CCNPPEISCommentsResource

From: Norman Meadow [meadownd@jhu.edu]
Sent: Thursday, April 10, 2008 11:04 PM
To: CalvertCliffsCOLAEIS Resource
Subject: Comments for Draft EIS for Calvert Cliffs 3
Attachments: NRC_DEIS-CalvertCliffs3.pdf

Dear NRC,

Attached as a pdf file are the written comments on the Draft EIS for Calvert Cliffs 3 from the Maryland Conservation Council.

Thank you for the opportunity to present our suggestions.

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Comments on the Draft EIS for Calvert Cliffs 3 from the Maryland Conservation Council

The purpose of the scoping process is to suggest topics for inclusion and analysis in a Draft Environmental Impact Statement, in this instance preliminary to the decision on the permit to build Calvert Cliffs Reactor #3.

The word "environmental" may have two connotations in the context of an EIS. If it is used to connote that the environment is solely a resource base for human economic activity, then nuclear power must be compared to other methods for the generation of electricity on the basis of cost, reliability, and lack of carbon dioxide emissions, balanced against the potential for harm.

From the biologist's viewpoint, the environment is an object for scientific study, and it thereby acquires value that is independent of economic considerations. It becomes an intellectual resource, a challenge to the ability of humans to understand extraordinarily complex objects. In this sense, the EIS, in addition to the factors listed above, must assign considerable importance to damage to habitat which diminishes both biological diversity and complexity.

It is the opinion of the Maryland Conservation Council (MCC) that commercial nuclear power will be far less damaging to the biology of our region than will several among the renewable resources being proposed as alternatives to the construction of the new reactor. Further, we believe that these renewables cannot provide a sufficient amount of electric power to significantly reduce dependence on coal. Finally, we believe that the potential for harm from commercial water-moderated nuclear reactors has been unjustifiably exaggerated, and that there is no credible evidence for death or cancer attributable to their operation.

The following expands the testimony given by Dr. Norman Meadow and Mrs. Karen Meadow at the first session of the scoping meeting in Solomons, MD on March 19, 2008. Dr. Meadow is the First Vice-President of the Maryland Conservation Council (MCC). He is also a research biochemist retired after 35 years in the Biology Department at The Johns Hopkins University with the title of Principal Research Scientist. Mrs. Meadow is the Treasurer of the MCC. Two additional board members of the MCC contributed to this document: D. Daniel Boone who is a forest ecologist, and William Biggley who was a Senior Researcher in the Biology Department of The Johns Hopkins University, and had a long standing association with the Radiation Safety Department on the Homewood Campus, finally as the Radiation Safety Officer.

The MCC is one of the oldest conservation groups in the State and it has worked for 40 years to protect Maryland’s Natural Heritage. Last November, its board of directors voted to support Constellation Energy’s request for a third reactor at Calvert Cliffs, and it may be the only conservation group in the State to adopt such a policy. Our organization’s position is based on two components of the controversy: 1) the comparative impact to wildlife and habitat of the alternative methods of generation, and 2) the potential for harm to human health from a reactor accident or an accident associated with the transportation or storage of spent nuclear fuel..

FIRST SECTION, RELATIVE BIOLOGICAL IMPACT:

We are aware that proponents of renewable energy always propose a package of several technologies. What we will show in the following section is that none of these technologies can produce electricity in a practicable way. Nuclear power can. Proposing a mixture of inadequate methods only obfuscates the discussion; the mixture can not be more practicable than its strongest component.

1) When considering **energy from wind**, the potential for electricity generation from commercial installations should be estimated from the annual and summer-time Capacity Factors documented by actual power production reports of existing facilities. This information is readily available from public websites of government agencies – e.g., EIA 960 and FERC EQR databases. Preferably, the Capacity Value (i.e., the capacity factor achieved during the 4-hour summer afternoon expected peak demand period – following the methodology used by PJM's grid managers) ought to be used in evaluating the capability of wind energy or other renewable energy projects to substitute for this proposed nuclear reactor. PJM recently revealed that seven existing wind installations in Pennsylvania currently have an annual Capacity Value of only 13% - as determined by three years of summer production data. It is important to acknowledge that demand for electricity in our grid region is significantly higher in the summer as compared to the winter months (the next highest demand season of the year). Nameplate capacity provided by the manufacturers of wind turbines is misleading for estimating the wind generation potential which possibly could come from facilities located in western Maryland or elsewhere in the Mid-Atlantic Highlands region.

- ❖ Nuclear reactors work at approximately 90+% capacity year round. Calculated from the Capacity Values mentioned above, 5,500 2 MW wind turbines would be required to produce the same amount of electricity as the proposed reactor during the summer months when our region's demand is highest (and increasing most rapidly).
- ❖ Since nearly all commercial wind energy development is currently planned for the ridgetops along the Appalachian Mountain chain, and since the vast majority of these potential development sites are presently covered in dense forest, the impact resulting from construction of 5,500 huge wind turbines and their associated roads and transmission lines likely would result in the clearing of about 20,000 acres of forest along approximately 800 miles of ridge line. Wind energy facilities which have been built in the last 5 years in the PJM grid region have averaged about 3 to 5 acres of forest cleared per wind turbine, and they install on average about 7 or 8 wind turbines per mile of ridgeline. It should be noted that, in fact, there is not nearly enough suitably windy ridgetop in western Maryland to accommodate this intensity of wind energy development.
- ❖ Clearing 20,000 acres of forest releases a significant amount of carbon dioxide and eliminates a major carbon sequestration source, which has to be deducted from the environmental advantage of the wind installation[1].
- ❖ When investigating ecological damage caused by industrial wind installation, the NRC should examine the quality of the research done to measure bird and bat kills in the Appalachians and should evaluate whether research done on wind installations in CA is applicable to the ecology of birds and bats in the Appalachians.
- ❖ Given that the 20,000 acres of forest and ridgetop habitat in the mountains of Western MD and adjacent states likely would be needed to generate an equivalent amount of electricity from wind installations as compared to the single new reactor proposed to be added to Calvert Cliffs, and given that as many or more than 5,500 huge wind turbines therefore would be situated on major bird and bat migratory routes, the environmental impact of the wind energy alternative to this nuclear reactor must be carefully considered.

❖ The habitat damage of the wind turbines far exceeds the actual 20,000 acres cleared, since many forest interior dwelling species will not successfully persist or reproduce within at least 300 feet of a cleared edge, meaning that for the 700 mile length of the road and turbine clearings, an additional 300+ feet of forest interior habitat will be lost along each side of the road and turbine clearings' entire length.

❖ In regard to offshore wind, the EIS should evaluate the amount of research that's been done on the effects of noise from the turbines on the ecology of the waters in which the turbines are placed. We are aware of only one study, carried out for one year prior to the construction of an offshore wind installation in Europe. One year's study is entirely inadequate given that many marine creatures do not reach reproductive maturity for decades. The effects of the noise injected into the marine environment might not manifest themselves for several decades.

❖ About 1650 offshore turbines (3.5 MW using a summer Capacity Factor of 25%) would be required to equal the summer-time generating capacity of the proposed nuclear reactor.

2) Bioenergy sources such as switch grass or short rotation forest crops are being proposed to fire steam boilers. The amount of land required to equal the proposed reactor's output should be investigated based on the known energy output and productivity for any crop being considered for firing stream boilers. Current average yields should be used, not unconfirmed projections of yield.

❖Approximately 6,000 square miles of land would be required for the cultivation of either switch grass[2, 3] or short rotation forest crops[2, 4]. This is 60% of the State's land area and is equal to the area of all current forest and agricultural land.

❖ The EIS should investigate the energy required to dry these crops as we have been unable to determine if this has been considered by proponents of the method.

3) Photovoltaic power's potential to provide electricity must be evaluated by using the Capacity Factor appropriate for Maryland, and not by nameplate capacity of the installations. The MCC estimates that it would require covering 100 square miles with solar panels (this is ½ the area of Calvert County) at a cost of $86 billion to equal the output of the single reactor..

4) Energy efficiency and conservation are important and should be implemented, but the EIS must consider the projected rate of growth of demand for electricity which will be driven significantly by population growth as projected by the U.S. Census Bureau. Efficiency and conservation can only slow the rate of growth of energy need, they will not be able to reduce absolute demand. The PJM estimates a 1.5% increase per year of summer peak load capacity over the next 15 years to meet demand, resulting in a total increase of 25% of current capacity. Compared to the year 2000, the US Census Bureau estimates that Maryland's population will be 33% larger by 2030 and 260% larger by 2100.

It is relevant to mention that the Japanese, who are the most frugal of the industrialized peoples, use 52% less carbon per capita than the Americans[5]. It is necessary in the long run to reduce the "carbon footprint" of Americans, but this will be a highly political, difficult, and very slow process. It seems unrealistic to target a level of frugality higher than that of the Japanese today. Nuclear power can provide a very significant share of our region's electricity without emissions of carbon dioxide, and therefore is the most effective technology in terms of reducing "carbon footprint" of our region's population.

5) Cost benefit analysis should include the actual cost for the per installed watt of generating capacity as well as the cost of extensive length of transmission lines that will be required for highly decentralized sources of electric power such as wind and photovoltaics, not the net cost to the purchaser after government tax liability relief. Projections of reductions in cost should not be treated as assured.

- ❖ Erecting 5500 wind turbines in western Maryland will cost $22 billion, using a cost of $2 million per installed MW.

Footnotes for the first section:

[1] Fargione, J., et al., 2008, *Science*, 319:1235-1238; Searchinger, T., et al., 2008, *Science*, 319:1238-1240.

[2] Calculated using a heat capacity of 17,500 Btu/dry kg; and a yield of 7 metric tons dry mass/hectare/year for both switch grass and short rotation forest crops.

[3] Kutscher, C. Ed, 2007, *Tackling Climate Change in the U.S.*, American Solar Energy Society, ISBN 0-89553-306-5. (P. 120, Table 2).

[4]http://www.forestry.gov.uk/website/pdf.nsf/pdf/src_preliminaryyieldestimates.pdf/$FILE/src_preliminaryyieldestimates.pdf

[5] *2007 World Population Data Sheet*, Population Reference Bureau, http://www.prb.org/pdf07/07WPDS_Eng.pdf

SECOND SECTION, THE HEALTH HAZARD COMPONENT:

Concerns about the health effects that might result from exposure to radioactivity affect opinion about the merits of constructing nuclear reactors and of transporting and long-term storage of spent fuel. These putative health hazards will strongly influence the decision about the application for Calvert Cliffs #3.

1) The scientific requirements for valid analysis of risk are clearly described in publications of the National Research Council known as the BEIR Reports[1], which should be considered carefully. These reports clearly state that the best estimates of risk are from studies for which there are data on individual dose, and for which appropriate control populations are available. They also explain the weakness of data gathered from so called "descriptive or ecological" studies for which data on individual dose and proper control groups are not available[1].

- ❖ When evaluating risk from accidents of the magnitude of that at Three Mile Island (TMI), the quality of the available studies should be evaluated by the criteria in the BEIR Reports. The results most often given to the public are from weak, ecological studies; the paper most frequently cited by opponents of nuclear power as demonstrating that the releases at TMI[2] caused damage to health is an ecological study. Two other groups of qualified researchers have not found evidence of cancer caused by TMI[3].

❖ The rate of incidence of cancer proposed by Wing, et al. is inconsistently high when compared to the rates that have been reported from exposures that were orders of magnitude higher than those which occurred at TMI. Table 1 compares the claims of Wing, et al. with those from the studies of the Radiation Effects Research Foundation on the atomic bomb survivors and studies on the clean-up workers at Chernobyl. In both of the latter events, the dosage was orders of magnitude higher, the number of subjects larger, and the follow-up time much longer than was the case with TMI. This comparison suggests that the conclusions of Wing, et al. result from erroneous assumptions. This is one of the more convincing pieces of evidence that caused the MCC to conclude that there is no credible evidence that accidents at water moderated reactors have caused harm to health.

❖ The conclusions of Wing, et al. are further weakened by the fact that the solid tumors that they have attributed to the radioactive releases were observed within 6 years of the accident. Virtually all oncologists believe that solid tumors do not become clinically manifest until at least 5 years, and more often at least 10 years after the event that turns a cell malignant[4].

❖ CANCER TYPE: Lung: 10 to 25 years; bone: 52 years; breast: 5 to 30 years; skin: 10 to 34 years; pharynx, hypopharynx, and larynx: ~25 years; salivary gland: 13 to 25 years; thyroid: 10 to 35 years; brain: 5 to 25 years[4].

2) When evaluating the environmental consequences of an accident (environmental in the context of the preservation of nature) at the proposed reactor, the EIS should consider many reports on the effects of radioactivity on wildlife[5] and not gratuitous statements that extrapolate exaggerated claims of health damage from humans to the rest of the biological world. Humans appear to be among the species most sensitive to radioactivity.

❖ The damage to wildlife from small releases should be contrasted with the damage to habitat that would result from the construction of thousands of wind turbines, either on- or off-shore, or the conversion of thousands of square miles of farm and forest to bioenergy production which you will hear about shortly.

3) The MCC believes that current methods for on-site storage of spent fuel have proven adequate and safe for several decades.

4) The EIS should consider recent proposals[6] that storage of spent fuel for several hundred years will reduce its radioactivity to the point where reprocessing will be far less difficult than if it were reprocessed a few years after removal from the reactor. Such intermediate-term storage would eliminate the necessity for material stored in Yucca Mountain to remain physically and chemically stable for hundreds of millennia.

5) The EIS should evaluate the strength of transportation casks from tests conducted at the Sandia National Laboratory (http://www.sandia.gov/tp/SAFE_RAM/SEVERITY.HTM), and consider the likelihood of a breach in any expected rail accident, including protracted fire, and lengthy submersion. The MCC believes that the strength of transportation casks is sufficient to prevent releases of radioactive material in any conceivable transportation accident. We suspect that the opinion of most people is that high level waste would be shipped in containers resembling oil drums. This is untrue.

Footnotes to the second section:

[1] *Health Risks from Exposure to Low Levels of Ionising Radiation, BEIR VII Phase2*, 2006, The National Academies Press, Washington, DC. Chapter 5, and pp. 207-208 of Chapter 9.

[2] Wing, S., et al., 1997, *Environmental Health Perspectives*, 105:52-57.

[3] Hatch, M.C., 1990, *American Journal of Epidemiology*, 132:397-412; Talbott, E.O., *et al.*, 2003, *Environmental Health Perspectives*, 111:341-348.

[4] Prasad, K., 1995, *Handbook of Radiobiology, 2nd ed.*, CRC Press, Boca Raton, FL

[5] Chesser, R.K., & Baker, R.J., 2006, *American Scientist*, 94:542-549; Mycio, M.,2005, "Wormwood Forest," Joseph Henry Press, Washington, D.C.

[6] "Managing Spent Nuclear Fuel," Position Statement of the Health Physics Society, 2007, PS022-1 (http://www.hps.org).

Table 1

	Excess:			Dose:	Number of	Follow-up
	Lung Cancer	Solid Tumors	Leukemia	(Times Background[4])	subjects	(years)
TMI: Wing,et al.	*68*	*197*	*10*	*1.04 to 1.2*	*21,200*	6
Atom Bomb Survivors	100	503	75	42 to 800	49,100	42
Chernobyl Clean-up Workers	0	0	6	46	71,900	15
				Background = 2.4 mSv/yr		