

**UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION**

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)	Docket No. 52-011-ESP
)	
Southern Nuclear Operating Company)	ASLBP No. 07-850-01-ESP-BD01
)	
(Early Site Permit for Vogtle ESP Site))	January 9, 2009

**TESTIMONY OF THOMAS C. MOORER
ON BEHALF OF
SOUTHERN NUCLEAR OPERATING COMPANY
CONCERNING ENVIRONMENTAL CONTENTION 1.3**

Q1: Please state your name and address.

A1: My name is Thomas Claibourne Moorer. My business address is: 42 Inverness Center Parkway, Birmingham, AL 35242-4809.

Q2: Please state your employer, position, and current responsibilities.

A2: I am currently employed by Southern Nuclear Operating Company ("SNC") as the Project Manager-Environmental. In that capacity, I am responsible for all environmental support activities for new plant and license renewal work for SNC. I was responsible for developing the Environmental Report filed by SNC as part of the Early Site Permit application for Vogtle Units 3 and 4 and all supporting activities. My Curriculum Vitae is provided as Exhibit SNC000014.

Q3: Please summarize your education and professional qualifications.

A3: I earned a Bachelor of Science degree in Environmental Science from Auburn University and a Bachelor of Science in Civil/Environmental Engineering from the University of

Alabama. I have over 30 years of experience in the environmental field, including 18+ years of experience in environmental engineering, licensing, and regulatory compliance in nuclear power. I have over 15 years of experience working in NEPA matters, including the development of Environmental Reports for Environmental Impact Statements supporting NRC licensing actions. I am heavily involved in the work of various industry groups, including EPRI, EEI, and NEI, and have both authored and co-authored numerous technical publications in the environmental field.

Since 2005, I have been responsible for all environmental support for new plants and license renewals, including development of the Environmental Reports (“ERs”) for the Vogtle Early Site Permit (“ESP”), Combined Construction and Operating License (“COL”) and License Renewal applications to NRC. I am responsible for interface with NRC for review of the ERs and subsequent EIS development, site audits and public meetings and for coordination with state and Federal agencies regarding ESP, COL, and License Renewal activities. Prior to 2005, I worked as the SNC Environmental Services Supervisor for over 15 years and managed the technical and regulatory support for permitting and environmental compliance in the areas of water, air, solid/hazardous waste, mixed waste, chemistry and hazardous materials for all three SNC plants. I have extensive NEPA experience, including the management of environmental support for the Plant Farley and Plant Hatch license renewals, as well as EPRI and NEI work associated with development of the NEI License Renewal Guideline. I have worked with NRC on the development of the Generic Environmental Impact Statement (“GEIS”) for license renewal. I also provided project management for numerous major environmental projects including technical studies to resolve NPDES permitting issues, wetlands and endangered species work, US Army Corps of Engineers permitting, and studies related to license renewal.

Q4: What is the purpose of your testimony?

A4: The purpose of this testimony is to describe the environmental issues and the potential adverse impacts to land and wildlife resources that would arise if a dry cooling system is utilized at Vogtle Units 3 and 4. Moreover, based on these impacts, I testify that dry cooling is not a feasible alternative for Vogtle Units 3 and 4. Finally, I discuss why wet cooling should be used at the Vogtle site.

I also note that I have submitted testimony on behalf of SNC regarding Environmental Contention – EC 1.2. In that testimony, I testify regarding preparation of the ER as part of the ESP application for Vogtle Units 3 and 4.

Q5: Have you reviewed Mr. Jim Cuchens' testimony?

A5: Yes. I have reviewed his testimony and the report entitled, "Feasibility of Air Cooled Condenser Cooling System for the Standardized AP1000 Nuclear Plant." (*See Exhibit SNC000024*).

Q6: What are your determinations after reviewing this testimony?

A6: The use of dry cooling at Plant Vogtle would create problems with engineering, construction feasibility, economic, and other issues cited by Mr. Cuchens in his testimony. In addition, dry cooling would produce a number of significant adverse land use, environmental, ecological, and aesthetic impacts. These factors, in addition to the technical reasons noted in Mr. Cuchens' testimony, demonstrate that dry cooling is not a feasible alternative for the proposed new units at Vogtle.

Q7: What other factors should be considered when determining the feasibility of dry cooling?

A7: There are environmental issues that should be considered as reasons why dry cooling technology is not a feasible alternative for Vogtle Units 3 and 4, including land use, ecological, and aesthetic impacts.

Q8: Are there detrimental impacts that could result from the use of dry cooling?

A8: Yes. Given that the proposed dry cooling tower footprint would require substantial portion of the undeveloped acreage at the Vogtle site, there would be significant land use, environmental, ecological, and aesthetic impacts.

Q9: How much land would dry cooling towers occupy?

A9: In accordance with the testimony provided by Mr. Cuchens, the actual dimensions of an ACC for the AP1000 is estimated as 2700 feet by 300 feet. The ACC must be oriented with the prevailing wind perpendicular to the longitudinal axis of the ACC. Based on discussions with cooling tower vendors, a minimum distance of 600 feet between the unit 3 and unit 4 towers would be required to prevent plume recirculation. In addition, a minimum of 600 feet of clearance would be required on each side of the towers to prevent interference with the wind approach to the towers and to allow for construction access and for maintenance after construction. Moreover, clearance of 500 feet is recommended on the tower ends. These conditions result in a minimum footprint of 7200 feet by 1500 feet. This results in a footprint of 248.9 acres. Exhibit SNC000040 is a depiction of the dry cooling towers on the Vogtle site.

Q10: How would this impact the available land at the Vogtle site?

A10: The Vogtle site contains a total of 3169 acres, with over 800 acres associated with the Unit 1 and Unit 2 power block, cooling towers, intake, switchyard, and ancillary areas and

Plant Wilson. The Vogtle site was originally a four-unit site and much of the area associated with the proposed new units will be located in areas that have already been excavated to plant grade and are currently in planted pine or grasses. This area is not large enough to support the dry cooling option. Therefore, dry cooling towers would have to be constructed in an undeveloped area.

Q11: How does this compare to the wet cooling towers proposed for Vogtle Units 3 and 4?

A11: The proposed natural draft cooling towers for the closed cycle wet cooling system will occupy approximately 70 acres of the 310 acre footprint of the Vogtle Units 3 and 4 site. The dry cooling option would require three times the land area. Therefore, this would require use of undisturbed areas of the site.

Q12: Where are the undeveloped areas on the Vogtle site that would be impacted?

A12: Based on the review of the site for potential dry cooling locations, there is only one area that could be utilized. This area is located in the undeveloped north/northeast portion of the site. This area is wooded, includes Mallard Pond, and is drained by a small unnamed creek.

Q13: Please describe Mallard Pond.

A13: Mallard Pond is a spring-fed pond located in an undeveloped, natural area in the north part of the site that drains through a wetland area to the Savannah River. The ESP for Vogtle was developed with controls in place to continue to protect the Mallard Pond area. This pond and the surrounding area provide important habitat diversity and wetlands support for the site. The pond was present when the site was originally purchased and has been maintained and protected from construction impacts since that time.

Q14: How will these undeveloped areas be affected by the footprint of the dry cooling towers?

A14: The types of impacts that would occur include: clearing and grubbing of land, including removal of a large number of trees; cut and fill to produce a flat area to support construction; re-routing and reconstruction of site drainage features including the Mallard Pond drainage; and the potential removal of Mallard Pond. Significant impacts to this area from construction activities and runoff could have serious impact on wildlife habitat and mitigation would obviously be required in the event the pond was significantly impacted. In addition, the amount of area disturbed from the construction of a dry cooling system would be substantial. *See Exhibit SNC000040.*

Q15: Would these undeveloped areas be impacted by the natural draft (wet) cooling towers?

A15: No. The natural draft towers would be located in an area that was previously disturbed during the construction of Unit 1 and Unit 2.

Q16: Would any sensitive species be affected by the construction and footprint of the dry cooling towers?

A16: Yes. The southeastern pocket gopher is known to reside in upland areas of dry, sandy soil or well-drained, fine-grained gravelly soil. Surface mounds indicative of the presence of the pocket gopher have been observed in the property bordering the northern part of the Vogtle site, near Mallard Pond, which includes the area where the dry cooling towers would be constructed. The southeastern pocket gopher is a “state threatened” species in Georgia, and it was added to Georgia’s list of protected species in October of 2006. *See Exhibit SNC000041.* In addition, there is currently at least one American alligator resident in Mallard Pond. The

American alligator is a Federal threatened species due to the similarity of its appearance with the American crocodile, which is a Federally-listed endangered species. *See* Exhibit SNC000042.

Q17: Are these species affected by the wet cooling towers?

A17: No. The habitat that supports these species does not occur in the area where the wet cooling towers will be constructed.

Q18: How much power is required to operate the dry cooling towers verses the wet cooling towers?

A18: Approximately 80 MWe would be required for station service to provide power to the dry cooling tower fans and other electrical loads and to compensate for efficiency losses that must be provided by a base load power source.

Q19: What impacts would result from this need for additional power?

A19: The additional station service requirements of a dry cooling system, in comparison to the proposed wet cooling system, would produce significant environmental concerns. Additional base load capacity would be required to offset station service needs, which would create significant impacts to the air, water, land use and ecology. In my judgment, this source of power would be either coal or nuclear. The coal source would result in significant air emissions. Assuming a bituminous coal source, 81 MWe would result in emission of approximately 300 tons of SO₂, 209 tons of NO_x, 7 pounds of Mercury, and 61,000 tons of CO₂ each year.

There would also be thermal and chemical impacts to water, and potentially wetland, ecological and other land use impacts. There would also be consumptive use of water of approximately 40 cfs. Mr. Cuchens' testimony also indicates a significant loss of efficiency associated with turbine back pressure and other engineering issues that could result in additional

power losses requiring offset. Additional air emissions would be associated with this additional power need further exacerbating this impact.

Q20: What other factors must be considered?

A20: The National Environmental Policy Act (NEPA) requires analyses of all reasonably foreseeable environmental impacts of new plant construction, which includes aesthetic impacts of major structures such as cooling towers. Due to the extremely large amount of land required, as well as the physical size of the dry cooling towers, the aesthetic impact would be significant.

Q21: Please elaborate on the potential aesthetic impacts?

A21: In the best case, even if Mallard Pond is not physically impacted, the isolated, serene nature of the pond and surrounding area will be severely altered by the view of the large dry cooling towers in the background when looking west. In addition to the visual impacts, there will be an increase in noise levels around Mallard Pond. Although the levels have not been quantified at this time, it is believed that they would be similar to wet mechanical draft cooling towers. Studies would be required to quantify the impact of noise and controls could be required dependent on the levels observed.

Q22: Would the dry cooling towers be visible from outside of the plant site?

A22: Yes. The dry cooling towers necessary to accommodate two AP1000 units would have a very large footprint on the site and would be visible from River Road. It would also be visible from most of the areas bordering the site and from the natural areas in the vicinity of Mallard Pond. In addition, the dry cooling towers would be visible from the Savannah River along much of the area where the river borders the site and from areas where transmission lines

intersect the road and/or river. This negative aesthetic impact must also be considered for the dry cooling application.

Q23: What are your conclusions and recommendations?

A23: As I stated previously, the testimony provided by Mr. Cuchens clearly demonstrates that dry cooling is not feasible as an alternative cooling technology for Vogtle Units 3 and 4 based upon engineering, construction feasibility, economic, and experience-based reasons. When considering these factors in addition to the negative environmental impacts discussed above, I agree with Mr. Cuchens that dry cooling is not feasible for use at Vogtle Units 3 and 4. My recommendation is that wet cooling technology should be implemented for Vogtle Units 3 and 4.

Q24: Are true, accurate and correct copies of each of the exhibits heretofore referenced in your testimony attached to this pre-filed written testimony, and do they accurately portray the facts they purport to portray?

A24. Yes, except for Exhibit SNC000014, which is attached to my testimony regarding Environmental Contention 1.2, and Exhibit SNC000024, which is attached to the testimony of James W. Cuchens.

Q25: Does this conclude your testimony?

A25: Yes.

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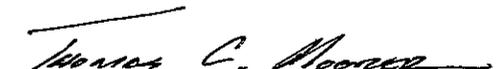
BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)	Docket No. 52-011-ESP
)	
Southern Nuclear Operating Company)	ASLBP No. 07-850-01- ESP-BD01
)	
(Early Site Permit for Vogtle ESP Site))	March 11, 2009

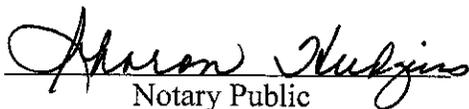
AFFIDAVIT OF THOMAS C. MOORER IN SUPPORT OF SOUTHERN NUCLEAR'S
REVISED DIRECT TESTIMONY ON ENVIRONMENTAL CONTENTION 1.3

I, Thomas C. Moorer, do hereby state as follows:

1. I have read the foregoing prepared testimony regarding environmental matters at the Plant Vogtle Site.
2. I attest to the accuracy of those statements, support them as my own, and endorse their introduction into the record of this proceeding. I declare under penalty of perjury that those statements, and my statements in this affidavit, are true and correct to the best of my knowledge, information and belief.


Thomas C. Moorer

Subscribed and sworn to before me
this 10 day of March, 2009.


Notary Public

My commission expires 6-9-09