most of the non-solar renewable power under Maryland's RPS law is expected to come from wind and biomass. Yet even the high amount of wind power considered by the EIS (400 MW of output) is less than 20% of the RPS requirement. Although outside the scope of the contention, we note that the EIS (as stated above) only contemplates 100 MW from biomass. Including all renewable sources, the EIS considers a high total of only 600 MW of electricity from renewables, or less than 25% of the law's requirement.

NRC Staff witness Mr. Kugler stated that some of Maryland's renewable requirement, other than solar which must be generated in-state, may be met by renewable energy credits—obtained from renewable energy actually generated outside Maryland.¹⁰ While this may be true to a degree, we do not find it credible that some 70%-75% of the RPS law will be met by out-of-state renewable energy credits. Thus, the EIS falls unacceptably and far short of recognizing the legal requirements of the State.

Some of the discrepancy between the EIS projections, the RPS mandate, and the Joint Intervenors projections may stem from the fact that the EIS initially used a date of December 2015 as the basis for its projections (changed before publication to December 2017)¹¹. Although this was originally stated by Applicants as the date of planned commercial operation of Calvert

⁹ For example, JNT000010

¹⁰ Transcript, page 405

¹¹ Transcript, page 388

Cliffs-3, this date is no longer realistic. Indeed, the EPR reactor design planned for use by Applicants is not scheduled for certification until 2013. And Applicants are currently regarded as ineligible to receive a license by the NRC staff on the grounds of foreign ownership (which is the subject of Contention 1).

Given a historically typical reactor construction time of about eight years, we find that the earliest time frame to consider the combination of alternatives is December 2022. This also coincides with the scheduled full implementation of Maryland's Renewable Portfolio Standard. This Board asked Joint Intervenors, who had, throughout this proceeding, been reluctant to prescribe a specific amount of renewable installed capacity they believe should be examined under the Combination of Alternatives section of the EIS, to do so in their final brief for a date in the range of 2020-2025.

Joint Intervenors inform us that, based on the expert testimony and exhibits provided during the course of this hearing, their estimate of the very feasible and economic—they believe much more realistic than the EIS projections—amount of solar and wind power by December 2022 is a total of 2,000 MW of installed solar capacity (about 450 MWe), or about 3-3.5% of Maryland's current electricity capacity and 1,500 MW of installed wind capacity (about 550 MWe), divided between large land-based wind, small wind, and offshore wind. For December 2025, Joint Intervenors would recommend 2,500 MW of installed solar capacity and 2,000 MW of installed wind capacity.

Other renewable energy sources fall outside the scope of this contention, but Joint Intervenors note that these suggested levels of solar and wind power for examination in the Combination of Alternatives section of the EIS still fall far short of the mandated renewable power levels in the Maryland RPS, and that the Combination of Alternatives section also falls short of Maryland's energy efficiency laws (as Contention 10 as originally submitted noted, the EIS considers only those energy efficiency measures presumed to be undertaken by Baltimore Gas and Electric Co., and not those that will be undertaken by the twelve other electric utilities that service Maryland and are affected by energy efficiency laws).

Thus, Joint Intervenors believe that to form a genuine examination of realistic alternatives to the proposed Calvert Cliffs-3 reactor, the EIS should examine an all-renewables/efficiency scenario. In this case, that would include greater reliance on biomass and marine energy (tidal, wave), as Intervenors' expert testimony suggested, as well as a greater contribution from energy efficiency, which combined with their recommendations on wind and solar power could easily meet and likely exceed the electrical output of Calvert Cliffs-3.

The Issue of Baseload Power

Applicants state that their purpose in pursuing construction of Calvert Cliffs-3 is to provide baseload power for the State of Maryland and that the EIS Combination of Alternatives assessment must therefore consider an equivalent amount of baseload power. The NRC staff has essentially accepted the Applicants' position in the EIS.

Joint Intervenors have countered that as a single-plant entity, Applicants cannot provide baseload power in the traditional sense as the plant must be closed at times for maintenance and refueling and Applicants have no back-up power sources to compensate for those outages. Joint Intervenors also argue that Applicants currently have no customers within Maryland's deregulated marketplace and have made no commitment to provide power within Maryland. To the contrary, Applicants have forthrightly stated that "CCNPP-3 will operate as a baseload, merchant independent power producer. The power produced will be sold on the wholesale market without specific consideration to supplying a traditional service area or satisfying a reserve margin objective."¹²

Joint Intervenors argue that while the EIS must give considerable deference to the Applicants' purpose, that need not connote blind acceptance of their stated purpose. Thus, in this case the preponderance of evidence indicates that Calvert Cliffs-3 may not, in fact, provide its full 1600 MWe capacity as baseload power to Maryland.

In the context of Contention 10C, the issue of baseload power and Calvert Cliffs-3's ability or intent to supply such power is relevant only to the extent that the alternatives to Calvert Cliffs-3 considered in the EIS must provide a traditional definition of baseload power.

Thus, Joint Intervenors also have argued, through exhibits¹³, briefs¹⁴, and expert testimony¹⁵, that solar and wind power (and other renewables) can provide the functional equivalent of

¹² Applicants Environmental Report, Rev. 7, Chapter 9, page 9-26

¹³ JNT000018 Page 31 and pp 23-24

¹⁴ Joint Intervenors' Rebuttal Statement of Position, pp 19-23.

¹⁵ For example, see Transcript, January 27, 2012, pp 614-620; 622-630, 662-667

baseload power through proper grid management and transmission practices, especially when backed up with a growing variety of storage technologies such as improved batteries, compressed air systems, and compressed liquid systems.

The Issue of Costs

A NEPA assessment of alternatives to a given project is not a “least-cost” energy analysis; the NEPA analysis is not attempting to determine the most advantageous economic choices, rather it is an environmental impact comparison. The economics of different energy technologies is relevant to the extent that alternatives need not be considered that are remote or speculative based on cost or lack of existing technology. In other words, the alternatives considered need not necessarily be cheaper in cost than the project considered, but neither should they be so expensive as to be remote or speculative.

In this case, Joint Intervenors presented evidence that in the nearby state of North Carolina at least, which has similar solar potential as Maryland, costs of new solar power have now fallen below costs of new nuclear power.¹⁶ All witnesses, whether or not they agreed with the precise calculations and assumptions of this exhibit, agreed that costs of new solar power have been falling and continue to fall.

There was general agreement that onshore wind in Maryland is cost-competitive with other sources of electricity, and, at the same time, that there is far less onshore wind potential in Maryland than there is in offshore wind. There was also general agreement among witnesses that

¹⁶ JNT000012

offshore wind remains fairly costly and will require federal and/or state assistance, at least in its initial development stages, in the form of loan guarantees, tax credits or other subsidies.

As for Calvert Cliffs-3, NRC staff witness Mr. Kugler testified that the NRC did not consider the cost of Calvert Cliffs-3 when conducting the Combination of Alternatives assessment.

Applicants' witness Mr. Lutchenkov testified that, like offshore wind projects, Calvert Cliffs-3 also requires a federal loan guarantee¹⁷ and "a favorable economic and regulatory structure," which was undefined but does not currently exist, in order to proceed.¹⁸ Joint Intervenors pointed out in their opening statement that the estimated construction cost of Calvert Cliffs-3 is over \$10 billion.¹⁹

The alternatives suggested for analysis by Joint Intervenors do not appear to be remote or speculative, certainly no more so than Calvert Cliffs-3 itself, nor does there appear to be any significant economic advantage for any of the technologies over any other that would weigh against including them or preclude them from a Combination of Alternatives analysis to Calvert Cliffs-3.

NEPA and the Combination of Alternatives Assessment

¹⁷ Joint Intervenors note that Applicants (UniStar Nuclear, then composed of Constellation Energy and Electricite de France) were offered such a loan guarantee for Calvert Cliffs-3 by the U.S. Department of Energy in October 2010. Constellation Energy rejected the loan guarantee as uneconomical and left UniStar Nuclear at that time. There has been no public indication that DOE is considering offering another loan guarantee for the Calvert Cliffs-3 project.

¹⁸ Transcript, page 522

¹⁹ Transcript, page 322

The National Environmental Policy Act (NEPA) requires federal agencies to prepare an Environmental Impact Statement to examine the environmental effects of projects, such as nuclear reactors, and assess alternatives to these projects to determine their comparative environmental impact before an agency determines whether to approve a given project.

In this case, the EIS considered single-source alternatives to Calvert Cliffs-3, such as coal and natural gas, and concluded that these alternatives would not be environmentally preferable. The EIS also found that the Combination of Alternatives the NRC chose to assess would not be environmentally preferable either. The issue before us is whether the NRC must choose to assess a feasible combination of alternatives that might result in a smaller environmental impact than Calvert Cliffs-3.

In testimony, NRC staff and Applicants' experts made the remarkable claim that no matter how much renewable energy were included in the Combination of Alternatives, nuclear power would come out environmentally preferable.²⁰

This is disturbing because it has at least the appearance that the issue has been prejudged before examination, which is unacceptable, and because it appears to challenge the foundation of NEPA. If nuclear power were always environmentally preferable to the alternatives, there would be no need for an analysis of the alternatives.

In our view, this is akin to the Applicants' efforts to deny standing to Joint Intervenors at the beginning of this proceeding on the grounds that Calvert Cliffs-3 would be so safe that no harm

²⁰ See, for example, Transcript, January 26, 2012, p 337 (NRC) and p 532 (applicant)

could ever come to anyone outside the plant gates even in an accident situation. We rejected that assertion then, as did the NRC Commissioners on appeal. And we now reject the assertion that nuclear power is always environmentally preferable to any combination of alternatives. This is a form of pre-judgment that has no place within the NRC. If nuclear power did not pose a unique set of environmental and public safety challenges, there would be no need for the NRC. There is, for example, no Solar Regulatory Commission or Wind Regulatory Commission established to regulate hazards, environmental and otherwise, from these technologies. The establishment and continued operation of the NRC is itself proof that these challenges exist and that there may be environmentally preferable alternatives.

Conclusion

This board rules in favor of the Joint Intervenors on Contention 10C and directs the NRC to reassess the Combination of Alternatives section of the Environmental Impact Statement for Calvert Cliffs-3 using an installed capacity of 2,000 MW of solar power and 1,500 MW of wind power as a baseline. We recommend that the NRC assess the environmental impacts of a Combination of Alternatives that includes only renewable energy sources and energy efficiency.

Respectfully submitted,

This 20th day of April 2012

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CERTIFICATE OF SERVICE

It is our understanding that all on the Calvert Cliffs-3 service list are receiving this motion through the submission I am making on April 20, 2012 via the EIE system.

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