

**UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION**

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of

Docket No. 52-016

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

**TESTIMONY OF MICHAEL MARIOTTE, EXECUTIVE DIRECTOR OF
NUCLEAR INFORMATION AND RESOURCE SERVICE, ON CONTENTION 10**

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

My name is Michael Mariotte and I am Executive Director of Nuclear Information and Resource Service (NIRS). I began work at NIRS in February 1985 and became Executive Director in October 1986. In that capacity, I have testified numerous times before U.S. Senate and House committees; before the Maryland State Legislature on Calvert Cliffs issues and the need for the state of Maryland to implement renewable energy and energy efficiency measures to replace the power of the existing Unit 1 and 2 reactors at Calvert Cliffs when they retire; before the Washington, DC Public Service Commission against the proposed merger of Pepco and Baltimore Gas & Electric (BG&E) due to the exposure to nuclear power that such a merger would cause Pepco as well as the inadequacy of BG&E's renewable and energy efficiency measures; before the Hungarian Parliament; before the Bulgarian Nuclear Safety Agency; before the U.S. Nuclear Regulatory Commission and numerous other official and non-official conferences, meetings and other functions in the U.S. and Greece, Ukraine, and Germany . I have been a guest lecturer at for-credit classes at the University of Delaware and Franklin & Marshall College (as recently as October 11, 1011) on nuclear power and sustainable energy issues. I frequently lecture on the viability and current status of renewable energy technologies and have throughout my tenure at NIRS.

Q.2. What is the purpose of your testimony?

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

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

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

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

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

Q.4. How does the EIS for Calvert Cliffs-3 understate the potential contribution of wind power to Maryland the larger PJM grid that services Maryland?

The Environmental Impact Statement for Calvert Cliffs-3 continues to perpetuate the fiction that offshore wind power potential for Maryland is roughly equivalent to that of Georgia.

In fact, according to a June 2010 report from the U.S. Department of Energy’s National Renewable Energy Laboratory, *Assessment of Offshore Wind Energy Resources for the United States*, easily accessible offshore wind power (that within three nautical miles of land) for Maryland is 4,289.80 Megawatts of power—far more than the 1,600 MW of power the proposed Calvert Cliffs-3 reactor would generate.¹ Even granting nuclear power’s greater efficiency over wind (approx. 85% capacity vs. 30% capacity) this offshore wind potential is nearly that of the proposed Calvert Cliffs-3 reactor even before other alternatives are thrown into the mix

¹ Joint Intervenors’ Exhibit JNT 000001

By comparison, Georgia has a total of 85.2 MW of power potential from offshore wind located with three nautical miles of land. Clearly, this statement by NRC was meant to mislead, rather than clarify, the debate over the potential offshore wind contribution to Maryland's, and the PJM's, electricity mix.

Indeed, the EIS assumes only 100 MW of wind power contribution in its discussion of alternatives to Calvert Cliffs-3, and notes that this would equal approximately 250-300 MW of installed capacity.²

The EIS further states, on the same page, that generation of this magnitude is not currently being proposed in Maryland, which is false.

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

As noted above, the actual potential for easily accessible offshore wind power, off the rather small Maryland coast alone, is about four times that acknowledged by the NRC—more than 4,000 MW (according to NREL, more than 6500 MW of offshore wind is available off the Maryland coast from 3-50 miles offshore, but since this large potential is not even needed to support this contention, we are only referencing it, rather than relying upon it as part of the wind potential).

Bluewater Wind, a subsidiary of NRG Energy—contrary to representations in the EIS—already is proposing to build a 600 MW wind farm offshore of Maryland.³ This single project, which would tap wind resources more than 12 miles from land, would itself provide four times the amount of wind power initially examined in the EIS, and ½ or more of the amount the EIS argues would not change its assessment.

In addition, Bluewater Wind has received approval to build a 450 MW wind farm off the coast of Delaware and is proposing to build another 350 MW off the coast of New Jersey, both of which would feed into the PJM grid that services Maryland. With these projects alone, which only scratch the surface of potential wind power in Maryland and the region, the power produced would exceed that considered in the Calvert Cliff-3 EIS. The actual potential for wind power in this small region is far greater—on the order of thousands of megawatts, as indicated by Joint Intervenors Exhibit 000001.

While this discussion is so far limited to offshore wind, we note that there are also onshore wind projects in Maryland, which, while generally smaller in scale, do contribute to the overall wind power potential for Maryland.

Q.5. How does the EIS for Calvert Cliffs-3 reactor understand the potential contribution of solar power to Maryland and the PJM grid that services Maryland.

² EIS for Calvert Cliffs-3, NUREG-1936, May 2011, p. 9-28

³ <http://www.nrgenergy.com/nrgbluewaterwind/maryland.html>

The EIS considers a potential contribution of a maximum of 75 MW of solar power as an alternative to Calvert Cliffs-3 in the EIS. This is far, far lower than the actual potential contribution.

The EIS concentrates on solar power plants, which Joint Intervenors agree are not a generally viable alternative at this time and could produce little more than 75 MW. But the EIS vastly underestimates (essentially providing zero credit for) the potential contribution of rooftop and other above-ground solar photovoltaics.

A map of solar power potential⁴ in the U.S. at first appears to show little solar potential for Maryland, at least compared to some other states in the southwestern U.S. However, the second most solar-state in the U.S. (i.e., the state with the second-most installed solar capacity as of October 2011) is New Jersey, which already has 260 MW of installed solar capacity, or more than three times that assumed by the EIS.⁵ And New Jersey has by no means maximized its solar potential.

As the DOE map of solar potential indicates, Maryland actually has slightly better solar potential than New Jersey. Germany, which has the highest solar generation capacity in the world, actually has a lower solar potential than Maryland or New Jersey. Germany currently has 17,000 MW of solar power installed, and expects to install at least 52,000 MW and possibly more than 70,000 MW of solar power by 2020⁶—approximately the same time frame in which the proposed Calvert Cliffs-3 reactor could possibly be built.

Moreover, given that the PJM grid services the mid-Atlantic region, the total solar potential for the region is above that.

Costs of solar power, particularly solar PV power, have been dropping dramatically. This is perhaps best illustrated by the recent bankruptcy of the Solyndra firm, which had developed a new form of solar PV technology, which cost approximately \$3,000/kw to manufacture, and which could not compete with existing solar PV firms which are providing solar PV technology of approximately \$1,000-\$1,500/kw—or about one third to one-sixth the stated cost (in the EIS) of the proposed Calvert Cliffs-3 nuclear reactor. Given this wide disparity in costs for technologies that provide the same end good—electricity—it is not surprise that solar power is the fastest growing source of electricity production in the U.S.

What is surprising is that the EIS completely fails to recognize this trend and suggests—erroneously—that solar PV will provide no power whatsoever to Maryland and the PJM grid during the 60-year period in which Calvert Cliffs-3 would operate. This is simply an untenable omission of the facts. Indeed, it would not be at all surprising if solar PV alone provides more electricity to Maryland and the PJM grid than Calvert Cliffs-3 could when it could first come online, not to mention even a small fraction of its potential lifespan—

⁴ JNT000002

⁵ http://www.energycentral.com/functional/news/news_detail.cfm?did=22031623

⁶ http://www.solarnovus.com/index.php?option=com_content&view=article&id=2591:intersolar-europe-2011-new-exhibit-of-german-solar-potential&catid=41:applications-tech-news&Itemid=245

i.e. within 10-20 years after coming online. And an EIS should consider, if it is to be meaningful, not just the likely situation when a nuclear reactor first comes online, but also the likely situation after the reactor has operated for a period of time. In this case, the EIS fails on both accounts.

Q.6. Can solar and wind power provide “baseload” power?

An underlying conceit of the EIS and Applicants’ Environmental Report is that technologies like solar and wind power can not provide “baseload” power and thus are somehow to be substantially discounted as to their potential contribution to the electrical needs of a state or region.

This line of argument certainly would have been relevant some years ago; it is much less relevant in 2011.

The notion of “baseload” power has changed radically from the late 20th century.

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

If, as Joint Intervenors believe, a completed Calvert Cliffs-3 would provide electricity too expensive for most people to purchase, then Calvert Cliffs-3 would not be a baseload power plant in the traditional sense of the word, but would instead be a “boutique” power plant selling high-priced power to whoever wants it (we note that in the record of this proceeding, the estimated cost of Calvert Cliffs-3 would be on the order of \$4,500/kw to \$6,000/kw, far above competing sources of electricity generation). In terms of providing “baseload” power for Maryland and the PJM service territory, Joint Intervenors argue that the extraordinary costs of building Calvert Cliffs-3 would preclude it from ever becoming part of the “baseload” for Maryland or the PJM region.

Moreover, in the time frame of this reactor license application, which realistically at this point assumes commercial operation no earlier than 2020, one must also consider the likely advances of technology (as opposed to fanciful advances in technology)--in other words, those advances which are likely to play a major role in our lives and decision-making.

In the case of this contention, the concept of storage for renewably-generated electricity is given short shrift. While the EIS does mention the concept of Compressed Air Energy Storage technology, it gives it short shrift and assumes that by 2020 and beyond to 2080—the period in which this reactor would be licensed—that the technology will not advance to a commercially applicable stage. Yet no rationale is provided for this assertion that CAES technology will not be commercially viable before Calvert Cliff-3 could even come online, much less operate for some years.

Similarly, the EIS does not address the potential of smart grids and distributed generation to allow a new vision of electricity distribution, one that is not as reliant on large, centralized power plants, but rather relies on dispersed, smaller, but perhaps more secure power stations—typically but not necessarily powered by renewable resources—that can meet our electrical needs. Solar and wind power, as our contention argues, are the most powerful technology candidates for this type of energy future, which is just as, and Joint Intervenors argue is much more so, economically viable as a proposed large nuclear reactor such as Calvert Cliffs-3.

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

In the context of the EIS, substantial contribution can also be granted to natural gas (although Joint Intervenors believe no such contribution is necessary). Indeed, Joint Intervenors believe and argue that natural gas should be considered only a back-up power source to renewable power generation, which can meet the needs of Maryland in the time frame of 2020. While such back-up power may be needed on occasion, it will be the power of last resort, rather than of first resort.

Joint Intervenors essentially agree with both Applicants and NRC staff on the future need for electricity in Maryland and the PJM service area (although we believe aggressive energy efficiency programs, such as those instituted by the state of Maryland, can reduce electricity demand more than given credit for in the EIS). However, we believe there are many different possible paths to generating and making that electricity available to Maryland and mid-Atlantic consumers.

The EIS for the proposed Calvert Cliffs-3 nuclear reactor does not recognize this simple reality, and does not effectively counter this simple reality. It does not adequately take into account the potential contributions of solar and wind power in Maryland or the entire region, and thus fails to provide a legally-defensible picture of the situation. As such, the EIS must be rejected as written and must be re-researched, re-written, and re-submitted before the proposed Calvert Cliffs-3 nuclear reactor can be considered for licensing.

Respectfully submitted,

This 21st day of October 2011

_____ Signed Electronically by _____

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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 October 3, 2011 via the EIE system.

JOINT INTERVENORS TESTIMONY, OCTOBER 21, 2011

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