

September 10, 2007

Mr. John S. Clarke, Assistant Director
Georgia Water Science Center
U.S. Geological Survey
Peachtree Business Center, Suite 130
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Atlanta, GA 30360-2824

SUBJECT: NRC STAFF REVIEW OF "SIMULATION AND PARTICLE-TRACKING ANALYSIS OF SELECTED GROUND-WATER PUMPING SCENARIOS AT PLANT VOGTLE, BURKE COUNTY, GEORGIA", TASK ORDER 2, CONTRACT Q-4109/J-3332, PLANT VOGTLE GROUNDWATER PUMPING ANALYSIS

Dear Mr. Clarke:

The U.S. Nuclear Regulatory Commission (NRC) staff has reviewed the draft of the report, "Simulation and Particle-Tracking Analysis of Selected Ground-Water Pumping Scenarios at Plant Vogtle, Burke County, Georgia" by G.S. Cherry and J.S. Clarke. This work was performed under Task Order 2, Contract Q-4109/J-3332, "Plant Vogtle Groundwater Pumping Analysis." Enclosed are the staff's comments on the subject draft report.

If you have any questions or comments concerning the staff's review, please contact me at 301-415-3053 or via email mdn@nrc.gov.

Sincerely,

/RA/

Mark D. Notich
Environmental Project Manager
Division of Site and Environmental Reviews
Office of New Reactors

Docket No: 52-011

Enclosure: As stated

cc w/encl: See next page

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DATE	09/04/2007	09/06/2007	09/10/2007

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Letter to John S. Clarke from Mark D. Notich dated: September 10, 2007

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**NRC Staff Review Comments on
“Simulation and Particle-Tracking Analysis of Selected
Ground-Water Pumping Scenarios at Plant Vogtle, Burke County, Georgia”
By Gregory S. Cherry and John S. Clarke, USGS
Task Order 2, Contract Q-4109/J-3332, “Plant Vogtle
Groundwater Pumping Analysis.”**

1. Make a global editing change by replacing “Plant Vogtle” with “the VEGP Site” throughout the document to establish consistency with the DEIS.
2. The NRC needs a copy of each reference for inclusion in the Agencywide Document Access and Management System (ADAMS).
3. Page 8, line 3; the 5147 sq mi area is described as 4455 sq mi on page 10; much later in the paper the 4455 sq mi area is noted as the grid region. Reconcile these numbers and descriptions throughout the document.
4. Page 8, end of 2nd paragraph; it would be good to note the substantial changes occurred in the vicinity of SRS wells and not the VEGP Site wells.
5. Page 9, line 3; Change “puming” to “pumping”.
6. Page 10, 2nd paragraph; Please note the origin of data (on screened intervals) that led to assigning pumping to lower Dublin, and upper and lower Midville aquifers. The best information that the staff is aware of is from the FSAR of 2003 that indicates the applicant draws water from aquifer zones below a depth of 450 ft at well TW-1. This report is more specific about the screened intervals, but the source is not mentioned.
7. Page 12, end of first paragraph; Add remarks regarding the level of contamination currently observed in the Gordon, Dublin and Midville aquifers underlying SRS, and the presence/absence of an upward hydraulic gradient which would protect the deeper confined aquifers from contamination in the Upper Three Runs aquifer.
8. Page 19, Section entitled “Simulation of Ground-Water Flow”; this section needs a paragraph describing or pointing (in references) to the geohydrologic data (hydraulic conductivity, porosity, effective porosity, etc.) employed in the aquifer model as well as the pathline/travel time predictions. If a set of general values were used for a given strata, they should be shown in a table. If a single value of effective porosity is used in the calculation of velocities and travel times, it should be noted.
9. Page 20, 2nd paragraph; the staff expected some note as to why these three layers (5, 6, and 7) were assigned a specified head boundary condition. Was it because any boundary value problem needs to have some Dirichlet boundary conditions in order to fix the solution in space, (i.e., a problem solved with all Neuman boundary conditions will have a correct shape but can float in space and

- present an infinite number of solutions)? Or, was it found beneficial to set these boundaries in order to match the influence of the Savannah River, the position “saddles” seen in the field data, and the groundwater flow to erosional windows into the Savannah River alluvium.
10. Page 20, last partial paragraph; were site-specific pumping data assigned to specific well locations in the model? How and/or where were “county-aggregate” pumping distributions applied in the model?
 11. Page 23, overall comment; Add plots showing the comparison of 2002 field observations (Figures 5-8) versus the results of the model in 2002? This would make more clear those areas or regions of the model that do not compare especially well, e.g., the P-19 cluster. This could also help one understand how the hypothesized channel features in Burke County could lead to an improved match.
 12. Page 25, 1st paragraph; A pointer to the “results of model simulations for 2002 are presented in Cherry (2006)...” is probably needed in the preceding section. The following comment belongs in that preceding section on the simulation of groundwater flow. The staff looked at the plots in Cherry (2006) and note that it appears that use has been made of river cells in the Gordon aquifer strata over an area including the large erosional window and extending all the way downriver to the small erosional window aligned with the Pen Branch Fault. Why was the small erosional window not modeled as an isolated window to the alluvial material of the river? The staff assumes better model results were achieved.
 13. Page 23, general; is there a metric like the match between observed and modeled approximate location of the saddle in each aquifer (below the SRS and Vogtle) that would indicate a reasonable model match? Some additional statements are needed regarding the match or calibration achieved between the 2002 observed setting and the 2002 simulated hydrologic condition.
 14. Page 26, line 4; Delete “ranging from” and insert “somewhat more than,” and insert “respectively” after “0.5 ft.”
 15. Page 26, last line; The 12 production wells at the SRS need to be shown on one or more figures. Including them on Figure 1B along with other wells drawing groundwater from the Dublin and Midville aquifer systems would be good. They could be shown on Figures 7 and 8 also.
 16. Page 27, 4th - 5th line; Delete “as much as 4-6” and insert “greater than 4 to 6.”
 17. Page 27, 5th line; Delete “6-8” and insert “greater than 6 to 8.”
 18. Page 27, 11th line; Insert “greater than” before “2 ft.”
 19. Page 28, 16th line; Insert “greater than” before “2 ft.”
 20. Page 28, 16th line; Insert “greater than” before “1 ft.”

21. Page 30, closing sentence of 1st full paragraph; Append to the sentence; "... because it has not been substantiated by field investigations."
22. Page 31, 16th line; Insert "less than" before "-0.5 to -2.0 ft."
23. Page 31, 16th line, Insert "less than" before "-0.5 to -8 ft."
24. Page 31, 19th line, Insert "greater than" before "0.25 to 1 ft."
25. Page 31, last line; Following the first sentence insert the following: "This scenario, while not proposed by the applicant and not viewed as plausible for long-term operation of proposed Vogtle Units 3 and 4, does illustrate the pumping rates necessary to draw groundwater from South Carolina to the Vogtle Site production wells, and does indicate the likely origin of such groundwater in South Carolina."
26. Page 32, 6th line; Delete "as much as 4-6 ft" and insert "greater than 4 to 6 ft."
27. Page 32, 6th line; Delete "6-8" and insert "greater than 6 to 8."
28. Page 32, 9th line; Insert "greater than" before "2 ft."
29. Table 2; Not clear where the footnote applies or whether it applies, i.e., "Now called MU-5."
30. Table 4; Need a footnote to the effect "Southern Nuclear Company has noted that the high pumping rates during startup of Units 1 and 2 were related to achieving water quality criteria, and not to groundwater demand by the facilities. Water treatment methods are now used to achieve the water quality criteria and have greatly reduced groundwater pumping rates."
31. Figure 1B; Show well locations drawing groundwater from the Dublin and Midville aquifer systems in the region shown; especially SRS wells and wells near Vogtle like the water supply well(s) in Waynesboro (if they are in this figure).
32. Figure 6; Under "Potentiometric contour" delete "Upper Three Runs" and insert "Gordon."
33. Figure 7; Under "Potentiometric contour" delete "Upper Three Runs" and insert "Dublin," also suggest showing the location of pumped wells in this region on this figure.
34. Figure 8; Under "Potentiometric contour" delete "Upper Three Runs" and insert "Midville"; also suggest showing the location of pumped wells in this region on this figure.
35. Figure 17; the maximum delta contour label (4) need to be better aligned.
36. Figure 19; the contour labels for "3" and "4" need to be better aligned.

37. Figure 20; the contour labels for “3” and “4” need to be better aligned (or is it “4” and “8”?).

38. Figure 21; the contour labels for “4” and perhaps “6” need to be better aligned.

39. Figure 22; the contour label for “4” needs to be better aligned.

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