Notes on the discussion of (RAIs)
July 16, 2008

Hydrology

RAI Number	Question Summary (RAI)	Full Text (supporting information)
2.3-2	Provide statements that reconcile the statements describing the pores, joints, bedding planes, and the description of the model (i.e., "equivalent porous media" versus "karst") in the ER and those in FSAR Section 2.5. *Charley Kincaid and the TVA hydrologist discussed the RAI and agreed that the relationship between the equivalent porous media model and the karst system needs to be described. Clarification is needed that the text / info in the FSAR Section 2.5 is consistent with the ER Section 2.3. A description of the relationship between the two is needed. An explanation of how the FSAR statement "a karst model was developed by TVA for the BLN site..." dovetails with the development and use of a groundwater model based on the equivalent porous media concept is needed.*	Section 2.3.1.5.4, page 2.3-24. Groundwater Occurrence and Usage. There is considerable discussion of the enlarged joints and fractures, e.g., "…most water producing fractures, both in the epikarst and bedrock aquifers are solutionally enlarged joints and bedding plane fractures." Later in Section 2.3.1.5.6, page 2.3-28, the applicant states the karst system includes "poorly integrated pores, joints, and tubes most with soil or clay fill." However, in FSAR Section 2.5.4.1.3 the following statements are made, • "A karst model was developed by TVA for the BLN site …" • "In the TVA model groundwater flow at the BLN site occurs within three different stratigraphic horizons… • "Water moves through rock via an integrated system of conduits following solutionally enlarge joints and bedding plane features." How do these two descriptions (i.e., ER and FSAR 2.5) of the system compare to the conceptual model of the system adopted for analysis and the mathematical representation of travel times reported later in the application.

RAI Number	Question Summary (RAI)	Full Text (supporting information)
2.3-4	Provide the reference source and the laboratory or field data for the hydraulic properties used to represent the backfill material. *Charlie Kincaid indicates this information is needed to support the background information (horizontal conductivity) that was provided in response to H-07 and H-08. NOTE: These will be old documents that may not meet ADAMS document standards, but the best available copies will be made available at NuStart's contractor's offices in WA for audit.*	

RAI Number	Question Summary (RAI)	Full Text (supporting information)
3.3-1	With respect to Table 3.6-1, describe the seasonal variation in chemical usage. Table 3.6.1 refers to an algaecide in the CWS. It does not refer to a molluskicide. Is a separate molluskicide used? If so what is the amount used per year, the frequency of use and the concentration in the waste stream for both the CWS and the SWS? *The discussion on July 16 clarified that the response needs to address:* *1) There are apparent conflicting statements in earlier response to Question ER-60 in ER Ltr. 01 (pgs. 86 & 87). Is there a seasonal variation or not in the use of these chemicals?* *2) Discrepancy between Table 3.6-1 and Section 5.2.2.2.1 on algaecide and molluskicide.*	Section 5.2.2.2.1 lists both an Algaecide (quaternary amine) and a Molluskicide (quaternary amine). Table 3.6-1 shows only an Algaecide.

RAI Number	Question Summary (RAI)	Full Text (supporting information)
5.2-1	Using a figure, identify the on-site area or areas that may be used for dredged material deposition. *In the discussion PNNL indicated that if the only information we have is that the disposal areas will be somewhere between the 500-yr flood contour and construction APE, the worst possible location within that region will need to be selected for analysis and this may result in a greater impact than will actually occur and so will be greater than TVA and others would want to see described in the report. By providing a more specific location, a more realistic and we anticipate a lower impact may be attributed to this action.*	Section 5.2.2 Water-Use Impacts. [also relevant to Section 5.2.1.6 Operational Activities, Section 5.5.1 Nonradioactive Waste Systems Impacts, and Section 6.3 Hydrological Monitoring] Assuming a figure is used to identify the on-site disposal area, also show the 500-yr flood elevation.

RAI Number	Question Summary (RAI)	Full Text (supporting information)
5.2-5	Provide a description of all nine CORMIX cases analyzed to understand the potential impact of discharge on the Tennessee River. *During the discussion Charley confirmed that the RAI summary is correct and that we need the description and data associated with an improved or clarified definition of the three flow regimes that are key to understanding the reservoir response to the proposed discharge. We need the CORMIX input files and output summaries as described in RAI 5.3-3 item (3), and they need to be docketed in response to RAI 5.2-5 or 5.3-3 as these are related requests.*	Section 5.2.2.8 The text lists and describes six cases; however, nine are described elsewhere. Why were only six described here?

RAI Number	Question Summary (RAI)	Full Text (supporting information)
5.3-2	(1) Provide the CORMIX output files for the ER Rev0 CORMIX analyses. (2) Provide a description and data associated with definition of "reversing river flow", and "maximum reverse river flow", e.g., the river discharge values employed in the analyses. *PNNL explained that in response to this RAI they need the description and data associated with improved or clarified definition of the three flow regimes that are key to understanding the reservoir response to the proposed discharge. This request for CORMIX input files and output summaries is related to the request documented in RAI 5.3-3 item (3), and the response to these two RAIs can be tied together.*	Section 5.3.2.1 Thermal Description and Physical Impacts. Provide the calculation package for all CORMIX runs reported in the application. Include all input and output files. Provide a discussion of how the river flow rates defined by "reversing river flow" and "maximum reverse river flow" were developed and the values adopted. Assuming data are used in the development, where and when was it collected? Include any more recent calculations and results supporting the "reversing river flow" and "maximum reverse river flow" values. (1) existing CORMIX run input – provided at ER Site Audit (2) existing CORMIX run output files (2) discussion of river flow rates and their derivation

RAI Number	Question Summary (RAI)	Full Text (supporting information)
5.3-3	(1) Provide data or an analysis of flow reversal at the Bellefonte site that better characterizes the flow reversal phenomena. Use the existing reservoir operation rules and any future anticipated changes to peaking strategy to evaluate these phenomena. (2) If results of the flow reversal warrant them, provide revised descriptions of the CORMIX runs that characterize the operation of the diffusers. (3) If additional CORMIX simulations are conducted, provide their input and output files. (4) Provide an analysis of the potential for discharge from the diffuser to re-enter the intake canal and be drawn back into the proposed facility. Also analyze the potential for discharge to be drawn into Town Creek. *The discussion of RAI 5.2-5 and 5.3-2 during the conference call are related to this RAI as well and that relationship is indicated in the conference call summary included in those portions of the table.*	Section 5.3.2.1 Thermal Description and Physical Impacts. Describe the process used to select the suite of conceptual models and associated CORMIX simulations presented in the application. Key to this discussion is gaining an understanding of the zero flow phenomena and its influence on the environmental response in Guntersville Reservoir. As Guntersville Reservoir goes through a flow reversal, what is the frequency of the reversal event and the duration of what is essentially zero flow. Provide data on the frequency and duration of flow reversal at the Bellefonte site. What is the relationship among data on discharge from Nickajack Dam (Figure 2.3-6), discharge from Guntersville Dam, and flow reversal at Guntersville Dam? During the ER Site Audit, TVA stated it was able to simulate the Guntersville Reservoir flow to better quantify the flow reversal phenomena at the Bellefonte site.

RAI Number	Question Summary (RAI)	Full Text (supporting information)
5.3-7	(1) Using the Guntersville Dam discharge record, calculate the 7Q10. (2) Using the Nickajack Dam discharge record, calculate the 7Q10. (3) Describe how these values compare to the 7Q10 derived from the South Pittsburg gage *In addition to the 7Q10 determination being performed for the reservoir near the site, this question also asks for 7Q10 at both dams (Guntersville and Nickajack). During the discussion Charlie Kincaid confirmed this is what he needs.*	Provide a calculated 7Q10 based on recent data on discharges from Guntersville Dam and Nickajack Dam and compare it to the 7Q10 presented and employed in the ER, Rev.0.

RAI Number	Question Summary (RAI)	Full Text (supporting information)
2.3.1-1	Provide description of the significant impact Nickajack, Guntersville and Wheeler reservoir have on the BLN plant operations and the impact BLN plant operations have on the reservoirs *We discussed the statement on Page 2.3-14 of the ER that states "Three, large manmade impoundments are located within 100 river mi. of the BLN site. These impoundments can significantly affect or be affected by BLN plant operations". It is not clear to us that the operation of the plant will have a significant impact on these reservoirs and wondered if it is a typo – the statement was meant to say that the operation of the plant will NOT have a significant impact. Are there significant aquatic, hydrologic or other impacts on the reservoirs – additional clarification is needed*	Page 2.3-14 states that "Three, large manmade impoundments are located within 100 river mi. of the BLN site. These impoundments can significantly affect or be affected by BLN plant operations". These impoundments include • Nickajack Reservoir • Guntersville Reservoir • Wheeler Reservoir. Elaborate on the significant impact that BLN could have on these reservoirs as well as the significant affect these reservoirs could have on the BLN plant operations. Address the impacts on water quality and the aquatic organisms.

RAI Number	Question Summary (RAI)	Full Text (supporting information)
5.3.1.2-2	Provide an estimate of the level of entrainment at the BLN site. *In the discussion PNNL commented that the ER states that 5 % of the flow through Guntersville Reservoir is pulled into the intake for Bellefonte. In another location in the ER it says that there is 100% mortality of the ichthyoplankton entrained. Does this mean 5% mortality for all ichthyoplankton in the reservoir? Is there information that would lead to a different conclusion? The NuStart SME indicated that they understood the question.*	The ER provides a description of the intake system and a discussion of the entrainment of ichthyoplankton. It also characterizes the mortality rate from entrainment. However, it does not entrainment quantify the amount of ichthyoplankton entrained as a fraction of the amount of ichthyoplankton occurring in the Guntersville reservoir.

RAI Number	Question Summary (RAI)	Full Text (supporting information)
2.5.3-2	Provide copies of cultural resources survey reports conducted within five miles of the BLN APE up until 2008. *The TVA cultural resources SME indicated that she looked for survey reports up to five miles from the site and that they plan to provide the information to NuStart's Richland office for audit.*	It appears that most to all of these documents were provided (sent to Richland), but upon inspection of site forms provided, one report that originally documents 1JA111, and 1JA113 authored by Dejartte and Dodd (1937) was not cited in ER nor provided in the box of documents sent to Richland. It is not clear if additional more recent surveys have been completed within close proximity of the BLN site since the March 2007 report completed at the BLN site. Are there other recent cultural resources surveys that have been completed within 5 miles of the site?
2.5.3-7	Provide archaeological site records for sites described in Table 2.5-21. *We discussed that this RAI had been satisfied with the exception of a site form for the town of Bellefonte. TVA clarified that no form has been created for the town of Bellefonte. We agreed that stating that fact would be an acceptable answer to this RAI*	Records sent to Richland do not include 1JA302, 1JA348, 1JA462, 1JA463, 1JA533, 1JA609, 1JA978 and form for Bellefonte town, if there is one?

RAI Number	Question Summary (RAI)	Full Text (supporting information)
7.2-2	Identify groundwater pathways that exist for severe accidents? *There was some discussion about two aspects of this RAI.* *1) Are there calculations of how the groundwater pathway affects severe accidents? TVA's response was that it is not a quantitative analysis, it is based on a qualitative analysis; there are no explicit calculations, just text from NUREG-1437. Their response will so indicate.* *2) The second aspect related to the whether the effects of porosity changes identified through other aspects of the Bellefonte application have been applied to severe accidents. Porosity has been updated and provided to NuStart, but not reflected in the severe accident analysis.*	In the severe accident analysis, a discussion of the potential for impacts from the groundwater pathway is requested.

RAI Number	Question Summary (RAI)	Full Text (supporting information)
10.4.1-2	In the discussion of fuel diversity (ER Section 10.4.1.2.2), provide data to indicate TVA's and the region's current and projected fuel mix in electrical power supply system. *During the discussion it was agreed that PNNL reviewers would look at information in ER Chapter 8 to confirm that this satisfies their needs. If so, TVA will likely just be able to indicate that the needed information is available.* *Since the meeting PNNL staff reviewed Chapter 8 and agree that the material included there provides appropriate information on TVA's fuel mix - there is no statement that indicates TVA is the only power provider in the region and if not what the fuel mix is for other providers in the region*	

RAI Number	Question Summary (RAI)	Full Text (supporting information)
2.5.2-1	Provide information (demographic, housing, transportation) describing the neighborhood(s) across Town Creek from the plant site in ER Section 2.5.1.2 or 2.5.2.6. Include a map/graphic of this area at a scale that illustrates the relationship of residences to the plant and transportation routes. *This request has been satisfied by the TVA letter dated July 03, 2008 with the exception of the map requested and providing clarification that the entire area across Town Creek from the plant is included in the analysis, not just the Creeks Edge development.*	These neighborhoods will incur the greatest exposure to plant-related transportation and aesthetic impacts given their proximity to the plant site and their separation from the plant site by open water. These neighborhoods include Creek's Edge subdivision, as well as the older residential neighborhoods and would include Jackson County roads 33 and 113 and Bellefonte Road.

RAI Number	Question Summary (RAI)	Full Text (supporting information)
2.5.2-2	Explain why the data for 2007 in Table 2.5-1 (Current Residential and Transient Population) and Table 2.5-2 (Projected Permanent Population) are identical, and provide corrections, if necessary. *PNNL provided further explanation that the captions need to be consistent with each other or the data in each table needs to represent the data set identified in the caption.*	The numbers are identical for Residential and Transient populations and permanent population in the two listed tables. Is that possible? If not, please provide corrections.
2.5.2-4	Provide additional detail to characterize the transportation network linking the population centers in the project region to the project site in ER Sections 2.5.2.2.2 and 2.5.2.2.3. Include level of service designations in this characterization and description of Jackson County roads 33 and 113 and Bellefonte Road. *This request has been satisfied by the TVA letter dated July 03, 2008*	Characterize the key transportation routes according to the Alabama Department of Transportation functional classification system (freeways, arterials, collectors and local streets) and level of service (LOS) data to support the analysis of impacts to the transportation system and nearby community residents.

RAI Number	Question Summary (RAI)	Full Text (supporting information)
2.5.2-6	Clarify whether and how emergency planning and resources in the study area will be affected by the Watts Bar and Sequoya nuclear power plants. (see discussion in ER Section 2.5.2.3.1) *This request has not been satisfied by the material received to date, particularly the need for information on how these plants affect the need for additional emergency response staff, equipment and facilities in Jackson County.*	
2.5.2-7	Discuss the status of the housing stock in the vicinity of the project since the 2000 Census, including other substantial development projects and expansions. *This request has been satisfied by the TVA letter dated July 03, 2008*	Discuss whether recent changes in the housing stock in the project vicinity could affect the distribution and impact of the construction and operations workforce (see the discussion in ER Section 2.5.2.6, page 2.5-14).

RAI Number	Question Summary (RAI)	Full Text (supporting information)
2.5.2-8	Provide either service ratios or other measures of adequacy (e.g., comparison to national or state standards or averages) or an assessment of adequacy by local officials for key facilities and services in the proximate communities (police, fire, medical, education). *This request has been partially satisfied by the TVA letter dated July 03, 2008 with the exception that clarification is needed that the ratio estimates at the time of peak construction are based on the total population (construction-related population increase plus projected baseline population in that year).*	

RAI Number	Question Summary (RAI)	Full Text (supporting information)
4.4.1-1	Provide a basis for the assumptions used concerning peak construction traffic in ER Section 4.4.1.3 and the frequency of carpooling. Describe the temporal distribution of traffic in more detail and explain whether the analysis reflects that workers will travel both to and from the site each day and that each delivery will involve trucks entering and exiting the site. Provide more detail to support the conclusion concerning U.S. Highway 72 and county roads 33 and 113 and Bellefonte Road, given baseline traffic patterns. Include information about the number and timing of barge traffic to the site and its implications for recreational use of the waterway. *This request has been partially satisfied by the TVA letter dated July 03, 2008 with the exception of providing a reference for the basis of assumptions about carpooling rates for construction and operations workers and accounting for the increase in traffic attributed to factors other than workers and deliveries – for example how traffic will increase due to the influx of worker families.*	ER Section 4.4.1.3 states" During the peak construction period, two staggered shifts of 10 hrs each are scheduled, with a combined workforce of 3000. The number of workers per shift is not known at this time. A conservative estimate of 100 daily truck deliveries is assumed for this analysis….It is also assumed that there is one worker per vehicle and no carpooling is taking place. The total number of vehicles, including deliveries, on the road during the peak construction period is projected at 3100 during the workday."

RAI Number	Question Summary (RAI)	Full Text (supporting information)
4.4.2-1	Throughout the discussion of construction phase impacts, please indicate the temporal progression building toward peak construction workforce and transitioning to the lower operations workforce. *This request has been partially satisfied by the TVA letter dated July 03, 2008 with the exception of explaining how the distinction between "operations" and construction workers during construction is carried through the subsequent calculations (e.g., immigration, commuting, wages, etc.) and clarifying the assumptions underlying those calculations.*	Impacts on community facilities and services as well as transportation are influenced by how fast the workforce and construction activities ramp up and ramp down, as well as how long they remain at peak levels. Please include this information in the assessment discussion.

RAI Number	Question Summary (RAI)	Full Text (supporting information)
4.4.2-2	Clarify what jurisdictional area(s) are included in the calculations of indirect jobs and income and how the employment and income multipliers were determined. Also clarify the relationship between the multiplier effect from construction worker expenditures and from TVA non-workforce purchases. Explain why the indirect jobs and income are being calculated based on the estimate of in-migrating workers rather than the total number of new construction jobs created in Jackson County by the project. *This request has been partially satisfied by the TVA letter dated July 3, 2008 with the exception of explaining how TVA addressed counties that are only partially within the 50 mile radius to clarify how the multiplier was established.*	ER Section 4.4.2.2 states: "The resulting multipliers were used to estimate the number of indirect jobs and expenditure of money in Jackson County, Alabama." However, the next paragraph states: "For every construction worker, an estimated additional 0.423 jobs is created in the region." Previously, the region has been defined as the 50-mile radius. Please clarify the geographic area upon which the multiplier is based is needed as well as the resulting geographic distribution of the indirect jobs and those filling them. This clarification has implications for the Benefit-Cost analysis in ER Section 10.4. Analyses that estimate impacts to Jackson County and to the entire project region separately might provide this clarity.

RAI Number	Question Summary (RAI)	Full Text (supporting information)
4.4.2-3	Please specify the geographic basis of the estimated multiplier of expenditures for materials and services by the project, and clarify the relationship between the multiplier and the total expenditures for materials and services by the plant. (Section 4.4.2.2) *This request has been partially satisfied by the TVA letter dated July 3, 2008 with the exception of explaining how TVA addressed counties that are only partially within the 50 mile radius to clarify how the multiplier was established.*	ER Section 4.4.2.2 states: "At this time annual expenditures within the region for materials and services during construction of the BLN site are not known." In the TVA letter dated May 2, 2008, pages 45 and 46, an estimate of $41 million in regional expenditures for the construction period was provided but no estimate of the multiplier effect of these expenditures was developed. Lacking annual expenditure data, the regional economic effects of plant expenditures could be averaged over the entire construction period (i.e., total expenditures divided by duration of construction in years). Please clarify whether the expenditure estimate is in current or constant dollars.

RAI Number	Question Summary (RAI)	Full Text (supporting information)
4.4.2-5	Clarify how the housing deficit analysis was conducted and provide greater quantification of the expected deficit. ER Section 4.4.2.4. Table 4.4-2 is labeled "Trends in Jackson County Housing Growth" but does not provide housing growth data *This request has been partially satisfied by the TVA letter dated July 03, 2008 with the exception of explaining how the construction of new hotels and similar transient housing is expected to affect this aspect of the analysis.*	Please provide a more detailed specification of the projected housing deficit.
4.4.2-6	Describe the consequences of a deficit in housing, and describe appropriate associated mitigation measures. (ER Section 4.4.2.4) *This request has been satisfied by the TVA letter dated July 3, 2008.*	Discuss the consequences of the rapid increase in housing demand in a deficit market. In addition, the mitigation measures suggested are more appropriate to address transportation/traffic impacts than housing impacts.

RAI Number	Question Summary (RAI)	Full Text (supporting information)
4.4.2-7	Provide a more detailed analysis of the impact on public schools in the project vicinity, including identifying the schools in the geographic area expecting to receive the greatest population impact from the project. Information about the demographics of construction workers and their families would enhance the analysis. Please combine more specific information about the expected school-age population and its geographic distribution with more specific information about the schools in the vicinity and their capacity to respond to the temporary increases. (ER Section 4.4.2.5) *This request has been partially satisfied by the TVA letter dated July 03, 2008 with the exception of describing the expected impacts on the school system.*	Please explain why analysis of percentage increases is based on current population levels rather than on the projected population at the time of the impact. Explain how the discussion of growth addresses not only growth caused by the project, but growth caused by the project on top of projected baseline growth.

RAI Number	Question Summary (RAI)	Full Text (supporting information)
4.4.3-1	Clarify the basis for excluding the minority population across Town Creek from the site from further consideration for impacts, including those caused by housing demand and traffic as well as noise and air quality impacts. (ER Section 4.4.3) *This request has been partially satisfied by the TVA letter dated July 03, 2008 with the exception of making it clear that the analysis has included all of the residents across Town Creek from the plant – not just the residents of Creeks Edge.*	

RAI Number	Question Summary (RAI)	Full Text (supporting information)
5.8.1-1	Provide more detail about the traffic patterns during the periods of construction and operation overlap, normal operation (clarify shift vehicle counts), and outages, and correct the analysis as necessary. Provide estimates of the number of outage workers and shift patterns. Clarify why assumptions about carpooling for operations workers differ from those for construction workers. (ER Section 5.8.1.2). *This request has been partially satisfied by the TVA letter dated July 03, 2008 with the exception of explaining why the assumptions made for the behavior of carpooling operations workers are expected to be different that the carpooling behavior of construction workers.*	
5.8.1-2	Include a more detailed description of the plumes and their aesthetic impacts. (ER Section 5.8.1.3). *This request has been satisfied by the TVA letter dated July 03, 2008.*	

RAI Number	Question Summary (RAI)	Full Text (supporting information)
5.8.2-1	Please clarify the analysis of indirect and induced jobs and income (i.e., the multiplier analysis) and confirm that the approach is consistent with the approach in ER Section 4.4.2.2. Include outage worker employment and income in the multiplier estimates. Include the multiplier effect of operations nonlabor expenditures, and clarify the geographic areas of analysis and the basis for their selection. (ER Section 5.8.2.2) *This request has not been satisfied by the TVA letters received to date. In particular it is not clear whether the "operations" workers on site during construction are treated as construction or operations workers with respect to their multiplier effect.*	In the TVA letter dated May 2, 2008, pages 45 and 46, an estimate of $550K in regional expenditures for the construction period was provided but no estimate of the multiplier effect of these expenditures was developed. Clarify whether these expenditures are expected to occur in Jackson County (i.e. "local") or in the larger region (including Huntsville and Chattanooga). Clarify whether this estimate includes outage expenditures and whether the expenditure estimate is in current or constant dollars.

RAI Number	Question Summary (RAI)	Full Text (supporting information)
8.2.2-1	Provide the updated Need for Power assessment incorporating Watts Bar II. *This request has been satisfied by the TVA letter dated May 30, 2008.*	Describe how the recent decision to proceed with Watts Bar II as a TVA resource in the region is reflected in TVA's Need for Power analysis.

RAI Number	Question Summary (RAI)	Full Text (supporting information)
10.4.1-2	In the discussion of fuel diversity (ER Section 10.4.1.2.2), provide data to indicate TVA's and the region's current and projected fuel mix in electrical power supply system. *During the discussion it was agreed that PNNL reviewers would look at information in ER Chapter 8 to confirm that this satisfies their needs. If so, we will likely just be able to indicate that they have the needed info.* *Since the meeting PNNL staff reviewed Chapter 8 and agree that the material included there provide appropriate information on TVA's fuel mix - there is no statement that indicates TVA is the only power provider in the region and if not what the fuel mix is for other providers in the region*	